

User Guide

Amazon Q Developer



Amazon Q Developer: User Guide

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What is Amazon Q Developer?

Note

Powered by Amazon Bedrock: Amazon Q Developer is built on Amazon Bedrock and includes [automated abuse detection](#) implemented in Amazon Bedrock to enforce safety, security, and the responsible use of AI.

Amazon Q Developer is a generative artificial intelligence (AI) powered conversational assistant that can help you understand, build, extend, and operate AWS applications. You can ask questions about AWS architecture, your AWS resources, best practices, documentation, support, and more. Amazon Q is constantly updating its capabilities so your questions get the most contextually relevant and actionable answers.

When used in an integrated development environment (IDE), Amazon Q provides software development assistance. Amazon Q can chat about code, provide inline code completions, generate net new code, scan your code for security vulnerabilities, and make code upgrades and improvements, such as language updates, debugging, and optimizations.

Amazon Q is powered by [Amazon Bedrock](#), a fully managed service that makes foundation models (FMs) available through an API. The model that powers Amazon Q has been augmented with high quality AWS content to get you more complete, actionable, and referenced answers to accelerate your building on AWS.

Note

This is the documentation for Amazon Q Developer. If you are looking for documentation for Amazon Q Business, see the [Amazon Q Business User Guide](#).

Get started with Amazon Q Developer

To quickly get started using Amazon Q, you can access it in the following ways:

AWS apps and websites

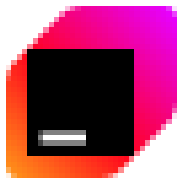
Add the [necessary permissions](#) to your IAM identity, and then choose the Amazon Q icon to start chatting in the AWS Management Console, AWS Documentation website, AWS website, or AWS Console Mobile Application. For more information, see [Using Amazon Q Developer on AWS apps and websites](#).

IDEs

Download the Amazon Q extension and use your AWS Builder ID (no AWS account required) to sign in for free.



[Download Amazon Q in Visual Studio Code](#)



[Download Amazon Q in JetBrains IDEs](#)



[Download Amazon Q in the AWS Toolkit for Visual Studio](#)



[Download Amazon Q in Eclipse IDEs \(Preview\)](#)

From your IDE, choose the Amazon Q icon to start chatting or initiate a development workflow. For more information, see [Installing the Amazon Q Developer extension or plugin in your IDE](#).

Command line

Download Amazon Q for command line for [macOS](#)

Download Amazon Q for command line for [Linux Appliance](#)

Download Amazon Q for command line for [Ubuntu](#)

For more information, see [Using Amazon Q Developer on the command line](#).

Amazon Q Developer in chat applications

Add the [AmazonQDeveloperAccess](#) managed policy to your IAM identity and channel guardrails for Microsoft Teams or Slack applications. For more information, see [Chatting with Amazon Q Developer in chat applications](#).

Amazon Q Developer pricing

Amazon Q Developer is available through a Free tier and the Amazon Q Developer Pro subscription. For more information, see [Amazon Q Developer pricing](#).

Amazon Q Developer features

Amazon Q Developer is available across AWS environments and services, and also as a coding assistant in third party IDEs.

Many of Amazon Q Developer's capabilities exist in a chat interface, where you can use natural language to ask questions about AWS, get help with code, explore resources, or troubleshoot. When you chat with Amazon Q, Amazon Q uses the context of your current conversation to inform its responses. You can ask follow-up questions or refer to its response when you ask a new question.

Other Amazon Q Developer features are available as a part of your workflows in AWS service consoles and supported IDEs. The following sections explain the different features of Amazon Q Developer that you might encounter across your AWS experience.

Analytics

Summarizing your data

With Amazon Q QuickSight, you can utilize the Generative BI authoring experience, create executive summaries of your data, ask and answer questions of data, and generate data stories.

For more information, see [Using Generative BI with Amazon Q QuickSight](#) in the *QuickSight User Guide*.

Management and governance

Exploring nodes using text prompts

Using AWS Systems Manager and Amazon Q, you can ask natural language questions about your managed nodes or instances. Amazon Q then uses the Systems Manager `ListNodes` action and creates filters based on your textual input to retrieve results.

For more information, see [Exploring nodes using text prompts in Amazon Q](#) in the *AWS Systems Manager User Guide*.

Investigating operational issues

Amazon CloudWatch investigations enhance your ability to investigate and analyze resources, events, and activities across your AWS environment. By leveraging natural language processing, Amazon Q simplifies the process of understanding complex scenarios and relationships within your AWS account.

Amazon Q Developer now helps you accelerate CloudWatch investigations across your AWS environment. Q looks for anomalies in your telemetry, surfaces related signals for you to explore, identifies potential root-cause hypothesis, and suggests next steps to help you remediate issues faster.

By integrating Amazon Q into your investigative workflows, you can accelerate problem solving, enhance your understanding of your AWS environment, and make more informed decisions about your infrastructure and applications.

For example questions to ask Amazon Q in the context of Amazon CloudWatch investigations, see [Chatting about your telemetry and operations](#).

For more information about CloudWatch investigations in general, see *CloudWatch investigations* in the [Amazon CloudWatch User Guide](#).

Taking inventory of your AWS resources

You can ask Amazon Q about your specific AWS account resources from anywhere in the AWS Management Console. You might not know where to locate relevant information about your resources, or you might be in one service console and want to access information about another service's resources without disrupting your workflow.

Amazon Q Developer answers your natural language questions about resources and provides deep links to those resources so you can quickly find them. You can ask Amazon Q to list a type of resource in your account, for details about a specific resource, or to list resources based on a criteria such as region or state.

For example, you may want to know how many Amazon EC2 instances you currently have running. In that case, you can ask Amazon Q your question in natural language, and it will provide an answer based on your specific resources.

For more information, see [Chatting about your resources with Amazon Q Developer](#).

For information about specific limits for each type, and how they relate to pricing for specific subscription package, see [Amazon Q Developer pricing](#).

Use Amazon Q in the AWS Console Mobile Application

Amazon Q is integrated with the AWS Console Mobile Application to answer questions about AWS. You configure access the same way that you get access to Amazon Q in the AWS Management Console. For more information, see [Getting started with Amazon Q Developer](#).

Diagnosing console errors

In the AWS Management Console, Amazon Q Developer can diagnose common errors you receive while working with AWS services, such as insufficient permissions, incorrect configuration, and exceeding service limits.

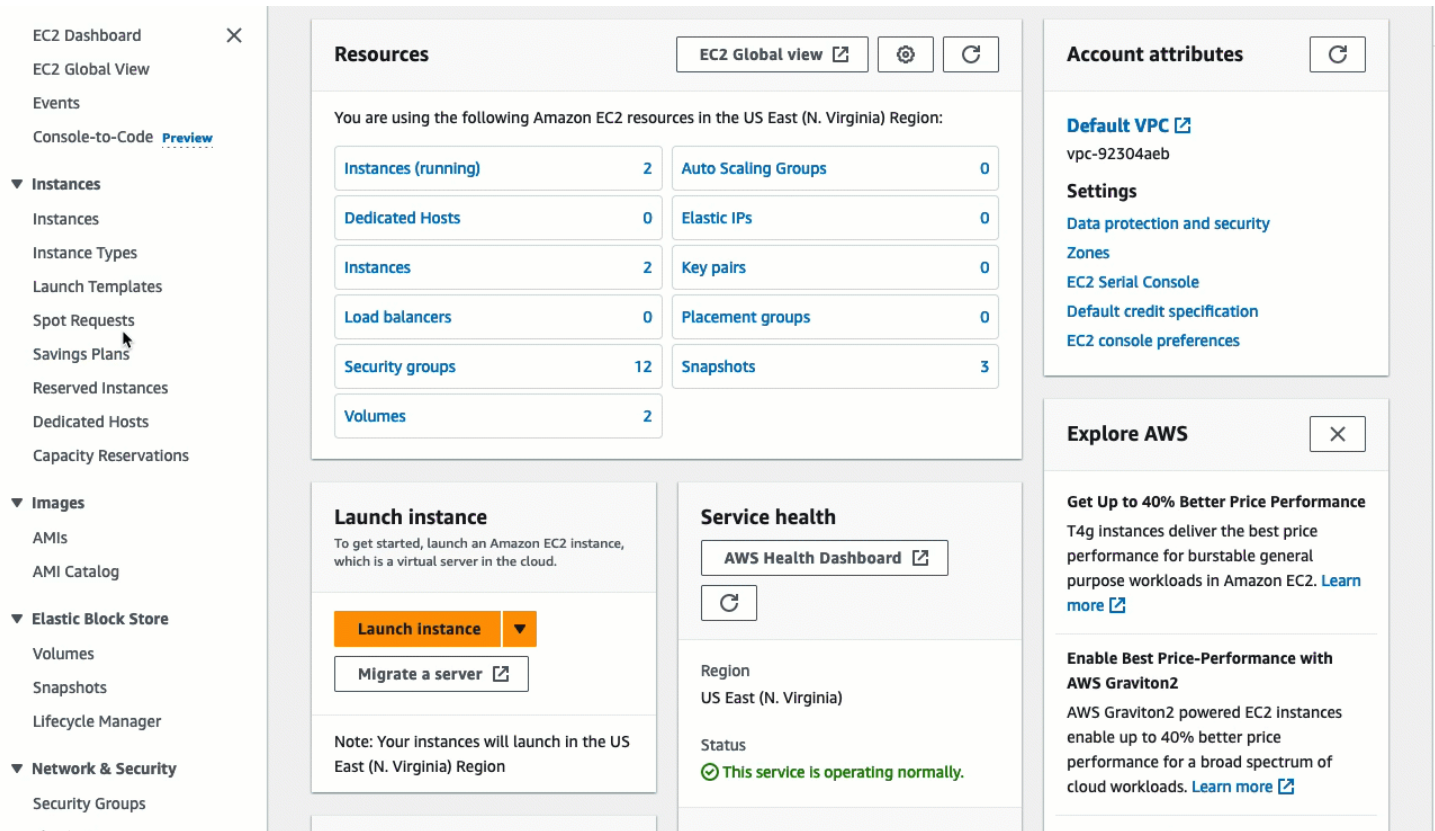
For more information, see [Diagnosing common errors in the console with Amazon Q Developer](#).

Compute

Choosing Amazon Elastic Compute Cloud instances

With so many Amazon EC2 instance types available, finding the right instance types for your workload can be time-consuming and complex. The Amazon Q instance type selector considers your use case, workload type, CPU manufacturer preference, and how you prioritize price and performance, as well as additional parameters that you can specify. It then uses this data to provide suggestions and guidance for Amazon EC2 instance types that are best suited to your new workloads.

For more information, see [Get recommendations from Amazon EC2 instance type finder](#) in the *Amazon Elastic Compute Cloud User Guide*.



Databases

Writing database queries with natural language

Amazon Q generative SQL uses generative AI to analyze user intent, query patterns, and schema metadata to identify common SQL query patterns directly within Amazon Redshift, accelerating the query authoring process for users and reducing the time required to derive actionable data insights.

For more information, see [Interacting with Amazon Q generative SQL](#) in the *Amazon Redshift Management Guide*.

Networking and content delivery

Analyzing network troubleshooting

You can use Amazon Q to help you diagnose network connectivity issues for applications that run in your Amazon VPCs. Amazon Q network troubleshooting can understand natural language

queries, and works with Reachability Analyzer to provide relevant responses. With Amazon Q, you can ask network reachability questions in a conversational format.

For more information, see [Amazon Q network troubleshooting for Reachability Analyzer](#) in the *Amazon VPC Reachability Analyzer Guide*.

Security, Identity, & Compliance

Analyzing network security configurations (preview)

You can easily get answers, in natural language, to questions about your network security configurations from AWS Shield network security director. Amazon Q helps you analyze your network security findings and provides recommended remediation steps in the console and chat applications. For more information, see [Analyze network security with Amazon Q Developer](#) in the *AWS Shield network security director Developer Guide*.

Developer tools

Ask Amazon Q Developer questions about building at AWS and for assistance with software development. Amazon Q can explain coding concepts and code snippets, generate code and unit tests, and improve code, including debugging or refactoring.

Developing code features

After you explain, in natural language, the feature that you want to develop, Amazon Q can use the context of your current project to generate an implementation plan and the accompanying code. Amazon Q can help you build AWS projects or your own applications. For more information, see [Developing features with Amazon Q Developer](#).

Getting inline code suggestions

Amazon Q provides you with code recommendations in real time. As you write code, Amazon Q automatically generates suggestions based on your existing code and comments. For more information, see [Generating inline suggestions with Amazon Q Developer](#).

Chatting about code in IDEs

Within integrated development environments (IDEs), Amazon Q can answer questions related to the software development process, including conceptual questions about programming and how

specific code works. You can also ask Amazon Q to update and improve code snippets from the chat panel. With multi-language support, you can chat with Amazon Q in any of the supported natural languages, including English, Mandarin, French, German, Italian, Japanese, Spanish, Korean, Hindi and Portuguese, with more languages available. For more information, see [Chatting with Amazon Q Developer about code](#).

To write code and get development assistance in the most full-featured environment with Amazon Q Developer, see [Using Amazon Q Developer in the IDE](#).

To enable basic code completion functionality in other interfaces across AWS, see [Generating inline suggestions in AWS coding environments](#).

Reviewing your code for security vulnerabilities and quality issues

Within IDEs, Amazon Q reviews your code for security vulnerabilities and code quality issues. Amazon Q can review as you code or review entire projects to monitor the security and quality of your applications throughout development. For more information, see [Reviewing code with Amazon Q Developer](#).

Transforming code

Amazon Q can perform automated language and operating system (OS)-level upgrades for your applications. For more information, see [Transforming code in the IDE with Amazon Q Developer](#).

Generating unit tests

Amazon Q Developer provides an AI-powered unit test generation feature to help development teams improve code coverage throughout their software development lifecycle. The Amazon Q Developer agent for unit test generation is available in the following environments:

- Amazon Q Developer IDE extension. For more information, see [Generating unit tests with Amazon Q](#).
- GitLab, as part of GitLab Duo. For more information, see [the section called “GitLab quick actions”](#).

Note

The unit test generation capability is available in all [Amazon Q Developer supported regions](#).

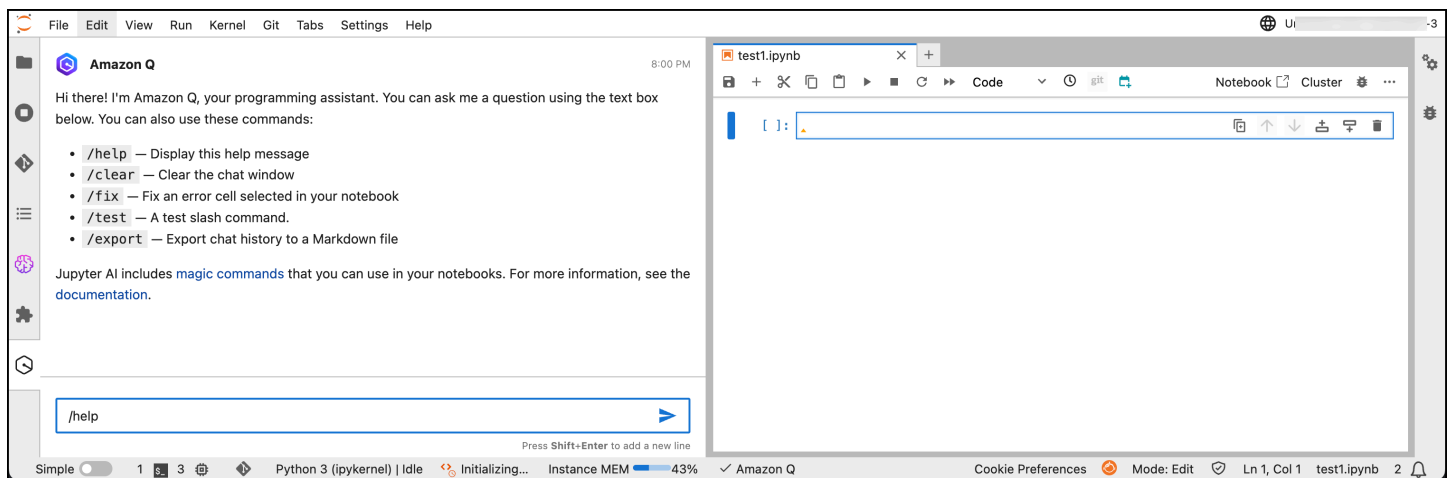
Developing software in Amazon CodeCatalyst

Amazon Q Developer in CodeCatalyst includes generative AI features that can help users in projects in your space develop software faster. You can assign issues to Amazon Q or recommend tasks for Amazon Q. You can also ask Amazon Q to write a description or to summarize content.

For more information, see [Managing generative AI features in Amazon CodeCatalyst](#) in the *Amazon CodeCatalyst administrator guide*.

Chatting about code in Amazon SageMaker AI Studio

Amazon SageMaker AI Studio is a web-based experience for running ML workflows. You can chat with Amazon Q Developer inside Studio to get guidance on SageMaker AI features, troubleshoot JupyterLab errors, and get sample code.



For more information, see [Use Amazon Q to Expedite Your Machine Learning Workflows](#) in the *SageMaker AI Developer Guide*.

Interacting with the command line and AWS CloudShell

Command Line Interface (CLI)

After installing Amazon Q for the command line, you can use it to complete CLI commands as it populates contextually relevant subcommands, options and arguments. It provides AI-generated completions as you type in the command line. Additionally, you can use Amazon Q to write natural language instructions that are instantly translated to an executable shell code snippet. You can also ask Amazon Q complex questions, and it provides feedback and instructions based on the conversation, as well as context and information outside of the conversation. You can then provide permission to Amazon Q so it performs actions on your behalf. With multi-language support, you can chat with Amazon Q in any of the supported natural languages, including English, Mandarin, French, German, Italian, Japanese, Spanish, Korean, Hindi and Portuguese, with more languages available. For more information, see [Using Amazon Q Developer on the command line](#).

AWS CloudShell

You can also use Amazon Q CLI in AWS CloudShell to interact in natural language conversations, ask questions, and receive responses from Amazon Q in your terminal. You can get the related shell command that reduces the need to search for or remember syntax. With Amazon Q, you can receive command suggestions as you type in the terminal. For more information, see [Using Amazon Q AWS CLI in AWS CloudShell](#).

Application integration

Writing scripts to automate AWS services

You may know exactly what to do with your AWS resources, and you may find yourself taking the same actions repeatedly. In that case, you can ask Amazon Q to write code that will automate the repetitive tasks.

For example, you may be working on a project that uses Amazon VPCs, Amazon EC2 instances, and Amazon RDS databases. In the course of your testing, you find that every time you create a Amazon VPC, spin up a server, and deploy a database, the configuration is the same. You always choose the same instance and database type, with the same options selected, using the same security groups, in subnets with the same NACL configuration. You don't want to have to go through the same manual process every time you want to re-create your test conditions.

You can use Amazon Q's Console-to-Code feature to automate a workflow instead of performing it manually every time. First, you activate Console-to-Code in the Amazon EC2 console. Then, Amazon Q records your actions as you go through the process of configuring and launching your instance. Finally, Amazon Q provides you with code, in a language of your choice, that automates the process you just performed.

For more information, see [Automating AWS services with Amazon Q Developer Console-to-Code](#).

Writing ETL scripts and integrating data

AWS Glue is a serverless data integration service that makes it easy for analytics users to discover, prepare, move, and integrate data from multiple sources.

Amazon Q data integration in AWS Glue includes the following capabilities:

- **Chat** – Amazon Q data integration in AWS Glue can answer natural language questions in English about AWS Glue and data integration domains like AWS Glue source and destination connectors, AWS Glue ETL jobs, Data Catalog, crawlers and AWS Lake Formation, and other feature documentation, and best practices. Amazon Q data integration in AWS Glue responds with step-by-step instructions, and includes references to its information sources.
- **Data integration code generation** – Amazon Q data integration in AWS Glue can answer questions about AWS Glue ETL scripts, and generate new code given a natural language question in English.
- **Troubleshoot** – Amazon Q data integration in AWS Glue is purpose built to help you understand errors in AWS Glue jobs and provides step-by-step instructions, to root cause and resolve your issues.

For more information, see [Amazon Q data integration in AWS Glue](#) in the *AWS Glue User Guide*.

Third-party integrations

Using GitLab Duo with Amazon Q

You can [GitLab Duo with Amazon Q](#) for your software development operations and source code management workflows. After setting up Amazon Q in GitLab Duo, you can invoke [quick actions](#) to automate tasks, including implement code for your ideas, transform your codebase, review merge requests for quality and vulnerabilities, and suggest unit tests.

For more information, see [GitLab Duo with Amazon Q](#) .

Using Amazon Q Developer features in GitHub

You can leverage Amazon Q Developer capabilities for your software development workflows. With specialized development agents, you can implement new ideas, review code for quality issues, address vulnerabilities with unit tests, and modernize legacy Java applications.

For more information, see [Amazon Q Developer for GitHub \(Preview\)](#) .

Cloud Financial Management

Understanding your costs

You can ask Amazon Q about your AWS bill and account costs in the AWS Management Console. Amazon Q can retrieve your cost data, explain costs, and analyze cost trends.

For more information, see [Chatting about your costs](#) .

Customer support

Getting customer support directly from Amazon Q

Amazon Q can answer your questions about account activation, cost spikes, bill adjustment, fraud events, health events, and issues with your AWS resources.

For more information, see [Chatting about your costs](#) , and [Asking Amazon Q to troubleshoot your resources](#) .

Creating a support ticket

Amazon Q can help you create a support case and then connect you to a human support agent at AWS.

For more information, see [Using Amazon Q Developer to chat with Support](#) .

Amazon Q in chat applications

You can activate Amazon Q in your Slack and Microsoft Teams applications to ask questions about building at AWS. To add Amazon Q to your chat applications, see [Chatting with Amazon Q](#)

[Developer in chat applications](#) . For more information, see [Get started with Slack](#) and [Get started with Microsoft Teams](#) in the *Amazon Q Developer in chat applications Administrator Guide*.

Getting started with Amazon Q Developer

This section provides comprehensive guidance on getting started with Amazon Q Developer. It covers the different tiers of service (Free, Pro, and Pro+), explains the various sign-in methods available, and walks you through the setup process for personal accounts (Builder IDs) and workforce identities in AWS IAM Identity Center. Whether you're an individual developer or an administrator setting up Amazon Q Developer for your organization, this section will help you choose the right approach for getting started quickly with Amazon Q.

Topics

- [Tiers of service for Q Developer – Free, Pro, and Pro+](#)
- [Getting started with a personal account \(Builder ID\)](#)
- [Getting started with IAM Identity Center](#)
- [Amazon Q Developer Pro subscriptions](#)

Tiers of service for Q Developer – Free, Pro, and Pro+

With Amazon Q Developer, you either use Amazon Q Developer at the Free, Pro, or Pro+ tier. Review the following information to understand what's offered at each tier.

Free tier

Amazon Q Developer offers a perpetual Free tier with monthly limits.

For more information about what's available at the Free tier, see the [Amazon Q Developer pricing page](#).

The Free tier is available to users with [personal accounts](#) (Builder IDs), users with identities in [IAM Identity Center](#), and users with IAM credentials. Consult the following table to understand the availability of Amazon Q in various interfaces at the Free tier depending on your sign in method.

Interface	Sign in method (Free tier)		
	Personal account (Builder ID)	IAM Identity Center	IAM credentials
AWS Management Console, and AWS apps and websites	 No	 Yes	 Yes
IDE	 Yes	 No	 No
Command line	 Yes	 No	 No

For more information about how content is used to improve the service at the Free tier, see [Amazon Q Developer service improvement](#).

Pro/Pro+ tier

Amazon Q Developer offers Pro and Pro+ tiers.

The *Pro tier*, also known as *Amazon Q Developer Pro*, is a paid version of the Amazon Q Developer service that offers higher usage limits than the Free tier. It also gives you access to advanced features, such as customizations, and .

The *Pro+ tier* (coming soon) builds upon the Pro tier, providing even higher usage limits for developers who need more capacity.

For information about pricing for the Pro and Pro+ tiers and individual requests, see the [Amazon Q Developer pricing page](#).

Both Pro and Pro+ tiers are available to users with [personal accounts](#) (Builder IDs), and users who have identities in [IAM Identity Center](#). Consult the following table to understand the availability of Amazon Q in various interfaces at the Pro and Pro+ tiers depending on your sign in method.

 **Note**

This guide uses the term *Pro tier* to refer to both the Pro and Pro+ tiers, unless indicated otherwise.

Interface	Sign in method (Pro and Pro+ tiers)		
	Personal account (Builder ID)	IAM Identity Center	
AWS Management Console, and AWS apps and websites	 No	 Yes	
IDE	 Yes	 Yes	
Command line	 Yes	 Yes	

Getting started with a personal account (Builder ID)

If you want to use Amazon Q Developer for personal projects, and you don't need to administer other users, you'll want to get started with a personal account, also known as a Builder ID. A *Builder ID* is a special type of AWS account that gives you the ability to use Amazon Q in your Integrated Development Environment (IDE) and your terminal's command line. Unlike a regular

AWS account, a Builder ID is meant to be used by you and you alone, does not allow access to the AWS Management Console, and cannot be assigned IAM roles or permissions.

You can set up a Builder ID for free to start. When you're ready, you can [upgrade to the Pro tier](#) by connecting your Builder ID to an AWS account to take advantage of higher usage limits.

For a list of features available at the Pro tier, see the [Amazon Q Developer pricing](#) page.

To get started with a personal account (Builder ID) at the Free or Pro tier

- [Before you begin: Understand the limitations of personal accounts \(Builder IDs\)](#)
- [Step 1: Sign up](#)
- [Step 2: Install Amazon Q](#)
- [Step 3: \(Optional\) Upgrade to the Pro tier](#)

Before you begin: Understand the limitations of personal accounts (Builder IDs)

Before you create a personal account (Builder ID) for use with Amazon Q, understand its limitations.

- With a Builder ID at the Free tier, you will be subject to usage limits. For information about what these limits are, see the [pricing page](#). If you need higher usage limits, subscribe your Builder ID to the Pro tier using the instructions that follow, or use IAM Identity Center following the guidance in [Getting started with IAM Identity Center](#).
- With a Builder ID at the Pro tier, you'll get *higher usage limits*, but you won't get Pro tier-only *features*, such as [customizations](#). For a list of Pro tier features that are not available to you, see the footnote at the bottom of the [Amazon Q Developer pricing page](#). If you need Pro tier features, use IAM Identity Center. For more information, see [Getting started with IAM Identity Center](#).
- With a Builder ID at both the Free and Pro tiers, Amazon Q is only supported in the IDE and at the command line. It is not supported [in the AWS Management Console, and on AWS apps and websites](#). If you need to use Q in the AWS Management Console, and on AWS apps and websites, use IAM Identity Center. For more information, see [Getting started with IAM Identity Center](#).

Step 1: Sign up

Sign up for a free personal account (Builder ID). For more information, see [Create your AWS Builder ID](#) in the *AWS Sign-In User Guide*.

Step 2: Install Amazon Q

Install Amazon Q in your Integrated Development Environment (IDE) or at the command line, and then authenticate using your personal account (Builder ID). For installation and authentication information, see:

- [Installing the Amazon Q Developer extension or plugin in your IDE](#)
- [Installing Amazon Q for command line](#)

Step 3: (Optional) Upgrade to the Pro tier

Upgrade to the Pro tier to take advantage of increased limits. See [Upgrading a personal account \(Builder ID\)](#).

Getting started with IAM Identity Center

IAM Identity Center is a service that is used by administrators to manage the identities of end users. In the context of Amazon Q Developer, administrators use IAM Identity Center to manage the identities of those whom they plan on subscribing to Amazon Q Developer Pro.

Users who have identities in IAM Identity Center or in a directory or database that is connected to IAM Identity Center are called *IAM Identity Center workforce users* in this guide.

You should get started with IAM Identity Center if:

- **You're an administrator** who wants to set up multiple users with Amazon Q Developer at the Pro tier. By using IAM Identity Center, your users get the full suite of Amazon Q Developer features, plus you get enterprise controls over the Amazon Q Developer subscriptions you administer. For example, you can cancel users' subscriptions, subscribe users in bulk, and track Amazon Q usage on a dashboard.
- **You're an individual user**, and you can't use a personal account (Builder ID) because of [its limitations](#).

Use the following instructions to get started with IAM Identity Center.

To get started with IAM Identity Center

- [Step 1: Choose a deployment option](#)
- [Step 2: Subscribe workforce users to Amazon Q Developer Pro](#)

Step 1: Choose a deployment option

Before you can subscribe users, you'll need to decide which AWS account or accounts you'll be working in. You'll need to make three key decisions:

- **Decision 1: Where to enable IAM Identity Center** – For more information about IAM Identity Center, see [What is IAM Identity Center?](#) in the *AWS IAM Identity Center User Guide*.
- **Decision 2: Where to install the Amazon Q Developer profile** – For more information about the profile, see [Amazon Q Developer profile](#).
- **Decision 3: Where to subscribe workforce users** – For more information about subscriptions, see [Amazon Q Developer Pro subscriptions](#).

Your specific combination of these three decisions constitutes your *deployment option*.

Deployment options are described in the following table. Pick an option before moving on to [Step 2: Subscribe workforce users to Amazon Q Developer Pro](#).

The table uses the following terms:

- *Standalone account* — An AWS account that is *not* part of an organization managed by [AWS Organizations](#).
- *Management account* — An AWS account that is part of an organization managed by [AWS Organizations](#). It is the ultimate owner of the organization, and is responsible for paying all charges accrued by the accounts in its organization.
- *Member account* — An AWS account, other than the management account, that is part of an organization managed by [AWS Organizations](#).

Deployment option	Description	Advantages	Disadvantages
Deployment option 1 (easiest): Deploy in a standalone account	Use this option if you're an end user and you want to subscribe yourself (and optionally, a small team of users) to quickly evaluate the features of Amazon Q. With this deployment option, in your standalone account, you: • enable IAM Identity Center, • install the Amazon Q Developer profile, and • subscribe yourself (and team members). For detailed instructions, see Subscribe users to Amazon Q Developer Pro in a standalone account.	Good for demos. You can try out Pro tier features for yourself without having to do an enterprise-wide implementation. More features than personal accounts (Builder IDs). For more information, see Limitations of Builder IDs.	Fewer features Because IAM Identity Center is enabled in a standalone account, it is considered to be an <i>account instance</i>, which has fewer features than organization instances¹.
Deployment option 2: Deploy in	Use this option if you're an administr	More features. Because IAM Identity Center is installed	Complexity. Requires coordination across

Deployment option	Description	Advantages	Disadvantages
management and member accounts	ator of multiple users. With this deployment option: - In the management account, you enable IAM Identity Center. - In a member account, you: - install the Amazon Q Developer profile, and - subscribe users. For detailed instructions, see Subscribe users to Amazon Q Developer Pro in a member account.	in a management account, it is considered to be an <i>organization instance</i>, which has more features than account instances². Distributed management t. Subscription management tasks are distributed across member accounts, which is a best practice.	accounts by multiple administrators.

Deployment option	Description	Advantages	Disadvantages
Deployment option 3: Deploy in a member account only	Use this option if you're an administrator of multiple users. With this deployment option, in a member account, you: • enable IAM Identity Center, • install the Amazon Q Developer profile, and • subscribe users. For detailed instructions, see Subscribe users to Amazon Q Developer Pro in a member account.	Quick setup. Individual member account administrators can deploy without waiting or needing approval for an enterprise-wide implementation. Flexibility for complex organizations. Use this option when you don't have a unified identity provider or identity store containing the entire user base that you want to subscribe to the Pro tier.	Fewer features. Because IAM Identity Center is enabled in a member account, it is considered to be an <i>account instance</i>, which has fewer features than organization instances¹.

Deployment option	Description	Advantages	Disadvantages
Deployment option 4: Deploy in a management account only  Warning Because this option violates best practices, only use it if you cannot use any other option.	Use this option if you're an administrator of multiple users. With this deployment option, in the management account, you: • enable IAM Identity Center, • install the Amazon Q Developer profile, • subscribe users, and • optionally, share the Amazon Q Developer profile with member accounts. For detailed instructions, see Subscribe users to Amazon Q Developer Pro in a management account.	More features. Because IAM Identity Center is installed in a management account, it is considered to be an <i>organization instance</i>, which has more features than account instances².	Does not comply with best practices . Because users are subscribed in the management account, and because of a limitation in Amazon Q Developer where delegated administration is not supported, management account administrators must handle subscription management tasks. You cannot follow the recommended practice of delegating tasks to member accounts.

¹ Account instances support fewer features than organization instances. For example, account instances don't support permission sets, which means that users cannot use their Pro tier subscriptions [in the AWS Management Console, and on AWS apps and websites](#). For a list of the

limitations of account instances, see [Account instance considerations](#) in the *AWS IAM Identity Center User Guide*.

² Organization instances offer a broader range of features compared to account instances, encompassing all IAM Identity Center capabilities. For a list of features supported by organization instances, see [When to use an organization instance](#) in the *AWS IAM Identity Center User Guide*.

Step 2: Subscribe workforce users to Amazon Q Developer Pro

After choosing a deployment option as described in [Step 1: Choose a deployment option](#), you are ready to subscribe workforce users. Subscribing workforce users involves three main steps: Enabling IAM Identity Center, installing the Amazon Q Developer profile, and subscribing users. Instructions on how to complete all steps are included in each of the following sections. You might need to read multiple sections if you're planning on performing steps in multiple accounts.

- [Subscribe users to Amazon Q Developer Pro in a standalone account](#)
- [Subscribe users to Amazon Q Developer Pro in a management account](#)
- [Subscribe users to Amazon Q Developer Pro in a member account](#)

Subscribe users to Amazon Q Developer Pro in a standalone account

A *standalone* account is one that is *not* part of an organization managed by [AWS Organizations](#).

If you are the owner of a standalone AWS account, use the following instructions to subscribe yourself (and a few others) to Amazon Q Developer Pro to evaluate the service's features and functionality.

After completing the steps on this page, read [What resources were created?](#) at the end to understand which resources were installed and configured on your behalf when you subscribed. This will help you cleanly remove everything when you're finished testing.

Prerequisites

Before you begin, make sure that:

- You have a **standalone** AWS account.
- You have the minimum permissions required to subscribe users and manage Amazon Q Developer settings. For more information, see [Allow administrators to use the Amazon Q console](#), and [Allow administrators to use the Amazon Q Developer console](#).

- (Optional) You have an account instance of IAM Identity Center set up in your standalone account. This IAM Identity Center contains the identities of the users you want to subscribe to Amazon Q Developer Pro, and must be deployed in a supported AWS Region, as described in [IAM Identity Center Regions supported by Amazon Q Developer](#). If you don't have an IAM Identity Center instance installed, that's ok. One will be installed when you subscribe the first user (yourself). For more information about IAM Identity Center, see [Organization and account instances of IAM Identity Center](#) in the *AWS IAM Identity Center User Guide*.

Note

The instructions on this page assume you have not already installed an IAM Identity Center instance in your standalone account.

Step 1: Install the Amazon Q Developer Pro profile and subscribe yourself

1. Sign in to the AWS Management Console using your standalone AWS account. Sign in as the root user, or as an IAM user with the permissions described in [Prerequisites](#).
2. Switch to the **Amazon Q Developer** console.
3. Make sure you're in the AWS Region where you want to install the [Amazon Q Developer profile](#) and where you want to store user data. For supported Regions, see [Supported Regions for the Q Developer console and Q Developer profile](#).
4. Choose the **Get started** button.

Note

If you see a **Settings** button instead of **Get started** button, it means that you've already run through the 'Get started' workflow and can skip to [Step 2: Subscribe team members](#).

A **Create your user** dialog box appears.

5. Enter your information. The email address can be the same or different from the one you used to sign up for your AWS account.

Choose **Continue**.

The **Create Amazon Q Developer profile** dialog box appears.

6. Review the contents of the dialog box and provide a name for your profile in **Profile name**. For help with cross-region inferencing, see [Cross-region processing in Amazon Q Developer](#). For help with disabling dashboard metrics, see [Disabling the Amazon Q Developer dashboard](#).

Choose **Create application**.

The Amazon Q Developer profile and managed application are installed, and your subscription is created.

7. (Optional) Verify that your subscription was created:
 1. In the Amazon Q Developer console, in the navigation pane, choose **Subscriptions**.
 2. In the main pane, choose the **Users** tab.

Your subscription should appear in the list in the **Pending** state. If not, refresh your browser tab.

 Note

Your subscription will change to the **Active** state after your first use of Amazon Q Developer features.

Now that you are subscribed, you must activate your subscription. You can do this now, or after you've subscribed team members, as described in the next section. To activate your subscription, check your inbox for emails titled **Invitation to join AWS IAM Identity Center** and **Activate Your Amazon Q Developer Pro Subscription**. Follow the instructions in these emails to activate your Amazon Q Developer Pro subscription and set up Amazon Q Developer Pro in your IDE. You should receive these emails within 24 hours.

Step 2: Subscribe team members

You might want to subscribe other team members so that they can try out Amazon Q Developer Pro with you. To subscribe them, use the following instructions.

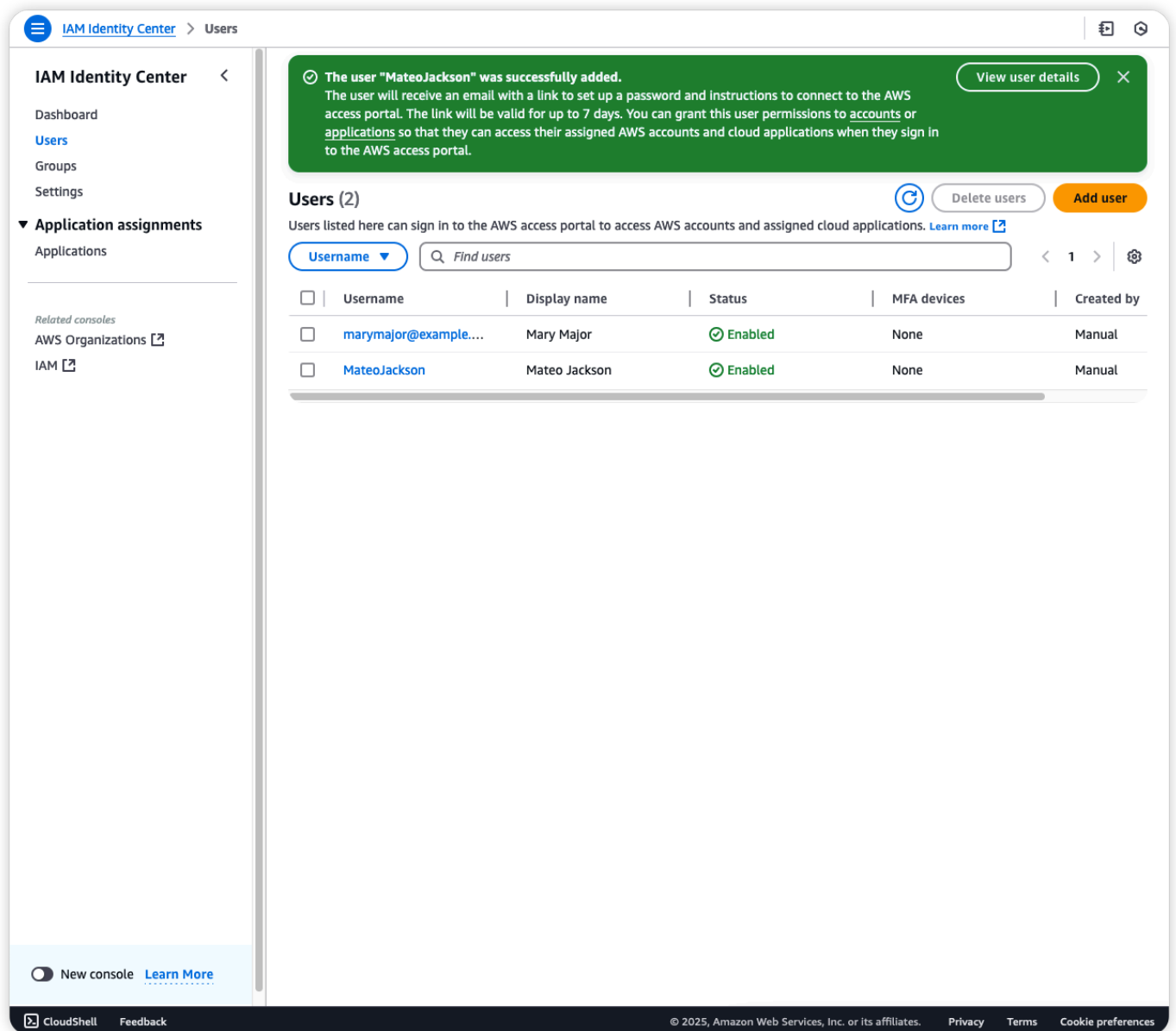
To add team members

1. Switch to the IAM Identity Center console (not the IAM console).

Note

IAM Identity Center was set up on your behalf when you subscribed yourself. For more information about the IAM Identity Center that was set up, see [What resources were created?](#).

2. Add users and groups. For instructions, see [Add users to your IAM Identity Center directory](#) in the *AWS IAM Identity Center User Guide*.



3. Go to the next procedure to subscribe team members.

To subscribe team members

1. Return to the Amazon Q Developer console.
2. In the navigation pane, choose **Subscriptions**, and then choose **Subscribe**.

The **Assign users and groups** dialog box appears.

3. Start typing the name of a team member or group that you added. The name should auto-populate.

4. Choose **Assign**.
5. Have users check their email. They should receive an email titled **Activate Your Amazon Q Developer Pro Subscription** within 24 hours. In this email, users will find guidance on how to begin using their Amazon Q Developer Pro license in the AWS Management Console and their Integrated Development Environment (IDE). The email includes users' unique Start URL and AWS Region for authentication, and provides quickstart steps for using Amazon Q Developer in their IDE. This email streamlines the onboarding process and saves you valuable time by eliminating the need for you to manually notify each new user.

What resources were created?

When you subscribed yourself (and optionally, team members), Amazon Q created the following AWS resources on your behalf:

- **An account instance of IAM Identity Center.** For more information about account instances of IAM Identity Center, see [Account instances of IAM Identity Center](#) in the *AWS IAM Identity Center User Guide*.

Note

Account instances of IAM Identity Center have [limitations](#). For example, account instances don't support console access. (Users can still use Amazon Q in the console, it's just that they'll be subject to the Free tier monthly limits.) If you want to use Amazon Q Developer Pro in the console and other AWS websites, you must be a user in an *organization instance* of IAM Identity Center, in a management account. For more information, see [Subscribe users to Amazon Q Developer Pro in a management account](#).

Note

You can't convert or merge an account instance of IAM Identity Center into an organization instance.

- **The first user**, in IAM Identity Center. You might have manually added team members too.
- **Pro tier subscriptions** for the first user and team members, in Amazon Q Developer.
- **An Amazon Q Developer profile**, in the Amazon Q Developer console, under **Settings**.

- A **managed application** called **QDefaultProfile**, in the IAM Identity Center that is set up in your standalone account. The application is associated with the Amazon Q Developer profile. Like the Amazon Q Developer profile, the application is created once and shared between all Amazon Q subscribers in your standalone account.

Subscribe users to Amazon Q Developer Pro in a management account

A *management account* is an AWS account that is part of an organization managed by [AWS Organizations](#). It is the ultimate owner of the organization, and is responsible for paying all charges accrued by the accounts in its organization.

If you are the owner of a management account, use the following instructions to subscribe users to Amazon Q Developer Pro in your account.

Note

If possible, subscribe users in member accounts instead of your management account. For more information, see [Step 1: Choose a deployment option](#).

For more information about organizations and management accounts, see [Terminology and concepts for AWS Organizations](#) in the *AWS Organizations User Guide*.

Prerequisites

Before you begin, make sure that:

- You have a **management** AWS account.
- You have the minimum permissions required to subscribe users and manage Amazon Q Developer settings. For more information, see [Allow administrators to use the Amazon Q console](#), and [Allow administrators to use the Amazon Q Developer console](#).
- You have an organization instance of IAM Identity Center set up in your management account. This IAM Identity Center contains the identities of the users you want to subscribe to Amazon Q Developer Pro, and must be deployed in a supported AWS Region, as described in [IAM Identity Center Regions supported by Amazon Q Developer](#). For more information about IAM Identity Center, see [Organization instances of IAM Identity Center](#) in the *AWS IAM Identity Center User Guide*.

Step 1: Install the Amazon Q Developer profile

1. Sign in to the AWS Management Console using your AWS management account.
2. Switch to the **Amazon Q Developer** console.
3. Make sure you're in the AWS Region where you want to install the [Amazon Q Developer profile](#) and where you want to store user data. For supported Regions, see [Supported Regions for the Q Developer console and Q Developer profile](#).
4. Choose **Get started**.

The **Create Amazon Q Developer profile** dialog box appears.

5. Review the contents of the dialog box and provide a name for your profile in **Profile name**. For help with:
 - Cross-region inferencing, see [Cross-region processing in Amazon Q Developer](#).
 - The **Share Amazon Q Developer settings with member account** check box, see [Enabling profile sharing in Amazon Q Developer](#) and [Step 1: Choose a deployment option](#).
 - Disabling dashboard metrics, see [Disabling the Amazon Q Developer dashboard](#).

Choose **Create application**.

The Amazon Q Developer profile and managed application are installed.

Step 2: Subscribe users

1. In the Amazon Q Developer console, from the navigation pane, choose **Subscriptions**.
2. Choose **Subscribe**.

The **Assign users and groups** dialog box appears.

3. Start typing the group or user you want to subscribe. The group or user will auto-populate with the ones available in the IAM Identity Center set up in your management account.
4. Choose **Assign**.
5. Have users check their email. They should receive an email titled **Activate Your Amazon Q Developer Pro Subscription** within 24 hours with instructions on how to begin using their Amazon Q Developer Pro license.

Step 3: Enable identity-enhanced console sessions

If you want to allow users to use their Amazon Q Developer Pro subscription [in the AWS Management Console, and on AWS apps and websites](#), enable identity-enhanced console sessions. For more information, see [Enabling identity-enhanced console sessions](#) in the *AWS IAM Identity Center User Guide*.

Note

If you don't enable identity-enhanced console sessions, users can still use Amazon Q in the AWS Management Console, and on AWS apps and websites, but they'll be limited to the Free tier.

What resources were created?

When you installed the Amazon Q Developer profile and subscribed users in your management account, Amazon Q created the following resources on your behalf:

- **Pro tier subscriptions** for users, in Amazon Q Developer.
- **An Amazon Q Developer profile**, in the Amazon Q Developer console, under **Settings**.
- **A managed application** called **QDefaultProfile**, in the IAM Identity Center that is set up in your management account. The application is associated with the Amazon Q Developer profile. Like the Amazon Q Developer profile, the application is created once and shared between all Amazon Q subscribers in your management account.

Note

Amazon Q can create the **QDefaultProfile** managed application in a maximum of 10 AWS accounts per AWS Region within an organization.

Subscribe users to Amazon Q Developer Pro in a member account

A *member account* is an AWS account, other than the management account, that is part of an organization managed by [AWS Organizations](#).

If you are the owner of a member account, use the following instructions to subscribe users to Amazon Q Developer Pro in your account.

Not sure whether to subscribe users in a member or management account? See [Step 1: Choose a deployment option](#) for help.

For more information about organizations, member accounts, and management accounts, see [Terminology and concepts for AWS Organizations](#) in the *AWS Organizations User Guide*.

Prerequisites

Before you begin, make sure that:

- You have a **member** AWS account.
- You have the minimum permissions required to subscribe users and manage Amazon Q Developer settings. For more information, see [Allow administrators to use the Amazon Q console](#), and [Allow administrators to use the Amazon Q Developer console](#).
- (Optional) You have an organization instance of IAM Identity Center set up in the *management account* or an account instance of IAM Identity Center set up in your *member account*. This IAM Identity Center instance contains the identities of the users you want to subscribe to Amazon Q Developer Pro, and must be deployed in a supported AWS Region, as described in [IAM Identity Center Regions supported by Amazon Q Developer](#). If you don't have an IAM Identity Center instance installed, that's ok. One will be installed in your member account when you subscribe the first user. For more information about IAM Identity Center, see [Organization and account instances of IAM Identity Center](#) in the *AWS IAM Identity Center User Guide*.

Step 1: Install the Amazon Q Developer Pro profile and subscribe the first user

1. Sign in to the AWS Management Console using your member AWS account.
2. Switch to the **Amazon Q Developer** console.
3. Make sure you're in the AWS Region where you want to install the [Amazon Q Developer profile](#) and where you want to store user data. For supported Regions, see [Supported Regions for the Q Developer console and Q Developer profile](#).
4. Choose the **Get started** button.

Note

If you see a **Settings** button instead of **Get started** button, it means that you've already run through the 'Get started' workflow and can skip to [Step 2: Subscribe other users](#).

5. Follow the on-screen prompts to subscribe your first user.
 - If the first user's email address matches one in an existing IAM Identity Center in either your member account or a management account, then Amazon Q connects to that IAM Identity Center.
 - If the first user's email address doesn't match one in an existing IAM Identity Center, then Amazon Q creates an IAM Identity Center account instance in your member account, and adds the first user to it. Note that:
 - Amazon Q only creates an IAM Identity Center account instance if there is no IAM Identity Center already in your member account.
 - Otherwise, if there is an IAM Identity Center account instance in your member account, but the user is not in it, then Amazon Q creates the user in the existing IAM Identity Center.

The **Create Amazon Q Developer profile** dialog box appears.

6. Review the contents of the dialog box and provide a name for your profile in **Profile name**. For help with cross-region inferencing, see [Cross-region processing in Amazon Q Developer](#). For help with disabling dashboard metrics, see [Disabling the Amazon Q Developer dashboard](#).

Choose **Create application**.

The Amazon Q Developer profile and managed application are installed, and the first user is subscribed.

7. (Optional) Verify that the first user's subscription was created:
 1. In the Amazon Q Developer console, in the navigation pane, choose **Subscriptions**.
 2. In the main pane, choose the **Users** tab.

The subscription of the first user should appear in the list in the **Pending** state. If not, refresh your browser tab.

 Note

The subscription will change to the **Active** state after the user's first use of Amazon Q Developer features.

8. Have the first user check their email. They should receive an email titled **Activate Your Amazon Q Developer Pro Subscription** within 24 hours. In this email, users will find guidance on how to begin using their Amazon Q Developer Pro license in the AWS Management Console and their Integrated Development Environment (IDE). The email includes users' unique Start URL and AWS Region for authentication, and provides quickstart steps for using Amazon Q Developer in their IDE. This email streamlines the onboarding process and saves you valuable time by eliminating the need for you to manually notify each new user.

Step 2: Subscribe other users

To subscribe other users, add them to your IAM Identity Center instance if they're not already there, and then subscribe them to Amazon Q Developer Pro by choosing **Subscribe** in the Amazon Q Developer console.

For instructions on adding users to IAM Identity Center, see [Add users to your IAM Identity Center directory](#) in the *AWS IAM Identity Center User Guide*.

Step 3: Enable identity-enhanced console sessions

If you want to allow users to use their Amazon Q Developer Pro subscription [in the AWS Management Console, and on AWS apps and websites](#), enable identity-enhanced console sessions. For more information, see [Enabling identity-enhanced console sessions](#) in the *AWS IAM Identity Center User Guide*.

If you don't enable identity-enhanced console sessions, users can still use Amazon Q in the AWS Management Console, and on AWS apps and websites, but they'll be limited to the Free tier.

Note

The ability to enable identity-enhanced console sessions—and therefore the ability to use Amazon Q Developer Pro subscriptions in the AWS Management Console, and on AWS apps and websites—is only supported with organization instances of IAM Identity Center, not account instances.

What resources were created?

When you subscribed users in your member account, Amazon Q created the following AWS resources on your behalf:

- **An account instance of IAM Identity Center.** This instance is only created if the first user you subscribed wasn't found in an existing IAM Identity Center in the member account or management account. For more information about account instances of IAM Identity Center, see [Account instances of IAM Identity Center](#) in the *AWS IAM Identity Center User Guide*.

 Note

Account instances of IAM Identity Center have [limitations](#). For example, account instances don't support console access. (Users can still use Amazon Q in the console, it's just that they'll be subject to the Free tier monthly limits.) If you want your users to be able to use Amazon Q Developer Pro in the console and other AWS websites, they must exist in an *organization instance* of IAM Identity Center, in a management account. For more information, see [Subscribe users to Amazon Q Developer Pro in a management account](#).

 Note

You can't convert or merge an account instance of IAM Identity Center into an organization instance.

- **The first user**, in IAM Identity Center. (You might have added team members too.)
- **Pro tier subscriptions** for the first user and other users, in Amazon Q Developer.
- **An Amazon Q Developer profile**, in the Amazon Q Developer console, under **Settings**.
- **A managed application** called **QDefaultProfile**, in IAM Identity Center. The application is associated with the Amazon Q Developer profile. Like the Amazon Q Developer profile, the application is created once and shared between all Amazon Q Developer Pro subscribers in your member account.

 Note

Amazon Q can create the **QDefaultProfile** managed application in a maximum of 10 AWS accounts per AWS Region within an organization.

Amazon Q Developer Pro subscriptions

An *Amazon Q Developer Pro subscription*, also called a *Pro tier subscription*, is a paid version of the Amazon Q Developer service. It offers enhanced AI development capabilities designed for professional developers and teams who require advanced features and higher usage limits beyond the Free tier offering. For more information about pricing tiers and feature availability, see the [Amazon Q Developer pricing page](#).

This chapter covers essential information for managing Amazon Q Developer Pro subscriptions for both personal accounts (Builder IDs) and workforce users (IAM Identity Center). It describes Region availability and support, billing details, and subscription status information. It also provides step-by-step guidance for key tasks such as unsubscribing, and upgrading to the Pro tier.

Topics

- [Amazon Q Developer Pro Region support](#)
- [Amazon Q Developer Pro subscription billing](#)
- [Amazon Q Developer subscription statuses](#)
- [Finding the Start URL for use with Amazon Q Developer](#)
- [Managing the encryption method in Amazon Q Developer](#)
- [Amazon Q Developer profile](#)
- [Enabling profile sharing in Amazon Q Developer](#)
- [Troubleshooting Amazon Q Developer Pro subscriptions](#)
- [Viewing an aggregated list of Amazon Q Developer subscriptions](#)
- [Unsubscribing from Amazon Q Developer Pro](#)
- [Upgrading to Amazon Q Developer Pro](#)

Amazon Q Developer Pro Region support

Region information for the Pro tier varies depending on whether you're an end-user with a personal account (Builder ID), or you're an administrator of IAM Identity Center workforce users.

Personal account (Builder ID) users

If you're the owner of a personal account (Builder ID), your Pro tier subscription is supported in the following Region:

- US East (N. Virginia)

IAM Identity Center workforce users

Read this section if you're an administrator of IAM Identity Center workforce users.

Topics

- [IAM Identity Center Regions supported by Amazon Q Developer](#)
- [Supported Regions for the Q Developer console and Q Developer profile](#)
- [Subscribing users to Amazon Q Developer Pro across AWS Regions](#)

IAM Identity Center Regions supported by Amazon Q Developer

The workforce users that you want to subscribe to Amazon Q Developer Pro must have identities in an IAM Identity Center instance (or a connected identity provider) in one of the Regions listed on the [Supported Regions page](#), except for opt-in Regions. If your users have identities in an IAM Identity Center instance in an opt-in Region, they can't be subscribed, which means they will only have access to the Free tier [in the AWS Management Console, and on AWS apps and websites](#), and they won't have access to Amazon Q in the IDE or at the command line.

Amazon Q stores the subscriptions of IAM Identity Center workforce users in the same Region as your IAM Identity Center instance.

Regardless of the IAM Identity Center Region, data is stored in the Region where you install the Amazon Q Developer profile.

For more information about Amazon Q Developer profiles, see [Amazon Q Developer profile](#).

For more information about data protection, see [Data protection in Amazon Q Developer](#).

Supported Regions for the Q Developer console and Q Developer profile

The **Amazon Q Developer console** and **Amazon Q Developer profile** are supported in the following Regions:

- US East (N. Virginia)
- Europe (Frankfurt)

For more information about the Amazon Q Developer profile, see [Amazon Q Developer profile](#).

Note

The following features aren't supported for Q Developer profiles created in the Europe (Frankfurt) Region:

- [Chatting with Support](#)
- [Troubleshooting resources with Amazon Q](#)
- [.NET transformations in the IDE](#)
- [Amazon Q in chat applications \(for Slack\)](#)
- Amazon Q in the AWS Console Mobile Application

Subscribing users to Amazon Q Developer Pro across AWS Regions

When you subscribe an IAM Identity Center workforce user to Amazon Q Developer Pro, you might need to work in two different AWS Regions:

- One Region for the IAM Identity Center instance (where user identities are managed, and where subscriptions are stored)
- Another Region for the Amazon Q Developer console (where the [Amazon Q Developer profile](#), customizations, and subscriptions are managed)

The Regions are not always the same because the Amazon Q Developer console is supported in fewer Regions than IAM Identity Center.

In a scenario where your IAM Identity Center is in a different Region from your Amazon Q Developer console, use the guidance in the following example to subscribe users.

Example subscription process in a multi-Region scenario

Let's walk through subscribing a user where:

- The IAM Identity Center instance is in **US West (N. California)**.
- The Amazon Q Developer console is in **US East (N. Virginia)**. This is the closest Region to the IAM Identity Center instance that the Amazon Q Developer console supports.

To subscribe the user

1. Add the user in your IAM Identity Center instance in **US West (N. California)**.
2. Switch to the Amazon Q Developer console in the **US East (N. Virginia)**.
3. Subscribe the user through the Amazon Q Developer console in **US East (N. Virginia)**.

Upon being subscribed:

- The user's subscription is created in **US West (N. California)**.
- The user's subscription is associated with their user entry in **US West (N. California)**.
- The user's subscription is associated with the Amazon Q Developer profile in **US East (N. Virginia)**.

Additionally, any data that Amazon Q Developer needs to store on the user's behalf will be stored in **US East (N. Virginia)**. For more information about data storage and security, see [Encryption at rest](#).

For detailed instructions on subscribing users, see [Getting started with IAM Identity Center](#).

Amazon Q Developer Pro subscription billing

Billing information for the Pro tier varies depending on whether you're an end-user with a personal account (Builder ID), or you're an administrator of IAM Identity Center workforce users.

Personal account (Builder ID) users

If you subscribed to the Pro tier with a personal account (Builder ID), you will be billed monthly. The AWS account that is linked to your Builder ID gets the bill.

The very first month you are subscribed, you are charged a prorated fee. For example, if you subscribe April 15th, you'll be charged half the subscription fee. After that, you'll be charged the full amount.

If you unsubscribe, billing stops at the end of the billing cycle. For more information, see [Unsubscribing from Amazon Q Developer Pro](#).

IAM Identity Center workforce users

If you're an administrator who has subscribed a set of IAM Identity Center workforce users to the Pro tier, you will be billed monthly for each user that you subscribe. For more information, see [Amazon Q Developer pricing](#).

If your business has [AWS Organizations](#) set up, billing for Amazon Q Developer Pro usage is per AWS organization. The management account gets the bill. If the same user is subscribed to Amazon Q Developer in multiple accounts within the same organization, you will not be double-billed.

If you don't have AWS Organizations set up, the AWS account under which your users are subscribed gets the bill.

You can view your bill in the Billing and Cost Management console. The Amazon Q expenses are listed on the **Charges by service** tab, under **Q**. For more information about the Billing and Cost Management console, see [What is AWS Billing and Cost Management?](#) in the *AWS Billing User Guide*.

You can identify the cost of Amazon Q subscriptions for specific users with resource IDs through AWS Billing and Cost Management. To do so, in the Billing and Cost Management console under [Data Exports](#), create either a standard data export or a legacy CUR export with the **Include resource IDs** option selected. To learn more, refer to [Creating data exports](#) in the *AWS Data Exports User Guide*.

If you unsubscribe users, billing stops at the end of the billing cycle. For more information, see [Unsubscribing from Amazon Q Developer Pro](#).

Amazon Q Developer subscription statuses

Subscription status information varies depending on whether you're an end-user with a personal account (Builder ID), or you're an administrator of IAM Identity Center workforce users.

Personal account (Builder ID) users

If you are a user with a personal account (Builder ID), you can view the status of your Amazon Q Developer Pro subscription on the **Subscriptions** page of the Amazon Q Developer console.

The possible statuses of your subscription are:

- **Active** – You have activated your subscription by using Amazon Q Developer features. You are being charged for your subscription.

- **Pending** – You are subscribed but you have not activated your subscription. You are not being charged for your subscription.
- **Canceled** – You canceled your subscription by unsubscribing from the Pro tier. You can no longer access Amazon Q Developer features and limits. For more information, see [Unsubscribing from Amazon Q Developer Pro](#).

IAM Identity Center workforce users

If you're an administrator who has subscribed a set of IAM Identity Center workforce users to the Pro tier, you can view the status of your users' subscriptions on the **Subscriptions** page of the Amazon Q Developer console.

The statuses will be slightly different depending on whether you're looking at the **Groups** tab or the **Users** tab.

The statuses on the **Groups** tab are:

- **Subscribed** – The group is subscribed to Amazon Q Developer Pro. You will be charged for active user subscriptions in the group.
- **Unavailable** – The group is subscribed, but its status is unavailable because trusted access is turned off in the management account. To turn on trusted access, see [Viewing an aggregated list of Amazon Q Developer subscriptions](#).
- **Canceled** – The group was canceled (unsubscribed) by an administrator. Users in the group can no longer access Amazon Q Developer Pro features. For more information, see [Unsubscribing from Amazon Q Developer Pro](#).

The statuses on the **Users** tab are:

- **Active** – The user has activated their subscription by using Amazon Q Developer features. You are being charged for this subscription.
- **Pending** – The user is subscribed but has not activated their subscription. You are not being charged for this subscription.
- **Unavailable** – The user is subscribed, but their status is unavailable because because trusted access is turned off in the management account. To turn on trusted access, see [Viewing an aggregated list of Amazon Q Developer subscriptions](#).

- **Canceled** – The user's subscription was canceled (unsubscribed) by an administrator, and the user can no longer access Amazon Q Developer features. For more information, see [Unsubscribing from Amazon Q Developer Pro](#).

Finding the Start URL for use with Amazon Q Developer

Note

This section does not apply to personal accounts (Builder IDs).

If you're an administrator who has subscribed a set of IAM Identity Center workforce users to the Pro tier, those users will need to sign in to Amazon Q in their IDE or at the command line using your IAM Identity Center's Start URL and Region. If you need to provide this URL to your users, you can find it in the Amazon Q Developer console, on the **Settings** page.

To find the Start URL

1. Open the Amazon Q Developer console.

To use the Amazon Q Developer console, you must have the permissions defined in [Allow administrators to use the Amazon Q Developer console](#).

2. Choose **Settings**.

The start URL is shown in **Start URL** near the top of the page.

Managing the encryption method in Amazon Q Developer

Note

This section does not apply to personal accounts (Builder IDs).

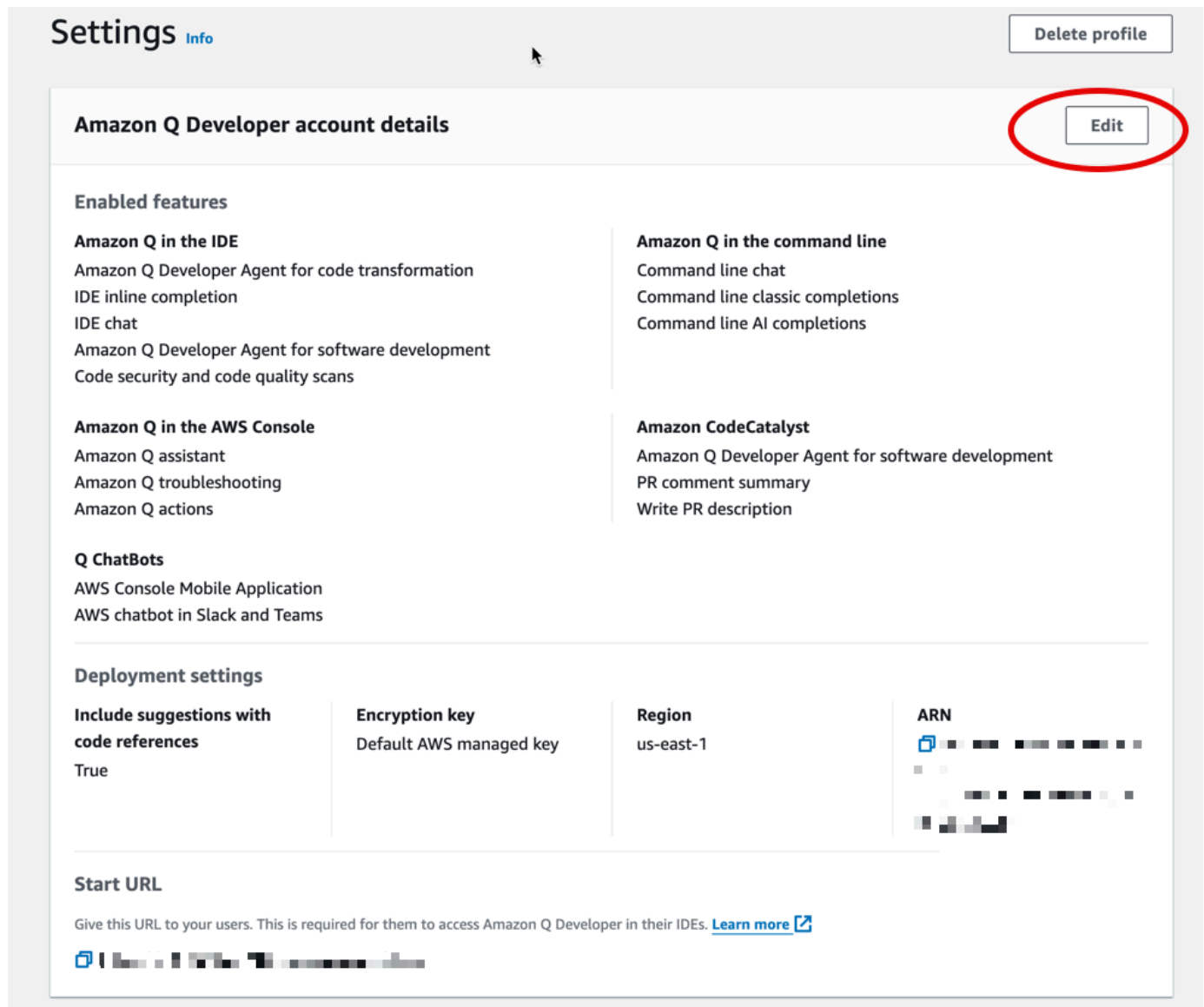
By default, Amazon Q Developer uses an AWS managed key for encryption. For some features, you can set up a customer managed key to encrypt data. For a list of features that support encryption with customer managed keys, see [Data encryption](#).

To set the key used for encryption, complete the following procedure.

1. Open the Amazon Q Developer console.

To use the Amazon Q Developer console, you must have the permissions defined in [Allow administrators to use the Amazon Q Developer console](#).

2. Choose **Settings**.
3. Choose **Edit** in the Amazon Q Developer account details panel.



4. On the **Edit details** page, expand the **Encryption key - optional** section.
5. To use a customer managed key for encryption, select **Customize encryption settings (advanced)**.
6. In the search bar that appears, search for the name of the key you want to use for encryption or enter the key ARN.

If you haven't created a key yet, choose **Create an AWS KMS key**, and then return to this page to add your key.

7. To disable encryption with your customer managed key and revert to an AWS managed key for encryption, deselect **Customize encryption settings (advanced)**.

Amazon Q Developer profile

Note

This section does not apply to personal accounts (Builder IDs).

An *Amazon Q Developer profile*, also known as a *settings profile*, is a collection of Amazon Q Developer settings associated with a set of IAM Identity Center workforce users who have been subscribed to Amazon Q Developer Pro. The profile is also associated with an Amazon Q Developer managed application. The very first time you subscribe users, you will be prompted to install this profile. Installing the profile causes several pages to appear in the side navigation of the Amazon Q Developer console where you can configure Amazon Q Developer Pro features. All subscriptions that you add to your account (during the initial subscription process, and later) will be associated with this profile.

Other characteristics of the Amazon Q Developer profile are:

- The profile is mandatory for use with IAM Identity Center workforce users. You cannot subscribe workforce users without it. It must be installed in the AWS account where you want to subscribe users to Amazon Q Developer Pro.
- The profile can be installed once per supported AWS Region, per AWS account. For a list of AWS Regions supported by the Amazon Q Developer profile, see [Supported Regions for the Q Developer console and Q Developer profile](#).

Enabling profile sharing in Amazon Q Developer

Note

This section does not apply to personal accounts (Builder IDs).

If you are a management account administrator within an organization managed by [AWS Organizations](#), you can enable the *profile sharing* feature. When profile sharing is enabled, the [Amazon Q Developer profile](#) that has been installed in a management account will be shared with member accounts. Sharing the profile has one benefit: it allows IAM Identity Center workforce users who are subscribed to Amazon Q Developer Pro in a *management* account to use their Amazon Q Developer Pro subscription [in the AWS Management Console, and on AWS apps and websites](#) while signed in to a *member* account. When profile sharing is disabled, these users can still use Amazon Q in the AWS Management Console, and on AWS apps and websites, while signed in to a member account, but they'll be subject to Free tier limits and features.

Enabling profile sharing has no effect on users' ability to use [Amazon Q in the integrated development environment \(IDE\)](#) or [on the command line](#).

Use the following instructions to enable profile sharing.

Prerequisites

Before you begin, make sure that:

- You are an administrator of an AWS *management* account.
- You have an IAM Identity Center instance set up in your management account and connected to Amazon Q. To check, sign in to your management account, go to the Amazon Q Developer console, choose **Settings**, and make sure that a **Start URL** appears.
- You have subscribed users to Amazon Q Developer Pro in your management account.
- You have the minimum permissions required to access the Amazon Q Developer console. For more information, see [Allow administrators to use the Amazon Q Developer console](#).

To enable profile sharing

1. Sign in to the AWS Management Console using your AWS management account.
2. Switch to the Amazon Q Developer console.
3. Choose **Settings**.
4. Scroll to the **Member account settings** section and choose **Edit**.
5. Enable **Q Developer managed application and settings profile**.
6. Choose **Save**.

Users who are subscribed to Amazon Q Developer Pro in your management account will now be able to use their Amazon Q Developer Pro subscription in the AWS Management Console, and on AWS apps and websites while signed in to a member account.

Troubleshooting Amazon Q Developer Pro subscriptions

If you are having trouble with Amazon Q Developer Pro subscriptions, review the following issues to understand how to resolve them.

Topics

- [Unable to subscribe users](#)
- [Users not receiving activation emails](#)
- [Users unable to use their subscription on AWS websites](#)
- [Users unable to use their subscription in the IDE](#)

Unable to subscribe users

Problem: Unable to subscribe users to Amazon Q Developer Pro

Solutions:

- Verify that you have the minimum permissions required to subscribe users. For more information, see [Allow administrators to use the Amazon Q Developer console](#). After you obtain the necessary permissions, reload the console page to access Amazon Q.
- Check that you're in the Amazon Q Developer console (not the Amazon Q console).
- Check that you're in a supported AWS Region for Amazon Q Developer. For more information, see [Supported Regions for the Q Developer console and Q Developer profile](#).
- Ensure you're following the correct workflow for the type of account you have. For more information, see [Getting started with a personal account \(Builder ID\)](#), [Subscribe users to Amazon Q Developer Pro in a standalone account](#), [Subscribe users to Amazon Q Developer Pro in a management account](#), or [Subscribe users to Amazon Q Developer Pro in a member account](#).

Users not receiving activation emails

Problem: Users are not receiving activation emails

Solutions:

- Verify the email address is correct in AWS IAM Identity Center.
- Have users check their spam or junk folders for emails titled **Activate Your Amazon Q Developer Pro Subscription**.
- Allow up to 24 hours for activation emails to be delivered.
- Verify the user was properly added to IAM Identity Center. For more information, see [Add users to your IAM Identity Center directory](#) in the *AWS IAM Identity Center User Guide*.

Users unable to use their subscription on AWS websites

Problem: Users are unable to use their subscriptions on AWS websites

When attempting to use Amazon Q [in the AWS Management Console, and on AWS apps and websites](#), users see the following message in their browser:

Your account has not been configured to use an Amazon Q subscription. You currently have access to the Free tier of Amazon Q. Contact your AWS administrator to configure your subscription.

Solutions:

- Verify that identity-enhanced console sessions are enabled (only available with organization instances of IAM Identity Center). For information about how to enable identity-enhanced console sessions, see [Enabling identity-enhanced console sessions](#).
- Check that the user has an active Amazon Q Developer Pro subscription. For more information, see [Amazon Q Developer subscription statuses](#).
- Verify that you're not using an account instance of IAM Identity Center. Account instances don't support console access. For more information, see [Account instance considerations](#) in the *AWS IAM Identity Center User Guide*.

Users with identities in an account instance of IAM Identity Center can still use Amazon Q in the console but will be limited to Free tier.

- If the user recently switched from the Free tier to the Pro tier, have them sign out of the AWS Management Console or another AWS website and sign back in again.

- If you subscribed the user as part of a group, allow up to 24 hours for their subscription to be activated. There might be a delay between the time the user is added to the group and the time their subscription becomes active.
- Verify that the user's access to the Amazon Q Developer Pro managed application was not revoked or that the managed application was not deleted. Restore access to the managed application if needed.
- If users don't have an active subscription, try getting them to refresh their page so that they can use the Free tier.

Users unable to use their subscription in the IDE

Problem: IAM Identity Center workforce users are unable to use their Pro subscriptions in the IDE

Solutions:

- Check that the user has an active Amazon Q Developer Pro subscription. For more information, see [Amazon Q Developer subscription statuses](#).
- If the user recently switched from the Free tier to the Pro tier, have them sign out of Amazon Q in the IDE and sign back in again.
- If you subscribed the user as part of a group, allow up to 24 hours for their subscription to be activated. There might be a delay between the time the user is added to the group and the time their subscription becomes active.
- Verify that the user's access to the Amazon Q Developer Pro managed application was not revoked or that the managed application was not deleted. Restore access to the managed application if needed.
- Have users sign in with a Builder ID to use the Free tier while they wait for their subscription to become active. For more information, see [Installing the Amazon Q Developer extension or plugin in your IDE](#).

Viewing an aggregated list of Amazon Q Developer subscriptions

Note

This section does not apply to personal accounts (Builder IDs).

If you are a management account administrator within an organization managed by [AWS Organizations](#), you can configure Amazon Q to display Amazon Q Developer Pro subscriptions from both *management* and *member* accounts in a single, unified list on the **Subscriptions** page of the Amazon Q Developer console while signed in to your management account. This organization-wide visibility eliminates the need to sign in to multiple accounts to track your subscriptions.

When organization-wide visibility is enabled, IAM Identity Center workforce users and groups subscribed in member accounts appear will appear as read-only with a greyed-out selector next to them, indicating that you cannot take action on them as a management account administrator. If you need to modify these users and groups, you must sign in to the member account that manages them.

 Note

Unified subscription information also appears on the **Dashboard** page of the Amazon Q Developer console when you enable organization-wide visibility.

If you are a member account administrator, you will only ever be able to view the subscriptions within the member accounts that you administer. This is true regardless of whether organization-wide visibility was enabled in the management account.

To enable organization-wide visibility of Amazon Q Developer subscriptions, you must enable trusted access to Amazon Q in your organization. *Trusted access* is an AWS Organizations feature that lets you designate Amazon Q as a *trusted service* that is allowed to query your organization's structure. This querying is required in order to show the status of subscriptions. (Without trusted access, the subscription status is set to **Unavailable**.)

To learn more about trusted access, see [Enabling trusted access for AWS Account Management](#) in the *AWS Organizations User Guide*.

To learn more about member and management accounts, see [Terminology and concepts for AWS Organizations](#) in the *AWS Organizations User Guide* for explanations.

Use the following instructions to enable trusted access to Amazon Q in your organization.

Prerequisites

Before you begin, make sure that:

- You are an administrator of an AWS *management* account.
- You have an *organization instance* of IAM Identity Center set up in your management account and connected to Amazon Q. To check, sign in to your management account, go to the Amazon Q console, choose **Settings**, and make sure the following message appears at the top: **Amazon Q connected to an organization instance of IAM Identity Center**.
- Your organization instance of IAM Identity Center contains users who are subscribed to Amazon Q Developer Pro in member accounts.
- You have the minimum permissions required to perform actions in the Amazon Q console. For more information, see [Allow administrators to use the Amazon Q console](#).

To enable trusted access (enable organization-wide visibility of subscriptions)

1. Sign in to the AWS Management Console using your AWS management account.
2. Switch to the Amazon Q Developer console.
3. Choose **Settings**.
4. In **Subscription view settings**, choose **Edit**.
5. Enable the toggle.
6. Choose **Save**.

Trusted access to Amazon Q is now enabled. Users and groups who are subscribed in member accounts now appear in the Amazon Q Developer console when you're signed in as a management account administrator.

Unsubscribing from Amazon Q Developer Pro

How you unsubscribe from the Pro tier depends on whether you're an end-user with a personal account (Builder ID) or an administrator of IAM Identity Center workforce users.

Unsubscribing a personal account (Builder ID)

Read this section if you want to unsubscribe your personal account (Builder ID) from the Pro tier.

When you unsubscribe your Builder ID, your subscription is marked as **Canceled**, and you can no longer access Amazon Q Developer features. (You can still use the [Free tier](#) though, provided you have not exceeded your Free tier limits.) The final monthly subscription fee is charged at the end of the current billing cycle. You'll be charged for the full month; the fee won't be prorated.

 Warning

Deleting your Builder ID does not unsubscribe you. To stop being billed, you must actively unsubscribe yourself using the instructions in this section.

You can unsubscribe starting from one of the following interfaces:

- IDE
- command line
- AWS Management Console

IDE

To unsubscribe your Builder ID starting from your IDE

1. Authenticate to Amazon Q in your IDE using your personal account (Builder ID). For more information, see [Installing the Amazon Q Developer extension or plugin in your IDE](#).
2. From the Amazon Q menu, choose **Manage Q Developer Pro Subscription**.

A browser window opens.

3. If prompted, sign in to the AWS Management Console using the AWS account that's linked to your personal account (Builder ID). You specified this AWS account when you upgraded your Builder ID to the Pro tier. For more information, see [Upgrading a personal account \(Builder ID\)](#).

The **Subscriptions** page in the Amazon Q Developer console appears.

4. In the **Builder ID users** section, choose **Unsubscribe**.

Command line

To unsubscribe your Builder ID starting from the command line

1. On a computer where Amazon Q for the command line is installed, open a terminal.
2. Make sure you're signed in with your personal account (Builder ID) by typing `q whoami` at the command line.

You should see a Logged in with Builder ID message.

3. Start a chat session by typing `q chat` at your terminal's prompt.

An interactive chat sessions opens.

4. Type **`/subscribe --manage`**.

The AWS Management Console launches in a browser window.

 Note

If the AWS Management Console doesn't automatically launch, copy and paste the URL from the terminal into a browser window.

5. If prompted, sign in to the AWS Management Console using the AWS account that's linked to your personal account (Builder ID). You specified this AWS account when you upgraded your Builder ID to the Pro tier. For more information, see [Upgrading a personal account \(Builder ID\)](#).

The **Subscriptions** page in the Amazon Q Developer console appears.

6. In the **Builder ID users** section, choose **Unsubscribe**.

AWS Management Console

To unsubscribe your Builder ID starting from the AWS Management Console

1. Sign in to the AWS Management Console using the AWS account that's linked to your personal account (Builder ID). You specified this AWS account when you upgraded your Builder ID to the Pro tier. For more information, see [Upgrading a personal account \(Builder ID\)](#).
2. Switch to the Amazon Q Developer console.
3. Choose **Subscriptions**.
4. In the **Builder ID users** section, choose **Unsubscribe**.

Unsubscribing IAM Identity Center workforce users

If you are the administrator of an AWS standalone account, an AWS management account, or an AWS member account, use the following procedure to unsubscribe IAM Identity Center workforce users from your account.

For more information about AWS management and member accounts, see [Managing AWS accounts in an organization with AWS Organizations](#).

Notes about unsubscribing users:

- If you are an administrator of either a management or member account within an organization managed by [AWS Organizations](#), you can only unsubscribe users if you created their subscriptions.
- If a user has been subscribed in both member and management accounts, both account administrators must unsubscribe the user from their respective accounts for the user to be fully unsubscribed.
- If you are a management account administrator, you can view other accounts the user is subscribed in by choosing **View subscriptions from member accounts** on the **Settings** page of the Amazon Q Developer console. This allows you to coordinate with member account administrators for unsubscription. Alternatively, if you have the appropriate permissions, you can sign in as a member account administrator and unsubscribe the user directly. For more information about viewing member account subscriptions as a management account administrator, see [Viewing an aggregated list of Amazon Q Developer subscriptions](#).
- After unsubscribing users or groups, their subscriptions are marked as **Canceled**, and they can no longer access Amazon Q Developer features. (They can still use the [Free tier](#) though, provided they have not exceeded their Free tier limits.) The final monthly subscription fee is charged at the end of the current billing cycle for all users who had active subscriptions. You'll be charged for the full month; the fee won't be prorated.

To unsubscribe a user or group you manage

1. Sign in to the AWS Management Console using your AWS standalone, management, or member account.
2. Switch to the Amazon Q Developer console.
3. In the **Identity provider users and groups** section, choose the **Users** or **Groups** tab.
4. Choose the user or group you want to unsubscribe.

5. Choose **More actions**.
6. Choose **Unsubscribe**.

Upgrading to Amazon Q Developer Pro

How you upgrade to the Pro tier from the Free tier depends on whether you're an end-user with a personal account (Builder ID) or whether you're an administrator of IAM Identity Center workforce users.

Upgrading a personal account (Builder ID)

Read this section if you want to upgrade your personal account (Builder ID) from the Free tier to a Pro tier monthly subscription. For reasons why you might consider upgrading, see [Tiers of service](#), and [Limitations of Builder IDs](#).

You can upgrade starting from one of the following interfaces:

- IDE
- command line

Before you begin

- Create an AWS account if you don't have one yet. This account will be linked to your Builder ID, and will be charged the monthly subscription fee. For more information about creating an account, see [Create an AWS account](#) in the *AWS Account Management Reference Guide*.

Note

You cannot link multiple Builder IDs to a single AWS account. If you have multiple Builder IDs that you want to upgrade, create separate AWS accounts for each.

IDE

To upgrade starting from the IDE

1. Authenticate to Amazon Q in your IDE using your personal account (Builder ID). For more information, see [Installing the Amazon Q Developer extension or plugin in your IDE](#).

2. In your IDE, do one of the following:

- If you see a `Monthly request limit reached` message in the Amazon Q chat window, choose **Subscribe to Q Developer Pro**.

Or

- From the Amazon Q menu, choose **Subscribe to Q Developer Pro**.

A browser window opens.

3. If prompted, sign in using your AWS account. You should have created this account previously, as described in **Before you begin**.

A **Review upgrade details for Q Developer Pro** page appears. The page shows your Builder ID, AWS account number, and subscription fee, among other information. For more information about the subscription fee, see [Subscription billing](#). The **Activation token** field shows a one-time token that links your AWS account with your Builder ID. This token is never used again.

4. Choose **Confirm upgrade**.

The **Subscriptions** page of the Amazon Q Developer console appears with an **Upgrade to Q Developer Pro successful** message at the top. You should see your user name listed in the **Builder ID users** section.

Your personal account (Builder ID) is now subscribed to the Pro tier.

5. (Optional) Return to the Amazon Q chat window in your IDE.

You should see a **Successfully subscribed to Amazon Q Developer Pro** message.

Command line

To upgrade starting from the command line

1. On a computer where Amazon Q for the command line is installed, open a terminal.
2. Make sure you're signed in with your personal account (Builder ID) by typing `q whoami` at the command line.

You should see a `Logged in with Builder ID` message.

3. Start a chat session by typing `q chat` at your terminal's prompt.

An interactive chat sessions opens.

4. Type **/subscribe**.

The AWS Management Console launches in a browser window.

 Note

If the AWS Management Console doesn't automatically launch, copy and paste the URL from the terminal into a browser window.

5. If prompted, sign in using your AWS account. You should have created this account previously, as described in **Before you begin**.

A **Review upgrade details for Q Developer Pro** page appears. The page shows your Builder ID, AWS account number, and subscription fee, among other information. For more information about the subscription fee, see [Subscription billing](#). The **Activation token** field shows a one-time token that links your AWS account with your Builder ID. This token is never used again.

6. Choose **Confirm upgrade**.

The **Subscriptions** page of the Amazon Q Developer console appears with a **Upgrade to Q Developer Pro successful** message at the top. You should see your user name listed in the **Builder ID users** section.

Your personal account (Builder ID) is now subscribed to the Pro tier.

7. (Optional) Verify that you're subscribed by typing **/subscribe** at the Q CLI prompt. Amazon Q should indicate that you're already subscribed.

Upgrading IAM Identity Center workforce users to the Pro tier

If you are the administrator of IAM Identity Center workforce users, you can upgrade these users to the Pro tier following the instructions in [Getting started with IAM Identity Center](#).

Using Amazon Q Developer on AWS apps and websites

Use Amazon Q Developer in the AWS Management Console, AWS Console Mobile Application, AWS Marketing website, AWS Documentation website, and supported chat applications to ask questions about AWS. You can ask Amazon Q about AWS architecture, best practices, support, and documentation. Amazon Q can also help with code that you're writing with the AWS SDKs and AWS Command Line Interface (AWS CLI).

In the AWS Management Console, you can ask Amazon Q about your AWS resources and costs, contact Support directly, and diagnose common console errors.

To quickly provide access to features of Amazon Q Developer on AWS, attach the [AmazonQDeveloperAccess](#) AWS managed policy to the IAM identity using Amazon Q. For permissions needed for specific features, see the topic for the feature you want to use.

Topics

- [Authenticating to your Amazon Q Developer Pro subscription](#)
- [Chatting with Amazon Q Developer about AWS](#)
- [Using Amazon Q Developer plugins](#)
- [Automating AWS services with Amazon Q Developer Console-to-Code](#)
- [Diagnosing common errors in the console with Amazon Q Developer](#)
- [Using Amazon Q Developer to chat with Support](#)

Authenticating to your Amazon Q Developer Pro subscription

To access Amazon Q at the Free tier, sign in to the AWS Management Console. Any Free tier features are available as long as you have the required permissions.

To access Amazon Q at the Pro tier, sign to the console with IAM Identity Center. When you sign in with IAM Identity Center, including authenticating through an external identity provider that is connected to IAM Identity Center, you will automatically have access to the Pro tier if your IAM Identity Center identity is subscribed to Amazon Q Developer Pro.

For more information on the Amazon Q Developer Pro tier, see [Tiers of service for Q Developer – Free, Pro, and Pro+](#).

Note

If you see an error message that starts with, Your account has not been configured to use an Amazon Q subscription, see [Troubleshooting Amazon Q Developer Pro subscriptions](#) for troubleshooting tips.

If you sign in to the AWS console with IAM or federation with IAM, then you will be prompted to authenticate with IAM Identity Center when you reach a Free tier limit or attempt to use a feature only available at the Pro tier.

Chatting with Amazon Q Developer about AWS

Chat with Amazon Q in the AWS Management Console, AWS Console Mobile Application, AWS website, AWS Documentation website, and chat applications to learn about AWS services.

You can ask Amazon Q about best practices, recommendations, step-by-step instructions for AWS tasks, and architecting your AWS resources and workflows. You can also ask about your AWS resources and account costs. Amazon Q additionally generates short scripts or code snippets to help you get started using the AWS SDKs and AWS CLI.

The following topics describe how to use Amazon Q chat and topics you can chat about.

Topics

- [Add permissions](#)
- [Start a conversation](#)
- [Manage conversations in the console](#)
- [Set chat settings](#)
- [Example questions](#)
- [Chatting about your resources with Amazon Q Developer](#)
- [Asking Amazon Q to troubleshoot your resources](#)
- [Chatting about your costs](#)
- [Chatting about your network security](#)
- [Chatting about your telemetry and operations](#)

Add permissions

For an IAM policy that grants permissions needed for chatting with Amazon Q, see [Allow users to chat with Amazon Q](#).

Start a conversation

To open up the Amazon Q chat panel in the AWS Management Console, choose the Amazon Q icon in the right sidebar. To open up the panel on the AWS website or any AWS service's documentation page, choose the Amazon Q icon in the bottom right corner.

To ask Amazon Q a question, enter your question into the text bar in the Amazon Q panel. Amazon Q generates a response to your question with a sources section that links to its references.

After you receive a response, you can optionally leave feedback by using the thumbs-up and thumbs-down icons. You can also copy the response to your clipboard by choosing the copy icon.

To start a new conversation in the console:

1. From the welcome screen, choose **New conversation** at the bottom of the chat panel.
2. From an active conversation, you can start a new conversation by choosing the plus icon in the top right corner of the chat panel. From the welcome screen, choose **New conversation** at the bottom of the chat panel.
3. To name or rename a conversation, choose the text at the top of the chat panel and enter your conversation name.

Manage conversations in the console

Amazon Q maintains the history of previously asked questions and responses within a given conversation to use as context to inform responses. You can save up to 1,000 separate conversations with Amazon Q chat in the AWS console.

When you start a conversation, it's automatically saved as a new conversation. You can title the conversation, or Amazon Q will generate a title based on the first few questions in the conversation.

You can switch between conversations to continue chatting with Amazon Q about previous topics you've asked about. Inactive conversations, in which you don't ask a new question, will be deleted after 90 days. Messages older than 90 days will be deleted, even if a conversation is still active.

To switch conversations:

1. Choose the menu icon on the top left of the chat panel. The **Conversations** page opens in the chat panel.
2. Choose the name of the conversation you want to resume. You are redirected to the chat panel where you can continue chatting with Amazon Q.

To delete conversations:

1. Choose the menu icon on the top left of the chat panel. The **Conversations** page opens in the chat panel.
2. Choose the delete icon next to the name of the conversation you want to delete. Confirm you want to delete the conversation by choosing **Delete** on the pop-up that appears.

If you're using Amazon Q in the console, your current conversation and associated context are maintained when you navigate to another place in the console or to another browser or tab.

If you're using Amazon Q on the AWS website, Documentation website, or Console Mobile Application, a new conversation starts without any context when you navigate to a new page, browser, or tab.

Set chat settings

To update your chat settings in Amazon Q, choose the gear icon in the top right corner of the chat panel.

You can specify the following settings:

- **Region** — Amazon Q defaults to the AWS Region set in the AWS Management Console when you open the chat panel. To update the Region used by Amazon Q, change your console Region.

Example questions

You can ask Amazon Q questions about AWS and AWS services, such as finding the right service or understanding best practices.

You can also ask about software development with the AWS SDKs and AWS CLI. Amazon Q in the console can generate short scripts or code snippets to help you get started using the AWS SDKs and AWS CLI.

The following are example questions that demonstrate how Amazon Q can help you build on AWS:

- What's the maximum runtime for a Lambda function?
- When should I put my resources in a VPC?
- What's the best container service to use to run my workload if I need to keep my costs low?
- How do I list my Amazon S3 buckets?
- How do I create and host a website on AWS?

Chatting about your resources with Amazon Q Developer

Amazon Q Developer answers questions about your AWS account resources to help you understand your AWS infrastructure through natural language prompts. Using advanced reasoning capabilities, Amazon Q analyzes and provides insights about your resources so you can quickly get the information you need without relying on multiple service consoles, APIs, or complicated scripts.

The type of resource analysis Amazon Q can perform includes:

- **Resource listing and details** – Ask for lists or specific details about resources in your account.
- **Filtered queries** – Request resource information based on criteria such as region or configuration state.
- **Cross-service analysis** – Ask complex questions about your infrastructure, configurations, and dependencies across multiple AWS resources and services.
- **Troubleshooting assistance** – Get help identifying and resolving issues with your resources. For more information, see [Asking Amazon Q to troubleshoot your resources](#).

For examples of questions you can ask, see [Ask Amazon Q for resource information](#).

Topics

- [How it works](#)
- [Prerequisites](#)
- [Ask Amazon Q for resource information](#)
- [Count resources with AWS Resource Explorer](#)

How it works

To respond to questions about resources, Amazon Q uses service APIs and AWS Cloud Control API to retrieve the requested information. To allow Amazon Q to call the APIs required to retrieve requested resource information, your IAM identity must have permissions to use those APIs. For more information, see [Prerequisites](#).

Amazon Q can perform get, list, and describe actions to retrieve information about multiple AWS resources at a time. When asked complex resource questions, Amazon Q creates dynamic, multi-step plans that explain the reasoning behind the actions it's taking to further your understanding of your AWS environment. If the initial plan fails, Amazon Q attempts alternative methods or prompts you for any additional information required to continue.

Amazon Q can't answer questions about the data stored in your resources, such as listing objects in an Amazon S3 bucket, or questions related to your account security, identity, credentials, or cryptography.

Prerequisites

You can chat about your account resources with Amazon Q in the AWS Management Console, AWS Console Mobile Application, and in [configured chat applications](#).

To chat about your resources, your IAM identity must have the following permissions:

- Permissions to chat with Amazon Q, to use Cloud Control API, and to allow Amazon Q to access your resources. For an IAM policy that grants the required permissions, see [Allow users to chat about resources with Amazon Q](#).
- Permissions to access the resources you ask about. For example, if you ask Amazon Q to list your Amazon S3 buckets, you must have the `s3:ListAllMyBuckets` permission.

Amazon Q will never access resources that your IAM identity doesn't have access to.

Important

Normal fees apply when you ask Amazon Q to perform read, list, or describe actions. For more information, see the pricing page for the AWS service you are asking Amazon Q about.

Ask Amazon Q for resource information

When you ask Amazon Q about your resources, you can specify the AWS Region that Amazon Q calls to locate your resources. If no Region is specified in a given query, Amazon Q will use a Region previously specified in your conversation if applicable, and otherwise uses your current console Region (or the most recent console Region if you are using a global console Region).

Amazon Q might need additional information to answer to your resource questions. When Amazon Q asks a follow up, reply with the requested details.

Following are example questions you can ask Amazon Q about your resources:

- Describe the encryption settings for S3 bucket *<name>*
- What SQS queues invoke my Lambda functions?
- Do I have any MySQL RDS clusters that need updates?
- List my EC2 instances in *<region>*
- Get the configuration for my lambda function *<name>*
- What alarms are configured for instance *<instance ID>*?

Count resources with AWS Resource Explorer

When you ask a question that requires resource counting, such as 'How many EC2 resources are running in my account?', Amazon Q uses Cloud Control API by default to return a count of the requested resources. You also have the option to enable and configure Resource Explorer for faster resource counting with Amazon Q.

If Resource Explorer is enabled, Amazon Q will attempt to use it when generating a response that requires counting your resources. Amazon Q can use Resource Explorer to count a single type of resource across all AWS Regions. Using Resource Explorer enables Amazon Q to count resources faster by returning the count from the Resource Explorer index, as opposed to calling service APIs to list resources and count the results.

If you choose to enable Resource Explorer for resource counting, note that resource information can be out of date. Resource Explorer indexes resources in your account by taking a periodic inventory, and if resources have been created or deleted after the last inventory, the resource count will be incorrect. Resource Explorer also doesn't support resource filtering. If you ask to count resources matching a specific criteria, Amazon Q will fall back to Cloud Control API.

If you don't have Resource Explorer enabled and configured for use, or if Amazon Q can't use Resource Explorer to answer your question, Amazon Q uses Cloud Control API to count resources. Using Cloud Control API ensures an accurate resource count and supports resource filtering, however this can also lead to increased latency compared to counting with Resource Explorer. If you are counting a large number of resources, Cloud Control API can also time out.

To use Resource Explorer for resource counting, the following configuration is required:

- The user interacting with Amazon Q must be in account where an Resource Explorer default view is configured and an aggregator index has been created in the same Region as the default view. For more information, see [Setting up Resource Explorer using Advanced setup](#) in the *AWS Resource Explorer User Guide*.
- The user's IAM identity must have read permissions for the default view. For more information, see [Granting access to Resource Explorer views for search](#) in the *AWS Resource Explorer User Guide*.

Asking Amazon Q to troubleshoot your resources

In the AWS Management Console, you can ask Amazon Q to troubleshoot issues you're having with your AWS resources. When you encounter a problem, open the chat panel and describe the situation to Amazon Q. For instance, you might enter, "I can't add an object to my S3 bucket" or "My load balancer is returning a 503 error". Amazon Q analyzes the information you provided to identify potential root causes. It then offers tailored solutions, step-by-step instructions, or best practices to resolve your issue efficiently.

Amazon Q currently accepts English prompts for the issues shown in the following table.

AWS service	Type of issue that Amazon Q can help with	Example prompts
Amazon S3	Permissions issues	Why can't I put objects into my S3 bucket? The bucket ID is amzn-s3-demo-bucket. Why can't I delete the object s3://amzn-s3-demo-bucket-locked/Q-Stream2.jpg?

AWS service	Type of issue that Amazon Q can help with	Example prompts
		Why can't I delete an object in S3?
AWS Glue	Job failures	My Glue job with the job name 'Run111B11B11-<...>' and the job run id 'bb_b1b111<...>' in the 'us-west-2' region failed. Why did my Glue job called GlueRun00AA00A00A-<...> fail?
Amazon Athena	Query issues	My Athena query didn't return any results. query ID: 222c22cc-2c022-<...> region id: us-east-2 I ran an Athena query with an execution ID of 333d33dd-3d33-<...> and a region of us-east-1, and it didn't return any results.

AWS service	Type of issue that Amazon Q can help with	Example prompts
Amazon ECS	Task stoppage issues; Fargate health check issues; disconnected agent issues	My ECS task is stopped and I don't know why. The details of the task are: Cluster: my-ecs-cluster, Service: my-ecs-service, Task Definition: my-task-definition, Task ARN: arn:aws:ecs:us-west-2:444444444444:task/my-ecs-cluster/4ee4ee4ee4444<...> I'm having a problem with my ECS task. The task health check always fails for the task in the 'my-ecs-cluster' cluster and service. The Amazon ECS agent on one of my container instances appears to be disconnected. The agent is not responding or updating its status, which is causing tasks to be stuck in a pending state.
Amazon EC2 Elastic Load Balancing	Health check issues; 504, 503, 502, and 500 errors	Why are the health checks for the target group called 'my-target-group' failing? Why am I receiving 503 errors from my load balancer 'my-elb'?

AWS service	Type of issue that Amazon Q can help with	Example prompts
Amazon EKS	Application Load Balancer (ALB) ingress controller issues; managed add-on issues	I have an ALB ingress controller in my EKS cluster, and am seeing a failure with the error message 'WebIdentityErr:failed to retrieve credentials'. The AWS region is us-west-2. There seems to be an issue with the add-ons in my EKS cluster called my-eks-cluster, in the us-west-2 region.
Amazon ECR	Secondary account access issues	I'm having difficulty granting access to an Amazon ECR image repository from a different AWS account. Specifically, I need to allow account 222222222222 to push and pull images from the repository named "my-ecr-repo" in my account (111111111111) in the region (us-west-2).

For Amazon Q to troubleshoot your resources, you'll need the same permissions as those outlined in [Chatting about your resources with Amazon Q Developer](#).

Chatting about your costs

You can ask Amazon Q about your historical and forecasted AWS cost data as well as how to optimize your costs. Amazon Q can retrieve your cost data, explain costs, and analyze cost trends, so you can understand your costs without referring to documentation or interrupting your workflow. Amazon Q can also provide recommendations on how to optimize your AWS costs,

including rightsizing instances, stopping or deleting idle or unused resources, migrating EC2 instances to AWS Graviton-based instances, and purchasing Savings Plans.

When you ask Amazon Q about your costs, its response includes the specific parameters used to retrieve the data, as well as a link to learn more in the AWS Management Console.

For more information about cost analysis in Amazon Q, see [Analyzing and optimizing your costs using generative AI with Amazon Q Developer](#) in the *AWS Cost Management User Guide*.

Prerequisites

You can chat about your AWS costs in the AWS Management Console and in [configured chat applications](#).

For Amazon Q to answer questions about your costs, the following prerequisites must be met.

Add permissions

To chat about your costs, your IAM identity must have permissions to chat with Amazon Q, access your billing data, and retrieve cost optimization recommendations. For an IAM policy that grants the required permissions, see [Allow Amazon Q to access cost data and provide cost optimization recommendations](#).

Enable AWS Cost Explorer and AWS Cost Optimization Hub

To chat about your costs with Amazon Q, you must enable AWS Cost Explorer in your AWS account. To enable Cost Explorer, open the Cost Explorer console. For more information, see [Enabling Cost Explorer](#) in the *AWS Cost Management User Guide*.

To receive cost optimization recommendations from Amazon Q, you must enable AWS Cost Optimization Hub. For more information, see [Getting started with Cost Optimization Hub](#) in the *AWS Cost Management User Guide*.

Example questions

Following are example questions about costs that you can ask Amazon Q:

- How much did we spend on SageMaker AI in January?
- What are the top contributing services to my AWS bill in the 'eu-central-1' region?
- What were my Amazon EC2 costs by instance type last week?
- What was my cost breakdown by service for the past three months?

- How can I lower my AWS bill?
- What are my top cost optimization opportunities?
- Are any of my Amazon EC2 instances over-provisioned?
- Which Savings Plans should I purchase?

Chatting about your network security

Chatting about network security is in preview, and is subject to change.

Amazon Q can help you analyze your network security configurations, identify missing or misconfigured AWS network security services, and provide recommendations for a stronger network security posture. This helps you understand network security findings, implement remediation steps, and follow security best practices without interrupting your workflow.

When you ask Amazon Q about your network security, its responses include specific information about your resources, related security findings, and detailed remediation instructions as well as links to learn more in the AWS Management Console.

For more information about network security analysis with Amazon Q, see [Get insights with Amazon Q Developer](#) in the *AWS Shield network security director Developer Guide*.

Prerequisites

You can chat about your AWS network security in the AWS Management Console and in [configured chat applications](#).

For Amazon Q to answer questions about your network security, the following prerequisites must be met.

Add permissions

To chat about your network security, your IAM identity must have permissions to chat with Amazon Q. For an IAM policy that grants the required permissions, see [Allow users to chat with Amazon Q](#).

Enable AWS Shield network security director

To chat about your network security with Amazon Q, you must enable AWS Shield network security director in your AWS account. To enable AWS Shield network security director:

1. Open the AWS Shield network security director console at <https://console.aws.amazon.com/nsd/>.
2. Follow the setup instructions to enable the service.
3. Run a scan to collect security information about your resources.

Example questions

Following are example questions about network security that you can ask Amazon Q:

- Identify my top network security findings
- Summarize the network security of my environment
- Are my systems at risk of DDoS attacks?
- How can I improve my network security?
- Do I have any resources without WAF protection?
- Which resources are not protected from common web vulnerabilities?
- What are the common network security issues on my EC2 instances?
- Do I have any WAF WebACLs that aren't protecting anything?

Chatting about your telemetry and operations

Amazon Q analyzes your CloudWatch telemetry and operational data to help manage your AWS environment. It retrieves resource health information, monitors alarms, and provides troubleshooting guidance. When you ask questions, Amazon Q may prompt you for specific details like resource names and time ranges to ensure accurate assistance.

AWS service health check: Evaluate the health of resources of specified AWS services, assisting customers in troubleshooting and resolving issues or errors they encounter with these resources.

- Is my Lambda function X healthy?
- Is anything wrong with my Amazon ECS clusters?
- Help me troubleshoot my DynamoDB tables between time X and Y.
- Investigate anomalies related to Amazon S3 between time X and Y.

Alarm troubleshooting: Identifies alarms in Alarm state and the underlying telemetry that triggered the alarm, helping customers diagnose the reasons behind the alarm/alert/pages.

- Why is my alarm with name X firing?

Application Signals specific troubleshooting: Analyzes CloudWatch Application Signals service-level objectives and indicators to determine the overall health of a service, enabling you to assess and maintain application performance.

- Is my Service X in environment Y healthy?

For more information about how Amazon Q analyzes your CloudWatch telemetry and operational data, see *CloudWatch investigations* in the [Amazon CloudWatch User Guide](#).

Using Amazon Q Developer plugins

Amazon Q Developer integrates with third party monitoring tools and security platforms so you can access your AWS application insights without leaving the AWS builder environment. In the AWS Management Console, you can chat about metrics provided by these tools to understand and address application performance, errors, or vulnerabilities.

After you configure a plugin, add the plugin alias to the beginning of your question when you chat with Amazon Q in the AWS console. Amazon Q calls the third party provider APIs to retrieve resources and generates a response with deep links to the external resources.

When Amazon Q calls a third party API, the API will not appear in AWS CloudTrail logs. The CloudTrail log will only show when an AWS Secrets Manager secret is accessed by Amazon Q to retrieve credentials to connect to the third party provider.

Amazon Q doesn't share any information with third party providers when you configure or use plugins. For more information on how Amazon Q uses your data, see [Data protection](#).

Note

Member accounts within an AWS organization don't have access to plugins that are configured in the organization's management account profile. Each member account must create their own Q Developer profile before they can configure and use plugins in their account.

⚠ Warning

Third party provider user permissions are not detected by Amazon Q Developer plugins. When an administrator configures a plugin in an AWS account, users with plugin permissions in that account have access to any resources in the third party provider account retrievable by the plugin.

You can configure IAM policies to restrict which plugins users have access to. For more information, see [Allow users to chat with plugins from one provider](#).

To get started, see the topic for the plugin you want to use with Amazon Q Developer.

Topics

- [Configuring the Amazon Q Developer CloudZero plugin](#)
- [Configuring the Amazon Q Developer Datadog plugin](#)
- [Configuring the Amazon Q Developer Wiz plugin](#)

Configuring the Amazon Q Developer CloudZero plugin

CloudZero is a cloud cost optimization platform that evaluates costs to improve cloud efficiency. If you use CloudZero to monitor your AWS costs, you can use the CloudZero plugin in Amazon Q Developer chat to access cost insights without leaving the AWS Management Console.

You can use the CloudZero plugin to understand your AWS costs, get cost optimization insights, and track billing. After you receive a response, you can ask follow up questions, such as the status or cost impact of CloudZero insights.

To configure the plugin, you provide authentication credentials from your CloudZero account to enable a connection between Amazon Q and CloudZero. After you configure the plugin, you can access CloudZero data by adding **@cloudzero** to the beginning of your question in Amazon Q chat.

⚠ Warning

CloudZero user permissions are not detected by the CloudZero plugin in Amazon Q. When an administrator configures the CloudZero plugin in an AWS account, users with plugin permissions in that account have access to any resources in the CloudZero account retrievable by the plugin.

You can configure IAM policies to restrict which plugins users have access to. For more information, see [Configure user permissions](#).

Prerequisites

Add permissions

To configure plugins, the following administrator level permissions are required:

- Permissions to access the Amazon Q Developer console. For an example IAM policy that grants needed permissions, see [Allow administrators to use the Amazon Q Developer console](#).
- Permissions to configure plugins. For an example IAM policy that grants the needed permissions, see [Allow administrators to configure plugins](#).

Acquire credentials

Before you begin, note the following information from your CloudZero account. These authentication credentials will be stored in an AWS Secrets Manager secret when you configure the plugin.

- **API key** – An access key that allows Amazon Q to call the CloudZero API to access your organization's cost insights and billing information. You can find the API key in your CloudZero account settings. For more information, see the [Authorization](#) in the CloudZero documentation.

For more information on acquiring credentials from your CloudZero account, see the [CloudZero documentation](#).

Secrets and service roles

AWS Secrets Manager secret

When you configure the plugin, Amazon Q creates a new AWS Secrets Manager secret for you to store CloudZero authentication credentials. Alternatively, you can use an existing secret that you create yourself.

If you create a secret yourself, enter the API key as plaintext:

your-api-key

For more information about creating secrets, see [Create a secret](#) in the *AWS Secrets Manager User Guide*.

Service roles

To configure the CloudZero plugin in Amazon Q Developer, you need to create a service role that gives Amazon Q permission to access your Secrets Manager secret. Amazon Q assumes this role to access the secret where your CloudZero credentials are stored.

When you configure the plugin in the AWS console, you have the option to create a new secret or use an existing one. If you create a new secret, the associated service role is created for you. If you use an existing secret and an existing service role, make sure your service role contains the following permissions, and has the following trust policy attached. The service role required depends on your secret encryption method.

If your secret is encrypted with an AWS managed KMS key, the following IAM service role is required:

```
{
  "Version": "2012-10-17",
  "Statement": [
    {
      "Effect": "Allow",
      "Action": [
        "secretsmanager:GetSecretValue"
      ],
      "Resource": [
        "arn:aws:secretsmanager:{{your-region}}:{{your-account-id}}:secret:
[[secret-id]]"
      ]
    }
  ]
}
```

If your secret is encrypted with a customer managed AWS KMS key, the following IAM service role is required:

```
{
  "Version": "2012-10-17",
  "Statement": [
    {

```

```

        "Effect": "Allow",
        "Action": [
            "secretsmanager:GetSecretValue"
        ],
        "Resource": "arn:aws:secretsmanager:{{region}}:{{accountId}}:secret:
{{secretId}}"
    },
    {
        "Effect": "Allow",
        "Action": [
            "kms:Decrypt"
        ],
        "Resource": "arn:aws:kms:{{region}}:{{accountId}}:key/{{keyId}}",
        "Condition": {
            "StringEquals": {
                "kms:ViaService": "secretsmanager.{{region}}.amazonaws.com"
            }
        }
    }
]
}

```

To allow Amazon Q to assume the service role, the service role needs the following trust policy:

Note

The codewhisperer prefix is a legacy name from a service that merged with Amazon Q Developer. For more information, see [Amazon Q Developer rename - Summary of changes](#).

```

{
  "Version": "2012-10-17",
  "Statement": [
    {
      "Effect": "Allow",
      "Principal": {
        "Service": "q.amazonaws.com"
      },
      "Action": ["sts:AssumeRole", "sts:SetContext"],
      "Condition": {
        "StringEquals": {
          "aws:SourceAccount": "{{accountId}}",

```

```
        "aws:SourceArn": "arn:aws:codewhisperer:{{region}}:{{accountId}}:profile/
        {{profileId}}"
    }
}
]
```

For more information about service roles, see [Create a role to delegate permissions to an AWS service](#) in the *AWS Identity and Access Management User Guide*.

Configure the CloudZero plugin

You configure plugins in the Amazon Q Developer console. Amazon Q uses credentials stored in AWS Secrets Manager to enable interactions with CloudZero.

To configure the CloudZero plugin, complete the following procedure:

1. Open the Amazon Q Developer console at <https://console.aws.amazon.com/amazonq/developer/home>
2. On the Amazon Q Developer console home page, choose **Settings**.
3. In the navigation bar, choose **Plugins**.
4. On the plugins page, choose the plus sign on the **CloudZero** panel. The plugin configuration page opens.
5. For **Configure AWS Secrets Manager**, choose either **Create a new secret** or **Use an existing secret**. The Secrets Manager secret is where your CloudZero authentication credentials will be stored.

If you create a new secret, enter the following information:

- a. For **CloudZero API key**, enter the API key for your CloudZero organization.
- b. A service role will be created that Amazon Q will use to access the secret where your CloudZero credentials are stored. Do not edit the service role that is created for you.

If you use an existing secret, choose a secret from the **AWS Secrets Manager secret** dropdown menu. The secret should include the CloudZero authentication credentials specified in the previous step.

For more information about the required credentials, see [Acquire credentials](#).

6. For **Configure AWS IAM service role**, choose either **Create new service role** or **Use existing service role**.

 Note

If you chose **Create a new secret** for step 6, you can't use an existing service role. A new role will be created for you.

If you create a new service role, a service role will be created that Amazon Q will use to access the secret where your CloudZero credentials are stored. Do not edit the service role that is created for you.

If you use an existing service role, choose a role from the dropdown menu that appears. Make sure your service role has the permissions and trust policy defined in [Service roles](#).

7. Choose **Save configuration**.
8. After the CloudZero plugin panel appears in the **Configured plugins** section on the Plugins page, users will have access to the plugin.

If you want to update the credentials for a plugin, you must delete your current plugin and configure a new one. Deleting a plugin removes all previous specifications. Any time you configure a new plugin, a new plugin ARN is generated.

Configure user permissions

To use plugins, the following permissions are required:

- Permissions to chat with Amazon Q in the console. For an example IAM policy that grants permissions needed to chat, see [Allow users to chat with Amazon Q](#).
- The `q:UsePlugin` permission.

When you grant an IAM identity access to a configured CloudZero plugin, the identity gains access to any resources in the CloudZero account retrievable by the plugin. CloudZero user permissions are not detected by the plugin. If you want to control access to a plugin, you can do so by specifying the plugin ARN in an IAM policy.

Each time you create or delete and re-configure a plugin, it is assigned a new ARN. If you use a plugin ARN in a policy, it will need to be updated if you want to grant access to the newly configured plugin.

To locate the CloudZero plugin ARN, go to the **Plugins** page in the Amazon Q Developer console and choose the configured CloudZero plugin. On the plugin details page, copy the plugin ARN. You can add this ARN to a policy to allow or deny access to the CloudZero plugin.

If you create a policy to control access to CloudZero plugins, specify CloudZero for the plugin provider in the policy.

For examples of IAM policies that control plugin access, see [Allow users to chat with plugins from one provider](#).

Chat with the CloudZero plugin

To use the CloudZero plugin, enter **@cloudzero** at the beginning of a question about CloudZero or your AWS application monitors and cases. Follow up questions or responses to questions from Amazon Q must also include **@cloudzero**.

Following are some example use cases and associated questions you can ask to get the most of out of the Amazon Q CloudZero plugin:

- **Learn about using CloudZero with AWS** – Ask about how CloudZero features work. Amazon Q might ask you for more information about what you're trying to do to provide the best answer.
 - **@cloudzero how do I use CloudZero?**
 - **@cloudzero how do I get started with CloudZero?**
- **List cost insights** – Get a list of cost insights or find out more about a specific insight.
 - **@cloudzero list my top cost insights**
 - **@cloudzero tell me more about insight <insight ID>**
- **Get billing information** – Ask the Amazon Q CloudZero plugin about your AWS billing information.
 - **@cloudzero what were my AWS costs for December 2024?**

Configuring the Amazon Q Developer Datadog plugin

Datadog is a monitoring and security platform that provides infrastructure, application, and network monitoring and analytics. If you use Datadog to monitor your AWS applications, you can

use the Datadog plugin in Amazon Q Developer chat to access monitoring information without leaving the AWS Management Console.

You can use the Datadog plugin to learn about Datadog, understand how it works with AWS services, and ask about your Datadog cases and monitors. After you receive a response, you can ask follow up questions, including how to address an issue or for details about Datadog resources.

To configure the plugin, you provide authentication credentials from your Datadog account to enable a connection between Amazon Q and Datadog. After you configure the plugin, you can access Datadog metrics by adding **@datadog** to the beginning of your question in Amazon Q chat.

Warning

Datadog user permissions are not detected by the Datadog plugin in Amazon Q. When an administrator configures the Datadog plugin in an AWS account, users with plugin permissions in that account have access to any resources in the Datadog account retrievable by the plugin.

You can configure IAM policies to restrict which plugins users have access to. For more information, see [Configure user permissions](#).

Prerequisites

Add permissions

To configure plugins, the following administrator level permissions are required:

- Permissions to access the Amazon Q Developer console. For an example IAM policy that grants needed permissions, see [Allow administrators to use the Amazon Q Developer console](#).
- Permissions to configure plugins. For an example IAM policy that grants the needed permissions, see [Allow administrators to configure plugins](#).

Acquire credentials

Before you begin, note the following information from your Datadog account. These authentication credentials will be stored in an AWS Secrets Manager secret when you configure the plugin.

- **Site parameter** – The Datadog site parameter you use. For example, `us3.datadoghq.com`. For more information, see [Getting Started with Datadog Sites](#) in the Datadog documentation.
- **API key and application key** – Access keys that allow Amazon Q to call the Datadog API to access events and metrics. You can find these under **Organization Settings** in your Datadog account. For more information, see [API and Application Keys](#) in the Datadog documentation.

Secrets and service roles

AWS Secrets Manager secret

When you configure the plugin, Amazon Q creates a new AWS Secrets Manager secret for you to store Datadog authentication credentials. Alternatively, you can use an existing secret that you create yourself.

If you create a secret yourself, make sure it includes the following credentials and uses the following JSON format:

```
{
  "ApiKey": "<your-api-key>",
  "AppKey": "<your-applicaition-key>"
}
```

For more information about creating secrets, see [Create a secret](#) in the *AWS Secrets Manager User Guide*.

Service roles

To configure the Datadog plugin in Amazon Q Developer, you need to create a service role that gives Amazon Q permission to access your Secrets Manager secret. Amazon Q assumes this role to access the secret where your Datadog credentials are stored.

When you configure the plugin in the AWS console, you have the option to create a new secret or use an existing one. If you create a new secret, the associated service role is created for you. If you use an existing secret and an existing service role, make sure your service role contains the following permissions, and has the following trust policy attached. The service role required depends on your secret encryption method.

If your secret is encrypted with an AWS managed KMS key, the following IAM service role is required:

```
{
  "Version": "2012-10-17",
  "Statement": [
    {
      "Effect": "Allow",
      "Action": [
        "secretsmanager:GetSecretValue"
      ],
      "Resource": [
        "arn:aws:secretsmanager:{{your-region}}:{{your-account-id}}:secret:
[[secret-id]]"
      ]
    }
  ]
}
```

If your secret is encrypted with a customer managed AWS KMS key, the following IAM service role is required:

```
{
  "Version": "2012-10-17",
  "Statement": [
    {
      "Effect": "Allow",
      "Action": [
        "secretsmanager:GetSecretValue"
      ],
      "Resource": "arn:aws:secretsmanager:{{region}}:{{accountId}}:secret:
{{secretId}}"
    },
    {
      "Effect": "Allow",
      "Action": [
        "kms:Decrypt"
      ],
      "Resource": "arn:aws:kms:{{region}}:{{accountId}}:key/{{keyId}}",
      "Condition": {
        "StringEquals": {
          "kms:ViaService": "secretsmanager.{{region}}.amazonaws.com"
        }
      }
    }
  ]
}
```

}

To allow Amazon Q to assume the service role, the service role needs the following trust policy:

Note

The `codewhisperer` prefix is a legacy name from a service that merged with Amazon Q Developer. For more information, see [Amazon Q Developer rename - Summary of changes](#).

```
{
  "Version": "2012-10-17",
  "Statement": [
    {
      "Effect": "Allow",
      "Principal": {
        "Service": "q.amazonaws.com"
      },
      "Action": ["sts:AssumeRole", "sts:SetContext"],
      "Condition": {
        "StringEquals": {
          "aws:SourceAccount": "{{accountId}}",
          "aws:SourceArn": "arn:aws:codewhisperer:{{region}}:{{accountId}}:profile/{{profileId}}"
        }
      }
    }
  ]
}
```

For more information about service roles, see [Create a role to delegate permissions to an AWS service](#) in the *AWS Identity and Access Management User Guide*.

Configure the Datadog plugin

You configure plugins in the Amazon Q Developer console. Amazon Q uses credentials stored in AWS Secrets Manager to enable interactions with Datadog.

To configure the Datadog plugin, complete the following procedure:

1. Open the Amazon Q Developer console at <https://console.aws.amazon.com/amazonq/developer/home>

2. On the Amazon Q Developer console home page, choose **Settings**.
3. In the navigation bar, choose **Plugins**.
4. On the plugins page, choose the plus sign on the **Datadog** panel. The plugin configuration page opens.
5. For **Site URL**, enter the URL of the Datadog site you use.
6. For **Configure AWS Secrets Manager**, choose either **Create a new secret** or **Use an existing secret**. The Secrets Manager secret is where your Datadog authentication credentials will be stored.

If you create a new secret, enter the following information:

- a. For **Datadog API key**, enter the API key for your Datadog organization.
- b. For **Datadog application key**, enter the application key for your Datadog account.
- c. A service role will be created that Amazon Q will use to access the secret where your Datadog credentials are stored. Do not edit the service role that is created for you.

If you use an existing secret, choose a secret from the **AWS Secrets Manager secret** dropdown menu. The secret should include the Datadog authentication credentials specified in the previous step.

For more information about the required credentials, see [Acquire credentials](#).

7. For **Configure AWS IAM service role**, choose either **Create new service role** or **Use existing service role**.

 Note

If you chose **Create a new secret** for step 6, you can't use an existing service role. A new role will be created for you.

If you create a new service role, a service role will be created that Amazon Q will use to access the secret where your Datadog credentials are stored. Do not edit the service role that is created for you.

If you use an existing service role, choose a role from the dropdown menu that appears. Make sure your service role has the permissions and trust policy defined in [Service roles](#).

8. Choose **Save configuration**.
9. After the Datadog plugin panel appears in the **Configured plugins** section on the Plugins page, users will have access to the plugin.

If you want to update the credentials for a plugin, you must delete your current plugin and configure a new one. Deleting a plugin removes all previous specifications. Any time you configure a new plugin, a new plugin ARN is generated.

Configure user permissions

To use plugins, the following permissions are required:

- Permissions to chat with Amazon Q in the console. For an example IAM policy that grants permissions needed to chat, see [Allow users to chat with Amazon Q](#).
- The `q:UsePlugin` permission.

When you grant an IAM identity access to a configured Datadog plugin, the identity gains access to any resources in the Datadog account retrievable by the plugin. Datadog user permissions are not detected by the plugin. If you want to control access to a plugin, you can do so by specifying the plugin ARN in an IAM policy.

Each time you create or delete and re-configure a plugin, it is assigned a new ARN. If you use a plugin ARN in a policy, it will need to be updated if you want to grant access to the newly configured plugin.

To locate the Datadog plugin ARN, go to the **Plugins** page in the Amazon Q Developer console and choose the configured Datadog plugin. On the plugin details page, copy the plugin ARN. You can add this ARN to a policy to allow or deny access to the Datadog plugin.

If you create a policy to control access to Datadog plugins, specify Datadog for the plugin provider in the policy.

For examples of IAM policies that control plugin access, see [Allow users to chat with plugins from one provider](#).

Chat with the Datadog plugin

To use the Datadog plugin, enter **@datadog** at the beginning of a question about Datadog or your AWS application monitors and cases. Follow up questions or responses to questions from Amazon Q must also include **@datadog**.

Following are some example use cases and associated questions you can ask to get the most out of the Amazon Q Datadog plugin:

- **Learn about using Datadog features in your AWS workload** – Ask about how Datadog features work with certain AWS services. Amazon Q might ask you for more information about what you're trying to do to provide the best answer.
 - **@datadog how do I use APM on EC2?**
- **Retrieve and summarize cases and monitors** – Ask about a specific case or monitor, or specify properties to get information about monitors and cases like create date, status, or author. For more information about properties, see [Properties](#) in the Datadog documentation.
 - **@datadog summarize the global outage case**
 - **@datadog summarize my top cases**
- **Check monitors that are in an alarm state** – Ask the Amazon Q Datadog plugin to find your AWS application monitors that are in alarm. You can follow up with questions about the monitors it lists.
 - **@datadog what monitors are in alarm?**
 - **@datadog what is the status for monitor <monitor ID>?**

Configuring the Amazon Q Developer Wiz plugin

Wiz is a cloud security platform that provides security posture management, risk assessment and prioritization, and vulnerability management. If you use Wiz to evaluate and monitor your AWS applications, you can use the plugin in Amazon Q chat to access insights from Wiz without leaving the AWS Management Console.

You can use the plugin to identify and retrieve Wiz issues, assess your riskiest assets, and understand vulnerabilities or exposures. After you receive a response, you can ask follow up questions, including how to remediate an issue.

To configure the plugin, you provide authentication credentials from your Wiz account to enable a connection between Amazon Q and Wiz. After you configure the plugin, you can access Wiz metrics by adding **@wiz** to the beginning of your question in Amazon Q chat.

Warning

Wiz user permissions are not detected by the Wiz plugin in Amazon Q. When an administrator configures the Wiz plugin in an AWS account, users with plugin permissions in that account have access to any resources in the Wiz account retrievable by the plugin. You can configure IAM policies to restrict which plugins users have access to. For more information, see [Configure user permissions](#).

Prerequisites

Add permissions

To configure plugins, the following administrator level permissions are required:

- Permissions to access the Amazon Q Developer console. For an example IAM policy that grants needed permissions, see [Allow administrators to use the Amazon Q Developer console](#).
- Permissions to configure plugins. For an example IAM policy that grants the needed permissions, see [Allow administrators to configure plugins](#).

Acquire credentials

Before you begin, note the following information from your Wiz account. These authentication credentials will be stored in an AWS Secrets Manager secret when you configure the plugin.

- **API endpoint URL** – The URL where you access Wiz. For example, `https://api.us1.app.wiz.io/graphql`. For more information, see [API endpoint URL](#) in the Wiz documentation.
- **Client ID and Client secret** – Credentials that allow Amazon Q to call Wiz APIs to access your application. For more information, see [Client ID and Client secret](#) in the Wiz documentation.

Secrets and service roles

AWS Secrets Manager secret

When you configure the plugin, Amazon Q creates a new AWS Secrets Manager secret for you to store Wiz authentication credentials. Alternatively, you can use an existing secret that you create yourself.

If you create a secret yourself, make sure it includes the following credentials and uses the following JSON format:

```
{
  "ClientId": "<your-client-id>",
  "ClientSecret": "<your-client-secret>"
}
```

For more information about creating secrets, see [Create a secret](#) in the *AWS Secrets Manager User Guide*.

Service roles

To configure the Wiz plugin in Amazon Q Developer, you need to create a service role that gives Amazon Q permission to access your Secrets Manager secret. Amazon Q assumes this role to access the secret where your Wiz credentials are stored.

When you configure the plugin in the AWS console, you have the option to create a new secret or use an existing one. If you create a new secret, the associated service role is created for you. If you use an existing secret and an existing service role, make sure your service role contains these permissions, and has the following trust policy attached. The service role required depends on your secret encryption method.

If your secret is encrypted with an AWS managed KMS key, the following IAM service role is required:

```
{
  "Version": "2012-10-17",
  "Statement": [
    {
      "Effect": "Allow",
      "Action": [
```

```

        "secretsmanager:GetSecretValue"
    ],
    "Resource": [
        "arn:aws:secretsmanager:{{your-region}}:{{your-account-id}}:secret:
[[secret-id]]"
    ]
}
]
}

```

If your secret is encrypted with a customer managed AWS KMS key, the following IAM service role is required:

```

{
  "Version": "2012-10-17",
  "Statement": [
    {
      "Effect": "Allow",
      "Action": [
        "secretsmanager:GetSecretValue"
      ],
      "Resource": "arn:aws:secretsmanager:{{region}}:{{accountId}}:secret:
{{secretId}}"
    },
    {
      "Effect": "Allow",
      "Action": [
        "kms:Decrypt"
      ],
      "Resource": "arn:aws:kms:{{region}}:{{accountId}}:key/{{keyId}}",
      "Condition": {
        "StringEquals": {
          "kms:ViaService": "secretsmanager.{{region}}.amazonaws.com"
        }
      }
    }
  ]
}

```

To allow Amazon Q to assume the service role, the service role needs the following trust policy:

Note

The `codewhisperer` prefix is a legacy name from a service that merged with Amazon Q Developer. For more information, see [Amazon Q Developer rename - Summary of changes](#).

```
{
  "Version": "2012-10-17",
  "Statement": [
    {
      "Effect": "Allow",
      "Principal": {
        "Service": "q.amazonaws.com"
      },
      "Action": ["sts:AssumeRole", "sts:SetContext"],
      "Condition": {
        "StringEquals": {
          "aws:SourceAccount": "{{accountId}}",
          "aws:SourceArn": "arn:aws:codewhisperer:{{region}}:{{accountId}}:profile/
{{profileId}}"
        }
      }
    }
  ]
}
```

For more information about service roles, see [Create a role to delegate permissions to an AWS service](#) in the *AWS Identity and Access Management User Guide*.

Configure the Wiz plugin

You configure plugins in the Amazon Q Developer console. Amazon Q uses credentials stored in AWS Secrets Manager to enable interactions with Wiz.

To configure the Wiz plugin, complete the following procedure:

1. Open the Amazon Q Developer console at <https://console.aws.amazon.com/amazonq/developer/home>
2. On the Amazon Q Developer console home page, choose **Settings**.
3. In the navigation bar, choose **Plugins**.

4. On the plugins page, choose the plus sign on the **Wiz** panel. The plugin configuration page opens.
5. For **API endpoint URL**, enter the URL of API endpoint where you access Wiz.
6. For **Configure AWS Secrets Manager**, choose either **Create a new secret** or **Use an existing secret**. The Secrets Manager secret is where your Wiz authentication credentials will be stored.

If you create a new secret, enter the following information:

- a. For **Client ID**, enter the Client ID for your Wiz account.
- b. For **Client Secret**, enter the Client Secret for your Wiz account.
- c. A service role will be created that Amazon Q will use to access the secret where your Wiz credentials are stored. Do not edit the service role that is created for you.

If you use an existing secret, choose a secret from the **AWS Secrets Manager secret** dropdown menu. The secret should include the Wiz authentication credentials specified in the previous step.

For more information about the required credentials, see [Acquire credentials](#).

7. For **Configure AWS IAM service role**, choose either **Create new service role** or **Use existing service role**.

 Note

If you chose **Create a new secret** for step 6, you can't use an existing service role. A new role will be created for you.

If you create a new service role, a service role will be created that Amazon Q will use to access the secret where your Wiz credentials are stored. Do not edit the service role that is created for you.

If you use an existing service role, choose a role from the dropdown menu that appears. Make sure your service role has the permissions and trust policy defined in [Service roles](#).

8. Choose **Save configuration**.
9. After the Wiz plugin panel appears in the **Configured plugins** section on the Plugins page, users will have access to the plugin.

If you want to update the credentials for a plugin, you must delete your current plugin and configure a new one. Deleting a plugin removes all previous specifications. Any time you configure a new plugin, a new plugin ARN is generated.

Configure user permissions

To use plugins, the following permissions are required:

- Permissions to chat with Amazon Q in the console. For an example IAM policy that grants permissions needed to chat, see [Allow users to chat with Amazon Q](#).
- The `q:UsePlugin` permission.

When you grant an IAM identity access to a configured Wiz plugin, the identity gains access to any resources in the Wiz account retrievable by the plugin. Wiz user permissions are not detected by the plugin. If you want to control access to a plugin, you can do so by specifying the plugin ARN in an IAM policy.

Each time you create or delete and re-configure a plugin, it is assigned a new ARN. If you use a plugin ARN in a policy, it will need to be updated if you want to grant access to the newly configured plugin.

To locate the Wiz plugin ARN, go to the **Plugins** page in the Amazon Q Developer console and choose the configured Wiz plugin. On the plugin details page, copy the plugin ARN. You can add this ARN to a policy to allow or deny access to the Wiz plugin.

If you create a policy to control access to Wiz plugins, specify Wiz for the plugin provider in the policy.

For examples of IAM policies that control plugin access, see [Allow users to chat with plugins from one provider](#).

Chat with the Wiz plugin

To use the Amazon Q Wiz plugin, enter **@Wiz** at the beginning of a question about your Wiz issues. Follow up questions or responses to questions from Amazon Q must also include **@Wiz**.

Following are some example use cases and associated questions you can ask to get the most of out of the Amazon Q Wiz plugin:

- **View issues with critical severity** – Ask the Amazon Q Wiz plugin to list your issues with critical or high severity. The plugin can return up to 10 issues. You can also ask to list up to the top 10 most severe issues.
 - **@wiz what are my critical severity issues?**
 - **@wiz can you specify the top 5?**
- **List issues based on date or status** – Ask to list issues based on create date, due date, or resolved date. You can also specify issues based on properties like status, severity, and type.
 - **@wiz which issues are due before <date>?**
 - **@wiz what are my issues that have been resolved since <date>?**
- **Assess issues with security vulnerabilities** – Ask about the vulnerabilities or exposures that are posing security threats in your issues.
 - **@wiz which issues are associated with vulnerabilities or external exposures?**

Automating AWS services with Amazon Q Developer Console-to-Code

What is Console-to-Code?

Console-to-Code is a feature of Amazon Q Developer that can help you write code to automate your use of other AWS services. Console-to-Code records your console actions, then uses generative AI to suggest code in your preferred language and format.

Tiers of service

Since Console-to-Code is a part of Amazon Q Developer, your use of it is subject to Amazon Q Developer's tiers of service.

- At the Free tier, there is no fixed monthly limit to the number of times you can record your console actions and generate CLI commands based on those actions. However, there is a limit to how many times per month you can generate code to use with the AWS CDK or AWS CloudFormation based on your recorded actions.

To access the Free tier, sign into the AWS Management Console. After you reach the monthly code generations limit, you must authenticate to the Pro tier in order to generate more code.

- At the Pro tier, there is no fixed monthly limit to the number of times you can generate code for the AWS CDK or CloudFormation.

To access the Pro tier, you must be a user registered with IAM Identity Center, and your IAM Identity Center identity must be subscribed to Amazon Q Developer Pro. For more information, see [Authenticating to your Amazon Q Developer Pro subscription](#) or contact your AWS administrator.

For more information on pricing tiers, visit the [Amazon Q Developer pricing page](#).

Note

When you record an action, you will still be charged for the action itself, if applicable. For example, if you record yourself provisioning an Amazon EC2 instance, then you will still be charged for the instance. There is no additional cost for recording the action.

Supported code formats

Console-to-Code can currently generate infrastructure-as-code (IaC) in the following languages and formats:

- CDK Java
- CDK Python
- CDK TypeScript
- CloudFormation JSON
- CloudFormation YAML

Where can you use Console-to-Code?

Using Console-to-Code across multiple services

Console-to-Code works across multiple services, saving its own state for as long as your browser tab is open.

For example, you may record your actions during a complete setup of a web server:

- In the Amazon VPC console, you provision two subnets (one public and one private), security groups, NACLs, a custom routing table, and an internet gateway.
- In the Amazon EC2 console, you provision an Amazon EC2 instance and place it in the public subnet.
- In the Amazon RDS console, you provision an Amazon RDS DB instance and place it in the private subnet.

Even if you perform your actions in different parts of the console and they use different AWS services, Console-to-Code can include them in a single recording.

AWS services that support Console-to-Code

Currently, Console-to-Code is available to record your actions when using the AWS management console with the following services:

- Amazon EC2
- Amazon VPC
- Amazon RDS

Granting permissions to use Console-to-Code

To use Console-to-Code, the following permissions are required:

- `q:GenerateCodeFromCommands` to use Console-to-Code. For an example IAM policy that grants the needed permission, see [Allow users to generate code from CLI commands with Amazon Q](#).
- Permissions to take the actions that you're going to record.

Using Console-to-Code

Using Console-to-Code consists of three steps.

Step 1: Start recording

To start recording with Console-to-Code, use the following procedure.

1. Go to the console of one of the integrated services (Amazon VPC, Amazon RDS, or Amazon EC2).
2. On the right edge of the browser window, choose the Console-to-Code



3. In the Console-to-Code side panel, choose **Start recording**.

Step 2: Take actions

In the consoles of any of the integrated services, proceed to take any actions that you want to record.

The Console-to-Code side panel retains its own state. You can move between the consoles of the integrated services, creating one recording that involves actions for multiple services.

The Console-to-Code side panel will retain your actions until your Console-to-Code session ends. The session will end when you close the browser tab, or when your AWS Management Console session ends, whichever comes first.

When you have finished taking actions that you want to convert to code, choose **Stop** from the top of the Console-to-Code panel.

Step 3: Gather CLI commands and generating code

You can follow either Step 3a or Step 3b.

Step 3a: Gather CLI commands

To use Console-to-Code to generate CLI commands based on your actions, use the following procedure.

1. In the Console-to-Code panel, review your recorded actions.

You can filter the recorded actions using the dropdown, search box, or filter widget at the top of the Console-to-Code panel.
2. At the top of the Console-to-Code panel, toggle the **Show CLI** setting. This will display the CLI command corresponding to each selected action.
3. Select the commands that you want to use. Only the commands with checked boxes will be used in the following steps.

4. Consolidate the CLI commands. Near the bottom of the Console-to-Code panel, choose the accordion icon (^). The CLI commands that you selected will appear by themselves in the panel.
5. Copy or download your chosen commands.

To learn more about the AWS CLI, see [What is the AWS Command Line Interface?](#) in the *AWS Command Line Interface User Guide*.

Step 3b: Generate code

1. In the Console-to-Code panel, review your recorded actions. You can filter the recorded actions using the dropdown, search box, or filter widget at the top of the Console-to-Code panel.
2. Select the actions that you want to convert into code. Only the actions with checked boxes will be used in the following steps.
3. Indicate the type of code that you want to generate. From the reverse dropdown menu at the lower right of the Console-to-Code panel, select the language and (if applicable) format of the code to be generated.
4. Choose **Generate chosen language**.

The generated code will appear, along with the equivalent CLI commands.

Diagnosing common errors in the console with Amazon Q Developer

In the AWS Management Console, Amazon Q Developer diagnoses common errors you encounter while working with AWS services, such as insufficient permissions, incorrect configuration, and exceeding service limits. Amazon Q troubleshoots errors you receive while using the following services in the AWS console:

- Amazon Elastic Compute Cloud (Amazon EC2)
- Amazon Elastic Container Service (Amazon ECS)
- Amazon Simple Storage Service (Amazon S3)
- AWS Lambda

In addition, Amazon Q troubleshoots IAM permission errors across all AWS console pages and a limited number of service-specific errors for some AWS services. Amazon Q doesn't maintain a history of previous error diagnosing sessions.

If you're unable to diagnose your error with Amazon Q, you can use Amazon Q to create a support case with Support. For more information, see [Using Amazon Q Developer to chat with Support](#). If you have an issue specific to the Amazon Q error diagnosing feature, you can use the thumbs-down icon to report an issue.

Add permissions

For an IAM policy that grants permissions needed for diagnosing console errors, see [Allow users to diagnose console errors with Amazon Q](#).

Diagnose common errors in the console

To use Amazon Q to diagnose an error in the AWS Management Console, use the following procedure.

1. If you receive an error that Amazon Q can help you with, a **Diagnose with Amazon Q** button appears in the error message. If you want to use Amazon Q to diagnose the error, choose **Diagnose with Amazon Q** to proceed.
2. A window appears where Amazon Q first provides information about the error. It then provides a series of steps you can take to resolve the error. It can take several seconds for Amazon Q to generate instructions.
3. To provide feedback, you can use the thumbs-up and thumbs-down icons. To provide detailed feedback, choose the **Tell me more** button that appears after you select an icon.

Using Amazon Q Developer to chat with Support

You can use Amazon Q Developer to create a support case and contact Support from anywhere in the AWS Management Console, including the AWS Support Center Console. Amazon Q uses the context of your conversation to draft a support case on your behalf automatically. It also adds your recent conversation to the support case description. After creating the case, Amazon Q can transfer you to a support agent in the method of your choice, including live chat in the same interface.

When you create a support case in Amazon Q, the case is also updated in the Support Center Console. To track updates on cases created with Amazon Q, use the Support Center Console.

The type of Support available to you depends on the support plan for your AWS account. All AWS users have access to account and billing support as part of the Basic Support plan. For technical support questions, only users with support plans other than the Basic Support plan can contact Support with Amazon Q. For more information about AWS Support, see [Getting started with AWS Support](#) in the *AWS Support User Guide*.

Tip

Before you create a support ticket, try asking Amazon Q to resolve the issue. For more information, see [Asking Amazon Q to troubleshoot your resources](#). You can also try the **Diagnose with Amazon Q** button, if it's available. For more information, see [Diagnosing console errors](#).

Prerequisites

To create cases in Amazon Q, you must meet the following requirements:

- You have a support plan higher than the Basic Support plan. Only users with support plans other than the Basic Support plan can contact Support with Amazon Q.
- You have permissions to chat with Amazon Q. For more information, see [Allow users to chat with Amazon Q](#).
- You have permissions to create Support cases. For more information, see [Manage access to Support Center](#).

Specify the right service

When you create a support case with Amazon Q, it populates the service field based on your question. If Amazon Q chooses the wrong service, update the case with the correct service. If your question has to do with multiple services, specify the service that's most applicable.

To contact Support about an Amazon Q feature that is part of another AWS service, create a support case for the other AWS service, not for Amazon Q. For example, if you're using Amazon Q network troubleshooting in Amazon VPC Reachability Analyzer, choose Amazon VPC for the service in the support case.

To contact Support about features in either Amazon Q Developer or Amazon Q Business, create a support case for Amazon Q.

Create a support case

To create an Support case with Amazon Q, use the following steps.

1. You can create an Support case through Amazon Q in one of two ways:
 - a. Ask for help directly by entering a question such as “I want to speak to someone” or “Get support”.

To provide more context for Amazon Q to create the support case, you can add more information when requesting support directly. Following is an example of providing more information in a request:

"I am unable to connect to my bastion instance. I have tried restarting it and generating new key pairs but still nothing works. This started this morning after a planned deployment. I can confirm that no other network related changes were made. Can I talk to someone?"

- b. If an Amazon Q response didn't help you, choose the thumbs-down icon on the response and then choose a reason that you're providing the feedback. To contact Support, choose **Create a support case**.

The following image shows the **Create a support case** button in the Amazon Q chat panel that appears after you leave feedback.

[3] [Troubleshoot instances with failed status checks - Amazon Elastic Compute Cloud](#) 



Thank you for your feedback. If you need further assistance related to this issue, you may contact support.

[Create a support case](#)

2. A support case appears in the chat panel. If you had a conversation with Amazon Q before requesting support, it will use the context of your conversation to autopopulate the fields in the case. To update any field in the support case, choose **Edit**. You can also attach files that help explain your issue.

If you didn't chat with Amazon Q before requesting support or Amazon Q otherwise can't complete the fields in the support case, you can input your support case information into the case manually.

The following image is an example of a filled-out support case in the Amazon Q chat panel.

Sure, I've drafted the following support case for you. Review details and make required changes before continuing. I will also add our recent conversation to the case description once submitted.

Support Level	Enterprise Support	Change 
Description	The customer is unable to connect to their instance after a recent deployment. They have tried restarting the instance and generating new key pairs but are still unable to connect. No other changes were made to the network configuration. The issue is problematic and the customer would like to chat with support.	
Case type	Technical	
Service	Elastic Compute Cloud (EC2 - Linux)	
Category	Instance Issue	
Severity	General guidance	
Additional Contacts	None	
Attachments	 Attach Files You can attach up to 3 files. Each file can be up to 5 MB.	
Cancel Edit Submit		

3. After confirming that the support case describes your needs, choose **Submit** to create the support case. If you no longer want to create the case, choose **Cancel**.

4. To contact Support, choose the method that you want to use. Depending on your case details, you can chat, email, or request a phone call from a live support agent:
 - a. **Chat** – If you choose to chat with an agent, a live support agent will enter the conversation. To end the chat with the support agent, choose **End this chat** at any time during the chat.

If you refresh your page, navigate to a different console, or get signed out of the console because of session expiration, the conversation will end.

If you minimize the chat panel or leave the page, you might miss notifications and be disconnected because of inactivity. We recommend that you keep the chat panel open throughout the duration of your support chat.
 - b. **Email** – If you choose to send an email message to an agent, a support agent will contact you at the email address that's associated with your AWS account.
 - c. **Call** – If you choose to call an agent, enter your phone number when prompted, and choose **Submit**. You will be added to the call queue.
5. You can leave feedback or choose **Skip** to return to the Amazon Q chat panel.

Leave feedback

After the support chat has ended, you can optionally leave feedback.

Rate your experience, enter any additional feedback, and then choose **Submit feedback**.

Using Amazon Q Developer in the IDE

Use Amazon Q Developer in integrated development environments (IDEs) to learn about AWS and get assistance with your software development needs. In IDEs, Amazon Q includes capabilities to provide guidance and support across various aspects of software development, such as answering questions about building on AWS, generating and updating code, security scanning, and optimizing and refactoring code.

To install Amazon Q in your IDE, see [Installing the Amazon Q Developer extension or plugin in your IDE](#).

Topics

- [Supported IDEs and available features](#)
- [Installing the Amazon Q Developer extension or plugin in your IDE](#)
- [Chatting with Amazon Q Developer about code](#)
- [Generating inline suggestions with Amazon Q Developer](#)
- [Transforming code in the IDE with Amazon Q Developer](#)
- [Developing features with Amazon Q Developer](#)
- [Generating unit tests with Amazon Q](#)
- [Reviewing code with Amazon Q Developer](#)
- [Generating documentation with Amazon Q Developer](#)
- [Supported languages for Amazon Q Developer in the IDE](#)

Supported IDEs and available features

The features you have access to depend on the IDE where you use Amazon Q. The following table describes the IDEs supported by Amazon Q and the availability and limitations of features in each IDE.

If no language support is specified, the IDE supports languages listed in the [Supported languages](#) topic.

Feature	VSCode	JetBrains	Eclipse	Visual Studio
Chat	Yes	Yes	Yes	Yes
MCP servers	Yes	Yes	Yes	Yes
Context in chat	Yes	Yes	Yes	Yes
Inline chat	Yes	Yes	Yes	No
Workspace context in chat	Yes	Yes	Yes	Yes
Inline suggestions	Yes	Yes	Yes	Yes
Transformations	Yes	Yes	No	Yes
Feature development	Yes	Yes	No	No
Unit test generation	Yes	Yes	No	No
Code reviews	Yes	Yes	No	Yes (C# only)
Documentation generation	Yes	Yes	No	No
Customizations	Yes	Yes	Yes	No

You can also generate inline suggestions in AWS coding environments. For more information, see [Generating inline suggestions in AWS coding environments](#).

Installing the Amazon Q Developer extension or plugin in your IDE

To set up Amazon Q Developer in your integrated development environment (IDE), complete the following steps. After installing the Amazon Q extension or plugin, authenticate through IAM Identity Center or AWS Builder ID. You can use Amazon Q for free, without an AWS account, by authenticating with Builder ID.

To get started, download the Amazon Q extension or plugin for your IDE:

- [Download Amazon Q for Eclipse](#)
- [Download Amazon Q for Visual Studio Code](#)
- [Download Amazon Q for JetBrains IDEs](#)
- [Download Amazon Q in the AWS Toolkit for Visual Studio](#)

 Note

In general, the default duration for a session that is authenticated through IAM Identity Center is 8 hours. However, in the case of Amazon Q, the default session lasts 90 days (if you set up IAM Identity Center on April 18, 2024 or later). For more information refer to [How to extend the session duration for Amazon Q in the IDE](#) in the *AWS IAM Identity Center User Guide*

To sign in and authenticate, complete the steps in this section.

Steps

- [Prerequisite: Supported IDE versions](#)
- [Authenticating in Eclipse IDEs](#)
- [Authenticating in JetBrains IDEs](#)
- [Authenticating in Visual Studio Code](#)
- [Authenticating in Visual Studio](#)
- [Using an IAM principal in your AWS console](#)

Prerequisite: Supported IDE versions

- The minimum version of Eclipse supported by Amazon Q is 2024-06 (4.32).
- The minimum version of JetBrains IDEs (including IntelliJ and PyCharm) supported by Amazon Q is 232.1.
- The minimum version of Visual Studio Code supported by Amazon Q is 1.85.0.
- Only Visual Studio for Windows is supported by Amazon Q. The minimum version of Visual Studio supported is Visual Studio 2022 version 17.7. All Visual Studio 2022 editions are supported.

Authenticating in Eclipse IDEs

You can authenticate for free with AWS Builder ID or with IAM Identity Center with a Amazon Q Developer Pro subscription. Choose your authentication method to see steps to start using Amazon Q in Eclipse.

Builder ID

This procedure does not require you to have Builder ID. If you have not yet signed up for Builder ID, you will have the opportunity to do so during the sign-in process.

1. Install the [Amazon Q plugin](#) in Eclipse.
2. Choose the Amazon Q icon in the top right corner of the IDE.
3. An Amazon Q tab opens at the bottom of the IDE. Under **Choose a sign-in option**, choose **Personal account**, and then choose **Continue**. You are redirected to your browser.
4. Follow the instructions in your browser to authenticate with Builder ID. When you've completed authentication, return to the Eclipse IDE.
5. To begin using Amazon Q, choose the Amazon Q icon to open the chat Amazon Q panel.

IAM Identity Center

Before you begin this procedure, your administrator should have:

- Created an identity for you in IAM Identity Center
- Subscribed that identity to Amazon Q Developer Pro

After your identity has been subscribed to Amazon Q Developer Pro, complete the following steps to authenticate:

1. Install the [Amazon Q plugin](#) in Eclipse.
2. Choose the Amazon Q icon in the top right corner of the IDE.
3. An Amazon Q tab opens at the bottom of the IDE. Under **Choose a sign-in option**, choose **Company account**, and then choose **Continue**.
4. Enter the **Start URL** that your administrator got from [the Amazon Q subscription console](#).
5. Choose the AWS Region in which your administrator set up your [IAM Identity Center instance](#).

6. Choose **Continue**. You are redirected to your browser.
7. Follow the instructions in your browser to authenticate with IAM Identity Center. When you've completed authentication, return to the Eclipse IDE.
8. To begin using Amazon Q, choose the Amazon Q icon to open the chat Amazon Q panel.

Authenticating in JetBrains IDEs

You can authenticate for free with AWS Builder ID or with IAM Identity Center with a Amazon Q Developer Pro subscription. Choose your authentication method to see steps to start using Amazon Q in your JetBrains IDE.

Builder ID

This procedure does not require you to have Builder ID. If you have not yet signed up for Builder ID, you will have the opportunity to do so during the sign-in process.

1. Install the [Amazon Q plugin](#) in your JetBrains IDE.
2. Choose the Amazon Q icon in your IDE.

The icon will be on the side of the interface by default.

3. Follow the instructions in your browser to authenticate with Builder ID.
4. To begin using Amazon Q, choose the Amazon Q icon to chat with Amazon Q, or choose **Amazon Q** from the navigation bar at the bottom of your IDE.

IAM Identity Center

Before you begin this procedure, your administrator should have:

- Created an identity for you in IAM Identity Center
- Subscribed that identity to Amazon Q Developer Pro

After your identity has been subscribed to Amazon Q Developer Pro, complete the following steps to authenticate:

1. Install the [Amazon Q plugin](#) in your JetBrains IDE.
2. Choose the Amazon Q icon in your IDE.

The icon will be on the side of the interface by default.

3. Choose **Company account**.
4. Provide the **Start URL** that your administrator got from [the Amazon Q subscription console](#).
5. Provide the AWS Region in which your administrator set up your IAM Identity Center [instance](#).
6. Choose **Continue**. The focus will switch to your web browser.
7. Follow the instructions in your browser to authenticate with IAM Identity Center, and then return to the IDE.
8. If your administrator has configured more than one Amazon Q Developer profile, you will see the profiles you have access to. Choose the profile that meets your current working needs, or that your administrator has instructed you to use. For more information about profiles, see [Amazon Q Developer profile](#).

If there is only one profile available, that profile will automatically be chosen and you can begin using Amazon Q.

To change your Amazon Q Developer profile, choose **Amazon Q** from the bottom of the IDE, and then choose **Change profile**. From the window that appears, choose the profile you'd like to use.

9. To begin using Amazon Q, choose the Amazon Q icon to chat with Amazon Q, or choose **Amazon Q** from the navigation bar at the bottom of your IDE.

Authenticating in Visual Studio Code

You can authenticate for free with AWS Builder ID or with IAM Identity Center with a Amazon Q Developer Pro subscription. Choose your authentication method to see steps to start using Amazon Q in VS Code.

Builder ID

This procedure does not require you to have Builder ID. If you have not yet signed up for Builder ID, you will have the opportunity to do so during the sign-in process.

1. Install the [Amazon Q extension](#) in VS Code.
2. Choose the Amazon Q icon in your IDE.

The icon will be on the side of the interface by default.

3. Follow the instructions in your browser to authenticate with Builder ID.
4. To begin using Amazon Q, choose the Amazon Q icon to chat with Amazon Q, or choose **Amazon Q** from the navigation bar at the bottom of your IDE.

IAM Identity Center

Before you begin this procedure, your administrator should have:

- Created an identity for you in IAM Identity Center
- Subscribed that identity to Amazon Q Developer Pro

After your identity has been subscribed to Amazon Q Developer Pro, complete the following steps to authenticate:

1. Install the [Amazon Q extension](#) in VS Code.
2. Choose the Amazon Q icon in your IDE.

The icon will be on the side of the interface by default.

3. Choose **Company account**.
4. Provide the **Start URL** that your administrator got from [the Amazon Q subscription console](#).
5. Provide the AWS Region in which your administrator set up your IAM Identity Center [instance](#).
6. Choose **Continue**. The focus will switch to your web browser.
7. Follow the instructions in your browser to authenticate with IAM Identity Center, and then return to the IDE.
8. If your administrator has configured more than one Amazon Q Developer profile, you will see the profiles you have access to. Choose the profile that meets your current working needs, or that your administrator has instructed you to use. For more information about profiles, see [Amazon Q Developer profile](#).

If there is only one profile available, that profile will automatically be chosen and you can begin using Amazon Q.

To change your Amazon Q Developer profile, choose **Amazon Q** from the bottom of the IDE, and then choose **Change profile**. From the command palette, choose the profile you'd like to use.

9. To begin using Amazon Q, choose the Amazon Q icon to chat with Amazon Q, or choose **Amazon Q** from the navigation bar at the bottom of your IDE.

Authenticating in Visual Studio

To connect to your AWS accounts from the Toolkit for Visual Studio, open the **Getting Started with the AWS Toolkit** User Interface (connection UI) by completing the following procedure.

1. From the Visual Studio main menu, expand **Extensions** then expand the **AWS Toolkit**.
2. From the **AWS Toolkit** menu options choose **Getting Started**.
3. The **Getting Started with the AWS Toolkit** connection UI opens in Visual Studio.

You can authenticate for free with AWS Builder ID or with IAM Identity Center with a Amazon Q Developer Pro subscription. Choose your authentication method to see steps to start using Amazon Q in Visual Studio.

Builder ID

1. From Visual Studio, expand **Extensions** from the main menu and then expand the **AWS Toolkit** sub-menu.
2. Choose **Getting started**. The **Getting Started** tab opens in the Visual Studio editor window.
3. In the **Amazon Q** section, choose **Enable**.
4. From the **Free Tier** section, choose the **Sign up or Sign in** button.
5. Confirm that you want to open the AWS Authorize request portal in your default web browser.
6. Follow the prompts in your default web browser. You're notified when the authorization process is complete, and it's safe to close your browser and return to Visual Studio.

IAM Identity Center

1. From Visual Studio, expand **Extensions** from the main menu and then expand the **AWS Toolkit** sub-menu.

2. Choose **Getting started**. The **Getting Started** tab opens in the Visual Studio editor window.
3. In the **Amazon Q** section, choose **Enable**. You will fill out the Professional Tier section to authenticate.
4. The credentials profile is made up of the Profile Name, Start URL, Profile Region, or SSO Region provided by an administrator at your company or organization. For detailed information about IAM Identity Center credentials, see [What is IAM Identity Center?](#) in the *IAM Identity Center User Guide*.

If you have an existing credentials profile, choose it from the dropdown menu in the Professional tier panel, and then choose **Connect**.

To create a new credentials profile, fill out the following fields from the Professional tier section:

- a. In the **Profile Name** text field, enter the name of the IAM Identity Center profile you want to authenticate with.
 - b. In the **Start URL** text field, enter the start URL that's attached to your IAM Identity Center credentials.
 - c. From the **Profile Region (defaults to us-east-1)** drop-down menu, choose the AWS Region that's defined by the IAM Identity Center user profile you're authenticating with.
 - d. From the **SSO Region (defaults to us-east-1)** drop-down menu, choose the **SSO Region** that's defined by your IAM Identity Center credentials, then choose the **Connect** button to open the **Log in with AWS IAM Identity Center** dialog.
5. Confirm that you want to open the AWS Authorize request portal in your default web browser.
 6. Follow the prompts in your default web browser. You're notified when the authorization process is complete, and it's safe to close your browser and return to Visual Studio.
 7. A **Sign into Amazon Q** window appears. In the credentials profile dropdown, choose the profile you used to authenticate in the previous steps.
 8. If your administrator has configured more than one Amazon Q Developer profile, you are then prompted to choose a Q Developer profile from the dropdown menu. Choose the profile that meets your current working needs, or that your administrator has instructed you to use. For more information about profiles, see [Amazon Q Developer profile](#).

If there is only one profile available, that profile will automatically be chosen and you can begin using Amazon Q.

To change your Amazon Q Developer profile, choose **Amazon Q** from the bottom of the IDE, and then choose **Change Q Developer Profile**. From the window that appears, choose the profile you'd like to use.

You can also change your profile by choosing the overflow menu at the top right corner of the chat window, and then choosing **Change Q Developer Profile**.

For more information about authenticating in the Toolkit for Visual Studio, see [Getting Started](#) in the *AWS Toolkit for Visual Studio User Guide*.

Using an IAM principal in your AWS console

Depending on how you use AWS, you may be accustomed to using your IAM credentials to sign in to the console for all AWS services. However, you cannot use Amazon Q Developer in the IDE as an IAM principal, or with an IAM role. You must authenticate with credentials from either IAM Identity Center or Builder ID.

Chatting with Amazon Q Developer about code

Chat with Amazon Q Developer in your integrated development environment (IDE) to ask questions about building at AWS and for assistance with software development. Amazon Q can explain coding concepts and code snippets, generate code and unit tests, and improve code, including debugging or refactoring.

Topics

- [The agentic coding experience with Amazon Q Developer in all supported IDEs](#)
- [Chatting with Amazon Q in natural languages](#)
- [Working with Amazon Q in your IDE](#)
- [Example topics and questions](#)
- [Reporting issues with responses from Amazon Q](#)
- [Explaining and updating code with Amazon Q Developer](#)
- [Chatting inline with Amazon Q Developer](#)
- [Adding context to Amazon Q Developer chat in the IDE](#)

- [Viewing, deleting, and exporting the Amazon Q Developer conversation history](#)

The agentic coding experience with Amazon Q Developer in all supported IDEs

Agentic coding is on by default for Amazon Q Developer in the IDE.

With agentic coding, Amazon Q acts as your coding partner, chatting agentially with you as you develop.

As you discuss your project with Amazon Q, it will offer suggestions for shell commands. Sometimes, when it deems those commands to be low-risk, it will run them on its own.

When you ask Amazon Q to improve your code, it will do so directly. You can view the changes in a diff and optionally undo them.

While Amazon Q is thinking between prompts, you have the option to continue to add instructions in the input window.

You can toggle agentic coding on or off with the `</>` icon at the bottom of the chat panel.

Chatting with Amazon Q in natural languages

Amazon Q Developer provides multi-language support when you chat in the IDE. Supported natural languages include Mandarin, French, German, Italian, Japanese, Spanish, Korean, Hindi, and Portuguese, with more languages available. To utilize this functionality, you can start a conversation with Amazon Q in the IDE using your preferred natural language. Amazon Q automatically detects the language and provides responses in the appropriate language.

Working with Amazon Q in your IDE

You can ask Amazon Q questions, update your code, and initiate actions with quick commands all from the Amazon Q chat panel in your IDE.

To start chatting with Amazon Q, choose the Amazon Q icon from the navigation bar in your IDE and enter your question in the text bar. To start chatting with Amazon Q in Visual Studio, choose **View** from the main menu and then choose **Amazon Q chat**.

When you ask Amazon Q a question, it uses the current file that is open in your IDE as context, including the programming language and the file path.

If Amazon Q includes code in its response, you can copy the code or insert it directly into your file by choosing **Insert at cursor**. Amazon Q might include inline references to its sources in its response. To view a list of sources, expand the **Sources** section at the bottom of a response.

Amazon Q maintains the context of your conversation within a given session inform future responses. You can ask follow up questions or refer to previous questions and responses throughout the duration of your session. To start a new conversation with Amazon Q, open a new tab in the panel. You can open up to 10 tabs at a time. Amazon Q doesn't retain context across different conversations.

Chat commands

You can enter the following commands in the chat panel to access Amazon Q features, depending on your IDE. For information about what Amazon Q features are available in your IDE, see [Supported IDEs](#).

- **/transform** - Use this command to update the code language version of an entire project. For more information, see [Upgrading Java versions](#).
- **/dev** - Use this command to get an implementation plan to develop a feature with Amazon Q. For more information, see [Developing features \(/dev\)](#).
- **/test** - Use this command to generate unit tests for your code with Amazon Q. For more information, see [Generating unit tests \(/test\)](#).
- **/review** - Use this command to review your codebase for security vulnerabilities and code quality issues with Amazon Q. For more information, see [Reviewing code \(/review\)](#).
- **/doc** - Use this command to generate READMEs for your project base with Amazon Q. For more information, see [Generating documentation \(/doc\)](#).
- **/clear** - Use this command to clear a current conversation. This removes all previous conversation from the chat panel and clears the context that Amazon Q has about your previous conversation.
- **/help** - Use this command to see an overview of what Amazon Q can and can't do, example questions, and quick commands.

Example topics and questions

Within IDEs, Amazon Q can answer questions about AWS services and software development, in addition to generating code. Amazon Q is particularly useful for answering questions related to the following subject areas:

- Building on AWS, including AWS service selection, limits, and best practices
- General software development concepts, including programming language syntax and application development
- Writing code, including explaining code, debugging code, and writing unit tests

Following are some example questions that you can ask to get the most out of Amazon Q in your IDE:

- How do I debug issues with my Lambda functions locally before deploying to AWS?
- How do I choose between AWS Lambda and Amazon EC2 for a scalable web application backend?
- What is the syntax of declaring a variable in TypeScript?
- How do I write an app in React?
- Provide me a description of what this *[selected code or application]* does and how it works.
- Generate test cases for *[selected code or function]*.

Reporting issues with responses from Amazon Q

You can optionally leave feedback for every response Amazon Q generates by using the thumbs-up and thumbs-down icons. To report an issue with a response, choose the thumbs-down icon, and enter information in the feedback window that appears.

Explaining and updating code with Amazon Q Developer

Amazon Q Developer can explain and update specific lines of code in your integrated development environment (IDE). To update your code, ask Amazon Q to make changes to a given line or block of code, and it will generate new code that reflects the changes that you asked it to make. Then, you can insert the updated code directly into the file where the code originated.

You can choose from the following options:

- **Explain** – Get your code explained in natural language.
- **Refactor** – Improve code readability or efficiency, among other improvements.
- **Fix** – Debug code.
- **Generate tests** – Create unit tests for the current file or selected code.

- **Optimize** – Enhance code performance.
- **Send to prompt** – Send the highlighted code to the Amazon Q chat panel, and ask questions that you have about the code.

Send code to Amazon Q

To get your code explained or updated by Amazon Q, complete the following steps.

1. Highlight a section of a code file in your IDE.
2. Right-click your highlighted code to open a context window. Choose **Amazon Q**, and then choose **Explain**, **Refactor**, **Fix**, **Generate tests**, **Optimize**, or **Send to prompt**.

If you choose **Send to prompt**, Amazon Q copies the highlighted code to the chat panel, where you can enter questions that you have about the code.

3. To replace the highlighted code with the newly generated code, you can copy the code or insert it directly into your file by choosing **Insert code**. Amazon Q replaces the original code with the updated code.

Chatting inline with Amazon Q Developer

The *inline chat* feature lets you chat with Amazon Q from your IDE's main coding window. To use the inline chat feature, you highlight code that you want suggestions for, and provide instructions in the small input screen. Amazon Q proceeds to generate code for you, which it presents in a diff within the main coding window. You can then choose to accept or reject the changes.

The advantage of inline chat is that it eliminates the context switching that occurs when moving between a chat window and the main coding window.

You would typically use the inline chat feature when you're reviewing code, writing unit tests, or performing other tasks that require code-based answers. For situations where you want text-based answers (for example, an answer to "Explain this code") then using the [chat window](#) is a better option.

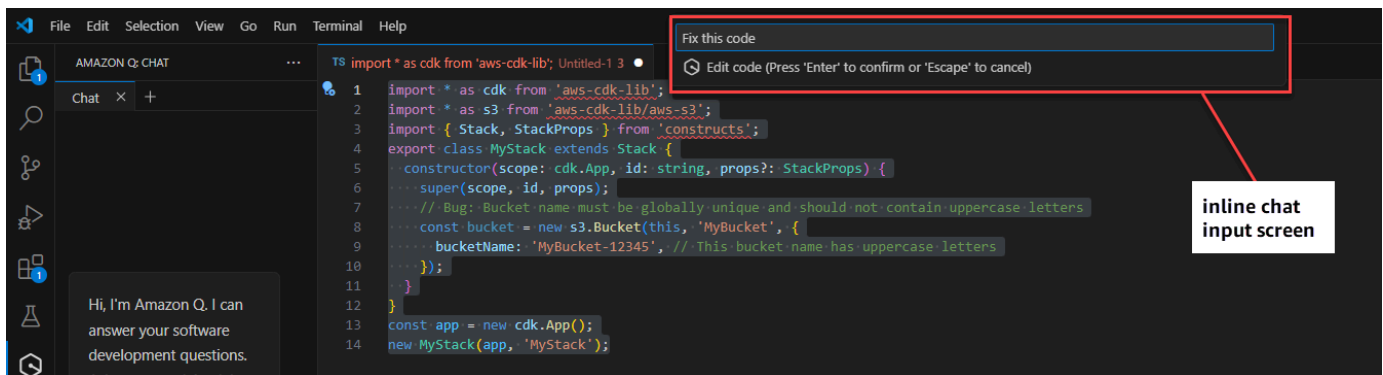
Amazon Q considers the code in the current file when generating a code recommendation through the inline chat. It won't look at code in other files or projects.

Amazon Q inline chat in action

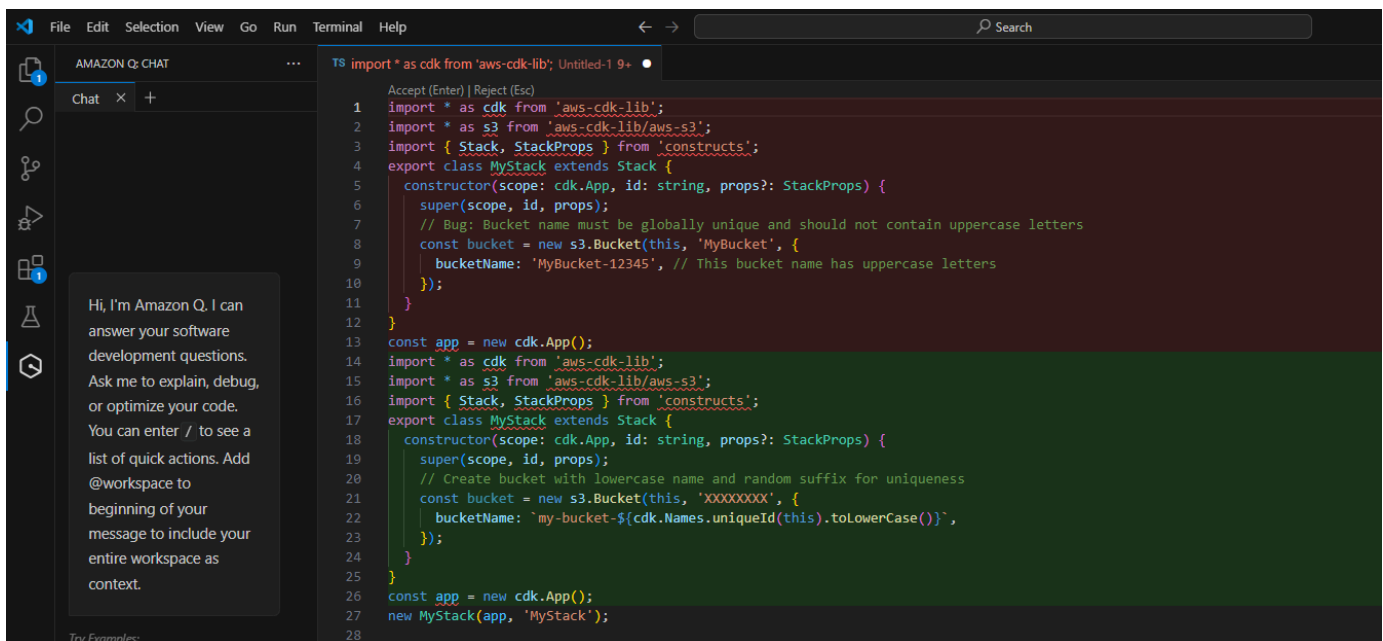
An inline chat session unfolds as follows.

1. You highlight the code that you want suggestions for, and then choose from the following options based on your IDE:
 - In Visual Studio Code and JetBrains, press `#+I` (Mac) or `Ctrl+I` (Windows)
 - In Eclipse, press `#+Shift+I` (Mac) or `Ctrl+Shift+I` (Windows)
 - Alternatively, you can right-click the selection and choose **Amazon Q** and then **Inline chat**

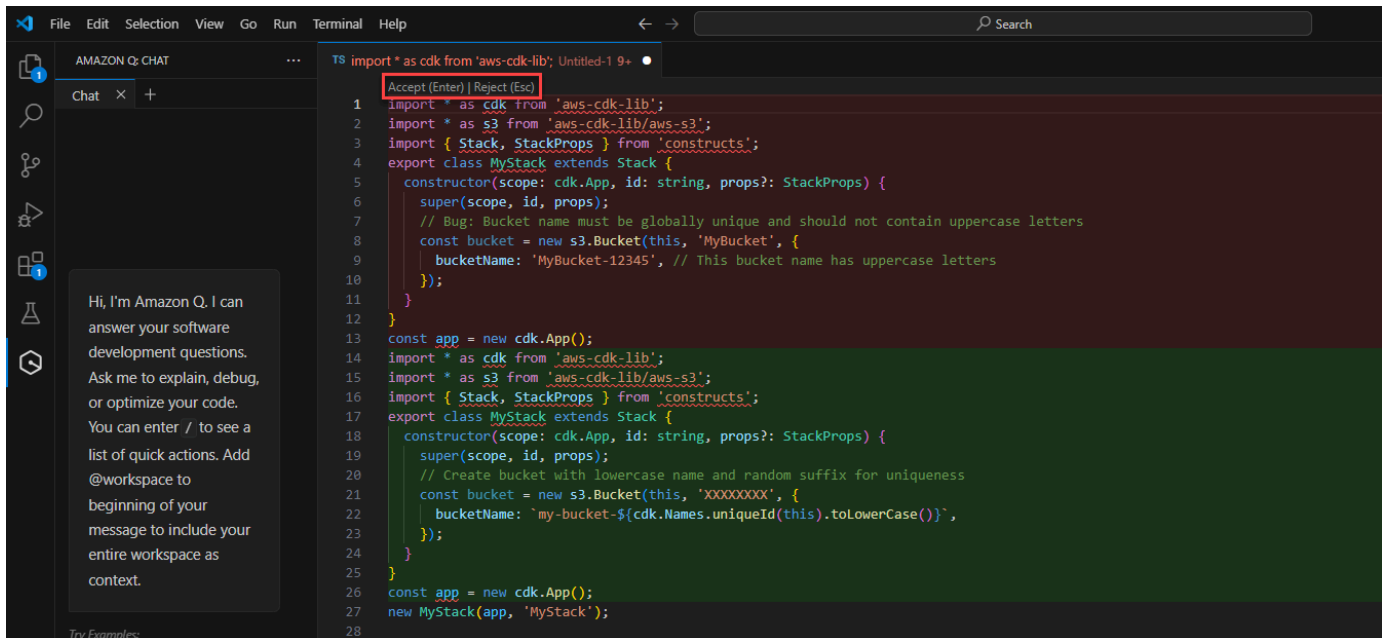
This launches a small input screen at the top of the main coding window where you can enter a prompt, such as **Fix this code**.



2. Amazon Q generates code and presents it in a diff.



3. You accept or reject the change by choosing **Accept** or **Reject**, or by pressing the keyboard equivalents (Enter or Esc).



Example topics and questions

The inline chat always returns code as the answer, so you can enter prompts like:

- Document this code
- Refactor this code
- Write unit tests for this function

Diff format

The inline chat displays the diff in multiple blocks, with the existing code on the top, and the suggested code on the bottom. A side-by-side diff is not supported.

Adding context to Amazon Q Developer chat in the IDE

When you chat with Amazon Q in the integrated development environment (IDE), you can provide Amazon Q with additional *context*, such as files and folders, that Amazon Q can use to tailor and improve its answers.

There are two ways to provide context to Amazon Q:

- **Explicitly** – To provide context explicitly, you enter @ in the chat window. The @ launches a context picker pop-up from which you select items to include as context. Alternatively, you can type @ and begin typing the name of the file, folder, or other context type to have it auto-complete. For more information, see [Explicit context types](#).
- **Automatically** – To provide context automatically, you set up the context separately, outside of the chat. Amazon Q automatically references the context whenever any developer working on the project types a question into the chat window. For more information, see [Automatic context types](#).

After Amazon Q generates an answer, it shows you the files it used as context in the **Context** drop-down list, which appears immediately above the start of the answer.

Explicit context types

When you type @ in the chat, you can select from the following context types:

- **@workspace** – Amazon Q uses your project's workspace as context for its answers. The **@workspace** option requires configuration. For more information, see [Adding workspace context to Amazon Q Developer chat in the IDE](#).
- **Folders** – Amazon Q shows you a list of folders in the current project, and uses the folder you select as context for its answers.
- **Files** – Amazon Q shows you a list of files in the current project, and uses the file you select as context for its answers.
- **Code** – Amazon Q shows you a list of classes, functions, global variables in the current project, and uses your selection as context for its answers.
- **Images** – Amazon Q allows you to add images as context for your prompts, useful for scenarios like generating code from UI mockups or sequence diagrams. Images must be in JPEG, PNG, GIF, or WebP format, with a maximum size of 3.75 MB and dimensions not exceeding 8,000 x 8,000 pixels. You can include up to 20 images in a single message, including any images pinned to context.
- **Prompts** – Amazon Q shows you a list of prompts that you have saved, and uses the prompt you select as context for its answers. The **Prompts** option requires some configuration. For more information, see [Saving prompts to a library for use with Amazon Q Developer chat](#).

Automatic context types

The following types of contexts will be used automatically by Amazon Q, if you've set them up:

- **Project rules** – Amazon Q will automatically use a set of project rules that you define as context. For more information, see [Creating project rules for use with Amazon Q Developer chat](#).
- **Customizations** – Amazon Q will automatically use a repository of source code as context. For more information about setting up customizations, see [Customizing suggestions](#).

Adding workspace context to Amazon Q Developer chat in the IDE

When you chat with Amazon Q in the integrated development environment (IDE), you can add **@workspace** to your question to automatically include the most relevant chunks of your workspace code as context. Amazon Q Developer determines relevance based on an index that is updated periodically.

With workspace context, Amazon Q has enhanced capabilities, including locating files, understanding how code is used across files, and generating code that leverages multiple files, including files that aren't opened.

Topics

- [Setup](#)
- [Ask questions with workspace context](#)

Setup

Before you continue, make sure you have the latest version of your IDE installed. You can then complete the following setup steps.

Enable indexing

To use your workspace as context, Amazon Q creates a local index of your workspace repository, including code files, configuration files, and project structure. During indexing, non-essential files like binaries or those specified in `.gitignore` files are filtered out.

It can take 5 to 20 minutes to index a new workspace. During this time, you can expect elevated CPU usage in your IDE. After initial indexing, the index is incrementally updated when you make changes to your workspace.

The first time you add workspace context, you must enable indexing in your IDE. Complete the following steps to enable indexing:

1. Add **@workspace** to your question in the Amazon Q chat panel.
2. Amazon Q prompts you to enable indexing. Choose **Settings** to be redirected to Amazon Q settings in your IDE.

If you aren't prompted, you can go to settings by choosing **Amazon Q** at the bottom of your IDE. Then, choose **Open Settings** from the Amazon Q task bar that opens.

3. Select the box next to **Workspace Index**.

Configure indexing (optional)

No configuration is necessary for the indexing process, however you can choose to specify the number of threads dedicated to indexing. If you increase the number of threads used, indexing will complete faster, and it will use more of your CPU. To update the indexing configuration, specify the number of threads for the **Workspace Index Worker Threads** setting. You can also set the maximum size of the files that can be indexed for workspace context, and enable the use of your graphics processing unit (GPU) for indexing.

Ask questions with workspace context

To add your workspace as context to your conversation with Amazon Q, open the workspace you want to ask questions about, and then add **@workspace** to your question in the chat panel. You must add **@workspace** to any question that you want to add workspace context to.

If you want to start chatting about a different workspace, open the workspace, and then open a new chat tab. Include **@workspace** in your question to add the new workspace as context.

You can ask Amazon Q about any file in your workspace, including unopened files. Amazon Q can explain files, locate code, and generate code across files, in addition to existing conversational coding capabilities.

Following are example questions you can ask Amazon Q that leverage workspace context in the chat:

- **@workspace** where is the code that handles authorization?
- **@workspace** what are the key classes with application logic in this project?

- @workspace explain main.py
- @workspace add auth to this project
- @workspace what third-party libraries or packages are used in this project, and for what purpose?
- @workspace add unit tests for function *<function name>*

Saving prompts to a library for use with Amazon Q Developer chat

You can build a library of common prompts that you can use when chatting with Amazon Q in the IDE. By storing these prompts in your library, you can easily insert them into the chat without having to retype the prompt each time. You can use saved prompts across multiple conversations and projects.

Prompts are saved in the `~/.aws/amazonq/prompts` folder.

To save a prompt to a prompt library

1. In your IDE, open an Amazon Q chat window.
2. Type **@**, and select **Prompts**.
3. Choose **Create a new prompt**.
4. In **Prompt name**, enter a prompt name such as **Create sequence diagram** and press Enter.

Amazon Q creates a prompt file called `Create sequence diagram.md` in the `~/.aws/amazonq/prompts` folder, and opens the file in your IDE.

5. In the prompt file, add a detailed prompt. For example:

```
Create a sequence diagram using Mermaid that shows the sequence of calls between resources. Ignore supporting resources like IAM policies and security group rules.
```

6. Save the prompt file.

To use a saved prompt

1. In your IDE, open an Amazon Q chat window.
2. Type **@**, and select **Prompts**.
3. Choose your saved prompt, for example, **Create sequence diagram**.

4. (Optional) In the chat input window, add details, as required. You can type more text and add more context types. An example prompt might look like this...

@Create a sequence diagram using the files in the **@lib** folder

5. Submit the prompt and wait for Amazon Q to generate an answer.

Pinning context items

Note

Context pinning is currently only available in the VS Code IDE.

Context pinning lets you specify context items that get added to all messages within your chat session. When you pin a context item, it's automatically included in every message within your current conversation, eliminating the need to repeatedly type commands like **@workspace**, **@file**, or **@folder**.

Pinned items can come from two sources: you can manually pin items you frequently reference, or Amazon Q may automatically add context, (such as your current active file,) to improve response quality. Pinned context items appear at the top of the text input box of your chat panel, and you have control to remove any context you don't want included.

To help maintain clear context boundaries, pinned items only apply to your current chat tab. When you open a new tab, you'll start fresh with only the default pinned context, such as the active file.

Using pinned context

To add pinned context items

1. In your IDE, open the Amazon Q chat panel.
2. After using a context command like **@workspace**, **@file**, **@folder**, or **@prompt** in a chat, click the desired context to pin it.

Alternatively, you can click the "@ Pin Context" button to view the available options and select a context to pin.

3. The pinned context will appear in the pinned context area at the top of your chat panel.

Methods to pin context items

There are three ways to pin context items:

1. Using the @Pin Context menu:

- Click the "@Pin Context" button in your chat panel.
- Select the desired context item from the available options.

2. Using the context menu and keyboard shortcut:

- Type "@" in the chat input to bring up the context menu.
- Navigate to the desired item.
- Press Option/Alt + Enter to pin the selected item.

3. Pinning from the input prompt:

- If you've already typed a context command (like `@workspace`, `@file`, `@folder`, or `@prompt`) in your input, hover over the context item in your input.
- Click on the item to pin it.

After pinning, the context item will appear in the pinned context area at the top of your chat's text input box.

To remove pinned context items

- To remove a pinned context item, click the X on the left side of the pill. This works for both user-pinned and system-added context items.

Creating project rules for use with Amazon Q Developer chat

You can build a library of project rules that you can use when chatting with Amazon Q in the IDE. These rules describe coding standards and best practices across your team. For example, you could have a rule that states that all Python code must use type hints, or that all Java code must use Javadoc comments. By storing these rules in your project, you can ensure consistency across developers, regardless of their experience level.

Project rules are defined in Markdown files in the project's *project-root*/.amazonq/rules folder.

Once you've created your project rules, Amazon Q will automatically use them as context whenever a developer chats with Amazon Q within your project, and will make sure to adhere to them when

generating answers. For more information about adding context to the chat, see [Adding context to Amazon Q Developer chat in the IDE](#).

You can create project rules either directly in the file system or through the Amazon Q chat interface.

To create a project rule using the Amazon Q chat interface

1. In your IDE, open the Amazon Q chat panel.
2. In the chat input box, click the **Rules** button.
3. Select **Create new rule**.
4. In the dialog that appears, enter a name for your rule.

This will create a Markdown file with that name in your project's *project-root*/.amazonq/rules folder.

5. Add your rule content in the editor.
6. Save the file.

To create a project rule using the file system

1. In your IDE, open the project's root folder.
2. In the project root folder, create the following folder:

project-root/.amazonq/rules

This folder holds all your project rules.

3. In *project-root*/.amazonq/rules, create a project rule file. It must be a Markdown file. For example:

cdk-rules.md

4. Open your project rule Markdown file.
5. Add a detailed prompt to the file. For example:

```
All Amazon S3 buckets must have encryption enabled, enforce SSL, and block public access.
All Amazon DynamoDB Streams tables must have encryption enabled.
All Amazon SNS topics must have encryption enabled and enforce SSL.
```

All Amazon SNS queues must enforce SSL.

6. Save the file.
7. (Optional) Add more project rule Markdown files.

You have now created one or more project rules. Amazon Q will use these rules as context automatically whenever a developer chats with Amazon Q within your project.

To manage rules in the Amazon Q chat interface

1. In your IDE, open the Amazon Q chat panel.
2. In the chat input box, click the **Rules** button to see all available rules.
3. Click on a rule to toggle it on or off for the current chat session:
 - Rules with a check mark are active and will be applied to your conversation.
 - Rules without a check mark are inactive for the current session.

Viewing, deleting, and exporting the Amazon Q Developer conversation history

When you chat with Amazon Q in the integrated development environment (IDE), Amazon Q saves each of your chat tabs as a separate conversation. You can view, search for, and delete these conversations. You can also export them to Markdown or HTML format files.

Amazon Q stores your conversations on your local computer, in your home directory.

Amazon Q saves conversations for each workspace separately, so if you don't see your conversation history, it might be because you're in the wrong workspace. Amazon Q only displays the conversation history for the current workspace.

Use the following instructions to view, search for, delete, and export your conversations.

To view and search for past conversations

1. In your IDE, sign in to Amazon Q.
2. Open an Amazon Q chat tab.
3. Open the chat history by doing one of the following:

- On the top-right of the chat panel, choose the **View chat history** button.
 - Press `ctrl+F` (Windows and Linux) or `# F` (Mac).
4. Do one of the following:
 - Choose the conversation you want to view. Conversations are organized by date.
 - Use the search bar near the top of the chat history to find a conversation. Amazon Q finds conversations that match exactly the text you enter.

To delete a single conversation

1. In your IDE, sign in to Amazon Q.
2. Do one of the following:
 - In the chat tab of an open chat session, enter **/clear** to delete the contents of the chat tab.
 - Open an Amazon Q chat tab, and then open the chat history by doing one of the following:
 - On the top-right of the chat panel, choose the **View chat history** button.
 - Press `ctrl+F` (Windows and Linux) or `# F` (Mac).

In the conversation that you want to delete, choose the vertical ellipsis (:) and choose **Delete**.

To export a conversation to Markdown or HTML

1. In your IDE, sign in to Amazon Q.
2. Do one of the following:
 - With a chat session already started, on the top-right of the chat panel, choose the **Export** button to export the conversation displayed in the tab.
 - Open an Amazon Q chat tab, and then open the chat history by doing one of the following:
 - On the top-right of the chat panel, choose the **View chat history** button.
 - Press `ctrl+F` (Windows and Linux) or `# F` (Mac).

In the conversation that you want to export, choose the vertical ellipsis (:) and choose **Export** to export the conversation to a Markdown or HTML format file.

By default, Amazon Q names the file `q-dev-chat-yyyy-mm-dd.md/html` and saves it in the root of your project.

Generating inline suggestions with Amazon Q Developer

Amazon Q can provide you with code recommendations in real time. As you write code, Amazon Q automatically generates suggestions based on your existing code and comments. Your personalized recommendations can vary in size and scope, ranging from a single line comment to fully formed functions.

When you start typing out single lines of code or comments, Amazon Q makes suggestions based on your current and previous inputs. Filenames are also taken into consideration.

Inline suggestions are automatically enabled when you download the Amazon Q extension. To get started, start writing code, and Amazon Q will begin generating code suggestions.

You can also customize the suggestions Amazon Q generates to your software development team's internal libraries, proprietary algorithmic techniques, and enterprise code style. For more information on customizing suggestions, see [Customizing suggestions](#).

Topics

- [Pausing suggestions with Amazon Q](#)
- [Amazon Q code completion in action](#)
- [Generating inline suggestions in AWS coding environments](#)
- [Using shortcut keys](#)
- [Using code references](#)
- [Code examples](#)

Pausing suggestions with Amazon Q

Choose your IDE to see steps for pausing and resuming inline code suggestions in Amazon Q.

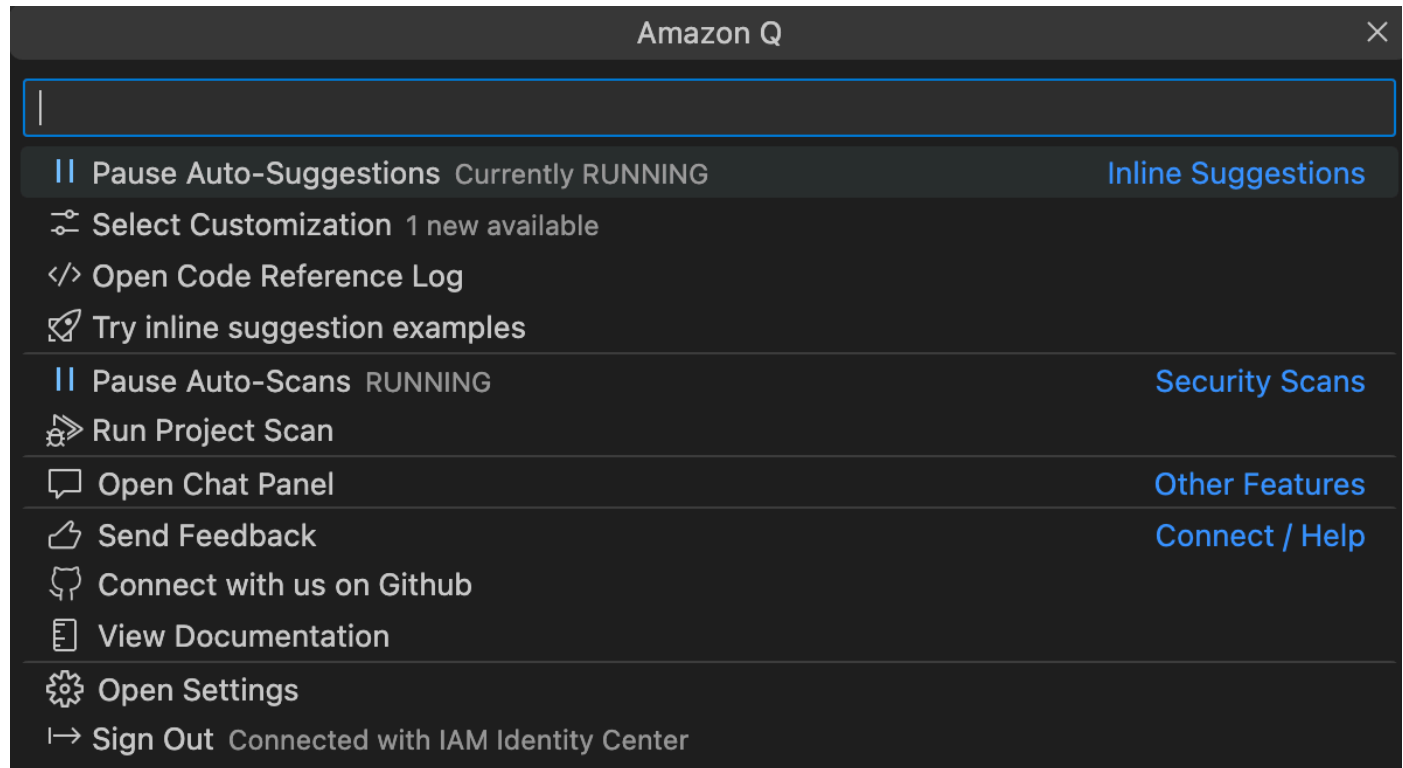
Visual Studio Code

1. In VS Code, choose **Amazon Q** from the component tray at the bottom of the IDE window.

The Amazon Q task bar opens at the top of the IDE window.

2. Choose **Pause Auto-Suggestions** or **Resume Auto-Suggestions**.

The following image shows the Amazon Q task bar in VS Code.



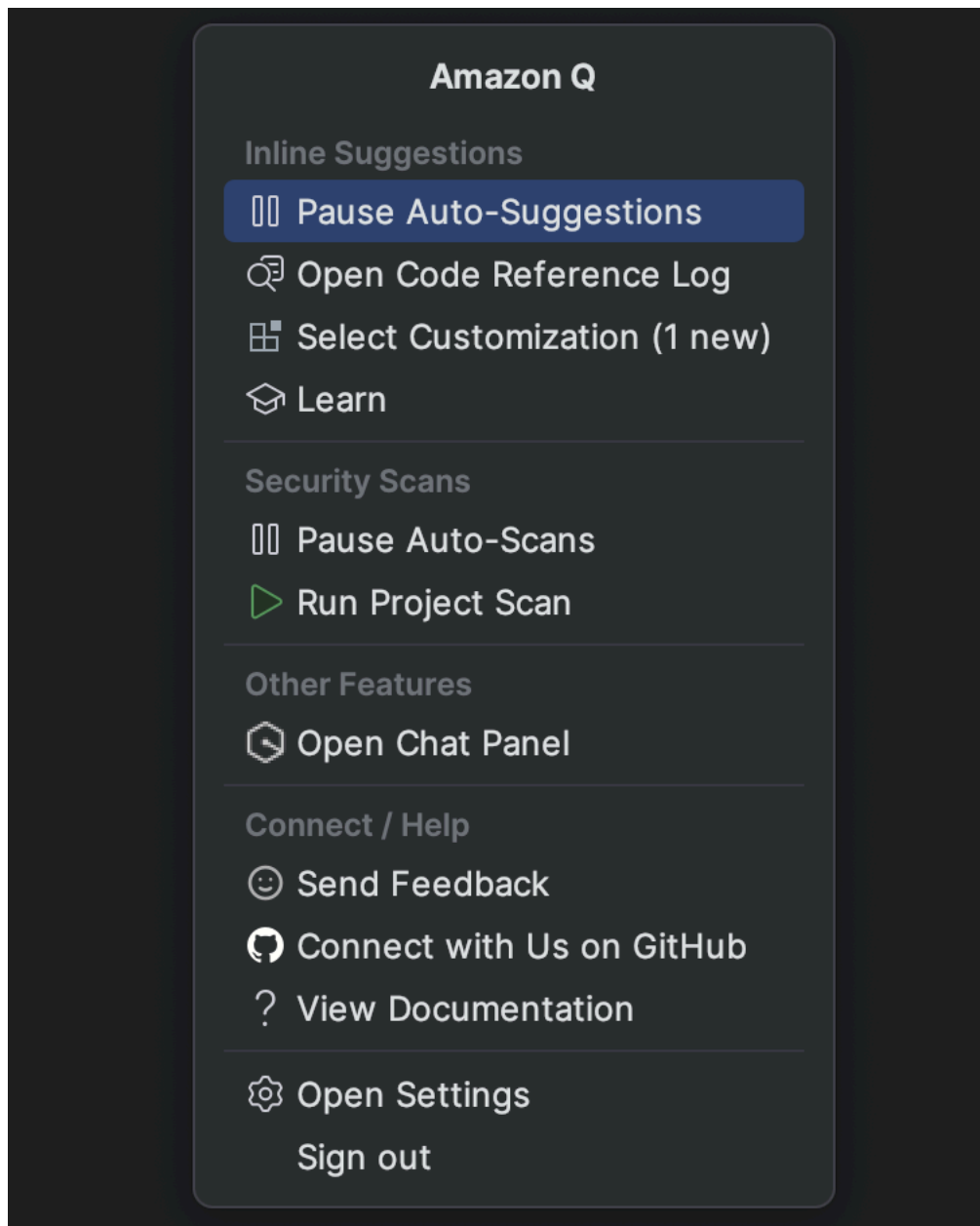
JetBrains

1. In your JetBrains IDE, choose **Amazon Q** from the status bar at the bottom of the IDE window.

The Amazon Q task bar opens above the status bar.

2. Choose **Pause Auto-Suggestions** or **Resume Auto-Suggestions**.

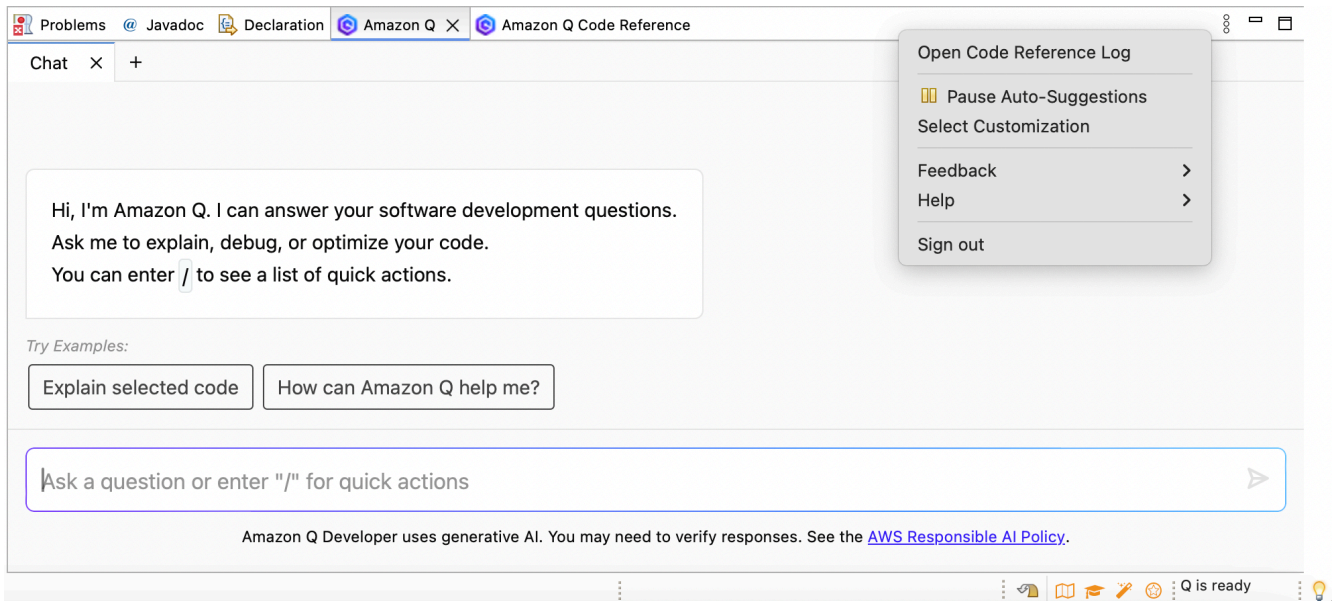
The following image shows the Amazon Q task bar in a JetBrains IDE.



Eclipse

1. In your Eclipse IDE, choose the **Amazon Q** icon in the top right corner of the IDE.
2. With the Amazon Q chat tab open, choose the ellipsis icon in the top right corner of the tab. The Amazon Q task bar opens.

The following image shows the Amazon Q task bar in an Eclipse IDE.

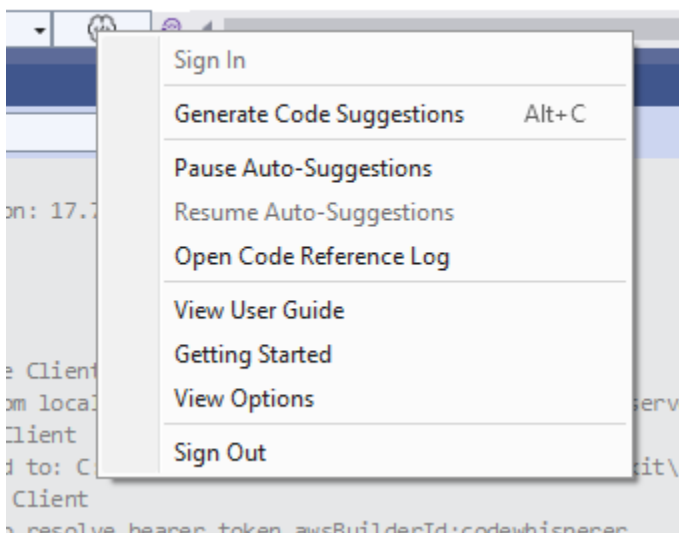


3. Choose **Pause Auto-Suggestions** or **Resume Auto-Suggestions**.

Visual Studio

1. From the edge of the window, choose the Amazon Q icon.
2. Select **Pause Auto-Suggestions** or **Resume Auto-Suggestions**

The following image shows the Amazon Q task bar in a Visual Studio.



AWS Cloud9

Amazon Q does not support toggling suggestions on and off in AWS Cloud9.

To stop receiving Amazon Q suggestions in AWS Cloud9, remove the IAM policy that gives Amazon Q access to AWS Cloud9 from the role or user that you are using to access AWS Cloud9.

AWS Lambda

To deactivate or re-activate Amazon Q code suggestions in Lambda:

1. In the Lambda console, open the screen for a particular Lambda function.
2. In the **Code source** section, from the toolbar, choose **Tools**.
3. From the dropdown menu, choose **Amazon Q Code Suggestions**.

Amazon SageMaker AI Studio

1. In the SageMaker AI Studio console, choose Amazon Q from the bottom of the window.

The Amazon Q panel will open.

2. Choose **Pause Auto-Suggestions** or **Resume Auto-Suggestions**.

JupyterLab

1. In the JupyterLab console, choose Amazon Q from the bottom of the window.

The Amazon Q panel will open.

2. Choose **Pause Auto-Suggestions** or **Resume Auto-Suggestions**.

AWS Glue Studio Notebook

1. In the AWS Glue Studio Notebook console, choose Amazon Q from the bottom of the window.

The Amazon Q panel will open.

2. Choose **Pause Auto-Suggestions** or **Resume Auto-Suggestions**.

Amazon Q code completion in action

This section demonstrates how Amazon Q can help you write a complete application. This application creates an Amazon S3 bucket and a Amazon DynamoDB table, plus a unit test that validates both tasks.

Here, Amazon Q helps the developer choose which libraries to import. Using the arrow keys, the developer toggles through multiple suggestions.

```
basics > boto-whisper-demo.py
1  import boto3
2  from boto3.session import Session
3  import unittest
4  from boto
```

Here, the developer enters a comment, describing the code they intend to write on the next line.

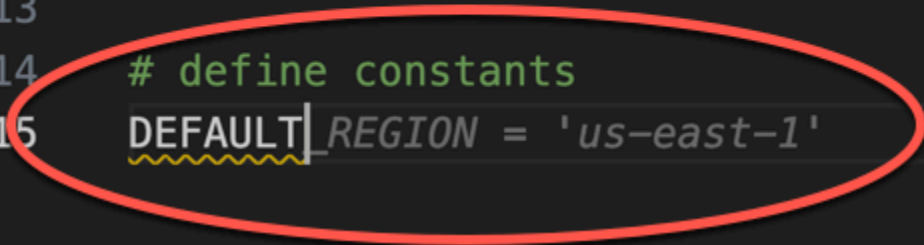
Amazon Q correctly anticipates the method to be called. The developer can accept the suggestion with the tab key.

```
basics > boto-whisper-demo.py
1  import boto3
2  from boto3.session import Session
3  import unittest
4  from botocore.exceptions import ClientError
5  import logging
6  import time
7
8  # set up logging
9  logging.basicConfig(level=logging.INFO)
```

Here, the developer prepares to define constants.

Amazon Q correctly anticipates that the first constant will be REGION and that its value will be us-east-1, which is the default.

```
basics > boto-whisper-demo.py > ...  
8   # set up logging  
9   logging.basicConfig(level=logging.INFO)  
10  
11  #Create a new session  
12  session = Session()  
13  
14  # define constants  
15  DEFAULTREGION = 'us-east-1'
```



Here, the developer prepares to write code that will open sessions between the user and both Amazon S3 and DynamoDB.

Amazon Q, familiar with AWS APIs and SDKs, suggests the correct format.

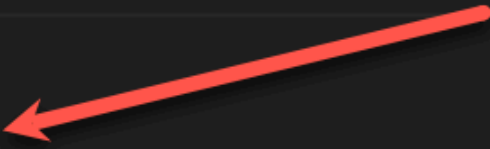
```
8   # set up logging  
9   logging.basicConfig(level=logging.INFO)  
10  
11  #Create a new session  
12  session = Session()  
13  
14  # define constants  
15  DEFAULT_REGION = 'us-east-1'  
16  TEST_BUCKET_NAME = 'my-test-bucket' + str(int(time.time()))  
17  TEST_TABLE_NAME = 'my-test-table' + str(int(time.time()))  
18  
19  # AWS Clients with session  
20  s3 = session.client('s3', region_name=DEFAULT_REGION)  
    dynamodb = session.client('dynamodb', region_name=DEFAULT_REGION)
```



The developer has merely written the name of the function that will create the bucket. But based on that (and the context), Amazon Q offers a full function, complete with try/except clauses.

Notice the use of `TEST_BUCKET_NAME`, which is a constant declared earlier in the same file.

```
18
19 # AWS Clients with session
20 s3_client = session.client('s3', region_name=us-east-1)
21 dynamodb_client = session.client('dynamodb', region_name=us-east-1)
22
23 def create_s3_bucket():
    """
    Creates a new S3 bucket
    """
    try:
        s3_client.create_bucket(Bucket=TEST_BUCKET_NAME)
    except ClientError as e:
        logging.error(e)
        return False
    return True
```



The developer has only just begun to type in the name of the function that will create a DynamoDB table. But Amazon Q can tell where this is going.

Notice that the suggestion accounts for the DynamoDB session created earlier, and even mentions it in a comment.


```
40 def create_dynamodb_table(table_name, region=None):  
    # global dynamodb # Use the global dynamodb client created with the session  
    print(f"Using region: {region}")  
    print(f"DynamoDB endpoint URL: {dynamodb.meta.endpoint_url}") # Print the end  
    try:  
        print(f"Creating table in region: {region}") # Add this line to debug  
        if region is None or region.lower() == 'us-east-1':  
            response = dynamodb.create_table(  
                TableName=table_name,  
                KeySchema=[  
                    {  
                        'AttributeName': 'id',  
                        'KeyType': 'HASH' # Partition key  
                    }  
                ],  
                BillingMode='PAY_PER_REQUEST',  
                ProvisionedThroughput=1000  
            )
```

The developer has done little more than write the name of the unit test class, when Amazon Q offers to complete it.

Notice the built-in references to the two functions created earlier in the same file.

The developer has only just begun to type in the name of the function that will create a DynamoDB table. But Amazon Q can tell where this is going.

Notice that the suggestion accounts for the DynamoDB session created earlier, and even mentions it in a comment.

```

69 # Unit test class
70 class TestBotoWhisper(unittest.TestCase):
71     def setUp(self):
72         self.s3 = session.client('s3', region_name=DEFAULT_REGION)
73         self.dynamodb = session.client('dynamodb', region_name=DEFAULT_REGION)
74         self.s3_resource = session.resource('s3', region_name=DEFAULT_REGION)
75         self.dynamodb_resource = session.resource('dynamodb', region_name=DEFAULT_REGION)
76
77     def tearDown(self):
78         self.s3.delete_bucket(Bucket=TEST_BUCKET_NAME)
79         self.dynamodb.delete_table(TableName=TEST_TABLE_NAME)
80
81     def test_create_s3_bucket(self):
82         self.assertTrue(create_s3_bucket(TEST_BUCKET_NAME, DEFAULT_REGION))
83
84     def test_create_dynamodb_table(self):
85         self.assertTrue(create_dynamodb_table(TEST_TABLE_NAME, DEFAULT_REGION))

```

Based only on a comment and the context, Amazon Q supplies the entire main function.

basics > boto-whisper-demo.py > ...

```

80 def test_create_dynamodb_table(self):
81     create_dynamodb_table('my-test-table')
82     client = boto3.client('dynamodb', region_name='us-east-1')
83     response = client.list_tables()
84     self.assertIn('my-test-table', response['TableNames'])
85
86 # Main function to create bucket and table
87 def main():
88     create_s3_bucket(TEST_BUCKET_NAME, region='us-east-1')
89     create_dynamodb_table(TEST_TABLE_NAME, region='us-east-1')

```

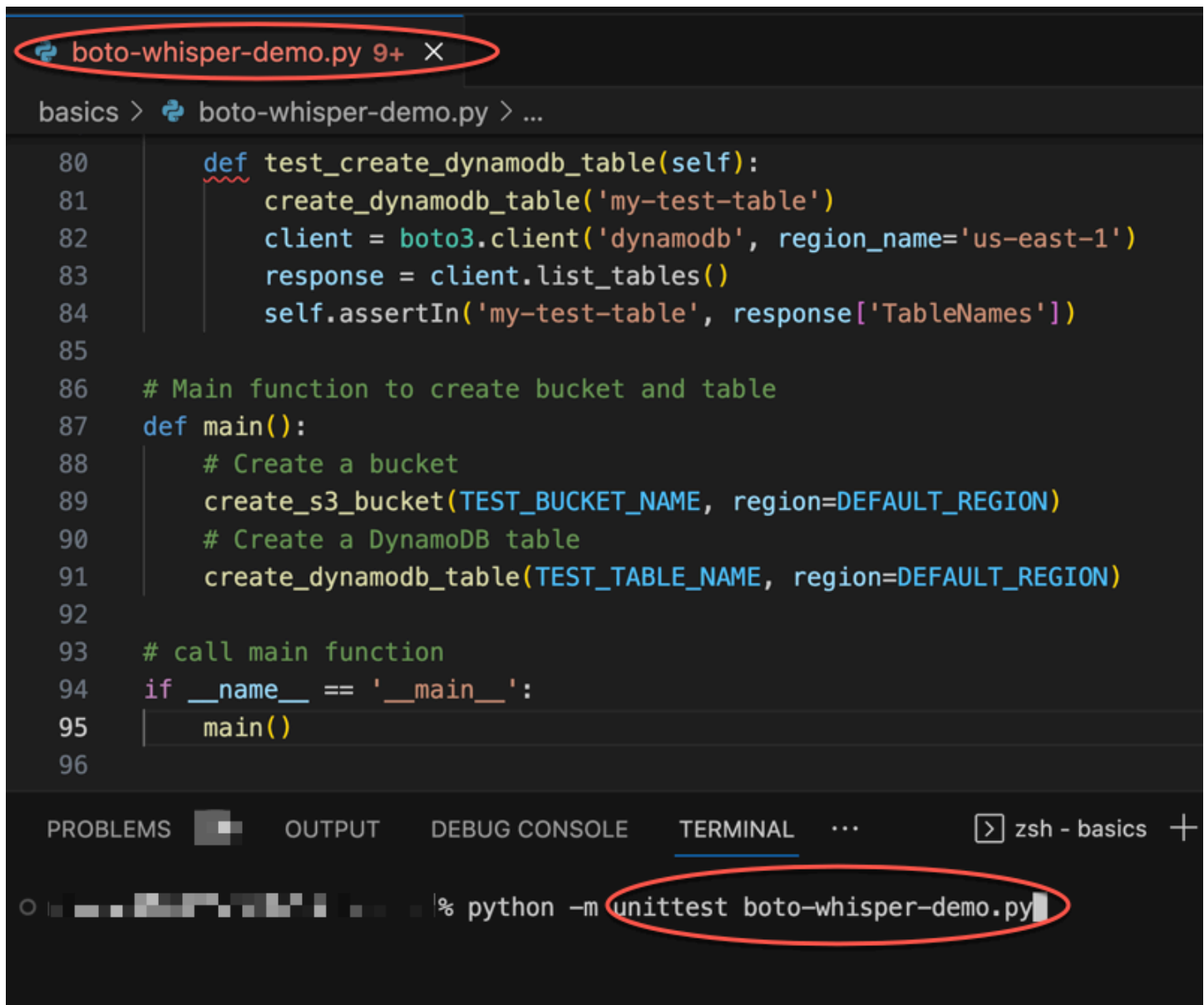
All that's left is the main guard, and Amazon Q knows it.

Based only on a comment and the context, Amazon Q supplies the entire main function.

```
# Main function to create bucket and table
def main():
    # Create a bucket
    create_s3_bucket(TEST_BUCKET_NAME, region=DEFAULT_REGION)
    # Create a DynamoDB table
    create_dynamodb_table(TEST_TABLE_NAME, region=DEFAULT_REGION)

# call main function
if __name__ == '__main__':
    main()
```

Finally, the developer runs the unit test from the terminal of the same IDE where the coding took place.



The screenshot displays an AWS coding environment. At the top, a file tab for `boto-whisper-demo.py` is highlighted with a red circle. Below the file explorer, the code editor shows a Python script with the following content:

```
80     def test_create_dynamodb_table(self):
81         create_dynamodb_table('my-test-table')
82         client = boto3.client('dynamodb', region_name='us-east-1')
83         response = client.list_tables()
84         self.assertIn('my-test-table', response['TableNames'])
85
86     # Main function to create bucket and table
87     def main():
88         # Create a bucket
89         create_s3_bucket(TEST_BUCKET_NAME, region=DEFAULT_REGION)
90         # Create a DynamoDB table
91         create_dynamodb_table(TEST_TABLE_NAME, region=DEFAULT_REGION)
92
93     # call main function
94     if __name__ == '__main__':
95         main()
96
```

At the bottom, the terminal panel is active, showing the command `% python -m unittest boto-whisper-demo.py` being executed, which is also circled in red.

Generating inline suggestions in AWS coding environments

In addition to third-party IDEs, Amazon Q Developer can generate inline suggestions within AWS services that provide their own coding environments.

The following sections describe how to set up Amazon Q inline code suggestions within integrated AWS services.

Note

If you are using Amazon Q as part of an enterprise, then you are using Amazon Q Developer Pro. In that case, administrators at your organization must complete additional steps before you can start coding. For more information, see [Getting started with Amazon Q Developer](#).

Topics

- [Using Amazon Q Developer with Amazon SageMaker AI Studio](#)
- [Using Amazon Q Developer with JupyterLab](#)
- [Using Amazon Q Developer with Amazon EMR Studio](#)
- [Using Amazon Q Developer with AWS Glue Studio](#)
- [Using Amazon Q Developer with AWS Lambda](#)
- [Using Amazon Q Developer with other services](#)

Using Amazon Q Developer with Amazon SageMaker AI Studio

You can chat with Amazon Q inside Amazon SageMaker AI Studio. You can also make code recommendations automatically as you write your code.

To use Amazon Q Developer with Amazon SageMaker AI Studio, you must add Amazon Q permissions to your SageMaker AI execution role. The way you configure permissions depends on whether you are using the Amazon Q Developer Free tier or the Pro tier.

To set up and activate Amazon Q for Amazon SageMaker AI Studio, see [Set up Amazon Q Developer for your users](#) in the *Amazon SageMaker AI User Guide*.

Using Amazon Q Developer with JupyterLab

This page describes how to set up and activate Amazon Q Developer for JupyterLab. Once activated, Amazon Q can make code recommendations automatically as you write your code.

Note

Python is the only programming language that Amazon Q supports in JupyterLab.

Installing JupyterLab

Install [JupyterLab](#) on your computer or if you already have JupyterLab installed, check its version by running the following command.

```
pip show jupyterlab
```

Note the version in the response, and follow the use the corresponding directions in one of the following sections.

Installation using pip for Jupyter Lab version ≥ 4.0

You can install and enable the Amazon Q extension for JupyterLab 4 with the following commands.

```
# JupyterLab 4
pip install amazon-q-developer-jupyterlab-ext
```

Installation using pip for Jupyter Lab version ≥ 3.6 and < 4.0

You can install and enable the Amazon Q extension for JupyterLab 3 with the following commands.

```
# JupyterLab 3
pip install amazon-q-developer-jupyterlab-ext~=3.0
jupyter server extension enable amazon-q-developer-jupyterlab-ext
```

Authenticating with AWS Builder ID

In the following procedure, you will set up Builder ID, which you will use to authenticate when you enable Amazon Q.

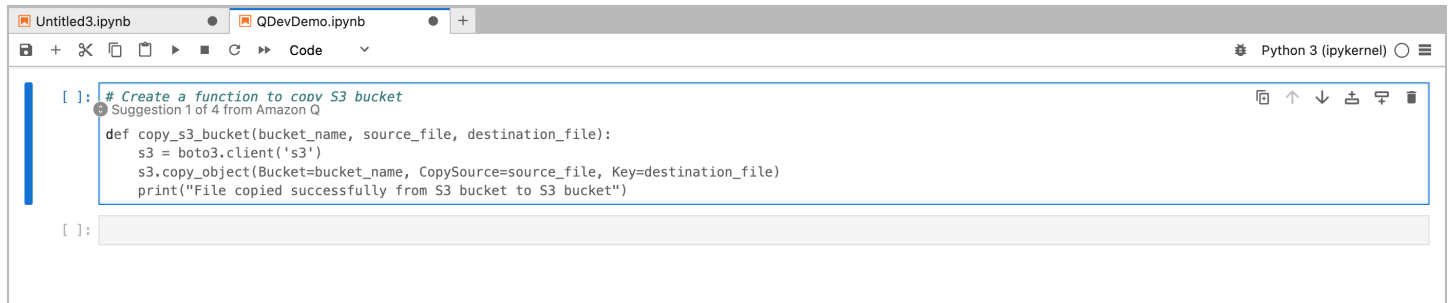
1. Refresh the browser tab on which you are using JupyterLab.
2. From the Amazon Q panel at the bottom of the window, choose **Start Amazon Q**.
3. From the pop-up window, choose **Copy Code and Proceed**.
4. On the **Create AWS Builder ID** page, if you don't have a Builder ID, enter a personal email address and choose **Next**.

If you already have a Builder ID, skip to the step about the **Authorize request** page.

5. On the next **Create your AWS Builder ID** page, enter a name and choose **Next**.
6. After you receive your email verification code, enter it in the blank field and choose **Verify**.
7. On the next screen, choose and confirm a password, then choose **Create AWS Builder ID**
8. On the next page choose **Allow** to allow Amazon Q to access your data.

Now you should be logged into Amazon Q in JupyterLab with Builder ID.

To begin coding, see [Using shortcut keys](#).



The screenshot shows the JupyterLab interface with two tabs: 'Untitled3.ipynb' and 'QDevDemo.ipynb'. The 'QDevDemo.ipynb' tab is active, displaying a code cell with a suggestion from Amazon Q. The suggestion is a Python function named 'copy_s3_bucket' that takes 'bucket_name', 'source_file', and 'destination_file' as arguments. The function uses the 'boto3' library to copy an object from one S3 bucket to another. The code is as follows:

```
[ ]: # Create a function to copy S3 bucket
      Suggestion 1 of 4 from Amazon Q
def copy_s3_bucket(bucket_name, source_file, destination_file):
    s3 = boto3.client('s3')
    s3.copy_object(Bucket=destination_file, CopySource=source_file, Key=destination_file)
    print("File copied successfully from S3 bucket to S3 bucket")

[ ]:
```

Using Amazon Q Developer with Amazon EMR Studio

This page describes how to set up and activate Amazon Q Developer for Amazon EMR Studio. Once activated, Amazon Q can make code recommendations automatically as you write your ETL code.

Note

Amazon Q supports Python, which can be used to code ETL scripts for Spark jobs in Amazon EMR Studio.

Use the following procedure to set up Amazon EMR Studio to work with Amazon Q.

1. Set up [Amazon EMR Studio Notebook](#).
2. Attach the following policy to the IAM user role for Amazon EMR Studio Notebook.

Note

The `codewhisperer` prefix is a legacy name from a service that merged with Amazon Q Developer. For more information, see [Amazon Q Developer rename - Summary of changes](#).

```
{
  "Version": "2012-10-17",
  "Statement": [
    {
      "Sid": "AmazonQDeveloperPermissions",
      "Effect": "Allow",
      "Action": [
        "codewhisperer:GenerateRecommendations"
      ],
      "Resource": "*"
    }
  ]
}
```

3. Open the [Amazon EMR console](#).
4. Under Amazon EMR Studio, choose **Workspaces (Notebooks)**.
5. Select your desired Workspace and choose **Quick launch**.

Using Amazon Q Developer with AWS Glue Studio

This page describes how to set up and activate Amazon Q Developer for [AWS Glue Studio Notebook](#). Once activated, Amazon Q can make code recommendations automatically as you write your ETL code.

Note

Amazon Q supports both Python and Scala, the two languages used for coding ETL scripts for Spark jobs in AWS Glue Studio.

In the following procedure, you will set up AWS Glue to work with Amazon Q.

1. [Set up AWS Glue Studio Notebook](#).
2. Attach the following policy to your IAM role for Glue Studio notebook

Note

The `codewhisperer` prefix is a legacy name from a service that merged with Amazon Q Developer. For more information, see [Amazon Q Developer rename - Summary of changes](#).

```
{
  "Version": "2012-10-17",
  "Statement": [
    {
      "Sid": "AmazonQDeveloperPermissions",
      "Effect": "Allow",
      "Action": [
        "codewhisperer:GenerateRecommendations"
      ],
      "Resource": "*"
    }
  ]
}
```

3. Open the [Glue console](#)
4. Under **ETL jobs**, choose **Notebooks**.
5. Verify that **Jupyter Notebook** is selected. Choose **Create**.
6. Enter a **Job name**.
7. For IAM role, select the role that you configured to interact with Amazon Q
8. Choose **Start notebook**.

Using Amazon Q Developer with AWS Lambda

This document describes how to set up and activate Amazon Q Developer for the Lambda console. Once activated, Amazon Q can make code recommendations on demand in the Lambda code editor as you develop your function.

Note

In the Lambda console, Amazon Q only supports functions using the Python and Node.js runtimes.

AWS Identity and Access Management permissions for Lambda

For Amazon Q to provide recommendations in the Lambda console, you must enable the correct IAM permissions for either your IAM user or role. You must add the `codewhisperer:GenerateRecommendations` permission, as outlined in the sample IAM policy below:

Note

The `codewhisperer` prefix is a legacy name from a service that merged with Amazon Q Developer. For more information, see [Amazon Q Developer rename - Summary of changes](#).

```
{
  "Version": "2012-10-17",
  "Statement": [
    {
      "Sid": "AmazonQDeveloperPermissions",
      "Effect": "Allow",
      "Action": ["codewhisperer:GenerateRecommendations"],
      "Resource": "*"
    }
  ]
}
```

It is best practice to use IAM policies to grant restrictive permissions to IAM principals. For details about working with IAM for AWS Lambda, see [Identity and access management in AWS Lambda](#) in the *AWS Lambda Developer Guide*.

Activating Amazon Q Developer with Lambda

To activate Amazon Q in the Lambda console code editor, complete these steps.

1. Open the [Functions page](#) of the Lambda console, and choose the function that you want to edit.
2. As you type in the code editor, automatic code suggestions from Amazon Q are enabled by default. To pause suggestions, choose **Amazon Q** in the bottom left corner of the **Code source** panel. The command palette opens at the top of the Code source panel. From there, choose **Pause auto-suggestions**.

For shortcut keys, see [Using shortcut keys](#).

Using Amazon Q Developer with other services

AWS Identity and Access Management permissions for other services

For Amazon Q to provide recommendations in the context of another service, you must enable the correct IAM permissions for either your IAM user or role. You must add the `codewhisperer:GenerateRecommendations` permission, as outlined in the sample IAM policy below:

Note

The `codewhisperer` prefix is a legacy name from a service that merged with Amazon Q Developer. For more information, see [Amazon Q Developer rename - Summary of changes](#).

```
{
  "Version": "2012-10-17",
  "Statement": [
    {
      "Sid": "AmazonQDeveloperPermissions",
      "Effect": "Allow",
      "Action": ["codewhisperer:GenerateRecommendations"],
      "Resource": "*"
    }
  ]
}
```

It is best practice to use IAM policies to grant restrictive permissions to IAM principals. For details about working with IAM, see [Security best practices](#) in the *IAM user guide*.

Using shortcut keys

While getting inline suggestions from Amazon Q, you can use keyboard shortcuts for common actions you take, such as initiating Amazon Q or accepting a recommendation.

Choose the integrated development environment (IDE) where you are developing code to see keyboard shortcuts for your IDE.

Visual Studio Code

Action	Keyboard shortcut
Manually initiate Amazon Q	MacOS: Option + C Windows: Alt + C
Accept a recommendation	Tab
Next recommendation	Right arrow
Previous recommendation	Left arrow
Reject a recommendation	ESC, backspace, or keep typing and the recommendation will disappear as soon as there is a character mismatch.
Accept next word	Option + right arrow

To change keybindings in VS Code, see [Key Bindings for Visual Studio Code](#) on the VS Code website.

Note

The inline suggestions toolbar in VS Code is disabled by default. For more information, see [Redesigned inline suggestions toolbar](#) on the VS Code website.

JetBrains

Action	Keyboard shortcut
Manually initiate Amazon Q	MacOS: Option + C Windows: Alt + C
Accept a recommendation	Tab
Next recommendation	Right arrow
Previous recommendation	Left arrow
Reject a recommendation	ESC, backspace, or keep typing and the recommendation will disappear as soon as there is a character mismatch.

To change keybindings in IntelliJ, see [IntelliJ IDEA keyboard shortcuts](#) on the JetBrains website.

Eclipse

Action	Keyboard shortcut
Manually initiate Amazon Q	MacOS: Option + C Windows: Alt + C
Accept a recommendation	Tab
Next recommendation	MacOS: Option +] Windows: Alt +]
Previous recommendation	MacOS: Option + [Windows: Alt + [

Action	Keyboard shortcut
Reject a recommendation	ESC, backspace, or keep typing and the recommendation will disappear as soon as there is a character mismatch.

To change keybindings in Eclipse, see [Changing the key bindings](#) in the Eclipse documentation.

Toolkit for Visual Studio

Action	Keyboard shortcut
Manually initiate Amazon Q <code>AWSToolkit.CodeWhisperer.GetSuggestion</code> in the keybindings	Windows: Alt + C
Accept a recommendation	Tab
Next recommendation <code>Edit.NextSuggestion</code> in the keybindings	Windows: Alt + .
Previous recommendation <code>Edit.PreviousSuggestion</code> in the keybindings	Windows: Alt + ,
Reject a recommendation	ESC, backspace, or keep typing and the recommendation will disappear as soon as there is a character mismatch.

See also Microsoft's [Visual Studio default keyboard shortcuts](#).

To change keybindings in Visual Studio, use Tools -> Options -> Keyboard.

Amazon SageMaker AI

Action	Keyboard shortcut
Manually initiate Amazon Q	MacOS: Option + C
	Windows: Alt + C
Accept a recommendation	Tab
Next recommendation	Down arrow
Previous recommendation	Up arrow
Reject a recommendation	ESC

JupyterLab

Action	Keyboard shortcut
Manually initiate Amazon Q	MacOS: Option + C
	Windows: Alt + C
Accept a recommendation	Tab
Next recommendation	Down arrow
Previous recommendation	Up arrow
Reject a recommendation	ESC

AWS Glue Studio Notebook

Action	Keyboard shortcut
Manually initiate Amazon Q	MacOS: Option + C
	Windows: Alt + C

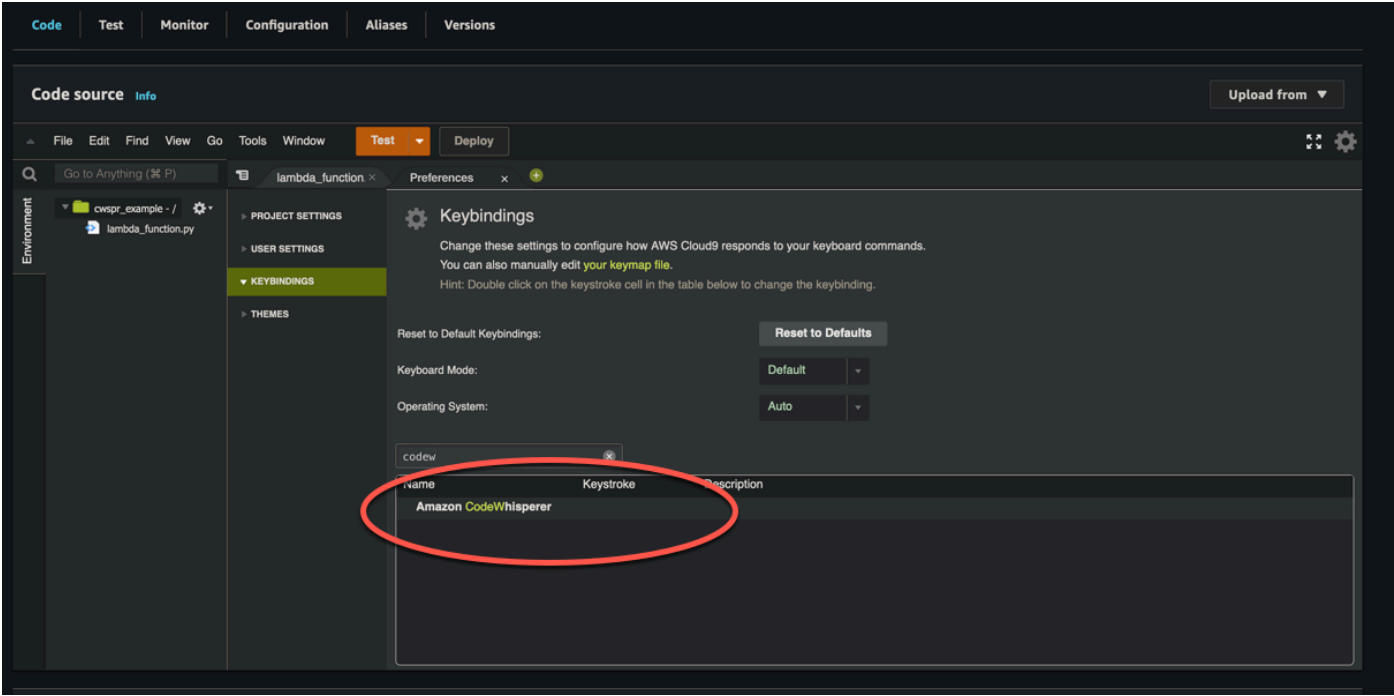
Action	Keyboard shortcut
Accept a recommendation	Tab
Next recommendation	Down arrow
Previous recommendation	Up arrow
Reject a recommendation	ESC

AWS Lambda

Action	Keyboard shortcut
Manually fetch a code suggestion	MacOS: Option + C Windows: Alt + C
Accept a suggestion	Tab
Reject a suggestion	ESC, Backspace, scroll in any direction, or keep typing and the recommendation automatically disappears.

To change the key bindings, use the following procedure.

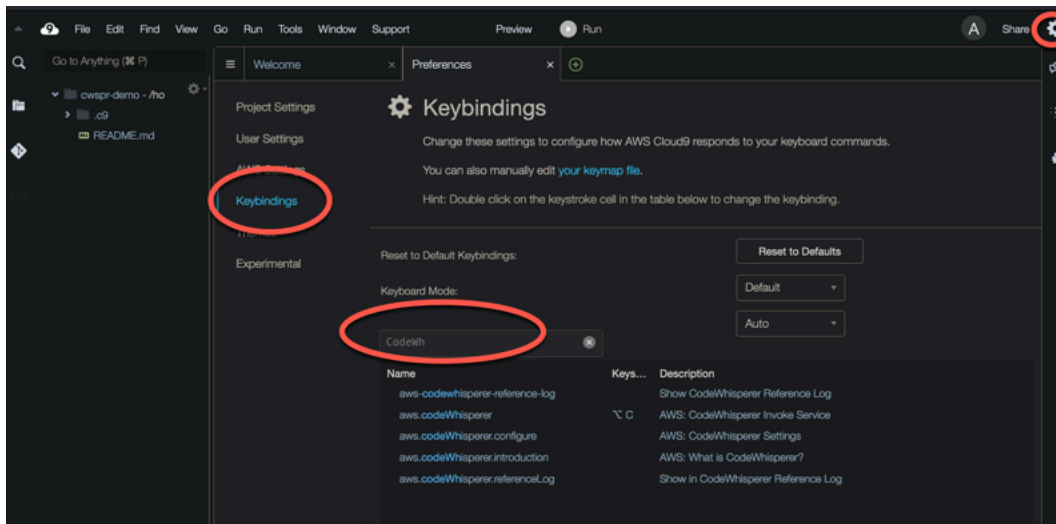
1. While viewing a particular function, choose the gear icon to open the **Preferences** tab.
2. On the **Preferences** tab, select **Keybindings**.
3. In the keybindings search box, enter Amazon Q.



AWS Cloud9

Action	Keyboard shortcut
Manually fetch a code suggestion	MacOS: Option + C Windows: Alt + C
Accept a suggestion	Tab
Reject a suggestion	ESC, Backspace, scroll in any direction, or keep typing and the recommendation automatically disappears.

- While viewing a particular environment, choose the gear icon to open the **Preferences** tab.
- On the **Preferences** tab, select **Keybindings**.
- In the keybindings search box, enter Amazon Q.
- In the Keystroke column, double-click the space corresponding to the function you're interested in.
- Enter the keys that you want to bind the function to.



Using code references

Amazon Q learns, in part, from open-source projects. Sometimes, a suggestion it's giving you may be similar to publicly available code. Code references include information about the source Amazon Q used to generate a recommendation.

Topics

- [View and update code references](#)
- [Turn code references off and on](#)
- [Opt out of code with references](#)

View and update code references

With the reference log, you can view references to code recommendations that are similar to publicly available code. You can also update and edit code recommendations suggested by Amazon Q.

Choose your IDE to see steps for how to view and update code references.

Visual Studio Code

To display the Amazon Q reference log in VS Code, use the following procedure.

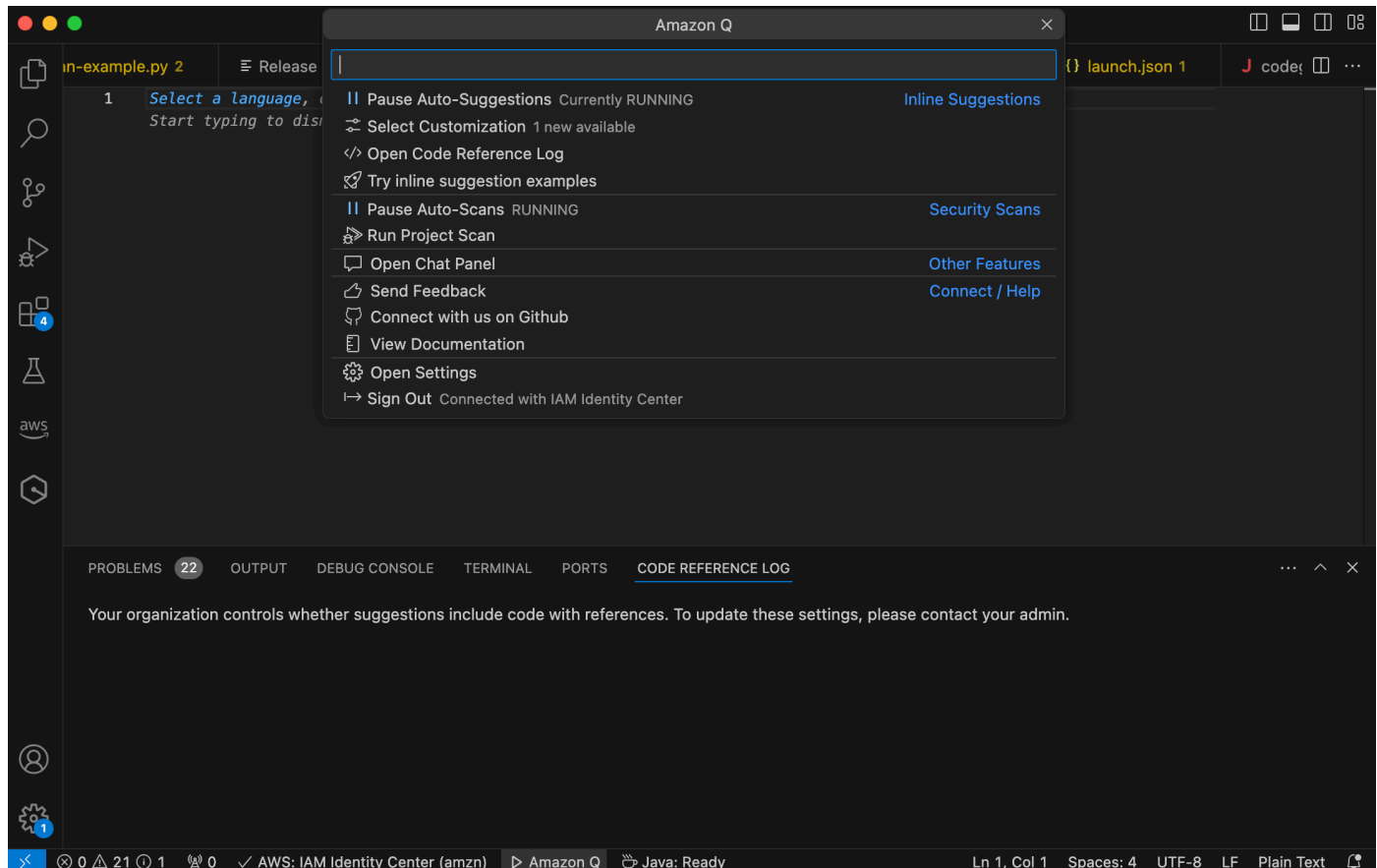
1. Make sure you are using the latest version of both VS Code and the Amazon Q extension.
2. In VS Code, choose **Amazon Q** from the component tray at the bottom of the IDE window.

The Amazon Q task bar opens at the top of the IDE window.

3. Choose **Open Code Reference Log**.

The code reference log tab opens. Any references to code recommendations are listed.

The following image shows the open Amazon Q task bar and code reference log tab.



JetBrains

To display the Amazon Q reference log in JetBrains IDEs, use the following procedure.

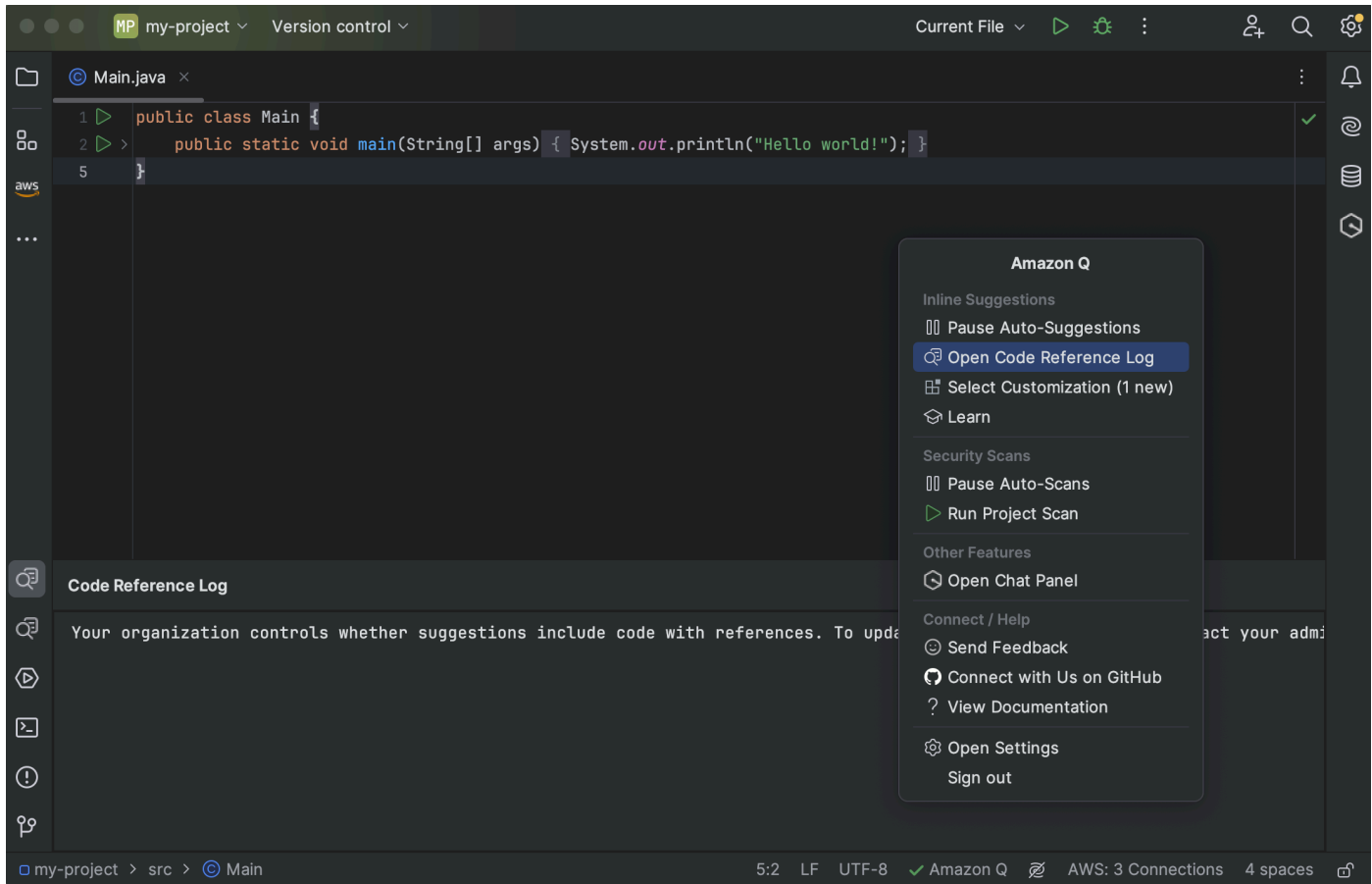
1. Make sure you are using the latest version of both your JetBrains IDE and the Amazon Q plugin.
2. In JetBrains, choose **Amazon Q** from the status bar at the bottom of the IDE window.

The Amazon Q task bar opens above the status bar.

3. Choose **Open Code Reference Log**.

The code reference log tab opens. Any references to code recommendations are listed.

The following image shows the open Amazon Q task bar and code reference log tab.

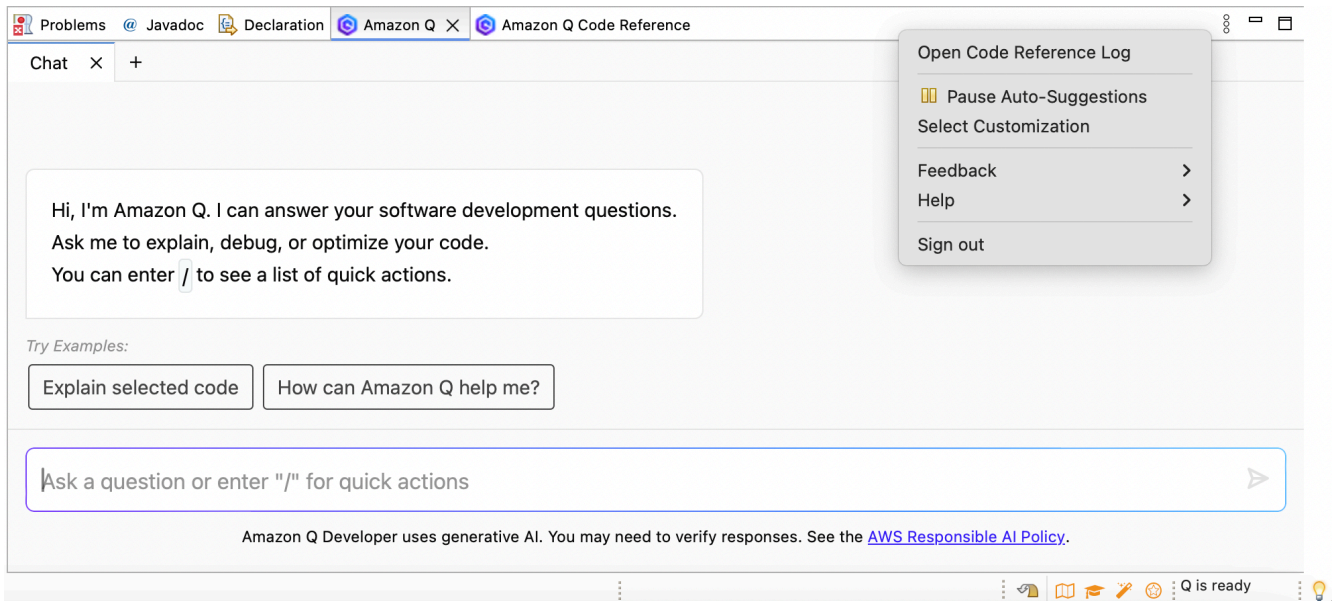


Eclipse

To display the Amazon Q reference log in Eclipse IDEs, use the following procedure.

1. Make sure you are using the latest version of both the Eclipse IDE and the Amazon Q plugin.
2. In your Eclipse IDE, choose the **Amazon Q** icon in the top right corner of the IDE.
3. With the Amazon Q chat tab open, choose the ellipsis icon in the top right corner of the tab. The Amazon Q task bar opens.

The following image shows the Amazon Q task bar in an Eclipse IDE.



4. Choose **Open Code Reference Log**.

The code reference log tab opens. Any references to code recommendations are listed.

Toolkit for Visual Studio

When Amazon Q suggests code that contains a reference in the Toolkit for Visual Studio, the reference type appears in the suggestion description.

```
# Create function to create a DynamoDB Table
def Suggestion (License: MIT) 1 / 1 | Tab to accept | ⚙️
    table = dynamodb.create_table(
        TableName='Products',
        KeySchema=[
            {
                'AttributeName': 'id'.

```

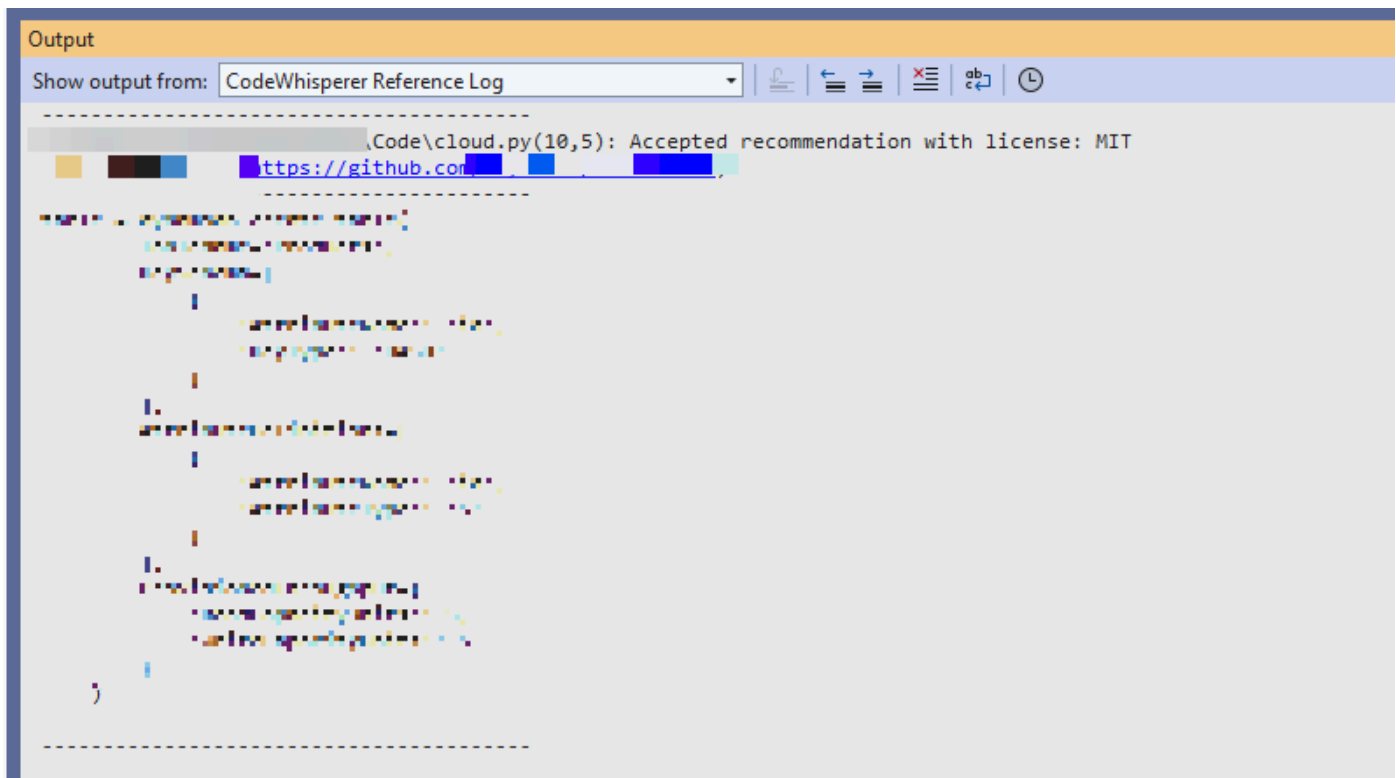
All accepted suggestions that contain references are captured in the reference log.

To access the reference log, choose the AWS icon, then select **Open Code Reference Log**.

A list of accepted suggestions that contain references will appear. This list includes:

- The location where the suggestion was accepted. Double clicking on this will take you to that location in your code.
- The associated license
- The referenced source code

- The fragment of code attributed to the reference



AWS Cloud 9

When you use Amazon Q with AWS Cloud 9, code references are on by default.

To turn them off, or to turn them back on later, use the following procedure.

1. On the AWS Cloud 9 console, in the upper left corner, choose the AWS Cloud 9 logo.
2. From the dropdown menu, choose **Preferences**.

On the right side of the console, the **Preferences** tab will open.

3. On the **Preferences** tab, under **Project Settings**, under **Extensions**, select **AWS Toolkit**.
4. Select or deselect **Amazon Q: Include Suggestions With Code References**.

Lambda

Amazon Q in Lambda does not support code references. When you use Amazon Q with Lambda, any code suggestions with references are omitted.

SageMaker AI Studio

To display the Amazon Q reference log in SageMaker AI Studio, use the following procedure.

1. At the bottom of the SageMaker AI Studio window, open the Amazon Q panel.
2. Choose **Open Code Reference Log**.

JupyterLab

To display the Amazon Q reference log in JupyterLab, use the following procedure.

1. At the bottom of the JupyterLab window, open the Amazon Q panel.
2. Choose **Open Code Reference Log**.

AWS Glue Studio Notebook

To display the Amazon Q reference log in AWS Glue Studio Notebook, use the following procedure.

1. At the bottom of the AWS Glue Studio Notebook window, open the Amazon Q panel.
2. Choose **Open Code Reference Log**.

Turn code references off and on

In most IDEs, code references are on by default. Choose your IDE to see steps for how to turn code references off or on.

Visual Studio Code

When you use Amazon Q with VS Code, code references are on by default.

To turn them off, or to turn them back on later, use the following procedure.

1. Make sure you are using the latest version of both VS Code and the Amazon Q extension.
2. In VS Code, choose **Amazon Q** from the component tray at the bottom of the IDE window.

The Amazon Q task bar opens at the top of the IDE window.

3. Choose **Open Settings**. The settings tab opens with the options related to Amazon Q displayed.

4. Select or deselect the box next to **Show Code With References**.

JetBrains

When you use Amazon Q with your JetBrains IDE, code references are on by default.

To turn them off, or to turn them back on later, use the following procedure.

1. Make sure you are using the latest version of both your JetBrains IDE and the Amazon Q plugin.
2. In JetBrains, choose **Amazon Q** from the status bar at the bottom of the IDE window.

The Amazon Q task bar opens above the status bar.

3. Choose **Open Settings**. The settings window opens with the options related to Amazon Q displayed.
4. Select or deselect the box next to **Show Code With References**.

Eclipse

When you use Amazon Q with Eclipse, code references are on by default.

To turn them off, or to turn them back on later, use the following procedure.

1. Make sure you are using the latest version of both the Eclipse IDE and the Amazon Q plugin.
2. Open **Settings** in your Eclipse IDE.
3. Choose **Amazon Q** from the left navigation bar.
4. Select or deselect the box next to **Show Code With References**.
5. Choose **Apply** to save your changes.

Toolkit for Visual Studio

When you use Amazon Q in the Toolkit for Visual Studio, code references are on by default.

To turn them off, or to turn them back on later, use the following procedure.

1. Make sure you are using the latest version of the Toolkit for Visual Studio.
2. Open **Options** in Visual Studio.

3. Choose **AWS Toolkit** from the left navigation bar, and then choose **Amazon Q**.
4. From the dropdown next to **Include Suggestions With References**, select True or False.
5. Choose **OK** to save your changes.

AWS Cloud 9

When you use Amazon Q with AWS Cloud 9, code references are on by default.

To turn them off, or to turn them back on later, use the following procedure.

1. On the AWS Cloud 9 console, in the upper left corner, choose the AWS Cloud 9 logo.
2. From the dropdown menu, choose **Preferences**.

On the right side of the console, the **Preferences** tab will open.

3. On the **Preferences** tab, under **Project Settings**, under **Extensions**, select **AWS Toolkit**.
4. Select or deselect **Amazon Q: Include Suggestions With Code References**.

Lambda

Amazon Q in Lambda does not support code references. When you use Amazon Q with Lambda, any code suggestions with references are omitted.

SageMaker AI Studio

When you use Amazon Q with SageMaker AI Studio, code references are on by default.

To turn them off, or to turn them back on later, use the following procedure.

1. From the top of the SageMaker AI Studio window choose **Settings**.
2. From the **Settings** dropdown, choose **Advanced Settings Editor**.
3. In the Amazon Q dropdown, select or deselect the box next to **Enable suggestions with code references**.

JupyterLab

When you use Amazon Q with JupyterLab, code references are on by default.

To turn them off, or to turn them back on later, use the following procedure.

1. From the top of the JupyterLab window choose **Settings**.
2. From the **Settings** dropdown, choose **Advanced Settings Editor**.
3. In the Amazon Q dropdown, select or deselect the box next to **Enable suggestions with code references**.

AWS Glue Studio Notebook

1. From the bottom of the AWS Glue Studio Notebook window choose **Amazon Q**.
2. From the pop-up menu, toggle the switch next to **Code with references**.

Note

Pausing code references will be valid only for the duration of the current AWS Glue Studio Notebook.

Opt out of code with references

In some IDEs, you can opt out of receiving suggestions with references at the administrator level.

Choose your IDE to see steps for opting out as an administrator.

Visual Studio Code

If you are an enterprise administrator, you can opt out of suggestions with code references for your entire organization. If you do this, individual developers in your organization will not be able to opt back in through the IDE. Those developers will be able to select and deselect the box discussed in the previous section, but it will have no effect if you have opted out at the enterprise level.

To opt out of suggestions with references at the enterprise level, use the following procedure.

1. In the Amazon Q Developer console, choose **Settings**.
2. In the **Amazon Q Developer account details** pane, choose **Edit**.
3. On the Edit details page, in the **Advanced settings** pane, deselect **Include suggestions with code references**.
4. Choose **Save changes**.

JetBrains

If you are an enterprise administrator, you can opt out of suggestions with code references for your entire organization. If you do this, individual developers in your organization will not be able to opt back in through the IDE. Those developers will be able to select and deselect the box discussed in the previous section, but it will have no effect if you have opted out at the enterprise level.

To opt out of suggestions with references at the enterprise level, use the following procedure.

1. In the Amazon Q Developer console, choose **Settings**.
2. In the **Amazon Q Developer account details** pane, choose **Edit**.
3. On the Edit details page, in the **Advanced settings** pane, deselect **Include suggestions with code references**.
4. Choose **Save changes**.

Eclipse

If you are an enterprise administrator, you can opt out of suggestions with code references for your entire organization. If you do this, individual developers in your organization will not be able to opt back in through the IDE. Those developers will be able to select and deselect the box discussed in the previous section, but it will have no effect if you have opted out at the enterprise level.

To opt out of suggestions with references at the enterprise level, use the following procedure.

1. In the Amazon Q Developer console, choose **Settings**.
2. In the **Amazon Q Developer account details** pane, choose **Edit**.
3. On the Edit details page, in the **Advanced settings** pane, deselect **Include suggestions with code references**.
4. Choose **Save changes**.

Toolkit for Visual Studio

To opt out of suggestions with references at the enterprise level, use the following procedure.

1. You can get to the code references setting in one of two ways:

- a. Choose the Amazon Q icon at the edge of the window, and then choose **Options...**
 - b. Go to **Tools -> AWS Toolkit -> Amazon Q**
2. Change the toggle to **True** or **False**, depending on whether you want to include suggestions with references.

AWS Cloud 9

Amazon Q in AWS Cloud 9 does not support opting out of code suggestions with references at the enterprise level.

To opt out at the individual developer level, see [Toggling code references](#).

Lambda

Amazon Q in Lambda does not support code references. When you use Amazon Q with Lambda, any code suggestions with references are omitted.

SageMaker AI Studio

Amazon Q does not support opting out of code suggestions with references at the enterprise level in SageMaker AI Studio.

JupyterLab

Amazon Q does not support opting out of code suggestions with references at the enterprise level in JupyterLab.

AWS Glue Studio Notebook

Amazon Q does not support opting out of code suggestions with references in AWS Glue Studio Notebook.

Code examples

Amazon Q can suggest code in different scenarios. To understand how it can help you as you write code in your programming language of choice, view the following code examples.

Topics

- [Using Amazon Q Developer for single-line code completion](#)
- [Using Amazon Q Developer for full function generation](#)
- [Using Amazon Q Developer for block completion](#)

- [Using Amazon Q Developer for Docstring, JSDoc, and Javadoc completion](#)
- [Using Amazon Q Developer for line-by-line recommendations](#)

Using Amazon Q Developer for single-line code completion

When you start typing out single lines of code, Amazon Q makes suggestions based on your current and previous inputs.

C++

```
17 int main(int argc, char **argv) {
18     Aws::SDKOptions options;
19     Aws::InitAPI(options); // Should only be called once.
20     {
21         Aws::Client::ClientConfiguration clientConfig;
22
23         clientConfig.region = "us-east-1";
24
25         Aws::SQS::SQSClient sqsClient(clientConfig);
26
27         Aws::Vector<Aws::String> allQueueUrls;
28         Aws::String nextToken; // Next token is used to handle a paginated response.
29         do {
30             Aws::SQS::Model::ListQueuesRequest request;
31
32             // ...
33
34         } while (!nextToken.empty());
35     }
36 }
```

JavaScript

In this example, Amazon Q completes a line of code that the developer begins.

```
1  /*
2   * Copyright Amazon.com, Inc. or its affiliates. All Rights Reserved.
3   * SPDX-License-Identifier: Apache-2.0
4   */
5
6  // Upload an object to Amazon S3 bucket.
7  // ...
```

TypeScript

In this example, the user enters a full comment, and then Amazon Q supplies the code that goes with it.



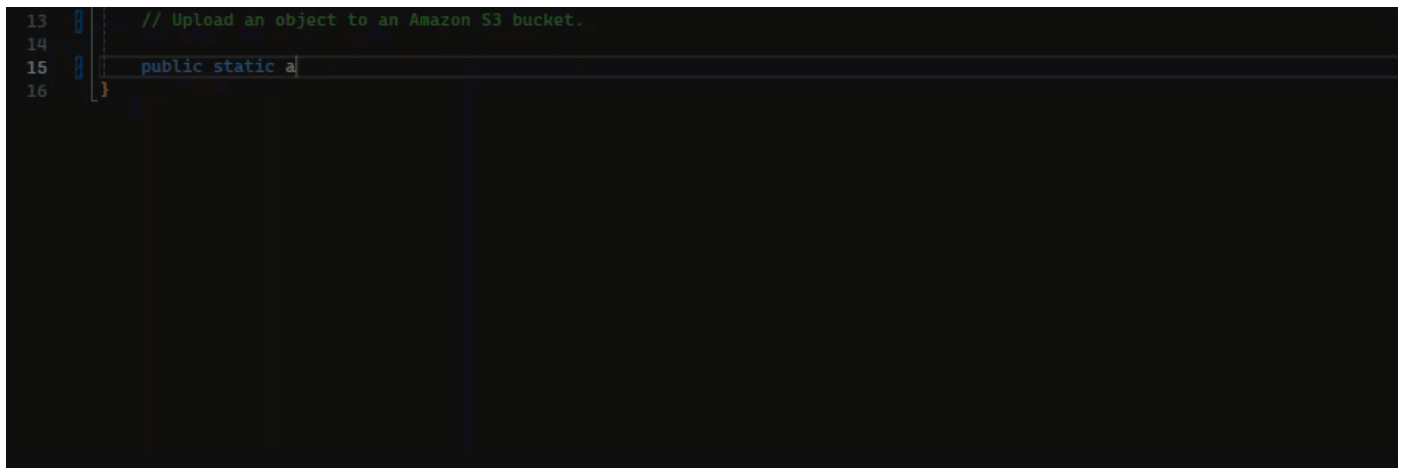
The screenshot shows a code editor with a tab labeled 'TS index.ts'. The code is as follows:

```
TS index.ts > ...  
1  import { S3Client } from "@aws-sdk/client-s3";  
2  
3  const client = new S3Client({});  
4  
5  |
```

A cursor is positioned at the end of line 5. A recommendation box is visible, showing a single-line suggestion: `import { S3Client } from "@aws-sdk/client-s3";`.

C#

In this example, Amazon Q provides a single-line recommendation based on a comment.



The screenshot shows a code editor with a tab labeled 'C#'. The code is as follows:

```
13  // Upload an object to an Amazon S3 bucket.  
14  
15  public static a  
16  }
```

A cursor is positioned at the end of line 15. A recommendation box is visible, showing a single-line suggestion: `import { S3Client } from "@aws-sdk/client-s3";`.

Shell

In the image below, Amazon Q offers recommendations on how to complete a single line of code.

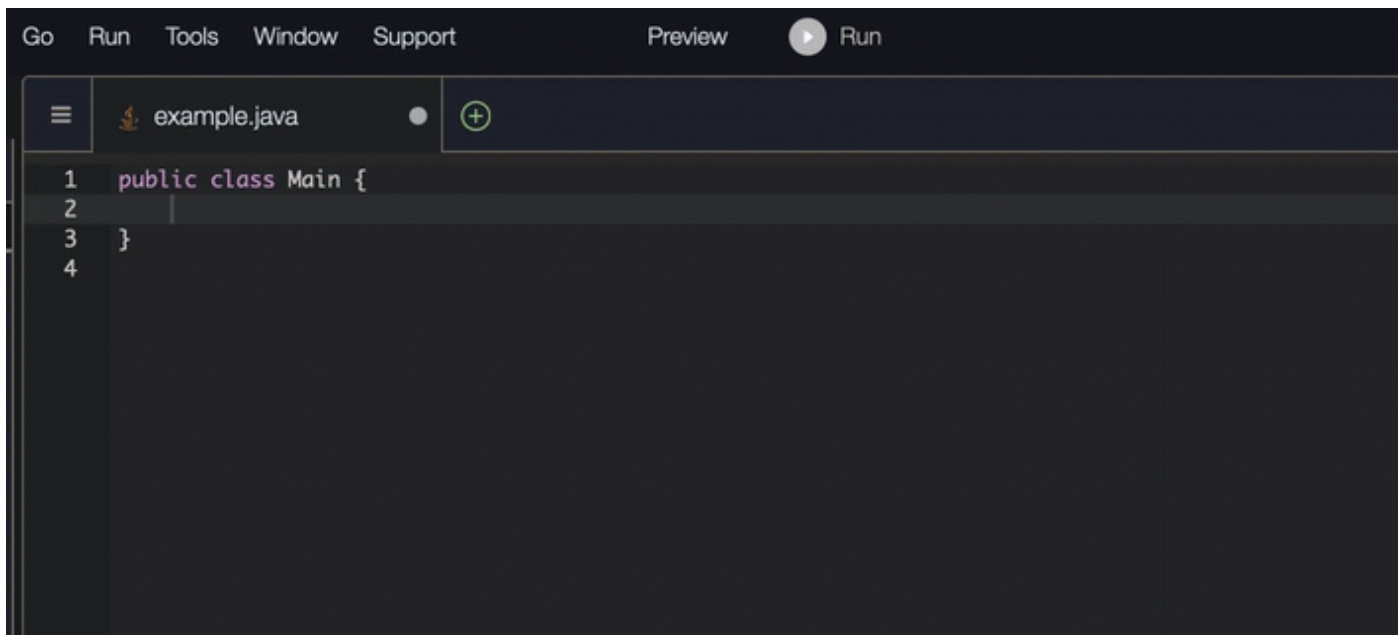
```
1 local access_key_response
2 access_key_response=$(iam_create_user_access_key -u "$user_name")
3 # shellcheck disable=SC2181
4 if [ $? -ne 0 ]; then
5     echo "ERROR: Failed to create access key for user '$user_name'"
6     exit 1
7 fi
8
9
```

Java

When you start typing out single lines of code, Amazon Q makes suggestions based on your current and previous inputs.

In the example below, in Java, a user enters the string `public` into an existing class.

Based on the input, Amazon Q generates a suggestion for the signature of the main method.



Python

In this example, Amazon Q recommends a single line of code, based on the developer's comment.

```
sagemaker_session = sage.Session()  
bucket = sagemaker_session.default_bucket()  
runtime = boto3.client("runtime.sagemaker")  
s3 = boto3.resource("s3")  
  
# Create a prefix called sampledata.  
prefix = "sampledata"  
  
# Create a filename called rawdata.csv  
filename = "rawdata.csv"
```

Using Amazon Q Developer for full function generation

Amazon Q can generate an entire function based on a comment that you've written. As you finish your comment Amazon Q will suggest a function signature. If you accept the suggestion, Amazon Q automatically advances your cursor to the next part of the function and makes a suggestion. Even if you enter an additional comment or line of code in between suggestions, Amazon Q will refactor based on your input.

C

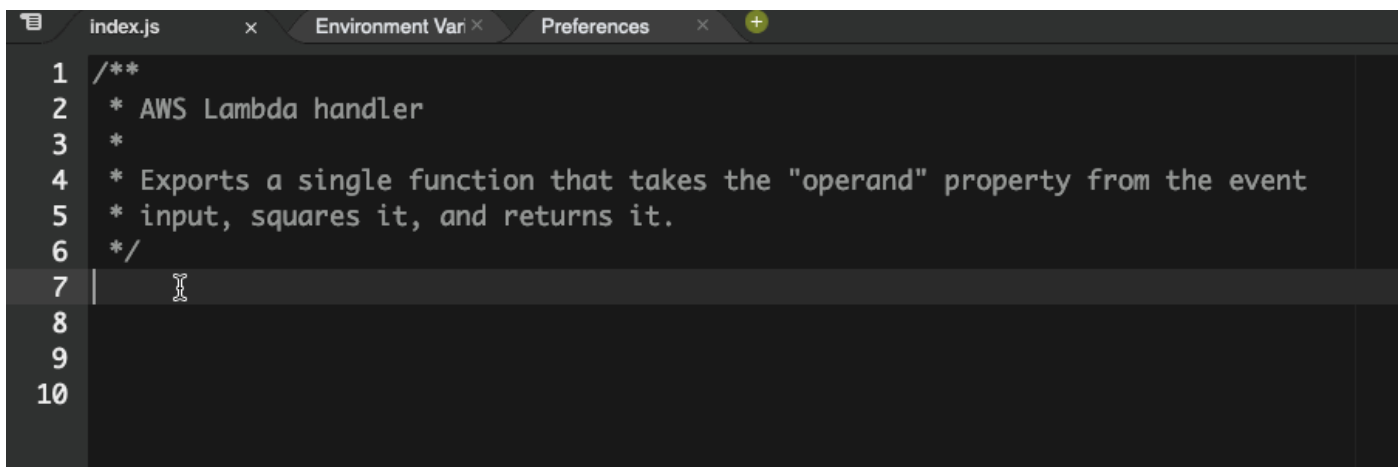
```
32 |  
33 |  
34 | bool AwsDoc::SQS::createQueue(const Aws::String &queueName,  
    |                               const Aws::Client::ClientConfiguration &clientConfigurat
```

C++

```
32 |  
33 |  
34 | bool AwsDoc::SQS::createQueue(const Aws::String &queueName,  
    |                               const Aws::Client::ClientConfiguration &clientConfigurat
```

JavaScript

In the following example, the user generates, and then edits, a full function based on a set of comments.



```
1 /**  
2  * AWS Lambda handler  
3  *  
4  * Exports a single function that takes the "operand" property from the event  
5  * input, squares it, and returns it.  
6  */  
7 |  
8  
9  
10
```

In the following image, a user has written a function signature for reading a file from Amazon S3. Amazon Q then suggests a full implementation of the `read_from_s3` method.

```
def read_from_s3(bucket, key):  
    import boto3  
    s3 = boto3.client('s3')  
    obj = s3.get_object(Bucket=bucket, Key=key)  
    return obj['Body'].read().decode('utf-8')
```

Note

Sometimes, as in the previous example, Amazon Q includes `import` statements as part of its suggestions. As a best practice, manually move these `import` statements to the top of your file.

As another example, in the following image, a user has written a function signature. Amazon Q then suggests a full implementation of the `quicksort` method.

```
def quicksort(a):  
    if len(a) <= 1:  
        return a  
    else:  
        pivot = a[0]  
        less = [i for i in a[1:] if i <= pivot]  
        greater = [i for i in a[1:] if i > pivot]  
        return quicksort(less) + [pivot] + quicksort(greater)
```

Amazon Q considers past code snippets when making suggestions. In the following image, the user in the previous example has accepted the suggested implementation for `quicksort` above. The user then writes another function signature for a generic `sort` method. Amazon Q then suggests an implementation based on what has already been written.

```
def quicksort(a):  
    if len(a) <= 1:  
        return a  
    else:  
        pivot = a[0]  
        less = [i for i in a[1:] if i <= pivot]  
        greater = [i for i in a[1:] if i > pivot]  
        return quicksort(less) + [pivot] + quicksort(greater)
```

```
def sort(a):
```

```
    return quicksort(a)
```

In the following image, a user has written a comment. Based on this comment, Amazon Q then suggests a function signature.

```
# Binary search function
```

```
def binary_search(arr, l, r, x):
```

In the following image, the user in the previous example has accepted the suggested function signature. Amazon Q can then suggest a complete implementation of the `binary_search` function.

```
# Binary search function
```

```
def binary_search(arr, l, r, x):
```

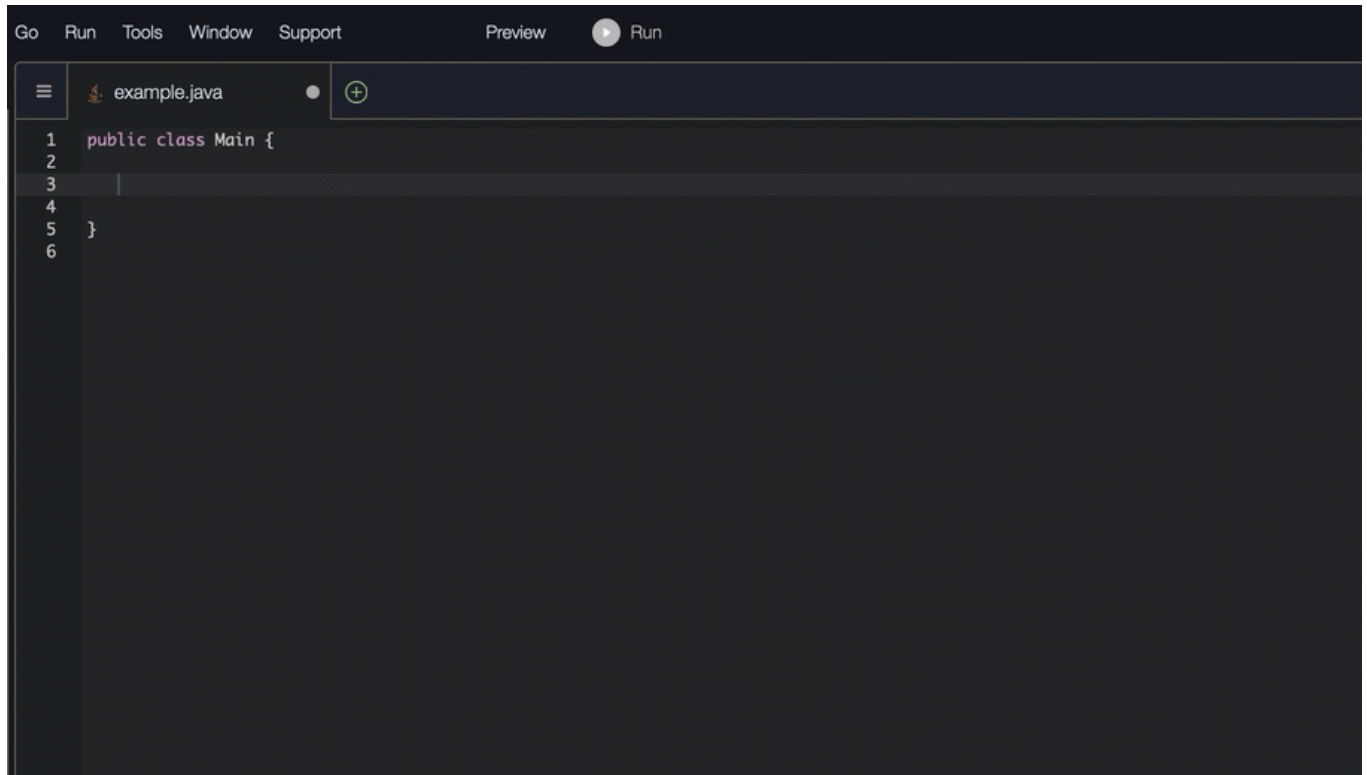
```
    while l <= r:  
        mid = l + (r - l) // 2  
        if arr[mid] == x:  
            return mid  
        elif arr[mid] < x:  
            l = mid + 1  
        else:  
            r = mid - 1
```

Java

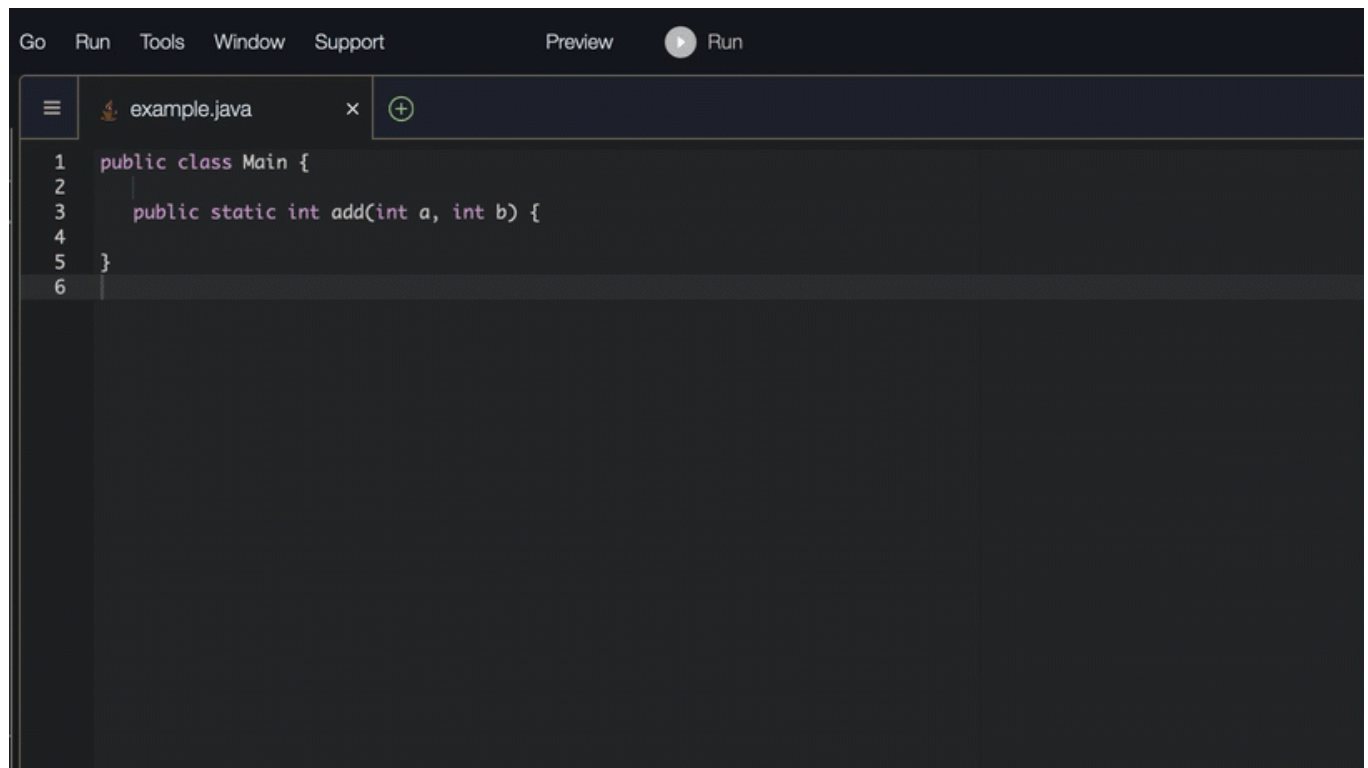
The following list contains examples of how Amazon Q makes suggestions and advances you through the entire process of creating a function.

1. In the following example, a user inputs a comment. Amazon Q suggests a function signature.

After the user accepts that suggestion, Amazon Q suggests a function body.

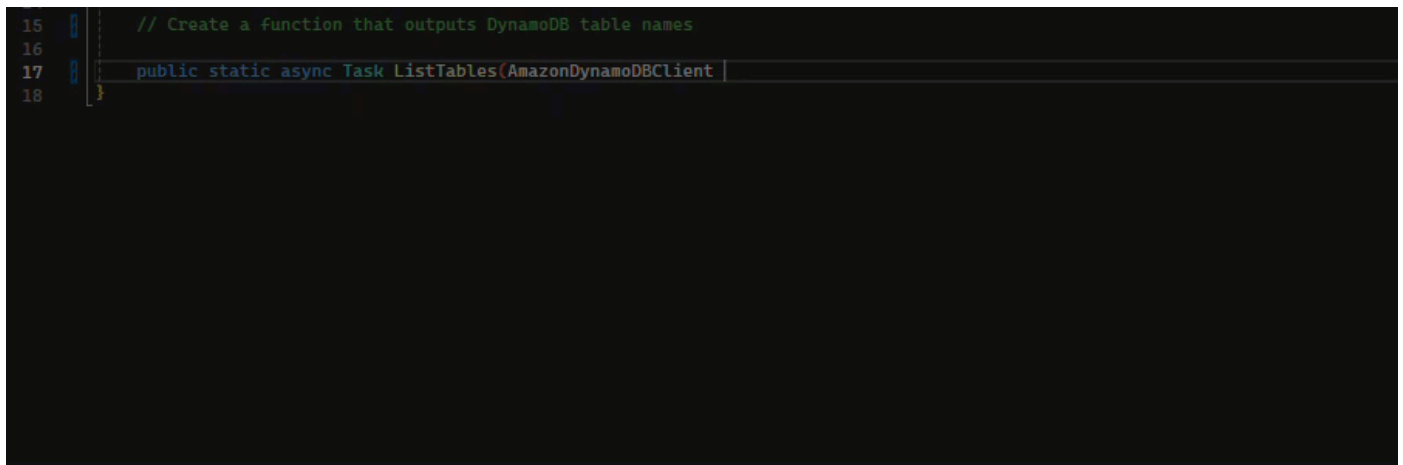


2. In the image below, a user inputs a comment in the body of the function prior to accepting a suggestion from Amazon Q. On the following line, Amazon Q generates a suggestion based on the comment.



C#

In the following example, Amazon Q recommends a full function.



TypeScript

In the following example, Amazon Q generates a function based on the user's docstrings.

```
/**  
·*·Upload·a·large·file·to·an·S3·bucket·in·multiple·parts.  
·*·@param·{string}·fileName·--·The·name·of·the·file·to·upload.  
·*·@param·{string}·bucketName·--·The·name·of·the·bucket·to·upload·to.  
·*/
```

Python

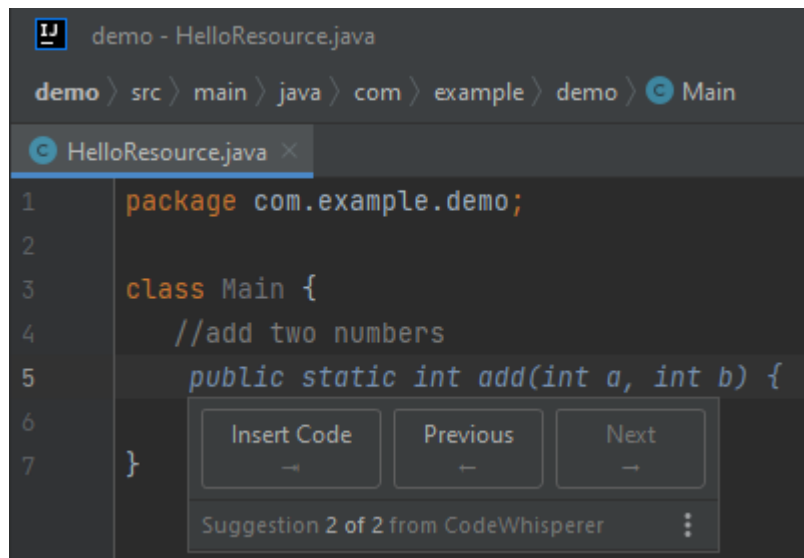
Amazon Q can generate an entire function based on a comment that you've written. As you finish your comment, Amazon Q will suggest a function signature. If you accept the suggestion, Amazon Q automatically advances your cursor to the next part of the function and makes a suggestion. Even if you enter an additional comment or line of code in between suggestions, Amazon Q will refactor based on your input.

In the following example, Amazon Q generates both a full function and the corresponding unit test.

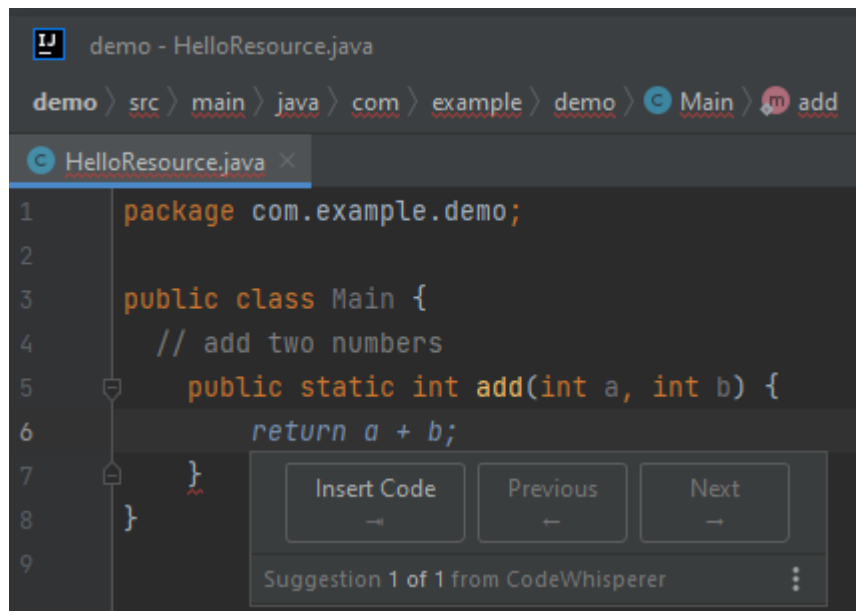
```
1 import boto3  
2 ddb_client = boto3.client('dynamodb')  
3
```

The following list contains examples of how Amazon Q makes suggestions and advances you through the entire process of creating a function.

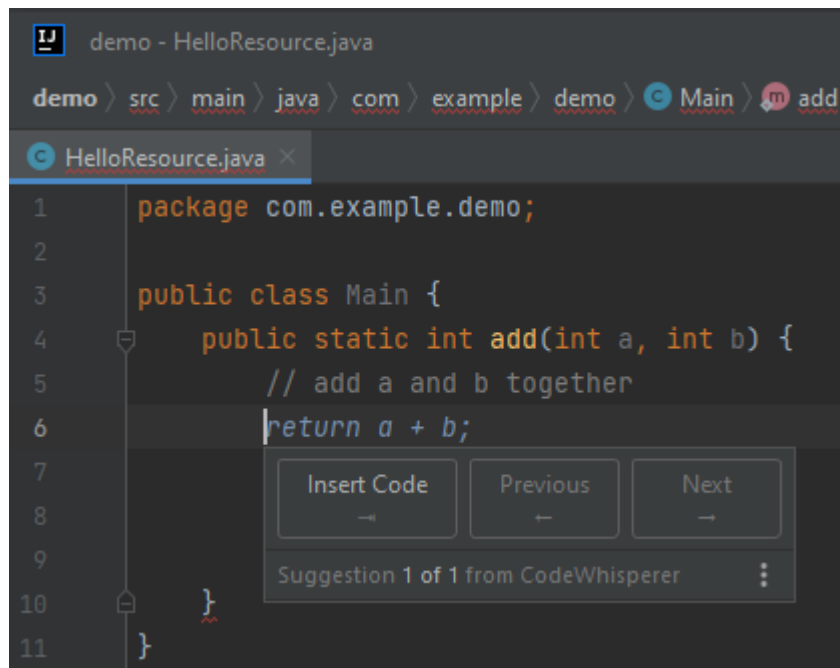
1. In the image below, a user has input a comment. The function signature, located below the comment, is a suggestion from Amazon Q.



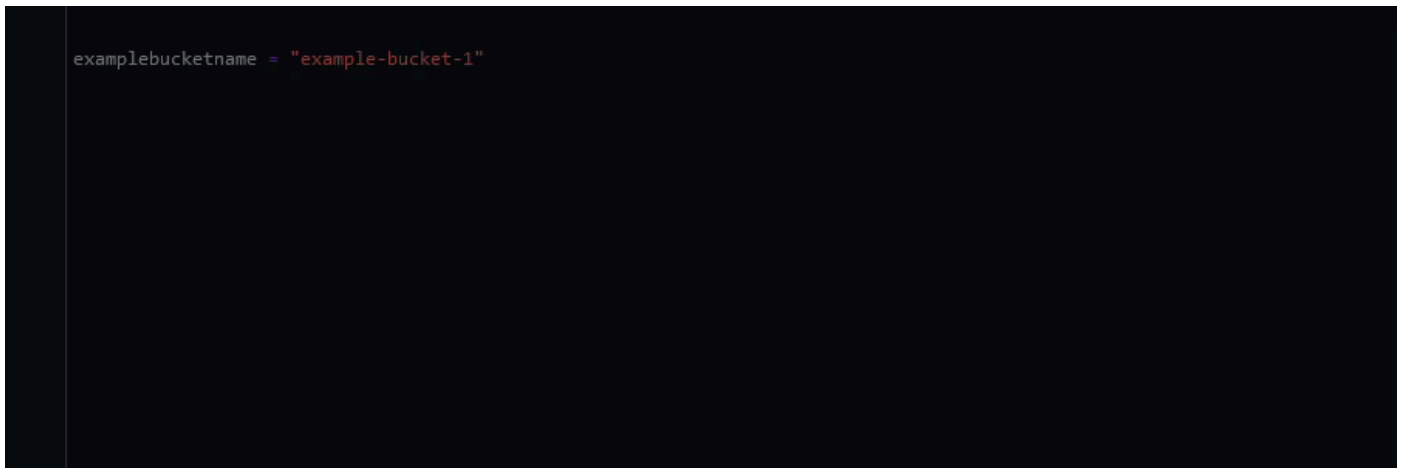
- In the image below, the user has accepted the Amazon Q suggestion for a function signature. Accepting the suggestion automatically advanced the cursor and Amazon Q has made a new suggestion for the function body.



- In the image below, a user input a comment in the body of the function prior to accepting a suggestion from Amazon Q. On the following line, Amazon Q has generated a new suggestion based on the content of the comment.



In this example, Amazon Q recommends a full function after the user types part of the signature.



Using Amazon Q Developer for block completion

Block completion is used to complete your if/for/while/try code blocks.

C

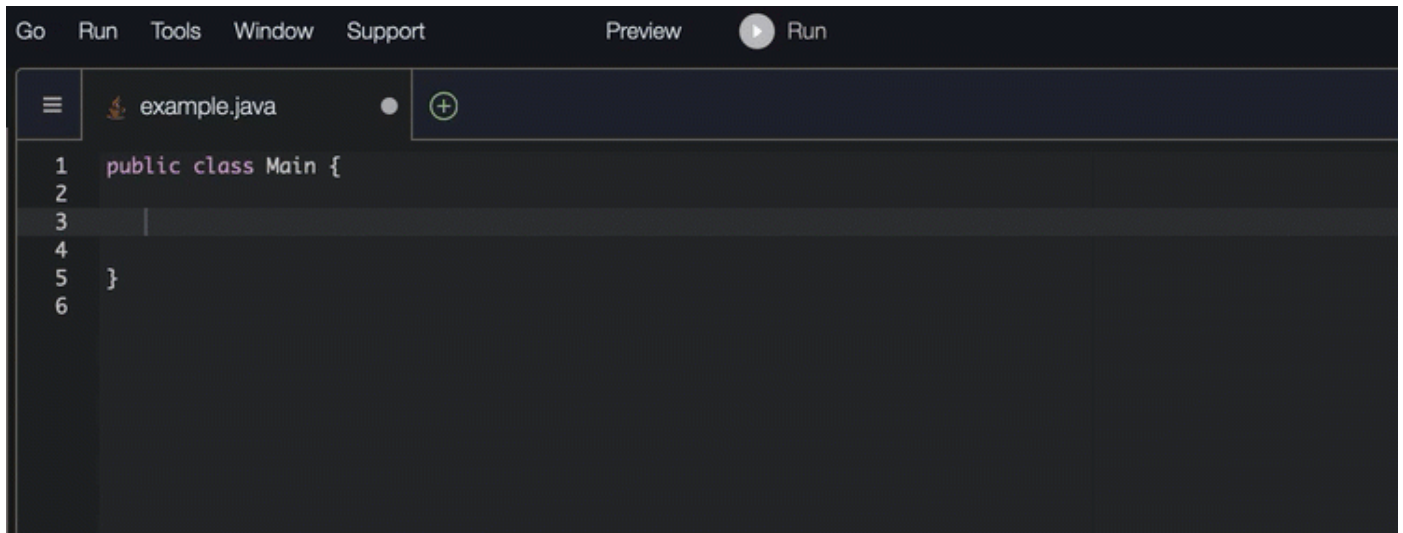
```
9
10 // function to pop the stack
11 int pop(Stack *stack) {
12     if (stack->top == -1) {
13         printf("Stack is empty\n");
14         return -1;
15     }
16     return stack->array[stack->top--];
17 }
18
19 // function to push the stack
20 void push(Stack *stack, int data) {
21     //
22 }
```

C++

```
33
34 bool AwsDoc::RDS::describeDBInstance(const Aws::String &dbInstanceIdentifier,
35                                       Aws::RDS::Model::DBInstance &instanceResult,
36                                       const Aws::RDS::RDSClient &client) {
37     //
38 }
39
```

Java

In the example below, a user enters the signature of an `if` statement. The body of the statement is a suggestion from Amazon Q.



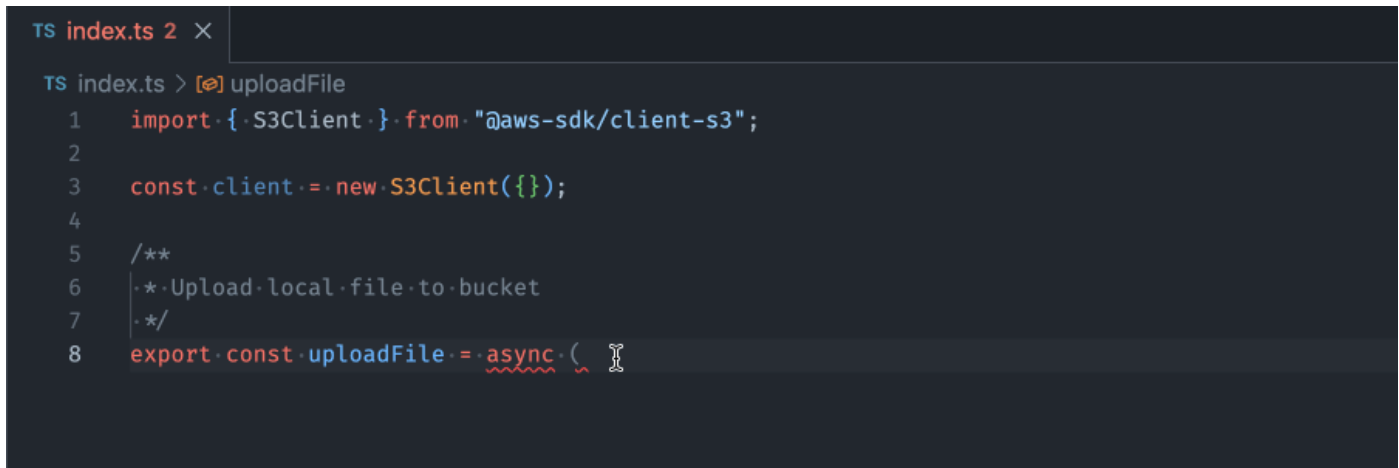
C#

In the image below, Amazon Q recommends a way to complete the function.



TypeScript

In the image below, Amazon Q recommends a way to complete the function.



```
TS index.ts > [⌘] uploadFile
1  import { S3Client } from "@aws-sdk/client-s3";
2
3  const client = new S3Client({});
4
5  /**
6   * Upload local file to bucket
7   */
8  export const uploadFile = async (
```

Python

In this example, Amazon Q recommends a block of code, based on the context.



```
examplebucketname = "example-bucket-1"

def print_bucket_contents(bucket_name):
    """
    Print the contents of a bucket.
    """
    print(f"Printing bucket contents for bucket {bucket_name}")
    for obj in s3.Bucket(bucket_name).objects.all():
        print(obj)
```

Using Amazon Q Developer for Docstring, JSDoc, and Javadoc completion

Amazon Q can help you generate or complete documentation inside your code.

C++

```

7  /// <summary>
8  /// This example shows how to attach a policy to an IAM role.
9  /// </summary>
10 /// <param name="roleName">
11 bool AwsDoc::IAM::putRolePolicy(
12     const Aws::String &roleName,
13     const Aws::String &policyName,
14     const Aws::String &policyDocument,
15     const Aws::Client::ClientConfiguration &clientConfig) {
16     Aws::IAM::IAMClient iamClient(clientConfig);
17     Aws::IAM::Model::PutRolePolicyRequest request;
18
19     request.SetRoleName(roleName);
20     request.SetPolicyName(policyName);
21     request.SetPolicyDocument(policyDocument);
22
23     Aws::IAM::Model::PutRolePolicyOutcome outcome = iamClient.PutRolePolicy(request);
24     if (!outcome.IsSuccess()) {
25         std::cerr << "Error putting policy on role. " <<
26             outcome.GetError().GetMessage() << std::endl;

```

Javascript

In this example, Amazon Q fills in JSDoc parameters based on existing constants.

```

1  import {PutObjectCommand, S3Client} from "@aws-sdk/client-s3";
2
3  const client = new S3Client({});
4
5  /**
6   *
7   */
8  export const putObject = async (bucketName, key, body) => {
9      const params = {
10         Bucket: bucketName,
11         Key: key,
12         Body: body,
13     };
14     return client.send(new PutObjectCommand(params));

```

C#

In this example, Amazon Q fills in JSDoc parameters based on existing constants.

```

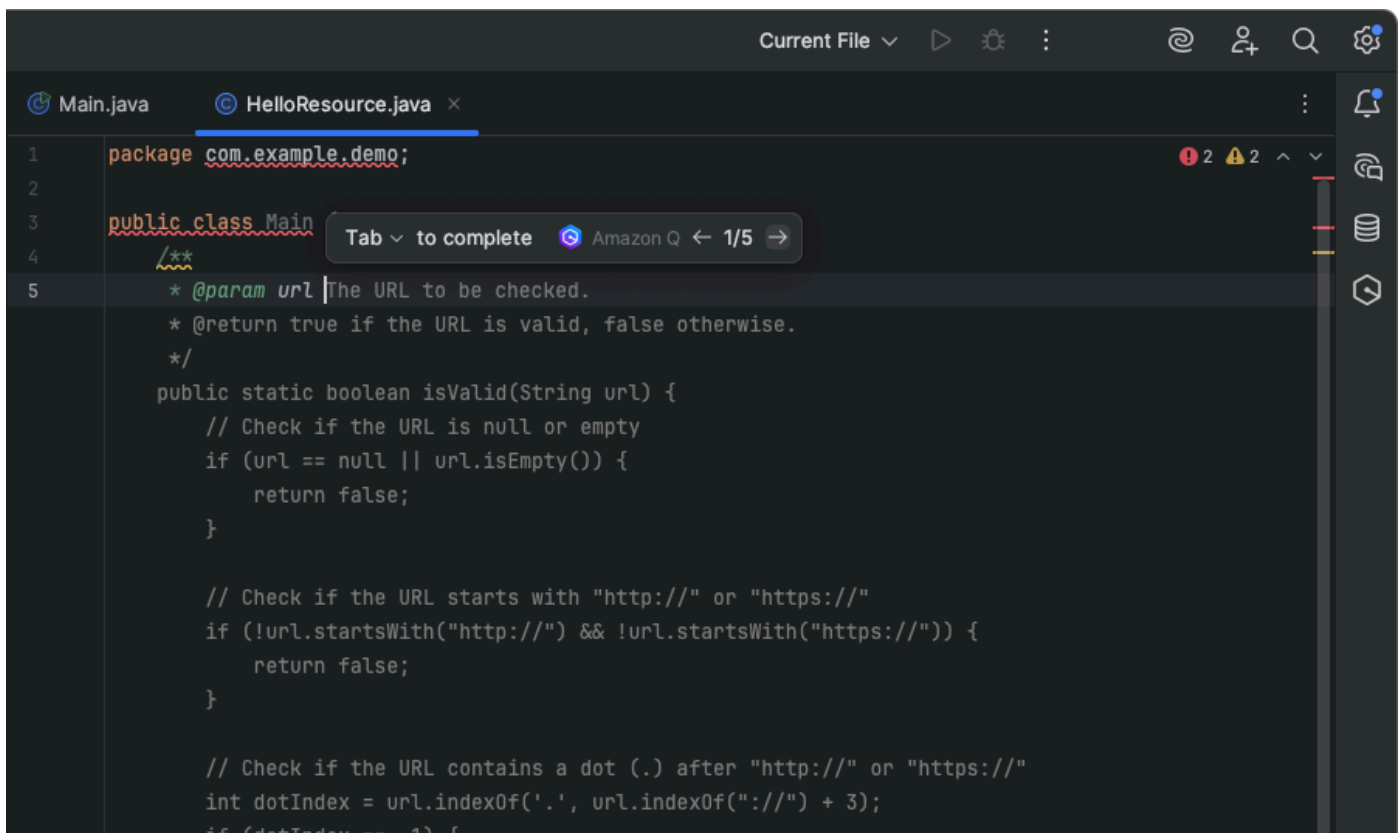
6  |  /// <summary>
7  |  /// Shows how to create a new Amazon S3 bucket.
8  |  /// </summary>
9  |  public static async Task<bool> CreateBucketAsync(IAmazonS3 client, string bucketName)
10 |  {
11 |      try
12 |      {
13 |          var request = new PutBucketRequest
14 |          {
15 |              BucketName = bucketName,
16 |              UseClientRegion = true,
17 |          };
18 |
19 |          var response = await client.PutBucketAsync(request);
20 |          return response.HttpStatusCode == System.Net.HttpStatusCode.OK;
21 |      }
22 |      catch (AmazonS3Exception ex)

```

Java

The following example is adapted from [an example on the Oracle website](#).

In the image below, the user has started entering a docstring. Amazon Q has suggested words to add to the docstring.



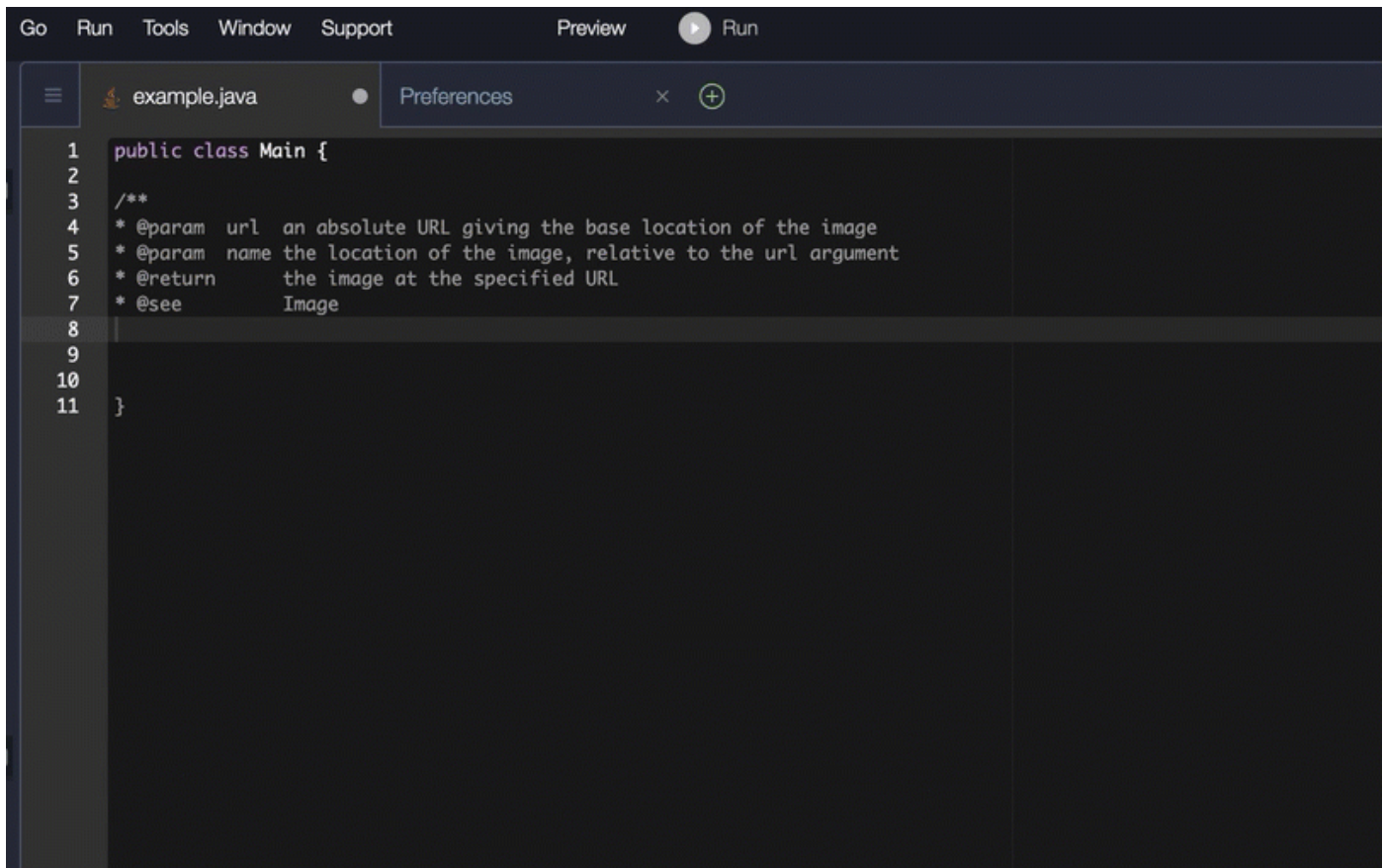
```

1  |  package com.example.demo;
2  |
3  |  public class Main
4  |  {
5  |      /**
6  |       * @param url The URL to be checked.
7  |       * @return true if the URL is valid, false otherwise.
8  |       */
9  |      public static boolean isValid(String url) {
10 |         // Check if the URL is null or empty
11 |         if (url == null || url.isEmpty()) {
12 |             return false;
13 |         }
14 |
15 |         // Check if the URL starts with "http://" or "https://"
16 |         if (!url.startsWith("http://") && !url.startsWith("https://")) {
17 |             return false;
18 |         }
19 |
20 |         // Check if the URL contains a dot (.) after "http://" or "https://"
21 |         int dotIndex = url.indexOf('.', url.indexOf(":/") + 3);
22 |         if (dotIndex == -1) {

```

The following example is adapted from [an example on the Oracle website](#).

In the example below, in Java, the user enters a docstring. Amazon Q suggests a function to process the docstring.

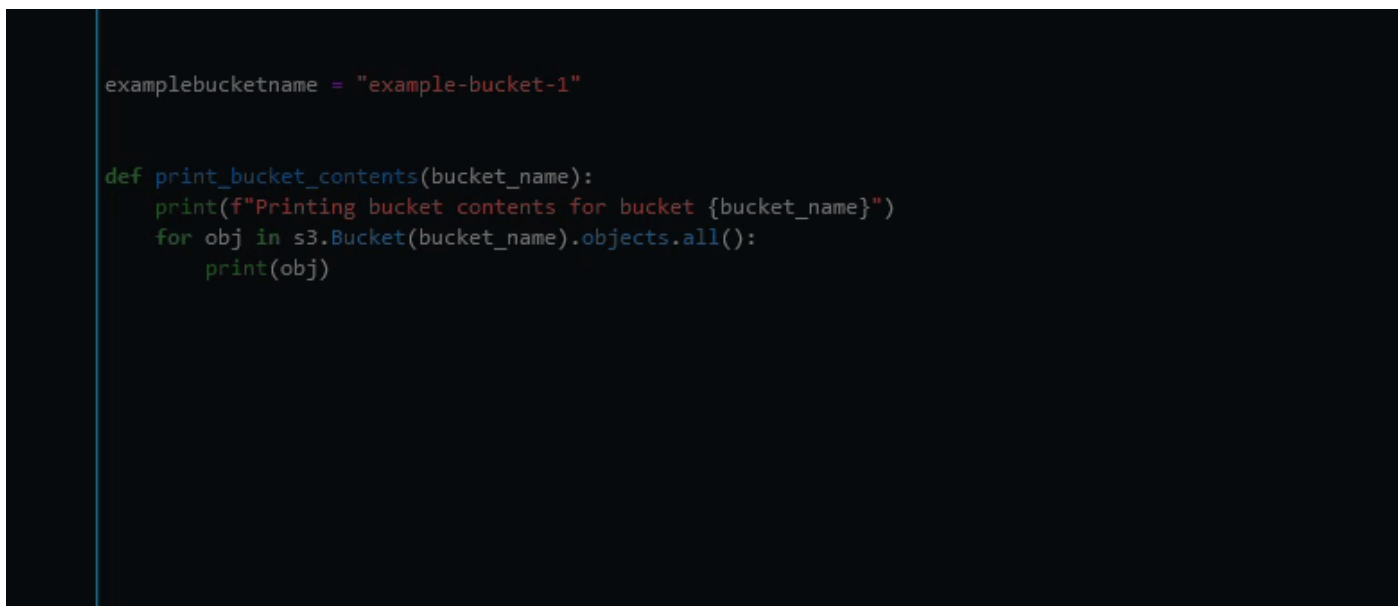


The screenshot shows an IDE window with a menu bar (Go, Run, Tools, Window, Support) and a toolbar (Preview, Run). The active file is 'example.java'. The code in the editor is as follows:

```
1 public class Main {
2
3 /**
4  * @param url an absolute URL giving the base location of the image
5  * @param name the location of the image, relative to the url argument
6  * @return the image at the specified URL
7  * @see Image
8
9
10
11 }
```

Python

In this example, Amazon Q recommends a Docstring, based on the surrounding context.



The screenshot shows a Python code snippet in a dark-themed editor. The code is as follows:

```
examplebucketname = "example-bucket-1"

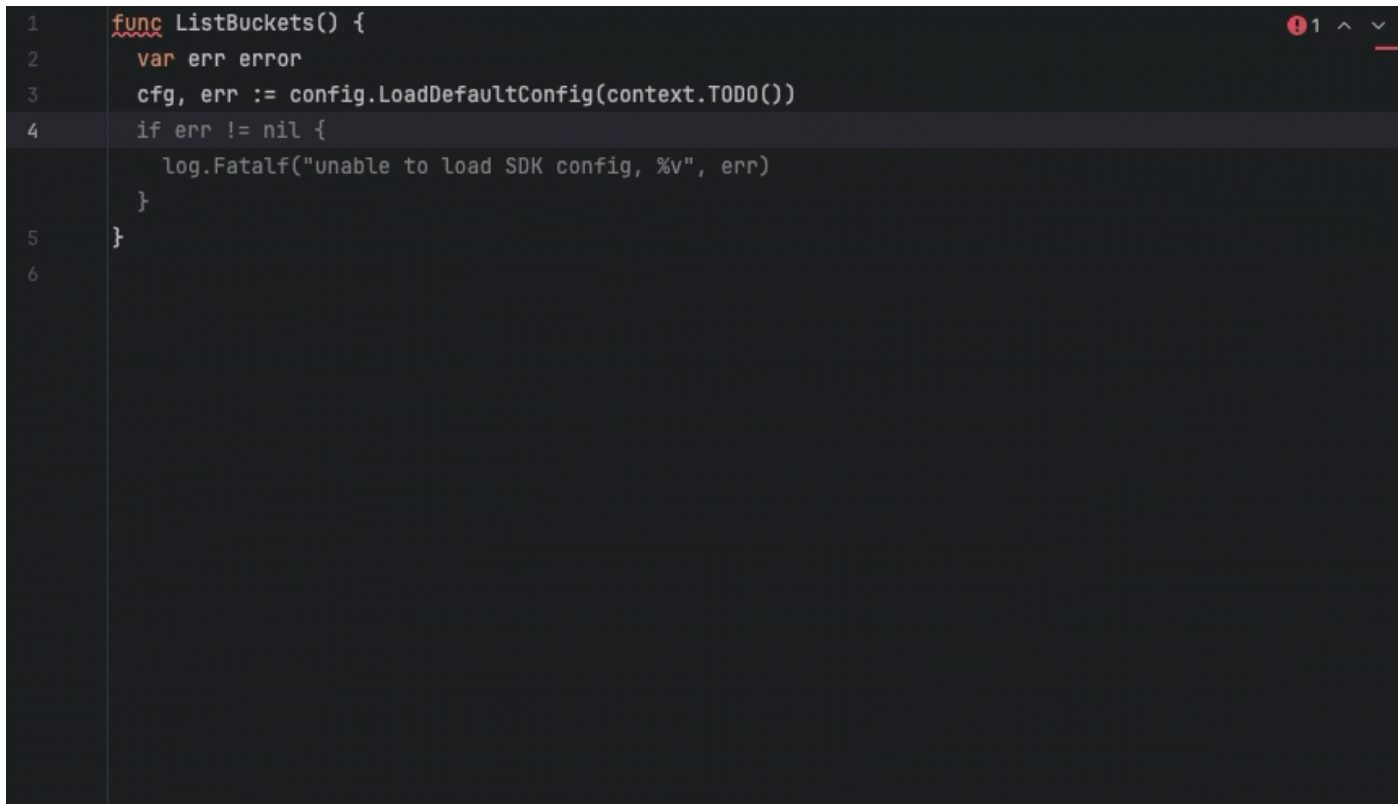
def print_bucket_contents(bucket_name):
    print(f"Printing bucket contents for bucket {bucket_name}")
    for obj in s3.Bucket(bucket_name).objects.all():
        print(obj)
```

Using Amazon Q Developer for line-by-line recommendations

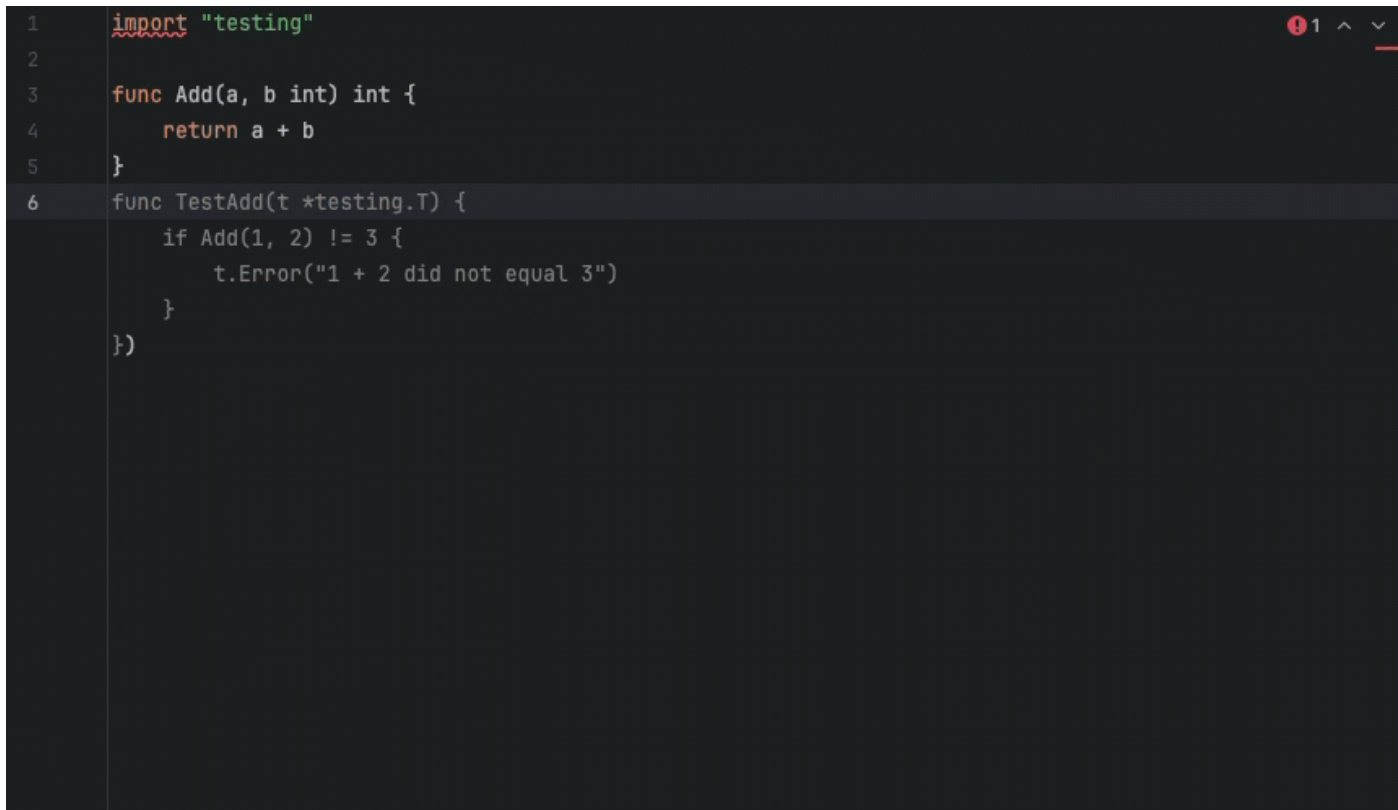
Depending on your use case, Amazon Q may not be able to generate an entire function block in one recommendation. However, Amazon Q can still provide line-by-line recommendations.

Go and GoLand

In this example, Amazon Q provides line-by-line recommendations.

A screenshot of a code editor with a dark theme. It shows a Go function named `ListBuckets()` with several lines of code. Line 1: `func ListBuckets() {`. Line 2: `var err error`. Line 3: `cfg, err := config.LoadDefaultConfig(context.TODO())`. Line 4: `if err != nil {`. Line 5: `log.Fatalf("unable to load SDK config, %v", err)`. Line 6: `}`. Line 7: `}`. The code is color-coded: `func` is orange, `ListBuckets()` is blue, `var` is orange, `err` is blue, `error` is blue, `cfg` is blue, `err` is blue, `:=` is orange, `config` is blue, `LoadDefaultConfig` is blue, `context` is blue, `TODO()` is blue, `if` is orange, `err` is blue, `!=` is orange, `nil` is blue, `log` is blue, `Fatalf` is blue, `"unable to load SDK config, %v", err` is blue, and `}` is blue. There is a red error icon in the top right corner of the editor window.

Here is another example of line-by-line recommendations, this time with a unit test.



```
1  import "testing"
2
3  func Add(a, b int) int {
4      return a + b
5  }
6  func TestAdd(t *testing.T) {
    if Add(1, 2) != 3 {
        t.Error("1 + 2 did not equal 3")
    }
}
```

C++ and CLion

In this example, Amazon Q provides line-by-line recommendations.


```
1  bool CreateBucket(const Aws::String& bucket_name,
2                    const Aws::Client::Client::ClientConfiguration &clientConfig) {
3      }
4
5
6
```

Python

In the following image, the customer has written an initial comment indicating that they want to publish a message to an Amazon CloudWatch Logs group. Given this context, Amazon Q is only able to suggest the client initialization code in its first recommendation, as shown in the following image.

Publish a message to a CloudWatch Logs Group

```
client = boto3.client('logs')
```

However, if the user continues to request line-by-line recommendations, Amazon Q also continues to suggest lines of code based on what's already been written.

```
# Publish a message to a CloudWatch Logs Group
client = boto3.client('logs')
response = client.put_log_events(
    logGroupName='VPCFlowLogs',
```

Note

In the example above, VPCFlowLogs may not be the correct constant value. As Amazon Q makes suggestions, remember to rename any constants as required.

Amazon Q can eventually complete the entire code block as shown in the following image.

```
# Publish a message to a CloudWatch Logs Group
client = boto3.client('logs')
response = client.put_log_events(
    logGroupName='VPCFlowLogs',
    logStreamName='VPCFlowLogs',
    logEvents=[
        {
            'timestamp': int(round(time.time() * 1000)),
            'message': json.dumps(event)
        }
    ]
)
```

No recommendations

In this example, Amazon Q provides recommendations, one line at a time.

```
role = get_execution_role()

sagemaker_session = sage.Session()
bucket = sagemaker_session.default_bucket()
runtime = boto3.client("runtime.sagemaker")
s3 = boto3.resource("s3")
```

Transforming code in the IDE with Amazon Q Developer

Amazon Q Developer can transform your code in integrated development environments (IDEs) by performing automated language and operating system (OS)-level upgrades and conversions. You provide the code to be transformed, and Amazon Q generates changes that you can review and apply to your files.

To get started, install Amazon Q in an IDE that supports transformations. Then, see the topic for the type of transformation you'd like to perform with Amazon Q.

For more information on IDEs that support transformation and how to install Amazon Q, see [Using Amazon Q Developer in the IDE](#).

Topics

- [Transforming Java applications with Amazon Q Developer](#)
- [Transforming .NET applications with Amazon Q Developer](#)

Transforming Java applications with Amazon Q Developer

Amazon Q supports the following types of transformations for Java applications:

- Java language and dependency version upgrades
- Embedded SQL conversion for Oracle to PostgreSQL database migration

To get started, see the topic for the type of transformation you'd like to perform.

Topics

- [Quotas](#)
- [Upgrading Java versions with Amazon Q Developer](#)
- [Converting embedded SQL in Java applications with Amazon Q Developer](#)
- [Transforming code on the command line with Amazon Q Developer](#)
- [Troubleshooting issues with Java transformations](#)

Quotas

Java application transformations with Amazon Q in the IDE and command line maintain the following quotas:

- **Lines of code per job** – The maximum number of code lines that Amazon Q can transform in a given transformation job.
- **Lines of code per month** – The maximum number of code lines that Amazon Q can transform in a month.
- **Concurrent jobs** – The maximum number of transformation jobs you can run at the same time. This quota applies to all transformations in the IDE, including [.NET transformations in Visual Studio](#).
- **Jobs per month** – The maximum number of transformation jobs you can run in one month.

Resource	Quotas	
Lines of code per job	Free tier: 1000 lines of code	
Lines of code per month	Free tier: 2000 lines of code	
Concurrent jobs	1 job per user 25 jobs per AWS account	
Jobs per month	Pro tier: 1000 jobs Free tier: 100 jobs	

Upgrading Java versions with Amazon Q Developer

Amazon Q Developer can upgrade your Java applications to newer language versions in the integrated development environment (IDE). Changes Amazon Q can make to upgrade your code include updating deprecated code components and APIs as well as upgrading libraries, frameworks, and other dependencies in your code.

To transform your code, Amazon Q first builds your code in the source language version and verifies that it has the information necessary to perform the transformation. After Amazon Q successfully transforms your code, you verify and accept the changes in your IDE. Since Amazon Q Developer makes the minimal changes necessary to make your upgraded code compatible with the target JDK, an additional transformation is required to upgrade your project's libraries and dependencies. For more information about how Amazon Q transforms your code, see [How Amazon Q Developer transforms code for Java language upgrades](#).

Topics

- [Supported Java upgrades and IDEs](#)
- [Step 1: Prerequisites](#)
- [Step 2: Configure your project](#)
- [Step 3: Create a dependency upgrade file \(optional\)](#)
- [Step 4: Transform your code](#)
- [How Amazon Q Developer transforms code for Java language upgrades](#)

Supported Java upgrades and IDEs

Amazon Q currently supports the following Java source code versions and target versions for transformations. Transforming code to the same Java version includes upgrading libraries and other dependencies in the source code version.

Supported Java upgrades

Source code version	Supported target versions
Java 8	Java 17 and Java 21
Java 11	Java 17 and Java 21
Java 17	Java 17 and Java 21

Source code version	Supported target versions
Java 21	Java 21

Amazon Q supports Java upgrades in the following IDEs:

- Modules in JetBrains IDEs
- Projects and workspaces in Visual Studio Code

Step 1: Prerequisites

Before you continue, make sure you've completed the steps in [Set up Amazon Q in your IDE](#).

Make sure that the following prerequisites are met before you begin a Code Transformation job:

- Your project is written in a [supported Java version](#) and is built on Maven.
- Your project successfully builds with Maven in your IDE. Maven 3.8 or later is currently supported.
- Your project source JDK is available locally and is the version of your source code. For example, if you are transforming Java 8 code, your local JDK installation should be JDK 8.
- Your project builds in 55 minutes or less.
- Your project is configured correctly, and the correct JDK version is specified. For more information, see [Step 2: Configure your project](#).
- Your project doesn't require access to resources on your private network, including a virtual private cloud (VPC) or on-premise network. For example, if your project contains unit tests that connect to a database in your network, the transformation will fail.
- Your project doesn't use plugins that package languages other than Java in your Java project. For example, if your project uses the [frontend-maven-plugin](#) for executing front-end JavaScript code in addition to your Java source code, the transformation will fail.
- Your local network allows uploads to Amazon S3 buckets that Amazon Q uses to transform your code. For more information, see [Allow access to Amazon S3 buckets in data perimeters](#).

Step 2: Configure your project

To configure your project, use the following information for the IDE you're using.

Configure a project in JetBrains

To configure your project in JetBrains, you might need to specify the following project and module settings.

If your modules use the same JDK and language level as your project, you don't need to update module settings.

- **Project SDK** – The JDK used to compile your project.
- **Project language level** – The Java version used in your project.
- **Module SDK** – The JDK used to compile your module.
- **Module language level** – The Java version used in your module.
- **Maven Runner JRE** – The JDK you build your module with.

Update project and module settings

To update your SDK and language level settings for your project or module, complete the following steps:

1. From your JetBrains IDE, choose **File** and then **Project Structure**.
2. The Project Structure window opens. Under **Project Settings**, choose **Project**.
 - a. To update your project JDK, choose from the dropdown list next to **SDK**.
 - b. To update your project language, choose from the dropdown next to **Language level**.
3. Under **Project Settings**, choose **Modules**.
 - a. To update your module JDK, choose from the dropdown list next to **SDK**.
 - b. To update your module language, choose from the dropdown next to **Language level**.

For more information, see [Project structure settings](#) and [Module structure settings](#) in the JetBrains documentation.

Update Maven settings

To update your Maven Runner JRE, complete the following steps:

1. From your JetBrains IDE, choose the gear icon, and then choose **Settings** in the menu that appears.

2. In the **Settings** window, choose **Build, Execution, Deployment**, then **Build Tools**, then **Maven**, and then **Runner**.
3. In the JRE field, choose the JDK used to build the module you're transforming.

Configure a project in VS Code

To configure your project in VS Code, your project must contain the following:

- A `pom.xml` file in the project root folder
- A `.java` file in the project directory

If your project contains a Maven wrapper executable (`mvnw` for macOS or `mvnw.cmd` for Windows), make sure it's at the root of your project. Amazon Q will use the wrapper, and no other Maven configuration is necessary.

If you aren't using a Maven wrapper, install Maven. For more information, see [Installing Apache Maven](#) in the Apache Maven documentation.

After installing Maven, add it to your PATH variable. For more information, see [How do I add Maven to my PATH?](#) Your Java runtime variable should also be pointing to a JDK and not to a JRE. To confirm your configuration is correct, run `mvn -v`. The output should show your Maven version and the runtime variable pointing to the path to your JDK.

Step 3: Create a dependency upgrade file (optional)

You can provide Amazon Q with a *dependency upgrade file*, a YAML file that lists your project's dependencies and which versions to upgrade to during a transformation. By providing a dependency upgrade file, you can specify third and first party dependencies that Amazon Q might not otherwise know to upgrade.

First party dependencies refer to the libraries, plugins, and frameworks that your organization maintains and are only available locally or on your organization's private network. Amazon Q is able to access your first party dependencies when it performs builds in your local environment. For more information, see [Building code in your local environment](#). Third party dependencies are publicly available or open source dependencies that aren't unique to your organization.

You can specify first party dependencies you want to upgrade in a YAML file, and Amazon Q upgrades them during the JDK upgrade (for example, Java 8 to 17). You can initiate a separate

transformation (17 to 17 or 21 to 21) after the initial JDK upgrade to upgrade third-party dependencies.

Once Amazon Q performs a minimum JDK upgrade, you can initiate a separate transformation to upgrade all third party dependencies. Alternatively, you can specify third party dependencies and their versions in a YAML file to only upgrade those dependencies during the library upgrade transformation.

Amazon Q will prompt you to provide a dependency upgrade file during the transformation. If you want to provide one, first make sure you've configured the file properly. The following fields are required in the YAML file:

- **name** - The name of the dependency upgrade file.
- **description** (optional) - A description of the dependency upgrade file, and for which transformation.
- **dependencyManagement** - Contains the list of dependencies and plugins to upgrade.
- **dependencies** - Contains the name and version of the libraries to upgrade.
- **plugins** - Contains the names and versions of the plugins to upgrade.
- **identifier** - The name of the library, plugin, or other dependency.
- **targetVersion** - The version of the dependency to upgrade to.
- **versionProperty** (optional) - The version of the dependency you're defining, as set with the `properties` tag in your application's `pom.xml` file.
- **originType** - Whether the dependency is first or third party, specified by either `FIRST_PARTY` or `THIRD_PARTY`.

Following is an example of a dependency upgrade YAML file, and the required configuration for Amazon Q to parse:

```
name: dependency-upgrade

description: "Custom dependency version management for Java migration from JDK 8/11/17
to JDK 17/21"

dependencyManagement:

  dependencies:
```

```
- identifier: "com.example:library1"

  targetVersion: "2.1.0"

  versionProperty: "library1.version" # Optional

  originType: "FIRST_PARTY"

- identifier: "com.example:library2"

  targetVersion: "3.0.0"

  originType: "THIRD_PARTY"

plugins:

- identifier: "com.example.plugin"

  targetVersion: "1.2.0"

  versionProperty: "plugin.version" # Optional

  originType: "THIRD_PARTY"
```

Step 4: Transform your code

Before you transform your own code, you might want to test that your IDE is setup correctly by transforming a sample project. Following is a sample GitHub project that is eligible for code transformation: <https://github.com/aws-samples/aws-appconfig-java-sample>.

To test your IDE setup, download and unzip the sample project, and complete the following steps for your IDE. If you are able to view the proposed changes and transformation summary, you are ready to transform your own code project. If the transformation fails, your IDE is not configured correctly. To address configuration issues, review [Step 2: Configure your project](#) and [Troubleshooting](#).

Note

Do not turn off or close your local machine during the code transformation because client-side build requires a stable network connection.

To upgrade the language version of your code project or module, complete the following steps for your IDE.

JetBrains

1. Open the module that you want to upgrade in JetBrains. Make sure you've successfully built your project in the IDE.
2. Choose the Amazon Q logo, and then enter **/transform** in the Amazon Q chat panel that opens.
3. A **Transform your application** pop-up appears. Choose the project that you want to upgrade from the dropdown list, and then choose **Transform**.
4. Amazon Q prompts you to provide an upgrade dependency file. If you have configured a YAML with the dependencies and version to upgrade to, add your file. Amazon Q will validate the file to ensure it's configured correctly. If you get an error, review the format and required fields described in [Step 3: Create a dependency upgrade file \(optional\)](#).
5. Amazon Q begins the transformation. You can view progress on the **Transformation details** tab.
6. After the transformation is complete, you can verify the upgraded code before updating your project. To view the new code, go to the **Transformation details** tab and then choose **View diff**. In the **Apply patch** window that appears, choose a file to open a diff view with your source code and upgraded code.
7. To accept the changes that Amazon Q made, choose **View diff** to open the **Apply patch** window. Select all the updated files, and choose **OK** to update your project in place.
8. To get details about how your code was upgraded and suggested next steps, on the **Transformation details** tab, choose **View transformation summary**.

Visual Studio Code

1. Open the project or workspace that you want to upgrade in VS Code. Make sure that you've successfully built your project in the IDE.
2. Choose the Amazon Q logo, and then enter **/transform** in the Amazon Q chat panel that opens.
3. Choose the project that you want to upgrade from the search bar at the top of the IDE.

4. If Amazon Q can't find the version of your source code, it prompts you to choose your code version. Choose the version that your source code is written in, and then choose **Transform** in the pop-up to proceed.
5. If prompted, enter the JAVA_HOME path to your JDK. For more information, see [Configure your VS Code project](#).
6. Amazon Q prompts you to provide an upgrade dependency file. If you have configured a YAML with the dependencies and version to upgrade to, add your file. Amazon Q will validate the file to ensure it's configured correctly. If you get an error, review the format and required fields described in [Step 3: Create a dependency upgrade file \(optional\)](#).
7. Amazon Q begins the transformation. You can view progress on the **Transformation Hub** tab.
8. After the transformation is complete, the **Proposed Changes** tab opens. To verify the upgraded code before updating your project, choose **Download proposed changes**. Choose a file to open a diff view with your source code and upgraded code.
9. To accept the changes Amazon Q made, go to the **Proposed Changes** tab and choose **Accept**.
10. To get details about how your code was upgraded and suggested next steps, on the **Transformation Hub**, choose the **Views and More Actions** ellipsis button, and then choose **Show Transformation Summary**.

How Amazon Q Developer transforms code for Java language upgrades

To transform your code, Amazon Q Developer generates a transformation plan that it uses to upgrade the code language version of your project. After transforming your code, it provides a transformation summary and a file diff for you to review changes before accepting them. Since Amazon Q Developer makes the minimal changes necessary to make your upgraded code compatible with the target JDK, an additional transformation is required to upgrade your project's libraries and dependencies. The following sections provide more details on how Amazon Q performs the transformation.

Building your code and creating a transformation plan

To begin transforming your code, Amazon Q builds your project locally and generates a build artifact that contains your source code, project dependencies, and build logs.

After generating the build artifact, Amazon Q builds your code in a secure build environment and creates a transformation plan, which is customized to the project or module you're upgrading.

The transformation plan outlines the specific changes Amazon Q will attempt to make, including new dependency versions, major code changes, and suggested replacements for deprecated code. These changes are based on the preliminary build of your code, and might change during the transformation.

Transforming your code

To transform your code, Amazon Q attempts to upgrade your code to the target Java version based on the proposed changes in the transformation plan. As it makes changes, it re-builds and runs existing unit tests in your source code to iteratively fix any encountered errors. The JDK upgrade can be made from the following source code version to the target version:

- Java 8 to 17
- Java 8 to 21
- Java 11 to 17
- Java 11 to 21
- Java 17 to 21

Amazon Q makes the minimal changes necessary to make your code compatible with the target Java version. After successfully upgrading to Java 17 or 21. Once Amazon Q performs a minimum JDK upgrade, you can initiate a separate transformation to upgrade all third party dependencies. Alternatively, you can specify third party dependencies and their versions in a YAML file to only upgrade those dependencies during the library upgrade transformation.

Amazon Q attempts to make the following changes when upgrading your code:

- Update deprecated code components according to the target Java version recommendations
- Upgrade popular libraries and frameworks to a version compatible with the target Java version. This includes updating the following libraries and frameworks to their latest available major versions:
 - Apache Commons IO
 - Apache HttpClient
 - bc-fips
 - Cucumber-JVM
 - Hibernate
 - jackson-annotations

- JakartaEE
- Javax
- javax.servlet
- jaxb-api
- jaxb-impl
- jaxen
- jcl-over-slf4j
- json-simple
- jsr305
- junit
- junit-jupiter-api
- Log4j
- Micronaut
- Mockito
- mockito-core
- Okio
- PowerMockito
- Quarkus
- slf4j
- slf4j-api
- Spring Boot
- Spring Framework
- Spring Security
- Swagger
- testng

 Note

Do not turn off or close your local machine during the code transformation because client-side build requires a stable network connection.

Building code in your local environment

During a transformation, Amazon Q performs verification builds in your local environment. Amazon Q transforms your code on the server side in multiple steps. After each step, Amazon Q sends the code to your local environment to build and test the changes it made. The code is then sent back to the server side to continue the transformation.

The build in your local environment helps verify the transformed code by allowing Amazon Q to run tests that require access to private resources. To minimize security risks associated with building AI-generated code in your local environment, Amazon Q reviews and updates the code it generates to address security concerns.

Reviewing the transformation summary and accepting changes

After the transformation is complete, Amazon Q provides a transformation summary with details about the changes it made, including the status of the final build which indicates whether your entire project was upgraded. You can also view a build log summary to understand any issues that prevented Amazon Q from building your code in the upgraded version.

The transformation summary additionally includes the differences between the changes proposed in the transformation plan and the changes Amazon Q ultimately made to upgrade your code, and any additional changes that weren't in the original plan.

After you review the transformation summary, you can view the changes Amazon Q is proposing in a file diff view. Any code changes Amazon Q suggests will not affect your current project files until you accept the changes. The transformed code is available up to 30 days after the transformation completes.

Completing partially successful transformations

Depending on the complexity and specifics of your codebase, there might be instances where the transformation is partially successful. This means that Amazon Q was able to transform only certain files or areas of code in your project. In this case, you have to manually update the remaining code for your project to be buildable in the updated language version.

To help transform the rest of your code, you can use Amazon Q chat in the IDE. You can ask Amazon Q to review the partially updated files and provide new code to address issues, such as compilation errors. You can also use features like [/dev](#) and [@workspace](#) to include more of your project as context and get suggestions for multiple files at a time.

Converting embedded SQL in Java applications with Amazon Q Developer

The Amazon Q Developer agent for code transformation in the IDE can help you convert embedded SQL to complete Oracle to PostgreSQL database migration with AWS Database Migration Service (AWS DMS).

AWS DMS is a cloud service that makes it possible to migrate relational databases, data warehouses, NoSQL databases, and other types of data stores. DMS Schema Conversion in AWS DMS helps you convert database schemas and code objects that you can apply to your target database. For more information, see [What is AWS Database Migration Service?](#) in the *AWS Database Migration Service User Guide*.

When you use AWS DMS and DMS Schema Conversion to migrate a database, you might need to convert the embedded SQL in your application to be compatible with your target database. Rather than converting it manually, you can use Amazon Q in the IDE to automate the conversion. Amazon Q uses metadata from a DMS Schema Conversion to convert embedded SQL in your application to a version that is compatible with your target database.

Currently, Amazon Q can convert SQL in Java applications for Oracle databases migrating to PostgreSQL. You will only see the option to transform SQL code in the IDE if your application contains Oracle SQL statements. See the prerequisites for more information.

Step 1: Prerequisites

Before you continue, make sure you've completed the steps in [Set up Amazon Q in your IDE](#).

Before you begin a code transformation job for SQL conversion, make sure the following prerequisites are met:

- You are migrating a Java application with embedded SQL from an Oracle database to a PostgreSQL database. Your application must contain Oracle SQL statements for it to be eligible for transformation.
- You have completed the process for converting your database schema using AWS DMS Schema Conversion. For more information, see [Migrating Oracle databases to Amazon RDS for PostgreSQL with DMS Schema Conversion](#) in the *Database Migration Guide*.
- After schema conversion is complete, you have downloaded the migration project file from the AWS DMS console.

Step 2: Configure your application

To convert your embedded SQL code, your Java project must contain at least one `.java` file.

If you are using a JetBrains IDE, you must set the SDK field in Project Structure settings to the applicable JDK. For information on configuring Project Structure settings, see [Project structure settings](#) in the JetBrains documentation.

Step 3: Convert embedded SQL

To convert the embedded SQL code in your Java application to a format that is compatible with your PostgreSQL target database, complete the following steps:

1. In your IDE where Amazon Q is installed, open the Java codebase that contains the embedded SQL you need to convert.
2. Choose the Amazon Q icon to open the chat panel.
3. Enter **/transform** in the chat panel.
4. If your Java application is eligible for SQL conversion, Amazon Q will prompt you to choose which type of transformation you'd like to perform. Enter **SQL conversion**.
5. Amazon Q prompts you to upload the schema metadata file you retrieved from Amazon S3. In the chat, Amazon Q provides instructions for retrieving the file.
6. Amazon Q prompts you to provide the project that contains the embedded SQL as well as the database schema file. Choose the appropriate files from the dropdown menus in the chat panel.
7. Confirm the details Amazon Q retrieved from the database schema are accurate.
8. Amazon Q begins converting your SQL code. This might take a few minutes.
9. After Amazon Q converts the SQL code, it provides a diff with any updates it has made to your files. Review the changes in the diffs, and then accept the changes to update your code.

Amazon Q also provides a transformation summary with details about the changes it made.

10. After updating your code, return to the AWS DMS console to verify the new SQL is compatible with the migrated database.

Transforming code on the command line with Amazon Q Developer

You can transform your applications from the command line with the Amazon Q Developer command line transformation tool. To transform your code, you provide the path to your source

code and any necessary configuration files, and Amazon Q generates new code in a series of steps. Throughout the transformation, Amazon Q builds code on your local environment to verify changes. For more information, see [Building code in your local environment](#). Amazon Q creates a new branch in your repository where it commits the code changes. When the transformation is complete, you can merge the branch into your original branch to incorporate the changes into your codebase.

To get started, install the command line tool and authenticate, and then see the commands to configure and start a transformation.

Topics

- [Building code in your local environment](#)
- [Commands](#)
- [Pausing or canceling a transformation](#)
- [Running a transformation on the command line with Amazon Q Developer](#)
- [Troubleshooting transformations on the command line](#)
- [Amazon Q Developer command line transformation tool version history](#)

Building code in your local environment

During a transformation, Amazon Q performs verification builds in your local environment. Amazon Q transforms your code on the server side in multiple steps. After each step, Amazon Q sends the code to your local environment to build and test the changes it made. The code is then sent back to the server side to continue the transformation.

The build in your local environment helps verify the transformed code by allowing Amazon Q to run tests that require access to private resources. To minimize security risks associated with building AI-generated code in your local environment, Amazon Q reviews and updates the code it generates to address security concerns.

Note

Amazon Q performs transformations based on your project's requests, descriptions, and content. To maintain security, avoid including external, unvetted artifacts in your project repository and always validate transformed code for both functionality and security.

Commands

For step-by-step instructions for running these commands, see [Running a transformation on the command line with Amazon Q Developer](#).

To configure a transformation and authenticate to Amazon Q Developer Pro, run:

```
qct configure
```

To start a transformation for a Java upgrade, run the following command. For *<your-source-java-version>*, you can enter JAVA_1.8, JAVA_8, JAVA_11, JAVA_17, or JAVA_21. For *<your-target-java-version>*, you can enter either JAVA_17 or JAVA_21. Both `--source_version` and `--target_version` are optional. The `--trust` flag enables a transformation to run while vetting code to maintain security.

```
qct transform --source_folder <path-to-folder>  
  --source_version <your-source-java-version>  
  --target_version <your-target-java-version>  
  --trust
```

To start a transformation for a SQL conversion, run:

```
qct transform --source_folder <path-to-folder>  
  --sql_conversion_config_file <path-to-sql-config-file>
```

To see what version of the command line tool for transformation you are using, run:

```
qct -v
```

To get help with transformations, run:

```
qct -h
```

Pausing or canceling a transformation

You can choose to pause or cancel your current transformation job. You can pause a transformation job for up to 12 hours before you can resume again.

To pause or cancel a code transformation job

1. In your CLI terminal, press **Ctrl+C** on your keyboard.

2. Select whether you want to pause or cancel your transformation.
 - Enter 1 if you want to pause the code transformation job. You can resume the job within 12 hours to continue the code transformation using the following QCT command: ``qct transform --source_folder=≤/Path/Given/Originally/To/QCT>``.
 - Enter 2 if you want to cancel the code transformation job.

Running a transformation on the command line with Amazon Q Developer

Complete these steps to transform your code on the command line with the Amazon Q Developer command line tool.

Prerequisites

Before you begin a transformation on the command line, the following prerequisites must be met:

- If you're upgrading your Java code version, your project meets the [prerequisites for upgrading Java versions with Amazon Q](#).
- If you're converting embedded SQL in a Java application, your application meets the [prerequisites for converting embedded SQL with Amazon Q](#).
- You have Python installed on your command line environment. This is how you will install the command line tool. The minimum supported Python version is 3.12.
- You are running the transformation on macOS or Linux.
- The size of your application is 2 GB or smaller.
- If you have specific dependencies you want Amazon Q to upgrade, you have configured a [dependency upgrade file](#).

Step 1: Choose authentication method and add permissions

You can authenticate IAM Identity Center to run transformations on the command line. Ensure you have the proper permissions.

Note

Customer managed keys aren't supported for transformations performed on the command line.

Add permissions

The IAM identity associated with either the AWS CLI profile or the Amazon Q Developer subscription you are using to authenticate must have permissions to perform transformations on the command line. Before you proceed, ensure your IAM identity has the permissions defined in [Allow users to run transformations on the command line](#).

Authenticate with IAM Identity Center through a Amazon Q Developer subscription

To authenticate with IAM Identity Center, you must be [subscribed to Amazon Q Developer Pro as a workforce user](#) by your administrator, and you must provide the Start URL to authenticate through your subscription. You or your administrator can find the Start URL in the Amazon Q Developer console. For more information see, [Finding the Start URL for use with Amazon Q Developer](#).

To add required permissions, see [Add permissions](#).

You provide the Start URL in [Step 4: Configure and authenticate](#).

Step 2: Install the tool

1. [Download the Amazon Q command line tool for transformations](#).

To download a previous version of the command line tool, see [Version history](#).

2. We recommend that you set up a virtual environment in Python to install the tool. To create a virtual environment, open a terminal window and run:

```
python -m venv qct-cli
```

3. To activate the virtual environment, run:

```
source qct-cli/bin/activate
```

4. To install the tool on your command line, run:

```
pip install amzn_qct_cli-1.0.0-py3-none-any.whl
```

Note

If you are using an older version of the command line tool for transformations, replace 1.0.0 with the [version](#) you downloaded.

5. To verify that the tool was installed, run:

```
which qct
```

Step 3: Create a dependency upgrade file (optional)

You can provide Amazon Q with a *dependency upgrade file*, a YAML file that lists your project's dependencies and which versions to upgrade to during a transformation. By providing a dependency upgrade file, you can specify third and first party dependencies that Amazon Q might not otherwise know to upgrade.

First party dependencies refer to the libraries, plugins, and frameworks that your organization maintains and are only available locally or on your organization's private network. Amazon Q is able to access your first party dependencies when it performs builds in your local environment. For more information, see [Building code in your local environment](#). Third party dependencies are publicly available or open source dependencies that aren't unique to your organization.

You can specify first party dependencies you want to upgrade in a YAML file, and Amazon Q upgrades them during the JDK upgrade (for example, Java 8 to 17). You can initiate a separate transformation (17 to 17 or 21 to 21) after the initial JDK upgrade to upgrade third-party dependencies.

Once Amazon Q performs a minimum JDK upgrade, you can initiate a separate transformation to upgrade all third party dependencies. Alternatively, you can specify third party dependencies and their versions in a YAML file to only upgrade those dependencies during the library upgrade transformation.

Amazon Q will prompt you to provide a dependency upgrade file during the transformation. If you want to provide one, first make sure you've configured the file properly. The following fields are required in the YAML file:

- **name** - The name of the dependency upgrade file.
- **description (optional)** - A description of the dependency upgrade file, and for which transformation.
- **dependencyManagement** - Contains the list of dependencies and plugins to upgrade.
- **dependencies** - Contains the name and version of the libraries to upgrade.
- **plugins** - Contains the names and versions of the plugins to upgrade.

- **identifier** - The name of the library, plugin, or other dependency.
- **targetVersion** - The version of the dependency to upgrade to.
- **versionProperty** (optional) - The version of the dependency you're defining, as set with the `properties` tag in your application's `pom.xml` file.
- **originType** - Whether the dependency is first or third party, specified by either `FIRST_PARTY` or `THIRD_PARTY`.

Following is an example of a dependency upgrade YAML file, and the required configuration for Amazon Q to parse:

```
name: dependency-upgrade

description: "Custom dependency version management for Java migration from JDK 8/11/17
to JDK 17/21"

dependencyManagement:

  dependencies:

    - identifier: "com.example:library1"

      targetVersion: "2.1.0"

      versionProperty: "library1.version" # Optional

      originType: "FIRST_PARTY"

    - identifier: "com.example:library2"

      targetVersion: "3.0.0"

      originType: "THIRD_PARTY"

  plugins:

    - identifier: "com.example.plugin"

      targetVersion: "1.2.0"

      versionProperty: "plugin.version" # Optional
```

```
originType: "THIRD_PARTY"
```

Step 4: Configure and authenticate

Before you can begin a transformation, you must authenticate to the AWS CLI and provide configuration details for your transformation.

1. If you're authenticating with IAM and you haven't already configured the AWS CLI, run the following command to provide authentication details.

```
aws configure
```

2. To start the transformation configuration process, run the following command:

```
qct configure
```

3. First, your Maven version is verified. If you have at least the minimum supported version, you will see the following output:

```
Running command: mvn --version at: path/to/current/directory  
Your Maven version is supported for transformations.
```

If you don't have a supported version of Maven, you must update it to continue. For more information, see the [Prerequisites](#).

4. You are then prompted to enter a JDK path for each supported Java version. You only need to specify the path to the JDK of the Java version you are upgrading.
5. Next, you are prompted to choose your authentication method.
 - a. To authenticate with IAM credentials stored in your AWS CLI profile, enter 1. You can specify a specific profile name or press enter to use the default profile.

If you'd like to add tags to your transformation, you can supply a CSV file where your tags are stored. The CSV must have two columns, with headers titled *key* and *value*, where tag key-value pairs are listed. To add these tags to your transformation, enter the path to the CSV file where tags are stored.

- b. To authenticate with IAM Identity Center through your Amazon Q Developer subscription, enter 2, and then enter the start URL for your subscription profile.

Next, enter the AWS Region where you were subscribed in the following format: us-east-1. For a list of supported Regions, see [Supported Regions](#). For a list of Region codes, see [Regional endpoints](#) in the *AWS General Reference guide*.

6. If you're upgrading your code's Java version, you have the option to receive your code suggestions from Amazon Q in one commit or multiple commits. Amazon Q will split the upgraded code into multiple commits by default. If you want all your code changes to appear in one commit, enter the letter 'O' for one commit when prompted.

For more information on how Amazon Q splits up the code changes, see [Reviewing the transformation summary and accepting changes](#).

7. Your configuration preferences are saved to a configuration.ini file.

Step 5: Run a transformation

Choose the type of transformation you're performing to see the required configuration and commands.

Note

Do not turn off or close your local machine during the code transformation because client-side build requires a stable network connection.

Java upgrade

Modifying the transformation plan

During Java version upgrades, Amazon Q generates a transformation plan that you can review before the transformation begins. You have the option to request the following changes to the plan:

- Which libraries Amazon Q upgrades, from the list included in the plan
 - Example prompts:
 - Only upgrade <dependency1>, <dependency2>, and <dependency5>
 - Don't upgrade <dependency1> or <dependency2>
- The target version to upgrade a library to

- Example prompts:
 - Upgrade `<dependency>` to this version instead `<version>`
- Which steps Amazon Q should perform
 - Example prompts:
 - Only complete steps 1-7
 - Don't run steps 5-9
- Add additional dependencies to upgrade (only an option when upgrading to a newer JDK version)
 - Example prompts:
 - Also upgrade `<dependency1>` to `<version2>`

Upgrade Java code

1. Run the following command to start a transformation for a Java upgrade. Replace `<path-to-folder>` with the path to the folder with the code you're transforming and `<your-target-java-version>` with either `JAVA_17` or `JAVA_21`.

```
qct transform --source_folder <path-to-folder>
               --target_version <your-target-java-version>
```

Additional command options:

- If you are specifying dependencies to upgrade, add the `--dependency_upgrade_file` option with the path to your dependency upgrade file.
 - If you don't want to review or update the transformation plan, add the `--no-interactive` flag to your command. Amazon Q won't ask you for feedback on the plan, and you won't have the opportunity to request changes.
2. If you didn't add the `--no-interactive` flag, Amazon Q will prompt you to provide feedback on the transformation plan. You can explain the changes you want to make in English natural language, and Amazon Q will update the plan if it can support the changes you request.
 3. Amazon Q begins the transformation. It will output status updates throughout the transformation. When it's complete, Amazon Q provides the path where the transformation results, logs, and configuration files are outputted.

Your upgraded code will be committed to the new branch Amazon Q created. Amazon Q will commit the code in one or multiple commits, depending on the selection you made when you ran `qct configure`.

4. If you're running another transformation after upgrading your Java version, start the second transformation in the same branch where you committed the changes from the first transformation.

SQL conversion

Before you begin, make you sure you've read [Converting embedded SQL in Java applications with Amazon Q Developer](#) to understand the prerequisites for this type of transformation.

1. To convert embedded SQL, you must first create a YAML file that contains the path to the schema metadata file from your [AWS DMS Schema Conversion](#).

Following is the required format of the file:

```
schema_conv_metadata_path: <path-to-metadata-zip-file>
```

2. Run the following command to start a transformation for a SQL conversion. Replace `<path-to-folder>` with the path to the folder with the code you're transforming and `<path-to-sql-config-file>` with the path to the YAML file you created in step 1.

```
qct transform --source_folder <path-to-folder>  
              --sql_conversion_config_file <path-to-sql-config-file>
```

3. If Amazon Q finds multiple schemas in your schema metadata file, it will stop the transformation and provide a list of the detected schemas. Choose which schema to use for the SQL conversion, and then add a new field schema: `<schema-name>` to the YAML file.
4. Amazon Q begins the transformation. It will output status updates throughout the transformation. When it's complete, Amazon Q provides the path where the transformation results, logs, and configuration files are outputted.

Your upgraded code will be committed to the new branch Amazon Q created.

Troubleshooting transformations on the command line

The following information can help you troubleshoot common issues when transforming applications on the command line with Amazon Q Developer.

Why is my bearer token not refreshing?

If you see the following error, it means you need to refresh the bearer token used for authentication.

```
Refreshing bearer token
('Error refreshing bearer token due to: ', InvalidGrantException('An error occurred
(InvalidGrantException) when calling the CreateToken operation: '))
('Error getting bearer token due to: ', RuntimeError(('Error refreshing bearer token
due to: ', InvalidGrantException('An error occurred (InvalidGrantException) when
calling the CreateToken operation: '))))
```

To address this error, run the following command:

```
rm ~/.aws/qcodetransform/credentials.json
```

Once you remove the outdated credentials file, run `qct transform` again to restart the transformation.

Amazon Q Developer command line transformation tool version history

Review the following information for details about current and past releases of the Amazon Q Developer command line transformation tool. The table includes the download link, release date, and release notes for each version.

Version	Release date	Release notes
1.0.0 (latest)	June 27, 2025	QCT CLI available for general availability and supports authentication through AWS IAM Identity Center. Available for AWS Region Europe (Frankfurt).

Version	Release date	Release notes
0.6.0	June 6, 2025	Includes support for providing a dependency upgrade file and iterating on the transformation plan.
0.5.2	April 16, 2025	Bug fixes to resolve issues when resuming jobs and failures for applications with first-party dependencies.
0.5.1	March 13, 2025	When you authenticate with IAM, you no longer need to provide an AWS Region. Also includes bug fix to include job status in output logs.
0.5.0	February 28, 2025	Includes support for authenticating with IAM through the AWS CLI.
0.4.1	February 17, 2025	Bug fix to include support for entering the AWS Region where your Amazon Q Developer subscription is configured.
0.4.0	February 14, 2025	Includes support for upgrading Java applications to Java 21.
0.3.0	February 12, 2025	Includes support for converting embedded SQL in Java applications.

Version	Release date	Release notes
0.2.0	February 3, 2025	Includes support for receiving upgraded Java code in multiple commits.
0.1.0	November 27, 2024	Initial release. Includes support for upgrading Java code versions from the command line.

Troubleshooting issues with Java transformations

The following information can help you troubleshoot common issues when transforming Java applications with Amazon Q Developer.

Topics

- [Why can't Amazon Q upload my project?](#)
- [Why are my Maven commands failing?](#)
- [How do I add Maven to my PATH?](#)
- [Why can't Amazon Q build my code?](#)
- [Why did my transformation fail after 55 minutes?](#)
- [Why can't I download my transformed code?](#)
- [How do I access code transformation logs?](#)
- [How do I find my transformation job ID?](#)

Why can't Amazon Q upload my project?

If your project fails to upload, it's likely due to one of the following issues. See the topic that corresponds to the error you see from Amazon Q.

Topics

- [Reduce project size](#)
- [Configure proxy settings in your IDE](#)
- [Allow access to Amazon S3](#)

Reduce project size

To transform your code, Amazon Q generates a project artifact, which includes your source code, project dependencies, and build logs. The maximum project artifact size for a transformation job is 2 GB. If you get an error related to project artifact size, you must decrease the size of your project or try transforming a smaller project. You can view the size of your project artifact file in the code transformation logs. For more information, see [How do I access code transformation logs?](#)

Configure proxy settings in your IDE

To transform your code, Amazon Q uploads your project artifact to a service-owned Amazon S3 bucket. Part of the upload process involves using SSL or TLS certificates to establish communication between Amazon S3 and your IDE. If you are using a proxy server, the SSL or TLS certificates used by your proxy server must be trusted, otherwise Amazon Q is not able to upload your project.

If you receive an error related to your proxy or certificates, you likely need to configure your IDE or operating system to trust your certificates or update other proxy settings.

Note

You might also encounter issues unrelated to certificates if you are behind your organization's proxy server or firewall. If you complete the following procedures to configure your certificates and still have issues, contact your network administrator to ensure you are allowed to communicate with Amazon S3 from your IDE. For more information, see [Allow access to Amazon S3](#).

Configure certificates in JetBrains

To configure your JetBrains IDE Java Runtime Environment (JRE) to trust the SSL or TLS certificates used by your proxy server, you must import the SSL or TLS certificates to the `cacerts` file in the JRE. The `cacerts` file is a file that contains trusted root certificates for secure connections such as HTTPS and SSL, and it's part of the JRE's security settings. To import a certificate, complete the following procedure.

Note

We recommend making a backup of the `cacerts` file before modifying it, as any mistakes can cause issues with secure connections.

1. Determine the path to the `cacerts` file in your JRE. The path of the `cacerts` file in the internal JRE shipped with your JetBrains IDE depends on the operating system and the version of the JetBrains IDE you're using.

Following are examples of paths to the `cacerts` file in common operating systems. Choose your operating system to see examples.

Note

<JetBrains Installation Folder> refers to the directory where JetBrains products are installed. This directory is typically chosen during the installation process. The `jbr` folder represents the JRE bundled with JetBrains IDEs, which is a specific version of the JRE tailored for use with JetBrains IDEs.

Windows

The `cacerts` file path for a JetBrains IDE installed on Windows is:

```
<JetBrains Installation Folder>\jbr\bin\cacerts
```

For example, if you installed a JetBrains IDE on Windows in the default location, the path might be:

```
C:\Program Files\JetBrains\jbr\bin\cacerts
```

macOS

The `cacerts` file path for a JetBrains IDE installed on macOS is:

```
/Applications/JetBrains Toolbox/<version>/JetBrains Toolbox.app/Contents/jbr/  
Contents/Home/lib/security/cacerts
```


For example, if you installed a JetBrains IDE on macOS in the default location, the path might be:

```
/Applications/JetBrains Toolbox/2022.3.4/JetBrains Toolbox.app/Contents/jbr/  
Contents/Home/lib/security/cacerts
```

Linux

The cacerts file path for a JetBrains IDE installed on Linux is:

```
/opt/jetbrains/jbr/lib/security/cacerts
```

2. Determine the certificate you need to import to the cacerts file. The certificate file typically has a .cer, .crt, or .der file extension. If you aren't sure which certificates you need to add, contact your network administrator.
3. Import the certificate to the cacerts keystore. You can do this with the Java `keytool` command.

- a. Open a command prompt and enter the following command:

```
keytool -import -alias <alias> -file <certificate_file> -keystore  
<path_to_cacerts>
```

- b. For <alias>, you can add a name for the certificate you are importing to refer to it later. This option is optional.
- c. For <certificate_file>, specify the path to the certificate you are importing. This should be a path to the .cer, .crt, or .der file containing the certificate.
- d. For <path_to_cacerts>, specify the path to the cacerts keystore file you saved in step 1. This is the file where you are importing the certificate.

For example, if you want to import a certificate named `my_certificate.cer` into the cacerts keystore of the bundled JRE in IntelliJ IDEA on Windows, and you want to give the alias `myalias` to the certificate, the command might be:

```
keytool -import -alias myalias -file my_certificate.cer -keystore "C:\Program Files  
\JetBrains\IntelliJ IDEA 2022.3.2\jbr\bin\cacerts"
```

4. During the import process, you'll be prompted to enter the keystore password. The default password for the cacerts keystore is `changeit`.
5. After running the command, you'll be asked to trust the certificate. To confirm the certificate is trusted and complete the import, enter `yes`.
6. You might also need to add the certificates to the IDE itself, in addition to the JRE. For more information, see [Server Certificates](#) in the JetBrains documentation.

Configure certificates in Visual Studio Code

To configure Visual Studio Code to trust the SSL or TLS certificates used by your proxy server, make sure you have configured the following proxy settings for your operating system.

Configure certificates in Visual Studio Code on macOS

Configure the following proxy settings for Visual Studio Code on macOS.

Add certificates to your macOS keychain

If you haven't already, you must add the certificates used by your proxy server to your macOS keychain. For information on adding certificates to your keychain, see [Add certificates to a keychain using Keychain Access on Mac](#) in the Keychain Access User Guide.

Install the Mac CA VSCode extension

The [Mac CA VSCode extension](#) allows Amazon Q to access the certificates you added to Keychain Access on your Mac.

To install the extension:

1. Search for `mac-ca-vscode` in the VS Code extensions pane, and choose **Install**.
2. Restart VS Code.

Update proxy settings in VS Code on macOS

Update the following settings to make sure VS Code is configured properly for your proxy.

1. Open settings in VS Code.
2. Enter `proxy` in the search bar.

3. In the **Http: Proxy** field, add your proxy URL.
4. Deselect **Http: Proxy Strict SSL**.
5. In the **Http: Proxy Support** dropdown list, choose **on**.
6. In the settings search bar, enter `http.experimental.systemCertificatesV2`. Select **Http › Experimental: System Certificates V2**.

Configure certificates in Visual Studio Code on Windows

Configure the following proxy settings for Visual Studio Code on Windows.

Add certificate as a trusted root certificate on Windows

If you haven't already, you must add the certificates used by your proxy server to your Trusted Root Certification Authorities store on Windows. To add a certificate, complete the following procedure:

1. Open the search tool or a Run command window.
2. Enter the following to open the Certificate Manager tool:

```
certmgr.msc
```

3. Choose the **Trusted Root Certification Authorities** store.
4. Right-click **Certificates**, choose **All Tasks**, and then choose **Import....**
5. Follow the instructions given to import your proxy certificate.
6. After you've imported your certificate, confirm the certificate was added.

In the **Trusted Root Certification Authorities** store, double click **Certificates**. Right-click the certificate you added and choose **Properties**. Under **Certificate purposes**, the option **Enable all purposes for this certificate** should be selected.

Install the Win-CA VSCode extension

The [Win-CA VSCode extension](#) allows Amazon Q to access the certificates you added to Trusted Root Certificates in Windows.

To install the extension:

1. Search for `win-ca` in the VS Code settings pane.

2. In the **Inject** dropdown list, choose **append**.

Update proxy settings in VS Code on Windows

Update the following settings to make sure VS Code is configured properly for your proxy.

1. Open settings in VS Code.
2. Enter proxy in the search bar.
3. In the **Http: Proxy** field, add your proxy URL.
4. Deselect **Http: Proxy Strict SSL**.
5. In the **Http: Proxy Support** dropdown list, choose **on**.
6. In the settings search bar, enter `http.experimental.systemCertificatesV2`. Select **Http › Experimental: System Certificates V2**.
7. Restart VS Code.

Allow access to Amazon S3

During a transformation, Amazon Q uploads your code to a service-owned Amazon S3 bucket. If your network or organization hasn't configured access to Amazon S3, Amazon Q isn't able to upload your project.

To ensure Amazon Q can upload your project, make sure your proxy configuration and other network components, such as Data Lost Prevention (DLP) policies, are configured to allow access to Amazon S3. You might also need to allowlist the Amazon S3 bucket where Amazon Q uploads your project. For more information, see [Amazon S3 bucket URLs and ARNs to allowlist](#).

If you transform a large project, DLP policies or other network components might cause delays and prevent a successful upload if they aren't configured to allowlist the Amazon S3 bucket. If you choose not to allowlist the bucket, you might need to transform a smaller project so that Amazon Q can upload it.

Why are my Maven commands failing?

Following are Maven configuration issues that you might see in the JetBrains and Visual Studio Code IDEs. If you address the issues and still see Maven errors, there might be an issue with your project. Use the information in the error logs to address any issues with your project, and then try transforming your project again.

Update Maven configuration in JetBrains

If a transformation fails in JetBrains due to Maven command issues, the error logs appear on the **Run** tab. Use the information in the logs to address the issue. Following are some issues that you might need to address:

- Make sure that your Maven home path is set to **Bundled**. Go to **Settings**, and then expand the **Build, Execution, Deployment** section. Expand the **Build Tools** section and then expand **Maven**. In the **Maven home path** dropdown list, choose **Bundled**.
- Make sure that the Java runtime environment (JRE) is using your project JDK. Go to **Settings**, and then expand the **Build, Execution, Deployment** section. Expand **Maven** and choose **Runner**. In the **JRE** dropdown list, choose **Use Project JDK**.
- Make sure that Maven is enabled. Go to **Settings** and choose **Plugins**. Search for Maven and choose the Maven plugin. If you see an **Enable** button, choose it to enable Maven.

Update Maven configuration in Visual Studio Code

If a transformation fails in VS Code because of Maven command issues, a text file that contains the error logs opens in a new tab. Use the information in the logs to address the issue.

Make sure that you have configured either one of the following options:

- Your project contains a Maven wrapper in the project root folder
- A version of Maven supported by Amazon Q is available on your PATH

For more information, see [How do I add Maven to my PATH?](#)

How do I add Maven to my PATH?

To transform your code in VS Code without using a Maven wrapper, you must install Maven and add it to your PATH variable.

To check if you have Maven installed correctly already, run `mvn -v` in a new OS terminal outside of Visual Studio Code. You should see an output with your Maven version.

If you get an output in your Visual Studio Code terminal but not in your OS terminal, or if the command isn't found, you need to add Maven to your PATH.

To add Maven to your PATH, follow the instructions for your machine.

macOS

To add Maven to your macOS PATH, complete the following steps.

1. Locate your Maven installation directory, or the folder where you installed Maven, and save the path to that folder.
2. Open the configuration file for your shell in an editor of your choice. For recent macOS versions, the default shell is zsh and the default configuration file is located at `~/.zshrc`.

Add the following lines to the bottom of the configuration file. Set the value of `M2_HOME` to the path you saved in step 1:

```
export M2_HOME="your Maven installation directory"
export PATH="${M2_HOME}/bin:${PATH}"
```

These commands make the `mvn` command available in all terminals.

3. Close all OS terminal windows and quit all Visual Studio Code instances.
4. To verify that Maven was added to your PATH, open a new OS terminal and run the following command:

```
mvn -v
```

You should see an output with your Maven version.

5. After seeing your Maven output, restart Visual Studio Code. You might also need to restart your machine. Open a new Visual Studio Code terminal and run the following command:

```
mvn -v
```

The output should be identical to the output in step 4. If the Visual Studio Code output is different, try the following to make sure your setup is correct:

- Check your PATH variable in Visual Studio Code. An IDE extension might be altering the PATH such that it differs from your local PATH variable. Uninstall the extension to remove it from your PATH.
- Check your default shell in Visual Studio Code. If it's set to something other than zsh, repeat these steps for your shell.

Windows

To add Maven to your Windows PATH, complete the following steps:

1. Locate your Maven installation directory, or the folder where you installed Maven, and save the path to that folder.
2. Open the Environment Variables window:
 - a. Choose the Windows button to open the search bar.
 - b. Enter `Edit environment variables for your account` and choose it.
3. In the **Environment Variables** window, look for the Path variable. If you have a Path variable already, choose **Edit...** to update it. If you don't see a Path variable, choose **New...** to add one.
4. In the **Edit environment variable** window that appears, double click the existing path to edit it, or choose **New** to add a new path entry.

Replace the existing Maven path entry with the path you saved in step 1, or add the path as a new entry. At the end of the path, add `\bin` as a suffix, as in the following example:

```
C:\Users\yourusername\Downloads\apache-maven-3.9.6-bin\apache-maven-3.9.6\bin
```

5. Choose **OK** to save the path entry, and then choose **OK** again in the **Environment Variables** window.
6. Open a new Command Prompt and run the following command:

```
mvn -v
```

You should see an output with your Maven version.

Why can't Amazon Q build my code?

If the transformation fails when Amazon Q is building your code, your project may not be configured properly for the environment where Amazon Q builds your code. You might need to update your build configuration or code implementation.

Review the build log output Amazon Q provides to determine if there are changes you can make to your project. Following are some common issues that might prevent Amazon Q from building your code.

Remove absolute paths in pom.xml

If you have an absolute path in your pom.xml file, Amazon Q won't be able to find the relevant files, and as a result might not be able to build your code.

Following is an example of an absolute path that you could have in your pom.xml file:

```
<toolspath>  
  <path>/Library/Java/JavaVirtualMachines/jdk-11.0.11.jdk/Contents/Home/lib/  
tools.jar</path>  
</toolspath>
```

Instead of using an absolute path, you can create a relative path using a pointer. Following is an example of how you can replace the previous absolute path with a relative path:

```
<toolspath>  
  <path>${java.home}/../lib/tools.jar</path>  
</toolspath>
```

Remove local or external databases in unit tests

Amazon Q runs any unit tests in your project when it builds your code. If a unit test calls a local or external database, Amazon Q won't have access to the database, causing the build to fail. To prevent the build from failing, you must either remove the database call from the unit test or remove the unit test before submitting the transformation.

Why did my transformation fail after 55 minutes?

If your code transformation job fails after 55 minutes, your code build time likely exceeds the build time limit. There is currently a time limit of 55 minutes for building your code.

If your local build time takes 55 minutes or longer, reduce your project's build time to transform your code. If your local build is faster than the build with Code Transformation, check your project for tasks that might be failing or take a longer time in a different environment. Consider disabling long-running test cases. Also consider using timeouts for attempts to access resources that might not be available from the secure IDE environment or the internet.

Why can't I download my transformed code?

If you aren't able to download your code after your transformation is complete, it's likely due to one of the following issues. See the topic that corresponds to the error you see from Amazon Q.

Topics

- [Reduce project size](#)
- [Download code diff within 30 days](#)
- [Configure proxy settings in your IDE](#)
- [Remove wildcard characters in JetBrains proxy settings](#)

Reduce project size

After the transformation is complete, Amazon Q generates an output artifact that contains a diff with your upgraded code and a transformation summary with information about the changes it made. The output artifact must be 1 GB or less in order for the IDE to download it.

If the output artifact exceeds the limit, you will not be able to download your upgraded code or transformation summary. Try transforming a smaller project to prevent a large output artifact. If the issue persists, contact Support. For information about contacting Support with Amazon Q, see [Using Amazon Q Developer to chat with Support](#).

Download code diff within 30 days

The code diff file with your upgraded code is only available for 30 days after the transformation is complete. If it's been over 30 days since the transformation completed, restart the transformation to download the diff file.

Configure proxy settings in your IDE

Amazon Q downloads your upgraded code from a service-owned Amazon S3 bucket. Part of the download process involves using SSL or TLS certificates to establish communication between Amazon S3 and your IDE. If you are using a proxy server, the SSL or TLS certificates used by your proxy server must be trusted, otherwise Amazon Q is not able to upload your project.

To download your code, you might need to configure your IDE to trust certificates or update other proxy settings. For more information on updating your proxy settings, see [Configure proxy settings in your IDE](#).

Remove wildcard characters in JetBrains proxy settings

If you have configured proxy settings in your JetBrains IDE, you might see the following error when downloading your upgraded code:

```
software.amazon.awssdk.core.exception.SdkClientException:  
Unable to execute HTTP request: Dangling meta character '*' near index 0
```

This is likely caused by the presence of a wildcard character (*) in the **No proxy for** field of your IDE's proxy settings. The Java SDK used by Amazon Q doesn't support wildcard entries in this field.

To download your code, remove any wildcards from the **No proxy for** field, and then restart your IDE. If you need to specify hosts that should bypass the proxy, use a regular expression instead of a wildcard. To update proxy settings in your JetBrains IDE, see [HTTP Proxy](#) in the JetBrains documentation.

How do I access code transformation logs?

Access logs in JetBrains

For information about how to access JetBrains log files, see [Locating IDE log files](#) in the JetBrains documentation.

To find logs emitted by Amazon Q in JetBrains, search the IDE logs for the following string:

```
software.aws.toolkits.jetbrains.services.codemodernizer
```

Code transformation logs start with the preceding string. Logs generated by Maven are displayed on the **Run** tab and have the preceding string before and after the log entry.

Access logs in Visual Studio Code

To find logs emitted by Amazon Q in VS Code, complete the following steps:

1. Choose **View** in the top navigation bar, and then choose **Command Palette**.
2. Search Amazon Q: View Logs in the command palette that appears.
3. The logs open in the IDE. To search the log files for CodeTransformation, use CMD + F or Control + F.

Code transformation logs in VS Code are prefixed with CodeTransformation:. Following is an example of a log generated in VS Code for a Maven copy dependencies error:

```
2024-02-12 11:29:16 [ERROR]: CodeTransformation: Error in running Maven copy-  
dependencies command mvn = /bin/sh: mvn: command not found
```

How do I find my transformation job ID?

Find your job ID in JetBrains

To find a transformation job ID in JetBrains, go to the **Transformation details** tab in the **Transformation Hub** and choose the **Show Job Status** (clock) icon.

Find your job ID in Visual Studio Code

To find a transformation job ID in VS Code, go to the **Transformation Hub** and choose the **Show Job Status** (clock) icon.

Transforming .NET applications with Amazon Q Developer

Amazon Q Developer can port your Windows-based .NET applications to Linux-compatible cross-platform .NET applications through a generative AI-powered refactoring workflow. Amazon Q also helps you upgrade outdated versions of cross-platform .NET applications to newer versions.

To transform a .NET solution or project, Amazon Q analyzes your codebase, determines the necessary updates to port your application, and generates a transformation plan before the transformation begins. During this analysis, Amazon Q divides your .NET solution or project into code groups that you can view in the transformation plan. A *code group* is a project and all its dependencies that together generate a buildable unit of code such as a dynamic link library (DLL) or an executable.

During the transformation, Amazon Q provides step-by-step updates in a Transformation Hub where you can monitor progress. After transforming your application, Amazon Q generates a summary with the proposed changes in a diff view for you to optionally verify the changes before you accept them. When you accept the changes, Amazon Q makes in-place updates to your .NET solution or project.

Amazon Q performs four key tasks to port .NET applications to Linux:

- **Upgrades language version** – Replaces outdated C# versions of code with Linux-compatible C# versions.
- **Migrates from .NET Framework to cross-platform .NET** – Migrates projects and packages from Windows dependent .NET Framework to cross-platform .NET compatible with Linux.
- **Rewrites code for Linux compatibility** – Refactors and rewrites deprecated and inefficient code components.

- **Generates a Linux compatibility readiness report** – For open-ended tasks where user intervention is needed to make the code build and run on Linux, Amazon Q provides a detailed report of actions needed to configure your application after transformation.

For more information about how Amazon Q performs .NET transformations, see [How it works](#).

Topics

- [Quotas](#)
- [Porting a .NET application with Amazon Q Developer in Visual Studio](#)
- [How Amazon Q Developer transforms .NET applications](#)
- [Troubleshooting issues with .NET transformations in the IDE](#)

Quotas

.NET transformations with Amazon Q in the IDE maintain the following quotas:

- **Lines of code per job** – The maximum number of code lines that Amazon Q can transform in a given transformation job. This is also the monthly total limit for .NET transformations.
- **Concurrent jobs** – The maximum number of transformation jobs you can run at the same time. This quota applies to all transformations in the IDE, including [Java transformations](#).

Resource	Quotas	
Lines of code per job	100,000 lines of code	
Concurrent jobs	1 job per user 2 jobs per AWS account	

Porting a .NET application with Amazon Q Developer in Visual Studio

Complete these steps to port a Windows-based .NET application to a Linux-compatible cross-platform .NET application with Amazon Q Developer in Visual Studio.

Step 1: Prerequisites

Before you continue, make sure you've completed the steps in [Set up Amazon Q in your IDE](#).

Make sure that the following prerequisites for your application are met before you begin a .NET transformation job:

- Your application contains only .NET projects written in C#.
- Your application only has Microsoft-authored NuGet package dependencies
- Your application only uses UTF-8 characters. If your application uses non-UTF-8 characters, Amazon Q will still attempt to transform your code.
- If your application is dependent on Internet Information Services (IIS), only default IIS configurations are used
- Amazon Q will evaluate the type of the project you selected and its dependencies to create a code group. Your code group can only have the following project types:
 - Console application
 - Class library
 - Web API
 - WCF Service
 - Business logic layers of Model View Controller (MVC) and Single Page Application (SPA)
 - Test projects

Note

Amazon Q doesn't support transforming UI layer components such as Razor views or WebForms ASPX files. If Amazon Q detects UI layer components in your solution or project, it will perform a partial transformation by excluding UI layer components, and you might need to refactor further to make your code buildable on the target .NET version.

Step 2: Transform your application

To transform your .NET solution or project, complete the following procedure:

1. Open any C# based solution or project in Visual Studio that you want to transform.
2. Open any C# code file in the editor.

3. Choose **Solution Explorer**.
4. From the Solution Explorer, right click a solution or project you want to transform, and then choose **Port with Amazon Q Developer**.
5. The **Port with Amazon Q Developer** window appears.

The solution or project you selected will be chosen in the **Choose a solution or project to transform** dropdown menu. You can expand the menu to choose a different solution or project to transform.

In the **Choose a .NET target** dropdown menu, choose the .NET version you want to upgrade to.

6. Choose **Confirm** to begin the transformation.
7. Amazon Q begins transforming your code. You can view the transformation plan it generates for details about how it will transform your application.

A **Transformation Hub** opens where you can monitor progress for the duration of the transformation. After Amazon Q has completed the **Awaiting job transformation startup** step, you can navigate away from the project or solution for the duration of the transformation.

8. After the transformation is complete, navigate to the **Transformation Hub** and choose **View diffs** to review the proposed changes from Amazon Q in a diff view.
9. Choose **View code transformation summary** for details about the changes Amazon Q made. You can also download the transformation summary by choosing **Download summary as .md**.

If any of the items in the **Code groups** table require input under the Linux porting status, you must manually update some files to run your application on Linux.

- a. From the **Actions** dropdown menu, choose **Download Linux readiness report**.
 - b. A .csv file opens with any changes to your project or solution that you must complete before your application is Linux compatible. It includes the project and file that need to be updated, a description of the item to be updated, and an explanation of the issue. Use the **Recommendation** column for ideas on how to address a Linux readiness issue.
10. To update your files in place, choose **Accept changes** from the **Actions** dropdown menu.

How Amazon Q Developer transforms .NET applications

Note

Transforming .NET applications with Amazon Q in the IDE is in preview, and is subject to change.

Review the following sections for details about how .NET transformation with Amazon Q Developer works.

Analyzing your application and generating a transformation plan

Before a transformation begins, Amazon Q builds your code locally to ensure it's buildable and configured correctly for transformation. Amazon Q then uploads your code to a secure and encrypted build environment on AWS, analyzes your codebase, and determines the necessary updates to port your application.

During this analysis, Amazon Q divides your .NET solution or project into code groups. A code group is a project and all its dependencies that together generate a buildable unit of code such as a dynamic link library (DLL) or an executable. Even if you didn't select all project dependencies to be transformed, Amazon Q determines the dependencies needed to build your selected projects and transforms them too, so that your transformed application will be buildable and ready for use.

After analyzing your code, Amazon Q generates a transformation plan that outlines the proposed changes that it will make, including a list of code groups and their dependencies that will be transformed.

Transforming your application

To start the transformation, Amazon Q builds your code again in the secure build environment to ensure it's buildable remotely. Amazon Q then begins porting your application. It works from the bottom up, starting with the lowest level dependency. If Amazon Q runs into an issue with porting a dependency, it stops the transformation and provides information about what caused the error.

The transformation includes the following updates to your application:

- Replacing outdated C# versions of code with Linux-compatible C# versions
- Upgrading .NET Framework to cross-platform .NET, including:

- Identifying and iteratively replacing packages, libraries, and APIs
- Upgrading and replacing NuGet packages and APIs
- Transitioning to cross-platform runtime
- Setting up middleware and updating runtime configurations
- Replacing private or third-party packages
- Handling IIS and WCF components
- Debugging build errors
- Rewriting code for Linux compatibility, including refactoring and rewriting deprecated and inefficient code to port existing code

Reviewing transformation summary and accepting changes

After the transformation is complete, Amazon Q provides a transformation summary with information about the proposed updates it made to your application, including the number of files changed, packages updated, and APIs changed. It flags any unsuccessful transformations, including affected files or portions of files and the errors encountered during an attempted build. You can also view a build summary with build logs to learn more about what changes were made.

The transformation summary also provides a Linux porting status, which indicates whether or not additional user input is needed to make the application Linux compatible. If any of the items in a code group require input from you, you download a Linux readiness report that contains Windows-specific considerations that Amazon Q could not address at build time. If input is needed for any code groups or files, review the report for details about what type of change still needs to be made and, if applicable, for recommendations for how to update your code. These changes must be made manually before your application can be run on Linux.

You can review the proposed changes Amazon Q made in a diff view before accepting them as in-place updates to your files. After updating your files and addressing any items in the Linux readiness report, your application is ready to run on cross-platform .NET.

Troubleshooting issues with .NET transformations in the IDE

Note

Transforming .NET applications with Amazon Q in the IDE is in preview, and is subject to change.

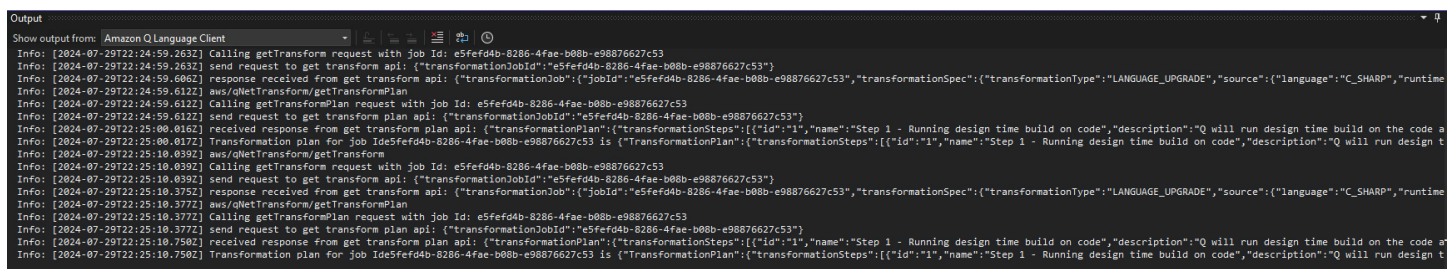
Use the following sections to troubleshoot common issues with .NET transformations in the IDE with Amazon Q Developer.

How do I know if a job is progressing?

If Amazon Q appears to be spending a long time on a step in the Transformation Hub, you can check whether the job is still active in the output logs. If diagnostic messages are being generated, the job is still active.

To check the outputs, choose the **Output** tab in Visual Studio. In the **Show output from:** menu, choose **Amazon Q Language Client**.

The following screenshot shows an example of the outputs Amazon Q generates during a transformation.



```
Output
Show output from: Amazon Q Language Client
Info: [2024-07-29T22:24:59.263Z] Calling getTransform request with job Id: e5fef44b-8286-4fae-b08b-e98876627c53
Info: [2024-07-29T22:24:59.263Z] send request to get transform api: {"transformationJobId":"e5fef44b-8286-4fae-b08b-e98876627c53"}
Info: [2024-07-29T22:24:59.686Z] response received from get transform api: {"transformationJob":{"jobId":"e5fef44b-8286-4fae-b08b-e98876627c53"},"transformationSpec":{"transformationType":"LANGUAGE_UPGRADE","source":{"language":"C_SHARP","runtime":
Info: [2024-07-29T22:24:59.612Z] aws/qnetTransform/getTransformPlan
Info: [2024-07-29T22:24:59.612Z] Calling getTransformPlan request with job Id: e5fef44b-8286-4fae-b08b-e98876627c53
Info: [2024-07-29T22:24:59.612Z] send request to get transform plan api: {"transformationJobId":"e5fef44b-8286-4fae-b08b-e98876627c53"}
Info: [2024-07-29T22:25:00.016Z] received response from get transform plan api: {"transformationPlan":{"transformationSteps":[{"id":"1","name":"Step 1 - Running design time build on code","description":"Q will run design time build on the code a
Info: [2024-07-29T22:25:00.017Z] Transformation plan for job Id: e5fef44b-8286-4fae-b08b-e98876627c53 is: {"TransformationPlan":{"transformationSteps":[{"id":"1","name":"Step 1 - Running design time build on code","description":"Q will run design t
Info: [2024-07-29T22:25:10.039Z] aws/qnetTransform/getTransform
Info: [2024-07-29T22:25:10.039Z] Calling getTransform request with job Id: e5fef44b-8286-4fae-b08b-e98876627c53
Info: [2024-07-29T22:25:10.039Z] send request to get transform api: {"transformationJobId":"e5fef44b-8286-4fae-b08b-e98876627c53"}
Info: [2024-07-29T22:25:10.375Z] response received from get transform api: {"transformationJob":{"jobId":"e5fef44b-8286-4fae-b08b-e98876627c53"},"transformationSpec":{"transformationType":"LANGUAGE_UPGRADE","source":{"language":"C_SHARP","runtime":
Info: [2024-07-29T22:25:10.377Z] aws/qnetTransform/getTransformPlan
Info: [2024-07-29T22:25:10.377Z] Calling getTransformPlan request with job Id: e5fef44b-8286-4fae-b08b-e98876627c53
Info: [2024-07-29T22:25:10.377Z] send request to get transform plan api: {"transformationJobId":"e5fef44b-8286-4fae-b08b-e98876627c53"}
Info: [2024-07-29T22:25:10.750Z] received response from get transform plan api: {"transformationPlan":{"transformationSteps":[{"id":"1","name":"Step 1 - Running design time build on code","description":"Q will run design time build on the code a
Info: [2024-07-29T22:25:10.750Z] Transformation plan for job Id: e5fef44b-8286-4fae-b08b-e98876627c53 is: {"TransformationPlan":{"transformationSteps":[{"id":"1","name":"Step 1 - Running design time build on code","description":"Q will run design t
```

Why are some projects not selected for transformation?

Amazon Q can only transform supported project types in the C# language. Currently, Amazon Q does not support porting UI layer components or projects written in the VB.NET or F# languages. For a list of supported project types and other prerequisites for transforming your .NET projects, see [Step 1: Prerequisites](#).

How can I get support if my project or solution isn't transforming?

If you aren't able to troubleshoot issues on your own, you can reach out to Support or your AWS account team to submit a support case.

To get support, provide the transformation job ID so AWS can investigate a failed job. To find a transformation job ID, choose the **Output** tab in Visual Studio. In the **Show output from:** menu, choose **Amazon Q Language Client**.

How can I prevent my firewall from interfering with transformation jobs?

If your organization uses a firewall, it might interfere with transformations in Visual Studio. You can temporarily disable security checks in Node.js to troubleshoot or test what is preventing the transformation from running.

The environment variable `NODE_TLS_REJECT_UNAUTHORIZED` controls important security checks. Setting `NODE_TLS_REJECT_UNAUTHORIZED` to "0" disables Node.js's rejection of unauthorized TLS/SSL certificates. This means:

- Self-signed certificates will be accepted
- Expired certificates will be allowed
- Certificates with mismatched hostnames will be permitted
- Any other certificate validation errors will be ignored

If your proxy uses a self-certificate, you can set the following environment variables instead of disabling `NODE_TLS_REJECT_UNAUTHORIZED`:

```
NODE_OPTIONS = -use-openssl-ca  
NODE_EXTRA_CA_CERTS = Path/To/Corporate/Certs
```

Otherwise, you must specify the CA certs used by the proxy to disable `NODE_TLS_REJECT_UNAUTHORIZED`.

To disable `NODE_TLS_REJECT_UNAUTHORIZED` on Windows:

1. Open the Start menu and search for **Environment Variables**.
2. Choose **Edit the system environment variables**.
3. In the **System Properties** window, choose **Environment Variables**.
4. Under **System variables**, choose **New**.
5. Set **Variable name** to `NODE_TLS_REJECT_UNAUTHORIZED` and **Variable value** to 0.
6. Choose **OK** to save the changes.
7. Restart Visual Studio.

Developing features with Amazon Q Developer

Note

You can ask for help with feature development directly in the chat. If you use `/dev`, your request will be redirected to the chat.

Amazon Q Developer can help you develop code features or make code changes to projects in your integrated development environment (IDE). You explain the task you want to accomplish, and Amazon Q uses the context of your current project or workspace to generate code to implement the changes. Amazon Q can help you build AWS projects or your own applications.

You can start an entirely new project, or work on an open project in your IDE. When you develop in an existing project, Amazon Q uses all relevant files in your workspace root as context to generate code. Amazon Q filters out files or folders defined in a `.gitignore` file, and only uses supported file types to generate code. For a list of supported file types, see the following GitHub links for your IDE:

- Supported file types for JetBrains IDEs – <https://github.com/aws/aws-toolkit-jetbrains/blob/main/plugins/core/jetbrains-community/src/software/aws/toolkits/jetbrains/services/telemetry/TelemetryUtils.kt>
- Supported file types for Visual Studio Code – <https://github.com/aws/aws-toolkit-vscode/blob/master/packages/core/src/shared/filetypes.ts>

To get started, open up a new or existing project and enter `/dev` in the Amazon Q chat panel. A new chat tab opens where you interact with Amazon Q to generate new code for your feature.

Topics

- [Develop features with `/dev`](#)
- [Best practices](#)
- [Example tasks](#)
- [Quotas](#)
- [Testing code suggestions generated by the Amazon Q `/dev` command](#)
- [Troubleshooting issues with feature development with Amazon Q Developer](#)

Develop features with `/dev`

Note

You can ask for help with feature development directly in the chat. If you use `/dev`, your request will be redirected to the chat.

To work on a code task with Amazon Q in your IDE, complete the following steps.

1. In your IDE, open a new or existing project or workspace where you want to develop features.
2. Choose the Amazon Q icon to open the Amazon Q chat panel.
3. Enter **/dev** in the Amazon Q chat panel followed by a description of the task you want to accomplish or the issue you want to resolve. You can provide a brief overview of a task, or add more details. Amazon Q uses your description and the code in your project to generate code.

Following is an example of a code change you can ask Amazon Q to implement:

/dev Create a new REST API endpoint /api/authenticate to handle user authentication. This endpoint should accept POST requests with user credentials and return a JWT token upon successful authentication. Additionally, update the user management system to integrate with the new authentication endpoint and enforce authentication for relevant API endpoints.

You can also enter **/dev** only to see example tasks.

4. A new tab opens. If you haven't already, enter a description of your task or issue.
5. Amazon Q begins to generate code for the task you've described. During the code generation, Amazon Q provides a summary of the steps it's taking and the files it's using or updating to suggest new code. This step can take a few minutes.

If you want Amazon Q to stop generating code, choose **Stop**. The incomplete code generation will count towards the code generation quota for this task. After you stop a generation, you have the option to enter another task description to keep working on your task.

Optionally, Amazon Q can test its code suggestions in a separate dev environment before presenting them to you in the chat window. For more information, see [Testing '/dev' suggestions](#).

6. After Amazon Q has generated code for your task, it provides a list of files with suggested changes. Choose a file to view a file diff with the changes.
7. To update your files with all of the suggested code changes, choose **Accept all changes**. You can also accept and reject changes to individual files. To accept an individual file change, hover your cursor over a file name and choose the green check mark. To reject a change, choose the red X. You can also choose **Accept remaining changes** to apply any changes you haven't accepted yet.

Once you accept a code change, you can't undo it. If you reject a code change, you can revert it by hovering over the file name and choosing the arrow. You then have the option to accept or reject the code change again.

8. If you aren't satisfied with the proposed changes, you can provide feedback on what can be improved. Choose **Provide feedback & regenerate**, and then describe the changes that you'd like Amazon Q to make.

Amazon Q generates new code based on your feedback. When the generated code meets your requirements, choose **Accept all changes** or accept individual files to update the code in your project or workspace.

9. After you've updated your code, Amazon Q prompts you to start working on a new task.

To start working on another task in your project or workspace, choose **Yes, I have another task**. Your previous conversation and generated code aren't used as context for the new task.

To end the feature development session, choose **No, thanks**. To keep chatting or initiate another workflow with Amazon Q, open a new chat tab.

Best practices

To make the most out of feature development with Amazon Q, follow these best practices:

- Provide a detailed description of the new feature or code changes you want to make, including the specifics of what the code should achieve. This allows Amazon Q to propose comprehensive and implementable code changes. For examples, see [Example tasks](#).
- Your feature shouldn't require updates to more than 5 files at a time. Asking Amazon Q to make larger changes might impact the quality and manageability of the implementation of your feature. If your file diff includes changes to many files, try reducing the scope of your feature description.

Example tasks

Following are example feature development tasks you can ask Amazon Q to perform, with the corresponding description you might provide.

- **Update CSS Styles for Responsive Layout:** Enhance the responsiveness of the application's layout by updating CSS styles. Focus on adjusting the layout for different screen sizes, ensuring optimal display across various devices.
- **Fix User Profile Image Upload:** Resolve the issue preventing users from uploading profile images. Investigate the file upload process, ensure proper file type validation, and address any server-side errors preventing successful uploads.
- **Refactor Code for Code Readability:** Improve the readability of a specific code module by refactoring it. Break down complex functions into smaller, more manageable units, and apply meaningful variable and function names for better clarity.
- **Implement Input Validation for Contact Form:** Add client-side and server-side input validation to the contact form to prevent submission of empty or invalid data. Display appropriate error messages to users for any validation failures.
- **Resolve Broken Links in Navigation Menu:** Investigate and fix broken links in the navigation menu of the application. Update the URLs or routes to ensure all navigation links lead to the correct pages.
- **Optimize Image Loading for Faster Page Loads:** Optimize image loading on key pages of the application to reduce page load times. Implement lazy loading or asynchronous loading techniques to prioritize the display of visible content.
- **Add Error Logging for Critical API Endpoints:** Enhance error handling by implementing logging for critical API endpoints. Log relevant error details such as request parameters and stack traces to facilitate debugging and troubleshooting.
- **Update Documentation for API Endpoints:** Review and update the documentation for existing API endpoints to reflect recent changes or additions. Ensure accuracy and completeness of information for developers consuming the API.
- **Refactor Database Queries for Efficiency:** Analyze and optimize database queries to improve efficiency and reduce resource consumption. Identify and eliminate redundant queries, optimize indexing, and consider caching strategies where applicable.

Quotas

Feature development with Amazon Q maintains the following quotas:

- **Code generations per task** – The number of times you can provide feedback to regenerate code for a given development task, including the initial code generation. This quota is reset every time you start a new task.

- **Code project size** – The maximum size of the code file or folder that Amazon Q can use as context to generate new code.

Quotas

Resource	Quota
Code generations per task	10
Code project size	200 MB uncompressed
	50 MB compressed

Testing code suggestions generated by the Amazon Q `/dev` command

By default, when you use the `/dev` command, Amazon Q does not automatically test the code that it presents to you in the chat. You need to save the code and then test it separately. Amazon Q can't test its code because it lacks an environment with the tools necessary to complete the work.

To enable Amazon Q to test its code, you must allow it to launch a *dev environment* by providing it with a *devfile*.

Note

For more information about the `/dev` command and the Amazon Q Developer Agent for software development, see [Developing features with Amazon Q Developer](#).

What is a dev environment?

A *dev environment* is a [Docker container](#) in which Amazon Q can test its code before presenting it to you in the chat. The container includes the preinstalled tools, languages, and frameworks necessary to test the code.

Amazon Q launches the Docker container in a *sandbox*, meaning the container is isolated from AWS services to protect them from problematic code that Amazon Q might generate.

What is a devfile?

A *devfile* is a YAML file that complies with the [devfile specification](#), which is an open standard defining *containerized development environments*, or *dev environments* for short.

A devfile describes:

- The name and location of Docker container image to be used as the dev environment.
- The commands to run automatically when the dev environment is launched.

A devfile can contain other types of information, but the two mentioned previously are the ones relevant to Amazon Q.

You can provide your own devfile, or you can let Amazon Q generate one for you.

How it works

Whenever you enter the `/dev` command into the Amazon Q chat panel, Amazon Q looks for a devfile in the root of your project.

If a devfile exists, Amazon Q:

1. Launches a dev environment in a sandbox, in AWS.
2. Generates a code suggestion (but doesn't present it to you yet).
3. Builds and tests the suggestion in the dev environment using the instructions in the devfile.
4. Iterates on the suggestion if the tests aren't passing. Amazon Q conducts three iterations, and this is not configurable.
5. Presents the tested code in the chat window.
6. Terminates the dev environment.

If a devfile doesn't exist, Amazon Q asks you whether you want to generate one. If you say yes, Amazon Q generates a devfile based on the context of your project. For more information about what this devfile might look like, see [Example devfiles in Amazon Q Developer](#). After generating the devfile, Amazon Q does not start using it. You'll need to enter another `/dev` command to invoke the devfile.

Sandbox specifications

The sandbox in which a dev environment is launched has 2 vCPUs and 4 GB of memory. The CPU and memory are not configurable.

Amazon VPC support

Amazon Q doesn't support running dev environments within your Amazon Virtual Private Cloud (Amazon VPC). For more information about Amazon VPC, see [What is Amazon VPC?](#) in the *Amazon Virtual Private Cloud User Guide*.

Topics

- [Configuring a devfile in Amazon Q](#)
- [Disabling Amazon Q from testing its code suggestions](#)
- [Example devfiles in Amazon Q Developer](#)
- [Universal image contents](#)

Configuring a devfile in Amazon Q

To enable Amazon Q to test the code suggestions it generates in response to a **/dev** command, you must configure a devfile. You can either:

- Have Amazon Q generate a devfile for you based on the context of your project.
- Create a devfile yourself.

For more information about devfiles and testing with Amazon Q, see [Testing code suggestions generated by the Amazon Q '/dev' command](#).

To have Amazon Q generate a devfile for you

1. In your IDE, run a **/dev** command. Amazon Q generates an untested suggestion, which it presents to you in the chat window.
2. At the end of the suggestion, choose the **Generate devfile to build code** button. Amazon Q generates a devfile.
3. Save the file as `devfile.yaml` in your project's root folder.

After saving the devfile, Amazon Q will begin to use it the next time the **/dev** command is used.

4. (Optional but recommended) Commit and push the devfile so that it's available to other users.

To configure your own devfile

1. Start with a basic devfile. You can have Amazon Q generate one for you (see the previous procedure), or you can use one of the examples in [Example devfiles in Amazon Q Developer](#).
2. Modify the devfile to suit your needs, following the guidelines in the next section, [Guidelines for configuring your own devfile](#).
3. Save the file as `devfile.yaml` in your project's root folder.

After saving the devfile, Amazon Q will begin to use it the next time the **/dev** command is used.

4. (Optional but recommended) Commit and push the devfile so that it's available to other users.

Guidelines for configuring your own dev file

- The Docker image specified in `image:` must reside in a public image registry like DockerHub or a public Amazon ECR registry. Private registries are not supported.
- The devfile must conform to the [devfile 2.2.0 schema](#).
- Not all objects in the devfile 2.2.0 schema are supported. Amazon Q only supports the `install`, `build`, and `test` commands. You can include other commands, but they won't be run.
- The commands in `commands:` must take less than five minutes to run in total. They'll time out after five minutes.
- If you need to reference artifacts, they must reside in a public artifact repository like [PyPI](#) or [npmjs.com](#). Private artifact repositories are not supported.
- Do not reference AWS resources (or any resources) that require authenticated access, such as Amazon S3 buckets. This is because the dev environment's Docker container is sandboxed and only has access to public resources on the Internet.

Disabling Amazon Q from testing its code suggestions

To turn off the feature that allows Amazon Q to test its code suggestions in a dev environment, go to your IDE's settings and turn off the **Amazon Q: Allow Q /dev to run code and test commands** setting. (You might need to choose the **Edit in settings.json** link under the setting name, and then set the corresponding JSON setting to `false` to turn off the setting.)

When you turn off this setting:

- Amazon Q will no longer display the **Generate devfile to build code** button to you when you run the `/dev` command in your IDE.
- Amazon Q will no longer look for a devfile, launch a dev environment, or test the code suggestions it generates for you.

Note

The ability to enable or disable the use of dev environments is not possible through the Amazon Q Developer console.

For more information about devfiles and testing with Amazon Q, see [Testing code suggestions generated by the Amazon Q '/dev' command](#).

Example devfiles in Amazon Q Developer

The following examples show devfiles that comply with the [devfile specification](#) and are suitable for use with Amazon Q. The examples are explained at the end of this page.

For more information about devfiles and how they're used in Amazon Q, see [Testing code suggestions generated by the Amazon Q '/dev' command](#).

Python example

The following example shows a devfile that you could use with a Python project.

```
schemaVersion: 2.0.0
components:
  - name: dev
    container:
```

```
    image: public.ecr.aws/aws-mde/universal-image:latest
  commands:
    - id: install
      exec:
        component: dev
        commandLine: "pip3.11 install -r requirements.txt"
    - id: test
      exec:
        component: dev
        commandLine: "python3.11 manage.py makemigrations && python3.11 manage.py test"
```

Node example

The following example shows a devfile that you could use with a Node.js project.

```
schemaVersion: 2.0.0
components:
  - name: dev
    container:
      image: public.ecr.aws/aws-mde/universal-image:latest
  commands:
    - id: install
      exec:
        component: dev
        commandLine: "npm install"
    - id: build
      exec:
        component: dev
        commandLine: "npm run build"
    - id: test
      exec:
        component: dev
        commandLine: "npm run test"
```

Explanation of examples

The following table describes each line or code block in the preceding devfile examples.

Line or code block	Description
<code>schemaVersion: 2.0.0</code>	Specifies the devfile schema version. Amazon Q only supports schema version 2.0.0 .

Line or code block	Description
<pre>components:</pre>	A list of components to deploy onto the dev environment.
<pre>- name: dev container: image: public.ecr.aws/aws-mde/ universal-image:latest</pre>	Indicates to use the latest universal image Docker image available in the public Amazon Elastic Container Registry (Amazon ECR) as the dev environment. You can change the version of this image, or you can replace the image with one of your own. For more information, see Universal image contents .
<pre>commands:</pre>	A list of commands to perform.
<pre>- id: <i>install/build/test</i> exec: component: dev commandLine: " <i>cli-instructions</i> "</pre>	An install, build, or test command. Amazon Q runs the <i>cli-instructions</i> instructions in the dev environment, on the universal image (or whatever image is specified in image:). The <i>cli-instructions</i> will be different depending on the context of your project. You can change these commands to suit your needs.

Universal image contents

When Amazon Q generates a devfile, it will set the devfile's `image:` setting to point to the universal image. The *universal image* is a public Docker image that includes preinstalled frameworks, languages, and tools that Amazon Q can use to test its code suggestions.

There are two supported versions of the universal image:

- 3.0
- 4.0

Note

The latest universal image maps to 3.0 (*not* 4.0).

For the list of packages installed on versions 3.0 and 4.0 of the universal image, see the following tables.

Amazon regularly patches the universal image packages following the version schema in the **Versioning schema** column.

If you're using later versions of the packages listed in the tables, or you need a different set of packages to be present, you have two options: You can add commands that describe how to install the required packages to the `commands :` section of the devfile, or you can supply your own Docker image containing the correct packages in the `image :` field.

For more information about testing code suggestions, see [Testing code suggestions generated by the Amazon Q '/dev' command](#).

Universal image 3.0 (latest)

Package	Versioning schema
aws-cli	2.x
docker-compose	2.x
dotnet	6.x, 7.x
golang	1.21.x
java	corretto11.x, corretto17.x
nodejs	18.x, 20.x
openssl	3.x
php	8.2.x
python	3.x

Package	Versioning schema
ruby	3.x
terraform	1.x

Universal image 4.0

Package	Versioning schema
aws-cli	2.x
docker-compose	2.x
dotnet	8.x
golang	1.22.x
java	corretto21.x
nodejs	20.x
php	8.2.x
python	3.x
ruby	3.x
terraform	1.x

Troubleshooting issues with feature development with Amazon Q Developer

The following information can help you troubleshoot common issues while developing features in the IDE with Amazon Q Developer.

How do I find my conversation ID?

You might need your conversation ID to get support for issues that arise during feature development with Amazon Q. For some error messages, the conversation ID appears in the message from Amazon Q. If you don't see it, use the following steps to find the conversation ID in your IDE.

Visual Studio Code

1. Open the Command Palette, and run the following command:

```
Amazon Q: View Logs.
```

2. An output console opens in the VS Code terminal. Search for the following string:

```
Amazon Q Developer Agent for software development Conversation ID:
```

The conversation ID is listed after the colon. Confirm that the timestamp corresponds to the conversation that you need the ID for.

JetBrains

1. At the top of the IDE, choose **Help**, and then **Show Log in Finder**.

Depending on your JetBrains IDE and operating system, the logs menu text might look different. For more information, see [Locating IDE log files](#) in the IntelliJ IDEA documentation.

2. Your file finder opens. Choose **idea.log** to open the log file.
3. Search for the following string:

```
Amazon Q Developer Agent for software development Conversation ID:
```

The conversation ID is listed after the colon. Confirm that the timestamp corresponds to the conversation that you need the ID for.

Generating unit tests with Amazon Q

Note

You can ask to generate unit tests directly in the chat. If you use `/test`, your request will be redirected to the chat. Try asking, **generate unit tests for my application**.

Amazon Q Developer agent provides an AI-powered unit test generation capability that automates the creation of unit tests throughout the software development lifecycle. This feature helps developers focus on accelerating feature development while ensuring code quality.

The Amazon Q agent for unit tests automates the following steps:

- **Test case identification:** The agent uses your project structure, existing code, and targeted file in the workspace to identify appropriate test cases.
- **Mock and stub creation:** Amazon Q generates necessary mocks and stubs for isolated testing.
- **Test code generation:** The agent produces unit tests based on the identified test cases.

The Amazon Q agent for unit tests supports Java and Python projects in VS Code and JetBrains IDEs. To learn about the supported test frameworks for each programming language, see [the section called “Unit test generation \(/test\)”](#).

Prerequisites

To use the unit test generation feature, you must download and install the Amazon Q IDE extension for VS Code or JetBrains IDEs. Follow the instructions in [the section called “Installing Amazon Q”](#) to set up the extension.

Note

While recommended, a functional project with a test framework setup in your IDE is optional.

Generate unit tests with `/test`

Note

You can ask to generate unit tests directly in the chat. If you use `/test`, your request will be redirected to the chat. Try asking, **generate unit tests for my application**.

After writing code, developers can initiate unit test generation in two primary ways:

- Type `/test` in the Amazon Q chat, optionally specifying instructions for the class, function, or method to consider.
- Highlight a section of code, open the right-click Amazon Q menu, and choose the **Generate tests** option.

When developers use the `/test` command without additional prompt, the agent:

- Examines the currently active file in the IDE.
- Checks for the existence of a corresponding unit test file for this active file in a test directory.
- If no such test file is found, it automatically creates a new one. The new test file is named after the original file, with a `test` prefix or suffix appended based on the test framework in use, and is placed in the test directory.
- If a test file already exists, it appends the new unit tests to the existing file.

Unit test generation process

The process involves the following steps:

1. **Input inference:** Amazon Q infers the target code, output file, and appropriate test and mock based on the workspace context and configured test framework. The agent identifies where to place the generated tests, either in an existing or new test file, and determines the target code to test. Developers can provide optional instructions to specify their target code and target file name.
2. **Context enrichment:** Amazon Q unit tests agent uses the open project as context, allowing it to generate tests that align with the IDE project's code and dependencies.

3. **Test generation:** The Amazon Q agent infers the appropriate inputs for unit test generation or allows users to provide that information manually. It then generates the unit tests. Throughout this process, the agent provides progress updates in the chat.

 Note

- When working with large projects, the initial project analysis may take some time. During this process, the progress indicator might remain at 0% for an extended period. This is normal behavior as Amazon Q indexes and uploads the project files.
- Unit test generation is performed one file at a time. For multiple files, use the `/test` command separately on each file.

4. **User review:** Amazon Q provides a diff for the final generated tests. Developers can review the generated tests and choose to:
- Accept the suggested tests.
 - Reject the changes.

Usage and considerations

The Amazon Q agent for unit tests is subject to general usage limits based on your subscription tier. These limits are shared across all Amazon Q features.

 Note

Each `/test` command counts toward your usage limit within the free tier.

For information about Amazon Q tiers of service, quotas, and pricing, see [Understanding tiers of service for Amazon Q](#).

You can use the Amazon Q dashboard in the AWS Management Console to track unit test generation metrics such as the number of unit tests generated, accepted, and the acceptance rate. You can also monitor the usage of quota-limited features and access detailed cost reports by feature. To learn about the Amazon Q dashboard, see [the section called “Viewing usage metrics \(dashboard\)”](#).

Handling special cases

Amazon Q handles various special cases and limitations during the unit test generation process to provide a smooth user experience and helpful guidance.

- **Unsupported programming language:** For unsupported languages, Amazon Q provides suggestions in the chat instead of generating test files.
- **Unsupported test framework:** When encountering an unsupported test framework, Amazon Q attempts to generate tests using its best available capabilities.
- **Test requested for non-active file:** Amazon Q only generates tests for the currently active file and instructs the user to open the desired file before retrying.
- **No function or method selected:** When no function or method is detected in the selected lines, Amazon Q guides the user to select lines within the body of the functions or methods for which they want to generate unit tests.
- **Code element not found:** If the specified class, function, method, or test case isn't found, Amazon Q prompts for verification of the element's name and location.
- **Non-public methods detected (Java):** For Java projects, Amazon Q only generates tests for public methods and informs the user if private or protected methods are specified.
- **Monthly usage limit reached:** Upon reaching the monthly quota, Amazon Q notifies the user and provides information on usage limits.

Note

Amazon Q processes one file at a time. If you request tests for multiple files simultaneously, no error will be raised, but no tests will be generated. To generate tests, ensure you're working with one file at a time.

Reviewing code with Amazon Q Developer

Amazon Q Developer can review your codebase for security vulnerabilities and code quality issues to improve the posture of your applications throughout the development cycle. You can initiate a review of an entire codebase, analyzing all files in your local project or workspace, or enable auto reviews that assess your code as you write it.

During a code review, Amazon Q assesses both your custom code and third-party libraries in your code. Before starting a code review, Amazon Q applies filtering to ensure that only relevant code is reviewed. As part of the filtering process, Amazon Q excludes unsupported languages, test code, and open source code.

When Amazon Q discovers a potential security vulnerability or quality issue in your code, it generates a code issue with a description of the issue and a recommended fix. For some issues, you can generate and apply a code fix, which updates your code files in-place.

Reviews are powered by both generative AI and rule-based automatic reasoning. [Amazon Q detectors](#), informed by years of AWS and Amazon.com security best practices, power the rule-based security and quality reviews. As security policies are updated and detectors are added, reviews automatically incorporate new detectors to ensure your code is compliant with the most up-to-date policies.

For information on supported IDEs for this feature, see [Supported IDEs](#). For information on supported languages, see [Language support for code reviews with /review](#).

Topics

- [Types of code issues](#)
- [Quotas](#)
- [Starting a code review with Amazon Q Developer](#)
- [Understanding code issues generated by Amazon Q Developer](#)
- [Addressing code issues with Amazon Q Developer](#)
- [Filtering code issues](#)
- [Code issue severity in Amazon Q Developer code reviews](#)

Types of code issues

Amazon Q reviews your code for the following types of code issues:

- **SAST scanning — Detect security vulnerabilities in your source code.** Amazon Q identifies various security issues, such as resource leaks, SQL injection, and cross-site scripting.
- **Secrets detection — Prevent the exposure of sensitive or confidential information in your code.** Amazon Q reviews your code and text files for secrets such as hardcoded passwords, database connection strings, and usernames. Secrets findings include information about the unprotected secret and how to protect it.

- **laC issues — Evaluate the security posture of your infrastructure files.** Amazon Q can review your infrastructure as code (laC) code files to detect misconfiguration, compliance, and security issues.
- **Code quality issues — Ensure your code is meeting quality, maintainability, and efficiency standards.** Amazon Q generates code issues related to various quality issues, including but not limited to performance, machine learning rules, and AWS best practices.
- **Code deployment risks — Assess risks related to deploying code.** Amazon Q determines if there are any risks to deploying or releasing your code, including application performance and disruption to operations.
- **Software composition analysis (SCA) — Evaluate third-party code.** Amazon Q examines third-party components, libraries, frameworks, and dependencies integrated into your code, ensuring third-party code is secure and up to date.

For a complete list of the detectors Amazon Q uses to review your code, see the [Amazon Q Detector Library](#).

Quotas

Amazon Q security scans maintain the following quotas:

- **Input artifact size** – The maximum size of all the files within an IDE project workspace, including third-party libraries, build JAR files, and temporary files.
- **Source code size** – The maximum size of the source code that Amazon Q scans after filtering all third-party libraries and unsupported files.

The following table describes the quotas maintained for auto scans and full project scans.

Resource	Auto reviews	File or project reviews
Input artifact size	200 KB	500 MB
Source code size	200 KB	50 MB

Starting a code review with Amazon Q Developer

Amazon Q can review your entire codebase, or auto-review your code as you write it.

Before you get started, make sure you've installed Amazon Q in an IDE that supports code reviews. For more information, see [Installing the Amazon Q Developer extension or plugin in your IDE](#).

Topics

- [Review as you code](#)
- [Review a file or project](#)

Review as you code

Note

Amazon Q auto-reviews are only available with a [Amazon Q Developer Pro subscription](#).

Auto-reviews are rule-based reviews powered by [Amazon Q detectors](#). Amazon Q automatically reviews the file you are actively coding in, generating code issues as soon as they are detected in your code. When Amazon Q performs auto reviews, it doesn't generate in-place code fixes.

Auto-reviews are enabled by default when you use Amazon Q. Use the following procedure to pause or resume auto-reviews.

Pause and resume auto-reviews

To pause auto-reviews, complete the following steps.

1. Choose **Amazon Q** from the bottom of the IDE window.

The Amazon Q task bar opens.

2. Choose **Pause Auto-Reviews**. To resume auto-reviews, choose **Resume Auto-Reviews**.

Review a file or project

You can also initiate a review from the chat panel to have Amazon Q review a particular file or project. File and project reviews include both rule-based and generative AI-powered reviews. Code issues generated during file or project reviews can include in-place code fixes.

To start a file or project review, complete the following steps:

JetBrains

1. Open a file or project you want to review in your IDE.
2. Choose the Amazon Q icon to open the chat panel. Enter **/review**.
3. A new chat tab opens. Amazon Q prompts you to choose a project or file to review. If you're reviewing a file, the file you want to review must be open and active in the IDE. If you're reviewing a project, the project must be open in the IDE.
4. Choose the type of review you want to run. Amazon Q begins reviewing the project or file that you currently have open in the IDE.
5. When the review is complete, the **Code Issues** tab opens above the chat panel with a list of the issues Amazon Q found.
6. You can choose an issue to be redirected to the specific area of the file where the vulnerable or low-quality code was detected.

To see more details about the issue, choose the magnifying glass icon to the right of the code issue name in the **Code Issues** tab. A **Code Issue Details** panel opens with information about the issue.

7. To address your code issues, see [Addressing code issues with Amazon Q Developer](#).

Visual Studio Code

1. Open a file or project you want to review in your IDE.
2. Choose the Amazon Q icon to open the chat panel. Enter **/review**.
3. A new chat tab opens. Amazon Q prompts you to choose a project or file to review. If you're reviewing a file, the file you want to review must be open and active in the IDE. If you're reviewing a project, the project must be open in the IDE.
4. Choose the type of review you want to run. Amazon Q begins reviewing the project or file that you currently have open in the IDE.
5. When the review is complete, the **Code Issues** tab opens above the chat panel with a list of the issues Amazon Q found.
6. You can choose an issue to be redirected to the specific area of the file where the vulnerable or low-quality code was detected.

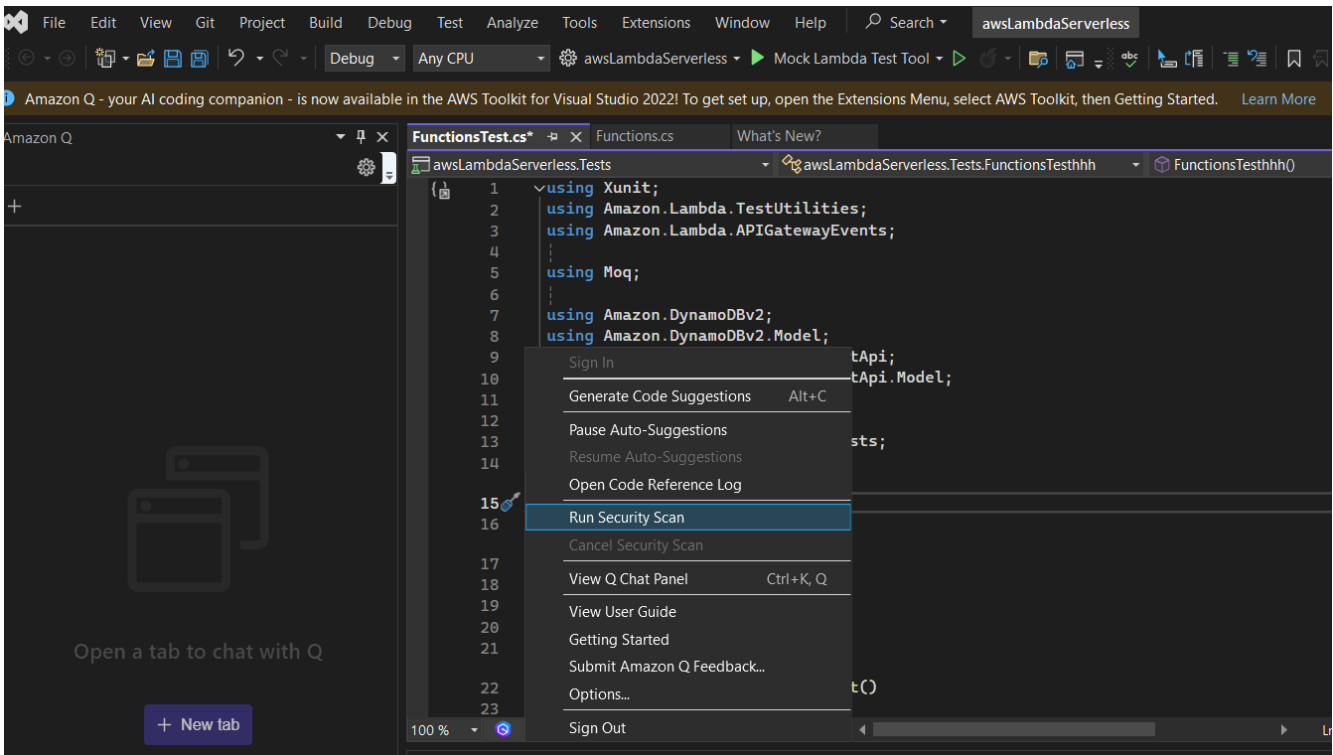
To see more details about the issue, choose the magnifying glass icon to the right of the code issue name in the **Code Issues** tab. A **Code Issue Details** panel opens on the right side of the IDE with information about the issue.

7. To address your code issues, see [Addressing code issues with Amazon Q Developer](#).

Visual Studio

1. Open up a file from the project you want to scan in Visual Studio.
2. Choose the Amazon Q icon at the bottom of your file to open the Amazon Q task bar.
3. From the task bar, choose **Run Security Scan**. Amazon Q begins scanning your project.

In the following image, in Visual Studio, the user chooses the **Amazon Q** icon, prompting a task bar from which the user may choose **Run Security Scan**.



4. The status of your scan is updated in the Visual Studio output pane. You're notified when the scan is complete.

For information about viewing and addressing findings, see [Addressing code issues with Amazon Q Developer](#).

Understanding code issues generated by Amazon Q Developer

Note

The following information about code issues is available in JetBrains IDEs and Visual Studio Code. For information about code issues in Visual Studio, see [the section called “Address issues in Visual Studio”](#).

A code issue generated by an Amazon Q review indicates that a security or quality issue was detected in your code. Code issues include the following details:

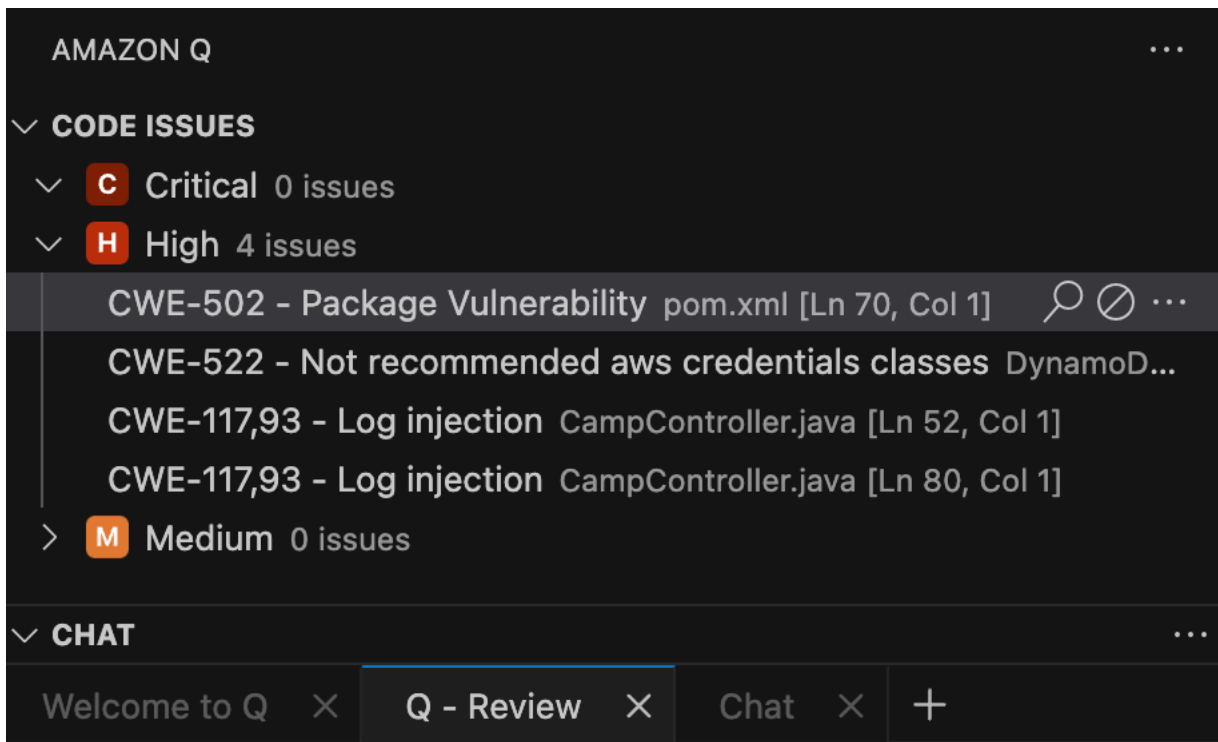
- **Code issue name and severity** – Listed at the top of the panel, the CWEs and name of the issue, in addition to the severity of the issue. For more information about severity, see [the section called “Code issue severity”](#).
- **Code issue description** – Describes the problem with the line or lines of code that generated the code issue.
- **Common Weakness Enumeration (CWE)** – One or more CWE types that apply to the detector that identified the code issue. Choose the CWE link to learn more about it.
- **Directory library** – A link to the detector in the Amazon Q Detector Library that generated the code issue.
- **File path** – The location of the file that contains the code that generated the code issue.

Learn more about a code issue

When Amazon Q detects a code issue, it underlines the affected code in your IDE file, and adds the issue to the **Code Issues** tab. You take the following actions to learn more about the code issue:

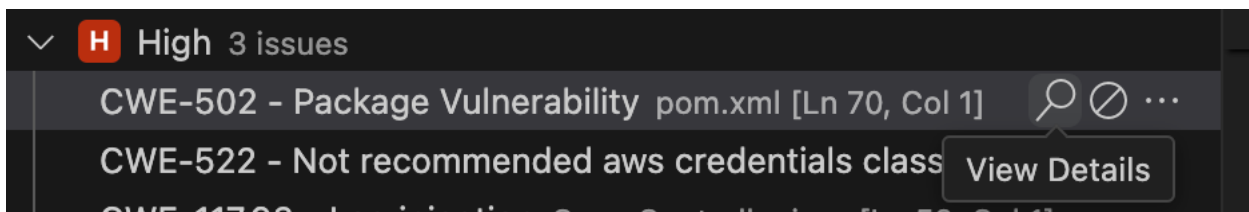
1. To see the code that generated the code issue, choose the issue from the **Code Issues** tab. The file where the code is written opens and the problematic code is underlined.

The following image shows the Code Issues tab in Visual Studio Code.



2. To see code issue details, choose the issue, and then choose the magnifying glass icon to open the **Code Issue Details** panel. You can also hover your cursor over the underlined code to see a popover with the same information.

The following image shows the magnifying glass icon for a code issue in Visual Studio Code.



Addressing code issues with Amazon Q Developer

The topics in this section explain how to address and resolve code issues, and, where applicable, how to ignore issues.

Topics

- [Address code issues in JetBrains and Visual Studio Code](#)
- [Address code issues in Visual Studio](#)

Address code issues in JetBrains and Visual Studio Code

To address a code issue in JetBrains and Visual Studio Code, you will either have the option to generate an in-place fix or generate an explanation that you can use to manually update your code.

You can take the following actions:

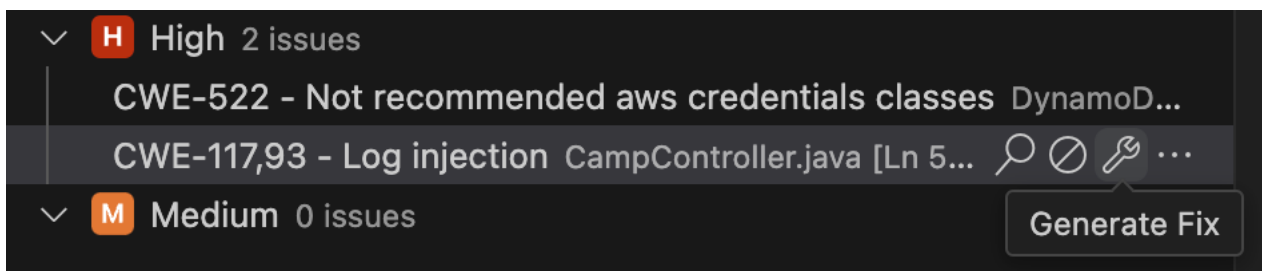
- Generate an in-place code fix
- Explain the issue and get new code
- Ignore the issue, or ignore all similar issues

Generate in place fixes for your file

If you open a code issue and see the **Generate fix** button, complete the following procedure to update your code in-place.

1. In the **Code Issues** tab, choose the code issue you want to address.
2. Choose the wrench glass icon to open the **Code Issue Details** panel, where Amazon Q will start generating a fix.

The following image shows the wrench icon for a code issue in Visual Studio Code.



3. Updated code appears in the **Code Issue Details** panel. You can perform the following actions:
 - a. Below the suggested code, choose **Open diff** to see a diff of the suggested code changes in the file where the code originated.
 - b. Below the suggested code, choose **Copy** to copy the code to your clipboard.
4. To apply the generated fix to your file, choose **Accept fix** at the bottom of the panel to replace the problematic code with the suggested code.
 - a. If the suggested code doesn't satisfy your requirements, you can choose **Regenerate fix** to see an alternate solution.

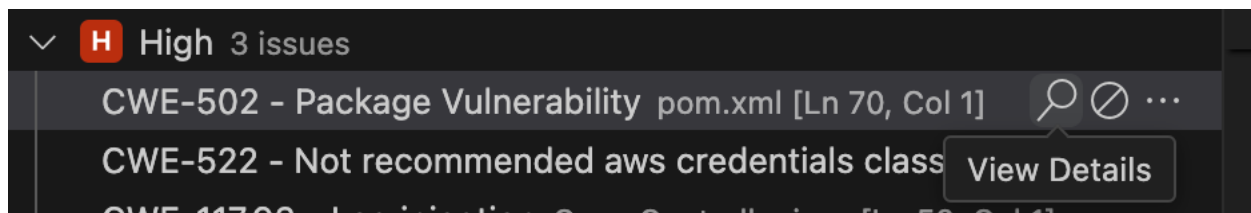
- b. When you apply the fix, the **Code Issue Details** panel closes, and the issue is automatically resolved and removed from the list of issues in the **Code Issues** tab.

Explain the code issue and get new code

If the code issue doesn't include the **Generate fix** button, complete the following procedure to see an in-depth explanation of the issue and steps for resolving it manually in the chat panel.

1. In the **Code Issues** tab, choose the code issue you want to address.
2. Choose the magnifying glass icon to open the **Code Issue Details** panel.

The following image shows the magnifying glass icon for a code issue in Visual Studio Code.



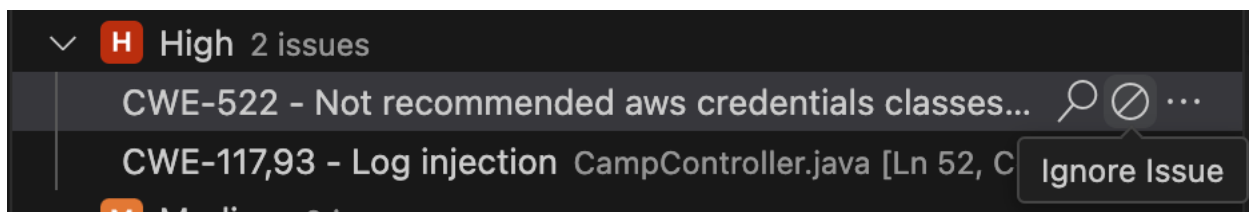
3. At the bottom of the **Code Issue Details** panel, choose **Explain**.
4. The type of code issue and associated code are sent to Amazon Q in the chat panel. Amazon Q provides an explanation of the issue and suggests new code you can use to replace the problematic code.
5. To add the code to your file, you can choose **Insert at cursor** to add the new code where your cursor is in the file. You can also choose **Copy** and paste the code to your file yourself.

Make sure to remove the underlined code to replace it with the new code.

Ignore a code issue

If the code issue isn't applicable, you can choose the ignore icon from the **Code Issues** tab to ignore the issue and remove it from the list of issues in the Code Issues tab.

The following image shows the ignore icon for a code issue in Visual Studio Code.



You can also choose **Ignore** from the **Code Issue Details** panel. The issue will be ignored and removed from the list of issues in the **Code Issues** tab. If you choose **Ignore all** from the Code Issue Details panel, this and other code issues with the same CWE will be ignored.

Address code issues in Visual Studio

To view code issues detected by Amazon Q in Visual Studio, open the Visual Studio **Error List** by expanding the **View** heading in the Visual Studio main menu and choosing **Error List**.

You can use the information in the code issue to update your code. After updating your code, review your code again to see if the issues were addressed.

By default, the Visual Studio **Error List** displays all of the warnings and errors for your code base. To filter your Amazon Q code issues from the Visual Studio **Error List**, create a filter by completing the following procedure.

Note

Code issues are only visible after you've run a code review in which Amazon Q detected issues.

Code issues appear as warnings in Visual Studio. In order to view issues detected by Amazon Q in the **Error List**, the **Warnings** option in the **Error List** heading must be selected.

Filter code issues in the Error List

1. From the Visual Studio main menu, choose view and then **Error List** to open the **Error List** pane.
2. From the **Error List** pane, right-click the header row to open the context menu.
3. From the context menu, expand **Show Columns**, and then select **Tool** in the expanded menu.
4. The **Tool** column is added to your **Error List**.
5. From the **Tool** column header, select the **Filter** icon and choose **Amazon Q** to filter for Amazon Q code issues.

Filtering code issues

Note

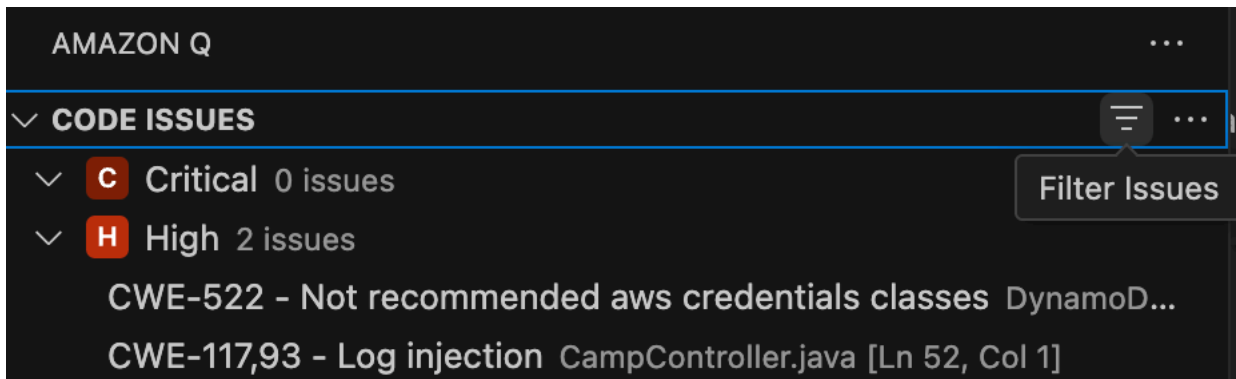
You can only filter code issues in JetBrains IDEs and Visual Studio Code.

When you filter code issues, only issues that meet the selected criteria are generated during code reviews. You can filter the issues based on their severity.

To filter code issues, complete the following procedure:

1. From the **Code Issues** tab, choose the filter icon.

The following image shows the filter icon in the Code Issues tab in Visual Studio Code.



2. The **Filter Issues** panel opens.

Select or deselect the boxes next to the severity types you want to filter for, and then choose **OK**. Only the issues you select will appear in the **Code Issues** tab.

Code issue severity in Amazon Q Developer code reviews

Amazon Q defines the severity of the code issues detected in your code so you can prioritize what issues to address and track the security posture of your application. The following sections explain what methods are used to determine the severity of code issues and what each level of severity means.

How severity is calculated

The severity of a code issue is determined by the detector that generated the issue. Detectors in the [Amazon Q Detector Library](#) are each assigned a severity using the Common Vulnerability Scoring System ([CVSS](#)). The CVSS considers how the finding can be exploited in its context (for example, can it be done over internet, or is physical access required) and what level of access can be obtained.

The following table outlines how severity is determined based on the level of access and level of effort required for a bad actor to successfully attack a system.

	Level of Effort			
	Not exploitable	Requires access to system	Internet with high LoE	Over internet
Level of access				
Full control of system or its output	N/A	High	Critical	Critical
Access to sensitive information	N/A	Medium	High	High
Can crash or slow down the system	Low	Low	Medium	Medium
Provides additional security	Info	Info	Low	Low
Best practice	Info	N/A	N/A	N/A

Severity definitions

The severity levels are defined as follows.

Critical – The code issue should be addressed immediately to avoid it escalating.

Critical code issues suggest that an attacker can gain control of the system or modify its behavior with moderate effort. It is recommended that you treat critical findings with the utmost urgency. You also should consider the criticality of the resource.

High – The code issue must be addressed as a near-term priority.

High severity code issues suggest that an attacker can gain control of the system or modify its behavior with high effort. It is recommended that you treat a high severity finding as a near-term priority and that you take immediate remediation steps. You also should consider the criticality of the resource.

Medium – The code issue should be addressed as a midterm priority.

Medium severity findings can lead to crash, unresponsiveness, or unavailability of the system. It is recommended that you investigate the implicated code at your earliest convenience. You also should consider the criticality of the resource.

Low – The code issue does not require action on its own.

Low severity findings suggest programming errors or anti-patterns. You do not need to take immediate action on low severity findings, but they can provide context when you correlate them with other issues.

Informational – No recommended action.

Informational findings include suggestions for quality or readability improvements, or alternative API operations. No immediate action is necessary.

Generating documentation with Amazon Q Developer

Note

You can ask to generate documentation directly in the chat. If you use `/doc`, your request will be redirected to the chat. Try asking, **generate documentation for my application**.

Amazon Q Developer helps you understand your code and keep documentation up to date by generating READMEs for your code.

Amazon Q can produce new documentation and update existing documentation in your codebase. By analyzing your project, code objects, and dependencies within your codebase, Amazon Q can document complex coding concepts and update documentation based on new code changes.

To generate documents, you open a project or workspace in your IDE and enter `/doc` in the chat. After you choose the type of documentation update you want to work on, Amazon Q will analyze your code, generate documentation, and provide a diff with the changes it made. You can accept the proposed changes, or provide feedback with additional changes you want Amazon Q to make.

For information on supported IDEs for this feature, see [Supported IDEs](#). For information on supported languages, see [Supported languages for Amazon Q Developer in the IDE](#).

Topics

- [Use cases](#)
- [Supported file types](#)
- [Quotas](#)
- [Generating and updating READMEs with Amazon Q Developer](#)
- [Best practices for documentation generation with Amazon Q Developer](#)

Use cases

Amazon Q can perform the following tasks from the chat panel in the IDE.

- **Create new documentation** – Amazon Q can create new READMEs for your project based on the code in the selected folder. If you already have a README and choose to create a new README, Amazon Q will overwrite your existing README, not update it. You still have the option to review the new content before Amazon Q overwrites your original README.
- **Create diagrams** – If your project folder contains infrastructure-as-code files (for example, AWS CDK files, AWS CloudFormation templates, Terraform configuration files, and so on), Amazon Q will create infrastructure diagrams that will be output to `infra.svg` files in the docs folder and referenced in the README. If you're using Visual Studio Code, you might need to install the **SVG Preview** (or similar) extension to view the diagrams within your IDE.
- **Make specific updates** – You can describe the changes you'd like Amazon Q to make to your README in natural language. You can do so by updating an existing README and then choosing the option to make a specific change. After Amazon Q generates documentation, you have the

option to describe additional changes you want it to make. You can request updates like adding a section, removing an existing section, or elaborating on an existing section.

- **Review new code and suggest documentation updates** – After you make code changes, Amazon Q can review the new code and suggest associated updates to your README.

Supported file types

Amazon Q reviews your source code and configuration files, including but not limited to the following files types, when generating documentation:

- .template files
- requirements.txt
- package.json
- tsconfig.json
- Dockerfile
- .git/config
- LICENSE
- LICENSE.md
- CONTRIBUTING
- CONTRIBUTING.md

Amazon Q filters out files or folders defined in a `.gitignore` file. If you want to exclude any files or folders from being reviewed for documentation generation, you can include them in a `.gitignore` file in your project or workspace.

Quotas

Documentation generation with Amazon Q maintains the following quotas:

- **README size** – The maximum size of a README that Amazon Q can review or generate. If an existing README exceeds this quota, Amazon Q isn't able to update the existing documentation. If a generated README exceeds this quota, Amazon Q isn't able to return the updated README.
- **Code project size** – The maximum size of the project or workspace that Amazon Q can use to generate documentation.

Even if you choose a smaller folder to generate documentation for, the parent project or workspace must be within this quota.

- **Document generations per task** – The number of times you can provide feedback to make changes to generated documentation, including the initial document generation. This quota is reset every time you start a new documentation task.

Amazon Q Developer Agent for software development Quotas

Resource	Quota
README size	30 KB
Code project size	200 MB uncompressed
	50 MB compressed
Document generations per task	10

Generating and updating READMEs with Amazon Q Developer

Note

You can ask to generate documentation directly in the chat. If you use `/doc`, your request will be redirected to the chat. Try asking, **generate documentation for my application**.

Before you get started, make sure you've installed Amazon Q in an IDE that supports documentation generation. For more information, see [the section called “Installing Amazon Q”](#).

To generate or update READMEs with Amazon Q in the IDE, complete the following procedure:

1. Open your IDE where you have the Amazon Q extension installed.
2. Choose the Amazon Q icon to open the chat panel. Enter `/doc`.
3. A new chat tab opens. Amazon Q prompts you to create a new README for your code or to update existing an README.

4. Choose which type of documentation task you want to work on.

If you update an existing README, choose whether you want Amazon Q to update your README with recent code changes, or if you want to provide specific changes Amazon Q should make to your README.

5. Amazon Q prompts you to confirm that you want to generate documentation for the current open folder in your IDE, or you can choose a new folder.

If you chose to make specific changes to your README, describe in detail what updates you want Amazon Q to make. For ideas on what to include in your description, see [Best practices](#).

Amazon Q begins generating your documentation. If your project folder contains infrastructure-as-code files, Amazon Q will create infrastructure diagrams that will be output to `infra.svg` files in the docs folder and referenced in the README.

6. After Amazon Q has generated your documents, it provides a diff with any changes. You can review the diffs, and then choose **Accept** in the chat to update your README in place.

If you want to make changes to the documentation generated, choose **Make changes**. You can then describe what you'd like Amazon Q to change and it will generate an updated README.

Best practices for documentation generation with Amazon Q Developer

To improve results from documentation generation with Amazon Q, follow these best practices:

- Amazon Q can generate documentation for any amount of code within the code project size quota, however very large repositories will take longer to generate documentation for and might be less specific. If you have a large repository, consider requesting documentation for a subset of code or a single file for more specific results.
- The quality of documentation Amazon Q generates can be improved if your code is well-commented and organized, has good naming conventions for programming entities, and follows other standard coding conventions.
- Amazon Q produces the highest quality documentation for code written in one or more of the supported languages. Code written in other languages might not be reflected in generated documentation, or could produce lower quality documentation. For more information on languages, see [Supported languages for Amazon Q Developer in the IDE](#).
- If you want to request specific changes to a README in natural language, you can do so by choosing to update an existing README and then choosing the option to make a specific change.

After Amazon Q generates documentation, you can also choose to make changes and describe what updates you want Amazon Q to make.

- When describing the updates you want Amazon Q to make to your documentation, consider the following:
 - The description of changes should include the sections you want to modify, the content you want to add or remove, and specific issues that need correcting.
 - Changes should relate to how project functionality is reflected in the README.
 - Content you refer to should be available in your codebase.
- Amazon Q doesn't have access to private or internal platforms. Amazon Q also might not have knowledge of third party tools or software or specialized tooling in your code. If your code includes resources Amazon Q can't access or isn't familiar with, that code won't be documented. You can manually edit the README to include content Amazon Q isn't able to generate.

Supported languages for Amazon Q Developer in the IDE

You can use the following features of Amazon Q Developer in the IDE with any programming language:

- [Chat](#)
- [Inline chat](#)
- [Feature development - /dev](#)
- [Documentation generation - /doc](#)

The quality of outputs while using these features varies based on the popularity of the language.

For the remaining features of Amazon Q in the IDE, the supported languages are listed in the following sections.

Language support for inline suggestions

Amazon Q supports [inline code suggestions](#) for multiple programming languages. The accuracy and quality of the code generation for a programming language depends on the size and quality of the training data.

In terms of the quality of the training data, the programming languages with the most support are:

- C
- C++
- C#
- Dart
- Go
- Java
- JavaScript
- Kotlin
- Lua
- PHP
- PowerShell
- Python
- R
- Ruby
- Rust
- Scala
- Shell
- SQL
- Swift
- SystemVerilog
- TypeScript

The Infrastructure as Code (IaC) languages with the most support are:

- CDK (Typescript, Python)
- HCL (Terraform)
- JSON
- YAML

Language support for transformations

The supported languages for transformation depend on the environment where you are transforming code.

In JetBrains IDEs and Visual Studio Code, Amazon Q can transform code in the following languages:

- [Java](#)
- [Embedded SQL conversion for Oracle to PostgreSQL database migration](#)

In Visual Studio, Amazon Q can transform code in the following languages:

- [C# in .NET applications](#)

For more information about supported languages and other prerequisites for transformation, see the topic for the type of transformation you're performing.

Language and framework support for unit test generation with /test

Amazon Q can [generate unit tests](#) for the following languages and test frameworks:

- Python
 - Supported test frameworks: Pytest, unittest
- Java
 - Supported test frameworks: JUnit (JUnit 4 and 5, JUnit Jupiter), Mockito

Language support for code reviews with /review

Amazon Q can create [code reviews](#) and provide automatic code fixes for files and projects written in the following languages:

- Java - Java 17 and earlier
- JavaScript - ECMAScript 2021 and earlier
- Python - Python 3.11 and earlier, within the Python 3 series
- C# - All versions (.NET 6.0 and later recommended)

- TypeScript - All versions
- Ruby - Ruby 2.7 and 3.2
- Go - Go 1.18
- C - C11 and earlier
- C++ - C++17 and earlier
- PHP - PHP 8.2 and earlier
- Kotlin - Kotlin 2.0.0 and earlier
- Scala - Scala 3.2.2 and earlier
- JSX - React 17 and earlier
- Infrastructure as Code (IaC) languages
 - AWS CloudFormation - 2010-09-09
 - Terraform - 1.6.2 and earlier
 - AWS CDK - TypeScript and Python

Language support for customizations

Amazon Q supports [customizations](#) for the following languages, and uses the listed file types to create customizations:

- Bash/Shell (.sh, .zsh, .bash)
- C (.c, .h)
- C# (.cs)
- C++ (.cpp, .hpp, .h)
- Dart (.dart)
- Go (.go)
- HCL (.hcl)
- HTML (.html, .htm)
- Java (.java)
- JavaScript (.js, .jsx)
- JSON (.json)
- Kotlin (.kt, .kts)
- Markdown (.md, .mdx)

- PHP (.php)
- Powershell (.ps1, .psm1, .psd1)
- Python (.py)
- reStructuredText (.rst)
- Ruby (.rb)
- Rust (.rs)
- Scala (.scala)
- Terraform (.tf, .tfvars)
- Text (.txt)
- TypeScript (.ts, .tsx)
- YAML (.yaml, .yml)

Using Amazon Q Developer on the command line

You can use Amazon Q Developer to enable completions for hundreds of popular CLIs like `git`, `npm`, `docker`, and `aws`. Amazon Q for command line integrates contextual information, providing Amazon Q with an enhanced understanding of your use case, enabling it to provide relevant and context-aware responses. As you begin typing, Amazon Q populates contextually relevant subcommands, options, and arguments.

You can install Amazon Q for command line on macOS and specific Linux environments, including `ApplImage` and `Ubuntu` packages, which provides features such as autocompletion, Amazon Q chat, and inline `zsh` completion. You can work with Amazon Q CLI to do the following:

- Command line interface to chat through natural language conversations, questions, and responses within your terminal environment.
- Translate natural language instructions to executable shell code snippets.
- Inline suggestions as you type in your command prompt, with completions to popular CLIs.

For more information, see [Supported command line environments](#) and [Installing Amazon Q for command line](#).

Topics

- [Supported command line environments](#)
- [Installing Amazon Q for command line](#)
- [Using chat on the command line](#)
- [Using the editor command in the CLI](#)
- [Using Git-aware file selection](#)
- [Context management and profiles](#)
- [Using context hooks](#)
- [Configuring Amazon Q settings](#)
- [Amazon Q CLI command reference](#)
- [Command line assistance features](#)
- [Contributing to Amazon Q for command line](#)

Supported command line environments

The autocomplete feature of Amazon Q for command line is supported on macOS and specific Linux environments, including Appliance and Ubuntu.

The following environments are supported for both macOS and Linux:

- Shells: bash, zsh, fish
- CLIs: Over 500 of the most popular CLIs such as git, aws, docker, npm, and yarn

macOS

Amazon Q for command line integrates with the following environments for macOS:

- Terminal emulators: iTerm2, macOS terminal, Hyper, Alacritty, Kitty, WezTerm. To see the full list of terminals, see the Amazon Q for command line [open source code](#).
- IDEs: VS Code terminal, JetBrains terminals (except Fleet)
- macOS 10.15 (Catalina) or later
- Architecture: x86_64 (Intel) or arm64 (Apple Silicon)

Linux

Amazon Q for command line integrates with the following environments for Linux:

- Platform requirements: Amazon Q for command line for Linux supports Ubuntu 22 and 24, and compatibility for a subset of features on Ubuntu 20. It may otherwise work with GNOME v42+ or environments where the display server is Xorg and the input method framework is IBus.
- Terminal emulators: GnomeConsole, GnomeTerminal, Kitty, Hyper, WezTerm, Alacritty, Tilix, Terminator
- Architecture: x86_64 or aarch64
- Note: Desktop functionality is currently only available on x86_64 architecture

Natural languages

Amazon Q Developer provides multi-natural-language support for the Amazon Q Developer command-line interface (CLI). Some of the supported natural languages include Mandarin, French, German, Italian, Japanese, Spanish, Korean, Hindi, and Portuguese, with more languages available.

To utilize this functionality, you can initiate a conversation with Amazon Q Developer using your preferred natural language. Amazon Q automatically detects the language and provides responses in the appropriate language.

Installing Amazon Q for command line

You can install Amazon Q for command line for macOS by initiating a file download for the Amazon Q application. For more information, see [Supported command line environments](#).

There are two modalities to consider when installing Amazon Q for command line. Minimal installation only distributes the binaries needed on Linux for Amazon Q chat and for the autocomplete feature to function over SSH (q and qterm). Full distribution contains the desktop application and requires the autocomplete feature to be used. If you want to only use the Amazon Q chat, consider that the minimal distribution also ships and installs qterm to your shell. You can use qterm for zsh to support inline completions and a full version isn't required. For more information, see [Installing with a zip file](#).

Note

For information about using the Amazon Q CLI with Windows, see [this blog post](#) on dev.to.

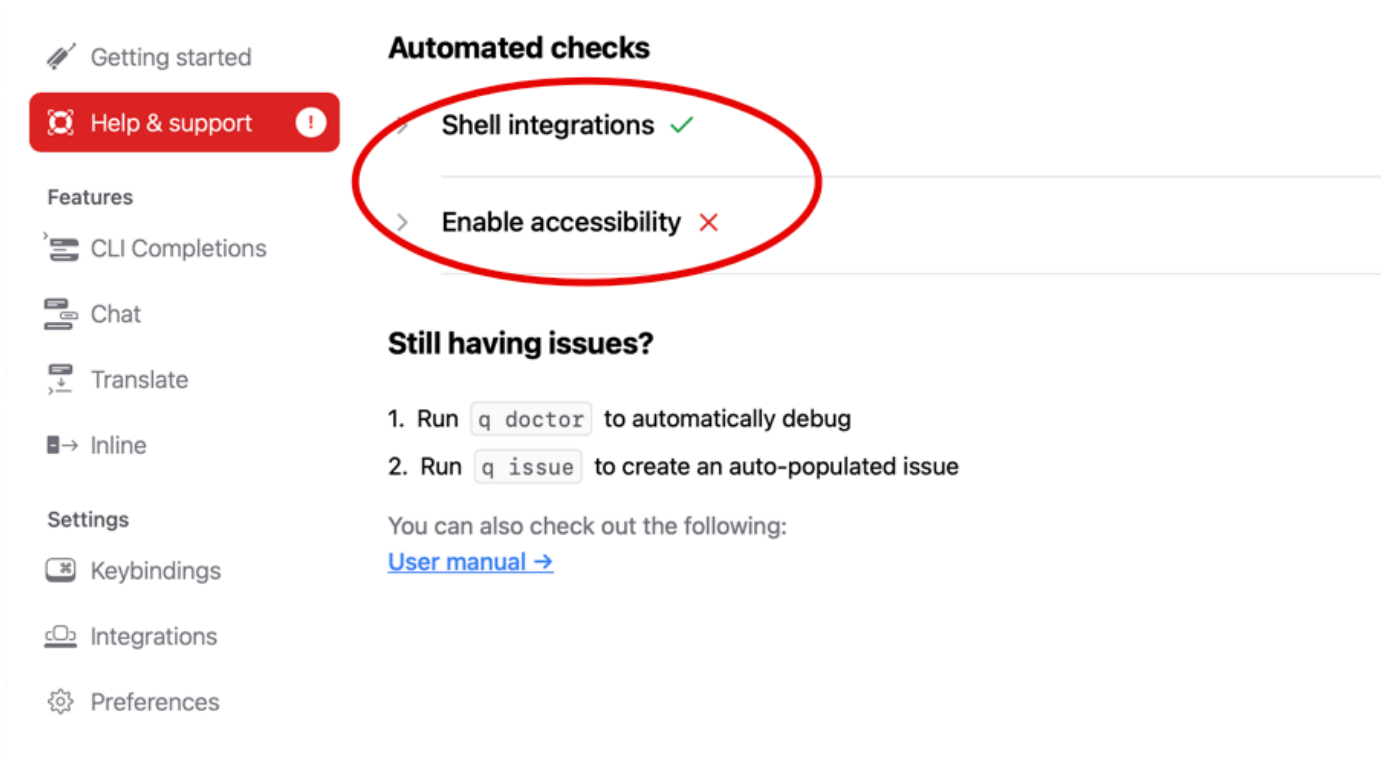
macOS

You can install Amazon Q for command line for macOS by downloading the application or by using Homebrew.

After installing Amazon Q for command line for macOS, you can enable SSH integration to be able to use autocomplete for over 500 command line tools. For more information, see [Local macOS Integration](#).

To install Amazon Q for command line for macOS

1. [Download Amazon Q for command line for macOS.](#)
2. (Optional) Verify the downloaded file for Amazon Q for command line on macOS. For more information, see [To verify the download \(optional\).](#)
3. Double-click on the downloaded .dmg file, and drag the app into your applications folder.
4. In your applications folder, double-click on Amazon Q. The GUI will open.
5. Enable the shell integrations. This will allow you to run Amazon Q from the shell, and will also allow Amazon Q to help you with shell command auto-completions.
6. Authenticate with [Builder ID](#), or with [IAM Identity Center](#) using the start URL given to you by your account administrator.
7. Follow the instructions to install the shell integrations, and to grant macOS accessibility permissions.



Linux Appliance

Warning

This installation method requires a GUI. If you are installing on Linux without a GUI, see [Installing with a zip file](#).

You can install Amazon Q for command line for Linux using the AppImage format, which is a portable format that works on most Linux distributions without requiring installation.

To install Amazon Q for command line for Linux using AppImage

1. [Download Amazon Q for command line for Linux AppImage.](#)

2. Make the AppImage executable:

```
chmod +x amazon-q.appimage
```

3. Run the AppImage:

```
./amazon-q.appimage
```

4. Authenticate with [Builder ID](#), or with [IAM Identity Center](#) using the start URL given to you by your account administrator.

Ubuntu

Warning

This installation method requires a GUI. If you are installing on Linux without a GUI, see [Installing with a zip file](#).

You can install Amazon Q for command line for Ubuntu using the .deb package.

To install Amazon Q for command line for Ubuntu

1. [Download Amazon Q for command line for Ubuntu.](#)

```
wget https://desktop-release.q.us-east-1.amazonaws.com/latest/amazon-q.deb
```

2. Install the package:

```
sudo apt-get install -f  
sudo dpkg -i amazon-q.deb
```

3. Launch Amazon Q for command line:

```
q
```

4. Authenticate with [Builder ID](#), or with [IAM Identity Center](#) using the start URL given to you by your account administrator.

Installing with a zip file

The setup for Linux integration with the Amazon Q Developer CLI requires installing the appropriate file for your system, verifying the file, and installing the program.

Install and update requirements

- You must be able to extract or "unzip" the downloaded package. If your operating system doesn't have the built-in unzip command, use an equivalent.
- Amazon Q for command line requires glibc 2.34 or newer, which is included by default in most major Linux distributions released since 2021.
- For older distributions with glibc versions earlier than 2.34, use the special musl-based version (indicated by `-musl.zip` in the filename).
- Amazon Q for command line is supported on 64-bit x86_64 and ARM aarch64 versions of recent distributions of Fedora, Ubuntu, and Amazon Linux 2023.

Checking your glibc version

To determine which version you need, check your glibc version:

```
ldd --version
```

If the version is 2.34 or newer, use the standard version. If it's older, use the musl version.

To download the installation file

Choose the appropriate download command based on your system architecture and glibc version:

Standard version (glibc 2.34+)

Linux x86-64

```
curl --proto '=https' --tlsv1.2 -sSf "https://desktop-release.q.us-east-1.amazonaws.com/latest/q-x86_64-linux.zip" -o "q.zip"
```

Linux ARM (aarch64)

```
curl --proto '=https' --tlsv1.2 -sSf "https://desktop-release.q.us-east-1.amazonaws.com/latest/q-aarch64-linux.zip" -o "q.zip"
```

Musl version (for glibc < 2.34)

Linux x86-64 with musl

```
curl --proto '=https' --tlsv1.2 -sSf "https://desktop-release.q.us-east-1.amazonaws.com/latest/q-x86_64-linux-musl.zip" -o "q.zip"
```

Linux ARM (aarch64) with musl

```
curl --proto '=https' --tlsv1.2 -sSf "https://desktop-release.q.us-east-1.amazonaws.com/latest/q-aarch64-linux-musl.zip" -o "q.zip"
```

To verify the download (optional)

If you chose to manually download the Amazon Q command line installer package .zip, you can verify the signatures using the GnuPG tool:

1. Download and install the gpg command using your package manager. For more information, see the [GnuPG documentation](#).
2. Create a public key file by creating a text file, and then paste in the following text:

```
-----BEGIN PGP PUBLIC KEY BLOCK-----
```

```
mDMEZig60RYJKwYBBAHaRw8BAQdAy/+G05U5/E0A72WlcD4WkYn5SInri8pc4Z6D
BKNNGOm0JEftYXpviBRIENMSSBUZWFtIDxxLWNsaUBhbWF6b24uY29tPoiZBBMW
CgBBFiEEmvYEF+gnQskUPgPsUNx6jcJMVmcFAmYo0tECGwMFCQPCZwAFCwkIBwIC
IgIGFQoJCA5CBBYCAwECHgcCF4AACgkQUNx6jcJMVmef5QD/QWWEgg/c0nbDnp68
SJXuFkwiNw1H2rPw9ZRIQMnfAS0A/0V6ZsGB4k0y1Bfc7CNfzRFGtovdBBgHqA6P
zQ/PNscGuDgEZig60RIKwYBBAGXVQEFAQEHC4q1eONMBCq3+wJwbZSr0vbuRba
```

```
D1xr4wUPn4Avn4AnAwEIB4h+BBgWCgAmFiEEmvYEF+gnQskUPgPsUNx6jcJMVmcF
AmYo0tECGwwFCQPCZwAACgkQUNx6jcJMVmchMgEA6l3RveCM0YHAGQaSFMkguoAo
vK6Fg0kDawgP0NPIP2oA/jIA04gsAntuQgM0sPunEdDeji2t+AhV02+DQIsXZpoB
=f8yY
-----END PGP PUBLIC KEY BLOCK-----
```

3. Import the Amazon Q command line public key with the following command, substituting *public-key-file-name* with the file name of the public key you created:

```
gpg --import public-key-file-name
```

```
gpg: directory '/home/username/.gnupg' created
gpg: keybox '/home/username/.gnupg/pubring.kbx' created
gpg: /home/username/.gnupg/trustdb.gpg: trustdb created
gpg: key 50DC7A8DC24C5667: public key "Amazon Q command line Team <q-command
line@amazon.com>" imported
gpg: Total number processed: 1
gpg:             imported: 1
```

4. Download the Amazon Q command line signature file for the package you downloaded. It has the same path and name as the .zip file it corresponds to, but has the extension .sig.

Standard version (glibc 2.34+):

Linux x86-64:

```
curl --proto '=https' --tlsv1.2 -sSf "https://desktop-release.q.us-
east-1.amazonaws.com/latest/q-x86_64-linux.zip.sig" -o "q.zip.sig"
```

Linux ARM (aarch64):

```
curl --proto '=https' --tlsv1.2 -sSf "https://desktop-release.q.us-
east-1.amazonaws.com/latest/q-aarch64-linux.zip.sig" -o "q.zip.sig"
```

Musl version (for glibc < 2.34):

Linux x86-64 with musl:

```
curl --proto '=https' --tlsv1.2 -sSf "https://desktop-release.q.us-
east-1.amazonaws.com/latest/q-x86_64-linux-musl.zip.sig" -o "q.zip.sig"
```

Linux ARM (aarch64) with musl:

```
curl --proto '=https' --tlsv1.2 -sSf "https://desktop-release.q.us-east-1.amazonaws.com/latest/q-aarch64-linux-musl.zip.sig" -o "q.zip.sig"
```

5. Verify the signature, passing both the downloaded .sig and .zip file names as parameters to the gpg command:

```
gpg --verify q.zip.sig q.zip
```

The output should look similar to the following:

```
gpg: Signature made Wed 24 Apr 2024 12:08:49 AM UTC
gpg:                using EDDSA key 9AF60417E82742C9143E03EC50DC7A8DC24C566
gpg: Good signature from "Amazon Q command line Team <q-command
line@amazon.com>" [unknown]
gpg: WARNING: This key is not certified with a trusted signature!
gpg:                There is no indication that the signature belongs to the owner.
Primary key fingerprint: 9AF6 0417 E827 42C9 143E 03EC 50DC 7A8D C24C 5667
```

Note

The warning in the output is expected and doesn't indicate a problem. It occurs because there isn't a chain of trust between your personal PGP key (if you have one) and the Amazon Q for command line PGP key. For more information, see [Web of trust](#).

To install Amazon Q CLI

1. Unzip the installer:

```
unzip q.zip
```

2. Run the install program:

```
./q/install.sh
```

By default, the files are installed to `~/local/bin`.

Setting up SSH for remote use

After installing Amazon Q CLI, you can configure remote Linux integration to enable command line functionality with Amazon Q on remote machines.

Local macOS Integration

To enable SSH integration from your local macOS machine:

1. Open your terminal or command prompt.
2. Enable the local SSH integrations:

```
q integrations install ssh
```

Remote Linux Integration

To configure the SSH integration on your remote Linux machine:

1. Edit your SSH server configuration:

```
sudo -e /etc/ssh/sshd_config
```

2. Add the following lines to the end of the config file:

```
AcceptEnv Q_SET_PARENT  
AllowStreamLocalForwarding yes
```

3. Restart the SSH service:

```
sudo systemctl restart sshd
```

4. Disconnect from the SSH session and reconnect.
5. After reconnecting, log in to Amazon Q:

```
q login
```

6. Verify the installation:

```
q doctor
```

Known limitations

If the Amazon Q desktop client quits while connected to a remote machine with SSH, an error message may print repeatedly:

```
connect to /var/folders/tg/u1vx4xfmvqav0oxfa4zfknaixwmb5br/T/cwrun/remote.sock port -2
failed: Connection refused
```

To stop the error, either exit the SSH session and reconnect or restart the Amazon Q desktop client.

Troubleshooting

If you encounter issues with the SSH integration:

1. Run **q doctor** to identify and fix common issues
2. Ensure both local and remote configurations are correct
3. Check that your SSH server is properly configured to accept the required environment variables
4. Verify that you're using the correct version (standard or musl) for your system

Uninstalling Amazon Q for command line

You can uninstall Amazon Q for command line if you no longer need it.

To uninstall Amazon Q for command line on macOS

1. Open the Applications folder in Finder.
2. Locate the Amazon Q application.
3. Drag the application to the Trash, or right-click and select "Move to Trash".
4. Empty the Trash to complete the uninstallation.

To uninstall Amazon Q for command line on Ubuntu

1. Use the apt package manager to remove the package:

```
sudo apt-get remove amazon-q
```

2. Remove any remaining configuration files:

```
sudo apt-get purge amazon-q
```

Debugging Amazon Q Developer for the command line

If you're having a problem with Amazon Q Developer for command line, run `q doctor` to identify and fix common issues.

Expected output

```
$ q doctor

# Everything looks good!

Amazon Q still not working? Run q issue to let us know!
```

If your output doesn't look like the expected output, follow the prompts to resolve your issue. If it's still not working, use `q issue` to report the bug.

Common issues

Here are some common issues you might encounter when using Amazon Q for command line:

Authentication failures

If you're having trouble authenticating, try running `q login` to re-authenticate.

Autocomplete not working

Ensure your shell integration is properly installed by running `q doctor`.

SSH integration issues

Verify that your SSH server is properly configured to accept the required environment variables.

Troubleshooting steps

Follow these steps to troubleshoot issues with Amazon Q for command line:

1. Run `q doctor` to identify and fix common issues.

- 2. Check your internet connection.
- 3. Verify that you're using a supported environment. For more information, see [Supported command line environments](#) .
- 4. Try reinstalling Amazon Q for command line.
- 5. If the issue persists, report it using `q issue`.

Using chat on the command line

The Amazon Q Developer CLI provides an interactive chat experience directly in your terminal. You can ask questions, get help with AWS services, troubleshoot issues, and generate code snippets without leaving your command line environment.

Starting a chat session

To start a chat session with Amazon Q, use the chat subcommand:

```
$ q chat
```

This opens an interactive chat session where you can type questions or commands.

To exit the chat session, type `/quit` or press **Ctrl+D**.

Chat commands

Amazon Q supports several commands that you can use during a chat session. These commands start with a forward slash (/).

Chat commands

Command	Description
<code>/load</code>	Import conversation state from a JSON file
<code>/save</code>	Export conversation state to a JSON file
<code>/prompts</code>	Lists all available prompts
<code>/usage</code>	Displays an estimate of the context window usage

Command	Description
!	Executes a shell command from inside an Amazon Q CLI session
ctrl-j	Allows multi-line input
ctrl-k	Fuzzy search
/editor	Uses the configured editor to compose prompts
/help	Displays a list of available commands
/issue	Reports an issue or make a feature request
/model	Displays available models and allows you to select one for your current chat session
/quit	Exits the chat session
/clear	Clears the chat history from the current session
/reset	Resets the conversation context, clearing all previous messages
/tools	Manages tools and permissions for tools that Amazon Q can use
/acceptall	Deprecated. Disables confirmation prompts when Amazon Q performs actions on your system
/profile	Manages Q profiles for Q Developer commands
/context	Manages the context information available to Amazon Q
/compact	Compacts the conversation history and shows the output of the compacted conversation history

Managing tool permissions

You can use the `/tools` command to manage permissions for tools that Amazon Q uses to perform actions on your system. This provides granular control over what actions Amazon Q can perform.

Tools commands

Command	Description
help	Shows help related to tools.
trust	Trusts a specific tool for the session.
untrust	Reverts a tool to per-request confirmation.
trust-all	Trusts all tools (equivalent to deprecated /acceptall).
reset	Resets all tools to default permission levels.

To view the current permission settings for all tools:

```
$ q chat  
Amazon Q> /tools
```

This displays a list of all available tools and their current permission status (trusted or per-request).

Tool permissions have two possible states:

- *Trusted*: Amazon Q can use the tool without asking for confirmation each time.
- *Per-request*: Amazon Q must ask for your confirmation each time before using the tool.

To trust or untrust a specific tool for the current session:

```
Amazon Q> /tools trust fs_read  
Amazon Q> /tools untrust execute_bash
```

```

> /tools untrust fs_read

Tool 'fs_read' set to per-request confirmation.

> /tools trust fs_write

Tool 'fs_write' is now trusted. I will not ask for confirmation before running this tool.

> /tools

Current tool permissions:
- execute_bash      Read-only commands [Default]
- fs_read           Per-request
- report_issue      Trusted [Default]
- use_aws           Read-only commands [Default]
- fs_write          Trusted

```

You can also trust all tools at once with `/tools trust-all` (equivalent to the deprecated `/acceptall` command):

```
Amazon Q> /tools trust-all
```

Warning

Using `/tools trust-all` carries risks. For more information, see [Understanding security risks](#).

The following image shows the status of the CLI tools when they are all in their default trust status.

```

> /tools Thank you so much Michael

Current tool permissions:
- execute_bash      Write-only commands [Default]
- report_issue      Trusted [Default]
- use_aws           Write-only commands [Default]
- fs_read           Trusted [Default]
- fs_write          Per-request [Default]

```

The following tools are natively available for Amazon Q to use:

Available tools

Tool	Description
<code>fs_read</code>	Reads files and directories on your system.
<code>fs_write</code>	Creates and modifies files on your system.
<code>execute_bash</code>	Executes bash commands on your system.
<code>use_aws</code>	Makes AWS CLI calls to interact with AWS services.
<code>report_issue</code>	Opens a browser to report an issue with the chat to AWS.

When Amazon Q attempts to use a tool that doesn't have explicit permission, it will ask for your approval before proceeding. You can choose to allow or deny the action, or trust the tool for the remainder of your session.

Each tool has a default trust behavior. `fs_read` is the only tool that is trusted by default.

Here are some examples of when to use different permission levels:

- *Trust `fs_read`*: When you want Amazon Q to read files without confirmation, such as when exploring a codebase.
- *Trust `fs_write`*: When you're actively working on a project and want Amazon Q to help you create or modify files.
- *Untrust `execute_bash`*: When working in sensitive environments where you want to review all commands before execution.
- *Untrust `use_aws`*: When working with production AWS resources to prevent unintended changes.

When Amazon Q uses a tool, it shows you the trust permission being used.

```
[Tool Request] Read from filesystem
Reading file: /Volumes/workplace/amazon-q-developer-cli/crates/q_cli/.gitignore, all lines
Allow this action? Use 't' to trust this tool for the session. [y/n/t]:
```

You can also specify trust permissions as part of starting a q chat session.

```
Options:
-a, --accept-all      (Deprecated, use --trust-all-tools) Enabling this flag allows the model to execute
                        all commands without first accepting them
--no-interactive       Print the first response to STDOUT without interactive mode. This will fail if the
                        prompt requests permissions to use a tool, unless --accept-all is also used
--profile <PROFILE>    Context profile to use
--trust-all-tools      Allows the model to use any tool to run commands without asking for confirmation
--trust-tools <TOOL_NAMES> Trust only this set of tools. Example: trust some tools:
                        '--trust-tools=fs_read,fs_write', trust no tools: '--trust-tools='
-v, --verbose...       Increase logging verbosity
-h, --help             Print help
```

Selecting a model for chat on the command line

You can select the model you want Amazon Q to use to respond to your requests during chat sessions. A default model is set when you start a chat session, and you can either change the model Amazon Q uses for a given session or set a default model for all sessions.

The following Anthropic models are available for chat sessions:

- Claude 3.5 Sonnet
- Claude 3.7 Sonnet (default)
- Claude Sonnet 4

The following sections describe how to change the model Amazon Q uses for chat sessions.

Change the model for a chat session

To change the model Amazon Q uses for a chat session you've already started, use the `/model` command.

The model that's currently being used is indicated on the list of supported models. To change the model, use arrow keys to move through the list, and choose enter on your keyboard to select one.

The model you select persists for the duration of the chat session, or until you change it. When you start a new session, Amazon Q uses the default model again.

Launch a chat session with a specific model

You can start a chat session with a specific model using a single command. Add the `--model` option with the name of a supported model to use that model for the session:

```
q chat --model <model name>
```

You must supply the model name in the following format:

- claude-3.5-sonnet
- claude-3.7-sonnet
- claude-4-sonnet

The model you select persists for the duration of the chat session, or until you change it. When you start a new session, Amazon Q uses the default model again.

Set a default model for chat sessions

You can change the default model that Amazon Q uses when you start chat sessions with the following command:

```
q settings chat.defaultModel <model name>
```

You must supply the model name in the following format:

- claude-3.5-sonnet
- claude-3.7-sonnet
- claude-4-sonnet

Amazon Q will use the model you set as the default model for all future chat sessions. You still have the option to set a different model for a given chat session using the previously described methods.

Conversations

Topics

- [Summarizing conversations](#)
- [Conversation persistence](#)

Summarizing conversations

The `/compact` command compacts the conversation history and shows the output of the compacted conversation history.

When the length of characters in your conversation history approaches the limit, Amazon Q provides a warning message, indicating that you should `/compact` your conversation history

```
> what is rust in 10 words
Rust is a systems programming language focused on safety, speed, and concurrency.
> why is rust famous in 10 words
Memory safety without garbage collection, performance, and zero-cost abstractions.
> why is rust used by gamers in 10 words
Rust isn't primarily for gamers; it's for performance-critical systems development.
> /compact --summary do not mention anything related to gaming in the summary
Compacting conversation history...
```

```
✓ Conversation has been successfully summarized and cleared!
• Custom prompt applied: do not mention anything related to gaming in the summary
• The assistant has access to all previous tool executions, code analysis, and discussion details
• The assistant will reference specific information from the summary when relevant
• Use '/compact --summary' to view summaries when compacting

CONVERSATION SUMMARY

## CONVERSATION SUMMARY
* Definition of Rust programming language in 10 words
* Reasons for Rust's popularity in 10 words
* Clarification about Rust's primary use case

## KEY INSIGHTS
* Rust is a systems programming language focused on safety, speed, and concurrency
* Rust is known for memory safety without garbage collection, performance, and zero-cost abstractions
* Rust is designed for performance-critical systems development
* The Amazon Q Developer CLI project contains 21,007 lines of Rust code
* The largest Rust file in the project is src/cli/doctor/mod.rs with 2,344 lines

This summary is stored in memory and available to the assistant.
It contains all important details from previous interactions.
```

Conversation persistence

Amazon Q can remember your conversations based on the directory where they take place. When you return to a directory where you previously chatted with Amazon Q, you can tell Q to automatically load that conversation history, allowing you to seamlessly continue your discussion.

Directory-based persistence

If it's your first time chatting in that directory, Amazon Q will start a new conversation (taking into consideration any designated [context](#)).

To explicitly resume a conversation in the current directory, use:

```
$ q chat --resume
```

Manually saving and loading conversations

You can also manually save and load conversations using the following commands while in a chat session:

- `/save [path]` - Saves your current conversation to a JSON file
 - Add `-f` or `--force` to overwrite an existing file
 - Example: `/save ~/my-project-conversation -f`
- `/load [path]` - Loads a conversation from a previously saved JSON file
 - Example: `/load ~/my-project-conversation.json`

Note

The `/save` and `/load` commands operate independently of the directory where the conversation was originally created. When loading a conversation, be mindful that it will replace your current conversation regardless of which directory it was saved from.

These commands are useful for:

- Backing up important conversations
- Sharing conversations with team members
- Moving conversations between different working directories

Working with images

Amazon Q can analyze and discuss images directly in your chat session. You can share images with Amazon Q by dragging and dropping them into your terminal window or by using the `fs_read` tool with the Image mode.

Drag and drop images

The simplest way to share images with Amazon Q is to drag and drop them directly into your terminal window. When you drag an image into the terminal:

1. The image path is automatically inserted into your prompt
2. You can then add text to provide context about what you want Amazon Q to do with the image
3. Amazon Q will process the image and respond based on its content

Example:

```
Amazon Q> /path/to/architecture-diagram.png Can you explain this architecture and  
generate sample code for implementing it?
```

Using `fs_read` with images

You can also explicitly use the `fs_read` tool to share images:

```
Amazon Q> Can you analyze this screenshot at /path/to/screenshot.png?
```

Amazon Q will automatically suggest using `fs_read` with Image mode when you mention image files.

Image use cases

Common use cases for sharing images with Amazon Q include:

- Analyzing screenshots of error messages for troubleshooting
- Converting architecture diagrams into code implementations
- Discussing UI/UX designs and generating corresponding HTML/CSS
- Understanding flowcharts and translating them into algorithms
- Reviewing code snippets shared as images

- Interpreting technical diagrams for documentation

Supported formats and limitations

Supported image formats include JPEG/JPG, PNG, GIF, and WebP. Images must be under 10MB in size, and you can share up to 10 images in a single request.

For best results:

- Use high-resolution images with clear text
- Provide specific instructions about what you want Amazon Q to do with the image
- For complex diagrams, consider providing additional context

Security considerations and best practices

Amazon Q provides powerful capabilities that can modify your system and AWS resources. Understanding security implications and following best practices helps you use these capabilities safely.

Understanding security risks

When using Amazon Q, be aware of the following potential security risks:

- *Unintended system changes*: Amazon Q may interpret your requests in unexpected ways, leading to unintended modifications
- *AWS resource modifications*: Resources could be created, modified, or deleted, potentially affecting production environments or incurring costs
- *Data loss*: Commands that delete or overwrite files could result in data loss
- *Security vulnerabilities*: Commands might compromise system security if not properly reviewed

These risks are significantly increased when using `/tools trust-all` or `/acceptall`, which bypass confirmation prompts.

Specific examples of risks include:

- A request to "clean up old files" might delete important configuration files
- A request to "optimize my EC2 instances" might terminate running instances

- A request to "fix security issues" might modify permissions in ways that expose sensitive data

Warning

AWS recommends against using `/tools trust-all` or `/acceptall` mode in production environments or when working with sensitive data or resources. You are responsible for all actions performed by Amazon Q when these modes are enabled.

General security best practices

When using Amazon Q in any environment, especially those with sensitive files, private keys, tokens, or other confidential information, consider implementing these security measures:

Restricting file access

By default, Amazon Q can read files without asking for permission each time (`fs_read` is trusted by default). For sensitive environments, you can restrict this behavior:

```
Amazon Q> /tools untrust fs_read
```

With this setting, Amazon Q will ask for your explicit permission before reading any file. This gives you granular control over which files Amazon Q can access during your session.

You can also make this setting persistent by adding it to your shell startup script:

```
echo 'alias q="q --untrust-fs-read"' >> ~/.bashrc
```

This ensures that every new Amazon Q session starts with `fs_read` untrusted, requiring explicit permission for file access.

Additional security measures

For environments with highly sensitive information, consider these additional measures:

- Use Amazon Q in a dedicated development environment that doesn't contain sensitive credentials or data
- Store sensitive files outside your project directories or in locations with restricted permissions
- Use environment variables for sensitive values instead of hardcoding them in files

- Consider using `/tools untrust use_aws` to require explicit permission before making AWS API calls
- Use project rules to define security guidelines and restrictions (see [Using project rules](#))

Using `/tools trust-all` safely

If you must use `/tools trustall` or `/acceptall` for specific workflows, follow these safety practices to minimize risks:

- Only use in development or testing environments, never in production
- Enable `/tools trust-all` only for specific tasks, then immediately disable it using `/tools reset` to return to default permissions
- Back up important data before enabling `/tools trust-all`
- Use AWS credentials with minimal permissions when `/tools trust-all` is enabled
- Carefully monitor all actions Amazon Q takes while `/tools trust-all` is enabled

To return to the default permission settings after using `/tools trust-all`, use the `reset` command:

```
Amazon Q> /tools reset
```

This reverts all tools to their default permission levels, with only `fs_read` trusted by default.

Using the editor command in the CLI

The Amazon Q Developer CLI provides an `/editor` command that opens your preferred text editor to compose complex prompts. This is particularly useful for multi-line prompts, code examples, or when you need to carefully structure your questions.

Basic usage

To open your default editor with an empty prompt:

```
Amazon Q> /editor
```

To open your editor with initial text:

```
Amazon Q> /editor Write a Python function that calculates Fibonacci numbers
```

When you use the `/editor` command, Amazon Q creates a temporary file with a `.md` extension, opens your specified editor with this file, and then reads the content and submits it as your prompt when you save and close the editor.

Setting your preferred editor

Amazon Q uses your system's `$EDITOR` environment variable to determine which editor to open. If not set, it defaults to `vi`.

Temporary setting (current session only)

To set your editor for the current terminal session only:

```
$ export EDITOR=nano
```

Permanent setting

To make your editor preference persistent across sessions, add the export command to your shell configuration file:

```
# For bash (add to ~/.bashrc)
export EDITOR=nano

# For zsh (add to ~/.zshrc)
export EDITOR=nano

# For fish shell (add to ~/.config/fish/config.fish)
set -x EDITOR nano
```

After editing your configuration file, either restart your terminal or source the file:

```
$ source ~/.bashrc # or ~/.zshrc
```

Common editor options

Here are some common editor options you can use:

- `vi` or `vim` - Vi/Vim text editor

- `nano` - Nano text editor (beginner-friendly)
- `emacs` - Emacs text editor
- `code -w` - Visual Studio Code (requires VS Code CLI to be installed)
- `subl -w` - Sublime Text (requires Sublime CLI to be installed)

Note

The `-w` flag for GUI editors is important as it makes the terminal wait until the file is closed.

How it works

The `/editor` command follows this workflow:

1. When you use the `/editor` command, Amazon Q creates a temporary file with a `.md` extension
2. Your specified editor opens with this file
3. You write your prompt in the editor and save the file
4. When you close the editor
5. Amazon Q reads the content and submits it as your prompt
6. The temporary file is automatically cleaned up

Working with code in the editor

When you write code in the editor, the entire content is sent as your prompt to Amazon Q when you close the editor. The code is not executed locally - it's treated as text input for the AI.

Example: Writing and submitting code

1. Type `/editor` to open your editor
2. Write a Python script in the editor:

```
def fibonacci(n):  
    if n <= 1:  
        return n  
    else:  
        return fibonacci(n-1) + fibonacci(n-2)
```

```
# This function seems inefficient
# How can I improve it?
```

3. Save and close the editor

4. Amazon Q will receive this entire text as your prompt and respond with suggestions for improving the code

This approach is useful for:

- Getting code reviews
- Asking for optimizations
- Explaining complex code structures
- Providing context for debugging help

Combining with other commands

The `/editor` command becomes even more powerful when combined with other Amazon Q CLI commands. Here are some practical combinations to enhance your workflow.

Using `/editor` with `/compact`

The `/compact` command makes Amazon Q responses more concise. This combination is excellent for efficient code reviews:

```
Amazon Q> /editor
# Write in the editor:
Please review this Python function that calculates prime numbers:

def is_prime(n):
    if n <= 1:
        return False
    if n <= 3:
        return True
    if n % 2 == 0 or n % 3 == 0:
        return False
    i = 5
    while i * i <= n:
        if n % i == 0 or n % (i + 2) == 0:
            return False
```

```
        i += 6
    return True

# Save and close

Amazon Q> /compact
# This makes Amazon Q provide a concise code review
```

Using /editor with /context

The `/context` command adds files to the conversation context. This combination is useful for discussing code that references other files:

```
Amazon Q> /context path/to/config.json
Amazon Q> /editor
# Write in the editor:
Given the config.json file I just shared, please help me write a Python function that:
1. Loads the configuration
2. Validates all required fields are present
3. Returns a validated config object

# Save and close
```

Using /editor with /clear

The `/clear` command starts a new conversation. This combination helps when switching topics:

```
Amazon Q> /clear
Amazon Q> /editor
# Write in the editor:
I want to start a new discussion about AWS Lambda cold starts.
What are the best practices for minimizing cold start times for Python Lambda
functions?

# Save and close
```

Using /editor for multi-step conversations

The `/editor` command creates a fresh temporary file each time it's used. You can use it multiple times in a conversation to build on previous responses:

```
# First use of editor for initial complex question
```

```
Amazon Q> /editor
# Write in editor:
I need to design a database schema for a library management system.
Requirements:
- Track books, authors, publishers
- Handle member checkouts and returns
- Support reservations and waiting lists
- Generate overdue notices

# After getting Amazon Q's response with initial schema design

# Second use of editor for follow-up with specific implementation details
Amazon Q> /editor
# Write in editor:
Based on your proposed schema, I have some follow-up questions:
1. How would you modify the Member table to support different membership tiers?
2. What indexes would you recommend for optimizing checkout queries?
3. Can you show me SQL to create the Books and Authors tables with proper
relationships?
```

The benefit of this approach is that you can carefully craft complex follow-up questions that reference the previous conversation, without having to type everything in the command line. Each editor session gives you the space and formatting control to compose detailed questions that build on Amazon Q's previous responses.

Using `/editor` with `/profile`

Switch to a different context profile before using the editor for specialized questions:

```
Amazon Q> /profile set aws-developer
Amazon Q> /editor
# Write detailed AWS-specific questions that benefit from the AWS developer profile
context
```

Using `/editor` with `/help`

If you're unsure about command options, you can use `/help` before `/editor`:

```
Amazon Q> /help editor
# Review the help information
Amazon Q> /editor
# Use the editor with better understanding of available options
```


Best practices for command combinations

1. Use `/context` before `/editor` when you need to reference specific files
2. Use `/editor` before `/compact` when you want concise responses to complex questions
3. Use `/clear` before `/editor` when starting a completely new topic
4. Use multiple `/editor` sessions for complex, multi-part conversations where you need to carefully craft follow-up questions
5. Consider your current profile before using `/editor` to ensure you're in the right context

Tips for effective use

- Use the editor for complex prompts that benefit from careful structuring
- Include code examples with proper indentation
- Organize multi-part questions with clear sections
- Use Markdown formatting for better structure
- If you save an empty file, no prompt will be submitted

Troubleshooting

- *Editor not opening*: Verify your `$EDITOR` environment variable is set correctly
- *"No such file or directory" error*: Ensure the editor command is installed and in your `PATH`
- *Terminal hanging*: For GUI editors, make sure to use the wait flag (e.g., `-w`)
- *Content not being submitted*: Check that you saved the file before closing the editor

Using Git-aware file selection

When working with Git repositories, Q CLI's fuzzy finder is Git-aware, making it easier to select and add relevant files to your context. This feature helps you quickly identify and include files that are part of your Git repository.

How Git-aware Selection Works

The Git-aware fuzzy finder automatically integrates with your repository's Git information to provide enhanced file selection capabilities:

- Recognizes Git-tracked files in your repository
- Shows Git status indicators alongside files
- Prioritizes relevant files based on Git history

Using Git-aware File Selection

To use git-aware file selection

1. Navigate to your Git repository in the terminal.
2. Run the context add command:

```
/context add
```

3. In the fuzzy finder interface, you'll see files from your repository with Git status indicators:
 - M – Modified files
 - A – Added files
 - ? – Untracked files
4. Type to filter files, using Git status as part of your search criteria.
5. Use the arrow keys to navigate and press Enter to select files to add to your context.

Tips for Git-aware Selection

- Use Git status indicators in your search to quickly find modified or untracked files
- The fuzzy finder prioritizes recently modified files in Git history
- Files ignored by Git (via .gitignore) are still available but deprioritized in the results

Context management and profiles

Understanding profiles and context

Profiles allow you to switch between sets of contexts that give you unique ways for Amazon Q Developer CLI to interact with you and your systems. Context files contain information like development rules, project details, or coding standards that Amazon Q uses to provide more relevant and tailored responses.

There is always a default profile, which contains a global context and workspace context:

- *Global context*: Files that are applied to all profiles
- *Workspace context*: Files specific to the current profile

When you add new profiles, they will have their own unique workspace context, allowing you to specify patterns of files that make that profile behave and interact in ways unique to your workflow and processes.

For example, you might create:

- A "terraform" profile with infrastructure-as-code guidelines
- A "python" profile with Python coding standards
- A "java" profile with Java best practices

By switching profiles, you can quickly change the context that Amazon Q uses to provide responses without having to manually specify these files in each conversation.

Managing profiles

You can manage profiles using either the `/profile` command or the `/context profile` commands.

Using the `/profile` command

The `/profile` command allows you to view and switch between different context profiles in the Amazon Q Developer CLI.

When you run the `/profile` command without arguments, it displays a list of available profiles:

```
q chat
> /profile
Available profiles:
* default
  dev
  prod
  staging
```

The asterisk (*) indicates the currently active profile.

To switch to a different profile, specify the profile name:

```
q chat
> /profile set dev
Switched to profile: dev
```

Managing context

Context files are markdown files that contain information you want Amazon Q to consider during your conversations. These can include project requirements, coding standards, development rules, or any other information that helps Amazon Q provide more relevant responses.

Adding context

You can add files or directories to your context using the `/context add` command:

```
q chat
> /context add README.md
Added 1 path(s) to profile context.
```

To add a file to the global context (available across all profiles), use the `--global` flag:

```
q chat
> /context add --global coding-standards.md
Added 1 path(s) to global context.
```

You can also add multiple files at once using glob patterns:

```
q chat
> /context add docs/*.md
Added 3 path(s) to profile context.
```

Viewing context

To view your current context, use the `/context show` command:

```
q chat
> /context show
Global context:
  /home/user/coding-standards.md
```

Profile context (terraform):

```
/home/user/terraform-project/README.md  
/home/user/terraform-project/docs/architecture.md  
/home/user/terraform-project/docs/best-practices.md
```

Removing context

To remove files from your context, use the `/context rm` command:

```
q chat  
> /context rm docs/architecture.md  
Removed 1 path(s) from profile context.
```

To remove files from the global context, use the `--global` flag:

```
q chat  
> /context rm --global coding-standards.md  
Removed 1 path(s) from global context.
```

To clear all files from your context, use the `/context clear` command:

```
q chat  
> /context clear  
Cleared all paths from profile context.
```

To clear the global context, use the `--global` flag:

```
q chat  
> /context clear --global  
Cleared all paths from global context.
```

Common use cases

Here are some common use cases for context profiles:

Using project rules

Amazon Q supports project-level rules that can define security guidelines and restrictions. These rules are defined in Markdown files in the `.amazonq/rules` directory of your project.

For example, you can create rules that specify:

- Which directories Amazon Q should avoid accessing
- Security requirements for generated code
- Coding standards and best practices

Project rules can be added to your context using the `/context add` command:

```
q chat
> /context add .amazonq/rules/*.md
Added 3 path(s) to profile context.
```

You can also add project rules to your global context to apply them across all profiles:

```
q chat
> /context add --global .amazonq/rules/security-standards.md
Added 1 path(s) to global context.
```

For more information about creating and using project rules, see [Creating project rules for use with Amazon Q Developer chat](#) in the IDE documentation.

Working with multiple projects

If you work on multiple projects with different requirements, you can create a profile for each project:

```
q chat
> /profile create project-a
Created profile: project-a
> /context add ./project-a/README.md ./project-a/docs/*.md
Added 4 path(s) to profile context.

> /profile create project-b
Created profile: project-b
> /context add ./project-b/README.md ./project-b/docs/*.md
Added 3 path(s) to profile context.
```

You can then switch between profiles as you move between projects:

```
q chat
```

```
> /profile project-a  
Switched to profile: project-a
```

Different development roles

You can create profiles for different roles you perform:

```
q chat  
> /profile create backend-dev  
Created profile: backend-dev  
> /context add backend-standards.md api-docs/*.md  
Added 4 path(s) to profile context.  
  
> /profile create devops  
Created profile: devops  
> /context add infrastructure/*.md deployment-guides/*.md  
Added 5 path(s) to profile context.
```

Using context hooks

Context hooks are a feature in Amazon Q Developer CLI that you can use to automatically inject context into your conversations with Q Developer. Instead of manually adding context with the `/context` command, context hooks run commands and include their output as context.

Types of context hooks

Q Developer CLI supports two types of context hooks:

Conversation start hooks

Run once at the beginning of a conversation. Their output is added to the conversation context and persists throughout the session.

Per-prompt hooks

Run with each user message. Their output is added only to the current prompt.

Managing context hooks

You can manage context hooks by using the `/context hooks` command in the Q Developer CLI.

View your hooks

To view all configured hooks at both global and profile levels:

```
/context hooks
```

This command displays all hooks that are configured for your current profile and at the global level, along with their status (enabled or disabled).

Add a hook

To add a new context hook:

```
/context hooks add [--global] <name> --trigger <trigger> --command <command>
```

<name>

A unique name for the hook

<trigger>

Either `per_prompt` or `conversation_start`

<command>

The shell command to execute

--global

(Optional) Add the hook to global configuration instead of the current profile

Example Adding a git status hook

```
/context hooks add git-status --trigger per_prompt --command "git status --short"
```

Remove a hook

To remove an existing context hook:

```
/context hooks rm <name> [--global]
```


Enable or disable hooks

To enable a specific hook:

```
/context hooks enable [--global] <name>
```

To disable a specific hook:

```
/context hooks disable [--global] <name>
```

To enable all hooks:

```
/context hooks enable-all [--global]
```

To disable all hooks:

```
/context hooks disable-all [--global]
```

Get help with hooks

To display detailed help for the hooks commands:

```
/context hooks help
```

Configurations

You can verify the configuration of your hooks at the following locations.

If the hook is global:

```
~/.aws/amazonq/global_context.json
```

If the hook is profile-based:

```
~/.aws/amazonq/profiles/profile-name/context.json
```

Example use cases

The following examples demonstrate common use cases for context hooks.

Git status

Add a hook to show git status with each prompt:

```
/context hooks add git-status --trigger per_prompt --command "git status --short"
```

This hook runs the `git status --short` command before each prompt and includes the output in your conversation with Q Developer. This helps Q Developer understand the current state of your git repository when you ask questions about version control or need help with git commands.

Project information

Add a hook to show project information at the start of a conversation:

```
/context hooks add project-info --trigger conversation_start --command "echo 'Project: '$(basename $(pwd))'"
```

This hook runs once at the beginning of your conversation and includes the current project name in the context. This helps Q Developer provide more relevant responses that are specific to your project.

Tip

You can expand this hook to include more project information, such as the programming language, framework, or project structure.

Behavior and limitations

When you use context hooks, keep the following behaviors and limitations in mind:

- Hooks run in parallel to minimize impact on response time
- Hook output is formatted and clearly marked in the context
- The `/clear` command re-evaluates conversation start hooks
- Hooks are stored in your Q Developer CLI configuration
- Currently, only inline command hooks are supported
- Hook output is limited to 10KB per hook
- Hooks time out after 5 seconds by default

Security considerations

When you use context hooks, consider the following security best practices:

- Context hooks execute shell commands with your current user permissions. Be careful about which commands you include in your hooks, as they have the same access as your user account.
- Be careful when adding hooks that might expose sensitive information, such as credentials or personal data. Review the output of your hooks to ensure that they don't include information that you don't want to share.
- Consider disabling hooks when they're not needed. This reduces the risk of accidentally exposing sensitive information.
- Don't use hooks to run commands that could modify your system or data. Hooks should be used for reading information, not for making changes.
- Be cautious when using hooks in shared environments. Other users might be able to see the output of your hooks if they have access to your Q Developer CLI sessions.

 Warning

Never include commands in your hooks that expose passwords, access keys, or other credentials. This information could be stored in your conversation history and potentially exposed to others.

Troubleshooting

If you encounter issues with context hooks, try the following solutions:

Troubleshooting context hooks

Issue	Solution
Hook doesn't run	Verify that the hook is enabled with <code>/context hooks</code>
Command fails	Test the command directly in your terminal to ensure it works
Output is too large	Modify your command to limit output size
Hook times out	Optimize your command for faster execution

Configuring Amazon Q settings

Amazon Q provides various ways to customize its behavior through settings. You can access these settings through both a graphical interface and command-line options.

Accessing settings

You can access Amazon Q settings in two ways:

- Settings GUI: Run `q settings` to open the graphical settings interface
- Command line: Use various commands to view and modify settings directly

Command line settings management

You can manage Amazon Q settings directly from the command line using the following commands:

Basic settings commands

Command	Description
<code>q settings</code>	Opens the settings GUI interface
<code>q settings all</code>	Lists all current settings
<code>q settings all -f json-pretty</code>	Lists all settings in formatted JSON
<code>q settings open</code>	Opens the settings file in your default editor
<code>q settings [KEY] [VALUE]</code>	Views or sets a specific setting
<code>q settings -d [KEY]</code>	Deletes a specific setting

When using `q settings` commands, you can specify the output format:

```
q settings -f [FORMAT]
```

Available formats:

- `plain`: Outputs results as markdown (default)
- `json`: Outputs results as JSON
- `json-pretty`: Outputs results as formatted JSON

Other Amazon Q CLI commands

Amazon Q offers many other command-line features beyond settings management. For a comprehensive reference of all available commands and their arguments, see [Amazon Q CLI command reference](#).

For help with any command, use the `--help` flag:

```
q [COMMAND] --help
```

Amazon Q CLI command reference

This section provides a comprehensive reference for all Amazon Q Developer CLI commands and their arguments. Use this reference to understand the available options for each command and their proper syntax.

For help with any command, you can use the `--help` flag:

```
q [COMMAND] --help
```

Global arguments

The following arguments are available with any Amazon Q CLI command:

Global arguments

Argument	Short form	Description
<code>--verbose</code>	<code>-v</code>	Increase logging verbosity. Can be repeated for more verbose output: <code>-v</code> , <code>-vv</code> , <code>-vvv</code> , <code>-vvvv</code>

Argument	Short form	Description
<code>--help</code>	<code>-h</code>	Show help information for the command
<code>--version</code>	<code>-V</code>	Show version information
<code>--help-all</code>		Print help for all subcommands

Commands

The following sections describe each Amazon Q CLI command and its available arguments.

q chat

Start an interactive chat session with Amazon Q. When no subcommand is specified, q defaults to q chat.

Syntax:

```
q chat [OPTIONS] [INPUT]
```

q chat arguments

Argument	Short form	Description
<code>--no-interactive</code>		Print the first response to STDOUT without interactive mode. This will fail if the prompt requests permissions to use a tool, unless <code>--trust-all-tools</code> is also used
<code>--resume</code>	<code>-r</code>	Resume the previous conversation from this directory
<code>--profile</code>		Context profile to use
<code>--trust-all-tools</code>		Allow the model to use any tool to run commands without asking for confirmation
<code>--trust-tools</code>		Trust only the specified set of tools. Provide a comma-separated list of tool names. Example:

Argument	Short form	Description
		<code>--trust-tools=fs_read,fs_write</code> . To trust no tools, use <code>--trust-tools=</code>
INPUT		The first question to ask (positional argument)

Examples:

```
q chat
q chat "How do I list files in Linux?"
q chat --no-interactive --trust-all-tools "Show me the current directory"
q chat --resume
q chat --profile my-profile "Help me with AWS CLI"
```

q translate

Translate natural language instructions to executable shell commands using AI.

Syntax:

```
q translate [OPTIONS] [INPUT...]
```

q translate arguments

Argument	Short form	Description
<code>--n</code>	<code>-n</code>	Number of completions to generate (must be ≤ 5)
INPUT		Natural language description of the command you want to generate (positional arguments)

Examples:

```
q translate "list all files in the current directory"
q translate "find all Python files modified in the last week"
q translate "compress all log files older than 30 days"
```

q doctor

Fix and diagnose common installation and configuration issues with Amazon Q.

Syntax:

```
q doctor [OPTIONS]
```

q doctor arguments

Argument	Short form	Description
--all	-a	Run all doctor tests, with no fixes
--strict	-s	Error on warnings

Examples:

```
q doctor
q doctor --all
q doctor --strict
```

q update

Update the Amazon Q application to the latest version.

Syntax:

```
q update [OPTIONS]
```

q update arguments

Argument	Short form	Description
--non-interactive	-y	Don't prompt for confirmation
--relaunch-dashboard		Relaunch into dashboard after update. Default is true

Argument	Short form	Description
--rollout		Uses rollout

Examples:

```
q update
q update --non-interactive
q update --rollout
```

q theme

Get or set the visual theme for the autocomplete dropdown menu. This affects the appearance of the popup window that shows command completions.

Syntax:

```
q theme [OPTIONS] [THEME]
```

q theme arguments

Argument	Description
--list	List all available themes
--folder	Show the theme directory path
THEME	Name of the theme to set. Built-in themes include: dark, light, system (positional argument)

Examples:

```
q theme --list
q theme --folder
q theme dark
q theme light
q theme system
```

Note: Theme changes affect the autocomplete popup window. You may need to trigger autocomplete suggestions to see the visual changes.

q integrations

Manage system integrations for Amazon Q.

Syntax:

```
q integrations [SUBCOMMAND] [OPTIONS]
```

q integrations subcommands

q integrations subcommands

Subcommand	Description
install	Install an integration. Supports --silent (-s) to suppress status messages
uninstall	Uninstall an integration. Supports --silent (-s) to suppress status messages
reinstall	Reinstall an integration. Supports --silent (-s) to suppress status messages
status	Check the status of an integration. Supports --format (-f) for output format

q inline

Manage inline suggestions (ghost text) that appear directly on your command line as you type. For more information, see [Command line assistance features](#)

Syntax:

```
q inline [SUBCOMMAND] [OPTIONS]
```

q inline subcommands

q inline subcommands

Subcommand	Description
enable	Enable inline suggestions that appear as you type
disable	Disable inline suggestions
status	Show whether inline suggestions are enabled or disabled
set-customization	Select a customization model to use. Optionally specify the ARN of the customization
show-customizations	Show available customization models. Supports --format (-f) for output format

Examples:

```
q inline enable
q inline disable
q inline status
q inline set-customization
q inline set-customization arn:aws:codewhisperer:us-east-1:123456789012:customization/example
q inline show-customizations
q inline show-customizations --format json
```

q login

Authenticate with Amazon Q using either AWS Builder ID (free) or IAM Identity Center (Pro).

Syntax:

```
q login [OPTIONS]
```

q login arguments

Argument	Description
--license	License type. Options: free (for Builder ID), pro (for Identity Center)
--identity-provider	Identity provider URL (for Identity Center)
--region	AWS region (for Identity Center)
--use-device-flow	Always use the OAuth device flow for authentication. Useful when browser redirects cannot be handled

Examples:

```
q login
q login --license free
q login --license pro --identity-provider https://my-company.awsapps.com/start --region us-east-1
q login --use-device-flow
```

q logout

Sign out of your Amazon Q session.

Syntax:

```
q logout
```

This command takes no additional arguments.

q whoami

Display information about the current user and authentication status.

Syntax:

```
q whoami [OPTIONS]
```

q whoami arguments

Argument	Short form	Description
--format	-f	Output format. Options: plain (default), json, json-pretty

q profile

Show the profile associated with the current IAM Identity Center user. This command is only available for Pro users.

Syntax:

```
q profile
```

This command takes no additional arguments.

q settings

Manage Amazon Q configuration settings. For detailed information about settings management, see [Configuring Amazon Q settings](#).

Syntax:

```
q settings [SUBCOMMAND] [OPTIONS] [KEY] [VALUE]
```

q settings arguments

Argument	Short form	Description
--delete	-d	Delete a setting
--format	-f	Output format. Options: plain (default), json, json-pretty
KEY		Setting key (positional argument)
VALUE		Setting value (positional argument)

q settings subcommands

q settings subcommands

Subcommand	Description
open	Open the settings file in your default editor
all	List all current settings. Supports --format option

q diagnostic

Run diagnostic tests to troubleshoot Amazon Q installation and configuration issues.

Syntax:

```
q diagnostic [OPTIONS]
```

q diagnostic arguments

Argument	Short form	Description
--format	-f	Output format. Options: plain (default), json, json-pretty
--force		Force limited diagnostic output

q issue

Create a new GitHub issue for Amazon Q feedback or bug reports.

Syntax:

```
q issue [OPTIONS] [DESCRIPTION...]
```

q issue arguments

Argument	Short form	Description
--force	-f	Force issue creation

Argument	Short form	Description
DESCRIPTION		Issue description (positional arguments)

q version

Display version information and optionally show the changelog.

Syntax:

```
q version [OPTIONS]
```

q version arguments

Argument	Description
--changelog[=VERSION]	Show the changelog. Use --changelog for current version, --changelog=all for all versions, or --changelog=x.x.x for a specific version

q mcp

Manage Model Context Protocol (MCP) servers. For detailed information about MCP, see [Using MCP with Amazon Q Developer](#).

Syntax:

```
q mcp [SUBCOMMAND] [OPTIONS]
```

q mcp add

Add or replace a configured MCP server.

Syntax:

```
q mcp add [OPTIONS]
```

q mcp add arguments

Argument	Description
--name	Name for the server (required)
--command	The command used to launch the server (required)
--scope	Where to add the server. Options: workspace , global
--env	Environment variables to use when launching the server. Format: key1=value1, key2=value2
--timeout	Server launch timeout in milliseconds
--force	Overwrite an existing server with the same name

q mcp remove

Remove a server from the MCP configuration.

Syntax:

```
q mcp remove [OPTIONS]
```

q mcp remove arguments

Argument	Description
--name	Name of the server to remove (required)
--scope	Scope to remove from. Options: workspace , global

q mcp list

List configured MCP servers.

Syntax:

```
q mcp list [SCOPE]
```


q mcp list arguments

Argument	Description
SCOPE	Scope to list. Options: workspace , global (positional argument)

q mcp import

Import a server configuration from another file.

Syntax:

```
q mcp import [OPTIONS] [SCOPE]
```

q mcp import arguments

Argument	Description
--file	File to import server configuration from (required)
--force	Overwrite an existing server with the same name
SCOPE	Scope to import to. Options: workspace , global (positional argument)

q mcp status

Get the status of a configured MCP server.

Syntax:

```
q mcp status [OPTIONS]
```

q mcp status arguments

Argument	Description
--name	Name of the server to get status for (required)

Log files

Amazon Q Developer CLI maintains log files that can be useful for troubleshooting. These logs are stored locally on your machine and are not sent to AWS.

Log file locations:

- **macOS:** \$TMPDIR/qlog/
- **Linux:** \$XDG_RUNTIME_DIR or TMPDIR or /tmp

The log level can be controlled by setting the Q_LOG_LEVEL environment variable. Valid values are:

- **error:** Only error messages (default)
- **warn:** Warning and error messages
- **info:** Informational, warning, and error messages
- **debug:** Debug, informational, warning, and error messages
- **trace:** All messages including detailed trace information

Warning

Log files may contain sensitive information from your conversations and interactions with Amazon Q, including file paths, code snippets, and command outputs. While these logs are stored only on your local machine and are not sent to AWS, you should be cautious when sharing log files with others.

Example of setting the log level (for debugging purposes):

```
# For bash/zsh
export Q_LOG_LEVEL=debug
q chat

# For fish
set -x Q_LOG_LEVEL debug
q chat
```

Command line assistance features

The Amazon Q CLI provides two distinct AI-powered assistance features to help you work more efficiently in your terminal:

- **Autocomplete Dropdown Menu:** A graphical menu that appears to the right of your cursor showing available command options you can select with arrow keys
- **Inline Suggestions:** Gray "ghost text" that appears directly on your command line as you type

These features work independently - you can use either one without the other, and they have separate configuration options.

Autocomplete dropdown menu

The autocomplete dropdown menu appears to the right of your cursor when typing commands, showing available options, subcommands, and arguments that you can select using arrow keys. This graphical menu supports theming and works with hundreds of popular command line tools including git, npm, docker, and aws.

Using the autocomplete dropdown

The autocomplete dropdown is automatically enabled after you install the Amazon Q CLI.

To use the autocomplete dropdown

1. [Install the Amazon Q CLI.](#)
2. Open your terminal or command prompt.
3. Start typing a command, and a graphical menu will appear to the right of your cursor showing available options.
4. Use arrow keys to navigate the suggestions, then press Tab or Enter to select an option.

The dropdown menu works with hundreds of command line tools, making it easier to remember command options and syntax.

Configuring the autocomplete dropdown

You can customize the autocomplete dropdown behavior and appearance:

- **Enable/disable:** `q settings autocomplete.disable false` (to enable) or `q settings autocomplete.disable true` (to disable)
- **Change theme:** `q theme dark`, `q theme light`, or `q theme system`
- **View current theme:** `q theme`
- **List available themes:** `q theme --list`

For a complete list of autocomplete configuration options, see [Configuring Amazon Q settings](#) .

Inline suggestions

Inline suggestions appear as "ghost text" directly on your command line as you type. This feature is separate from the autocomplete dropdown menu and can be enabled or disabled independently.

Using inline suggestions

Inline suggestions are enabled by default after installation. As you type commands, gray ghost text will appear showing potential completions.

To use inline suggestions

1. [Install the .](#)
2. Open your terminal or command prompt.
3. Start typing a command, and gray ghost text will appear showing suggested completions.
4. Press the right arrow key or Tab to accept the suggestion, or continue typing to ignore it.

Managing inline suggestions

You can control inline suggestions using the `q inline` command:

- **Enable:** `q inline enable`
- **Disable:** `q inline disable`
- **Check status:** `q inline status`
- **Set customization:** `q inline set-customization [ARN]`
- **Show available customizations:** `q inline show-customizations`

For complete command reference, see [q inline](#) .

Supported tools

The autocomplete dropdown menu supports a wide range of command line tools, including:

- AWS CLI
- Git
- Docker
- npm
- kubectl
- terraform
- And many more standard Unix/Linux commands

Contributing to Amazon Q for command line

You can help improve Amazon Q for command line by providing feedback, reporting issues, and suggesting new features.

GitHub repository

Amazon Q for command line is an open-source project. You can find the source code and contribute to the project on GitHub.

Visit the [Amazon Q Developer CLI GitHub repository](#) to:

- View the source code
- Report issues
- Submit pull requests
- Participate in discussions

Reporting issues

You can report issues with Amazon Q for command line directly from the command line or through GitHub.

To report an issue using the command line

1. Open your terminal or command prompt.

2. Run the following command:

```
q issue
```

3. Follow the prompts to describe the issue you're experiencing.
4. Review the information that will be included in your report, including system information and logs.
5. Confirm to submit the issue report.

The issue report will be sent to the Amazon Q team for investigation.

To report an issue on GitHub

1. Visit the [Issues page](#) on the GitHub repository.
2. Click "New issue".
3. Fill out the issue template with details about the problem you're experiencing.
4. Submit the issue.

Providing feedback

You can provide feedback on Amazon Q for command line to help improve the product.

To provide feedback

1. Open your terminal or command prompt.
2. Run the following command:

```
q feedback
```

3. Follow the prompts to provide your feedback.

Your feedback will be sent to the Amazon Q team and used to improve future versions of the product.

RFCs

You can participate in discussions about new features and improvements to Amazon Q for command line through the RFC (Request for Comments) process.

Visit the [Discussions page](#) on the GitHub repository to:

- View existing RFCs
- Comment on proposed features
- Submit your own RFC for a new feature

Telemetry data

Amazon Q for command line collects telemetry data to help improve the product. This data includes information about how you use the product, such as which commands you run and how often you use different features.

You can opt out of telemetry data collection at any time.

To opt out of telemetry data collection

1. Open your terminal or command prompt.
2. Run the following command:

```
q telemetry disable
```

To re-enable telemetry data collection, use the following command:

```
q telemetry enable
```

Using MCP with Amazon Q Developer

The Model Context Protocol (MCP) is an open standard that enables AI assistants to interact with external tools and services. Amazon Q Developer CLI now supports MCP, allowing you to extend Q's capabilities by connecting it to custom tools and services.

Topics

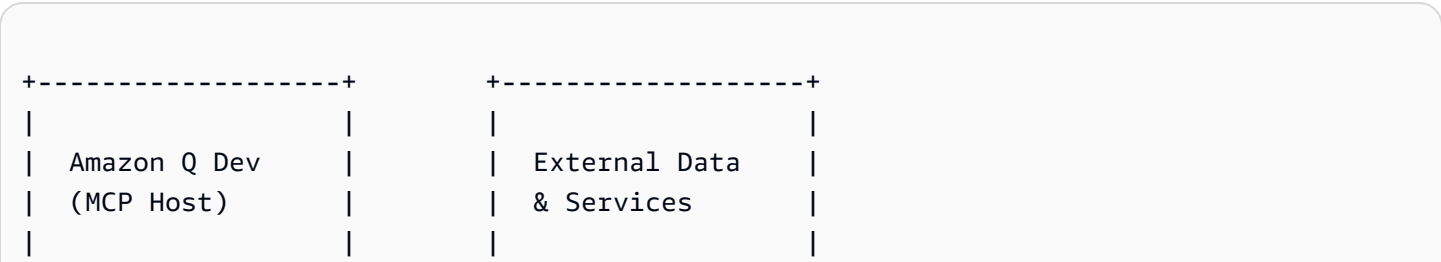
- [MCP overview](#)
- [MCP configuration in the CLI](#)
- [MCP server loading](#)
- [Tools and prompts](#)
- [MCP configuration for Q Developer in the IDE](#)
- [Key benefits](#)
- [MCP architecture](#)
- [Core MCP concepts](#)
- [Understanding MCP configuration files](#)
- [MCP security](#)

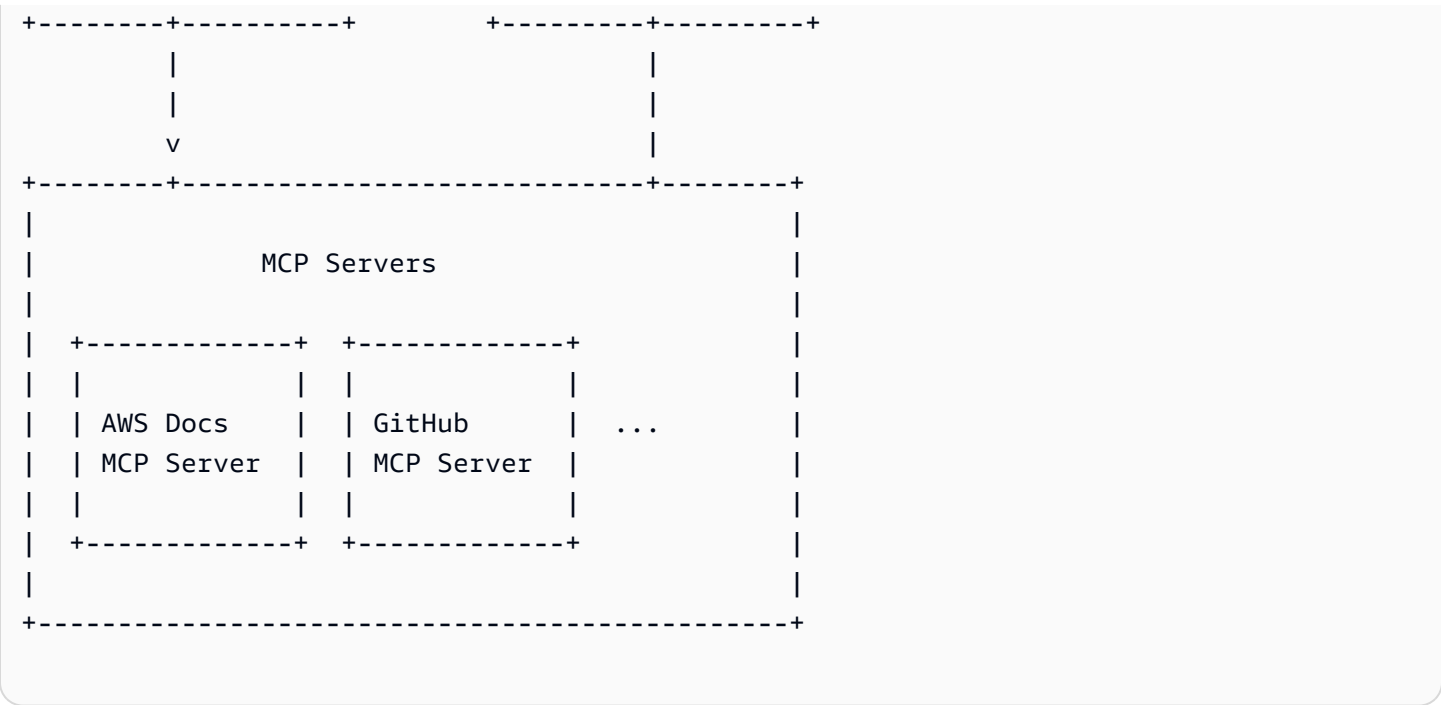
MCP overview

MCP (Model Context Protocol) is an open protocol that standardizes how AI assistants communicate with external tools. It defines a structured way for AI models to discover available tools, request tool execution with specific parameters, and receive and process tool results.

Think of MCP like a universal connector for AI models, enabling them to interact with external systems, fetch live data, and integrate with various tools seamlessly. This allows Amazon Q to provide more contextually relevant assistance by accessing the information it needs in real-time.

Example MCP Architecture Overview





<caption>
MCP architecture showing how Amazon Q Developer CLI connects to external data sources through MCP servers
</caption>

MCP configuration in the CLI

This page covers CLI-specific options for configuring MCP servers. For general information about MCP configuration, see [Understanding MCP configuration](#).

Configuration commands

Usage: qchat mcp [OPTIONS] *COMMAND*

MCP configuration commands

Command	Description
qchat mcp add	Add or replace a configured server
qchat mcp remove	Remove a server from the MCP configuration
qchat mcp list	List configured servers

Command	Description
<code>qchat mcp import</code>	Import a server configuration from another file
<code>qchat mcp status</code>	Get the status of a configured server
<code>qchat mcp help</code>	Print this list of commands or help for the given subcommand(s)

MCP server loading

Amazon Q loads MCP servers in the background, allowing you to start interacting immediately without waiting for all servers to initialize. Tools become available progressively as their respective servers finish loading.

Checking server status

You can use the `/tools` command to see which servers are still loading and which tools are already available.

Configuring server initialization

You can customize the server initialization timeout using:

```
$ q settings mcp.initTimeout [value]
```

Where `[value]` is the timeout in milliseconds. This setting controls how long Amazon Q will wait for servers to initialize before allowing you to start interacting.

Tools and prompts

This section covers how to use MCP tools and prompts with Amazon Q Developer CLI.

Understanding MCP tools

MCP tools are executable functions that MCP servers expose to Amazon Q Developer CLI. They enable Amazon Q Developer to perform actions, process data, and interact with external systems on your behalf.

Each tool in MCP has:

- **Name:** A unique identifier for the tool
- **Description:** A human-readable description of what the tool does
- **Input Schema:** A JSON Schema defining the parameters the tool accepts
- **Annotations:** Optional hints about the tool's behavior and effects

Discovering available tools

To see what tools are available in your Q CLI session:

```
/tools
```

This command displays all available tools, including both built-in tools and those provided by MCP servers.

Tools can have different permission levels that determine how they're used:

- **Auto-approved:** These tools can be used without explicit permission for each invocation
- **Requires approval:** These tools need your explicit permission each time they're used
- **Dangerous:** These tools are marked as potentially risky and require careful consideration before approval

Using tools

You can use MCP tools in two ways:

1. **Natural Language Requests:** Simply describe what you want to do, and Q will determine which tool to use.
2. **Direct Tool Invocation:** You can also explicitly request Q to use a specific tool.

Working with prompts

MCP servers can provide predefined prompts that help guide Q in specific tasks:

- List available prompts: `/prompts`
- Use a prompt:

- @ *prompt-name* arg1 arg2

Example of using a prompt with arguments:

```
@fetch https://docs.aws.amazon.com/amazonq/latest/qdeveloper-ug/command-line-mcp-configuration.html
```

MCP configuration for Q Developer in the IDE

This page covers IDE-specific options for configuring MCP servers. For general information about MCP configuration, see [Understanding MCP configuration](#).

Accessing the MCP configuration UI

The following image shows the GUI used for configuring an MCP server for Q Developer in the IDE.

The screenshot shows the 'Edit MCP Server' dialog in the IDE. The dialog has a dark theme and a close button (X) in the top right corner. The configuration options are as follows:

- Scope:** Two radio buttons: 'Global - Used globally.' (selected) and 'This workspace - Only used in this workspace.'
- Name:** A text input field containing 'AWSDocMCPServer'.
- Transport:** A dropdown menu showing 'stdio'.
- Command:** A text input field containing 'uvx'.
- Arguments - optional:** A text input field containing 'awslabs.aws-documentation-mcp-server@latest'.
- Environment variables - optional:** A table with two columns: 'Name' and 'Value'.

Name	Value
FASTMCP_LOG_LEVEL	ERROR
AWS_DOCUMENTATION_PARTITION	aws
- Timeout - use 0 to disable:** A text input field containing '60'.

At the bottom right, there are 'Save' and 'Cancel' buttons.

To access the MCP configuration UI in Q Developer in the IDE:

1. Open your IDE (VS Code, JetBrains, etc.).
2. Open the Q Developer panel.
3. Open the **Chat** panel.
4. Choose the tools icon.



Adding an MCP server

To add an MCP server to the IDE:

1. [Access the MCP configuration UI.](#)
2. Choose the plus (+) symbol.
3. Select the scope: global or local.

If you select global scope, the MCP server configuration is stored in `~/.aws/amazonq/mcp.json` and available across all your projects. If you select local scope, the configuration is stored in `.amazonq/mcp.json` within your current project.

4. In the **Name** field, enter the name of the MCP server.

For example, if we were installing the [AWS Documentation MCP server](#), the name might be *AWSDocMCPServer*.

5. Select the transport protocol.

Currently, only `stdio` is supported.

6. In the **Command** field, enter the shell command that the MCP server will run when it initializes.

In the case of the AWS Documentation MCP Server, the command is `uvx`. This is an alias for `uv tool run`, which creates an ephemeral Python environment.

7. In the **Arguments** field, enter an argument to be given to the shell command, if applicable.

In the case of the AWS Documentation MCP Server, the argument is *aws^{labs}.aws-documentation-mcp-server@latest*. This is a Python package identifier that points to a package hosted on PyPI (Python Package Index).

Add more arguments as necessary.

8. Fill in environment variables as applicable.

In the case of our example, we first fill in Name: *FASTMCP_LOG_LEVEL* and Value: *ERROR*.

We will also use the name *AWS_DOCUMENTATION_PARTITION* and the value *aws* to indicate the [partition](#) that we'll be working with.

9. Enter a **Timeout** value, as applicable.

For our example, we'll keep the recommended value of 60 (seconds).

10. Choose **Save**.

The configuration panel will be replaced with the tool permissions panel.

11. Follow the procedure under [Reviewing and adjusting tool permissions](#).

Troubleshooting your MCP configuration

After you add an MCP server in the IDE, Amazon Q will attempt to connect to it.

If there are connection issues, then an alert will be displayed at the top of the panel. You should not expect the tools from that MCP server to function properly until the alert is resolved.

Choose **Fix Configuration** to return to the MCP configuration screen so that you can make the appropriate changes.

Enabling an MCP server

The following procedure assumes that the MCP server in question is not already enabled.

To enable an MCP server in the IDE:

1. Open the MCP Servers panel.
2. Next to the server that you want to enable, choose **Enable**.

Disabling an MCP server

To disable an MCP server in the IDE:

1. Open the MCP Servers panel.
2. Choose the server you want to disable.
3. Choose the three dots next to **Edit setup**.
4. Choose **Disable MCP Server**.

Deleting an MCP server that is currently enabled

To delete an MCP server that is currently enabled from the IDE:

1. Open the MCP Servers panel.
2. Choose the server you want to delete.

A panel will open with details about that server.

3. Choose the three dots next to **Edit setup**.
4. Choose **Delete MCP server**.
5. Confirm the deletion when prompted.

Deleting an MCP server that is currently disabled

To delete an MCP server that is currently disabled from the IDE:

1. Open the MCP Servers panel.
2. Next to the server that you want to delete, choose **Delete**.
3. Confirm the deletion when prompted.

Reviewing and adjusting tool permissions

To review and adjusting tool permissions:

1. Open the MCP Servers panel.
2. Choose the MCP server for which you want to review and adjust permissions.
3. For each tool, you can set one of the following permission levels:
 - Ask: Prompt for permission each time the tool is used.
 - Always allow: Allow the tool to run without prompting.

- Deny: Do not use this tool.

Key benefits

- **Extensibility:** Connect Amazon Q to specialized tools for specific domains or workflows
- **Customization:** Create custom tools tailored to your specific needs
- **Ecosystem Integration:** Leverage the growing ecosystem of MCP-compatible tools
- **Standardization:** Use a consistent protocol supported by multiple AI assistants
- **Flexibility:** MCP allows you to switch between different LLM providers while maintaining the same tool integrations
- **Security:** Keep your data within your infrastructure with local MCP servers

MCP architecture

MCP follows a client-server architecture where:

- **MCP Hosts:** Programs like Amazon Q Developer CLI that want to access data through MCP
- **MCP Clients:** Protocol clients that maintain 1:1 connections with servers
- **MCP Servers:** Lightweight programs that each expose specific capabilities through the standardized Model Context Protocol
- **Local Data Sources:** Your computer's files, databases, and services that MCP servers can securely access
- **Remote Services:** External systems available over the internet (e.g., through APIs) that MCP servers can connect to

Example MCP Communication Flow





<caption>

Communication flow between user, Amazon Q Developer CLI, and external services through MCP

</caption>

Core MCP concepts

Tools

Tools are executable functions that MCP servers expose to clients. They allow Amazon Q to:

- Perform actions in external systems
- Process data in specialized ways
- Interact with APIs and services
- Execute commands on your behalf

Tools are defined with a unique name, a description, an input schema (using JSON Schema), and optional annotations about the tool's behavior.

Prompts

Prompts are predefined templates that help guide Amazon Q in specific tasks. They can:

- Accept dynamic arguments
- Include context from resources
- Chain multiple interactions
- Guide specific workflows

- Surface as UI elements (like slash commands)

Resources

Resources represent data that MCP servers can provide to Amazon Q, such as:

- File contents
- Database records
- API responses
- Documentation
- Configuration data

Understanding MCP configuration files

Configuration file locations

MCP client configuration in Amazon Q Developer is stored in JSON format, in a file named `mcp.json`. This section explains how MCP configuration works and how to structure your configuration files.

Amazon Q Developer CLI supports two levels of MCP configuration:

1. **Global Configuration:** `~/.aws/amazonq/mcp.json` - Applies to all workspaces
2. **Workspace Configuration:** `.amazonq/mcp.json` - Specific to the current workspace

Both files are optional; neither, one, or both can exist. If both files exist, Amazon Q Developer reads MCP configuration from both and combines them, taking the union of their contents. If there is a conflict (i.e., a server defined in the global config is also present in the workspace config), a warning is displayed and only the server entry in the workspace config is used.

Configuration file structure

The MCP configuration file uses a JSON format with the following structure:

```
{  
  "mcpServers": {
```

```
  "server-name": {
    "command": "command-to-run",
    "args": ["arg1", "arg2"],
    "env": {
      "ENV_VAR1": "value1",
      "ENV_VAR2": "value2"
    },
    "timeout": 60000
  }
}
```

Each MCP server entry is an object, with the server name as the key. The name must be unique within each MCP config file and across global and project config files. The server name must not be empty and must not be longer than 250 characters.

Each MCP server entry object must have either the "command" property (for stdio transport) or the "url" property (for HTTP transport, which will be supported in a future release).

If there are any unexpected attributes in the JSON file, a warning is displayed and those attributes are ignored.

Stdio server configuration

If the "command" property is present in an entry, this MCP server uses stdio transport. The following attributes are supported:

- **command (required):** The shell command to use to launch the MCP server. This is a string that represents a valid shell command.
- **args (optional):** An array of command-line arguments to pass to the server when it is launched. The arguments are passed in the exact order they are defined in the config file. If not defined, no arguments are passed to the server.
- **env (optional):** An object containing environment variables to set when launching the server. Each value must be a string. If not defined, no environment variables are set.
- **timeout (optional):** The maximum time in milliseconds that the client will wait for a response from the MCP server for a tool call, prompt retrieval, or resource retrieval. This must be a positive integer value. If not defined, a default value of 60,000 ms (1 minute) is used.

Example of a stdio server configuration:

```
{
  "mcpServers": {
    "stdio-mcp-server": {
      "command": "mycommand",
      "args": [
        "arg1"
      ],
      "env": {
        "API_KEY": "value1"
      },
      "timeout": 60000
    }
  }
}
```

Configuration examples

Basic example with a single MCP server:

```
{
  "mcpServers": {
    "markdown-tools": {
      "command": "npx",
      "args": [
        "-y",
        "@example/markdown-mcp"
      ]
    }
  }
}
```

Example with multiple MCP servers and environment variables:

```
{
  "mcpServers": {
    "git-tools": {
      "command": "npx",
      "args": [
        "-y",
        "@example/git-mcp"
      ],
      "timeout": 30000
    }
  }
}
```

```
    },
    "api-tools": {
      "command": "npx",
      "args": [
        "-y",
        "@example/api-mcp"
      ],
      "env": {
        "API_URL": "https://api.example.com",
        "API_KEY": "your-api-key"
      },
      "timeout": 120000
    }
  }
}
```

Configuration best practices

- Use descriptive names for your MCP servers to make them easily identifiable.
- Use the global configuration file for MCP servers that you want to use across all projects.
- Use workspace-specific configuration files for MCP servers that are only relevant to a particular project.
- Adjust timeout values based on the expected response time of each MCP server.
- Regularly check for updates to your MCP servers to ensure you have the latest features and security fixes.

MCP security

When using MCP servers with Amazon Q Developer CLI, it's important to understand the security implications and best practices.

Security model

The MCP security model in Amazon Q Developer CLI is designed with these principles:

1. **Explicit Permission:** Tools require explicit user permission before execution
2. **Local Execution:** MCP servers run locally on your machine
3. **Isolation:** Each MCP server runs as a separate process

4. **Transparency:** Users can see what tools are available and what they do

Security considerations

Key security considerations when using MCP:

- Only install servers from trusted sources
- Review tool descriptions and annotations before approving
- Use environment variables for sensitive configuration
- Keep MCP servers and the Q CLI updated
- Monitor MCP logs for unexpected activity

Third-party integration with Amazon Q Developer

Amazon Q Developer integrates with popular development platforms to enhance your software development workflows through specialized artificial intelligence (AI) capabilities. Supported integrations include GitLab Duo and GitHub, providing AI-powered assistance throughout the development lifecycle. These integrations help streamline development by automating routine tasks, improving code quality, and accelerating modernization efforts.

GitLab Duo with Amazon Q Developer

GitLab Duo with Amazon Q Developer provides a comprehensive suite of AI experiences integrated directly into your GitLab workflows. Available for GitLab Self-Managed offering and Ultimate tier subscribers, the integration enables quick actions in GitLab issues and merge requests to trigger AI capabilities. The integration also includes GitLab Duo Chat powered by Amazon Q, providing contextual assistance throughout your development process.

GitLab Duo with Amazon Q provides:

- Feature development of high-level ideas with a quick action in GitLab issues
- Code reviews for code quality, issues, and security concerns with a quick action in merge requests
- Code modernization to latest supported Java version with a quick action in GitLab issues
- Unit test generation with a quick action in merge requests
- Integrated chat support for development tasks

To get started, see [Set up GitLab Duo with Amazon Q](#).

Amazon Q Developer for GitHub (Preview)

The Amazon Q Developer integration with GitHub enables automated feature development, code reviews, and Java modernization through specialized AI agents. When you assign a GitHub issue to Amazon Q Developer, it uses the issue and project code as context to generate new code and create a pull request. During the development process, you can provide feedback and Amazon Q Developer iterates on the suggested code, creating a collaborative development workflow.

Amazon Q Developer offers the following key capabilities in GitHub:

- Feature development label that automatically implements new features and bug fixes from idea to pull request
- Automated code reviews of new or reopened pull requests for code quality, issues, and security concerns
- Code transformation label that automatically upgrades codebase to supported Java version
- Slash commands to provide alternative ways to initiate feature development and code transformation from issues, and code reviews after initial automatic review
- Iterative development by providing feedback on generated code and implementing
- Browser extensions to quickly assign feature development and code transformation tasks to Amazon Q Developer

To get started, see [Quickstart: Installing, using features in GitHub, and increasing usage limits](#).

Project rules for Amazon Q Developer

Amazon Q Developer enables you to create and maintain project-specific rules in GitLab or GitHub, which define coding standards and best practices for your team (such as requiring type hints in Python code or Javadoc comments in Java code). These rules, stored as Markdown files in the `project-root/.amazonq/rules` directory, ensure consistency across all developers regardless of experience level, and are automatically incorporated into context for Amazon Q Developer when developers interact with Amazon Q Developer within your project, ensuring all generated responses adhere to your established guidelines. For more information, see [Creating project rules for Amazon Q Developer in third-party platforms](#).

GitLab Duo with Amazon Q

[GitLab Duo with Amazon Q](#) provides a suite of artificial intelligence (AI) experiences, such as propose code implementation for your idea, transform your code to Java 17, review merge requests for quality and vulnerabilities, and suggest unit tests. Additionally, you can use the GitLab Duo Chat feature that supports Amazon Q to address developmental tasks, such as vulnerability explanation, troubleshoot failed pipelines, and code refactoring. It's available for the GitLab Self-Managed offering and the Ultimate tier subscription (GitLab Duo with Amazon Q subscription add-on). For more information, see the [GitLab plans](#) in the *GitLab documentation*.

After configuring GitLab Duo with Amazon Q, you can use quick actions in GitLab issues and merge request comments to trigger the AI capabilities. For more information, see [GitLab Duo concepts](#)

and [Getting started with GitLab Duo with Amazon Q](#). To learn about all features available on GitLab Duo with Amazon Q, see [Additional supported features](#) in the *GitLab documentation*.

Topics

- [GitLab Duo concepts](#)
- [Getting started with GitLab Duo with Amazon Q](#)
- [Customizing a CI/CD pipeline for code transformation](#)
- [Troubleshooting issues for GitLab Duo with Amazon Q](#)

GitLab Duo concepts

Here are some concepts and terms to know when using [GitLab Duo with Amazon Q](#).

Topics

- [Configuring GitLab Duo with Amazon Q](#)
- [Onboarding with AWS identity provider and IAM role creation](#)
- [GitLab quick actions](#)

Configuring GitLab Duo with Amazon Q

Before you can use Amazon Q artificial intelligence (AI) capabilities in GitLab, you must first do the following:

- Have a [self-managed instance](#) with [GitLab 17.8.0](#) or later.
- Have a [GitLab Ultimate subscription with Amazon Q](#) (no trial access).
- Turn on GitLab Duo features (experimental and beta features are off by default). For more information, see [Turn on beta and experimental features](#).
- Create an [IAM identity provider](#) for GitLab. For more information, see [Create an IAM identity provider](#) in the *GitLab documentation*.
- Create an [IAM role](#) that trusts the IAM identity provider is able to access Amazon Q in GitLab, which requires the use of specific permissions. For more information, see [Create an IAM role](#) in the *GitLab documentation*.

Onboarding with AWS identity provider and IAM role creation

As part of the GitLab Duo onboarding process, you need to create an Amazon Q Developer profile through the [Amazon Q Developer console](#). The profile allows you to create customization and control settings for all or a subset of users in your identity provider. After creating a profile, you need an OpenID Connect (OIDC) identity provider (IdP), as well as an IAM service role, to establish trust between GitLab Duo and your AWS account. To learn how to create the required resources and set up GitLab Duo with Amazon Q, see [Set up GitLab Duo with Amazon Q](#) in the *GitLab documentation*.

When the new IAM role is created, the required trust policy with the necessary permissions is also created. A role trust policy is a required [resource-based policy](#) that is attached to a role in IAM.

You need to add a permissions policy, which grants ability to connect with Amazon Q and utilize the features in the GitLab Duo with Amazon Q integration. The policy must be added when creating the IAM role. To learn more about the permissions provided by the permissions policy, see [GitLabDuoWithAmazonQPermissionsPolicy](#).

Alternatively, you can create an inline policy and add the required permissions. You can choose to create an inline policy if you want to custom access control. For more information, see [Managed policies and inline policies](#) and [Policies and permissions in AWS Identity and Access Management](#) in the *IAM User Guide*.

Trust policy

```
{
  "Version": "2012-10-17",
  "Statement": [
    {
      "Effect": "Allow",
      "Action": "sts:AssumeRoleWithWebIdentity",
      "Principal": {
        "Federated": "arn:aws:iam:{{AWS_Account_ID}}:oidc-provider/
auth.token.gitlab.com/cc/oidc/{{Instance_ID}}"
      },
      "Condition": {
        "StringEquals": {
          "auth.token.gitlab.com/cc/oidc/{{Instance_ID}}:aud": "gitlab-cc-
{{Instance_ID}}"
        }
      }
    }
  ]
}
```

```

    }
  }
]
}
```

Permissions policy

```

{
  "Version": "2012-10-17",
  "Statement": [
    {
      "Sid": "GitLabDuoUsagePermissions",
      "Effect": "Allow",
      "Action": [
        "q:SendEvent",
        "q:CreateAuthGrant",
        "q:UpdateAuthGrant",
        "q:GenerateCodeRecommendations",
        "q:SendMessage",
        "q:ListPlugins",
        "q:VerifyOAuthAppConnection"
      ],
      "Resource": "*"
    },
    {
      "Sid": "GitLabDuoManagementPermissions",
      "Effect": "Allow",
      "Action": [
        "q:CreateOAuthAppConnection",
        "q>DeleteOAuthAppConnection"
      ],
      "Resource": "*"
    },
    {
      "Sid": "GitLabDuoPluginPermissions",
      "Effect": "Allow",
      "Action": [
        "q:CreatePlugin",
        "q>DeletePlugin",
        "q:GetPlugin"
      ],
      "Resource": "arn:aws:qdeveloper:*:*:plugin/GitLabDuoWithAmazonQ/*"
    }
  ]
}
```

```
]
}
```

Optionally, you can also use customer managed keys (CMK) to encrypt your resources if you want full control over the lifecycle and usage of your key. The `kms:ViaService` condition key to limit who can use CMK for encrypting and decrypting content. For more information, see [Manage access to Amazon Q Developer for third-party integration](#).

GitLab quick actions

When invoked, quick actions perform tasks for you in GitLab issues and merge requests. To learn how to invoke quick actions in GitLab, see the [GitLab documentation](#).

Merge request generation and iteration

- `/q dev` – Allows you to go from a high-level idea captured in a GitLab issue to having Amazon Q generate a ready-to-review merge request with the proposed code implementation. This helps streamline the process of turning concepts into working code. The merge request is created in a new branch and Amazon Q assigns the issue creator as a merge request reviewer. You're also provided a merge request summary. For more information, see [Turn an idea into a merge request](#).
- `/q dev (revise)` – Allows you to iterate on the proposed code implementation provided by Amazon Q rather than starting again from an issue. Amazon Q reviews your feedback and makes updates to the code that was originally generated. You're also provided with commit messages for each change being made. The description following each iteration is updated and a comment describing the feedback is incorporated into the iteration. You can then review and merge the suggestions to your code. For more information, see [Make code changes based on feedback](#).

Code transformation

- `/q transform` – Allows you to initiate the upgrade process from Java Maven 8 or Java Maven 11 to Java Maven 17 project. Starting from a GitLab issue, Amazon Q analyzes the code to determine the necessary Java upgrades or modernization, updates the issue, automatically opens a new merge request with the proposed changes, and assigns the issue creator as a reviewer. You need a [GitLab Runner](#) setup to build, and it needs to be customized for code transformation. For more information, see [Customizing a CI/CD pipeline for code transformation](#) and [Upgrade Java](#).

Note

The source version of a Maven project needs to be identified before you can transform your code, so your compiler settings need to be set within a `pom.xml` file. Therefore, your `pom.xml` file must have a [source and target](#).

Unit test generation

- `/q test` – Allows you to generate unit tests for new added lines of source code in your merge request. Amazon Q comments with unit test suggestions that can be added to your test file. You can apply the generated tests at once or review each test individually before applying. If a test file isn't found in the merge request, Amazon Q provides the unit tests that you can manually add to a test file. For more information, see [Create test coverage](#).

Code review

- `/q review` – Allows you to initiate a merge request review in GitLab Duo with Amazon Q. An automatic code review is initiated for new merge requests. As a GitLab administrator, you can also configure Amazon Q to turn off automatic reviews. Automated code reviews identify and fix potential issues as Amazon Q generates and suggests code fixes to your merge request. They provide quality checks, analyzing for issues, logical errors, anti-patterns, code duplication, and more.

Amazon Q gives you code analysis with comments, with each comment providing a separate finding. This quick action is available for all languages. Automatic code reviews are initiated when you open new merge requests or reopen previously closed ones. However, automatic code reviews won't be triggered by subsequent commits made within an existing merge request. You can manually trigger a code review by using the `/q review` quick action.

You can configure code reviews to run automatically on every new merge request within your GitLab instance or group. For more information, see [Review a merge request](#).

Chat session in web UI and IDEs

- GitLab Duo Chat and Code Suggestions works with Amazon Q to provide support for CI/CD configuration, error explanations, and addressing questions. You can use slash commands in a

chat session to invoke the GitLab Duo with Amazon Q chat capabilities. For more information, see [Ask GitLab Duo Chat](#).

Getting started with GitLab Duo with Amazon Q

[GitLab Duo with Amazon Q](#) brings artificial intelligence (AI) capabilities directly into your software development operations and source code management workflows. You can get started with [GitLab Duo with Amazon Q](#) using a self-managed GitLab instance and an [GitLab Ultimate subscription](#) that's synchronized with GitLab. You need to create an Amazon Q Developer profile, add a connection with an OpenID Connect (OIDC) identity provider, and create an IAM role to access Amazon Q from GitLab. For more information, see [Onboarding with AWS identity provider and IAM role creation](#). To learn how to create the required resources and set up GitLab Duo with Amazon Q, see [Set up GitLab Duo with Amazon Q](#) in the *GitLab documentation*.

At any time, you can configure the availability of GitLab Duo with Amazon Q by turning it on or off for your instance, group, or project. For more information, see [Turn off GitLab Duo with Amazon Q](#).

Once you set up GitLab Duo with Amazon Q, you can begin using the AI capabilities of Amazon Q in GitLab to transform your code to Java 17, review merge requests for quality and vulnerabilities, and suggest unit tests. You can also use the GitLab Duo Chat feature that supports Amazon Q to address developmental tasks, such as vulnerability explanation, troubleshoot failed pipelines, and code refactoring.

Before you can invoke code transformation, you must have at least one [GitLab Runner](#) available for your project that must be customized. For more information, see [Customizing a CI/CD pipeline for code transformation](#). To learn more about how to invoke quick actions in GitLab issues and merge requests, see [GitLab Duo with Amazon Q](#).

Customizing a CI/CD pipeline for code transformation

Amazon Q for code transformation performs some of its capabilities using static analysis, and this requires your compile and test scope dependencies to be provided in addition to your project source code. Code transformation for GitLab uses a [GitLab CI/CD](#) job to provide access to those dependencies.

Before you can invoke code transformation for your project, you need the following:

- At least one [GitLab Runner](#).

- CI/CD feature must be enabled on the project.
- A `.gitlab-ci.yml` committed on the project's default branch.

To customize a CI/CD pipeline for code transformation

1. If your project doesn't already have a GitLab CI/CD pipeline, create one using the [Maven.gitlab-ci.yml](#) template provided by GitLab. For more information, see [Create a project pipeline](#).
2. Update the `.gitlab-ci.yml` file with the following job:

```
q-code-transformation:
  stage: build
  script:
    - 'mvn $MAVEN_CLI_OPTS test-compile'
    - 'mvn $MAVEN_CLI_OPTS dependency:copy-dependencies -DoutputDirectory=dependencies -Dmdep.useRepositoryLayout=true -Dmdep.copyPom=true -Dmdep.addParentPoms=true'
  artifacts:
    name: q-code-transformation-dependencies
    paths:
      - dependencies/*
  rules:
    - if: $CI_COMMIT_REF_NAME =~ /^q\/transform-\/ && $CI_PIPELINE_SOURCE == 'push'
      when: always
```

- The first `mvn` invocation validates that your project compiles before Amazon Q code transformation attempts to process it. The goal may be one of `test-compile`, `test`, `integration-test`, or `verify`.
- The second `mvn` invocation copies project dependencies to a staging directory to include them as job artifacts.
- The `artifacts` section uploads the copied dependencies so they can be accessed by Amazon Q code transformation.
- The `rules` section configures this job to only run on branch names that start with `q/transform-*` when a new commit is pushed. That isn't the case when a merge request is opened.

Dynamically selecting a Java version

When Amazon Q code transformation opens a merge request in GitLab after completing, your project pipeline runs whichever jobs are configured to run for merge requests. Since the updated code targets Java 17, these jobs encounter build errors if the job attempts to build them using Java 8 or Java 11.

The following is an advanced `.gitlab-ci.yml` that uses Docker and dynamically chooses Java 17 when jobs are running on a merge request with a branch name starting with `q/transform-*`. Once you decide to merge the opened request to your default branch, you need to modify your `.gitlab-ci.yml` to use Java 17 by default.

```
variables:
  MAVEN_OPTS: >-
    -Dhttps.protocols=TLSv1.2
    -Dmaven.repo.local=$CI_PROJECT_DIR/.m2/repository
    -Dorg.slf4j.simpleLogger.showDateTime=true
    -Djava.awt.headless=true
    -Dmaven.install.skip=true

  MAVEN_CLI_OPTS: >-
    --batch-mode
    --errors
    --fail-at-end
    --show-version
    --no-transfer-progress
    -DinstallAtEnd=true
    -DdeployAtEnd=true

  BUILD_IMAGE: maven:3-openjdk-8

workflow:
  rules:
    - if: $CI_COMMIT_REF_NAME =~ /^q\/transform-\/ && $CI_PIPELINE_SOURCE ==
      'merge_request_event'
      variables:
        BUILD_IMAGE: maven:3-openjdk-17
    - when: always

image: $BUILD_IMAGE

cache:
```



```
paths:
  - .m2/repository

compile:
  stage: build
  script:
    - 'mvn $MAVEN_CLI_OPTS compile'

verify:
  stage: test
  script:
    - 'mvn $MAVEN_CLI_OPTS verify'

q-code-transformation:
  stage: build
  script:
    - 'mvn $MAVEN_CLI_OPTS test-compile'
    - 'mvn $MAVEN_CLI_OPTS dependency:copy-dependencies -DoutputDirectory=dependencies
-Dmdep.useRepositoryLayout=true -Dmdep.copyPom=true -Dmdep.addParentPoms=true'
  artifacts:
    name: q-code-transformation-dependencies
    paths:
      - dependencies/*
  rules:
    - if: $CI_COMMIT_REF_NAME =~ /^q\/transform-\/ && $CI_PIPELINE_SOURCE == 'push'
      when: always
```

Troubleshooting issues for GitLab Duo with Amazon Q

Consult the following section to troubleshoot common onboarding problems when using GitLab Duo with Amazon Q.

GitLab instance blocks inbound requests

Problem: My GitLab instance blocks inbound requests, and Amazon Q can't call back into my GitLab instance.

Solution: Identify what's blocking the inbound request, and make modifications to accept inbound requests from Amazon Q, which could be in the form of one of the following:

- A proxy
- A firewall layer

- Denylist or allowlist at any infrastructure layer

You need to reonboard to your GitLab instance to resync. For more information, see [Set up GitLab Duo with Amazon Q](#) in the *GitLab documentation*.

Connection between Gitlab and Amazon Q out of sync

Problem: I modified GitLab Duo with Amazon Q application and now the connection between GitLab and Amazon Q is out of sync.

Solution: When GitLab and Amazon Q are out of sync, it can lead to invalid credentials, inability to refresh credentials, and unauthorized response from GitLab when Amazon Q calls into GitLab.

Instance domain name not resolvable

Problem: I modified the GitLab instance URL after onboarding, and now the connection between GitLab and Amazon Q are out of sync. Amazon Q ins't able to call the GitLab instance successfully anymore.

Solution: You need to ensure the domain name is resolvable. Reonboard to your GitLab instance. For more information, see [Set up GitLab Duo with Amazon Q](#) in the *GitLab documentation*.

Incorrect IAM role and identity provider (IdP)

Problem: My IAM role doesn't provide the correct permissions to the APIs required by GitLab Duo with Amazon Q.

Solution: Ensure the identity provider (IdP) and IAM roles are set up correctly. For more information, see [Set up GitLab Duo with Amazon Q](#) in the *GitLab documentation*.

Amazon Q Developer profile doesn't exist

Problem: I'm trying to onboard to GitLab Duo with Amazon Q, but coming across the following issue: Application could not be craeted by the AI Gateway: Error 400 - {"detail":"An error occured (ValidationException) when calling the Create0AuthAppConnection operation: ProfileDoesNotExist"}

Solution: You need to first create an Amazon Q Developer profile through the Amazon Q Developer console. For more information, see [Set up GitLab Duo with Amazon Q](#) in the *GitLab documentation*.

Amazon Q Developer for GitHub (Preview)

Note

Amazon Q Developer for GitHub is in preview release and is subject to change.

[Amazon Q Developer for GitHub or GitHub Enterprise Cloud](#) allows you to leverage Amazon Q Developer capabilities for your software development workflows. With specialized development agents, you can implement new ideas, review code for quality issues, address vulnerabilities with unit tests, and modernize legacy Java applications. Once the agent completes a task, you can provide feedback, and the agent iterates on the previous solution. For more information, see [Amazon Q Developer agents](#).

You can access the Amazon Q Developer integration through [GitHub](#) and authorize it to provide access to your organization's repositories. To get started with Amazon Q Developer for GitHub, see [Quickstart: Installing, using features in GitHub, and increasing usage limits](#).

Important

To install the Amazon Q Developer app and authorize access to GitHub repositories, you must meet the requirements for the GitHub organization. For more information, see [Requirements to install a GitHub App](#) and [Roles in organization](#) in the *GitHub documentation*.

Note

The Amazon Q Developer integration with GitHub processes data in the United States. For more information, see [Cross-region processing in Amazon Q Developer](#).

Note

Amazon Q Developer for GitHub (Preview) does not currently use your content for service improvement. If we enable this in the future, we will provide you with adequate notice and a way for you to opt out of such use.

Topics

- [Installing Amazon Q Developer app and authorizing access](#)
- [Amazon Q Developer agents](#)
- [Registering app installation](#)
- [Using browser extensions in GitHub](#)
- [Using slash commands in GitHub issues and pull requests](#)
- [Quickstart: Installing, using features in GitHub, and increasing usage limits](#)
- [Developing features and iterating with Amazon Q Developer in GitHub](#)
- [Reviewing code with Amazon Q Developer in GitHub](#)
- [Transforming code with Amazon Q Developer in GitHub](#)
- [Customizing a workflow for code transformation](#)
- [Increasing usage limits and configuring details in Amazon Q Developer console](#)
- [Configuring registered installation details](#)
- [Troubleshooting issues for Amazon Q Developer for GitHub](#)

Installing Amazon Q Developer app and authorizing access

As a GitHub organization administrator, you can install and configure the Amazon Q Developer app from [GitHub](#) for free without the need to set up an AWS account to get started. During the installation process, you choose to provide access to all or selected repositories in your GitHub organization. After installing and authorizing, you have access to free usage for the Amazon Q Developer features in GitHub. You can increase free usage by registering the app installation in the [Amazon Q Developer console](#). For more information, see [Quickstart: Installing, using features in GitHub, and increasing usage limits](#).

Important

To install the Amazon Q Developer app and authorize access to GitHub repositories, you must meet the requirements for the GitHub organization. For more information, see [Requirements to install a GitHub App](#) and [Roles in organization](#) in the *GitHub documentation*.

Note

If your GitHub enterprise organization has enabled IP allowlisting, you must accept the allowed IP addresses on the GitHub app. You can also choose to automatically add the IP addresses to your allow list. For more information, see [Allowing access by GitHub Apps](#) and [Enabling allowed IP addresses](#) in the GitHub documentation.

The following IP addresses are used to access your GitHub resources:

```
34.228.181.128
44.219.176.187
54.226.244.221
```

Amazon Q Developer agents

Amazon Q Developer agents provide support across the software development lifecycle from coding, testing, and deploying to troubleshooting and modernizing applications.

- **Amazon Q development agent** – After creating an issue and adding the feature development label, Amazon Q Developer automatically implements your new features and bug fixes. Amazon Q Developer creates a pull request with the changes and a summary of the changes. Instead of applying a label, you can also initiate feature development with the `/q dev` slash command in a comment of the issue. For more information, see [Developing features and iterating with Amazon Q Developer in GitHub](#).
- **Amazon Q code review agent** – When a new pull request is created or a closed pull request is reopened, Amazon Q Developer automatically performs a code review and provides feedback on code quality, potential issues, and security concerns. Amazon Q Developer also generates fixes for the identified issues, which you can review and choose to commit to the pull request. Automatic code reviews are not triggered by subsequent commits made within an existing pull request. You can initiate additional code reviews within pull requests with the `/q review` slash command. For more information, see [Reviewing code with Amazon Q Developer in GitHub](#).
- **Amazon Q transform agent** – After creating an issue and adding the code transformation label, Amazon Q Developer transforms your code from Java version 8 or 11 to version 17. Amazon Q Developer creates a pull request with the changes and summary of the changes. Instead of applying a label, you can also initiate code transformation with the `/q transform` slash command in a comment of the issue. For more information, see [Transforming code with Amazon Q Developer in GitHub](#).

Important

The Amazon Q Developer app attempts to automatically create the **Amazon Q development agent** and the **Amazon Q transform agent** labels in GitHub repositories you authorize access to. If the labels are not automatically created, or if they're unintentionally deleted, you can manually create them in GitHub. The labels must be named as **Amazon Q development agent** and **Amazon Q transform agent** in order for them to be recognized and processed as Amazon Q Developer labels. For more information, see [Creating a label](#) in the *GitHub documentation*.

Registering app installation

The Amazon Q Developer integration for GitHub is available for free without the need to set up an AWS account to get started. You're provided with limited invocations per month for feature development and code transformation, as well as limited number of lines for code reviews per month. You can increase free usage by registering your Amazon Q Developer app installation with your AWS account. For more information, see [Increasing usage limits and configuring details in Amazon Q Developer console](#).

Important

To register the app installation in the Amazon Q Developer console, you must meet the requirements for the GitHub organization. For more information, see [Requirements to install a GitHub App](#) and [OAuth apps and organizations](#) in the *GitHub documentation*.

Using browser extensions in GitHub

You can use the Amazon Q Developer extension in a supported browser to quickly add a label for feature development or code transformation in GitHub issues without having to search through label menus.

The Amazon Q Developer extension is available for the following browsers:

- [Google Chrome](#)
- [Mozilla Firefox](#)
- [Microsoft Edge](#)

Using slash commands in GitHub issues and pull requests

You can use slash commands in comments within GitHub issues or pull requests to invoke Amazon Q Developer to perform development tasks or provide support.

- `/q dev` - Invokes Amazon Q Developer in a GitHub issue to automatically implement new features and bug fixes. Amazon Q Developer creates a pull request with the changes and a summary of the changes.
- `/q review` - Invokes Amazon Q Developer to automatically perform code reviews when pull requests are created or reopened, providing feedback on code quality, potential issues, and security concerns, along with suggested fixes. Automatic reviews are not triggered by subsequent commits to existing pull requests.
- `/q transform` - Invokes Amazon Q Developer to automatically transform Java 8 or 11 code to Java 17 when an issue is created with the code transformation label. Amazon Q Developer creates a pull request with the changes and a summary of the modifications.
- `/q help` - Provides information about Amazon Q Developer for GitHub, including slash commands, features, customization details, as well as a link to the [Amazon Q Developer for GitHub \(Preview\)](#) documentation in the *Amazon Q Developer Developer Guide*.

Quickstart: Installing, using features in GitHub, and increasing usage limits

Note

Amazon Q Developer for GitHub is in preview release and is subject to change.

This tutorial provides a walkthrough of the following tasks:

1. Install the Amazon Q Developer app from the GitHub Marketplace and provide access to your repositories.
2. Get started with Amazon Q Developer in an issue by adding a label for either feature development or code transformation, or by creating a new pull request for code review. Alternatively, you can use slash commands in issues to initiate feature development or code transformation. You can also initiate additional code reviews within pull requests with a slash command.

3. (Optional) Register your Amazon Q Developer app installation with your AWS account to increase your usage limits.

Step 1: Install Amazon Q Developer in GitHub and authorize access

You can use Amazon Q Developer in GitHub free without the need to set up an AWS account to get started. The first step to using Amazon Q Developer in GitHub is to install the app from [GitHub](#). During this process, you can provide Amazon Q Developer access to all your GitHub repositories or selected repositories.

Important

To install the Amazon Q Developer app and authorize access to GitHub repositories, you must meet the requirements for the GitHub organization. For more information, see [Requirements to install a GitHub App](#) and [Roles in organization](#) in the *GitHub documentation*.

To install Amazon Q Developer and authorize access

1. Navigate to the [Amazon Q Developer for GitHub app](#) page.
2. If necessary, sign in to your [GitHub](#) account using your GitHub credentials.
3. Review the Amazon Q Developer app's overview and features, and then choose **Install**.
4. Do one of the following to configure access to your GitHub repositories:
 - a. To provide access to all current and future repositories, choose **All repositories**.
 - b. To provide access to specific repositories, choose **Only select repositories**, choose the **Select repositories** dropdown, and then choose a repository you want to allow to access to.
5. Choose **Install** to complete installing Amazon Q Developer in GitHub and authorizing it to access your repositories.

After installing the app in GitHub and authorizing access, you're redirected to the Amazon Q Developer overview page in GitHub. You can navigate to your GitHub repository to begin using the Amazon Q Developer features.

 Note

If your GitHub enterprise organization has enabled IP allowlisting, you must accept the allowed IP addresses on the GitHub app. You can also choose to automatically add the IP addresses to your allow list. For more information, see [Allowing access by GitHub Apps](#) and [Enabling allowed IP addresses](#) in the GitHub documentation.

The following IP addresses are used to access your GitHub resources:

```
34.228.181.128
44.219.176.187
54.226.244.221
```

Step 2: Using Amazon Q Developer features in GitHub

After installing the Amazon Q Developer app in GitHub and authorizing access to your repositories, you can begin using the Amazon Q Developer agents for support across the software development lifecycle from coding, testing, and deploying to troubleshooting and modernizing applications. For more information, see one of the following:

 Important

The Amazon Q Developer app attempts to automatically create the **Amazon Q development agent** and the **Amazon Q transform agent** labels in GitHub repositories you authorize access to. If the labels are not automatically created, or if they're unintentionally deleted, you can manually create them in GitHub. The labels must be named as **Amazon Q development agent** and **Amazon Q transform agent** in order for them to be recognized and processed as Amazon Q Developer labels. For more information, see [Creating a label](#) in the *GitHub documentation*.

- [Developing features and iterating with Amazon Q Developer in GitHub](#)
- [Reviewing code with Amazon Q Developer in GitHub](#)
- [Transforming code with Amazon Q Developer in GitHub](#)

Step 3: Increase free usage limits and configure details

You can use Amazon Q Developer agents in GitHub for free without the need to set up an AWS account to get started. You're provided with limited invocations per month for feature development and code review, as well as limited number of lines of code transformation per month. You can increase your free usage at any time by registering your Amazon Q Developer app installation with your AWS account. Registering also provides with the ability to configure details such as disabling code reviews and adding tags for searching and filtering. For more information, see [Increasing usage limits and configuring details in Amazon Q Developer console](#).

Important

To register the app installation in the Amazon Q Developer console, you must meet the requirements for the GitHub organization. For more information, see [Requirements to install a GitHub App](#) and [OAuth apps and organizations](#) in the *GitHub documentation*.

Developing features and iterating with Amazon Q Developer in GitHub

Note

Amazon Q Developer for GitHub is in preview release and is subject to change.

You can use Amazon Q Developer in GitHub to streamline development by automatically implementing new features and bug fixes, taking tasks from idea to a completed pull request. When you add the feature development label to an issue or use the `/q dev slash` command, Amazon Q Developer uses the issue, including its title and description, as well as repository code as context to generate new code fixes and create a pull request. On the pull request, you can provide feedback and Amazon Q Developer iterates on the suggested code.

You can have Amazon Q Developer perform feature development a limited number of times per month. You can increase your free usage at any time by registering your Amazon Q Developer app installation with your AWS account. For more information, see [Increasing usage limits and configuring details in Amazon Q Developer console](#).

Important

The Amazon Q Developer app attempts to automatically create the **Amazon Q development agent** and the **Amazon Q transform agent** labels in GitHub repositories you authorize access to. If the labels are not automatically created, or if they're unintentionally deleted, you can manually create them in GitHub. The labels must be named as **Amazon Q development agent** and **Amazon Q transform agent** in order for them to be recognized and processed as Amazon Q Developer labels. For more information, see [Creating a label](#) in the *GitHub documentation*.

To use Amazon Q Developer for feature development

1. If necessary, sign in to your [GitHub](#) account using your GitHub credentials.
2. Navigate to your GitHub organization, and then navigate to the repository you want to implement new features with Amazon Q Developer.
3. Choose **Issues**, and then create a new issue or choose an existing issue. For more information, see [Create an issue](#) in the *GitHub documentation*.
 - For a new issue, in the **Add a title** text input field, enter a title that provides context to Amazon Q Developer for the feature development (example: "Create an image recognition app"). The issue description should also be included as it also provides context.

For an existing issue, you can edit the issue title and description to provide context to Amazon Q Developer for the feature development. For more information, see [Editing an issue](#) in the *GitHub documentation*.

4. When creating an issue or configuring an existing issue, you can apply the feature development Amazon Q Developer label or use the `/q dev` slash command. Do one of the following:
 - To apply the label to the issue, do one of the following:
 - Choose the **Assign to Amazon Q** dropdown menu provided as a browser extension, and then choose the **Amazon Q development agent** label.
 - In the right side menu, choose **Labels**, and then choose the **Amazon Q development agent** label.
 - To use the `/q dev` slash command in a comment:

1. Within the issue, navigate to **Add a comment**, and in the comment text input field, enter `/q dev`.
 2. Choose **Comment**.
5. For a new issue, choose **Create issue** to finish creating the issue with the necessary details for Amazon Q Developer to develop features. If you configure an existing issue, ensure you save the changes. For more information, see [Editing an issue](#) in the *GitHub documentation*.

When Amazon Q Developer finishes generating code changes for the feature development, it comments on the issue and opens a pull request.

6. Navigate to the comment left by Amazon Q Developer (example: "I finished generating the proposed code changes and opened a pull request: Resolve Create an image recognition app"), and then choose the pull request link.

You can also navigate to the **Pull requests** tab, and then choose the pull request created by Amazon Q Developer.

7. Choose the **Files changed** tab to view the code changes.
8. If you're satisfied with the suggested code changes, you can merge the pull request. For more information, see [Merge a pull request](#).

You can also review the pull request for the feature development and iterate on the suggested code changes by providing feedback to Amazon Q Developer.

To iterate on Amazon Q Developer feature development code

1. Choose the pull request created by Amazon Q Developer, and then choose the **Files changed** tab to view the code changes.
2. For the line of code you want to leave feedback for and have Amazon Q Developer iterate, choose **+** to add a comment with feedback, and then choose **Start a review**.

After you submit the review, Amazon Q Developer begins reviewing the code based on your feedback. When Amazon Q Developer is done revising your feedback, it commits the changes to the pull request and updates you with a comment.

3. Choose **Finish your review**, choose the **Request changes** radio button, and then choose **Submit review** to have your feedback reviewed.

4. If you're satisfied with the updated code changes, you can merge the pull request or iterate on the code again with new feedback. For more information, see [Merge a pull request](#).

Amazon Q Developer integrates with GitHub Actions workflows to create an intelligent feedback loop system. When a pull request is created, configured workflows, such as unit tests, automatically execute. If the workflow fails, Amazon Q Developer analyzes the output, and based on the results and failure information, it iterates on the code changes. As code changes are pushed and workflows execute, Amazon Q Developer interprets the results and uses this information to refine its approach. That creates a continuous learning loop where each iteration builds upon previous attempts and Amazon Q Developer is able to evolve its solutions.

The effectiveness of a feedback loop is dependent on having well-defined tests and workflows that provide meaningful feedback to Amazon Q Developer to interpret and act upon. You can configure workflows using GitHub Actions YAML files in your repository, allowing for customized testing and validation processes that Amazon Q Developer can respond to. For more information, see [Understanding GitHub Actions](#) in the *GitHub documentation*.

Reviewing code with Amazon Q Developer in GitHub

Note

Amazon Q Developer for GitHub is in preview release and is subject to change.

Amazon Q Developer enables automated code reviews within GitHub. When you create a new pull request or reopen a closed pull request, Amazon Q Developer automatically performs a code review and provides feedback on code quality, potential issues, and high-severity findings. Amazon Q Developer also generates fixes for the identified issues, which you can review and choose to commit to the pull request. Automatic code reviews are not triggered by subsequent commits made within an existing pull request.

You can also initiate code reviews within pull requests with the `/q review` slash command. The slash command can be added to a new pull request comment, which initiates a new code review of the pull request in its current state, including any comments and new commits. For more information, see [Initiating code reviews with Amazon Q Developer in GitHub pull requests](#).

You can have Amazon Q Developer perform a code review for a limited amount of lines per month. You can increase your free usage at any time by registering your Amazon Q Developer

app installation with your AWS account. For more information, see [Increasing usage limits and configuring details in Amazon Q Developer console](#).

 Note

If the code review capability was previously disabled, it must be enabled in the [Amazon Q Developer console](#) before you can apply the label in GitHub. For more information, see [Editing features for Amazon Q Developer in GitHub](#).

To use Amazon Q Developer for code reviews and apply fixes

Before you start a review, you can customize a code quality review by defining custom coding standards in simple Markdown files in the `project-root/.amazonq/rules` directory. Amazon Q automatically follows your guidelines, ensuring consistent code quality across your entire project. For more information, see [Creating project rules for Amazon Q Developer in third-party platforms](#).

1. If necessary, sign in to your [GitHub](#) account using your GitHub credentials.
2. Navigate to your GitHub organization, and then navigate to the repository you want to perform a code review with Amazon Q Developer.
3. Create a new a pull request for changes made to your source code. For more information, see [Creating a pull request](#) in the *GitHub documentation*.

When you create a new pull request, Amazon Q Developer automatically begins a code review to find potential issues. Once Amazon Q Developer completes the review, it submits each finding as a separate comment, as well as suggested fixes that you can commit to the pull request.

4. Review the proposed code changes by Amazon Q Developer, choose **Commit suggestion**, and then choose **Commit changes** to update the pull request.
5. If you're satisfied with the suggested code fixes, you can merge the pull request to apply the code changes suggested by Amazon Q Developer. For more information, see [Merging a pull request](#) in the *GitHub documentation*.

Initiating code reviews with Amazon Q Developer in GitHub pull requests

After an automatic code review performed by Amazon Q Developer for a new or reopened GitHub pull request, you can initiate additional code reviews to iterate on your code using the `/q review` slash command. The code review is performed on the entire pull request's diff.

Note

You can only initiate a code review within a pull request with a new comment. The `/q review` slash command will not work in an existing comment thread.

To use initiate code reviews in a pull request

1. If necessary, sign in to your [GitHub](#) account using your GitHub credentials.
2. Navigate to your GitHub organization, and then navigate to the pull request you want to perform a code review with Amazon Q Developer. For more information, see [About pull requests](#).
3. Within the pull request, navigate to **Add a comment**, and in the comment text input field, enter `/q review`.
4. Choose **Comment** to initiate the code review.

It can take a few minutes for Amazon Q Developer to complete analyzing the pull request code. After Amazon Q Developer finishes analyzing, it replies to your comment with its critical and severity findings, as well as proposed changes you can choose to commit and update the pull request.

5. If you're satisfied with the suggested code fixes, you can merge the pull request to apply the code changes suggested by Amazon Q Developer. For more information, see [Merging a pull request](#) in the *GitHub documentation*.

Transforming code with Amazon Q Developer in GitHub

Note

Amazon Q Developer for GitHub is in preview release and is subject to change.

With the code transformation feature, you can update your technology stack, enhance performance, and ensure future compatibility while preserving the core functionality of your existing code. With Amazon Q Developer, you can avoid technical debt and build your applications for long-term sustainability and scalability.

When you add the code transformation label to an issue or use the `/q transform slash` command, Amazon Q Developer transforms your code from Java version 8 or 11 to version 17. Amazon Q Developer then creates a pull request with the changes and summary of the changes that you can merge into your mainline.

You can have Amazon Q Developer perform a code transformation a limited number of times per month. You can increase your free usage at any time by registering your Amazon Q Developer app installation with your AWS account. For more information, see [Increasing usage limits and configuring details in Amazon Q Developer console](#).

Prerequisites

Before transforming your codebase with Amazon Q Developer, consider the following requirements:

- Ensure your GitHub repository has GitHub Actions enabled. For more information, see [Understanding GitHub Actions](#) and [Enabling a workflow](#) in the *GitHub documentation*.
- Create and configure your workflow file in the `.github/workflows/` directory to handle code transformation tasks. For more information, see [Customizing a workflow for code transformation](#).

After meeting the prerequisites, you can apply the **Amazon Q transform agent** label and upgrade your codebase in your GitHub repository.

Important

The Amazon Q Developer app attempts to automatically create the **Amazon Q development agent** and the **Amazon Q transform agent** labels in GitHub repositories you authorize access to. If the labels are not automatically created, or if they're unintentionally deleted, you can manually create them in GitHub. The labels must be named as **Amazon Q development agent** and **Amazon Q transform agent** in order for them to be recognized and processed as Amazon Q Developer labels. For more information, see [Creating a label](#) in the *GitHub documentation*.

To upgrade your codebase

1. If necessary, sign in to your [GitHub](#) account using your GitHub credentials.
2. Navigate to your GitHub organization, and then navigate to the repository you want to transform your codebase.
3. Choose **Issues**, and then create a new issue. For more information, see [Create an issue](#) in the *GitHub documentation*.
4. In the **Add a title** text input field, enter a title that provides context to Amazon Q Developer for code transformation (example: "Upgrade codebase"). The issue description should also be included as it also provides context.
5. When creating an issue or configuring an existing issue, you can apply the code transformation Amazon Q Developer label or use the `/q transform` slash command. Do one of the following:
 - To apply the label to the issue, do one of the following:
 - Choose the **Assign to Amazon Q** dropdown menu provided as a browser extension, and then choose the **Amazon Q transform agent** label.
 - In the right side menu, choose **Labels**, and then choose the **Amazon Q transform agent** label.
 - To use the `/q transform` slash command in a comment:
 1. Within the issue, navigate to **Add a comment**, and in the comment text input field, enter `/q transform`.
 2. Choose **Comment**.
6. Choose **Create issue** to finish creating the issue with the necessary details for Amazon Q Developer to transform your code.

When Amazon Q Developer finishes generating code changes for the feature development, it will comment on the issue and opens a pull request.

7. Navigate to the comment left by Amazon Q Developer (example: "I finished upgrading your code and opened a pull request: Resolve Upgrade codebase."), and then choose the pull request link.

You can also navigate to the **Pull requests** tab, and then choose the pull request created by Amazon Q Developer.

8. Choose the **Files changed** tab to view the changes.

9. If you're satisfied with the suggested code changes, you can merge the pull request. For more information, see [Merge a pull request](#).

Amazon Q Developer leaves a comment that provides a transformation summary with details regarding files that it updated. You can find the summary in the `build_logs.txt` file provided in the comment. If Amazon Q Developer can't perform a complete code transformation, it also provides a summary regarding the errors that prevented the complete transformation.

Customizing a workflow for code transformation

Note

Amazon Q Developer for GitHub is in preview release and is subject to change.

When the Amazon Q Developer code transformation agent creates a pull request in GitHub after completing the task, your project pipeline runs the jobs that are configured to run for pull requests. Since the updated code targets Java 17, the jobs encounter build errors if the job attempts to build them using Java 8 or Java 11.

Before you apply the **Amazon Q transform agent** label to a GitHub issue, you need to create and configure a workflow file in the `.github/workflows/` directory to handle code transformation tasks.

To customize a workflow for code transformation

1. If your repository doesn't already have a workflow, create a GitHub Actions workflow file. For more information, see [Quickstart for GitHub actions](#) and [Creating an example workflow](#) in the *GitHub documentation*.
2. Update your workflow file with the following job:

```
q-code-transformation:
  runs-on: ubuntu-latest
  steps:
    - uses: actions/checkout@v3
    - uses: actions/setup-java@v3
      with:
        java-version: '17'
        distribution: 'adopt'
```

```

- name: Build and copy dependencies
  run: |
    mvn ${ env.MAVEN_CLI_OPTS } verify
    mvn ${ env.MAVEN_CLI_OPTS } dependency:copy-dependencies -
DoutputDirectory=dependencies -Dmdep.useRepositoryLayout=true -Dmdep.copyPom=true -
Dmdep.addParentPoms=true

- name: Upload artifacts
  uses: actions/upload-artifact@v4
  with:
    name: q-code-transformation-dependencies
    path: dependencies

```

Dynamically selecting a Java version for GitHub workflow

The following dynamically code snippet dynamically chooses Java 17 when jobs are running on a pull request created by the **Amazon Q code transform agent**. When you decide to merge the open pull request to your default branch, you need to modify your workflow file in the `.github/workflows/` directory to use Java 17 by default.

```

name: Q Code Transformation

on:
  push:
    branches:
      - 'Q-TRANSFORM-issue-*'

env:
  MAVEN_CLI_OPTS: >-
    -Djava.version=${{ contains(github.event.head_commit.message, 'Code transformation
completed') && '17' || '1.8' }}

jobs:
  q-code-transformation:
    runs-on: ubuntu-latest
    steps:
      - uses: actions/checkout@v3
      - uses: actions/setup-java@v3
        with:
          java-version: ${{ contains(github.event.head_commit.message, 'Code
transformation completed') && '17' || '8' }}

```

```

        distribution: 'adopt'

- name: Build and copy dependencies
  run: |
    mvn ${ env.MAVEN_CLI_OPTS } verify
    mvn ${ env.MAVEN_CLI_OPTS } dependency:copy-dependencies -
DoutputDirectory=dependencies -Dmdep.useRepositoryLayout=true -Dmdep.copyPom=true -
Dmdep.addParentPoms=true

- name: Upload artifacts
  uses: actions/upload-artifact@v4
  with:
    name: q-code-transformation-dependencies
    path: dependencies

```

Handling first-party dependencies in GitHub workflows

You can enhance your GitHub workflow to handle first-party dependencies when using Amazon Q Developer for code transformation.

The standard Amazon Q Developer workflow handles projects with public Maven dependencies. However, enterprise projects often include first-party dependencies, including private Java ARchive (JAR files) not available in public repositories. This enhanced workflow extends the standard configuration to support both public and private dependencies.

Use cases for enhanced workflow

Use the enhanced GitHub workflow configuration if your project has:

- Private or internal JAR dependencies
- Custom utility libraries not available in Maven Central
- Build failures with `Could not resolve dependencies` errors

Example Configuration

The following example shows a complete workflow configuration that handles first-party dependencies:

```
name: Q Code Transformation
```

```

on:
  push:
    branches:
      - 'Q-TRANSFORM-issue-*'

env:
  MAVEN_CLI_OPTS: >-
    -Djava.version=${{ contains(github.event.head_commit.message, 'Code transformation
completed') }} '17' || '1.8' }}
    -Dmaven.compiler.source=${{ contains(github.event.head_commit.message, 'Code
transformation completed') }} '17' || '1.8' }}
    -Dmaven.compiler.target=${{ contains(github.event.head_commit.message, 'Code
transformation completed') }} '17' || '1.8' }}

jobs:
  q-code-transformation:
    runs-on: ubuntu-latest
    steps:
      - uses: actions/checkout@v4
      - uses: actions/setup-java@v4
        with:
          java-version: ${{ contains(github.event.head_commit.message, 'Code
transformation completed') }} '17' || '8' }}
          distribution: 'temurin'

      - name: Cache Maven dependencies
        uses: actions/cache@v4
        with:
          path: ~/.m2
          key: ${{ runner.os }}-m2-${{ hashFiles('**/pom.xml') }}
          restore-keys: ${{ runner.os }}-m2

      - name: Install First-Party Dependencies
        run: |
          mvn install:install-file \
            -Dfile=./your-library/built-library/1.0.0/your-library-1.0.0.jar \
            -DgroupId=com.yourcompany.samples \
            -DartifactId=your-library \
            -Dversion=1.0.0 \
            -Dpackaging=jar

      - name: Build and copy dependencies
        run: |
          mvn ${{ env.MAVEN_CLI_OPTS }} verify

```

```

mvn ${env.MAVEN_CLI_OPTS} dependency:copy-dependencies -
DoutputDirectory=dependencies -Dmdep.useRepositoryLayout=true -Dmdep.copyPom=true -
Dmdep.addParentPoms=true

- name: Upload artifacts
  uses: actions/upload-artifact@v4
  with:
    name: q-code-transformation-dependencies
    path: dependencies

- name: Debug information
  if: failure()
  run: |
    echo "Branch: ${github.ref_name}"
    echo "Commit message: ${github.event.head_commit.message}"
    echo "Java version logic result:
${contains(github.event.head_commit.message, 'Code transformation completed') &&
'17' || '8'}"
    echo "Local Maven repository contents:"
    find ~/.m2/repository/com/yourcompany/samples -name "*.jar" 2>/dev/null ||
echo "No your-library found in local repo"
    java -version
    mvn -version

```

Key components of enhanced workflow

The enhanced GitHub workflow has several key components:

- **First-party dependency installation**

The workflow includes a critical step for installing private dependencies using the Maven `install:install-file` command. This ensures your private dependencies are available in the local Maven repository during transformation.

- **Dynamic Java version handling**

The workflow automatically switches between Java 8 and Java 17 based on the transformation state, using environment variables to manage compiler properties.

- **Maven configuration**

The enhanced workflow includes comprehensive Maven configuration with:

- Dependency caching for improved performance

- Complete compiler property management
- Repository layout preservation
- POM file handling
- **Implementation steps**
 - Identify your private dependencies in `pom.xml`
 - Organize JAR files in your repository structure
 - Customize the workflow with your specific paths and coordinates
 - Test the workflow on a branch matching the pattern `Q-TRANSFORM-issue-*`
- **Troubleshooting**

The workflow includes a debug information step that activates on failure, providing:

- Branch information
- Commit message details
- Java version configuration
- Local Maven repository contents
- Java and Maven version information

Increasing usage limits and configuring details in Amazon Q Developer console

Note

Amazon Q Developer for GitHub is in preview release and is subject to change.

You can use Amazon Q Developer agents in GitHub for free without the need to set up an AWS account to get started. You're provided with limited invocations per month for the feature development and code review capabilities, as well as specified number of lines for code transformation per month. You can increase your free usage at any time by registering your Amazon Q Developer app installation with your AWS account.

By default, the **Code reviews**, **Feature development**, and **Code transformation** features are enabled in GitHub when you install the app. You can disable any of these features when you

register. Registering requires an Amazon Q Developer profile to manage the features from the console. The profile stores your settings and code recommendation customization.

Important

To register the app installation in the Amazon Q Developer console, you must meet the requirements for the GitHub organization. For more information, see [Requirements to install a GitHub App](#) and [OAuth apps and organizations](#) in the *GitHub documentation*.

To register your Amazon Q Developer installation

1. Navigate to the [Amazon Q Developer console](#), and in the navigation pane, choose **Amazon Q Developer in GitHub**.
2. Choose **Register installation**, and then choose **Authorize** to be directed to GitHub.

If you previously authorized Amazon Q Developer to access your GitHub organization, you'll be redirected back to the Amazon Q Developer console. In this case, skip to step 4.

3. Sign in to your GitHub account using your GitHub credentials. If you have multiple accounts, choose the account where you want to provide access to Amazon Q Developer.
4. Choose **Authorize Amazon Q Developer** to provide access to your GitHub account. You'll be redirected back to Amazon Q Developer console after the authorization.
5. Enter details for an Amazon Q Developer profile.

If you previously created a profile when getting started with Amazon Q Developer, skip to step 6. To learn more about the profile, see [Amazon Q Developer profile](#).

- Under **Amazon Q Developer profile**, enter your profile details.
 - i. In the **Profile name** text input field, enter a name that can be recognized and referenced. Consider including the region so the profile name can be properly identified (example: "QDevProfile_us-east-1").
 - ii. (Optional) Choose **Additional settings**, and in the **Profile description - optional** text input field, enter a description for your profile to provide context and identify your profile.
6. Under **Registration details**, enter your GitHub details, optionally configure the code reviews feature, and add tags.

- a. In the **Registration name** text input field, enter a name for your app installation.
 - b. (Optional) In the **Organization name - *optional*** text input field, enter a name for the organization associated with the app installation.
 - c. (Optional) Under **Features**, configure the **Code reviews** feature by choosing the toggle to enable or disable the feature. **Feature development** and **Code transformation** configuration cannot be modified. The features are enabled by default.
 - d. (Optional) Under **Tags - optional**, choose **Add new tag** to add a tag that can help to search and filter your AWS resources in GitHub.
7. Choose **Register** to create an Amazon Q Developer profile and register your app installation in GitHub with your AWS account.

After you successfully create an Amazon Q Developer profile and register the app installation in GitHub, you can view the registration details. You can still enable or disable features, as well as add tags at a later time. You can also delete a GitHub app installation. For more information [Configuring registered installation details](#).

Configuring registered installation details

Note

Amazon Q Developer for GitHub is in preview release and is subject to change.

After you create an Amazon Q Developer profile and register the app installation in GitHub, you can do the following from the Amazon Q Developer console:

- Enable or disable the use of code reviews. Feature development and code transformation configuration cannot currently be modified.
- Find links to browser extensions that provide a way to add Amazon Q Developer feature labels in the GitHub issues.
- Add tags to search and filter your resources or track AWS costs.
- Delete a GitHub app installation registration.

Editing features for Amazon Q Developer in GitHub

The features available for Amazon Q Developer in GitHub are enabled by default when you install the app in GitHub and provide authorization to access your organization. You can choose to disable a feature if you no longer want to use the feature in GitHub.

To enable or disable a feature for Amazon Q Developer in GitHub

1. Navigate to the [Amazon Q Developer console](#).
2. In the navigation pane, under **Amazon Q Developer in GitHub**, choose **Registered installations**.
3. Under the **Name** column, choose the registration name for the installation you want to enable or disable a feature.
4. Under **Features**, choose **Edit** to configure the feature availability.
5. In the modal, choose the toggle for the feature you want to enable or disable, and then choose **Save** to confirm the changes.

After enabling or disabling a feature in the [Amazon Q Developer console](#), the changes are reflected in GitHub. Attempting to assign an issue to a Amazon Q Developer label after disabling the feature will lead to an error. Code reviews will no longer take place in new pull requests if the feature is disabled.

Installing browser extensions

You can install the Amazon Q Developer extension in one of the supported browsers. The extension enables you to quickly assign feature development or code transformation tasks to Amazon Q Developer in GitHub issues without having to search through label menus.

The Amazon Q Developer extension is available for the following browsers:

- [Google Chrome](#)
- [Mozilla Firefox](#)
- [Microsoft Edge](#)

You can also view the supported browsers on the registration installation details page in the [Amazon Q Developer console](#).

Deleting Amazon Q Developer GitHub app installation registration

You can delete a registration for one or more of your GitHub app installation through the Amazon Q Developer console. After permanently deleting your registration, all data associated with the registration is also deleted. The action can't be undone.

To delete your GitHub app installation

1. Navigate to the [Amazon Q Developer console](#).
2. In the navigation pane, under **Amazon Q Developer in GitHub**, choose **Registered installations**.
3. Do one of the following:
 - Under the **Actions** column, choose **Delete registration** for the installation you want to delete.
 - Under the **Name** column, choose the registration name for the installation you want to delete, and then choose **Delete**.

Under the **Actions** column, choose **Delete registration** for registered installation you want to delete.

4. In the modal, review the details for deleting registration.
5. In the text input field, enter **confirm**, and then choose **Delete** to confirm the changes.

Once you delete a GitHub app installation, you can choose to register a new installation.

Troubleshooting issues for Amazon Q Developer for GitHub

Consult the following section to troubleshoot common problems when using Amazon Q Developer for GitHub.

Amazon Q Developer not generating pull requests in repositories with branch protection rules

Problem: Amazon Q Developer isn't able to create a pull request in my GitHub repository, which has branch protection rules.

Solution: The branch protection rules prevents Amazon Q Developer from creating a branch to create a pull request. In order to use Amazon Q Developer for GitHub in repositories with branch protection rules, you need to add the Amazon Q Developer app to your allow list.

To add the Amazon Q Developer app to your allow list

1. If necessary, sign in to your [GitHub](#) account using your GitHub credentials.
2. Navigate to your GitHub organization, and then navigate to the repository you want to allow list the Amazon Q Developer for GitHub app.
3. Choose **Settings**, and then choose **Branches** from the navigation pane.
4. Under **Branch protection rules**, choose **Edit** to modify the branch protection rules.
5. Choose **Restrict pushes that create matching branches**, and search for the Amazon Q Developer for GitHub app.
6. Choose **Save changes** to allow Amazon Q Developer to create pull requests for issues with Amazon Q Developer labels.

To learn more about modifying branch protection rules in GitHub, see [Creating a branch protection rule](#).

Amazon Q Developer labels missing in GitHub issues

Problem: I don't see the **Amazon Q development agent** or **Amazon Q transform agent** labels in GitHub issues.

Solution: If the labels aren't automatically created when you installed the Amazon Q Developer for GitHub app, or they were unintentionally deleted, you can manually create them in GitHub. The labels must be named as **Amazon Q development agent** and **Amazon Q transform agent** in order for them to be recognized and processed as Amazon Q Developer labels. For more information, see [Creating a label](#) in the *GitHub documentation*.

Amazon Q Developer not creating code for GitHub issues

Problem: I created a GitHub issue and invoked Amazon Q Developer to perform a task, but I got the following series of messages regarding technical difficulties:

1. # I'm working on generating code for this issue. I'll update this issue with a comment and open a pull request when I'm done.

2. `## I'm having technical difficulties. I couldn't solve the issue. I'm going to try again. This might take some time.`
3. `## I'm having technical difficulties. I couldn't solve the issue. I'm going to try again. This might take some time.`
4. `# I'm having technical difficulties. I couldn't solve the issue.`

Consider reassigning this issue to a user. This will help you stay within the quotas for generative AI feature usage.

Solution: If Amazon Q Developer is not able to process your issue and generate code for it, create a new issue and apply the **Amazon Q development agent** or the **Amazon Q transform agent** label to the new issue. To learn more about creating an issue and applying an Amazon Q Developer agent label, see [Developing features and iterating with Amazon Q Developer in GitHub](#) or [Transforming code with Amazon Q Developer in GitHub](#).

Creating project rules for Amazon Q Developer in third-party platforms

You can build a library of project rules that you can use with Amazon Q Developer in GitLab or GitHub. These rules describe coding standards and best practices across your team. For example, you could have a rule that states that all Python code must use type hints, or that all Java code must use Javadoc comments. By storing these rules in your project, you can ensure consistency across developers, regardless of their experience level.

Project rules are defined in Markdown files in the project's *project-root*/.amazonq/rules folder.

Once you've created your project rules, Amazon Q Developer will automatically use them as context within your project, and will make sure to adhere to them when generating code for feature development.

To create a project rule using the file system

1. In your third-party repository, open your project's root folder.
2. In the project root folder, create the following folder:

project-root/.amazonq/rules

This folder holds all your project rules.

3. In *project-root*/.amazonq/rules, create a project rule file. It must be a Markdown file.
For example:

```
cdk-rules.md
```

4. Open your project rule Markdown file.
5. Add a detailed prompt to the file. For example:

```
All Amazon S3 buckets must have encryption enabled, enforce SSL, and block public access.  
All Amazon DynamoDB Streams tables must have encryption enabled.  
All Amazon SNS topics must have encryption enabled and enforce SSL.  
All Amazon SNS queues must enforce SSL.
```

6. Commit, review, and merge your changes.
7. (Optional) Add more project rule Markdown files.

You have now created one or more project rules. Amazon Q will use these rules as context automatically within your project.

Chatting with Amazon Q Developer in chat applications

You can chat with Amazon Q Developer in Microsoft Teams and Slack chat applications. In configured channels, Amazon Q can answer questions about best practices for building solutions, troubleshooting issues, and identifying next steps. The following Amazon Q chat features are available in configured chat applications:

- [Chatting about AWS](#)
- [Chatting about your resources with Amazon Q Developer](#)
- [Troubleshooting resource issues](#)
- [Chatting about your costs](#)
- [Chatting about your telemetry and operations](#)
- [Amazon Q network troubleshooting for Reachability Analyzer](#)

For more information about the complete set of features available when you use Amazon Q in chat applications, see [What is Amazon Q Developer in chat applications?](#) in the *Amazon Q Developer in chat applications Administrator Guide*.

Note

When you use Amazon Q Developer in chat applications, access is limited to the Amazon Q Developer Free tier.

Enable Amazon Q chat in your channels

To add chat capabilities to a Microsoft Teams or Slack channel that is already configured with Amazon Q Developer, complete the following steps. To set up Amazon Q Developer in your chat applications for the first time and allow users to chat with Amazon Q, see [Get started with Microsoft Teams](#) and [Get started with Slack](#) in the *Amazon Q Developer in chat applications Administrator Guide*.

Before you can ask Amazon Q questions from a Microsoft Teams or Slack channel, you need to add Amazon Q to the channel. First, update your AWS Identity and Access Management (IAM) role settings to include the [AmazonQDeveloperAccess](#) managed policy, and then add the policy as a channel guardrail. If you need administrator access, add the [AmazonQFullAccess](#) policy instead.

1. Add the AmazonQDeveloperAccess managed policy to your IAM role:
 - a. Sign in to the AWS Management Console and open the [IAM console](#).
 - b. In the navigation pane of the IAM console, choose **Roles**.
 - c. Choose the name of the role that you want to modify.
 - d. In **Permissions policies**, choose **Add permissions** and **Attach policies**.
 - e. Enter AmazonQDeveloperAccess in the search.
 - f. Select **AmazonQDeveloperAccess**.
 - g. Choose **Add permissions**.
2. Add the AmazonQDeveloperAccess managed policy to your channel guardrails:
 - a. Open the [Amazon Q Developer in chat applications console](#).
 - b. Choose a configured client.
 - c. Select a configured channel.
 - d. Choose **Set guardrails**.
 - e. Enter AmazonQDeveloperAccess in the search.
 - f. Select **AmazonQDeveloperAccess**.
 - g. Choose **Save**.

Ask Amazon Q questions in your channel

To check that your configuration was successful, ask Amazon Q a question. Enter @Amazon Q followed by your question.

Following are some examples of questions that you can ask Amazon Q from your configured channel:

- @Amazon Q how do I troubleshoot lambda concurrency issues?
- @Amazon Q what are the best practices for securing S3 buckets?
- @Amazon Q what is the maximum zipped file size for a lambda?
- @Amazon Q get the configuration for my lambda function *name*?
- @Amazon Q what is the size of the auto scaling group *name* in us-east-2?
- @Amazon Q can you show ec2 instances running in us-east-1?

Customizing suggestions

Note

Customizations are supported for the following features of Amazon Q Developer:

- inline suggestions – see [Generating inline suggestions](#)
- chat in the IDE – see [Chatting about code](#)

With customizations, Amazon Q Developer can assist with software development in ways that conform to your team's internal libraries, proprietary algorithmic techniques, and enterprise code style.

An Amazon Q customization is a set of elements that enables Amazon Q to provide you with suggestions based on your company's codebase. You connect a data source that contains your code base, and Amazon Q uses your content to provide assistance that caters to the style of your organization's developers.

Your customizations are fully isolated from each other within your account. They are also isolated from the data of other customers. Only users [specified by a Amazon Q Developer administrator](#) have access to any specific customization. Before a Amazon Q administrator can specify which users can access which customizations, you must authorize that administrator permission to do so. For more information, see [Prerequisites for Amazon Q customizations](#).

Topics

- [Prerequisites for Amazon Q customizations](#)
- [Creating your customization](#)
- [Deleting your customization](#)
- [Optimizing your customization](#)
- [Logging and troubleshooting](#)
- [Activating your Amazon Q customizations](#)
- [Updating your Amazon Q customizations](#)
- [Adding users and groups to your Amazon Q customizations](#)
- [Using Amazon Q customizations](#)

Prerequisites for Amazon Q customizations

Amazon Q customizations build upon the foundation of Amazon Q Developer Pro, and uses its features.

To use Amazon Q customizations you must first follow the Amazon Q Developer Pro setup process under [Getting started with Amazon Q Developer](#). This includes adding any users to your Amazon Q Developer Pro profile that you also wish to grant access to Amazon Q Customizations.

Authorizing your administrator

When you use Amazon Q Customizations, your Amazon Q administrator must be authorized to access your codebase, which you can store on Amazon S3 or through AWS CodeConnections. However, during the standard setup process for Amazon Q Developer Pro, your AWS Organizations administrator does not provide the Amazon Q administrator with access to those services.

This means that to create customizations, administrators need additional permissions. For an example policy that grants the needed permissions, see [Allow administrators to create customizations](#).

Note

If you are using GitHub as your data source, you can restrict usage to certain repositories. See [Create a connection to GitHub](#) in the *Developer Tools Console User Guide*.

Note

The encryption key that you set up for Amazon Q Developer Pro is also used for customizations.

Preparing your data

It's important to create your customization using the best possible source material. When preparing your data source, add code containing patterns that are encouraged on your team. Avoid code containing anti-patterns, bugs, security vulnerabilities, performance issues, and so forth.

To prepare your data source, follow these guidelines:

- Your data source must contain at least 2 MB, and at most 20 GB, of source code files from supported languages. Any file in your data source that's larger than 10 MB will be ignored.
- There is no limit on the number of files in your data source, but you must include at least 10 files for each language that you want your customization to support.
- File names and individual directory names must not exceed 255 characters. (Cumulatively, they can exceed 255 characters.) Exceeding these limits causes the customization creation to fail.
- In the Amazon S3 data source, all source code must be placed within a directory and not at the root level. Any files at the root level will be ignored.

Note

For information on supported languages for customizations and what file types are used to create customizations, see [Language support for customizations](#).

You can store information about the creation of your customizations in Amazon CloudWatch Logs. For more information, see [Accessing customization-related messages in Amazon CloudWatch Logs](#).

Creating your customization

This section explains how to create a customization with Amazon Q.

To create your customization, follow this procedure:

1. Subscribe users to Amazon Q Developer Pro following the instructions in [Getting started with IAM Identity Center](#). As part of the subscription process, you will install the Amazon Q Developer profile, which is necessary to create customizations.
2. Sign in to the AWS Management Console.
3. Switch to the Amazon Q Developer console.
4. From the navigation pane on the left, choose **Customizations**.
5. The customizations page will appear.
6. Choose **Create customization**.
7. Enter a customization name and (optional) description.

Note

Use both names and descriptions that will be informative to your developers. Developers from your organization who are authorized to use Amazon Q Developer Pro will be able to see them in their IDE through the AWS plugin.

Connecting to your data source

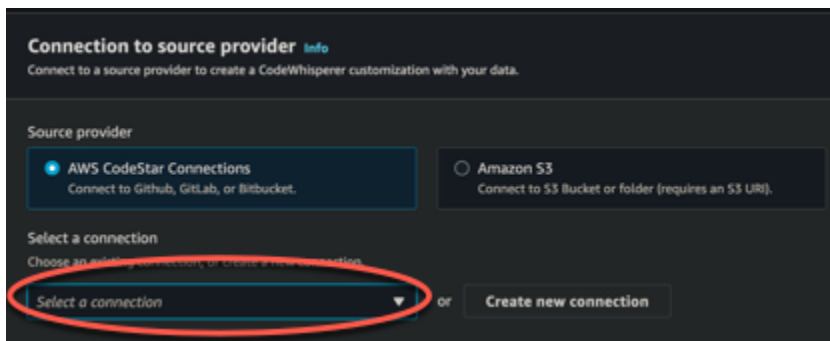
Before you create a customization, you must connect to the data source that contains your codebase. How you do this depends on where your data source is.

If your data source is in Github, GitLab, or Bitbucket, then you can connect to it with AWS CodeConnections. Otherwise, place your data in a folder within an Amazon S3 bucket.

To learn more about CodeConnections, see [What are connections?](#) in the *Developer Tools console User Guide*.

To connect to your data source through CodeConnections

1. Under **Connection to source provider**, select **AWS CodeStar CodeConnections**.
2. If you want to use an existing connection, choose **Select a connection**.



Then, under **Choose repository selection**, do one of the following:

- To use all the repositories in the connection to generate the customization, choose **Use all repositories in this connection**.
- To select specific repositories to generate the customization, choose **Select specific repositories** and then choose **Choose repositories**. In the the pop-up window, find the repositories you want to use, and then choose **Add**.

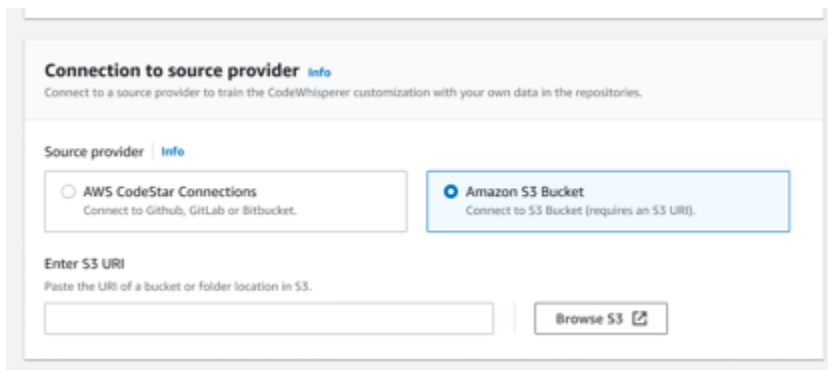
Note

Although there is no limit to the number of repositories you can include in a customization, you are restricted to 100 when you individually select them. If you want to use more than 100 repositories, choose the **Use all repositories** option, or place the repositories in Amazon S3 and follow the instructions for connecting your data source through Amazon S3.

3. If you want to create a new connection, choose **Create a new connection** and follow the remaining steps of this procedure.
4. In the pop-up window that opens, navigate to your data source and follow the instructions in the console.
5. After you create your data source, return to the **Create customization** page.
6. Under **Select a connection**, select your connection from the dropdown.

To connect to your data source through Amazon S3

1. Under **Connection to source provider**, select Amazon S3.



The screenshot shows a web interface titled "Connection to source provider" with a sub-header "Info". Below the title is a descriptive sentence: "Connect to a source provider to train the CodeWhisperer customization with your own data in the repositories." There are two main sections. The first is "Source provider" with two radio button options: "AWS CodeStar Connections" (with subtext "Connect to GitHub, GitLab or Bitbucket.") and "Amazon S3 Bucket" (with subtext "Connect to S3 Bucket (requires an S3 URI)."). The "Amazon S3 Bucket" option is selected. The second section is "Enter S3 URI" with the instruction "Paste the URI of a bucket or folder location in S3." It contains a text input field and a "Browse S3" button with an external link icon.

2. Choose **Browse Amazon S3**.
3. Navigate to your codebase and make a note of the URI. The codebase must be in a folder within the Amazon S3 bucket, not the bucket's root.

For more information, see [Creating, configuring, and working with Amazon S3 buckets](#) and [Access control best practices](#) in the *Amazon S3 User Guide*.

4. Paste the URL into the field labeled **Enter Amazon S3 URI**.

Before you create your customization, you have the option of adding tags to it.

To learn more about tags, see [the Tagging your AWS resources User Guide](#).

After following the procedures above, choose **Create customization**.

Customizations and your data

Amazon Q customizations use your content to present suggestions to you in the style of your organization's developers.

However, AWS will not store or use your content in any context that does not directly serve your enterprise.

AWS will not use your content to provide code suggestions to other customers.

Amazon Q will not reference [code reviews](#) for other customers (or for you).

For more information, see [Amazon Q Developer service improvement](#).

Troubleshooting the creation of your customization

- You may receive the error: Total size of the provided repositories exceeds the maximum allowed size of *number* for a customization.

In that case, remove a repository from your data source and try again.

- You may receive the error: Insufficient data to create a customization. Add more files from supported languages and retry.

In order for code written in a particular language to be used to create a customization, there must be at least 10 files containing code in that language in your data source. Your data source must contain at least 2 MB, while it is recommended to have close to 20MB, and at most 20 GB, of source code files from supported languages.

Some files, even if they are in the relevant language, will not count toward the 2 MB. For example, duplicate files and files in an unsupported format will not be counted.

If you receive this error, add more files containing the programming language that is the focus of your customization, and try again.

- You may receive the error: Encountered an issue when retrieving some of the selected repositories from CodeConnections. Check the customization's log deliveries for details.

If you receive this error, try creating or updating the customization again with valid repositories that your connection has access to.

Deleting your customization

This section explains how to delete a customization with Amazon Q.

Warning

Deleting a customization will delete all versions associated with the resource.

To delete your customization, follow this procedure:

1. Sign in to the AWS Management Console.
2. Switch to the Amazon Q Developer console.
3. From the navigation pane on the left, choose **Customizations**.
4. The customizations page will appear.
5. If the customization that you want to delete is still active, choose **Deactivate**.
6. Choose **Delete**.

Note

You can also delete a customization from the page that gives the details of that customization.

To do that, just choose **Delete** from the upper right corner of the customization detail page.

Optimizing your customization

This page explains how to optimize your customization.

Optimizing your customization

This section contains suggestions for optimizing your suggestion .

- Consider expanding your data source to include more code repositories.
- If you primarily included data from limited programming languages, consider expanding to more languages.
- Remove auto-generated files and repositories, or those generated from templates. Including such files is typically not valuable, and tends to just add noise.
- It is possible that your codebase does not frequently use internal libraries. If you know this to be true, then the core Amazon Q model may already have been performing as well as possible.

Optimizing for the languages you use

In order for code in a particular language to be used in a customization, you must include at least 20 data files containing that language, and all of your source files together must come to at least 2 MB. If your developers write code in a language that is not supported by your customization, Amazon Q's recommendations in that language will come from the Amazon Q base model (not your customization). In other words, they will be the same recommendations that you would receive if you did not have a customization. This, in turn, could affect the metrics on your dashboard. For example, the "Lines of code generated by Amazon Q" may be less than what it would have been if the language commonly used by your developers had been included in your customization.

Logging and troubleshooting

Setting up log delivery

Amazon Q can provide you with log files that will help you understand and troubleshoot issues with your customization.

You can have your log files sent to a [Amazon CloudWatch Logs](#) group, an [Amazon S3](#) bucket, an [Amazon Data Firehose](#), or any combination.

To set up log delivery, select the Log deliveries tab on the console page for your customization. Follow the instructions in the interface to configure your log deliveries. Then choose **Create log deliveries**.

The prefix of logs delivered to an Amazon S3 bucket will be: AWSLogs/*account_id*/codeWhispererCustomizationLogs/*region*/*customization_id*/*year*/*month*/*day*/*hour*/

The files will be zipped, with the naming format:

*account_id*_codeWhispererCustomizationLogs_*customization_id*_date_file_id.log.gz

Warning

In order to get the most use out of customization logs, it's best to set up log delivery within five minutes of creating the customization.

To learn more about the permissions required to delivery logs to multiple resources, see [Logging that requires additional permissions \[V2\]](#) in the *Amazon CloudWatch Logs User Guide*.

Understanding customization-related log messages

The following table lists log messages that may help you understand issues with your customization.

Log message	Log level
Starting to ingest <i>number</i> repos from source <i>source</i>	Info
Downloading data from repo: <i>repo name</i>	Info
Received <i>amount</i> MB of supported data. <i>amount</i> MB required. Add more data and retry.	Error
The provided CodeStar Connection ARN: <i>Arn</i> is invalid.	Error
Access denied when attempting to reach the provided CodeStar Connection: <i>Arn</i>	Error

Log message	Log level
Failed to download with AWS CodeStar Connection: <i>Arn</i> probably deleted by customer	Error
ProviderThrottlingException from CodeStar Connection: <i>Arn</i> while cloning repository: <i>repository</i>	Error
Processing data from S3: <i>S3 URI</i>	Info
Invalid S3 path specified: <i>S3 Directory</i>	Error
Unable to access the provided S3 bucket: <i>bucket name</i>	Error
The provided S3 bucket: <i>bucket name</i> does not exist.	Error
The provided S3 key <i>S3 URI</i> does not exist.	Error
Failed to ingest <i>number of failed repos / total number of repos</i> repositories	Error
Unable to process repository: <i>repo name</i> , with a size of <i>repo size</i> GB, exceeds the limit of <i>max size</i> GB.	Warn
Unable to process file: <i>file name</i> , with a size of <i>file size</i> , which exceeds the limit of <i>max file size</i> MB	Error

Log message	Log level
Unable to process collection: <i>collection name</i> , with total size of <i>total repo size</i> MB, which exceeds the limit of <i>max total repo size</i> MB	Error
The following languages will be used for customization: <i>list of languages</i> . Languages may be excluded from customization if they are not sufficiently represented in your files.	Info

Understanding customization-related error messages in the console

The following table will help you understand customization-related messages in the Amazon Q console.

Error message	Suggested action
You have activated the maximum number of customizations.	Deactivate an active customization and try again.
You have exceeded the maximum number of group permissions limit of <i>limit</i> .	Remove a group and retry.
You have exceeded the maximum number of user permissions limit of <i>limit</i> .	Remove a user and retry.
Maximum active jobs reached.	Wait until an in-progress job in the same account has finished. Retry the operation.
Encountered an unexpected error when processing the request.	Retry the operation. If it continues to fail, contact customer support.

Error message	Suggested action
Encountered an issue when retrieving some of the selected repositories from CodeConnections. Check the customization's log deliveries for details.	Try creating or updating the customization again with valid repositories that your connection has access to.
Access denied when attempting to reach the provided AWS CodeConnections connection.	Validate permissions on your connection and on your third-party provider. Then retry the operation.
One or more repositories not found while accessing the provided AWS CodeConnections connection.	Validate permissions and list of repos from the third-party provider. Then retry the operation.
The provided AWS CodeConnections connection ARN is invalid.	Update the customization with a corrected Connection ARN.
The Host associated with the provided AWS CodeConnections connection is unavailable.	Try again in 5 minutes.
Invalid Amazon S3 path specified.	Update the customization with a valid Amazon S3 URI.
Unable to access the provided Amazon S3 bucket.	Validate permissions for the admin's role. Retry after fixing any permission issues.
The provided Amazon S3 bucket does not exist.	Update the customization with a valid Amazon S3 URI.
The provided Amazon S3 key does not exist.	Update the customization with a valid Amazon S3 URI.
Insufficient data to create a customization. Add more files from supported languages and retry.	Add more data to the same data source, and update the customization with the same reference.

Error message	Suggested action
Total size of the provided repositories exceeds the maximum allowed size of <i>size</i> for a customization.	Remove some data from the provided data source. Update the customization with the same reference.
You have created the maximum number of customizations. Delete an existing customization and try again.	Delete the current customization and retry.
Customizations exist within the account. You must delete all customizations prior to deleting the profile.	Delete all customizations associated with the account and retry.

Activating your Amazon Q customizations

Activating a version

This section describes how to activate and deactivate a version of your customization.

You can activate a new version of a customization, even while developers from your organization are using the previous version. After you activate the new version, the developers will seamlessly begin using it, with no adjustments needed on the development side.

You can also roll your customization back to a previously active state. However, Amazon Q does not actually re-activate a previously activated version. Instead, it creates a new version by copying a previous version and then activating the copy.

For example, suppose that you have three versions: 1, 2, and 3. The active version is 3. You decide to go back to version 1. But "re-activating" version 1 is actually just copying version 1 and creating version 4. That's the version you use: version 4, the new copy of the old version.

To activate a version of your customization, follow this procedure:

1. Sign in to the AWS Management Console.
2. Switch to the Amazon Q Developer console.
3. From the navigation pane on the left, choose **Customizations**.

The customizations page will appear.

4. Choose the customization you want to activate a version for.

The customization details page will appear.

5. Choose the version you want to activate from the **Versions** table.
6. Choose **Activate**.

To deactivate a customization, choose **Deactivate** from the dropdown.

Updating your Amazon Q customizations

A customization is created based on a snapshot of your data source at the time of creation. You might want to update your Amazon Q customization if:

- You updated the files in your data source, and you want to re-create your customization with the new files.
- You want to switch the data source from AWS CodeConnections to Amazon S3, or the reverse.
- You want to change the repositories referenced in a CodeConnections data source.

A customization can have multiple versions.

Amazon Q administrators have access to a maximum of three versions for each customization:

- the latest version
- the currently active version
- the most recently active version that is not currently active

Creating a new version

To create a new version of your customization, follow this procedure:

1. Sign in to the AWS Management Console.
2. Switch to the Amazon Q Developer console.
3. From the navigation pane on the left, choose **Customizations**.

The customizations page will appear.

4. Choose the customization for which you want to create a new version.

The customization details page will appear.

5. Do one of the following:
 - Select **Create new version** from the **Actions** dropdown.
 - Choose the **Sources** tab, and then choose **Update**.

The **Update customization** page appears.

6. Select **Create new version** from the **Actions** dropdown.
7. (Optional) Change the data source.

Create new version [Info](#)

Connection to source provider [Info](#)
Connect to a source provider to create a CodeWhisperer customization with your data.

Source provider

☐ AWS CodeStar Connections
Connect to Github, GitLab, or Bitbucket.

☒ Amazon S3
Connect to S3 Bucket or folder (requires an S3 URI).

Enter S3 URI
Paste the URI of a bucket or folder location in S3.

[Browse S3](#)

[Cancel](#) [Create](#)

8. (Optional) If you selected the CodeConnections data source, change the repositories associated with the connection.
9. Choose **Create**.

If you receive error messages, see [Troubleshooting the creation of your customization](#).

Adding users and groups to your Amazon Q customizations

This section contains information about how to add users and groups to customizations.

Note

You must activate a customization before you can add users to it.

Note

You can only add a user or group to a customization if you have already subscribed them to Amazon Q Developer Pro as an IAM Identity Center workforce user. For more information, see [Step 2: Subscribe workforce users to Amazon Q Developer Pro](#).

1. Sign in to the AWS Management Console.
2. Switch to the Amazon Q Developer console.
3. From the navigation panel, choose **Customizations**.
4. Choose the name of the customization to which you want to add users or groups.
5. In the bottom half of the window, if necessary, select the **Users and groups** tab. and then the **Users** or **Groups** sub-tab.
6. Select the users or groups that require access to your customization.
7. Choose **Add users** or **Add groups**.

Using Amazon Q customizations

This section contains information about how to use customizations as a developer.

Amazon Q only supports customizations in VS Code and JetBrains IDEs.

Note

Customizations are supported for the following features of Amazon Q Developer:

- inline suggestions – see [Generating inline suggestions](#)
- chat in the IDE – see [Chatting about code](#)

Visual Studio Code

To use customizations with Visual Studio Code:

1. Authenticate to Amazon Q Developer Pro with IAM Identity Center using the steps in [Installing the Amazon Q Developer extension or plugin in your IDE](#).

2. In the **Developer Tools** pane, under Amazon Q, choose **Select Customization**.
3. At the top of the window, from the dropdown menu, select the appropriate customization.

JetBrains

To use customizations in JetBrains IDEs:

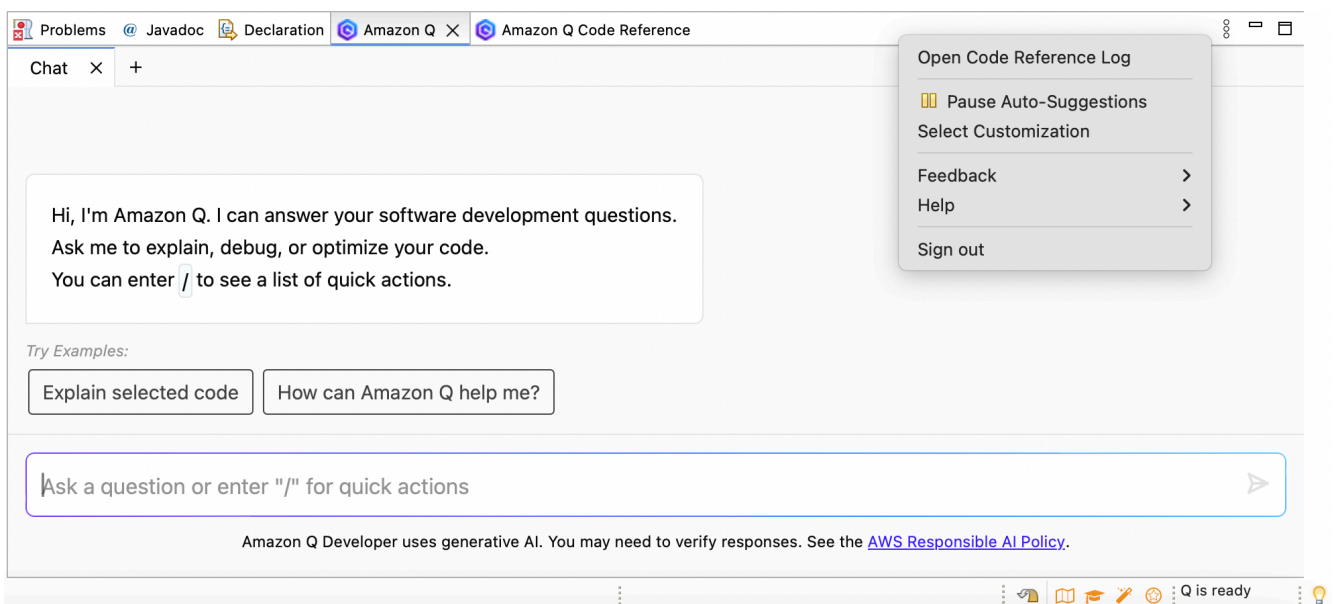
1. Authenticate to Amazon Q Developer Pro with IAM Identity Center using the steps in [Installing the Amazon Q Developer extension or plugin in your IDE](#).
2. In the **Developer Tools** pane, under Amazon Q, choose **Select Customization**.
3. In the pop-up window, select the appropriate customization.
4. Choose **Connect**.

Eclipse

To use customizations in Eclipse IDEs:

1. Authenticate to Amazon Q Developer Pro with IAM Identity Center using the steps in [Installing the Amazon Q Developer extension or plugin in your IDE](#).
2. In your Eclipse IDE, choose the **Amazon Q** icon in the top right corner of the IDE.
3. With the Amazon Q chat tab open, choose the ellipsis icon in the top right corner of the tab. The Amazon Q task bar opens.

The following image shows the Amazon Q task bar in an Eclipse IDE.



4. Choose **Select Customization**.
5. In the pop-up window, select the appropriate customization.
6. Choose **Select**.

Security in Amazon Q Developer

Cloud security at AWS is the highest priority. As an AWS customer, you benefit from a data center and network architecture that is built to meet the requirements of the most security-sensitive organizations.

Security is a shared responsibility between AWS and you. The [shared responsibility model](#) describes this as security of the cloud and security in the cloud:

- **Security of the cloud** – AWS is responsible for protecting the infrastructure that runs AWS services in the AWS Cloud. AWS also provides you with services that you can use securely. Third-party auditors regularly test and verify the effectiveness of our security as part of the [AWS Compliance Programs](#). To learn about the compliance programs that apply to Amazon Q, see [AWS Services in Scope by Compliance Program](#).
- **Security in the cloud** – Your responsibility is determined by the AWS service that you use. You are also responsible for other factors including the sensitivity of your data, your company's requirements, and applicable laws and regulations

This documentation helps you understand how to apply the shared responsibility model when using Amazon Q Developer. It shows you how to configure Amazon Q to meet your security and compliance objectives. You also learn how to use other AWS services that help you to monitor and secure your Amazon Q resources.

Topics

- [Data protection in Amazon Q Developer](#)
- [Identity and access management for Amazon Q Developer](#)
- [Compliance validation for Amazon Q Developer](#)
- [Resilience in Amazon Q Developer](#)
- [Infrastructure security in Amazon Q Developer](#)
- [Configuring a firewall, proxy server, or data perimeter for Amazon Q Developer](#)
- [Amazon Q Developer and interface endpoints \(AWS PrivateLink\)](#)

Data protection in Amazon Q Developer

The AWS [shared responsibility model](#) applies to data protection in Amazon Q Developer. As described in this model, AWS is responsible for protecting the global infrastructure that runs all of the AWS Cloud. You are responsible for maintaining control over your content that is hosted on this infrastructure. You are also responsible for the security configuration and management tasks for the AWS services that you use. For more information about data privacy, see the [Data Privacy FAQ](#). For information about data protection in Europe, see the [AWS Shared Responsibility Model and GDPR](#) blog post on the *AWS Security Blog*.

For data protection purposes, we recommend that you protect AWS account credentials and set up individual users with AWS Identity and Access Management (IAM). That way each user is given only the permissions necessary to fulfill their job duties. We also recommend that you secure your data in the following ways:

- Use multi-factor authentication (MFA) with each account.
- Use SSL/TLS to communicate with AWS resources. We recommend TLS 1.2 or later.
- Set up API and user activity logging with AWS CloudTrail.
- Use AWS encryption solutions, along with all default security controls within AWS services.
- Use advanced managed security services such as Amazon Macie, which assists in discovering and securing sensitive data that is stored in Amazon S3.
- If you require FIPS 140-2 validated cryptographic modules when accessing AWS through a command line interface or an API, use a FIPS endpoint. For more information about the available FIPS endpoints, see [Federal Information Processing Standard \(FIPS\) 140-2](#).

We strongly recommend that you never put confidential or sensitive information, such as your customers' email addresses, into [tags](#) or free-form text fields such as a **Name** field. This includes when you work with Amazon Q or other AWS services using the AWS Management Console, API, AWS Command Line Interface (AWS CLI), or AWS SDKs. Any data that you enter into tags or free-form text fields used for names may be used for billing or diagnostic logs. For more information about how Amazon Q Developer uses content, see [Amazon Q Developer service improvement](#).

Topics

- [Data storage in Amazon Q Developer](#)
- [Data encryption in Amazon Q Developer](#)
- [Amazon Q Developer service improvement](#)

- [Opt out of data sharing in the IDE](#)
- [Cross-region processing in Amazon Q Developer](#)

Data storage in Amazon Q Developer

Amazon Q stores your questions, its responses, and additional context, such as console metadata and code, to generate responses to your questions and requests. For information about how data is encrypted, see [Data encryption in Amazon Q Developer](#). For information about how AWS may use some questions that you ask Amazon Q and its responses to improve our services, see [Amazon Q Developer service improvement](#).

AWS Regions where content is processed and stored

If you're an IAM Identity Center workforce user, at the Amazon Q Developer Pro tier, your content is stored in the AWS Region where your Amazon Q Developer profile was created only for the following features:

- Amazon Q chat in the AWS Management Console
- Diagnosing AWS console errors with Amazon Q
- Amazon Q in Eclipse, JetBrains IDEs, Visual Studio Code, and Visual Studio
- Amazon Q on the command line

When you use any other feature at the Amazon Q Developer Pro tier, your content may be stored and processed in a US Region. If you are using a Q Developer profile in a non-US Region, you can create a service control policy (SCP) to block access to features that store content and perform inference in the US. For an example SCP, see [Manage access to Amazon Q Developer with policies](#).

For other Amazon Q features and integrations, and when using the Amazon Q Developer Free tier, your content is stored in a Region in the US. Data processed during diagnosing console error sessions is stored in the US West (Oregon) Region. All other data is stored in the US East (N. Virginia) Region. Note the following features that store data differently.

Note

When you use [Console to Code with Amazon Q](#), content is stored in your console Region and processed in a US Region.

When you use Amazon Q generative SQL in Amazon Redshift, your content is stored and processed in your console Region. For more information, see [Interacting with Amazon Q generative SQL](#) in the *Amazon Redshift Management Guide*.

When you create an investigation with Amazon CloudWatch investigations, your content may be stored and processed in other Regions. For more information, see the [Security in CloudWatch investigations](#) topic in the *Amazon CloudWatch User Guide*.

With cross-region inferencing, your requests to Amazon Q Developer may be processed in a different Region within the geography where your content is stored. For more information, see [Cross-region inference](#).

Data encryption in Amazon Q Developer

This topic provides information specific to Amazon Q Developer about encryption in transit and encryption at rest.

Encryption in transit

All communication between customers and Amazon Q and between Amazon Q and its downstream dependencies is protected using TLS 1.2 or higher connections.

Encryption at rest

Amazon Q stores data at rest using Amazon DynamoDB and Amazon Simple Storage Service (Amazon S3). The data at rest is encrypted using AWS encryption solutions by default. Amazon Q encrypts your data using AWS owned encryption keys from AWS Key Management Service (AWS KMS). You don't have to take any action to protect the AWS managed keys that encrypt your data. For more information, see [AWS owned keys](#) in the *AWS Key Management Service Developer Guide*.

For IAM Identity Center workforce users subscribed to Amazon Q Developer Pro, administrators can set up encryption with customer managed KMS keys for data at rest for the following features:

- Chat in the AWS console
- Diagnosing AWS console errors
- Customizations
- Agents in the IDE

You can only encrypt data with a customer managed key for the listed features of Amazon Q in the AWS console and the IDE. Your conversations with Amazon Q on the AWS website, AWS Documentation pages, and in chat applications are only encrypted with AWS-owned keys.

Customer managed keys are KMS keys in your AWS account that you create, own, and manage to directly control access to your data by controlling access to the KMS key. Only symmetric keys are supported. For information on creating your own KMS key, see [Creating keys](#) in the *AWS Key Management Service Developer Guide*.

When you use a customer managed key, Amazon Q Developer makes use of KMS grants, allowing authorized users, roles, or applications to use a KMS key. When an Amazon Q Developer administrator chooses to use a customer managed key for encryption during configuration, a grant is created for them. This grant is what allows the end user to use the encryption key for data encryption at rest. For more information on grants, see [Grants in AWS KMS](#).

If you change the KMS key used to encrypt chats with Amazon Q in the AWS console, you must start a new conversation to begin using the new key to encrypt your data. Any conversations that were encrypted with the previous key won't be retained, and only future conversations will be encrypted with the updated key. If you want to maintain your conversations from a previous encryption method, you can revert to the key you were using during those conversations. If you change the KMS key used to encrypt diagnosing console error sessions, you must start a new diagnose session to begin using the new key to encrypt your data.

Using customer managed KMS keys

After creating a customer managed KMS key, an Amazon Q Developer administrator must provide the key in the Amazon Q Developer console to use it to encrypt data. For information on adding the key in the Amazon Q Developer console, see [Managing the encryption method in Amazon Q Developer](#).

To set up a customer managed key to encrypt data in Amazon Q Developer, administrators need permissions to use AWS KMS. The required KMS permissions are included in the example IAM policy, [Allow administrators to use the Amazon Q Developer console](#).

To use features that are encrypted with a customer managed key, users need permissions to allow Amazon Q to access the customer managed key. For a policy that grants the needed permissions, see [Allow Amazon Q access to customer managed keys](#).

If you see an error related to KMS grants while using Amazon Q Developer, you likely need to update your permissions to allow Amazon Q to create grants. To automatically configure the

needed permissions, go to the Amazon Q Developer console and choose **Update permissions** in the banner at the top of the page.

Amazon Q Developer service improvement

To help Amazon Q Developer provide the most relevant information, we may use certain content from Amazon Q, such as questions that you ask Amazon Q and its responses, for service improvement. This page explains what content we use and how to opt out.

Amazon Q Developer Free tier content used for service improvement

We may use certain content from Amazon Q Developer Free tier for service improvement. Amazon Q may use this content, for example, to provide better responses to common questions, fix Amazon Q operational issues, for de-bugging, or for model training.

Content that AWS may use for service improvement includes, for example, your questions to Amazon Q and the responses and code that Amazon Q generates.

We do not use content from Amazon Q Developer Pro or Amazon Q Business for service improvement.

Note

Amazon Q Developer for GitHub (Preview) does not currently use your content for service improvement. If we enable this in the future, we will provide you with adequate notice and a way for you to opt out of such use.

How to opt out

The way you opt out of Amazon Q Developer Free Tier using content for service improvement depends on the environment where you use Amazon Q.

For the AWS Management Console, AWS Console Mobile Application, AWS websites, and in chat applications, configure an AI services opt-out policy in AWS Organizations. For more information, see [AI services opt-out policies](#) in the *AWS Organizations User Guide*.

In the IDE, for Amazon Q Developer Free Tier, adjust your settings in the IDE. For more information, see [Opt out of data sharing in the IDE](#).

Opt out of data sharing in the IDE

This page explains how to opt out of sharing your data in the IDE where you use Amazon Q, including third-party IDEs and AWS coding environments. For information on how Amazon Q uses this data, see [Amazon Q Developer service improvement](#).

Opting out of sharing your client-side telemetry

Your client-side telemetry quantifies your usage of the service. For example, AWS may track whether you accept or reject a recommendation. Your client-side telemetry does not contain actual code.

To learn more about the telemetry data collected by Amazon Q in the IDE, see the [commonDefinitions.json](#) document in the `aws-toolkit-common` Github repository.

For detailed information about the telemetry data collected by each IDE where you use Amazon Q, reference the resource documents in the following GitHub repositories:

- [Amazon Q extension for VS Code](#)
- [Amazon Q plugin for JetBrains](#)
- [Amazon Q plugin for Eclipse](#)
- [AWS Visual Studio Toolkit with Amazon Q](#)

Note

Don't add personally identifiable information (PII) or other confidential or sensitive information in free text fields in the IDE.

Choose your IDE for instructions on opting out of sharing your client-side telemetry.

Visual Studio Code

To opt out of sharing your telemetry data in VS Code, use this procedure:

1. Open **Settings** in VS Code.
2. If you are using VS Code workspaces, switch to the **Workspace** sub-tab. In VS Code, workspace settings override user settings.

3. In the Settings search bar, enter Amazon Q: Telemetry.
4. Deselect the box.

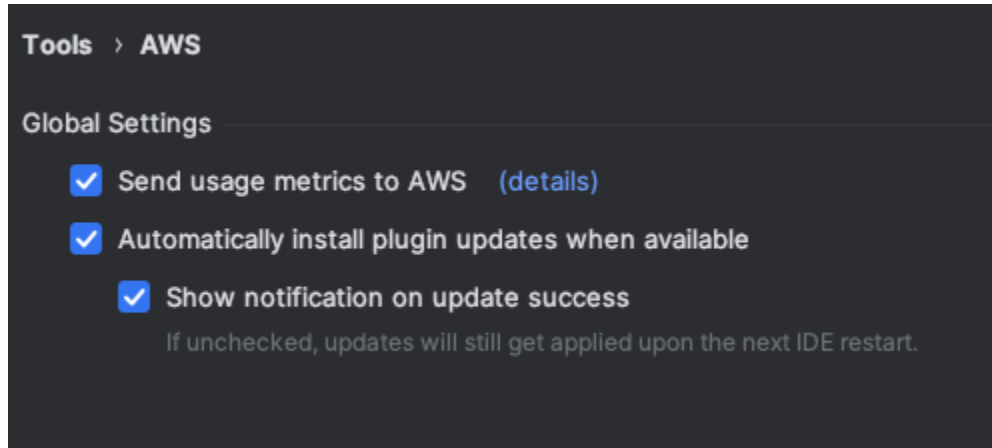
Note

This is a decision for each developer to make inside their own IDE. If you are using Amazon Q as part of an enterprise, your administrator will not be able to change this setting for you.

JetBrains

To opt out of sharing your telemetry data in JetBrains, use this procedure:

1. In your JetBrains IDE, open **Preferences** (on a Mac, this will be under **Settings**).
2. In the left navigation bar, choose **Tools**, and then choose **AWS**.
3. Deselect **Send usage metrics to AWS**.



Note

This is a decision for each developer to make inside their own IDE. If you are using Amazon Q as part of an enterprise, your administrator will not be able to change this setting for you.

Eclipse

To opt out of sharing your telemetry data in Eclipse IDEs, use this procedure:

1. Open **Settings** in your Eclipse IDE.
2. Choose **Amazon Q** from the left navigation bar.
3. Deselect the box next to **Send usage metrics to AWS**.
4. Choose **Apply** to save your changes.

Note

This is a decision for each developer to make inside their own IDE. If you are using Amazon Q as part of an enterprise, your administrator will not be able to change this setting for you.

Visual Studio

To opt out of sharing your telemetry data in the AWS Toolkit for Visual Studio, use this procedure:

1. Under **Tools**, choose **Options**.
2. In the **Options** pane, choose **AWS Toolkit**, and then choose **General**.
3. Deselect **Allow AWS Toolkit to collect usage information**.

Note

This is a decision for each developer to make inside their own IDE. If you are using Amazon Q as part of an enterprise, your administrator will not be able to change this setting for you.

AWS Cloud9

1. From inside your AWS Cloud9 IDE, choose the AWS Cloud9 logo at the top of the window, then choose **Preferences**.

2. On the **Preferences** tab choose **AWS Toolkit**.
3. Next to **AWS: client-side telemetry**, toggle the switch to the off position.

 Note

This setting affects whether or not you share your AWS Cloud9 client-side telemetry in general, not just for Amazon Q.

Lambda

When you use Amazon Q with Lambda, Amazon Q does not share your client-side telemetry with AWS.

SageMaker AI Studio

1. From the top of the SageMaker AI Studio window choose **Settings**.
2. From the **Settings** dropdown, choose **Advanced Settings Editor**.
3. In the Amazon Q dropdown, select or deselect the box next to **Share usage data with Amazon Q**.

JupyterLab

1. From the top of the JupyterLab window choose **Settings**.
2. From the **Settings** dropdown, choose **Advanced Settings Editor**.
3. In the Amazon Q dropdown, select or deselect the box next to **Share usage data with Amazon Q**.

AWS Glue Studio Notebook

1. From the bottom of the AWS Glue Studio Notebook window choose **Amazon Q**.
2. From the pop-up menu, toggle the switch next to **Share telemetry with AWS**.

Note

Pausing the sharing of client-side telemetry will be valid only for the duration of the current AWS Glue Studio Notebook.

Command line

In the command line tool, under **Preferences**, toggle **Telemetry**.

Opting out of sharing your content

For information on content AWS uses, see [Amazon Q Developer service improvement](#).

Visual Studio Code

At the Amazon Q Developer Pro Tier, Amazon Q does not collect your content.

At the Amazon Q Developer Free Tier, to opt out of sharing your content in VS Code, use the following procedure.

1. Open **Settings** in VS Code.
2. If you are using VS Code workspaces, switch to the **Workspace** sub-tab. In VS Code, workspace settings override user settings.
3. In the Settings search bar, enter Amazon Q: Share Content.
4. Deselect the box.

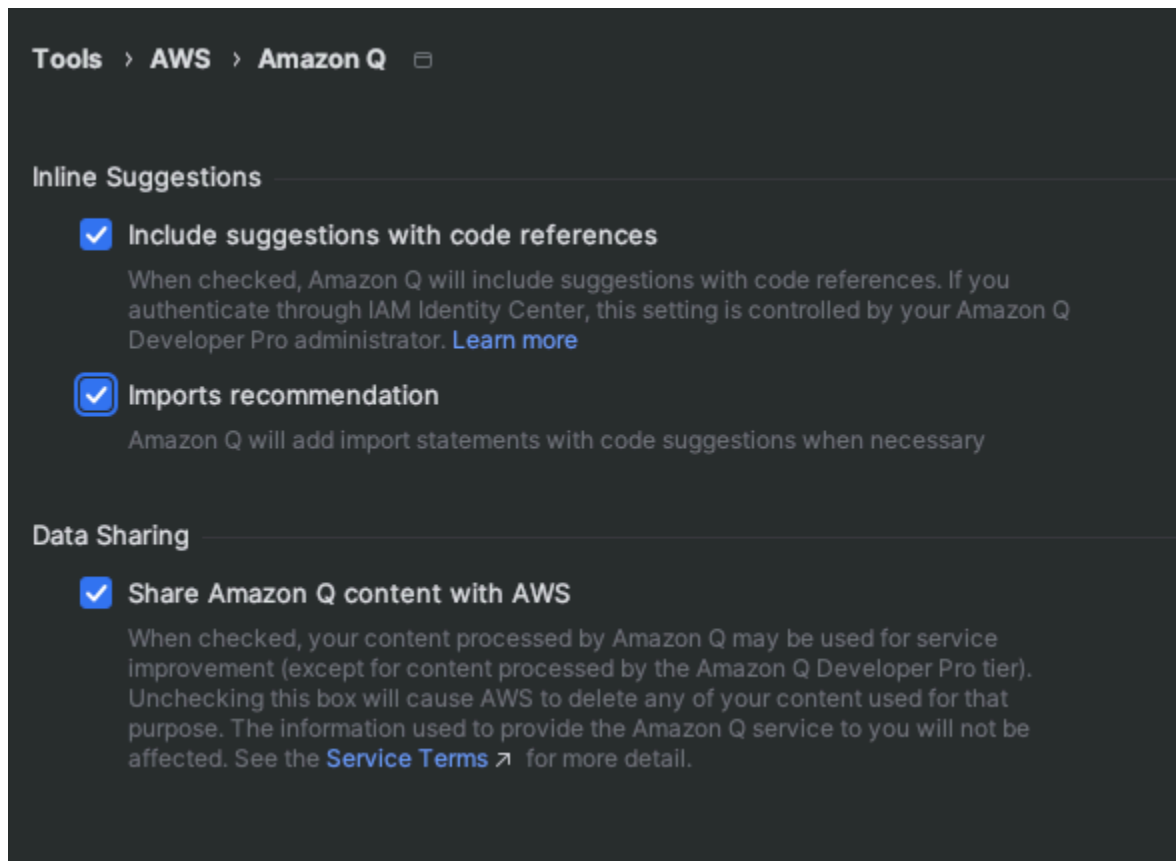
JetBrains

At the Amazon Q Developer Pro Tier, Amazon Q does not collect your content.

At the Amazon Q Developer Free Tier, to opt out of sharing Amazon Q data in JetBrains, use the following procedure.

1. Make sure you are using the latest version of JetBrains.
2. In your JetBrains IDE, open **Preferences** (on a Mac, this will be under **Settings**).
3. In the left navigation bar, choose **Tools --> AWS --> Amazon Q**.

4. Under **Data sharing**, deselect **Share Amazon Q content with AWS**.



Eclipse

At the Amazon Q Developer Pro tier, Amazon Q does not collect your content.

At the Amazon Q Developer Free tier, to opt out of sharing Amazon Q data in Eclipse IDEs, use the following procedure.

1. Make sure you are using the latest version of your Eclipse IDE.
2. In your Eclipse IDE, open **Settings**.
3. In the left navigation bar, choose **Amazon Q**.
4. Deselect the box next to **Share Amazon Q content with AWS**.
5. Choose **Apply** to save your changes.

Visual Studio

At the Amazon Q Developer Pro Tier, Amazon Q does not collect your content.

At the Amazon Q Developer Free Tier, to opt out of sharing your content in Visual Studio, use the following procedure.

Bring up the Amazon Q options menu one of two ways:

- Choose the AWS Toolkit icon from the edge of the window, then choose **Options...**
- Go to **Tools -> Options -> AWS Toolkit -> Amazon Q**

Toggle **Share Amazon Q Content with AWS** to **True** or **False**.

AWS Cloud9

When you use Amazon Q with AWS Cloud9, Amazon Q does not share your content with AWS.

Note

The AWS Cloud9 settings do contain a toggle switch for sharing Amazon Q content with AWS, but that switch is non-functional.

Lambda

When you use Amazon Q with Lambda, Amazon Q does not share your content with AWS.

Note

The Lambda settings do contain a toggle switch for sharing Amazon Q content with AWS, but that switch is non-functional.

SageMaker AI Studio

When you use Amazon Q with SageMaker AI Studio, Amazon Q does not share your content with AWS.

JupyterLab

1. From the top of the JupyterLab window choose **Settings**.
2. From the **Settings** dropdown, choose **Advanced Settings Editor**.
3. In the Amazon Q dropdown, select or deselect the box next to **Share content with Amazon Q**.

AWS Glue Studio Notebook

When you use Amazon Q with AWS Glue Studio Notebook, Amazon Q does not share your content with AWS.

Command line

In the command line tool, under **Preferences**, toggle **Share Amazon Q content with AWS**.

Cross-region processing in Amazon Q Developer

The following sections describe how cross-region inference and cross-region calls are used to provide the Amazon Q Developer service.

Cross-region inference

Amazon Q Developer is powered by Amazon Bedrock, and uses cross-region inference to distribute traffic across different AWS Regions to enhance large language model (LLM) inference performance and reliability. With cross-region inference, you get:

- Increased throughput and resilience during high demand periods
- Improved performance
- Access to newly launched Amazon Q Developer capabilities and features that rely on the most powerful LLMs hosted on Amazon Bedrock

Cross-region inference requests are kept within the AWS Regions that are part of the geography where the data originally resides. For example, a request made from a Amazon Q Developer profile created in the US is kept within the AWS Regions in the US. Some Amazon Q Developer features and integrations may perform inference in Regions other than where your Q Developer profile was created. For more information, see [Supported regions for Amazon Q Developer cross-region inference](#).

Although cross-region inferencing doesn't change where your data is stored, your requests and output results may move outside of the Region where the data originally resides. All data is encrypted while transmitted across Amazon's secure network. There's no additional cost for using cross-region inference.

Cross region inference doesn't affect where your data is stored. For information on where data is stored when you use Amazon Q Developer, see [Data protection in Amazon Q Developer](#).

Supported regions for Amazon Q Developer cross-region inference

The following table describes what Regions your requests may be routed to depending on the geography where the request originated.

Supported Amazon Q Developer geography	Inference regions
United States	US East (N. Virginia) (us-east-1) US West (Oregon) (us-west-2) US East (Ohio) (us-east-2)
Europe	Europe (Frankfurt) (eu-central-1) Europe (Ireland) (eu-west-1) Europe (Paris) (eu-west-3) Europe (Stockholm) (eu-north-1)
Asia Pacific*	Asia Pacific (Mumbai) (ap-south-1) Asia Pacific (Seoul) (ap-northeast-2) Asia Pacific (Singapore) (ap-southeast-1) Asia Pacific (Sydney) (ap-southeast-2) Asia Pacific (Tokyo) (ap-northeast-1)

*Cross-region inferencing in the Asia Pacific Regions is only supported when you use Amazon Q generative SQL in the Asia Pacific (Seoul) Region.

For a complete list of Regions where you can use Amazon Q Developer, see [Supported Regions for Amazon Q Developer](#).

Cross-region calls

Certain requests that you make to Amazon Q Developer may require cross-region calls. Cross-region calls are API calls made by Amazon Q from one AWS Region to another AWS Region.

Amazon Q makes cross-region calls when your request requires it to retrieve information from a Region different from your current Region. For example, when you ask Amazon Q questions about your AWS resources that are located in different Regions, it will make a cross-region call to access your resources and retrieve the relevant data to respond to your question. In addition, if a response from Amazon Q requires information from a global AWS service endpoint, Amazon Q may make calls outside of the Region where your data is stored. For more information on global services, see [Global services](#) in the *AWS Fault Isolation Boundaries AWS Whitepaper*.

If you'd like to disable cross-region calls made by Amazon Q Developer, you can create a policy that prevents Amazon Q from making API calls on your behalf. By doing so, you won't have access to features that require Amazon Q to make API calls on your behalf, even if Amazon Q is making calls within your current Region. For an IAM policy that prevents Amazon Q from making API calls on your behalf, including cross-region calls, see [Deny Amazon Q permission to perform actions on your behalf](#).

Identity and access management for Amazon Q Developer

AWS Identity and Access Management (IAM) is an AWS service that helps an administrator securely control access to AWS resources. IAM administrators control who can be *authenticated* (signed in) and *authorized* (have permissions) to use Amazon Q Developer resources. IAM is an AWS service that you can use with no additional charge.

Topics

- [Audience](#)
- [Authenticating with identities](#)
- [Managing access using policies](#)
- [How Amazon Q Developer works with IAM](#)
- [Manage access to Amazon Q Developer with policies](#)
- [Manage access to Amazon Q Developer for third-party integration](#)
- [Amazon Q Developer permissions reference](#)
- [AWS managed policies for Amazon Q Developer](#)
- [Using service-linked roles for Amazon Q Developer and User Subscriptions](#)

Audience

How you use IAM differs, depending on the work you do in Amazon Q.

Service user – If you use the Amazon Q service to do your job, then your administrator provides you with the credentials and permissions that you need. As you use more Amazon Q features to do your work, you might need additional permissions. Understanding how access is managed can help you request the right permissions from your administrator.

Service administrator – If you're in charge of Amazon Q resources at your company, you probably have full access to Amazon Q. It's your job to determine which Amazon Q features and resources your service users should access. You must then submit requests to your IAM administrator to change the permissions of your service users. Review the information on this page to understand the basic concepts of IAM. To learn more about how your company can use IAM with Amazon Q, see [How Amazon Q works with IAM](#).

IAM administrator – If you're an IAM administrator, you might want to learn details about how you can write policies to manage access to Amazon Q. If you're an IAM administrator, consider learning the details about how you can write policies to manage IAM user access to services. For information that's specific to Amazon Q, see [AWS Regions managed policies for Amazon Q](#).

Authenticating with identities

Authentication is how you sign in to AWS using your identity credentials. You must be *authenticated* (signed in to AWS) as the AWS account root user, an IAM user, or by assuming an IAM role.

You can sign in to AWS as a federated identity by using credentials provided through an identity source. AWS IAM Identity Center (IAM Identity Center) users, your company's single sign-on authentication, and your Google or Facebook credentials are examples of federated identities. When you sign in as a federated identity, your administrator previously set up identity federation using IAM roles. When you access AWS by using federation, you are indirectly assuming a role.

Depending on the type of user you are, you can sign in to the AWS Management Console or the AWS access portal. For more information about signing in to AWS, see [How to sign in to your AWS account](#) in the *AWS Sign-In User Guide*.

Regardless of the authentication method that you use, you might also be required to provide additional security information. For example, AWS recommends that you use multi-factor authentication (MFA) to increase the security of your account. To learn more, see [Multi-factor](#)

[authentication](#) in the *AWS IAM Identity Center User Guide* and [Using multi-factor authentication \(MFA\) in AWS](#) in the *IAM User Guide*.

AWS account root user

When you first create an AWS account, you begin with a single sign-in identity that has complete access to all AWS services and resources in the account. This identity is called the AWS account root user and is accessed by signing in with the email address and password that you used to create the account. We strongly recommend that you don't use the root user for your everyday tasks. Safeguard your root user credentials and use them to perform tasks that only the root user can perform. For the complete list of tasks that require you to sign in as the root user, see [Tasks that require root user credentials](#) in the *IAM User Guide*.

Federated identity

As a best practice, require human users, including users that require administrator access, to use federation with an identity provider to access AWS services by using temporary credentials.

A federated identity is a user from your enterprise user directory, a web identity provider, the AWS Directory Service, the Identity Center directory, or any user that accesses AWS services by using credentials provided through an identity source. When federated identities access AWS accounts, they assume roles, and the roles provide temporary credentials.

For centralized access management, we recommend that you use AWS IAM Identity Center. You can create users and groups in IAM Identity Center, or you can connect and synchronize to a set of users and groups in your own identity source for use across all your AWS accounts and applications. For information about IAM Identity Center, see [What is IAM Identity Center?](#) in the *AWS IAM Identity Center User Guide*.

IAM users and groups

An [IAM user](#) is an identity within your AWS account that has specific permissions for a single person or application. Where possible, we recommend relying on temporary credentials instead of creating IAM users who have long-term credentials such as passwords and access keys. However, if you have specific use cases that require long-term credentials with IAM users, we recommend that you rotate access keys. For more information, see [Rotate access keys regularly for use cases that require long-term credentials](#) in the *IAM User Guide*.

An [IAM group](#) is an identity that specifies a collection of IAM users. You can't sign in as a group. You can use groups to specify permissions for multiple users at a time. Groups make permissions easier

to manage for large sets of users. For example, you could have a group named *IAMAdmins* and give that group permissions to administer IAM resources.

Users are different from roles. A user is uniquely associated with one person or application, but a role is intended to be assumable by anyone who needs it. Users have permanent long-term credentials, but roles provide temporary credentials. For more information, see [When to create an IAM user \(instead of a role\)](#) in the *IAM User Guide*.

IAM roles

An [IAM role](#) is an identity within your AWS account that has specific permissions. An IAM role is similar to an IAM user but is not associated with a specific person. You can temporarily assume an IAM role in the AWS Management Console by [switching roles](#). You can assume a role by calling an AWS Command Line Interface (AWS CLI) or AWS API operation or by using a custom URL. For more information about methods for using roles, see [Using IAM roles](#) in the *IAM User Guide*.

IAM roles with temporary credentials are useful in the following situations:

- **Federated user access** – To assign permissions to a federated identity, you create a role and define permissions for the role. When a federated identity authenticates, the identity is associated with the role and is granted the permissions that are defined by the role. For information about roles for federation, see [Creating a role for a third-party Identity Provider](#) in the *IAM User Guide*. If you use IAM Identity Center, you configure a permission set. To control what your identities can access after they authenticate, IAM Identity Center correlates the permission set to a role in IAM. For information about permissions sets, see [Permission sets](#) in the *AWS IAM Identity Center User Guide*.
- **Temporary IAM user permissions** – An IAM user can assume an IAM role to temporarily take on different permissions for a specific task.
- **Cross-account access** – You can use an IAM role to allow someone (a trusted principal) in a different account to access resources in your account. Roles are the primary way to grant cross-account access. However, with some AWS services, you can attach a policy directly to a resource (instead of using a role as a proxy). For more information about the difference between roles and resource-based policies for cross-account access, see [How IAM roles differ from resource-based policies](#) in the *IAM User Guide*.
- **Cross-service access** – Some AWS services use features in other AWS services. A service might do this using the calling principal's permissions, using a service role, or using a service-linked role.
 - **Principal permissions** – When you use an IAM user or role to perform actions in AWS, you are considered a principal. Policies grant permissions to a principal. When you use some services,

you might perform an action that then triggers another action in a different service. In this case, you must have permissions to perform both actions.

- **Service role** – A service role is an IAM role that a service assumes to perform actions on your behalf. An IAM administrator can create, modify, and delete a service role from within IAM. For more information, see [Creating a role to delegate permissions to an AWS service](#) in the *IAM User Guide*.
- **Service-linked role** – A service-linked role is a type of service role that is linked to an AWS service. The service can assume the role to perform an action on your behalf. Service-linked roles appear in your AWS account and are owned by the service. An IAM administrator can view but not edit the permissions for service-linked roles.
- **Applications running on Amazon EC2** – You can use an IAM role to manage temporary credentials for applications that are running on an Amazon EC2 instance and making AWS CLI or AWS API requests. This is preferable to storing access keys within the Amazon EC2 instance. To assign an IAM role to an Amazon EC2 instance and make it available to all of its applications, you create an instance profile that is attached to the instance. An instance profile contains the role and enables programs that are running on the Amazon EC2 instance to get temporary credentials. For more information, see [Using an IAM role to grant permissions to applications running on Amazon EC2 instances](#) in the *IAM User Guide*.

For more information about whether to use IAM roles, see [When to create an IAM role \(instead of a user\)](#) in the *IAM User Guide*.

Managing access using policies

You control access in AWS by creating policies and attaching them to AWS identities or resources. A policy is an object in AWS that, when associated with an identity or resource, defines their permissions. AWS evaluates these policies when a principal (user, root user, or role session) makes a request. Permissions in the policies determine whether the request is allowed or denied. Most policies are stored in AWS as JSON documents. For more information about the structure and contents of JSON policy documents, see [Overview of JSON policies](#) in the *IAM User Guide*.

Administrators can use AWS JSON policies to specify who has access to what. That is, which **principal** can perform **actions** on what **resources**, and under what **conditions**.

Every IAM entity (user or role) starts with no permissions. By default, users can do nothing, not even change their own password. To give a user permission to do something, an administrator must attach a permissions policy to a user. Or the administrator can add the user to a group that

has the intended permissions. When an administrator gives permissions to a group, all users in that group are granted those permissions.

IAM policies define permissions for an action regardless of the method that you use to perform the operation. For example, suppose that you have a policy that allows the `iam:GetRole` action. A user with that policy can get role information from the AWS Management Console, the AWS CLI, or the AWS API.

Identity-based policies

Identity-based policies are JSON permissions policy documents that you can attach to an identity, such as an IAM user, role, or group. These policies control what actions users and roles can perform, on which resources, and under what conditions. For more information about how to create an identity-based policy, see [Creating IAM policies](#) in the *IAM User Guide*.

Identity-based policies can be further categorized as *inline policies* or *managed policies*. Inline policies are embedded directly into a single user, group, or role. Managed policies are standalone policies that you can attach to multiple users, groups, and roles in your AWS account. Managed policies include AWS managed policies and customer managed policies. For more information about how to choose between a managed policy or an inline policy, see [Choosing between managed policies and inline policies](#) in the *IAM User Guide*.

Resource-based policies

Resource-based policies are JSON policy documents that you attach to a resource such as an Amazon S3 bucket. Service administrators can use these policies to define what actions a specified principal (account member, user, or role) can perform on that resource and under what conditions. Resource-based policies are inline policies. There are no managed resource-based policies.

Access control lists (ACLs)

Access control lists (ACLs) are a type of policy that controls which principals (account members, users, or roles) have permissions to access a resource. ACLs are similar to resource-based policies, although they do not use the JSON policy document format. Amazon S3, AWS WAF, and Amazon VPC are examples of services that support ACLs. For more information about ACLs, see [Access Control List \(ACL\) overview](#) in the *Amazon S3 User Guide*.

Other policy types

AWS supports additional, less-common policy types. These policy types can set the maximum permissions granted to you by the more common policy types.

- **Permissions boundaries** – A permissions boundary is an advanced feature in which you set the maximum permissions that an identity-based policy can grant to an IAM entity (IAM user or role). You can set a permissions boundary for an entity. The resulting permissions are the intersection of an entity's identity-based policies and its permissions boundaries. Resource-based policies that specify the user or role in the `Principal` field are not limited by the permissions boundary. An explicit deny in any of these policies overrides the allow. For more information about permissions boundaries, see [Permissions boundaries for IAM entities](#) in the *IAM User Guide*.
- **Service control policies (SCPs)** – SCPs are JSON policies that specify the maximum permissions for an organization or organizational unit (OU) in AWS Organizations. AWS Organizations is a service for grouping and centrally managing multiple AWS accounts that your business owns. If you enable all features in an organization, then you can apply SCPs to any or all of your accounts. The SCP limits permissions for entities in member accounts, including each AWS account root user. For more information about Organizations and SCPs, see [How SCPs work](#) in the *AWS Organizations User Guide*.
- **Session policies** – Session policies are advanced policies that you pass as a parameter when you programmatically create a temporary session for a role or federated user. The resulting session's permissions are the intersection of the user or role's identity-based policies and the session policies. Permissions can also come from a resource-based policy. An explicit deny in any of these policies overrides the allow. For more information, see [Session policies](#) in the *IAM User Guide*.

Multiple policy types

When multiple types of policies apply to a request, the resulting permissions are more complicated to understand. To learn how AWS determines whether to allow a request when multiple policy types are involved, see [Policy evaluation logic](#) in the *IAM User Guide*.

How Amazon Q Developer works with IAM

Before you use IAM to manage access to Amazon Q Developer, learn what IAM features are available to use with Amazon Q Developer.

IAM features you can use with Amazon Q Developer

IAM feature	Amazon Q support
Identity-based policies	Yes
Resource-based policies	No
Policy actions	Yes
Policy resources	No
Policy condition keys	No
ACLs	No
ABAC (tags in policies)	No
Temporary credentials	Yes
Principal permissions	Yes
Service roles	No
Service-linked roles	Yes

To get a high-level view of how Amazon Q and other AWS services work with most IAM features, see [AWS services that work with IAM](#) in the *IAM User Guide*.

Identity-based policies for Amazon Q

Supports identity-based policies: Yes

Identity-based policies are JSON permissions policy documents that you can attach to an identity, such as an IAM user, group of users, or role. These policies control what actions users and roles can perform, on which resources, and under what conditions. To learn how to create an identity-based policy, see [Define custom IAM permissions with customer managed policies](#) in the *IAM User Guide*.

With IAM identity-based policies, you can specify allowed or denied actions and resources as well as the conditions under which actions are allowed or denied. You can't specify the principal in an identity-based policy because it applies to the user or role to which it is attached. To learn about all

of the elements that you can use in a JSON policy, see [IAM JSON policy elements reference](#) in the *IAM User Guide*.

Identity-based policy examples for Amazon Q

To view examples of Amazon Q Developer identity-based policies, see [Identity-based policy examples for Amazon Q Developer](#).

Resource-based policies within Amazon Q

Supports resource-based policies: No

Resource-based policies are JSON policy documents that you attach to a resource. Examples of resource-based policies are IAM *role trust policies* and Amazon S3 *bucket policies*. In services that support resource-based policies, service administrators can use them to control access to a specific resource. For the resource where the policy is attached, the policy defines what actions a specified principal can perform on that resource and under what conditions. You must [specify a principal](#) in a resource-based policy. Principals can include accounts, users, roles, federated users, or AWS services.

To enable cross-account access, you can specify an entire account or IAM entities in another account as the principal in a resource-based policy. Adding a cross-account principal to a resource-based policy is only half of establishing the trust relationship. When the principal and the resource are in different AWS accounts, an IAM administrator in the trusted account must also grant the principal entity (user or role) permission to access the resource. They grant permission by attaching an identity-based policy to the entity. However, if a resource-based policy grants access to a principal in the same account, no additional identity-based policy is required. For more information, see [Cross account resource access in IAM](#) in the *IAM User Guide*.

Policy actions for Amazon Q

Supports policy actions: Yes

Administrators can use AWS JSON policies to specify who has access to what. That is, which **principal** can perform **actions** on what **resources**, and under what **conditions**.

The **Action** element of a JSON policy describes the actions that you can use to allow or deny access in a policy. Policy actions usually have the same name as the associated AWS API operation. There are some exceptions, such as *permission-only actions* that don't have a matching API

operation. There are also some operations that require multiple actions in a policy. These additional actions are called *dependent actions*.

Include actions in a policy to grant permissions to perform the associated operation.

To see a list of Amazon Q actions, see [Manage access to Amazon Q Developer with policies](#).

Policy actions in Amazon Q use the following prefix before the action:

```
q
```

To specify multiple actions in a single statement, separate the actions with commas.

```
"Action": [  
    "q:action1",  
    "q:action2"  
]
```

You can specify multiple actions using wildcards (*). For example, to specify all actions that begin with the word Get, include the following action:

```
"Action": "q:Get*"
```

To view examples of Amazon Q Developer identity-based policies, see [Identity-based policy examples for Amazon Q Developer](#).

Policy resources for Amazon Q

Supports policy resources: No

Administrators can use AWS JSON policies to specify who has access to what. That is, which **principal** can perform **actions** on what **resources**, and under what **conditions**.

The Resource JSON policy element specifies the object or objects to which the action applies. Statements must include either a Resource or a NotResource element. As a best practice, specify a resource using its [Amazon Resource Name \(ARN\)](#). You can do this for actions that support a specific resource type, known as *resource-level permissions*.

For actions that don't support resource-level permissions, such as listing operations, use a wildcard (*) to indicate that the statement applies to all resources.

```
"Resource": "*"
```

To view examples of Amazon Q Developer identity-based policies, see [Identity-based policy examples for Amazon Q Developer](#).

Policy condition keys for Amazon Q

Supports service-specific policy condition keys: No

Administrators can use AWS JSON policies to specify who has access to what. That is, which **principal** can perform **actions** on what **resources**, and under what **conditions**.

The Condition element (or Condition *block*) lets you specify conditions in which a statement is in effect. The Condition element is optional. You can create conditional expressions that use [condition operators](#), such as equals or less than, to match the condition in the policy with values in the request.

If you specify multiple Condition elements in a statement, or multiple keys in a single Condition element, AWS evaluates them using a logical AND operation. If you specify multiple values for a single condition key, AWS evaluates the condition using a logical OR operation. All of the conditions must be met before the statement's permissions are granted.

You can also use placeholder variables when you specify conditions. For example, you can grant an IAM user permission to access a resource only if it is tagged with their IAM user name. For more information, see [IAM policy elements: variables and tags](#) in the *IAM User Guide*.

AWS supports global condition keys and service-specific condition keys. To see all AWS global condition keys, see [AWS global condition context keys](#) in the *IAM User Guide*.

To view examples of Amazon Q Developer identity-based policies, see [Identity-based policy examples for Amazon Q Developer](#).

ACLs in Amazon Q

Supports ACLs: No

Access control lists (ACLs) control which principals (account members, users, or roles) have permissions to access a resource. ACLs are similar to resource-based policies, although they do not use the JSON policy document format.

ABAC with Amazon Q

Supports ABAC (tags in policies): No

Attribute-based access control (ABAC) is an authorization strategy that defines permissions based on attributes. In AWS, these attributes are called *tags*. You can attach tags to IAM entities (users or roles) and to many AWS resources. Tagging entities and resources is the first step of ABAC. Then you design ABAC policies to allow operations when the principal's tag matches the tag on the resource that they are trying to access.

ABAC is helpful in environments that are growing rapidly and helps with situations where policy management becomes cumbersome.

To control access based on tags, you provide tag information in the [condition element](#) of a policy using the `aws:ResourceTag/key-name`, `aws:RequestTag/key-name`, or `aws:TagKeys` condition keys.

If a service supports all three condition keys for every resource type, then the value is **Yes** for the service. If a service supports all three condition keys for only some resource types, then the value is **Partial**.

For more information about ABAC, see [Define permissions with ABAC authorization](#) in the *IAM User Guide*. To view a tutorial with steps for setting up ABAC, see [Use attribute-based access control \(ABAC\)](#) in the *IAM User Guide*.

Using temporary credentials with Amazon Q

Supports temporary credentials: Yes

Some AWS services don't work when you sign in using temporary credentials. For additional information, including which AWS services work with temporary credentials, see [AWS services that work with IAM](#) in the *IAM User Guide*.

You are using temporary credentials if you sign in to the AWS Management Console using any method except a user name and password. For example, when you access AWS using your company's single sign-on (SSO) link, that process automatically creates temporary credentials. You also automatically create temporary credentials when you sign in to the console as a user and then

switch roles. For more information about switching roles, see [Switch from a user to an IAM role \(console\)](#) in the *IAM User Guide*.

You can manually create temporary credentials using the AWS CLI or AWS API. You can then use those temporary credentials to access AWS. AWS recommends that you dynamically generate temporary credentials instead of using long-term access keys. For more information, see [Temporary security credentials in IAM](#).

Cross-service principal permissions for Amazon Q

Supports forward access sessions (FAS): Yes

When you use an IAM user or role to perform actions in AWS, you are considered a principal. When you use some services, you might perform an action that then initiates another action in a different service. FAS uses the permissions of the principal calling an AWS service, combined with the requesting AWS service to make requests to downstream services. FAS requests are only made when a service receives a request that requires interactions with other AWS services or resources to complete. In this case, you must have permissions to perform both actions. For policy details when making FAS requests, see [Forward access sessions](#).

Service roles for Amazon Q

Supports service roles: No

A service role is an [IAM role](#) that a service assumes to perform actions on your behalf. An IAM administrator can create, modify, and delete a service role from within IAM. For more information, see [Create a role to delegate permissions to an AWS service](#) in the *IAM User Guide*.

Warning

Changing the permissions for a service role might break Amazon Q functionality. Edit service roles only when Amazon Q provides guidance to do so.

Service-linked roles for Amazon Q

Supports service-linked roles: Yes

A service-linked role is a type of service role that is linked to an AWS service. The service can assume the role to perform an action on your behalf. Service-linked roles appear in your AWS

account and are owned by the service. An IAM administrator can view, but not edit the permissions for service-linked roles.

For details about creating or managing Amazon Q service-linked roles, see [Using service-linked roles for Amazon Q Developer and User Subscriptions](#).

Manage access to Amazon Q Developer with policies

Note

The information on this page pertains to accessing Amazon Q Developer. For information about managing access to Amazon Q Business, see [Identity-based policy examples for Amazon Q Business](#) in the *Amazon Q Business User Guide*.

The policies and examples in this topic are specific to Amazon Q in the AWS Management Console, AWS Console Mobile Application, AWS website, AWS Documentation, and in chat applications. Other services integrated with Amazon Q might require different policies or settings. End users of Amazon Q in third-party IDEs are not required to use IAM policies. For more information, see the documentation for the service that contains an Amazon Q feature or integration.

By default, users and roles don't have permission to use Amazon Q. IAM administrators can manage access to Amazon Q Developer and its features by granting permissions to IAM identities.

The quickest way for an administrator to grant access to users is through an AWS managed policy. The `AmazonQFullAccess` policy can be attached to IAM identities to grant full access to Amazon Q Developer and its features. For more information about this policy, see [AWS managed policies for Amazon Q Developer](#).

To manage specific actions that IAM identities can perform with Amazon Q Developer, administrators can create custom policies that define what permissions a user, group, or role has. You can also use service control policies (SCPs) to control what Amazon Q features are available in your organization.

For a list of all Amazon Q permissions you can control with policies, see the [Amazon Q Developer permissions reference](#).

Topics

- [Policy best practices](#)

- [Assign permissions](#)
- [Manage access with service control policies \(SCPs\)](#)
- [Identity-based policy examples for Amazon Q Developer](#)

Policy best practices

Identity-based policies determine whether someone can create, access, or delete Amazon Q Developer resources in your account. These actions can incur costs for your AWS account. When you create or edit identity-based policies, follow these guidelines and recommendations:

- **Get started with AWS managed policies and move toward least-privilege permissions** – To get started granting permissions to your users and workloads, use the *AWS managed policies* that grant permissions for many common use cases. They are available in your AWS account. We recommend that you reduce permissions further by defining AWS customer managed policies that are specific to your use cases. For more information, see [AWS managed policies](#) or [AWS managed policies for job functions](#) in the *IAM User Guide*.
- **Apply least-privilege permissions** – When you set permissions with IAM policies, grant only the permissions required to perform a task. You do this by defining the actions that can be taken on specific resources under specific conditions, also known as *least-privilege permissions*. For more information about using IAM to apply permissions, see [Policies and permissions in IAM](#) in the *IAM User Guide*.
- **Use conditions in IAM policies to further restrict access** – You can add a condition to your policies to limit access to actions and resources. For example, you can write a policy condition to specify that all requests must be sent using SSL. You can also use conditions to grant access to service actions if they are used through a specific AWS service, such as AWS CloudFormation. For more information, see [IAM JSON policy elements: Condition](#) in the *IAM User Guide*.
- **Use IAM Access Analyzer to validate your IAM policies to ensure secure and functional permissions** – IAM Access Analyzer validates new and existing policies so that the policies adhere to the IAM policy language (JSON) and IAM best practices. IAM Access Analyzer provides more than 100 policy checks and actionable recommendations to help you author secure and functional policies. For more information, see [Validate policies with IAM Access Analyzer](#) in the *IAM User Guide*.
- **Require multi-factor authentication (MFA)** – If you have a scenario that requires IAM users or a root user in your AWS account, turn on MFA for additional security. To require MFA when API operations are called, add MFA conditions to your policies. For more information, see [Secure API access with MFA](#) in the *IAM User Guide*.

For more information about best practices in IAM, see [Security best practices in IAM](#) in the *IAM User Guide*.

Assign permissions

To provide access, add permissions to your users, groups, or roles:

- Users and groups in AWS IAM Identity Center:

Create a permission set. Follow the instructions in [Create a permission set](#) in the *AWS IAM Identity Center User Guide*.

- Users managed in IAM through an identity provider:

Create a role for identity federation. Follow the instructions in [Create a role for a third-party identity provider \(federation\)](#) in the *IAM User Guide*.

- IAM users:

- Create a role that your user can assume. Follow the instructions in [Create a role for an IAM user](#) in the *IAM User Guide*.
- (Not recommended) Attach a policy directly to a user or add a user to a user group. Follow the instructions in [Adding permissions to a user \(console\)](#) in the *IAM User Guide*.

Manage access with service control policies (SCPs)

Service control policies (SCPs) are a type of organization policy that you can use to manage permissions in your organization. You can control what Amazon Q Developer features are available in your organization by creating an SCP that specifies permissions for some or all Amazon Q actions.

For more information about using SCPs to control access in your organization, see [Creating, updating, and deleting service control policies](#) and [Attaching and detaching service control policies](#) in the *AWS Organizations User Guide*.

Example SCP: Deny access to Amazon Q outside EU Regions

The following SCP denies access to any use of Amazon Q Developer outside of the Europe (Frankfurt) Region (eu-central-1).

Note

The `codewhisperer` prefix is a legacy name from a service that merged with Amazon Q Developer. For more information, see [Amazon Q Developer rename - Summary of changes](#).

```
{
  "Version": "2012-10-17",
  "Statement": [
    {
      "Sid": "DenyAmazonQDeveloperOutsideEU",
      "Effect": "Deny",
      "Action": [
        "codewhisperer:GenerateRecommendations",
        "q:SendMessage",
        "q:GenerateCodeFromCommands",
        "sqlworkbench:GetQSqlRecommendations"
      ],
      "Resource": "*",
      "Condition": {
        "StringNotEquals": {
          "aws:RequestedRegion": [ "eu-central-1" ]
        }
      }
    }
  ]
}
```

Example SCP: Deny access to Amazon Q

The following SCP denies access to Amazon Q Developer.

Note

Denying access to Amazon Q will not disable the Amazon Q icon or chat panel in the AWS console, AWS website, AWS documentation pages, or AWS Console Mobile Application.

```
{
  "Version": "2012-10-17",
  "Statement": [
    {
```

```
    "Sid": "DenyAmazonQFullAccess",
    "Effect": "Deny",
    "Action": [
        "q:*"
    ],
    "Resource": "*"
  }
]
```

Identity-based policy examples for Amazon Q Developer

The following example IAM policies control permissions for various Amazon Q Developer actions. Use them to allow or deny Amazon Q Developer access for your users, roles, or groups.

Note

The following example policies grant permissions for features of Amazon Q Developer, but users might need additional permissions to access Amazon Q with an Amazon Q Developer Pro subscription. For more information, see [Allow users to access Amazon Q with an Amazon Q Developer Pro subscription](#).

You can use these policies as written, or you can add permissions for the individual Amazon Q features you want to use. For more information about configuring IAM permissions with Amazon Q, see [Manage access to Amazon Q Developer with policies](#).

For a list of all Amazon Q permissions you can control with policies, see the [Amazon Q Developer permissions reference](#).

Topics

- [Administrator permissions](#)
- [User permissions](#)

Administrator permissions

The following policies allow Amazon Q Developer administrators to perform administrative tasks in the Amazon Q subscription management console and Amazon Q Developer console.

For policies that enable the use of Amazon Q Developer features, see [User permissions](#).

Allow administrators to use the Amazon Q console

The following example policy grants permissions for a user to perform actions in the Amazon Q console. The Amazon Q console is where you configure Amazon Q's integration with AWS IAM Identity Center and AWS Organizations. Most other Amazon Q Developer-related tasks must be completed in the Amazon Q Developer console. For more information, see [Allow administrators to use the Amazon Q Developer console](#).

Note

The codewhisperer prefix is a legacy name from a service that merged with Amazon Q Developer. For more information, see [Amazon Q Developer rename - Summary of changes](#).

```
{
  "Version": "2012-10-17",
  "Statement": [
    {
      "Effect": "Allow",
      "Action": [
        "organizations:ListAWSServiceAccessForOrganization",
        "organizations:DisableAWSServiceAccess",
        "organizations:EnableAWSServiceAccess",
        "organizations:DescribeOrganization"
      ],
      "Resource": [
        "*"
      ]
    },
    {
      "Effect": "Allow",
      "Action": [
        "sso:ListApplications",
        "sso:ListInstances",
        "sso:DescribeRegisteredRegions",
        "sso:GetSharedSsoConfiguration",
        "sso:DescribeInstance",
        "sso:CreateInstance",
        "sso:CreateApplication",
        "sso:PutApplicationAuthenticationMethod",
        "sso:PutApplicationAssignmentConfiguration",
        "sso:PutApplicationGrant",

```

```

        "sso:PutApplicationAccessScope",
        "sso:DescribeApplication",
        "sso:DeleteApplication",
        "sso:GetSSOStatus",
        "sso:CreateApplicationAssignment",
        "sso:DeleteApplicationAssignment",
        "sso:UpdateApplication"
    ],
    "Resource": [
        "*"
    ]
},
{
    "Effect": "Allow",
    "Action": [
        "sso-directory:DescribeUsers",
        "sso-directory:DescribeGroups",
        "sso-directory:SearchGroups",
        "sso-directory:SearchUsers",
        "sso-directory:DescribeGroup",
        "sso-directory:DescribeUser",
        "sso-directory:DescribeDirectory"
    ],
    "Resource": [
        "*"
    ]
},
{
    "Effect": "Allow",
    "Action": [
        "signin:ListTrustedIdentityPropagationApplicationsForConsole",
        "signin:CreateTrustedIdentityPropagationApplicationForConsole"
    ],
    "Resource": [
        "*"
    ]
},
{
    "Effect": "Allow",
    "Action": [
        "codewhisperer:ListProfiles",
        "codewhisperer:CreateProfile",
        "codewhisperer:DeleteProfile"
    ],

```

```

        "Resource": [
            "*"
        ]
    },
    {
        "Effect": "Allow",
        "Action": [
            "user-subscriptions:ListClaims",
            "user-subscriptions:ListUserSubscriptions",
            "user-subscriptions:CreateClaim",
            "user-subscriptions:DeleteClaim",
            "user-subscriptions:UpdateClaim"
        ],
        "Resource": [
            "*"
        ]
    },
    {
        "Effect": "Allow",
        "Action": [
            "q:CreateAssignment",
            "q:DeleteAssignment"
        ],
        "Resource": [
            "*"
        ]
    },
    {
        "Effect": "Allow",
        "Action": [
            "iam:CreateServiceLinkedRole"
        ],
        "Resource": [
            "arn:aws:iam::*:role/aws-service-role/user-subscriptions.amazonaws.com/
AWSServiceRoleForUserSubscriptions"
        ]
    }
]
}

```

Allow administrators to use the Amazon Q Developer console

The following example policy grants permissions for a user to access the Amazon Q Developer console. In the Amazon Q Developer console, administrators perform most Amazon Q Developer-related configuration tasks, including tasks related to subscriptions, code references, customizations, and chat plugins. This policy also includes permissions to create and configure customer managed KMS keys.

There are a few Amazon Q Developer Pro tasks that administrators must complete through the Amazon Q console (instead of the Amazon Q Developer console). For more information, see [Allow administrators to use the Amazon Q console](#).

Note

To create customizations or plugins, your Amazon Q Developer Pro administrator will require additional permissions.

- For permissions needed for customizations, see [Prerequisites for customizations](#).
- For permissions needed for plugins, see [Allow administrators to configure plugins](#).

You will need one of two policies to use the Amazon Q Developer console. The policy you need depends on if you're setting up Amazon Q Developer for the first time or if you're configuring a legacy Amazon CodeWhisperer profile.

Note

The `codewhisperer` prefix is a legacy name from a service that merged with Amazon Q Developer. For more information, see [Amazon Q Developer rename - Summary of changes](#).

For new administrators of Amazon Q Developer, use the following policy:

```
{
  "Version": "2012-10-17",
  "Statement": [
    {
      "Effect": "Allow",
      "Action": [
        "sso:ListInstances",
```

```

        "sso:CreateInstance",
        "sso:CreateApplication",
        "sso:PutApplicationAuthenticationMethod",
        "sso:PutApplicationGrant",
        "sso:PutApplicationAssignmentConfiguration",
        "sso:ListApplications",
        "sso:GetSharedSsoConfiguration",
        "sso:DescribeInstance",
        "sso:PutApplicationAccessScope",
        "sso:DescribeApplication",
        "sso:DeleteApplication",
        "sso:CreateApplicationAssignment",
        "sso:DeleteApplicationAssignment",
        "sso:UpdateApplication",
        "sso:DescribeRegisteredRegions",
        "sso:GetSSOStatus"
    ],
    "Resource": [
        "*"
    ]
},
{
    "Effect": "Allow",
    "Action": [
        "iam:ListRoles"
    ],
    "Resource": [
        "*"
    ]
},
{
    "Effect": "Allow",
    "Action": [
        "sso-directory:GetUserPoolInfo",
        "sso-directory:DescribeUsers",
        "sso-directory:DescribeGroups",
        "sso-directory:SearchGroups",
        "sso-directory:SearchUsers",
        "sso-directory:DescribeDirectory"
    ],
    "Resource": [
        "*"
    ]
},

```



```

{
  "Effect": "Allow",
  "Action": [
    "signin:ListTrustedIdentityPropagationApplicationsForConsole",
    "signin:CreateTrustedIdentityPropagationApplicationForConsole"
  ],
  "Resource": [
    "*"
  ]
},
{
  "Effect": "Allow",
  "Action": [
    "user-subscriptions:ListClaims",
    "user-subscriptions:ListApplicationClaims",
    "user-subscriptions:ListUserSubscriptions",
    "user-subscriptions:CreateClaim",
    "user-subscriptions:DeleteClaim",
    "user-subscriptions:UpdateClaim"
  ],
  "Resource": [
    "*"
  ]
},
{
  "Effect": "Allow",
  "Action": [
    "organizations:DescribeAccount",
    "organizations:DescribeOrganization",
    "organizations:ListAWSServiceAccessForOrganization",
    "organizations:DisableAWSServiceAccess",
    "organizations:EnableAWSServiceAccess"
  ],
  "Resource": [
    "*"
  ]
},
{
  "Effect": "Allow",
  "Action": [
    "kms:ListAliases",
    "kms:CreateGrant",
    "kms:Encrypt",
    "kms:Decrypt",

```

```

        "kms:GenerateDataKey*",
        "kms:RetireGrant",
        "kms:DescribeKey"
    ],
    "Resource": [
        "*"
    ]
},
{
    "Effect": "Allow",
    "Action": [
        "codeguru-security:UpdateAccountConfiguration"
    ],
    "Resource": [
        "*"
    ]
},
{
    "Effect": "Allow",
    "Action": [
        "iam:CreateServiceLinkedRole"
    ],
    "Resource": [
        "arn:aws:iam::*:role/aws-service-role/q.amazonaws.com/
AWSServiceRoleForAmazonQDeveloper"
    ]
},
{
    "Effect": "Allow",
    "Action": [
        "codewhisperer:UpdateProfile",
        "codewhisperer:ListProfiles",
        "codewhisperer:TagResource",
        "codewhisperer:UntagResource",
        "codewhisperer:ListTagsForResource",
        "codewhisperer:CreateProfile"
    ],
    "Resource": [
        "*"
    ]
},
{
    "Effect": "Allow",
    "Action": [

```

```

        "q:ListDashboardMetrics",
        "q:CreateAssignment",
        "q:DeleteAssignment"
    ],
    "Resource": [
        "*"
    ]
},
{
    "Effect": "Allow",
    "Action": [
        "cloudwatch:GetMetricData",
        "cloudwatch:ListMetrics"
    ],
    "Resource": [
        "*"
    ]
}
]
}
```

For legacy Amazon CodeWhisperer profiles, the following policy will enable an IAM principal to administer a CodeWhisperer application.

```

{
  "Version": "2012-10-17",
  "Statement": [
    {
      "Effect": "Allow",
      "Action": [
        "sso-directory:SearchUsers",
        "sso-directory:SearchGroups",
        "sso-directory:GetUserPoolInfo",
        "sso-directory:DescribeDirectory",
        "sso-directory:ListMembersInGroup"
      ],
      "Resource": [
        "*"
      ]
    },
    {
      "Effect": "Allow",
      "Action": [
```

```

    "iam:ListRoles"
  ],
  "Resource": [
    "*"
  ]
},
{
  "Effect": "Allow",
  "Action": [
    "pricing:GetProducts"
  ],
  "Resource": [
    "*"
  ]
},
{
  "Effect": "Allow",
  "Action": [
    "sso:AssociateProfile",
    "sso:DisassociateProfile",
    "sso:GetProfile",
    "sso:ListProfiles",
    "sso:ListApplicationInstances",
    "sso:GetApplicationInstance",
    "sso:CreateManagedApplicationInstance",
    "sso:GetManagedApplicationInstance",
    "sso:ListProfileAssociations",
    "sso:GetSharedSsoConfiguration",
    "sso:ListDirectoryAssociations",
    "sso:DescribeRegisteredRegions",
    "sso:GetSsoConfiguration",
    "sso:GetSSOStatus"
  ],
  "Resource": [
    "*"
  ]
},
{
  "Effect": "Allow",
  "Action": [
    "identitystore:ListUsers",
    "identitystore:ListGroups"
  ],
  "Resource": [

```

```

        "*"
    ],
},
{
    "Effect": "Allow",
    "Action": [
        "organizations:DescribeAccount",
        "organizations:DescribeOrganization"
    ],
    "Resource": [
        "*"
    ]
},
{
    "Effect": "Allow",
    "Action": [
        "kms:ListAliases",
        "kms:CreateGrant",
        "kms:Encrypt",
        "kms:Decrypt",
        "kms:GenerateDataKey*",
        "kms:RetireGrant",
        "kms:DescribeKey"
    ],
    "Resource": [
        "*"
    ]
},
{
    "Effect": "Allow",
    "Action": [
        "codeguru-security:UpdateAccountConfiguration"
    ],
    "Resource": [
        "*"
    ]
},
{
    "Effect": "Allow",
    "Action": [
        "iam:CreateServiceLinkedRole"
    ],
    "Resource": [

```

```

        "arn:aws:iam::*:role/aws-service-role/q.amazonaws.com/
AWSServiceRoleForAmazonQDeveloper"
    ],
    },
    {
        "Effect": "Allow",
        "Action": [
            "codewhisperer:UpdateProfile",
            "codewhisperer:ListProfiles",
            "codewhisperer:TagResource",
            "codewhisperer:UntagResource",
            "codewhisperer:ListTagsForResource",
            "codewhisperer:CreateProfile"
        ],
        "Resource": [
            "*"
        ]
    },
    {
        "Effect": "Allow",
        "Action": [
            "q:ListDashboardMetrics",
            "cloudwatch:GetMetricData",
            "cloudwatch:ListMetrics"
        ],
        "Resource": [
            "*"
        ]
    }
]
}

```

Allow administrators to create customizations

The following policy grants administrators permission to create and manage customizations in Amazon Q Developer.

To configure customizations in the Amazon Q Developer console, your Amazon Q Developer administrator will require access to the Amazon Q Developer console. For more information, see [Allow administrators to use the Amazon Q Developer console](#).

Note

In the following policy, the IAM service will report errors on the `codeconnections:ListOwners` and `codeconnections:ListRepositories` permissions. Create the policy with these permissions anyway. The permissions are required, and the policy will work despite the errors.

Note

The `codewhisperer` prefix is a legacy name from a service that merged with Amazon Q Developer. For more information, see [Amazon Q Developer rename - Summary of changes](#).

In the following example, replace *account number* with your AWS account number.

```
{
  "Version": "2012-10-17",
  "Statement": [
    {
      "Effect": "Allow",
      "Action": [
        "sso-directory:DescribeUsers"
      ],
      "Resource": [
        "*"
      ]
    },
    {
      "Effect": "Allow",
      "Action": [
        "kms:CreateGrant"
      ],
      "Resource": [
        "*"
      ]
    },
    {
      "Effect": "Allow",
      "Action": [
        "codewhisperer:CreateCustomization",
```

```

        "codewhisperer:DeleteCustomization",
        "codewhisperer:ListCustomizations",
        "codewhisperer:ListCustomizationVersions",
        "codewhisperer:UpdateCustomization",
        "codewhisperer:GetCustomization",
        "codewhisperer:ListCustomizationPermissions",
        "codewhisperer:AssociateCustomizationPermission",
        "codewhisperer:DisassociateCustomizationPermission"
    ],
    "Resource": [
        "*"
    ]
},
{
    "Effect": "Allow",
    "Action": [
        "codeconnections:ListConnections",
        "codeconnections:ListOwners",
        "codeconnections:ListRepositories",
        "codeconnections:GetConnection"
    ],
    "Resource": [
        "*"
    ]
},
{
    "Effect": "Allow",
    "Action": "codeconnections:UseConnection",
    "Resource": "*",
    "Condition": {
        "ForAnyValue:StringEquals": {
            "codeconnections:ProviderAction": [
                "GitPull",
                "ListRepositories",
                "ListOwners"
            ]
        }
    }
},
{
    "Effect": "Allow",
    "Action": [
        "s3:GetObject*",
        "s3:GetBucket*",

```



```

        "s3:ListBucket*"
      ],
      "Resource": [
        "*"
      ]
    }
  ]
}

```

Allow administrators to configure plugins

The following example policy grants administrators permissions to view and configure third party plugins in the Amazon Q Developer console.

Note

In order to access the Amazon Q Developer console, administrators also need the permissions defined in [Allow administrators to use the Amazon Q Developer console](#).

```

{
  "Version": "2012-10-17",
  "Statement": [
    {
      "Effect": "Allow",
      "Action": [
        "q:CreatePlugin",
        "q:GetPlugin",
        "q>DeletePlugin",
        "q:ListPlugins",
        "q:ListPluginProviders",
        "q:UpdatePlugin",
        "q:CreateAuthGrant",
        "q:CreateOAuthAppConnection",
        "q:SendEvent",
        "q:UpdateAuthGrant",
        "q:UpdateOAuthAppConnection",
        "q:UpdatePlugin",
        "iam:CreateRole",
        "secretsmanager:CreateSecret"
      ],
      "Resource": "*"
    }
  ]
}

```

```

    },
    {
      "Effect": "Allow",
      "Action": [
        "iam:PassRole"
      ],
      "Resource": "*",
      "Condition": {
        "StringEquals": {
          "iam:PassedToService": [
            "q.amazonaws.com"
          ]
        }
      }
    }
  ]
}

```

Allow administrators to configure plugins from one provider

The following example policy grants an administrator permission to configure plugins from one provider, specified by the plugin ARN with the name of the plugin provider and a wildcard character (*). To use this policy, replace the following in the ARN in the Resource field:

- ***AWS-region*** – The AWS Region where the plugin will be created.
- ***AWS-account-ID*** – The AWS account ID of the account where your plugin is configured.
- ***plugin-provider*** – The name of the plugin provider that you want to allow configuration for, like CloudZero, Datadog, or Wiz. The plugin provider field is case sensitive.

Note

In order to access the Amazon Q Developer console, administrators also need the permissions defined in [Allow administrators to use the Amazon Q Developer console](#).

```

{
  "Version": "2012-10-17",
  "Statement": [
    {
      "Sid": "Allow permissions to create a plugin from one provider",

```

```

    "Effect": "Allow",
    "Action": [
        "q:CreatePlugin",
        "q:GetPlugin",
        "q>DeletePlugin"
    ],
    "Resource": "arn:aws:qdeveloper:AWS-region:AWS-account-ID:plugin/plugin-
provider/*"
    }
  ]
}

```

Allow migration of more than one network or more than one subnet

```

{
  "Version": "2012-10-17",
  "Statement": [{
    "Sid": "MGNNetworkMigrationAnalyzerEC2ResourceSgTag",
    "Effect": "Allow",
    "Action": [
        "ec2:CreateSecurityGroup"
    ],
    "Resource": [
        "arn:aws:ec2:region:account-id:vpc/*"
    ],
    "Condition": {
        "StringEquals": {
            "aws:ResourceTag/CreatedBy": "AWSApplicationMigrationService"
        }
    }
  },
  {
    "Sid": "MGNNetworkMigrationAnalyzerEC2RequestSgTag",
    "Effect": "Allow",
    "Action": [
        "ec2:CreateSecurityGroup"
    ],
    "Resource": [
        "arn:aws:ec2:region:account-id:security-group/*",
        "arn:aws:ec2:region:account-id:security-group-rule/*"
    ],
    "Condition": {

```

```

        "StringEquals": {
            "aws:RequestTag/CreatedBy": "AWSApplicationMigrationService"
        }
    },
    {
        "Sid": "MGNNetworkMigrationAnalyzerEC2SecurityGroupTags",
        "Effect": "Allow",
        "Action": [
            "ec2:CreateTags"
        ],
        "Resource": [
            "arn:aws:ec2:region:account-id:security-group/*",
            "arn:aws:ec2:region:account-id:security-group-rule/*",
            "arn:aws:ec2:region:account-id:network-interface/*",
            "arn:aws:ec2:region:account-id:network-insights-path/*",
            "arn:aws:ec2:region:account-id:network-insights-analysis/*"
        ],
        "Condition": {
            "StringEquals": {
                "aws:RequestTag/CreatedBy": "AWSApplicationMigrationService",
                "ec2:CreateAction": [
                    "CreateSecurityGroup",
                    "CreateNetworkInterface",
                    "CreateNetworkInsightsPath",
                    "StartNetworkInsightsAnalysis"
                ]
            }
        }
    },
    {
        "Sid": "MGNNetworkMigrationAnalyzerENIResourceTag",
        "Effect": "Allow",
        "Action": [
            "ec2:CreateNetworkInterface"
        ],
        "Resource": [
            "arn:aws:ec2:region:account-id:subnet/*"
        ],
        "Condition": {
            "StringEquals": {
                "aws:ResourceTag/CreatedBy": "AWSApplicationMigrationService"
            }
        }
    }
}

```

```

    }
  },
  {
    "Sid": "MGNNetworkMigrationAnalyzerENISG",
    "Effect": "Allow",
    "Action": [
      "ec2:CreateNetworkInterface"
    ],
    "Resource": [
      "arn:aws:ec2:region:account-id:security-group/*"
    ]
  },
  {
    "Sid": "MGNNetworkMigrationAnalyzerEC2ResourceTag",
    "Effect": "Allow",
    "Action": [
      "ec2:CreateNetworkInsightsPath"
    ],
    "Resource": [
      "*"
    ],
    "Condition": {
      "StringEquals": {
        "aws:ResourceTag/CreatedBy": "AWSApplicationMigrationService"
      }
    }
  },
  {
    "Sid": "MGNNetworkMigAnalyzerEC2RequestTag",
    "Effect": "Allow",
    "Action": [
      "ec2:CreateNetworkInterface",
      "ec2:CreateNetworkInsightsPath",
      "ec2:StartNetworkInsightsAnalysis"
    ],
    "Resource": [
      "*"
    ],
    "Condition": {
      "StringEquals": {
        "aws:RequestTag/CreatedBy": "AWSApplicationMigrationService"
      }
    }
  }
},

```

```

    {
      "Sid": "MGNNetworkMigrationAnalyzeNetwork",
      "Effect": "Allow",
      "Action": [
        "ec2:StartNetworkInsightsAnalysis"
      ],
      "Resource": [
        "*"
      ]
    }
  ]
}

```

User permissions

The following policies allow users to access features of Amazon Q Developer on AWS apps and websites, including the AWS Management Console, AWS Console Mobile Application, and AWS Documentation site.

For policies that enable administrative access to Amazon Q Developer, see [Administrator permissions](#).

Note

Users accessing Amazon Q in the IDE or on the command line don't require IAM permissions.

Allow users to access Amazon Q with an Amazon Q Developer Pro subscription

The following example policy grants permission to use Amazon Q with an Amazon Q Developer Pro subscription. Without these permissions, users can only access the Free tier of Amazon Q. To chat with Amazon Q or use other Amazon Q features, users need additional permissions, such as those granted by the example policies in this section.

```

{
  "Version": "2012-10-17",
  "Statement": [
    {
      "Sid": "AllowGetIdentity",
      "Effect": "Allow",
      "Action": [

```

```

        "q:GetIdentityMetadata"
      ],
      "Resource": "*"
    },
    {
      "Sid": "AllowSetTrustedIdentity",
      "Effect": "Allow",
      "Action": [
        "sts:SetContext"
      ],
      "Resource": "arn:aws:sts::*:self"
    }
  ]
}

```

Allow Amazon Q access to customer managed keys

The following example policy grants users permissions to access features encrypted with a customer managed key by allowing Amazon Q access to the key. This policy is required to use Amazon Q if an administrator has set up a customer managed key for encryption.

```

{
  "Version": "2012-10-17",
  "Statement": [
    {
      "Sid": "QKMSDecryptGenerateDataKeyPermissions",
      "Effect": "Allow",
      "Action": [
        "kms:Decrypt",
        "kms:GenerateDataKey",
        "kms:GenerateDataKeyWithoutPlaintext",
        "kms:ReEncryptFrom",
        "kms:ReEncryptTo"
      ],
      "Resource": [
        "arn:aws:kms:{{region}}:{{account_id}}:key/[key_id]"
      ],
      "Condition": {
        "StringLike": {
          "kms:ViaService": [
            "q.{{region}}.amazonaws.com"
          ]
        }
      }
    }
  ]
}

```

```
    }  
  }  
]  
}
```

Allow users to chat with Amazon Q

The following example policy grants permissions to chat with Amazon Q in the console.

```
{  
  "Version": "2012-10-17",  
  "Statement": [  
    {  
      "Sid": "AllowAmazonQConversationAccess",  
      "Effect": "Allow",  
      "Action": [  
        "q:StartConversation",  
        "q:SendMessage",  
        "q:GetConversation",  
        "q:ListConversations",  
        "q:UpdateConversation",  
        "q>DeleteConversation"  
      ],  
      "Resource": "*"   
    }  
  ]  
}
```

Allow users to use Amazon Q CLI with AWS CloudShell

The following example policy grants permissions to use Amazon Q CLI with AWS CloudShell.

Note

The `codewhisperer` prefix is a legacy name from a service that merged with Amazon Q Developer. For more information, see [Amazon Q Developer rename - Summary of changes](#).

```
{  
  "Version": "2012-10-17",  
  "Statement": [  
    {  
      "Sid": "AllowAmazonQConversationAccess",  
      "Effect": "Allow",  
      "Action": [  
        "q:StartConversation",  
        "q:SendMessage",  
        "q:GetConversation",  
        "q:ListConversations",  
        "q:UpdateConversation",  
        "q>DeleteConversation"  
      ],  
      "Resource": "*"   
    }  
  ]  
}
```



```

    "Effect": "Allow",
    "Action": [
        "codewhisperer:GenerateRecommendations",
        "codewhisperer:ListCustomizations",
    ],
    "Resource": "*"
},
{
    "Effect": "Allow",
    "Action": [
        "q:StartConversation",
        "q:SendMessage"
    ],
    "Resource": "*"
}
]
}

```

Allow users to run transformations on the command line

The following example policy grants permissions to transform code with the Amazon Q command line tool for transformations.

```

{
    "Version": "2012-10-17",
    "Statement": [
        {
            "Effect": "Allow",
            "Action": [
                "qdeveloper:StartAgentSession",
                "qdeveloper:ImportArtifact",
                "qdeveloper:ExportArtifact",
                "qdeveloper:TransformCode"
            ],
            "Resource": "*"
        }
    ]
}

```

Allow users to diagnose console errors with Amazon Q

The following example policy grants permissions to diagnose console errors with Amazon Q.

```
{
  "Version": "2012-10-17",
  "Statement": [
    {
      "Sid": "AllowAmazonQTroubleshooting",
      "Effect": "Allow",
      "Action": [
        "q:StartTroubleshootingAnalysis",
        "q:GetTroubleshootingResults",
        "q:StartTroubleshootingResolutionExplanation",
        "q:UpdateTroubleshootingCommandResult",
        "q:PassRequest",
        "cloudformation:GetResource"
      ],
      "Resource": "*"
    }
  ]
}
```

Allow users to generate code from CLI commands with Amazon Q

The following example policy grants permissions to generate code from recorded CLI commands with Amazon Q, which enables the use of the Console-to-Code feature.

```
{
  "Version": "2012-10-17",
  "Statement": [
    {
      "Sid": "AllowAmazonQConsoleToCode",
      "Effect": "Allow",
      "Action": "q:GenerateCodeFromCommands",
      "Resource": "*"
    }
  ]
}
```

Allow users to chat about resources with Amazon Q

The following example policy grants permission to chat with Amazon Q about resources, and allows Amazon Q to retrieve resource information on your behalf. Amazon Q only has permission to access resources that your IAM identity has permissions for.

```
{
  "Version": "2012-10-17",
  "Statement": [
    {
      "Sid": "AllowAmazonQPassRequest",
      "Effect": "Allow",
      "Action": [
        "q:StartConversation",
        "q:SendMessage",
        "q:GetConversation",
        "q:ListConversations",
        "q:UpdateConversation",
        "q>DeleteConversation",
        "q:PassRequest"
      ],
      "Resource": "*"
    },
    {
      "Sid": "AllowCloudControlReadAccess",
      "Effect": "Allow",
      "Action": [
        "cloudformation:GetResource",
        "cloudformation:ListResources"
      ],
      "Resource": "*"
    }
  ]
}
```

Allow Amazon Q to perform actions on your behalf in chat

The following example policy grants permission to chat with Amazon Q, and allows Amazon Q to perform actions on your behalf. Amazon Q only has permission to perform actions that your IAM identity has permission to perform.

```
{
  "Version": "2012-10-17",
  "Statement": [
    {
      "Sid": "AllowAmazonQPassRequest",
      "Effect": "Allow",
      "Action": [
        "q:StartConversation",
```

```

        "q:SendMessage",
        "q:GetConversation",
        "q:ListConversations",
        "q:UpdateConversation",
        "q>DeleteConversation",
        "q:PassRequest"
    ],
    "Resource": "*"
}
]
}

```

Allow Amazon Q to access cost data and provide cost optimization recommendations

The following example policy grants permission to chat with Amazon Q about your costs and allows Amazon Q to access your cost data and provide cost analysis and optimization recommendations. This policy includes the relevant permissions in AWS Cost Explorer, AWS Cost Optimization Hub, and AWS Compute Optimizer.

```

{
  "Version": "2012-10-17",
  "Statement": [
    {
      "Sid": "AllowAmazonQChatAndPassRequest",
      "Effect": "Allow",
      "Action": [
        "q:StartConversation",
        "q:SendMessage",
        "q:GetConversation",
        "q:ListConversations",
        "q:UpdateConversation",
        "q>DeleteConversation",
        "q:PassRequest"
      ],
      "Resource": "*"
    },
    {
      "Sid": "AllowCostAnalysis",
      "Effect": "Allow",
      "Action": [
        "ce:GetCostAndUsage",
        "ce:GetCostForecast",
        "ce:GetTags",

```

```

        "ce:GetCostCategories",
        "ce:GetDimensionValues"
    ],
    "Resource": "*"
},
{
    "Sid": "AllowCostOptimization",
    "Effect": "Allow",
    "Action": [
        "cost-optimization-hub:GetRecommendation",
        "cost-optimization-hub:ListRecommendations",
        "cost-optimization-hub:ListRecommendationSummaries",
        "compute-optimizer:GetAutoScalingGroupRecommendations",
        "compute-optimizer:GetEBSVolumeRecommendations",
        "compute-optimizer:GetEC2InstanceRecommendations",
        "compute-optimizer:GetECSServiceRecommendations",
        "compute-optimizer:GetRDSDatabaseRecommendations",
        "compute-optimizer:GetLambdaFunctionRecommendations",
        "compute-optimizer:GetIdleRecommendations",
        "compute-optimizer:GetEffectiveRecommendationPreferences",
        "ce:GetReservationPurchaseRecommendation",
        "ce:GetSavingsPlansPurchaseRecommendation"
    ],
    "Resource": "*"
}
]
}

```

Deny Amazon Q permission to perform specific actions on your behalf

The following example policy grants permission to chat with Amazon Q, and allows Amazon Q to perform any action on your behalf that your IAM identity has permission to perform, except for Amazon EC2 actions. This policy uses the [aws:CalledVia global condition key](#) to specify that Amazon EC2 actions are only denied when Amazon Q calls them.

```

{
    "Version": "2012-10-17",
    "Statement": [
        {
            "Effect": "Allow",
            "Action": [
                "q:StartConversation",
                "q:SendMessage",

```

```

        "q:GetConversation",
        "q:ListConversations",
        "q:UpdateConversation",
        "q>DeleteConversation",
        "q:PassRequest"
    ],
    "Resource": "*"
  },
  {
    "Effect": "Deny",
    "Action": [
      "ec2:*"
    ],
    "Resource": "*",
    "Condition": {
      "ForAnyValue:StringEquals": {
        "aws:CalledVia": ["q.amazonaws.com"]
      }
    }
  }
]
}

```

Allow Amazon Q permission to perform specific actions on your behalf

The following example policy grants permission to chat with Amazon Q, and allows Amazon Q to perform any action on your behalf that your IAM identity has permission to perform, with the exception of Amazon EC2 actions. This policy grants your IAM identity permission to perform any Amazon EC2 action, but only allows Amazon Q to perform the `ec2:describeInstances` action. This policy uses the [aws:CalledVia global condition key](#) to specify that Amazon Q is only allowed to call `ec2:describeInstances`, and not any other Amazon EC2 actions.

```

{
  "Version": "2012-10-17",
  "Statement": [
    {
      "Effect": "Allow",
      "Action": [
        "q:StartConversation",
        "q:SendMessage",
        "q:GetConversation",
        "q:ListConversations",
        "q:UpdateConversation",

```

```

        "q:DeleteConversation",
        "q:PassRequest"
    ],
    "Resource": "*"
},
{
    "Effect": "Allow",
    "Action": [
        "ec2:*"
    ],
    "Resource": "*",
    "Condition": {
        "ForAnyValue:StringNotEquals": {
            "aws:CalledVia": ["q.amazonaws.com"]
        }
    }
},
{
    "Effect": "Allow",
    "Action": [
        "ec2:describeInstances"
    ],
    "Resource": "*",
    "Condition": {
        "ForAnyValue:StringEquals": {
            "aws:CalledVia": ["q.amazonaws.com"]
        }
    }
}
]
}

```

Allow Amazon Q permission to perform actions on your behalf in specific regions

The following example policy grants permission to chat with Amazon Q, and allows Amazon Q to make calls to only the us-east-1 and us-west-2 Regions when performing actions on your behalf. Amazon Q can't make calls to any other Region. For more information on how to specify what Regions you can make calls to, see [aws:RequestedRegion](#) in the *AWS Identity and Access Management User Guide*.

```

{
    "Version": "2012-10-17",
    "Statement": [

```

```

{
  "Effect": "Allow",
  "Action": [
    "q:StartConversation",
    "q:SendMessage",
    "q:GetConversation",
    "q:ListConversations",
    "q:UpdateConversation",
    "q>DeleteConversation",
    "q:PassRequest"
  ],
  "Resource": "*",
  "Condition": {
    "StringEquals": {
      "aws:RequestedRegion": [
        "us-east-1",
        "us-west-2"
      ]
    }
  }
}

```

Deny Amazon Q permission to perform actions on your behalf

The following example policy prevents Amazon Q from performing actions on your behalf.

```

{
  "Version": "2012-10-17",
  "Statement": [
    {
      "Sid": "DenyAmazonQPassRequest",
      "Effect": "Deny",
      "Action": [
        "q:PassRequest"
      ],
      "Resource": "*"
    }
  ]
}

```


Allow users to chat with plugins from one provider

The following example policy grants permission to chat with any plugin from a given provider that an administrator configures, specified by the plugin ARN with the name of the plugin provider and a wildcard character (*). If the plugin is deleted and re-configured, a user with these permissions will retain access to the newly configured plugin. To use this policy, replace the following in the ARN in the Resource field:

- *AWS-region* – The AWS Region where the plugin was created.
- *AWS-account-ID* – The AWS account ID of the account where your plugin is configured.
- *plugin-provider* – The name of the plugin provider that you want to allow access to, like CloudZero, Datadog, or Wiz. The plugin provider field is case sensitive.

```
{
  "Version": "2012-10-17",
  "Statement": [
    {
      "Sid": "AllowAmazonQConversationAccess",
      "Effect": "Allow",
      "Action": [
        "q:StartConversation",
        "q:SendMessage",
        "q:GetConversation",
        "q:ListConversations",
        "q:UpdateConversation",
        "q>DeleteConversation"
      ],
      "Resource": "*"
    },
    {
      "Sid": "AllowAmazonQPluginAccess",
      "Effect": "Allow",
      "Action": [
        "q:UsePlugin"
      ],
      "Resource": "arn:aws:qdeveloper:AWS-region:AWS-account-ID:plugin/plugin-provider/*"
    }
  ]
}
```

```
}
```

Allow users to chat with a specific plugin

The following example policy grants permission to chat with a specific plugin, specified by the plugin ARN. If the plugin is deleted and re-configured, a user will not have access to the new plugin unless the plugin ARN is updated in this policy. To use this policy, replace the following in the ARN in the Resource field:

- *AWS-region* – The AWS Region where the plugin was created.
- *AWS-account-ID* – The AWS account ID of the account where your plugin is configured.
- *plugin-provider* – The name of the plugin provider that you want to allow access to, like CloudZero, Datadog, or Wiz. The plugin provider field is case sensitive.
- *plugin-ARN* – The ARN of the plugin you want to allow access to.

```
{
  "Version": "2012-10-17",
  "Statement": [
    {
      "Sid": "AllowAmazonQConversationAccess",
      "Effect": "Allow",
      "Action": [
        "q:StartConversation",
        "q:SendMessage",
        "q:GetConversation",
        "q:ListConversations",
        "q:UpdateConversation",
        "q>DeleteConversation"
      ],
      "Resource": "*"
    },
    {
      "Sid": "AllowAmazonQPluginAccess",
      "Effect": "Allow",
      "Action": [
        "q:UsePlugin"
      ],
      "Resource": "arn:aws:qdeveloper:AWS-region:AWS-account-ID:plugin/plugin-provider/plugin-ARN"
    }
  ]
}
```

```
    }  
  ]  
}
```

Deny access to Amazon Q

The following example policy denies all permissions to use Amazon Q.

Note

When you deny access to Amazon Q, the Amazon Q icon and chat panel will still appear in the AWS console, AWS website, AWS documentation pages, or AWS Console Mobile Application.

```
{  
  "Version": "2012-10-17",  
  "Statement": [  
    {  
      "Sid": "DenyAmazonQFullAccess",  
      "Effect": "Deny",  
      "Action": [  
        "q:*"  
      ],  
      "Resource": "*"   
    }  
  ]  
}
```

Allow users to view their permissions

This example shows how you might create a policy that allows IAM users to view the inline and managed policies that are attached to their user identity. This policy includes permissions to complete this action on the console or programmatically using the AWS CLI or AWS API.

```
{  
  "Version": "2012-10-17",  
  "Statement": [  
    {  
      "Sid": "ViewOwnUserInfo",  

```

```

    "Effect": "Allow",
    "Action": [
        "iam:GetUserPolicy",
        "iam:ListGroupsForUser",
        "iam:ListAttachedUserPolicies",
        "iam:ListUserPolicies",
        "iam:GetUser"
    ],
    "Resource": ["arn:aws:iam::*:user/${aws:username}"]
},
{
    "Sid": "NavigateInConsole",
    "Effect": "Allow",
    "Action": [
        "iam:GetGroupPolicy",
        "iam:GetPolicyVersion",
        "iam:GetPolicy",
        "iam:ListAttachedGroupPolicies",
        "iam:ListGroupPolicies",
        "iam:ListPolicyVersions",
        "iam:ListPolicies",
        "iam:ListUsers"
    ],
    "Resource": "*"
}
]
}

```

Manage access to Amazon Q Developer for third-party integration

For third-party integrations, you must use the AWS Key Management Service (KMS) to manage access to Amazon Q Developer instead of IAM policies that are neither identity-based or resource-based.

Allow administrators to use customer managed keys to update role policies

The following example key policy grants permission to use [customer managed keys \(CMK\)](#) when creating your key policy on a configured role in the KMS Console. When configuring the CMK, you must provide the [IAM role ARN](#), an identifier, used by your integration to call Amazon Q. If you already onboarded an integration such as a GitLab instance, you must reonboard the instance for all resources to be encrypted with CMK.

The `kms:ViaService` condition key limits the use of a KMS key to requests from specified AWS services. Additionally, it's used to deny permission to use a KMS key when the request comes from particular services. With the condition key, you can limit who can use CMK for encrypting or decrypting content. For more information, see [kms:ViaService](#) in the *AWS Key Management Service Developer Guide*.

With KMS encryption context, you have an optional set of key-value pairs that can be included in cryptographic operations with symmetric encryption KMS keys to enhance authorization and auditability. The encryption context can be used to verify the integrity and authenticity of encrypted data, control access to symmetric encryption KMS keys in key policies and IAM policies, and identify and categorize cryptographic operations in AWS CloudTrail logs. For more information, see [Encryption context](#) in the *AWS Key Management Service Developer Guide*.

```
{
  "Version": "2012-10-17",
  "Statement": [
    {
      "Sid": "Sid0",
      "Effect": "Allow",
      "Principal": {
        "AWS": "arn:aws:iam::{{awsAccountId}}:role/{{rolename}}"
      },
      "Action": [
        "kms:GenerateDataKeyWithoutPlaintext",
        "kms:Decrypt",
        "kms:ReEncryptFrom",
        "kms:ReEncryptTo",
        "kms:GenerateDataKey",
        "kms:Encrypt",
        "kms:DescribeKey"
      ],
      "Resource": "*",
      "Condition": {
        "StringEquals": {
          "kms:ViaService": "q.{{region}}.amazonaws.com",
          "kms:EncryptionContext:aws-crypto-ec:aws:qdeveloper:accountId":
            "{{accountId}}"
        }
      }
    }
  ]
}
```

```
}
```

Amazon Q Developer permissions reference

Amazon Q Developer uses two types of APIs to provide the service:

- User and administrator permissions, which can be used in policies to control usage of Amazon Q
- Other APIs used to provide the service, which can't be used in policies to control usage of Amazon Q

This section provides information about the APIs used by Amazon Q Developer, and what they do.

Topics

- [Amazon Q Developer permissions](#)
- [Amazon Q User Subscriptions permissions](#)
- [Other Amazon Q Developer APIs](#)

Amazon Q Developer permissions

You can use the following permissions as a reference when you are setting up [Authenticating with identities in Amazon Q](#) and writing permissions policies that you can attach to an IAM identity (identity-based policies).

The following table shows the Amazon Q Developer permissions that you can allow or deny access to in policies.

Important

To chat with Amazon Q, an IAM identity needs permissions for the following actions:

- `StartConversation`
- `SendMessage`
- `GetConversation` (console only)
- `ListConversations` (console only)

If one of these actions isn't explicitly allowed by an attached policy, an IAM permissions error is returned when you try to chat with Amazon Q.

 Note

The `codewhisperer` prefix is a legacy name from a service that merged with Amazon Q Developer. For more information, see [Amazon Q Developer rename - Summary of changes](#).

Using `q:PassRequest`

`q:PassRequest` is an Amazon Q permission that allows Amazon Q to call AWS APIs on your behalf. When you add the `q:PassRequest` permission to an IAM identity, Amazon Q gains permission to call any API that the IAM identity has permission to call. For example, if an IAM role has the `s3:ListAllMyBuckets` permission and the `q:PassRequest` permission, Amazon Q is able to call the `ListAllMyBuckets` API when a user assuming that IAM role asks Amazon Q to list their Amazon S3 buckets.

You can create IAM policies that restrict the scope of the `q:PassRequest` permission. For example, you can prevent Amazon Q from performing a specific action, or only permit Amazon Q to perform a subset of actions for a service. You can also specify what regions Amazon Q can make calls to when performing actions on your behalf.

For examples of IAM policies that control the use of `q:PassRequest`, see the following identity-based policy examples:

- [Allow Amazon Q to perform actions on your behalf in chat](#)
- [Deny Amazon Q permission to perform specific actions on your behalf](#)
- [Allow Amazon Q permission to perform specific actions on your behalf](#)
- [Allow Amazon Q permission to perform actions on your behalf in specific regions](#)
- [Deny Amazon Q permission to perform actions on your behalf](#)

Amazon Q User Subscriptions permissions

Amazon Q Developer administrators must have the following permissions to create and manage subscriptions for users and groups in their organization.

The following terminology is useful in understanding what subscriptions permissions do:

User

An individual user, represented within AWS IAM Identity Center by a unique user ID.

Group

A collection of users, represented within AWS IAM Identity Center by a unique group ID.

Subscription

A subscription is tied to a single Identity Center user, and entitles them to use Amazon Q features. A subscription does not authorize a user to use Amazon Q features. For example, if Adam is subscribed to Amazon Q Developer Pro, they are entitled to used Amazon Q Developer features, but they don't have access to those features until their administrator grants them the needed permissions.

Other Amazon Q Developer APIs

The following table shows the APIs that are used by features of Amazon Q in the IDE. These APIs aren't used to control access to features of Amazon Q, but they will appear in AWS CloudTrail logs in management accounts when users access the associated feature.

Note

The `codewhisperer` prefix is a legacy name from a service that merged with Amazon Q Developer. For more information, see [Amazon Q Developer rename - Summary of changes](#).

AWS managed policies for Amazon Q Developer

An AWS managed policy is a standalone policy that is created and administered by AWS. AWS managed policies are designed to provide permissions for many common use cases so that you can start assigning permissions to users, groups, and roles.

The quickest way for an administrator to grant access to users is through an AWS managed policy. The following AWS managed policies for Amazon Q Developer can be attached to IAM identities:

- `AmazonQFullAccess` provides full access to enable interactions with Amazon Q Developer, including administrator access.
- `AmazonQDeveloperAccess` provides full access to enable interactions with Amazon Q Developer, without administrator access.

 Note

Users accessing Amazon Q in the IDE or on the command line don't require IAM permissions.

Keep in mind that AWS managed policies might not grant least-privilege permissions for your specific use cases because they're available for all AWS customers to use. We recommend that you reduce permissions further by defining [customer managed policies](#) that are specific to your use cases.

You cannot change the permissions defined in AWS managed policies. If AWS updates the permissions defined in an AWS managed policy, the update affects all principal identities (users, groups, and roles) that the policy is attached to. AWS is most likely to update an AWS managed policy when a new AWS service is launched or new API operations become available for existing services.

For more information, see [AWS managed policies](#) in the *IAM User Guide*.

AmazonQFullAccess

The `AmazonQFullAccess` managed policy provides administrator access to allow users in your organization to access Amazon Q Developer. It also provides full access to enable interactions with Amazon Q Developer, including logging in with IAM Identity Center to access Amazon Q through an Amazon Q Developer Pro subscription.

Note

To enable full access to complete administrative tasks in the Amazon Q subscription management console and Amazon Q Developer Pro console, additional permissions are needed. For more information, see [Administrator permissions](#).

To view the permissions for this policy, see [AmazonQFullAccess](#) in the *AWS Managed Policy Reference*.

AmazonQDeveloperAccess

The AmazonQDeveloperAccess managed policy provides full access to enable interactions with Amazon Q Developer, without administrator access. It includes access to log in with IAM Identity Center to access Amazon Q through an Amazon Q Developer Pro subscription.

To use some features of Amazon Q, you might need additional permissions. See the topic for the feature you want to use for information on permissions.

To view the permissions for this policy, see [AmazonQDeveloperAccess](#) in the *AWS Managed Policy Reference*.

AWSServiceRoleForAmazonQDeveloper

This AWS managed policy grants permissions commonly needed to use Amazon Q Developer. The policy is added to the AWSServiceRoleForAmazonQDeveloper service linked role that is created when you onboard to Amazon Q.

You can't attach AWSServiceRoleForAmazonQDeveloper to your IAM entities. This policy is attached to [a service-linked role](#) that allows Amazon Q to perform actions on your behalf. For more information, see [Using service-linked roles for Amazon Q Developer and User Subscriptions](#).

This policy grants *administrator* permissions that allows metrics to be published for Billing / Usage.

Permissions details

This policy includes the following permissions.

- `cloudwatch` – Allows principals to publish usage metrics to CloudWatch for Billing / Usage. This is required so that you can track your usage of Amazon Q in CloudWatch.

To view the permissions for this policy, see [AWSServiceRoleForAmazonQDeveloper](#) in the *AWS Managed Policy Reference*.

AWSServiceRoleForUserSubscriptions

This AWS managed policy grants permissions commonly needed to use Amazon Q Developer. The policy is added to the `AWSServiceRoleForUserSubscriptions` service-linked role that is created when you create Amazon Q subscriptions.

You can't attach `AWSServiceRoleForUserSubscriptions` to your IAM entities. This policy is attached to [a service-linked role](#) that allows Amazon Q to perform actions on your behalf. For more information, see [Using service-linked roles for Amazon Q Developer and User Subscriptions](#).

This policy provides access for Amazon Q Subscriptions to your Identity Center resources to automatically update your subscriptions.

Permissions details

This policy includes the following permissions.

- `identitystore` – Allows principals to track Identity Center directory changes so that subscriptions can be automatically updated.

`organizations` – Allows principals to track AWS Organizations changes so that subscriptions can be automatically updated.

`sso` – Allows principals to track Identity Center instance changes so that subscriptions can be automatically updated.

To view the permissions for this policy, see [AWSServiceRoleForUserSubscriptions](#) in the *AWS Managed Policy Reference*.

GitLabDuoWithAmazonQPermissionsPolicy

This policy grants permission to connect with Amazon Q and utilize the features in the GitLab Duo with Amazon Q integration. The policy is added to the IAM role created from the Amazon Q Developer console to access Amazon Q. You need to manually provide the IAM role to GitLab as an Amazon Resource Name (ARN). The policy allows the following:

- **GitLab Duo usage permissions** - Allows basic operations such as sending events and messages, creating and updating auth grants, generating code recommendations, listing plugins, and verifying OAuth app connections.
- **GitLab Duo management permissions** - Enables the creation and deletion of OAuth app connections, providing control over the integration setup.
- **GitLab Duo plugin permissions** - Grants specific permissions to create, delete, and retrieve plugins related to the GitLab Duo integration with Amazon Q.

To view the permissions for this policy, see [GitLabDuoWithAmazonQPermissionsPolicy](#) in the *AWS Managed Policy Reference*.

Policy updates

View details about updates to AWS managed policies for Amazon Q Developer since this service began tracking these changes. For automatic alerts about changes to this page, subscribe to the RSS feed on the [Document history for Amazon Q Developer User Guide](#) page.

Change	Description	Date
AmazonQDeveloperAccess - Updated policy	Additional permissions have been added to manage conversation history in Amazon Q chat.	May 14, 2025
AmazonQFullAccess - Updated policy	Additional permissions have been added to manage conversation history in Amazon Q chat.	May 14, 2025
AmazonQFullAccess - Updated policy	Additional permission has been added to update feature enablement controls for third-party integration plugin.	May 2, 2025

Change	Description	Date
AmazonQFullAccess - Updated policy	Additional permissions have been added to allow access and enable interactions with Amazon Q Developer for third-party plugins.	April 30, 2025
GitLabDuoWithAmazonQPermissionsPolicy - Updated policy	Additional permission has been added to allow updates to a third-party OAuth application with Amazon Q Developer.	April 30, 2025
GitLabDuoWithAmazonQPermissionsPolicy - New policy	Allows GitLab to connect with Amazon Q Developer to use GitLab Duo with Amazon Q integration features.	April 17, 2025
AWSServiceRoleForUserSubscriptions - Updated policy	Allows Amazon Q to discover the email verification status of end users.	February 17, 2025
AmazonQDeveloperAccess - Updated policy	Additional permissions have been added to enable the use of Amazon Q Developer plugins.	November 13, 2024
AmazonQFullAccess - Updated policy	Additional permissions have been added to configure and use Amazon Q Developer plugins and to create and manage tags for Amazon Q Developer resources.	November 13, 2024
AmazonQDeveloperAccess - Updated policy	Additional permissions have been added to enable code generation from CLI commands with Amazon Q.	October 28, 2024
AmazonQFullAccess - Updated policy	Additional permissions have been added to enable code generation from CLI commands with Amazon Q.	October 28, 2024

Change	Description	Date
AmazonQFullAccess - Updated policy	Additional permissions have been added to enable Amazon Q to access downstream resources.	July 9, 2024
AmazonQDeveloperAccess - New policy	Provides full access to enable interactions with Amazon Q Developer, without administrator access.	July 9, 2024
AmazonQFullAccess - Updated policy	Additional permissions have been added to enable subscriptions checks for Amazon Q Developer.	April 30, 2024
AWSServiceRoleForUserSubscriptions - New policy	Allows Amazon Q Subscriptions to automatically update subscriptions from changes in AWS IAM Identity Center, AWS IAM Identity Center directory and AWS Organizations on your behalf.	April 30, 2024
AWSServiceRoleForAmazonQDeveloper - New policy	Allows Amazon Q to call Amazon CloudWatch and Amazon CodeGuru on your behalf.	April 30, 2024
AmazonQFullAccess - New policy	Provides full access to enable interactions with Amazon Q Developer.	November 28, 2023
Amazon Q Developer started tracking changes	Amazon Q Developer started tracking changes to AWS managed policies.	November 28, 2023

Using service-linked roles for Amazon Q Developer and User Subscriptions

Amazon Q Developer uses AWS Identity and Access Management (IAM) [service-linked roles](#). A service-linked role is a unique type of IAM role that is linked directly to Amazon Q Developer. Service-linked roles are predefined by Amazon Q Developer and include all the permissions that the service requires to call other AWS services on your behalf.

Topics

- [Using service-linked roles for Amazon Q Developer](#)
- [Using service-linked-roles for User Subscriptions](#)

Using service-linked roles for Amazon Q Developer

Amazon Q Developer uses AWS Identity and Access Management (IAM) [service-linked roles](#). A service-linked role is a unique type of IAM role that is linked directly to Amazon Q Developer. Service-linked roles are predefined by Amazon Q Developer and include all the permissions that the service requires to call other AWS services on your behalf.

A service-linked role makes setting up Amazon Q Developer easier because you don't have to manually add the necessary permissions. Amazon Q Developer defines the permissions of its service-linked roles, and unless defined otherwise, only Amazon Q Developer can assume its roles. The defined permissions include the trust policy and the permissions policy, and that permissions policy cannot be attached to any other IAM entity.

You can delete a service-linked role only after first deleting their related resources. This protects your Amazon Q Developer resources because you can't inadvertently remove permission to access the resources.

For information about other services that support service-linked roles, see [AWS services that work with IAM](#) and look for the services that have **Yes** in the **Service-linked roles** column. Choose a **Yes** with a link to view the service-linked role documentation for that service.

Learn about [AWS managed policies for Amazon Q Developer](#).

Service-linked role permissions for Amazon Q Developer

Amazon Q Developer uses the service-linked role named **AWSServiceRoleForAmazonQDeveloper** – This role grants permissions to Amazon Q to access data in your account to calculate billing,

provides access to create and access security reports in Amazon CodeGuru, and emit data to CloudWatch.

The `AWSServiceRoleForAmazonQDeveloper` service-linked role trusts the following services to assume the role:

- `q.amazonaws.com`

The role permissions policy named `AWSServiceRoleForAmazonQDeveloper` allows Amazon Q Developer to complete the following actions on the specified resources:

- Action: `cloudwatch:PutMetricData` on `AWS/Q CloudWatch namespace`

You must configure permissions to allow your users, groups, or roles to create, edit, or delete a service-linked role. For more information, see [Service-linked role permissions](#) in the *IAM User Guide*.

Creating a service-linked role for Amazon Q Developer

You don't need to manually create a service-linked role. When you create a profile for Amazon Q in the AWS Management Console, Amazon Q Developer creates the service-linked role for you.

If you delete this service-linked role, and then need to create it again, you can use the same process to recreate the role in your account. When you update the settings, Amazon Q creates the service-linked role for you again.

You can also use the IAM console or AWS CLI to create a service-linked role with the `q.amazonaws.com` service name. For more information, see [Creating a service-linked role](#) in the *IAM User Guide*. If you delete this service-linked role, you can use this same process to create the role again.

Editing a service-linked role for Amazon Q Developer

Amazon Q Developer does not allow you to edit the `AWSServiceRoleForAmazonQDeveloper` service-linked role. After you create a service-linked role, you cannot change the name of the role because various entities might reference the role. However, you can edit the description of the role using IAM. For more information, see [Editing a service-linked role](#) in the *IAM User Guide*.

Deleting a service-linked role for Amazon Q Developer

If you no longer need to use a feature or service that requires a service-linked role, we recommend that you delete that role. That way you don't have an unused entity that is not actively monitored

or maintained. However, you must clean up the resources for your service-linked role before you can manually delete it.

 **Note**

If the Amazon Q Developer service is using the role when you try to delete the resources, then the deletion might fail. If that happens, wait for a few minutes and try the operation again.

To manually delete the service-linked role using IAM

Use the IAM console, the AWS CLI, or the AWS API to delete the `AWSServiceRoleForAmazonQDeveloper` service-linked role. For more information, see [Deleting a service-linked role](#) in the *IAM User Guide*.

Supported Regions for Amazon Q Developer service-linked roles

Amazon Q Developer does not support using service-linked roles in every Region where the service is available. You can use the `AWSServiceRoleForAmazonQDeveloper` role in the following Regions. For more information, see [AWS Regions and endpoints](#).

Region name	Region identity	Support in Amazon Q Developer
US East (N. Virginia)	us-east-1	Yes
US East (Ohio)	us-east-2	No
US West (N. California)	us-west-1	No
US West (Oregon)	us-west-2	No
Africa (Cape Town)	af-south-1	No
Asia Pacific (Hong Kong)	ap-east-1	No
Asia Pacific (Jakarta)	ap-southeast-3	No
Asia Pacific (Mumbai)	ap-south-1	No

Region name	Region identity	Support in Amazon Q Developer
Asia Pacific (Osaka)	ap-northeast-3	No
Asia Pacific (Seoul)	ap-northeast-2	No
Asia Pacific (Singapore)	ap-southeast-1	No
Asia Pacific (Sydney)	ap-southeast-2	No
Asia Pacific (Tokyo)	ap-northeast-1	No
Canada (Central)	ca-central-1	No
Europe (Frankfurt)	eu-central-1	No
Europe (Ireland)	eu-west-1	No
Europe (London)	eu-west-2	No
Europe (Milan)	eu-south-1	No
Europe (Paris)	eu-west-3	No
Europe (Stockholm)	eu-north-1	No
Middle East (Bahrain)	me-south-1	No
Middle East (UAE)	me-central-1	No
South America (São Paulo)	sa-east-1	No
AWS GovCloud (US-East)	us-gov-east-1	No
AWS GovCloud (US-West)	us-gov-west-1	No

Using service-linked-roles for User Subscriptions

User Subscriptions uses AWS Identity and Access Management (IAM) [service-linked roles](#). A service-linked role is a unique type of IAM role that is linked directly to User Subscriptions. Service-linked

roles are predefined by User Subscriptions and include all the permissions that the service requires to call other AWS services on your behalf.

A service-linked role makes setting up User Subscriptions easier because you don't have to manually add the necessary permissions. User Subscriptions defines the permissions of its service-linked roles, and unless defined otherwise, only User Subscriptions can assume its roles. The defined permissions include the trust policy and the permissions policy, and that permissions policy cannot be attached to any other IAM entity.

You can delete a service-linked role only after first deleting their related resources. This protects your User Subscriptions because you can't inadvertently remove permissions required by the resources.

For information about other services that support service-linked roles, see [AWS services that work with IAM](#) and look for the services that have **Yes** in the **Service-linked roles** column. Choose a **Yes** with a link to view the service-linked role documentation for that service.

Service-linked role permissions for User Subscriptions

User Subscriptions uses the service-linked role named **AWSServiceRoleForUserSubscriptions**. This role provides access for User Subscriptions to your IAM Identity Center resources in order to automatically update your subscriptions.

The **AWSServiceRoleForUserSubscriptions** service-linked role trusts the following services to assume the role:

- `user-subscriptions.amazonaws.com`

The role permissions policy named [AWSServiceRoleForUserSubscriptions](#) allows User Subscriptions to complete the following actions on the specified resources:

- Action: `identitystore:DescribeGroup` on *
- Action: `identitystore:DescribeUser` on *
- Action: `identitystore:IsMemberInGroups` on *
- Action: `identitystore:ListGroupMemberships` on *
- Action: `organizations:DescribeOrganization` on *

Action: `sso:DescribeApplication` on *

Action: `sso:DescribeInstance` on *

Action: `sso:ListInstances` on *

Action: `sso-directory:DescribeUser` on *

You must configure permissions to allow your users, groups, or roles to create, edit, or delete a service-linked role. For more information, see [Service-linked role permissions](#) in the *IAM User Guide*.

Creating a service-linked role for User Subscriptions

You don't need to manually create a service-linked role. When you create a User Subscription in the AWS Management Console, User Subscriptions creates the service-linked role for you.

If you delete this service-linked role, and then need to create it again, you can use the same process to recreate the role in your account. When you update the settings, User Subscriptions creates the service-linked role for you again.

You can also use the IAM console or AWS CLI to create a service-linked role with the `q.amazonaws.com` service name. For more information, see [Creating a service-linked role](#) in the *IAM User Guide*. If you delete this service-linked role, you can use this same process to create the role again.

Editing a service-linked role for User Subscriptions

User Subscriptions does not allow you to edit the `AWSServiceRoleForUserSubscriptions` service-linked role. After you create a service-linked role, you cannot change the name of the role because various entities might reference the role. However, you can edit the description of the role using IAM. For more information, see [Editing a service-linked role](#) in the *IAM User Guide*.

Deleting a service-linked role for User Subscriptions

If you no longer need to use a feature or service that requires a service-linked role, we recommend that you delete that role. That way you don't have an unused entity that is not actively monitored or maintained. However, you must clean up the resources for your service-linked role before you can manually delete it.

 Note

If the User Subscriptions service is using the role when you try to delete the resources, then the deletion might fail. If that happens, wait for a few minutes and try the operation again.

To manually delete the service-linked role using IAM

Use the IAM console, the AWS CLI, or the AWS API to delete the `AWSServiceRoleForUserSubscriptions` service-linked role. For more information, see [Deleting a service-linked role](#) in the *IAM User Guide*.

Supported Regions for User Subscriptions service-linked roles

Amazon Q Developer Subscriptions supports using service-linked roles in all of the Regions where the service is available. For more information, see [AWS Regions and endpoints](#).

Amazon Q Developer Subscriptions does not support using service-linked roles in every Region where the service is available. You can use the `AWSServiceRoleForUserSubscriptions` role in the following Regions.

Region name	Region identity	Support in User Subscriptions
US East (N. Virginia)	us-east-1	Yes
US West (Oregon)	us-west-2	Yes
US East (N. Virginia)	us-east-1	Yes
US East (Ohio)	us-east-2	Yes
US East (Ohio)	us-east-2	Yes
US West (N. California)	us-west-1	Yes
Asia Pacific (Mumbai)	ap-south-1	Yes
Asia Pacific (Osaka)	ap-northeast-3	Yes
Asia Pacific (Seoul)	ap-northeast-2	Yes

Region name	Region identity	Support in User Subscriptions
Asia Pacific (Singapore)	ap-southeast-1	Yes
Asia Pacific (Sydney)	ap-southeast-2	Yes
Asia Pacific (Tokyo)	ap-northeast-1	Yes
Canada (Central)	ca-central-1	Yes
Europe (Frankfurt)	eu-central-1	Yes
Europe (Ireland)	eu-west-1	Yes
Europe (London)	eu-west-2	Yes
Europe (Paris)	eu-west-3	Yes
Europe (Stockholm)	eu-north-1	Yes
South America (São Paulo)	sa-east-1	Yes

Compliance validation for Amazon Q Developer

To learn whether an AWS service is within the scope of specific compliance programs, see [AWS services in Scope by Compliance Program](#) and choose the compliance program that you are interested in. For general information, see [AWS Compliance Programs](#).

You can download third-party audit reports using AWS Artifact. For more information, see [Downloading Reports in AWS Artifact](#).

Your compliance responsibility when using AWS services is determined by the sensitivity of your data, your company's compliance objectives, and applicable laws and regulations. AWS provides the following resources to help with compliance:

- [Security Compliance & Governance](#) – These solution implementation guides discuss architectural considerations and provide steps for deploying security and compliance features.
- [HIPAA Eligible Services Reference](#) – Lists HIPAA eligible services. Not all AWS services are HIPAA eligible.

- [AWS Compliance Resources](#) – This collection of workbooks and guides might apply to your industry and location.
- [AWS Customer Compliance Guides](#) – Understand the shared responsibility model through the lens of compliance. The guides summarize the best practices for securing AWS services and map the guidance to security controls across multiple frameworks (including National Institute of Standards and Technology (NIST), Payment Card Industry Security Standards Council (PCI), and International Organization for Standardization (ISO)).
- [Evaluating Resources with Rules](#) in the *AWS Config Developer Guide* – The AWS Config service assesses how well your resource configurations comply with internal practices, industry guidelines, and regulations.
- [AWS Security Hub](#) – This AWS service provides a comprehensive view of your security state within AWS. Security Hub uses security controls to evaluate your AWS resources and to check your compliance against security industry standards and best practices. For a list of supported services and controls, see [Security Hub controls reference](#).
- [Amazon GuardDuty](#) – This AWS service detects potential threats to your AWS accounts, workloads, containers, and data by monitoring your environment for suspicious and malicious activities. GuardDuty can help you address various compliance requirements, like PCI DSS, by meeting intrusion detection requirements mandated by certain compliance frameworks.
- [AWS Audit Manager](#) – This AWS service helps you continuously audit your AWS usage to simplify how you manage risk and compliance with regulations and industry standards.

Resilience in Amazon Q Developer

The AWS global infrastructure is built around AWS Regions and Availability Zones. AWS Regions provide multiple physically separated and isolated Availability Zones, which are connected with low-latency, high-throughput, and highly redundant networking. With Availability Zones, you can design and operate applications and databases that automatically fail over between zones without interruption. Availability Zones are more highly available, fault tolerant, and scalable than traditional single or multiple data center infrastructures.

For more information about AWS Regions and Availability Zones, see [AWS Global Infrastructure](#).

Infrastructure security in Amazon Q Developer

As a managed service, Amazon Q is protected by AWS global network security. For information about AWS security services and how AWS protects infrastructure, see [AWS Cloud Security](#). To

design your AWS environment using the best practices for infrastructure security, see [Infrastructure Protection](#) in *Security Pillar AWS Well-Architected Framework*.

You use AWS published API calls to access Amazon Q Developer through the network. Clients must support the following:

- Transport Layer Security (TLS). We require TLS 1.2 and recommend TLS 1.3.
- Cipher suites with perfect forward secrecy (PFS) such as DHE (Ephemeral Diffie-Hellman) or ECDHE (Elliptic Curve Ephemeral Diffie-Hellman). Most modern systems such as Java 7 and later support these modes.

Additionally, requests must be signed by using an access key ID and a secret access key that is associated with an IAM principal. Or you can use the [AWS Security Token Service](#) (AWS STS) to generate temporary security credentials to sign requests.

Configuring a firewall, proxy server, or data perimeter for Amazon Q Developer

If you're using a firewall, proxy server, or [data perimeter](#), make sure to allowlist traffic to the following URLs and Amazon Resource Names (ARNs) so that Amazon Q works as expected.

General URLs to allowlist

In the following URLs, replace:

- *idc-directory-id-or-alias* with your IAM Identity Center instance's directory ID or alias. For more information about IAM Identity Center, see [What is IAM Identity Center?](#) in the *AWS IAM Identity Center User Guide*.
- *sso-region* with the AWS Region where your IAM Identity Center instance is enabled. For more information, see [IAM Identity Center Regions supported by Amazon Q Developer](#).
- *profile-region* with the AWS Region where your Amazon Q Developer profile is installed. For more information about the Amazon Q Developer profile, see [Amazon Q Developer profile](#) and [Supported Regions for the Q Developer console and Q Developer profile](#).

URL	Purpose
<i>idc-directory-id-or-alias</i> .awsapps.com	Authentication
oidc. <i>sso-region</i> .amazonaws.com	Authentication
*.sso. <i>sso-region</i> .amazonaws.com	Authentication
*.sso-portal. <i>sso-region</i> .amazonaws.com	Authentication
*.aws.dev	Authentication
*.awsstatic.com	Authentication
*.console.aws.a2z.com	Authentication
*.sso.amazonaws.com	Authentication
https://codewhisperer.us-east-1.amazonaws.com	Amazon Q Developer features
https://q. <i>profile-region</i> .amazonaws.com	Amazon Q Developer features
https://idetoolkits-hostedfiles.amazonaws.com/*	Amazon Q Developer in the IDE, configuration
https://idetoolkits.amazonaws.com/*	Amazon Q Developer in the IDE, endpoints
q-developer-integration.us-east-1.api.aws	Amazon Q Developer in the IDE, endpoints
https://aws-toolkit-language-servers.amazonaws.com/*	Amazon Q Developer in the IDE, language processing
https://aws-language-servers.us-east-1.amazonaws.com/*	Amazon Q Developer in the IDE, language processing

URL	Purpose
<code>https://client-telemetry.us-east-1.amazonaws.com</code>	Amazon Q Developer in the IDE, telemetry
<code>cognito-identity.us-east-1.amazonaws.com</code>	Amazon Q Developer in the IDE, telemetry

Amazon S3 bucket URLs and ARNs to allowlist

For some features, Amazon Q uploads artifacts to AWS service-owned Amazon S3 buckets. If you are using data perimeters to control access to Amazon S3 in your environment, you might need to explicitly allow access to these buckets to use the corresponding Amazon Q features.

The following table lists the URL and ARN of each of the Amazon S3 buckets that Amazon Q requires access to, and the features that use each bucket. You can use the bucket URL or bucket ARN to allowlist these buckets, depending on how you control access to Amazon S3.

You only need to allowlist the bucket in the AWS Region where the Amazon Q Developer profile is installed. For more information about the Amazon Q Developer profile, see [Amazon Q Developer profile](#).

Amazon S3 bucket URL and ARN	Purpose
US East (N. Virginia): <code>https://amazonq-code-scan-us-east-1-29121b44f7b.s3.amazonaws.com/</code> <code>arn:aws:s3:::amazonq-code-scan-us-east-1-29121b44f7b</code> Europe (Frankfurt): <code>https://amazonq-code-scan-eu-central-1-9374e402cc5.s3.amazonaws.com/</code>	An Amazon S3 bucket used to upload artifacts for Amazon Q code reviews

Amazon S3 bucket URL and ARN	Purpose
arn:aws:s3:::amazonq-code-scan-eu-central-1-9374e402cc5	
US East (N. Virginia): - https://amazonq-code-transformation-us-east-1-c6160f047e0.s3.amazonaws.com/ - arn:aws:s3:::amazonq-code-transformation-us-east-1-c6160f047e0 Europe (Frankfurt): - https://amazonq-code-transformation-eu-central-1-a0a89cc2b94.s3.amazonaws.com/ - arn:aws:s3:::amazonq-code-transformation-eu-central-1-a0a89cc2b94	An Amazon S3 bucket used to upload artifacts for the Amazon Q Developer Agent for code transformation

Amazon S3 bucket URL and ARN	Purpose
US East (N. Virginia): • <code>https://amazonq-feature-development-us-east-1-a5b980054c6.s3.amazonaws.com/</code> • <code>arn:aws:s3:::amazonq-feature-development-us-east-1-a5b980054c6</code> Europe (Frankfurt):	An Amazon S3 bucket used to upload artifacts for the Amazon Q Developer Agent for software development

Note

A URL and ARN are not available for the Europe (Frankfurt) Region. As a workaround, tell users to use the agentic chat feature for their software development needs.

Amazon S3 bucket URL and ARN	Purpose
US East (N. Virginia): - https://amazonq-test-generation-us-east-1-74b667808f2.s3.us-east-1.amazonaws.com/ - arn:aws:s3:::amazonq-test-generation-us-east-1-74b667808f2 Europe (Frankfurt): - https://amazonq-test-generation-eu-central-1-335c4259858.s3.us-east-1.amazonaws.com/ - arn:aws:s3:::amazonq-test-generation-eu-central-1-335c4259858	An Amazon S3 bucket used to upload artifacts for the Amazon Q Developer Agent for unit test generation

Configuring a corporate proxy in Amazon Q

If your end users are working behind a corporate proxy, have them complete the following steps to successfully connect to Amazon Q.

Step 1: Configuring proxy settings in your IDE

Specify your proxy server's URL in your IDE.

 Note

You must configure an HTTP or HTTPS proxy. SOCKS proxies are not supported.

Eclipse

1. In Eclipse, open **Preferences** as follows:
 - On Windows or Ubuntu:
 - From the Eclipse menu bar, choose **Window**, and then choose **Preferences**.
 - On macOS:
 - From the menu bar, choose **Eclipse**, and then choose **Settings** or **Preferences** depending on your macOS version.
2. In the search bar, enter **Amazon Q** and open Amazon Q.
3. Under **Proxy Settings**, set **HTTPS Proxy URL** to your corporate proxy URL.

Examples: `http://proxy.company.com:8080`, `https://proxy.company.com:8443`

4. Leave the Amazon Q settings open and go to the next step.

JetBrains

In JetBrains, manually configure your proxy server's host name and port following the guidance in the [HTTP Proxy](#) topic of the IntelliJ IDEA documentation.

Visual Studio

1. From the Visual Studio main menu, choose **Tools**, then choose **Options**.
2. From the **Options** menu, expand **AWS Toolkit**, then choose **Proxy**.
3. From the **Proxy** menu, set **Host** and **Port** to your corporate proxy host and port.

Examples: `http://proxy.company.com:8080`, `https://proxy.company.com:8443`

Visual Studio Code

1. From VS Code, open VS Code **Settings** by pressing **CMD + ,** (Mac) or **Ctrl + ,** (Windows/Linux).
2. From the **Settings** search bar, enter **Http: Proxy**, then locate it in the search results.
3. Enter your corporate proxy URL.

Examples: `http://proxy.company.com:8080`, `https://proxy.company.com:8443`

4. (Optional) in the **Settings** search bar, enter **HTTP: No Proxy**, then locate it in the results.

5. Choose the **Add Item** button, then add domains that bypass the proxy, separated by commas.

Step 2: Configuring SSL certificate handling

Amazon Q automatically detects and uses the trusted certificates installed on your system. If you are experiencing certificate errors, you must manually specify a certificate bundle by completing the following procedure.

Note

The following are situations where manual configuration is required.

- You are encountering certificate-related errors after configuring the proxy.
- Your corporate proxy uses certificates that aren't in your system's trust store.
- Amazon Q fails to automatically detect your corporate certificates.

Eclipse

- In the Amazon Q settings in Eclipse, under **Proxy Settings**, set **CA Cert PEM** to the path of your corporate certificate file. The file must have a `.pem` file extension. (You cannot use a `.crt` file.)

An example path resembles the following:

```
/path/to/corporate-ca-bundle.pem
```

For instructions on obtaining this file, see [Getting your corporate certificate](#).

JetBrains

In JetBrains, manually install your corporate certificate following the guidance in the [Trusted root certificates](#) topic of the IntelliJ IDEA documentation.

For instructions on obtaining the certificate, see [Getting your corporate certificate](#).

Visual Studio

- Configure the following Windows Environment Variables:

- `NODE_OPTIONS = --use-openssl-ca`
- `NODE_EXTRA_CA_CERTS = cert-path`

Replace *cert-path* with the path of your corporate certificate file. The file must have a `.pem` file extension. (You cannot use a `.crt` file.)

An example path resembles the following:

```
/path/to/corporate-ca-bundle.pem
```

For instructions on obtaining the corporate certificate file, see [Getting your corporate certificate](#). For detailed information about the Windows Environment Variables, see the [Node.js documentation](#).

Visual Studio Code

1. From VS Code, open VS Code **Settings** by pressing **CMD + ,** (Mac) or **Ctrl + ,** (Windows/Linux).
2. From the **Settings** search bar, enter **Amazon Q > Proxy: Certificate Authority**, then locate it in the search results.
3. Enter the path of your corporate certificate file. It will have a `.pem` or `.crt` file extension.

An example path resembles the following:

```
/path/to/corporate-ca-bundle.pem
```

For instructions on obtaining this file, see [Getting your corporate certificate](#).

Step 3: Restart your IDE

You must restart your IDE in order to update Amazon Q with your changes.

Troubleshooting

If you completed the procedures in the previous sections and you are still experiencing issues, use the following instructions to troubleshoot.

Eclipse

1. Make sure your proxy URL format includes `http://` or `https://`.
2. Make sure your certificate file path is correct and accessible.
3. Review your Amazon Q logs in the Eclipse Error Log. To navigate to the Error Log, do one of the following:
 - Sign in to Amazon Q in Eclipse, choose the down-arrow next to the Q icon at the top-right, and then choose **Help, View Logs**.
 - From the Eclipse menu, choose **Window, Show View, Error Log**.

Note

If you encounter the following error messages:

- unable to verify the first certificate, make sure you followed the instructions in [Step 2: Configuring SSL certificate handling](#) to specify a certificate manually.
- self signed certificate, make sure you followed the instructions in [Step 2: Configuring SSL certificate handling](#) to specify a certificate manually.
- ECONNREFUSED, check your internet connection and proxy information.

JetBrains

1. Make sure your proxy URL format includes `http://` or `https://`.
2. Make sure your certificate file path is correct and accessible.
3. Review your Amazon Q logs in the JetBrains log file. For help on finding the log file, see [Locating IDE log files](#) on the JetBrains IDEs Support page.

Note

If you encounter the following error messages:

- unable to verify the first certificate, make sure you followed the instructions in [Step 2: Configuring SSL certificate handling](#) to specify a certificate manually.

- self signed certificate, make sure you followed the instructions in [Step 2: Configuring SSL certificate handling](#) to specify a certificate manually.
- ECONNREFUSED, check your internet connection and proxy information.

Visual Studio

1. Make sure your proxy URL format includes `http://` or `https://`.
2. Make sure your certificate file path is correct and accessible.
3. Review the AWS Toolkit extension's logs as follows:
 - From the Visual Studio main menu, expand **Extensions**.
 - Choose **AWS Toolkit** to expand the AWS Toolkit menu, then choose **View Toolkit Logs**.
 - When the AWS Toolkit logs folder opens in your Operating System, sort the files by date and locate any log file that contains information relevant to your current issue.
4. Review your Amazon Q logs in the Visual Studio Activity Log. For more information, see [Troubleshooting Extensions with the Activity Log](#).

Note

If you encounter the following error messages:

- unable to verify the first certificate, make sure you followed the instructions in [Step 2: Configuring SSL certificate handling](#) to specify a certificate manually.
- self signed certificate, make sure you followed the instructions in [Step 2: Configuring SSL certificate handling](#) to specify a certificate manually.
- ECONNREFUSED, check your internet connection and proxy information.

Visual Studio Code

1. Make sure your proxy URL format includes `http://` or `https://`.
2. Make sure your certificate file path is correct and accessible.
3. Review your Amazon Q logs in the **Output panel** of VS Code.

Note

If you encounter the following error messages:

- unable to verify the first certificate, make sure you followed the instructions in [Step 2: Configuring SSL certificate handling](#) to specify a certificate manually.
- self signed certificate, make sure you followed the instructions in [Step 2: Configuring SSL certificate handling](#) to specify a certificate manually.
- ECONNREFUSED, check your internet connection and proxy information.

Getting your corporate certificate

To obtain your corporate certificate, ask your IT team for the following information:

- Your corporate certificate bundle, which is typically a .pem or .crt file.
- Your proxy server details, including your host name, port, and authentication method.

Or, export the certificate from your browser:

1. Visit any HTTPS site on your corporate domain.
2. Near the address bar, choose the lock icon or a similar icon. (The icon differs depending your browser vendor.)
3. Export the root certificate to a file. Make sure you include the whole certificate chain. The steps to export the root certificate will be slightly different depending on the browser you're using. Consult your browser's documentation for detailed steps.

Amazon Q Developer and interface endpoints (AWS PrivateLink)

Note

Amazon Q Developer supports interface endpoints for features available [in your IDE](#). Chatting with Amazon Q [on AWS apps and websites](#) is not supported for VPC endpoints. Neither is the Amazon Q Developer transformation web experience.

You can establish a private connection between your VPC and Amazon Q Developer by creating an *interface VPC endpoint*. Interface endpoints are powered by [AWS PrivateLink](#), a technology that enables you to privately access Amazon Q APIs without an internet gateway, NAT device, VPN connection, or AWS Direct Connect connection. Instances in your VPC don't need public IP addresses to communicate with Amazon Q APIs. Traffic between your VPC and Amazon Q does not leave the Amazon network.

Each interface endpoint is represented by one or more [Elastic Network Interfaces](#) in your subnets.

For more information, see [Interface VPC endpoints \(AWS PrivateLink\)](#) in the *Amazon VPC User Guide*.

Considerations for Amazon Q VPC endpoints

Before you set up an interface VPC endpoint for Amazon Q, ensure that you review [Interface endpoint properties and limitations](#) in the *Amazon VPC User Guide*.

Amazon Q supports making calls to all of its API actions from your VPC, in the context of services that are configured to work with Amazon Q.

Prerequisites

Before you begin any of the procedures below, ensure that you have the following:

- An AWS account with appropriate permissions to create and configure resources.
- A VPC already created in your AWS account.
- Familiarity with AWS services, especially Amazon VPC and Amazon Q.

Creating an interface VPC endpoint for Amazon Q

You can create a VPC endpoint for the Amazon Q service using either the Amazon VPC console or the AWS Command Line Interface (AWS CLI). For more information, see [Creating an interface endpoint](#) in the *Amazon VPC User Guide*.

Create the following VPC endpoints for Amazon Q using the following service names:

- `com.amazonaws.region.q`
- `com.amazonaws.us-east-1.codewhisperer`

Replace *region* with AWS Region where your Amazon Q Developer profile is installed. For more information, see [Supported Regions for the Q Developer console and Q Developer profile](#).

Note

The Amazon CodeWhisperer endpoint (`com.amazonaws.us-east-1.codewhisperer`) is only supported in the US East (N. Virginia) Region.

If you enable private DNS for the endpoint, you can make API requests to Amazon Q using its default DNS name for the Region, for example, `q.us-east-1.amazonaws.com`.

For more information, see [Accessing a service through an interface endpoint](#) in the *Amazon VPC User Guide*.

Using an on-premises computer to connect to a Amazon Q endpoint

This section describes the process of using an on-premises computer to connect to Amazon Q through a AWS PrivateLink endpoint in your AWS VPC.

1. [Create a VPN connection between your on-premises device and your VPC.](#)
2. [Create an interface VPC endpoint for Amazon Q.](#)
3. [Set up an inbound Amazon Route 53 endpoint.](#) This will enable you to use the DNS name of your Amazon Q endpoint from your on-premises device.

Using an in-console coding environment to connect to a Amazon Q endpoint

This section describes the process of using an in-console coding environment to connect to a Amazon Q endpoint.

In this context, an in-console IDE is an IDE that you access inside the AWS console, and authenticate to with IAM. Examples include SageMaker AI Studio and AWS Glue Studio.

1. [Create an interface VPC endpoint for Amazon Q.](#)
2. Set up Amazon Q with the in-console coding environment
 - [SageMaker AI Studio](#)
 - [AWS Glue Studio](#)
3. Configure the coding environment to use the Amazon Q endpoint.
 - [SageMaker AI Studio](#)
 - [AWS Glue Studio](#)

Connecting to Amazon Q through AWS PrivateLink from a third-Party IDE on an Amazon EC2 instance

This section will walk you through the process of installing a third-party Integrated Development Environment (IDE) like Visual Studio Code or JetBrains on an Amazon EC2 instance, and configuring it to connect to Amazon Q using AWS PrivateLink.

1. [Create an interface VPC endpoint for Amazon Q.](#)
2. Launch an Amazon EC2 instance in your desired subnet within your VPC. You can choose an Amazon Machine Image (AMI) that is compatible with your third-party IDE. For example, you can select an Amazon Linux 2 AMI.
3. Connect to the Amazon EC2 instance.
4. Install and Configure the IDE (Visual Studio Code or JetBrains).
5. [Install the Amazon Q extension or plugin.](#)
6. Configure the IDE to connect via AWS PrivateLink.
 - [Network connections in Visual Studio Code](#)

- [JetBrains remote development](#)

Monitoring and tracking the use of Amazon Q Developer

Monitoring is an important part of maintaining the reliability, availability, and performance of Amazon Q Developer and your other AWS solutions. AWS provides the following monitoring tools and features to monitor and record Amazon Q Developer activity:

- *AWS CloudTrail* captures API calls and related events made by or on behalf of your AWS account and delivers the log files to an Amazon Simple Storage Service (Amazon S3) bucket that you specify. You can identify which users and accounts called AWS, the source IP address from which the calls were made, and when the calls occurred. For more information, see [Logging Amazon Q Developer API calls using AWS CloudTrail](#).
- *Amazon CloudWatch* monitors your AWS resources and the applications you run on AWS in real time. You can collect and track metrics, create customized dashboards, and set alarms that notify you or take actions when a specified metric reaches a threshold that you specify. For example, you can have CloudWatch track the number of times that Amazon Q has been invoked on your account, or the number of daily active users. For more information, see [Monitoring Amazon Q Developer with Amazon CloudWatch](#).

Amazon Q Developer also includes the following features to help you track and record user activity in Amazon Q:

- A *dashboard* shows you aggregate user activity metrics of Amazon Q Developer Pro subscribers. For more information, see [Viewing Amazon Q Developer user activity on the dashboard](#).
- *User activity reports* show you what individual users are up to in Amazon Q. For more information, see [Viewing the activity of specific users in Amazon Q Developer](#).
- *Prompt logs* provide you with a record of all the prompts that users enter into the Amazon Q chat in their integrated development environment (IDE). For more information, see [Logging users' prompts in Amazon Q Developer](#).

Logging Amazon Q Developer API calls using AWS CloudTrail

Amazon Q Developer Pro is integrated with AWS CloudTrail, a service that provides a record of actions taken by a user, role, or an AWS service in Amazon Q. CloudTrail captures all API calls for Amazon Q as events. The calls captured include calls from the Amazon Q console and code calls to the Amazon Q API operations. If you create a trail, you can enable continuous delivery of CloudTrail

events to an Amazon S3 bucket, including events for Amazon Q. If you don't configure a trail, you can still view the most recent events in the CloudTrail console in **Event history**. Using the information collected by CloudTrail, you can determine the request that was made to Amazon Q, the IP address from which the request was made, who made the request, when it was made, and additional details.

For more information about CloudTrail, see the [AWS CloudTrail User Guide](#).

Amazon Q Developer information in CloudTrail

CloudTrail is enabled on your AWS account when you create the account. When activity occurs in Amazon Q Developer, that activity is recorded in a CloudTrail event along with other AWS service events in **Event history**. You can view, search, and download recent events in your AWS account. For more information, see [Viewing Events with CloudTrail Event History](#) in the *AWS CloudTrail User Guide*.

For an ongoing record of events in your AWS account, including events for Amazon Q, create a trail. A *trail* enables CloudTrail to deliver log files to an Amazon S3 bucket. By default, when you create a trail in the console, the trail applies to all AWS Regions. The trail logs events from all Regions in the AWS partition and delivers the log files to the Amazon S3 bucket that you specify. Additionally, you can configure other AWS services to further analyze and act upon the event data collected in CloudTrail logs. For more information, see the following topics in the *AWS CloudTrail User Guide*:

- [Overview for creating a trail](#)
- [CloudTrail supported services and integrations](#)
- [Configuring Amazon SNS notifications for CloudTrail](#)
- [Receiving CloudTrail log files from multiple Regions](#)
- [Receiving CloudTrail log files from multiple accounts](#)

All Amazon Q Developer actions are logged by CloudTrail and generate entries in the CloudTrail log files.

Every event or log entry contains information about who generated the request. The identity information helps you determine the following:

- Whether the request was made with root or AWS Identity and Access Management (IAM) user credentials
- Whether the request was made with temporary security credentials for a role or federated user

- Whether the request was made by another AWS service

For more information, see [CloudTrail userIdentity element](#) in the *AWS CloudTrail User Guide*.

Understanding Amazon Q Developer log file entries

A trail is a configuration that enables delivery of events as log files to an Amazon S3 bucket that you specify. CloudTrail log files contain one or more log entries. An event represents a single request from any source and includes information about the requested action, the date and time of the action, request parameters, and so on. CloudTrail log files aren't an ordered stack trace of the public API calls, so they don't appear in any specific order.

Amazon Q Developer also makes API calls with a `dryRun` parameter to verify that you have the necessary permissions for the action, without actually making the request. Calls to Amazon Q Developer APIs with the `dryRun` parameter are captured as events and recorded in a CloudTrail log with `"dryRun" : true` in the `requestParameters` field.

The following example shows a CloudTrail log entry that demonstrates the `SendMessage` action.

```
{
  "eventVersion": "1.08",
  "userIdentity": {
    "type": "AssumedRole",
    "principalId": "AROAXD12ABCDEF3G4HI5J:aws-user",
    "arn": "arn:aws:sts::123456789012:assumed-role/PowerUser/aws-user",
    "accountId": "123456789012",
    "accessKeyId": "ASIAAB12CDEFG34HIJK",
    "sessionContext": {
      "sessionIssuer": {
        "type": "Role",
        "principalId": "AROAXD12ABCDEF3G4HI5J",
        "arn": "arn:aws:iam::123456789012:role/PowerUser",
        "accountId": "123456789012",
        "userName": "PowerUser"
      },
      "webIdFederationData": {},
      "attributes": {
        "creationDate": "2023-11-28T10:00:00Z",
        "mfaAuthenticated": "false"
      }
    }
  },
  "requestParameters": {
    "dryRun": true
  },
  "responseElements": {
    "messageId": "12345678901234567890123456789012"
  },
  "errorCode": "DryRunOperation",
  "errorMessage": "The request is denied due to this request's DryRun operation.",
  "eventTime": "2023-11-28T10:00:00Z",
  "eventSource": "qdeveloper.amazonaws.com",
  "eventName": "SendMessage",
  "eventType": "AwsApiCall",
  "readOnly": false,
  "resources": [
    {
      "arn": "arn:aws:qdeveloper:us-east-1:123456789012:qdev-instance/PowerUser",
      "type": "qdev-instance"
    }
  ],
  "sourceIPAddress": "192.168.1.1",
  "userAgent": "aws-cli/2.11.0 Python/3.10.10 Linux/5.15.0-101-ubuntu-amd64 botocore/2.11.0"
}
```

```

    "eventTime": "2023-11-28T10:00:00Z",
    "eventSource": "q.amazonaws.com",
    "eventName": "SendMessage",
    "awsRegion": "us-east-1",
    "sourceIPAddress": "123.456.789.012",
    "userAgent": "Mozilla/5.0 (Windows NT 10.0; Win64; x64; rv:109.0) Gecko/20100101
Firefox/115.0",
    "requestParameters": {
      "Origin": "https://conversational-experience-
worker.widget.console.aws.amazon.com",
      "conversationId": "a298ec0d-0a49-4d2e-92bd-7d6e629b4619",
      "source": "CONSOLE",
      "conversationToken": "****",
      "utterance": "****"
    },
    "responseElements": {
      "result": {
        "content": {
          "text": {
            "body": "****",
            "references": []
          }
        },
        "format": "PLAINTEXT",
        "intent": {},
        "type": "TEXT"
      },
      "Access-Control-Expose-Headers": "x-amzn-RequestId,x-amzn-ErrorType,x-amzn-
ErrorMessage,Date",
      "metadata": {
        "conversationExpirationTime": "2024-02-25T19:31:38Z",
        "conversationId": "a298ec0d-0a49-4d2e-92bd-7d6e629b4619",
        "conversationToken": "****",
        "utteranceId": "3b87b46f-04a9-41ef-b8fe-8abf52d2c053"
      },
      "resultCode": "LLM"
    },
    "additionalEventData": {
      "quickAction": "dev"
    },
    "requestID": "19b3c30e-906e-4b7f-b5c3-509f67248655",
    "eventID": "a552c487-7d97-403a-8ec4-d49539c7a03d",
    "readOnly": false,
    "eventType": "AwsApiCall",

```

```

"managementEvent": true,
"recipientAccountId": "123456789012",
"eventCategory": "Management"
}

```

The following example shows a CloudTrail log entry that demonstrates the PassRequest action.

```

{
  "eventVersion": "1.09",
  "userIdentity": {
    "type": "AssumedRole",
    "principalId": "AIDA60N6E4XEGIEEXAMPLE",
    "arn": "arn:aws:iam::555555555555:user/Mary",
    "accountId": "555555555555",
    "accessKeyId": "AKIAIOSFODNN7EXAMPLE",
    "sessionContext": {
      "sessionIssuer": {
        "type": "Role",
        "principalId": "AIDA60N6E4XEGIEEXAMPLE",
        "arn": "arn:aws:iam::555555555555:user/Mary",
        "accountId": "555555555555",
        "userName": "Mary"
      }
    },
    "attributes": {
      "creationDate": "2024-04-10T20:03:01Z",
      "mfaAuthenticated": "false"
    },
    "invokedBy": "q.amazonaws.com"
  },
  "eventTime": "2024-04-10T20:04:42Z",
  "eventSource": "q.amazonaws.com",
  "eventName": "PassRequest",
  "awsRegion": "us-east-1",
  "sourceIPAddress": "q.amazonaws.com",
  "userAgent": "q.amazonaws.com",
  "requestParameters": null,
  "responseElements": null,
  "requestID": "2d528c76-329e-410b-9516-EXAMPLE565dc",
  "eventID": "ba0801a1-87ec-4d26-be87-EXAMPLE75bbb",
  "readOnly": false,
  "eventType": "AwsApiCall",
  "managementEvent": true,

```

```

    "recipientAccountId": "555555555555",
    "eventCategory": "Management"
  }

```

The following example shows a CloudTrail log entry that demonstrates Amazon Q calling the `s3:ListBuckets` action on your behalf.

```

{
  "eventVersion": "1.09",
  "userIdentity": {
    "type": "AssumedRole",
    "principalId": "AIDA60N6E4XEGIEEXAMPLE",
    "arn": "arn:aws:iam::555555555555:user/Paulo",
    "accountId": "555555555555",
    "accessKeyId": "AKIAIOSFODNN7EXAMPLE",
    "sessionContext": {
      "sessionIssuer": {
        "type": "Role",
        "principalId": "AIDA60N6E4XEGIEEXAMPLE",
        "arn": "arn:aws:iam::555555555555:user/Paulo",
        "accountId": "555555555555",
        "userName": "Paulo"
      },
      "attributes": {
        "creationDate": "2024-04-10T14:06:08Z",
        "mfaAuthenticated": "false"
      }
    },
    "invokedBy": "q.amazonaws.com"
  },
  "eventTime": "2024-04-10T14:07:55Z",
  "eventSource": "s3.amazonaws.com",
  "eventName": "ListBuckets",
  "awsRegion": "us-east-1",
  "sourceIPAddress": "q.amazonaws.com",
  "userAgent": "q.amazonaws.com",
  "requestParameters": {
    "Host": "s3.amazonaws.com"
  },
  "responseElements": null,
  "additionalEventData": {
    "SignatureVersion": "SigV4",
    "CipherSuite": "ECDHE-RSA-AES128-GCM-SHA256",

```

```
    "bytesTransferredIn": 0,
    "AuthenticationMethod": "AuthHeader",
    "x-amz-id-2": "ExampleRequestId123456789",
    "bytesTransferredOut": 4054
  },
  "requestID": "ecd94349-b36f-44bf-b6f5-EXAMPLE9c463",
  "eventID": "2939ba50-1d26-4a5a-83bd-EXAMPLE85850",
  "readOnly": true,
  "eventType": "AwsApiCall",
  "managementEvent": true,
  "recipientAccountId": "555555555555",
  "vpceEndpointId": "vpce-EXAMPLE1234",
  "eventCategory": "Management"
}
```

Monitoring Amazon Q Developer with Amazon CloudWatch

 **Note**

The metrics discussed here only pertain to using [Amazon Q in your IDE](#).

You can monitor Amazon Q Developer using CloudWatch, which collects raw data and processes it into readable, near real-time metrics. These statistics are kept for 15 months, so that you can access historical information and gain a better perspective on how Amazon Q is performing. You can also set alarms that watch for certain thresholds, and send notifications or take actions when those thresholds are met. For more information, see the [Amazon CloudWatch User Guide](#).

The Amazon Q Developer service reports the following metrics in the AWS/Q namespace.

Dimension	Metric	Use case or explanation
s		
Count	Invocations	You want to determine how many invocations have been counted over time.
UserCount	DailyActiveUserTrend	You want to determine the number of active users per day.

Dimensions	Metric	Use case or explanation
SubscriptionUserCount	SubscriptionCount	You want to determine the number of users with paying subscriptions.
UniqueUserCount	MonthlyActiveUniqueUsers	You want to determine the number of users who are active in a given month.
ProgrammingLanguage, SuggestionState, CompletionType	GeneratedLineCount	You want to determine the number of lines generated by Amazon Q Developer.
ProgrammingLanguage, SuggestionState, CompletionType	SuggestionReferenceCount	You want to determine the number of recommendation triggers with references that have taken place.
ProgrammingLanguage	CodeScanCount	You want to determine the number of code scans that have taken place.
ProgrammingLanguage	TotalCharacterCount	The number of characters in your file, including all suggestions from Amazon Q Developer.
ProgrammingLanguage	CodeWhispererCharacterCount	The number of characters generated by Amazon Q Developer.

To aggregate Invocations, use the Sum statistic.

To aggregate DailyActiveUserTrend, use the Sum statistic, and use "1 Day" as the period.

To aggregate SubscriptionCount, use the Sum statistic.

To aggregate MonthlyActiveUniqueUsers use the Sum statistic, and use "30 Days" as the period.

Identifying actions by specific users with Amazon CloudWatch Logs

It's possible to get user-level metrics on your Amazon Q Developer usage. To figure out which user has taken a particular action, look for the events called `SendTelemetryEvent`, and examine the JSON object of type `SendTelemetryEventRequest` that they contain. Within that object, the schema appears as follows.

Tip

You can also output individual users' activity in Amazon Q Developer to a report in CSV format. For more information, see [Viewing the activity of specific users in Amazon Q Developer](#).

```
http://json-schema.org/draft-07/schema#",
  "definitions": {
    "ProgrammingLanguage": {
      "type": "object",
      "properties": {
        "languageName": {
          "type": "string",
          "enum": [
            "python",
            "javascript",
            "java",
            "csharp",
            "typescript",
            "c",
            "cpp",
            "go",
            "kotlin",
            "php",
            "ruby",
            "rust",
```



```

        "scala",
        "shell",
        "sql",
        "json",
        "yaml",
        "vue",
        "tf",
        "tsx",
        "jsx",
        "plaintext"
    ],
    "description": "Programming Languages supported by Q"
  }
},
"Dimension": {
  "type": "object",
  "properties": {
    "name": {
      "type": "string",
      "description": "must match ^[-a-zA-Z0-9._]*$ and be between 1 and
255 characters"
    },
    "value": {
      "type": "string",
      "description": "must match ^[-a-zA-Z0-9._]*$ and be between 1 and
1024 characters"
    }
  }
},
"telemetryEvents": {
  "UserTriggerDecisionEvent": {
    "type": "object",
    "properties": {
      "sessionId": {
        "type": "string",
        "description": "UUID for the session"
      },
      "requestId": {
        "type": "string",
        "description": "UUID for the request"
      },
      "customizationArn": {

```

```

        "type": "string",
        "description": "ARN of the customization matching pattern: ^arn:
[-.a-z0-9]{1,63}:codewhisperer:([-.a-z0-9]{0,63}:){2}([a-zA-Z0-9-_:/]){1,1023}$"
    },
    "programmingLanguage": {
        "$ref": "#/definitions/ProgrammingLanguage"
    },
    "completionType": {
        "type": "string",
        "enum": [
            "BLOCK",
            "LINE"
        ]
    },
    "suggestionState": {
        "type": "string",
        "enum": [
            "ACCEPT",
            "REJECT",
            "DISCARD",
            "EMPTY"
        ]
    },
    "recommendationLatencyMilliseconds": {
        "type": "number"
    },
    "timestamp": {
        "type": "string",
        "description": "datetime, example: Jul 23, 2024, 12:11:02 AM"
    },
    "triggerToResponseLatencyMilliseconds": {
        "type": "number"
    },
    "suggestionReferenceCount": {
        "type": "integer"
    },
    "generatedLine": {
        "type": "integer"
    },
    "numberOfRecommendations": {
        "type": "integer"
    }
},
"required": [

```

```

        "sessionId",
        "requestId",
        "programmingLanguage",
        "completionType",
        "suggestionState",
        "recommendationLatencyMilliseconds",
        "timestamp"
    ]
},
"CodeCoverageEvent": {
    "type": "object",
    "properties": {
        "customizationArn": {
            "type": "string",
            "description": "ARN of the customization matching pattern: ^arn:[-\\.a-z0-9]{1,63}:codewhisperer:([-\\.a-z0-9]{0,63}:){2}([a-zA-Z0-9-_:/]){1,1023}$"
        },
        "programmingLanguage": {
            "$ref": "#/definitions/ProgrammingLanguage"
        },
        "acceptedCharacterCount": {
            "type": "integer"
        },
        "totalCharacterCount": {
            "type": "integer"
        },
        "timestamp": {
            "type": "string",
            "description": "datetime, example: Jul 23, 2024, 12:11:02 AM"
        },
        "unmodifiedAcceptedCharacterCount": {
            "type": "integer"
        }
    },
    "required": [
        "programmingLanguage",
        "acceptedCharacterCount",
        "totalCharacterCount",
        "timestamp"
    ]
},
"UserModificationEvent": {
    "type": "object",
    "properties": {

```

```

        "sessionId": {
            "type": "string",
            "description": "UUID for the session"
        },
        "requestId": {
            "type": "string",
            "description": "UUID for the request"
        },
        "programmingLanguage": {
            "$ref": "#/definitions/ProgrammingLanguage"
        },
        "modificationPercentage": {
            "type": "number",
            "description": "This is the percentage of AI generated code which
has been modified by the user"
        },
        "customizationArn": {
            "type": "string",
            "description": "ARN of the customization matching pattern: ^arn:
[-.a-z0-9]{1,63}:codewhisperer:([-.a-z0-9]{0,63}:){2}([a-zA-Z0-9-_:/]){1,1023}$"
        },
        "timestamp": {
            "type": "string",
            "description": "datetime, example: Jul 23, 2024, 12:11:02 AM"
        }
    },
    "required": [
        "sessionId",
        "requestId",
        "programmingLanguage",
        "modificationPercentage",
        "timestamp"
    ]
},
"CodeScanEvent": {
    "type": "object",
    "properties": {
        "programmingLanguage": {
            "$ref": "#/definitions/ProgrammingLanguage"
        },
        "codeScanJobId": {
            "type": "string"
        },
        "timestamp": {

```

```

        "type": "string",
        "description": "datetime, example: Jul 23, 2024, 12:11:02 AM"
    },
    "codeAnalysisScope": {
        "type": "string",
        "enum": [
            "FILE",
            "PROJECT"
        ]
    }
},
"required": [
    "programmingLanguage",
    "codeScanJobId",
    "timestamp"
],
},
"CodeScanRemediationsEvent": {
    "type": "object",
    "properties": {
        "programmingLanguage": {
            "$ref": "#/definitions/ProgrammingLanguage"
        },
        "CodeScanRemediationsEventType": {
            "type": "string",
            "enum": [
                "CODESCAN_ISSUE_HOVER",
                "CODESCAN_ISSUE_APPLY_FIX",
                "CODESCAN_ISSUE_VIEW_DETAILS"
            ]
        },
        "timestamp": {
            "type": "string",
            "description": "datetime, example: Jul 23, 2024, 12:11:02 AM"
        },
        "detectorId": {
            "type": "string"
        },
        "findingId": {
            "type": "string"
        },
        "ruleId": {
            "type": "string"
        }
    },

```

```

        "component": {
            "type": "string"
        },
        "reason": {
            "type": "string"
        },
        "result": {
            "type": "string"
        },
        "includesFix": {
            "type": "boolean"
        }
    }
},
"MetricData": {
    "type": "object",
    "properties": {
        "metricName": {
            "type": "string",
            "description": "must match pattern ^[-a-zA-Z0-9._]*$ and be between
1 and 1024 characters"
        },
        "metricValue": {
            "type": "number"
        },
        "timestamp": {
            "type": "string",
            "description": "datetime, example: Jul 23, 2024, 12:11:02 AM"
        },
        "product": {
            "type": "string",
            "description": "must match pattern ^[-a-zA-Z0-9._]*$ and be between
1 and 128 characters"
        },
        "dimensions": {
            "type": "array",
            "items": {
                "$ref": "#/definitions/Dimension"
            },
            "description": "maximum size of 30"
        }
    }
},
"required": [
    "metricName",

```

```

        "metricValue",
        "timestamp",
        "product"
    ]
},
"ChatAddMessageEvent": {
    "type": "object",
    "properties": {
        "conversationId": {
            "type": "string",
            "description": "ID which represents a multi-turn conversation,
length between 1 and 128"
        },
        "messageId": {
            "type": "string",
            "description": "Unique identifier for the chat message"
        },
        "customizationArn": {
            "type": "string",
            "description": "ARN of the customization matching pattern: ^arn:
[-.a-z0-9]{1,63}:codewhisperer:([-.a-z0-9]{0,63}:){2}([a-zA-Z0-9-_:/]){1,1023}$"
        },
        "userIntent": {
            "type": "string",
            "enum": [
                "SUGGEST_ALTERNATE_IMPLEMENTATION",
                "APPLY_COMMON_BEST_PRACTICES",
                "IMPROVE_CODE",
                "SHOW_EXAMPLES",
                "CITE_SOURCES",
                "EXPLAIN_LINE_BY_LINE",
                "EXPLAIN_CODE_SELECTION",
                "GENERATE_CLOUDFORMATION_TEMPLATE"
            ]
        },
        "hasCodeSnippet": {
            "type": "boolean"
        },
        "programmingLanguage": {
            "$ref": "#/definitions/ProgrammingLanguage"
        },
        "activeEditorTotalCharacters": {
            "type": "integer"
        }
    },

```

```

        "timeToFirstChunkMilliseconds": {
            "type": "number"
        },
        "timeBetweenChunks": {
            "type": "array",
            "items": {
                "type": "number"
            },
            "description": "maximum size of 100"
        },
        "fullResponseLatency": {
            "type": "number"
        },
        "requestLength": {
            "type": "integer"
        },
        "responseLength": {
            "type": "integer"
        },
        "numberOfCodeBlocks": {
            "type": "integer"
        },
        "hasProjectLevelContext": {
            "type": "boolean"
        }
    },
    "required": [
        "conversationId",
        "messageId"
    ],
    "ChatInteractWithMessageEvent": {
        "type": "object",
        "properties": {
            "conversationId": {
                "type": "string",
                "description": "ID which represents a multi-turn conversation,
length between 1 and 128"
            },
            "messageId": {
                "type": "string",
                "description": "Unique identifier for the chat message"
            },
            "customizationArn": {

```



```

        "type": "string",
        "description": "ARN of the customization matching pattern: ^arn:
[-.a-z0-9]{1,63}:codewhisperer:([-.a-z0-9]{0,63}:){2}([a-zA-Z0-9-_:/{1,1023})$"
    },
    "interactionType": {
        "type": "string",
        "enum": [
            "INSERT_AT_CURSOR",
            "COPY_SNIPPET",
            "COPY",
            "CLICK_LINK",
            "CLICK_BODY_LINK",
            "CLICK_FOLLOW_UP",
            "HOVER_REFERENCE",
            "UPVOTE",
            "DOWNVOTE"
        ],
        "description": "Chat Message Interaction Type"
    },
    "interactionTarget": {
        "type": "string",
        "description": "Target of message interaction"
    },
    "acceptedCharacterCount": {
        "type": "integer"
    },
    "acceptedLineCount": {
        "type": "integer"
    },
    "acceptedSnippetHasReference": {
        "type": "boolean"
    },
    "hasProjectLevelContext": {
        "type": "boolean"
    }
},
"required": [
    "conversationId",
    "messageId"
],
"ChatUserModificationEvent": {
    "type": "object",
    "properties": {

```

```

        "conversationId": {
            "type": "string",
            "description": "ID which represents a multi-turn conversation,
length between 1 and 128"
        },
        "customizationArn": {
            "type": "string",
            "description": "ARN of the customization matching pattern: ^arn:
[-.a-z0-9]{1,63}:codewhisperer:([-.a-z0-9]{0,63}:){2}([a-zA-Z0-9-_:/]){1,1023}$"
        },
        "messageId": {
            "type": "string",
            "description": "Unique identifier for the chat message"
        },
        "programmingLanguage": {
            "$ref": "#/definitions/ProgrammingLanguage"
        },
        "modificationPercentage": {
            "type": "number",
            "description": "This is the percentage of AI generated code which
has been modified by the user"
        },
        "hasProjectLevelContext": {
            "type": "boolean"
        }
    },
    "required": [
        "conversationId",
        "messageId",
        "modificationPercentage"
    ]
},
"SuggestionState": {
    "type": "string",
    "enum": [
        "ACCEPT",
        "REJECT",
        "DISCARD",
        "EMPTY"
    ]
},
"TerminalUserInteractionEvent": {
    "type": "object",
    "properties": {

```

```

        "terminalUserInteractionEventType": {
            "type": "string",
            "enum": [
                "CODEWHISPERER_TERMINAL_TRANSLATION_ACTION",
                "CODEWHISPERER_TERMINAL_COMPLETION_INSERTED"
            ],
            "description": "Terminal User Interaction Event Type"
        },
        "terminal": {
            "type": "string"
        },
        "terminalVersion": {
            "type": "string"
        },
        "shell": {
            "type": "string"
        },
        "shellVersion": {
            "type": "string"
        },
        "duration": {
            "type": "integer"
        },
        "timeToSuggestion": {
            "type": "integer"
        },
        "isCompletionAccepted": {
            "type": "boolean"
        },
        "cliToolCommand": {
            "type": "string"
        }
    },
    "FeatureDevEvent": {
        "type": "object",
        "properties": {
            "conversationId": {
                "type": "string",
                "description": "ID which represents a multi-turn conversation,
length between 1 and 128"
            }
        }
    },
    "required": [

```

```

        "conversationId"
    ]
}
},
"SendTelemetryEventRequest": {
    "type": "object",
    "properties": {
        "clientToken": {
            "type": "string",
            "description": "The client's authentication token"
        },
        "telemetryEvent": {
            "properties": {
                "oneOf": [
                    {
                        "_comment": "This event is emitted when a user accepts or
rejects an inline code suggestion",
                        "$ref": "#/definitions/userTriggerDecisionEvent"
                    },
                    {
                        "_comment": "This event is emitted every five minutes. It
details how much code is written by inline code suggestion and in total during that
period",
                        "$ref": "#/definitions/codeCoverageEvent"
                    },
                    {
                        "_comment": "This event is emitted when a code snippet from
inline code suggestion has been edited by a user. It details the percentage of that
code snippet modified by the user",
                        "$ref": "#/definitions/userModificationEvent"
                    },
                    {
                        "_comment": "This field is emitted when a security scan is
requested by a user",
                        "$ref": "#/definitions/codeScanEvent"
                    },
                    {
                        "_comment": "This field is emitted when a security scan
recommended remediation is accepted by a user",
                        "$ref": "#/definitions/codeScanRemediationsEvent"
                    },
                    {
                        "_comment": "This event is deprecated but may still occur
in telemetry. Do not use this.",

```

```

        "$ref": "#/definitions/metricData"
      },
      {
        "_comment": "This event is emitted when Q adds an AI
generated message to the chat window",
        "$ref": "#/definitions/chatAddMessageEvent"
      },
      {
        "_comment": "This event is emitted when a user interacts
with a chat message",
        "$ref": "#/definitions/chatInteractWithMessageEvent"
      },
      {
        "_comment": "This event is emitted when a user modifies a
code snippet sourced from chat. It gives a percentage of the code snippet which has
been modified",
        "$ref": "#/definitions/chatUserModificationEvent"
      },
      {
        "_comment": "This event is emitted when a user interacts
with a terminal suggestion",
        "$ref": "#/definitions/terminalUserInteractionEvent"
      },
      {
        "_comment": "This event is emitted when a user first
prompts the /dev feature.",
        "$ref": "#/definitions/featureDevEvent"
      }
    ]
  },
  "optOutPreference": {
    "type": "string",
    "enum": [
      "OPTIN",
      "OPTOUT"
    ],
    "description": "OPTOUT and telemetry is only provided to the account of
purchasing enterprise, OPTIN and telemetry may also be used for product improvement"
  },
  "userContext": {
    "type": "object",
    "properties": {
      "ideCategory": {

```

```

        "type": "string",
        "enum": [
            "JETBRAINS",
            "VSCODE",
            "CLI",
            "JUPYTER_MD",
            "JUPYTER_SM"
        ]
    },
    "operatingSystem": {
        "type": "string",
        "description": "The operating system being used"
    },
    "product": {
        "type": "string",
        "description": "The name of the product being used"
    },
    "clientId": {
        "type": "string",
        "description": "A UUID representing the individual client being
used"
    },
    "ideVersion": {
        "type": "string",
        "description": "The version of the Q plugin"
    }
},
"required": [
    "ideCategory",
    "operatingSystem",
    "product",
    "clientId",
    "ideVersion"
]
},
"profileArn": {
    "type": "string",
    "description": "The arn of the Q Profile used to configure individual
user accounts."
}

```

Observe that a `SendTelemetryEvent` may contain one of a number of telemetry events. Each of these describes a specific interaction between the development environment.

A more detailed description of each event appears below.

UserTriggerDecisionEvent

This event is triggered when a user interacts with a suggestion made by Amazon Q. It captures whether the suggestion was accepted, rejected, or modified, along with relevant metadata.

- `completionType`: Whether the completion was a block or a line.
- `suggestionState`: Whether the user accepted, rejected, or discarded the suggestion.

CodeScanEvent

This event is logged when a code scan is performed. It helps track the scope and result of the scan, providing insights into security and code quality checks.

- `codeScanJobId`: The unique identifier for the code scan job.
- `codeAnalysisScope`: Whether the scan was performed at the file level or the project level.
- `programmingLanguage`: The language being scanned.

CodeScanRemediationsEvent

This event captures user interactions with Amazon Q's remediation suggestions, such as applying fixes or viewing issue details.

- `CodeScanRemediationsEventType`: The type of remediation action taken (e.g., viewing details or applying a fix).
- `includesFix`: A boolean indicating whether the code issue includes a suggested fix.

ChatAddMessageEvent

This event is triggered when a new message is added to an ongoing chat conversation. It captures the user's intent and any code snippets involved.

- `conversationId`: The unique identifier for the conversation.
- `messageId`: The unique identifier for the chat message.
- `userIntent`: The user's intent, such as improving code or explaining code.

- `programmingLanguage`: The language related to the chat message.

ChatInteractWithMessageEvent

This event captures when users interact with chat messages, such as copying code snippets, clicking links, or hovering over references.

- `interactionType`: The type of interaction (for example, copy, hover, click).
- `interactionTarget`: The target of the interaction (for example, a code snippet or a link).
- `acceptedCharacterCount`: The number of characters from the message that were accepted.
- `acceptedSnippetHasReference`: A boolean indicating if the accepted snippet included a reference.

TerminalUserInteractionEvent

This event logs user interactions with terminal commands or completions in the terminal environment.

- `terminalUserInteractionEventType`: The type of interaction (for example, terminal translation or code completion).
- `isCompletionAccepted`: A boolean indicating whether the completion was accepted by the user.
- `duration`: The time taken for the interaction.

Accessing customization-related messages in Amazon CloudWatch Logs

You can store information about the creation of your [customization](#) in [Amazon CloudWatch Logs](#).

You can authorize your Amazon Q Developer administrator to view those logs with the following permission set.

To learn more about the permissions required to delivery logs to multiple resources, see [Logging that requires additional permissions \[V2\]](#) in the *Amazon CloudWatch Logs User Guide*.

```
{  
  "Version": "2012-10-17",
```



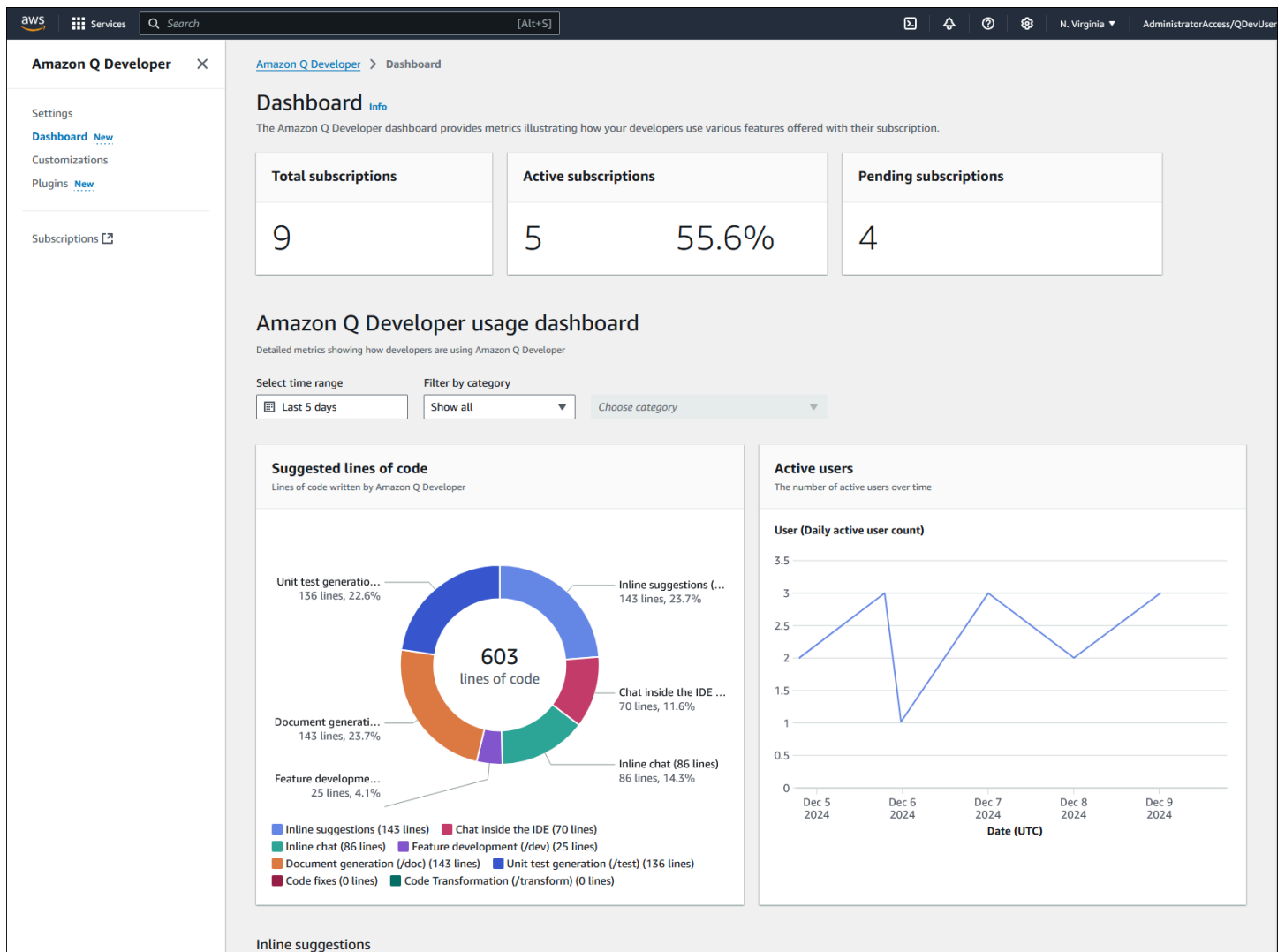
```

"Statement": [
  {
    "Sid": "AllowLogDeliveryActions",
    "Effect": "Allow",
    "Action": [
      "logs:PutDeliverySource",
      "logs:GetDeliverySource",
      "logs>DeleteDeliverySource",
      "logs:DescribeDeliverySources",
      "logs:PutDeliveryDestination",
      "logs:GetDeliveryDestination",
      "logs>DeleteDeliveryDestination",
      "logs:DescribeDeliveryDestinations",
      "logs>CreateDelivery",
      "logs:GetDelivery",
      "logs>DeleteDelivery",
      "logs:DescribeDeliveries",
      "firehose:ListDeliveryStreams",
      "firehose:DescribeDeliveryStream",
      "s3:ListAllMyBuckets",
      "s3:ListBucket",
      "s3:GetBucketLocation"
    ],
    "Resource": [
      "arn:aws:logs:us-east-1:account number:log-group:*",
      "arn:aws:firehose:us-east-1:account number:deliverystream/*",
      "arn:aws:s3:::*"
    ]
  }
]
}

```

Viewing Amazon Q Developer user activity on the dashboard

Available only for Amazon Q Developer administrators, the Amazon Q Developer dashboard summarizes useful data about how your Pro tier subscribers use the service.



Amazon Q generates and displays new metrics on an hourly basis for the most part. The only section that is not updated hourly is the **Active users** widget, which is updated daily according to the coordinated universal time (UTC) clock.

The dashboard shows metrics collected from users who are subscribed in:

- the AWS account that you're currently signed into
- and
- member accounts, if you're signed in to a management account for which [organization-wide visibility of subscriptions](#) has been enabled.

 Note

The **Active users** widget only displays information from the account that you're currently signed into.

To view and filter the dashboard

1. Sign in to the AWS Management Console.
2. Switch to the Amazon Q Developer console.
3. From the navigation pane, choose **Dashboard**.
4. (Optional) Filter the information by date range, programming language, [customization](#), or integrated development environment (IDE) vendor.

Notes:

- If the **Dashboard** link is not available in the navigation pane, see [Troubleshooting the dashboard](#).
- If you'd like to send user metrics to a daily report with a per-user breakdown of their Amazon Q Developer usage, see [Viewing the activity of specific users in Amazon Q Developer](#).
- For information about specific metrics, see [Descriptions of Amazon Q Developer dashboard usage metrics](#) or choose the help link

)
at the top-right of the dashboard page.

Descriptions of Amazon Q Developer dashboard usage metrics

The following table describes the metrics shown in the Amazon Q Developer dashboard.

For more information about the dashboard, see [Viewing Amazon Q Developer user activity on the dashboard](#).

Metric name	Description
Total subscriptions	Shows the total subscriptions in the current AWS account, as well as subscriptions in

Metric name	Description
	member accounts, if you're signed in to a management account for which organization-wide visibility of subscriptions has been enabled.
Active subscriptions	Shows the total active subscriptions in the current AWS account, as well as subscriptions in member accounts, if you're signed in to a management account for which organization-wide visibility of subscriptions has been enabled. <i>Active subscriptions</i> are those belonging to users who have started using Amazon Q in their integrated development environment (IDE). You are being charged for these subscriptions. For more information about active subscriptions, see Amazon Q Developer subscription statuses.
Pending subscriptions	Shows the total pending subscriptions in the current AWS account, as well as subscriptions in member accounts, if you're signed in to a management account for which organization-wide visibility of subscriptions has been enabled. <i>Pending subscriptions</i> are those belonging to users who have not yet started using Amazon Q in their IDE. You are not being charged for these subscriptions. For more information about pending subscriptions, see Amazon Q Developer subscription statuses.

Metric name	Description
Accepted lines of code	Shows a pie chart that indicates the lines of code accepted by users, broken down by Amazon Q feature (/dev , /doc , /test , and so on).
Active users	Shows a line graph that indicates the number of subscribers who were actively using Amazon Q in the IDE during a specified date range.
Inline suggestions	Shows the total number of suggestions and accepted suggestions for the inline suggestions feature. The percentage of accepted suggestions is calculated by taking the number of suggestions accepted by users, and dividing it by the total suggestions generated by Amazon Q. The total suggestions count includes suggestions that were accepted and actively rejected; it does not include suggestions that were dismissed because the user continued to type or started performing other operations in their IDE.
Inline chat	Shows the total number of suggestions and number of accepted suggestions for the inline chat feature. The percentage of accepted suggestions is calculated by taking the number of suggestions accepted by users, and dividing it by the total suggestions generated by Amazon Q.
Chat in the IDE – Total messages sent	Shows the total number of responses from Amazon Q in the Amazon Q chat window of the user's IDE.

Metric name	Description
Feature development (/dev) – Acceptance rate	Shows the acceptance rate for the Feature development (/dev) feature. The acceptance rate is calculated by taking the number of lines of code accepted by users, and dividing it by the total lines of code suggested by Amazon Q.
Document generation (/doc)	Shows the total number of documentation files (such as READMEs and supporting files) created and updated by the Document generation (/doc) feature. The acceptance rates equal the number of file updates or creations accepted by users, divided by the total number of files updates or creations suggested by Amazon Q.
Unit test generation (/test)	Shows the total number of unit tests generated by the Unit test generation (/test) feature and the number of unit tests accepted by users. The acceptance rate is calculated by taking the number of unit tests accepted by users, and dividing it by the total number of unit tests generated by Amazon Q.
Code reviews (/review)	Shows the total number of code reviews and findings reports generated by the Code reviews (/review) feature. The Total code reviews (manual only) and Findings report (manual only) refer to the code reviews and finding reports that are <i>not</i> auto-generated .

Metric name	Description
Code fixes	Shows the total number of code fixes generated by Amazon Q. The acceptance rate is calculated by taking the number of code fixes accepted by users, and dividing it by the total number of code fixes suggested by Amazon Q.
Code transformation (/transform)	Shows the total number code transformations performed by the Transformation (/transform) feature, and the number of lines of code processed.

Disabling the Amazon Q Developer dashboard

You might want to disable the Amazon Q Developer dashboard if you have concerns about data privacy, page load times, or other potential issues. When you disable the dashboard, the dashboard page (and any links to it) will no longer be available in the Amazon Q Developer console.

For more information about the dashboard, see [Viewing usage metrics \(dashboard\)](#).

To disable the dashboard

1. Open the Amazon Q Developer console:
 - If you set up Amazon Q Developer with an organization instance of AWS IAM Identity Center, then sign in using a management account or member account.
 - If you set up Amazon Q Developer with an account instance of IAM Identity Center, then sign in using the account associated with that instance.
2. Choose **Settings**, and in the **Amazon Q Developer user activity** section, choose **Edit**.
3. Disable **Amazon Q Developer usage dashboard**.

Troubleshooting the Amazon Q Developer dashboard

If the Amazon Q Developer dashboard page is not available, do the following:

- **Verify your permissions.** To view the dashboard, you need the following permissions:
 - `q:ListDashboardMetrics`
 - `codewhisperer:ListProfiles`
 - `sso:ListInstances`
 - `user-subscriptions:ListUserSubscriptions`
 - To see metrics generated before November 22, 2024, you also need:
`cloudwatch:GetMetricData` and `cloudwatch:ListMetrics`

For more information about permissions, see [Allow administrators to use the Amazon Q Developer console](#).

- **Verify your settings.** In the Amazon Q Developer console, choose **Settings** and make sure that the **Amazon Q Developer usage dashboard** toggle is enabled.

For more information about the dashboard, see [Viewing usage metrics \(dashboard\)](#).

Viewing the activity of specific users in Amazon Q Developer

You can configure Amazon Q to collect user activity telemetry of individual Amazon Q Developer subscribers in your organization and present that information in a report. The report gives you insights into how specific users are using Amazon Q.

Amazon Q generates the report every day at midnight (00:00) Coordinated Universal Time (UTC), and saves it in a CSV file at the following path:

```
s3://bucketName/prefix/AWSLogs/accountId/QDeveloperLogs/  
by_user_analytic/region/year/month/day/00/accountId_by_user_analytic_timestamp.c
```

The CSV file is laid out as follows:

- Each row shows a user who interacted with Amazon Q that day.
- Each column shows a metric, as described in [User activity report metrics](#). Metrics are calculated based on the user telemetry collected over the course of the day.

If more than 1,000 users interact with Amazon Q during the day, Amazon Q splits the data into several CSV files containing 1,000 users each, and having suffixes of `part_1`, `part_2`, and so on.

Note

When you enable user activity reports, Amazon Q collects telemetry regardless of how a developer has set the **Enable Amazon Q to send usage data to AWS** setting in their IDE. That setting controls whether telemetry can be used by the *AWS corporation*, not your organization. For more information about this setting, see [Opting out of sharing your client-side telemetry](#).

Use the following instructions to enable user activity reports.

Prerequisite

Create an Amazon S3 bucket to hold the user activity report CSV file. The bucket must:

- Be in the AWS Region where the Amazon Q Developer profile was installed. This profile was installed when you subscribed IAM Identity Center workforce users to Amazon Q Developer Pro for the first time. For more information about this profile and the Regions where it's supported, see [Amazon Q Developer profile](#), and [Supported Regions for the Q Developer console and Q Developer profile](#).
- Be in the AWS account where users are subscribed. If users are subscribed in multiple AWS accounts, then you must create buckets in each of those accounts. Cross-account buckets are not supported.
- (Optional but recommended) Be different from the bucket you might be using for [prompt logging](#).
- Include a prefix, also known as a subfolder, where Amazon Q will save the CSV file. The CSV file cannot be saved in the root of the bucket.
- Have a bucket policy like the one that follows. Replace *bucketName*, *region*, *accountId*, and *prefix* with your own information.

```
{
  "Version": "2012-10-17",
  "Statement": [
    {
      "Sid": "QDeveloperLogsWrite",
      "Effect": "Allow",
      "Principal": {
        "Service": "q.amazonaws.com"
      },
    },
  ],
}
```

```

        "Action": [
            "s3:PutObject"
        ],
        "Resource": [
            "arn:aws:s3:::bucketName/prefix/*"
        ],
        "Condition": {
            "StringEquals": {
                "aws:SourceAccount": "accountId"
            },
            "ArnLike": {
                "aws:SourceArn": "arn:aws:codewhisperer:region:accountId:*"
            }
        }
    }
}

```

If you're configuring SSE-KMS on the bucket, add the below policy on the KMS key:

```

{
    "Effect": "Allow",
    "Principal": {
        "Service": "q.amazonaws.com"
    },
    "Action": "kms:GenerateDataKey",
    "Resource": "*",
    "Condition": {
        "StringEquals": {
            "aws:SourceAccount": "accountId"
        },
        "ArnLike": {
            "aws:SourceArn": "arn:aws:codewhisperer:region:accountId:*"
        }
    }
}

```

To learn about protecting the data in your Amazon S3 bucket, see [Protecting data with encryption](#) in the *Amazon Simple Storage Service User Guide*.

To enable user activity reports

1. Open the Amazon Q Developer console.

To use the Amazon Q Developer console, you must have the permissions defined in [Allow administrators to use the Amazon Q Developer console](#).
2. Choose **Settings**.
3. Under **Q Developer user activity reports**, choose **Edit**.
4. Toggle **Collect granular metrics per user**.
5. Under **S3 location**, enter the Amazon S3 URI that you will use to hold the CSV reports.
Example: `s3://amzn-s3-demo-bucket/user-activity-reports/`

User activity report metrics

The following table describes the metrics that are included in the user activity reports generated by Amazon Q Developer.

For more information about these reports, see [Viewing the activity of specific users in Amazon Q Developer](#).

Metric name	Description
Chat_AICodeLines	Lines of code suggested by Amazon Q and accepted by the user. This metric includes code that was generated through the Amazon Q chat (not inline chat) and inserted into the IDE.
Chat_MessagesInteracted	Number of chat messages where the user has interacted positively with Amazon Q. Examples of positive interactions: clicking a link, inserting a suggestion, and upvoting a response from Amazon Q. This metric includes messages that were generated by Amazon Q chat (not inline chat).
Chat_MessagesSent	Number of messages sent to and from Amazon Q. This metric includes the user

Metric name	Description
	prompts and Amazon Q responses in the Amazon Q chat (not inline chat).
CodeFix_AcceptanceEventCount	Number of code fixes suggested by Amazon Q and accepted by the user. This metric applies to code fixes generated through the /review command .
CodeFix_AcceptedLines	Lines of code suggested by Amazon Q and accepted by the user. This metric applies to lines of code generated through the /review command .
CodeFix_GeneratedLines	Lines of code suggested by Amazon Q. This metric applies to lines of code generated through the /review command .
CodeFix_GenerationEventCount	Number of code fixes suggested by Amazon Q. This metric applies to code fixes generated through the /review command .
CodeReview_FailedEventCount	Number of code issues that were found but for which Amazon Q could not suggest a code fix. This metric applies to code issues generated using the /review command .
CodeReview_FindingsCount	Number of code issues found by Amazon Q. This metric applies to code issues found using the /review command .
CodeReview_SucceededEventCount	Number of code issues that were found and for which Amazon Q was able to generate a suggested code fix. This metric applies to code issues found using the /review command .

Metric name	Description
Dev_AcceptanceEventCount	Number of code features suggested by Amazon Q and accepted by the user. This metric applies to code features generated through the /dev command .
Dev_AcceptedLines	Lines of code suggested by Amazon Q and accepted by the user. This metric applies to lines of code generated through the /dev command .
Dev_GeneratedLines	Lines of code suggested by Amazon Q. This metric applies to lines of code generated through the /dev command .
Dev_GenerationEventCount	Number of code features suggested by Amazon Q. This metric applies to code features generated through the /dev command .
DocGeneration_AcceptedFileUpdates	Number of file updates suggested by Amazon Q and accepted by the user. This metric applies to file updates generated through the /doc command .
DocGeneration_AcceptedFilesCreations	Number of file creations suggested by Amazon Q and accepted by the user. This metric applies to file creations generated through the /doc command .
DocGeneration_AcceptedLineAdditions	Lines of documentation additions suggested by Amazon Q and accepted by the user. This metric applies to documentation generated through the /doc command .

Metric name	Description
DocGeneration_AcceptedLineUpdates	Lines of documentation updates suggested by Amazon Q and accepted by the user. This metric applies to documentation generated using the /doc command .
DocGeneration_EventCount	Number of times the user engaged with Amazon Q using the /doc command .
DocGeneration_RejectedFileCreations	Number of file creations suggested by Amazon Q and rejected by the user. This metric applies to file creations generated through the /doc command .
DocGeneration_RejectedFileUpdates	Number of file updates suggested by Amazon Q and rejected by the user. This metric applies to file updates generated through the /doc command .
DocGeneration_RejectedLineAdditions	Lines of documentation additions suggested by Amazon Q and rejected by the user. This metric applies to documentation generated through the /doc command .
DocGeneration_RejectedLineUpdates	Lines of documentation updates suggested by Amazon Q and rejected by the user. This metric applies to documentation generated using the /doc command .
InlineChat_AcceptedLineAdditions	Lines of code additions suggested by Amazon Q and accepted by the user. This metric includes code additions generated through the inline chat (not Amazon Q chat).

Metric name	Description
InlineChat_AcceptedLineDeletions	Lines of code deletions suggested by Amazon Q and accepted by the user. This metric includes code deletions suggested through the inline chat (not Amazon Q chat).
InlineChat_AcceptanceEventCount	Number of inline chat (not Amazon Q chat) suggestions that were accepted by the user.
InlineChat_DismissalEventCount	Number of inline chat (not Amazon Q chat) suggestions that were abandoned by the user. By 'abandoned', we mean that the code suggestion was displayed but the user kept typing or performing other operations in their IDE, and did not explicitly accept or reject the code suggestion.
InlineChat_DismissedLineAdditions	Lines of code additions suggested by Amazon Q and abandoned by the user. By 'abandoned', we mean that the code suggestion was displayed but the user kept typing or performing other operations in their IDE, and did not explicitly accept or reject the code suggestion. This metric includes code additions generated through the inline chat (not Amazon Q chat).
InlineChat_DismissedLineDeletions	Lines of code deletions suggested by Amazon Q and abandoned by the user. By 'abandoned', we mean that the code suggestion was displayed but the user kept typing or performing other operations in their IDE, and did not explicitly accept or reject the code suggestion. This metric includes code deletions suggested through the inline chat (not Amazon Q chat).

Metric name	Description
InlineChat_EventCount	Number of inline chat (not Amazon Q chat) sessions that the user engaged in.
InlineChat_RejectedLineAdditions	Lines of code additions suggested by Amazon Q and rejected by the user. This metric includes code additions generated through the inline chat (not Amazon Q chat).
InlineChat_RejectedLineDeletions	Lines of code deletions suggested by Amazon Q and rejected by the user. This metric includes code deletions suggested through the inline chat (not Amazon Q chat).
InlineChat_RejectionEventCount	Number of inline chat (not Amazon Q chat) suggestions that were rejected by the user.
Inline_AICodeLines	Lines of code suggested by Amazon Q and accepted by the user. This metric includes code that was accepted as inline suggestions .
Inline_AcceptanceCount	Number of inline suggestions accepted by the user.
Inline_SuggestionsCount	Number of inline suggestions displayed to the user.
TestGeneration_AcceptedLines	Lines of code suggested by Amazon Q and accepted by the user. This metric applies to lines of code generated through the /test command .
TestGeneration_AcceptedTests	Number of unit tests suggested by Amazon Q and accepted by the user. This metric applies to unit tests generated through the /test command .

Metric name	Description
TestGeneration_EventCount	Number of times the user engaged with Amazon Q through the /test command .
TestGeneration_GeneratedLines	Lines of code suggested by Amazon Q. This metric applies to lines of code generated through the /test command .
TestGeneration_GeneratedTests	Number of unit tests suggested by Amazon Q. This metric applies to unit tests generated through the /test command .
Transformation_EventCount	Number of times the user engaged with Amazon Q through the /transform command , excluding the times when the user transformed code on the command line .
Transformation_LinesGenerated	Lines of code suggested by Amazon Q. This metric applies to code generated through the /transform command , excluding code transformed on the command line .
Transformation_LinesIngested	Lines of code provided to Amazon Q for transformation. This metric applies to code that is provided through the /transform command , excluding code provided for transformation on the command line , or for an SQL conversion .

Logging users' prompts in Amazon Q Developer

Administrators can enable the logging of all [inline suggestions](#) and [chat conversations](#) that users have with Amazon Q in their integrated development environment (IDE). These logs can help with auditing, debugging, analytics, and ensuring compliance.

When developers use inline suggestions, Amazon Q will log the accepted and actively rejected suggestions. When developers chat with Amazon Q, Amazon Q will log both the developers'

prompts and Amazon Q's responses. When developers chat with [the Amazon Q Agent for software development](#) using the `/dev` command, only the prompts will be logged.

Amazon Q stores the logs in an Amazon S3 bucket that you create, at the following path:

bucketName/prefix/AWSLogs/accountId/QDeveloperLogs/log-type/region/year/month/day/utc-hour/zipFile.gz/logFile.json

At the previous path, *log-type* is one of the following:

- `GenerateAssistantResponse` — holds chat logs
- `GenerateCompletions` — holds inline completion logs
- `StartTaskAssistCodeGeneration` — holds `/dev` logs

For examples and explanations of log file contents, see [Prompt log examples in Amazon Q Developer](#).

There is no charge for the prompt logging feature other than the storage cost of the Amazon S3 bucket used to hold the logs, and a small fee for the optional KMS key used to encrypt the bucket.

Use the following instructions to enable prompt logging.

Prerequisite

Create an Amazon S3 bucket to hold the prompt logs. The bucket must:

- Be in the AWS Region where the Amazon Q Developer profile was installed. This profile was installed when you subscribed users to Amazon Q Developer Pro for the first time. For more information about this profile and the Regions where it's supported, see [Amazon Q Developer profile](#), and [Supported Regions for the Q Developer console and Q Developer profile](#).
- Be in the AWS account where users are subscribed. If users are subscribed in multiple AWS accounts, then you must create a bucket in each account. Cross-account buckets are not supported.
- Have a bucket policy like the one that follows. Replace *bucketName*, *region*, *accountId*, and *prefix* with your own information.

```
{
  "Version": "2012-10-17",
  "Statement": [
    {
```

```

        "Sid": "QDeveloperLogsWrite",
        "Effect": "Allow",
        "Principal": {
            "Service": "q.amazonaws.com"
        },
        "Action": [
            "s3:PutObject"
        ],
        "Resource": [
            "arn:aws:s3:::bucketName/prefix/*"
        ],
        "Condition": {
            "StringEquals": {
                "aws:SourceAccount": "accountId"
            },
            "ArnLike": {
                "aws:SourceArn": "arn:aws:codewhisperer:region:accountId:*"
            }
        }
    }
}

```

If you're configuring SSE-KMS on the bucket, add the following policy on the KMS key:

```

{
    "Effect": "Allow",
    "Principal": {
        "Service": "q.amazonaws.com"
    },
    "Action": "kms:GenerateDataKey",
    "Resource": "*",
    "Condition": {
        "StringEquals": {
            "aws:SourceAccount": "accountId"
        },
        "ArnLike": {
            "aws:SourceArn": "arn:aws:codewhisperer:region:accountId:*"
        }
    }
}

```

To learn about protecting the data in your Amazon S3 bucket, see [Protecting data with encryption](#) in the *Amazon Simple Storage Service User Guide*.

To enable prompt logging

1. Open the Amazon Q Developer console.

To use the Amazon Q Developer console, you must have the permissions defined in [Allow administrators to use the Amazon Q Developer console](#).

Note

You must sign in as a standalone account administrator, or management account administrator. Member account administrators cannot enable prompt logging.

2. Choose **Settings**.
3. Under **Preferences**, choose **Edit**.
4. In the Edit preferences window, toggle **Q Developer prompt logging**.
5. Under Amazon S3 location, enter the Amazon S3 URI that you will use to receive the logs.
Example: `s3://amzn-s3-demo-bucket/qdev-prompt-logs/`

Prompt log examples in Amazon Q Developer

This section provides examples of prompt logs generated by Amazon Q Developer.

Following each example is a table that describes the log file's fields.

For more information about prompt logs, see [Logging users' prompts in Amazon Q Developer](#).

Topics

- [Inline suggestions log example](#)
- [Chat log example](#)
- [/dev log example](#)

Inline suggestions log example

The following example shows a log file that is generated when a user accepts an inline suggestion.

```
{
  "records": [
    {
      "generateCompletionsEventRequest": {
        "leftContext": "import * cdk from 'aws-cdk-lib';\r\nimport * s3
from 'aws-cdk-lib/aws-s3';\r\nimport { Stack, StackProps } from 'constructs';\r
\nexport class MyStack extends Stack {\r\n  constructor(scope: cdk.App, id: string,
props?: StackProps) {\r\n    super(scope, id, props);\r\n\r\n    new s3.Bucket(this,
'XXXXXXX', {\r\n      versioned: true\r\n    });\r\n  }\r\n  ",
        "rightContext": "",
        "fileName": "cdk-modified.ts",
        "customizationArn": null,
        "userId": "d-92675051d5.b8f1f340-9081-70ad-5fc5-0f37151937a6",
        "timeStamp": "2025-01-06T15:09:16.412719Z"
      },
      "generateCompletionsEventResponse": {
        "completions": ["synth() {\n    return
cdk.App.prototype.synth.apply(this, arguments);\n  }"],
        "requestId": "797c70ee-abc9-4cc7-a148-b9df17f6ce48"
      }
    }
  ]
}
```

The following table describes the fields in the log file for inline suggestions.

Field name	Description
records	Top-level field that contains a set of inline suggestions, also known as inline completions.
generateCompletionsEventRequest	Describes the request for an inline code suggestion. The request is made by Amazon Q, on behalf of the user.

Field name	Description
leftContext	Indicates the code before the cursor that Amazon Q is using for context to generate an inline suggestion.
rightContext	Indicates the code after the cursor that Amazon Q is using for context to generate an inline suggestion.
fileName	Indicates the name of the file in which an inline suggestion was requested.
customizationArn	Indicates the Amazon Resource Name (ARN) of the customization applied to inline suggestions. In this example, there is no customization. For more information about customizations, see Customizing suggestions .
userId	Indicates the user ID of the user who requested an inline suggestion.
timeStamp	Indicates the date and time that the inline suggestion was requested. The timestamp is in Coordinated Universal Time (UTC).
generateCompletionsEventResponse	Describes the inline suggestion generated by Amazon Q.
completions	Indicates the inline suggestion that Amazon Q provided and that the user accepted.
requestId	The ID of the inline request that uniquely identifies the event.

Chat log example

The following example shows a log file that is generated when a user chats using Amazon Q in their IDE.

```
{
  "records": [
    {
      "generateAssistantResponseEventRequest": {
        "prompt": "Can you explain how to set up object-level access control in an S3 bucket using AWS CDK?",
        "chatTriggerType": "MANUAL",
        "customizationArn": null,
        "userId": "d-92675051d5.b8f1f340-9081-70ad-5fc5-0f37151937a6",
        "timestamp": "2025-01-06T15:05:56.313070Z"
      },
      "generateAssistantResponseEventResponse": {
        "assistantResponse": "I'll explain how to set up object-level access control for an S3 bucket using AWS CDK. Here's how you can implement different access control configurations: [[1]](https://docs.aws.amazon.com/AmazonS3/latest/API/s3_example_s3_Scenario_ManageACLs_section.html)\n\n1. Using Bucket Owner Enforced (Recommended Modern Approach):\n```\ntypescript\nimport * as cdk from 'aws-cdk-lib';\nimport * as s3 from 'aws-cdk-lib/aws-s3';\n\nnew s3.Bucket(this, 'XXXXXXX', {\n  objectOwnership: s3.ObjectOwnership.BUCKET_OWNER_ENFORCED,\n  blockPublicAccess: s3.BlockPublicAccess.BLOCK_ALL\n});\n```\n\n2. Using Public Access Block Configuration:\n```\ntypescript\nimport * as cdk from 'aws-cdk-lib';\nimport * as s3 from 'aws-cdk-lib/aws-s3';\n\nnew s3.Bucket(this, 'XXXXXXX', {\n  blockPublicAccess: new s3.BlockPublicAccess({\n    blockPublicAcls: true,\n    blockPublicPolicy: true,\n    ignorePublicAcls: true,\n    restrictPublicBuckets: true\n  })\n});\n```\n\n3. Setting Access Control for Specific Use Cases:\n```\ntypescript\nimport * as cdk from 'aws-cdk-lib';\nimport * as s3 from 'aws-cdk-lib/aws-s3';\nimport * as iam from 'aws-cdk-lib/aws-iam';\n\nconst bucket = new s3.Bucket(this, 'XXXXXXX', {\n  // Enable versioning for object-level recovery\n  versioned: true,\n  \n  // Enforce encryption\n  encryption: s3.BucketEncryption.S3_MANAGED,\n  \n  // Block all public access\n  blockPublicAccess: s3.BlockPublicAccess.BLOCK_ALL,\n  \n  // Enforce object ownership\n  objectOwnership: s3.ObjectOwnership.BUCKET_OWNER_ENFORCED,\n  \n  // Enable server access logs\n  serverAccessLogsPrefix: 'logs/'\n});\n\n// Grant read access to specific IAM role\nconst role = new iam.Role(this, 'MyRole', {\n  assumedBy: new iam.ServicePrincipal('lambda.amazonaws.com'),\n});\nbucket.grantRead(role);\n\n// Grant write access to specific objects with prefix\nbucket.addToResourcePolicy(new iam.PolicyStatement({\n  actions: ['s3:PutObject'],\n  resources: [bucket.arnForObjects('uploads/*')],\n  principals: [new iam.AccountRootPrincipal()]\n}));\n```\n\n4. Setting up Lifecycle Rules
```

```

for Objects:\n```typescript\nimport * as cdk from 'aws-cdk-lib';\nimport
* as s3 from 'aws-cdk-lib/aws-s3';\n\nnew s3.Bucket(this, 'XXXXXXX', {\n
lifecycle: [\n    {\n        transitions: [\n            {\n                storageClass:
s3.StorageClass.INFREQUENT_ACCESS,\n                transitionAfter: cdk.Duration.days(30)\n            },\n            {\n                storageClass: s3.StorageClass.GLACIER,\n
                transitionAfter: cdk.Duration.days(90)\n            }\n        ],\n        expiration:
cdk.Duration.days(365)\n    }\n  ]\n});\n```\n\nKey points to remember:\n- Always use
the principle of least privilege\n- Block public access by default unless explicitly
required\n- Use BUCKET_OWNER_ENFORCED for object ownership when possible\n- Consider
implementing lifecycle rules for cost optimization\n- Use versioning for sensitive
data\n- Implement server-side encryption\n- Use resource policies and IAM roles
for access control instead of ACLs\n- Monitor access patterns using server access
logging\n\nThese configurations help create a secure and well-managed S3 bucket with
appropriate access controls at both bucket and object levels.",
    "followupPrompts": "How can you implement multi-factor authentication
for S3 bucket access using AWS CDK?What are the best practices for setting up object-
level versioning in AWS S3 using CDK?How can you use AWS CDK to create a custom error
message for unauthorized access attempts on an S3 bucket?",
    "messageMetadata": {
        "conversationId": "491bd3cd-d70d-40c0-a452-5ef3f0878422",
        "utteranceId": null
    },
    "codeReferenceEvents": [],
    "supplementaryWebLinksEvent": [
        {
            "uri": "https://docs.aws.amazon.com/AmazonS3/latest/API/
s3_example_s3_Scenario_ManageACLs_section.html",
            "title": "[1] Manage access control lists (ACLs) for Amazon S3
buckets using an AWS SDK - Amazon Simple Storage Service",
            "snippet": "The following code example shows how to manage
access control lists (ACLs) for Amazon S3 buckets.\n\n.NET\n\n**AWS SDK for .NET**
\n\n```\n    using System;\n    using System.Collections.Generic;\n    using
System.Threading.Tasks;\n    using Amazon.S3;\n    using Amazon.S3.Model;\n\n    /// <summary>\n    /// This example shows how to manage Amazon Simple Storage
Service\n    /// (Amazon S3) access control lists (ACLs) to control Amazon S3
bucket\n    /// access.\n    /// </summary>\n    public class ManageACLs\n    {\n
        public static async Task Main()\n        {\n            string bucketName
= \"amzn-s3-demo-bucket1\";\n            string newBucketName = \"amzn-s3-demo-
bucket2\";\n            string keyName = \"sample-object.txt\";\n            string
emailAddress = \"someone@example.com\";\n\n            // If the AWS Region where
your bucket is located is different from\n            // the Region defined for
the default user, pass the Amazon S3 bucket's\n            // name to the client
constructor. It should look like this:\n            // RegionEndpoint bucketRegion =
RegionEndpoint.USEast1;\n            IAmazonS3 client = new AmazonS3Client();\n\n

```



```

        await TestBucketObjectACLsAsync(client, bucketName, newBucketName, keyName,
emailAddress);\n        }\n\n        ///S3 bucket with a canned ACL, then retrieves the ACL\n        ///  
information and then  
adds a new ACL to one of the objects in the\n        ///  
Amazon S3 bucket.\n        ///  
</summary>\n        ///  
<param name="client">The initialized Amazon S3 client  
object used to call\n        ///  
methods to create a bucket, get an ACL, and add a  
different ACL to\n        ///  
one of the objects.</param>\n        ///  
<param name=  
"bucketName">A string representing the original Amazon S3\n        ///  
bucket name.</  
param>\n        ///  
<param name="newBucketName">A string representing the name of  
the\n        ///  
new bucket that will be created.</param>\n        ///  
<param name=  
"keyName">A string representing the key name of an Amazon S3\n        ///  
object  
for which we will change the ACL.</param>\n        ///  
<param name="emailAddress">A  
string representing the email address\n        ///  
belonging to the person to whom  
access to the Amazon S3 bucket will be\n        ///  
granted.</param>\n        ///  
public  
static async Task TestBucketObjectACLsAsync(\n        ///  
IAmazonS3 client,\n        ///  
string bucketName,\n        ///  
string newBucketName,\n        ///  
string keyName,\n        ///  
string emailAddress)\n        ///  
{\n        ///  
try\n        ///  
{\n        ///  
    // Create a new Amazon S3 bucket and specify canned ACL.\n        ///  
var success = await CreateBucketWithCannedACLAsync(client, newBucketName);\n        ///  
    // Get the ACL on a bucket.\n        ///  
await GetBucketACLAsync(client, bucketName);\n        ///  
    // Add (replace) the ACL on an object in a  
bucket.\n        ///  
await AddACLToExistingObjectAsync(client, bucketName, keyName, emailAddress);\n        ///  
}\n        ///  
catch (AmazonS3Exception amazonS3Exception)\n        ///  
{\n        ///  
    Console.WriteLine($"Exception: {amazonS3Exception.Message}");\n        ///  
}\n        ///  
}\n\n        ///  
</summary>\n        ///  
Creates a new Amazon S3 bucket with a canned ACL attached.\n        ///  
</summary>\n        ///  
<param name="client">The initialized client object used to  
call\n        ///  
PutBucketAsync.</param>\n        ///  
<param name="newBucketName">A  
string representing the name of the\n        ///  
new Amazon S3 bucket.</param>\n        ///  
<returns>Returns a boolean value indicating success or failure.</returns>\n        ///  
public static async Task<bool> CreateBucketWithCannedACLAsync(IAmazonS3 client,  
string newBucketName)\n        ///  
{\n        ///  
    var request = new PutBucketRequest()\n        ///  
{\n        ///  
        BucketName = newBucketName,\n        ///  
        BucketRegion = S3Region.EUWest1,\n        ///  
        // Add a canned ACL.\n        ///  
        CannedACL = S3CannedACL.LogDeliveryWrite,\n        ///  
    };\n        ///  
    var response = await client.PutBucketAsync(request);\n        ///  
    return response.HttpStatusCode == System.Net.HttpStatusCode.OK;\n        ///  
}\n\n        ///  
</summary>\n        ///  
Retrieves the ACL associated with the Amazon S3 bucket name in the\n        ///  
bucketName parameter.\n        ///  
</summary>\n        ///  
<param name="client">The initialized client object used to call\n        ///  
PutBucketAsync.</  
param>\n        ///  
<param name="bucketName">The Amazon S3 bucket for which we  
want to get the\n        ///  
ACL list.</param>\n        ///  
<returns>Returns an  
S3AccessControlList returned from the call to\n        ///  
GetACLAsync.</returns>\n        ///  
public static async Task<S3AccessControlList> GetBucketACLAsync(IAmazonS3

```

```

client, string bucketName)\n        {\n            GetACLResponse response = await\nclient.GetACLSync(new GetACLRequest\n                {\n                    BucketName =\nbucketName,\n                });\n\n            return response.AccessControlList;\n        }\n    }\n\n    /// <summary>\n    /// Adds a new ACL to an existing object\nin the Amazon S3 bucket.\n    /// </summary>\n    /// <param name=\"client\n\">The initialized client object used to call\n    /// PutBucketAsync.</param>\n    /// <param name=\"bucketName\">A string representing the name of the Amazon\nS3\n    /// bucket containing the object to which we want to apply a new ACL.</\nparam>\n    /// <param name=\"keyName\">A string representing the name of the\nobject\n    /// to which we want to apply the new ACL.</param>\n    /// <param\nname=\"emailAddress\">The email address of the person to whom\n    /// we will be\napplying to whom access will be granted.</param>\n    public static async Task\nAddACLToExistingObjectAsync(IAmazonS3 client, string bucketName, string keyName,\nstring emailAddress)\n    {\n        // Retrieve the ACL for an object.\nGetACLResponse aclResponse = await client.GetACLSync(new GetACLRequest\n    {\n        BucketName = bucketName,\n        Key = keyName,\n    });\n\n    S3AccessControlList acl = aclResponse.AccessControlList;\n\n    // Retrieve the owner.\n    Owner owner = acl.Owner;\n\n    // Clear existing grants.\n    acl.Grants.Clear();\n\n    // Add a grant to reset the owner's full permission\n    // (the previous\nclear statement removed all permissions).\n    var fullControlGrant = new\nS3Grant\n    {\n        Grantee = new S3Grantee { CanonicalUser =\nacl.Owner.Id },\n    }; \n    acl.AddGrant(fullControlGrant.Grantee,\nS3Permission.FULL_CONTROL);\n\n    // Specify email to identify grantee\nfor granting permissions.\n    var grantUsingEmail = new S3Grant\n    {\n        Grantee = new S3Grantee { EmailAddress = emailAddress },\n        Permission = S3Permission.WRITE_ACP,\n    };\n\n    // Specify log delivery group as grantee.\n    var grantLogDeliveryGroup\n= new S3Grant\n    {\n        Grantee = new S3Grantee { URI =\n\"http://acs.amazonaws.com/groups/s3/LogDelivery\" },\n        Permission =\nS3Permission.WRITE,\n    };\n\n    // Create a new ACL.\n    var newAcl = new S3AccessControlList\n    {\n        Grants = new\nList<S3Grant> { grantUsingEmail, grantLogDeliveryGroup },\n        Owner =\nowner,\n    }; \n\n    // Set the new ACL. We're throwing away the\nresponse here.\n    _ = await client.PutACLSync(new PutACLRequest\n    {\n        BucketName = bucketName,\n        Key = keyName,\n        AccessControlList = newAcl,\n    });\n    }\n}\n\nFor API details, see the following topics in AWS SDK for .NET API Reference_\n * GetBucketAcl\n * GetObjectAcl\n * PutBucketAcl\n * PutObjectAcl\nFor a complete\nlist of AWS SDK developer guides and code examples, see Developing with Amazon S3\nusing the AWS SDKs. This topic also includes information about getting started and\ndetails about previous SDK versions.\n"}

```

```
      "requestId": "dad38fc0-815c-45f7-970a-db916cb7f131"
    }
  }
]
```

Field name	Description
records	Top-level field that contains a set of prompts and responses.
generateAssistantResponseEventRequest	Describes the prompt entered by the user in the chat window in their IDE.
prompt	Indicates the prompt the user entered into the chat window.
chatTriggerType	MANUAL indicates that the user entered a prompt into the chat window, or clicked on one of the suggested questions in the chat window. INLINE_CHAT indicates that the user entered a prompt into the small input screen in the main coding window. For more information about chatting inline, see Chatting inline with Amazon Q Developer .
customizationArn	Indicates the Amazon Resource Name (ARN) of the customization applied to the chat. In this example, there is no customization. For more information about customizations, see Customizing suggestions .
userId	Indicates the user ID of the user who entered the prompt.
timeStamp	Indicates the date and time that the user entered the prompt. The timestamp is in universal time (UTC).

Field name	Description
generateAssistantResponseEventResponse	Describes the response generated by Amazon Q.
assistantResponse	Indicates the response that Amazon Q provided to the user's prompt.
followupPrompts	Indicates the follow-up example prompts that were displayed to the user at the end of the response.
messageMetadata	Describes metadata associated with the response.
conversationId	Indicates the conversation ID of the response. The conversation ID groups together messages in a chat session.
utteranceId	Indicates the utterance ID of the response. An utterance ID is a label that distinguishes one prompt from another within a dialogue or data set.
codeReferenceEvents	Describes links to code references included in the response.
supplementaryWebLinksEvent	Indicates the links that were displayed to the user at the end of the response.
requestId	The ID of the response that uniquely identifies the event.

/dev log example

The following example shows a log file that is generated with a user enters a **/dev** command in the Amazon Q chat in their IDE.

```
{
```

```
    "records": [
      {
        "startTaskAssistCodeGenerationEventRequest": {
          "prompt": "write a python application that prints 'hello world!' text
to the screen and format it in red bold text",
          "chatTriggerType": "MANUAL",
          "conversationId": "da1c95b6-84e1-46a2-9ef9-fe92f5ee169e",
          "customizationArn": null,
          "userId": "d-92675051d5.b8f1f340-9081-70ad-5fc5-0f37151937a6",
          "timeStamp": "2025-01-13T15:40:27.808027101Z"
        },
        "startTaskAssistCodeGenerationEventResponse": {
          "requestId": "e504f126-7197-4e3c-a046-1a10d5a3f3e0"
        }
      }
    ]
  }
```

Field name	Description
records	Top-level field that contains a set of prompts and responses.
startTaskAssistCodeGenerati onEventRequest	Describes the /dev prompt entered by the user in the chat window in their IDE.
prompt	Indicates the /dev prompt the user entered into the chat window.
chatTriggerType	MANUAL indicates that the user entered a prompt into the chat window, or clicked on one of the suggested questions in the chat window. INLINE_CHAT indicates that the user entered a prompt into the small input screen in the main coding window. For more information about chatting inline, see Chatting inline with Amazon Q Developer .

Field name	Description
conversationId	Indicates the conversation ID of the response. The conversation ID groups together messages in a chat session.
customizationArn	Indicates the Amazon Resource Name (ARN) of the customization applied to the chat. In this example, there is no customization. For more information about customizations, see Customizing suggestions .
userId	Indicates the user ID of the user who entered the prompt.
timeStamp	Indicates the date and time that the user entered the prompt. The timestamp is in universal time (UTC).
startTaskAssistCodeGenerationEventResponse	Describes the response generated by Amazon Q. Currently, recording the responses to /dev commands is not supported, so the field won't include a response.
assistantResponse	Indicates the response that Amazon Q provided to the user's prompt.
requestId	The ID of the response that uniquely identifies the event.

Supported Regions for Amazon Q Developer

Note

If you make a request that requires Amazon Q Developer to retrieve information from an opt-in Region not listed on this page, Amazon Q can make calls to that Region. To manage access to Regions Amazon Q can make calls to, see [Allow Amazon Q permission to perform actions on your behalf in specific regions](#).

This topic describes the AWS Regions where you can use Amazon Q Developer. For more information about AWS Regions, see [Specify which AWS Regions your account can use](#) in the *AWS Account Management Reference Guide*.

Your data may be processed in a different Region from the Region where you use Amazon Q Developer. For information on cross-region processing in Amazon Q Developer, see [Cross-region processing](#). For information on where data is stored during processing, see [Data protection](#).

Supported Regions (enabled by default)

Amazon Q Developer is available in the AWS Management Console, AWS Console Mobile Application, AWS website, AWS Documentation website, and integrated chat applications in the following AWS Regions. These Regions are enabled by default, meaning you don't need to enable them before use. For more information, see [Regions that are enabled by default](#).

Note

The Amazon Q Developer service within the AWS Management Console is only available in the Regions outlined in [Supported Regions for the Q Developer console and Q Developer profile](#). To manage Amazon Q Developer settings as an administrator, you must go to the Amazon Q Developer service and then use the Region selector to switch to a supported Region.

You can chat and use other Amazon Q console features in the following Regions. Certain features of Amazon Q might not be available in all of these Regions. Check the topic for the feature you're using to verify availability.

- US East (Ohio)
- US East (N. Virginia)
- US West (N. California)
- US West (Oregon)
- Asia Pacific (Mumbai)
- Asia Pacific (Osaka)
- Asia Pacific (Seoul)
- Asia Pacific (Singapore)
- Asia Pacific (Sydney)
- Asia Pacific (Tokyo)
- Canada (Central)
- Europe (Frankfurt)
- Europe (Ireland)
- Europe (London)
- Europe (Paris)
- Europe (Stockholm)
- South America (São Paulo)

Supported opt-in Regions

To use an opt-in Region with Amazon Q Developer, you must enable the Region manually. For more information, see [Opt-in Regions](#).

Opt-in Regions are only supported in the Amazon Q Developer Free tier. The following opt-in Regions are supported.

- Africa (Cape Town)
- Asia Pacific (Hong Kong)
- Asia Pacific (Hyderabad)
- Asia Pacific (Jakarta)
- Asia Pacific (Malaysia)
- Asia Pacific (Melbourne)

- Asia Pacific (Thailand)
- Canada West (Calgary)
- Europe (Milan)
- Europe (Spain)
- Europe (Zurich)
- Mexico (Central)
- Middle East (Bahrain)
- Middle East (UAE)
- Israel (Tel Aviv)

Amazon Q Developer rename - Summary of changes

On April 30, 2024, Amazon CodeWhisperer became a part of Amazon Q Developer. This section points you to the parts of this guide where you can find documentation for features that you are accustomed to using through CodeWhisperer.

As you transition from using CodeWhisperer to using Amazon Q Developer, you may consider the following changes to be most significant:

- The [administrative setup](#) at the professional tier (Amazon Q Developer Pro) is different than it was for CodeWhisperer Professional.
- You can [chat with Amazon Q Developer](#) in the AWS Management Console, and on the AWS documentation and marketing websites.

The following familiar features of CodeWhisperer are available as part of Amazon Q Developer, with a few changes:

- Coding suggestions [in a third-party IDE](#)
- Coding suggestions [in the context of another AWS service](#)
- Suggestions [at the command line](#)
- [Customizations](#)
- [Code reviews](#)
- [Dashboard](#)

Document history for Amazon Q Developer User Guide

The following table describes the document history for the *Amazon Q Developer User Guide*. For notifications about updates to this documentation, you can subscribe to the RSS feed.

Change	Description	Date
Added GitHub workflow for first-party dependencies content	Updated Customizing a workflow for code transformation section with new GitHub workflow for handling first-party dependencies page.	July 16, 2025
Updated the user activity metrics topic	Updated the User activity report metrics topic with additional metrics related to the inline chat feature.	July 15, 2025
Updated the proxy configuration section	Updated the Configuring a corporate proxy in Amazon Q to include instructions for Eclipse, JetBrains, and Visual Studio.	July 15, 2025
Pro+ tier (coming soon)	A new Pro+ tier is coming soon.	July 14, 2025
Image context support added to IDE chat	Amazon Q now supports using images as context in the IDE chat panel. This feature allows users to include images when prompting, enabling scenarios such as generating code from UI mockups or sequence diagrams.	July 9, 2025
Updated the Builder ID upgrade section	Added a note to the Upgrading a personal account	July 7, 2025

[\(Builder ID\)](#) section to indicate that you cannot link multiple Builder IDs to a single AWS account.

[Updated the profile sharing section](#)

The [Enabling profile sharing](#) section incorrectly indicated that the profile settings in the management account would override those in member accounts when profile sharing was enabled. This statement has been removed, and the purpose of profile sharing has been clarified.

July 2, 2025

[Added slash commands details to Amazon Q Developer for GitHub content](#)

[Amazon Q Developer for GitHub](#) can be invoked with [slash commands](#) to perform feature development, code reviews, and code transformation, as well invoke for help, which provides a link to the Amazon Q Developer for GitHub content.

June 30, 2025

[Updated details for QCT CLI in IDEs](#)

Added details about maintaining security, pausing or canceling code transformation, new parameter for `qct transform` command, and LLM summary output in the [IDE code transformation](#) content. QCT CLI also now supports `https://q.eu-central-1.amazonaws.com/`.

June 26, 2025

New content for creating project rules in third-party platforms	You can create project rules in GitLab and GitHub for standards and best practices.	June 26, 2025
Updated KMS policy for third-party integration	Added "kms:Decrypt" , "kms:DescribeKey" , "kms:Encrypt" , "kms:GenerateDataKey" to KMS policy for managed access to Amazon Q Developer for third-party integration .	June 25, 2025
Added proxy configuration instructions	Added a Configuring a corporate proxy in Amazon Q for Visual Studio Code section.	June 25, 2025
Updated user activity reports	User activity reports are now generated at midnight UTC, and broken into several files with 1,000 users in each.	June 24, 2025
Updated the Amazon S3 bucket section	Updated the Amazon S3 bucket URLs and ARNs to allowlist section to indicate version 1.72.0 and later of the Visual Studio Code plugin for Amazon Q does not require allowlisting of buckets.	June 24, 2025
Rebranded Amazon Q Developer operational investigations	Updated various sections to reflect the rebranding of <i>Amazon Q Developer operational investigations</i> to <i>CloudWatch investigations</i> .	June 24, 2025

Updated GitHub feature development and code transformation details	Amazon Q Developer for GitHub can now be invoked to perform feature development and transform code using slash commands in comments within an issue.	June 19, 2025
Rules button added to VS Code IDE chat	Added Rules button to the chat interface for creating and managing project rules through the UI.	June 18, 2025
Pinned context support added to VS Code IDE chat	Added context pinning functionality in VS Code to maintain selected context items across chat interactions, with support for manual pinning and system-added context management.	June 18, 2025
Updated details for code transformation in IDEs	Added code transformation details about source code version and target code version, and additional transformation requirements to upgrade project libraries and dependencies. Removed details about multiple diffs.	June 17, 2025
Chat with Amazon Q about network security	You can chat about network security with Amazon Q in the console and in chat applications.	June 17, 2025

Added new Data storage topic	Added the Data storage in Amazon Q Developer topic with information about where content is stored.	June 13, 2025
MCP in the IDE	MCP servers can now be used with Amazon Q Developer in the IDE .	June 12, 2025
Personal account (Builder ID) upgrade	Users with personal accounts (Builder IDs) can now upgrade to the Pro tier .	June 11, 2025
Updates to subscription statuses	Updated the description of the Unavailable subscription status in Amazon Q Developer subscription statuses .	June 9, 2025
Support for specifying dependencies for transformations on the CLI	You can provide a dependency upgrade file and modify the transformation plan for Java upgrades with the command line tool for transformations.	June 9, 2025
Expanded command line reference	A new command reference section provides more information on the arguments you can use to invoke the Q CLI.	June 9, 2025
Model selection for chat on the command line	You can now select the model you want Amazon Q to use for chat sessions on the command line.	June 5, 2025

Chat context support expanded to JetBrains, Visual Studio, and Eclipse IDEs	Amazon Q now supports contexts in the JetBrains, Visual Studio, and Eclipse IDE chat panel.	June 5, 2025
Agentic chat in all supported IDEs	Agentic chat is available in all supported IDEs .	June 5, 2025
Updated GitHub code review details	Amazon Q Developer for GitHub can now perform code reviews within GitHub pull requests. They can be initiated with the <code>/q review</code> slash command in a new comment.	June 2, 2025
Cost optimization capabilities in chat	In addition to cost analysis, you can chat with Amazon Q to get AWS cost optimization insights .	June 2, 2025
Updated the firewall page	Updated and added URLs on the Configuring a firewall, proxy server, or data perimeter for Amazon Q Developer Pro page.	May 22, 2025
MCP configuration commands	Commands that you can give directly from your non-Q command line to configure MCP servers for Amazon Q .	May 21, 2025
Updated the customization policy topic	The Allow administrators to create customizations topic now describes permission errors that may occur when you create the customization policy.	May 16, 2025

Updated troubleshooting tasks	The Troubleshooting Amazon Q Developer Pro subscriptions topic now includes more information.	May 15, 2025
Updated new code review behavior for GitLab Duo and GitHub	Automatic code reviews have been updated so they are triggered in new or reopened GitLab merge requests and GitHub pull requests. Code reviews are not triggered by subsequent commits.	May 15, 2025
Updated VPC endpoints	Updated the VPC endpoints on the Amazon Q Developer and interface endpoints (AWS PrivateLink) page.	May 15, 2025
Improved MCP server loading	MCP servers now load in the background, allowing you to start interacting with Amazon Q immediately without waiting for all servers to initialize.	May 15, 2025
Added image support in chat	Amazon Q can now analyze and discuss images directly in your chat session using the <code>fs_read</code> tool with the Image mode.	May 15, 2025

Added conversation persistence	Amazon Q automatically remembers your conversations based on the directory where they take place, and provides <code>/export</code> and <code>/import</code> commands for manually managing conversation state.	May 15, 2025
Updated managed policies: AmazonQFullAccess and AmazonQDeveloperAccess	Additional permissions have been added to the AmazonQFullAccess policy and AmazonQDeveloperAccess policy to manage conversation history.	May 14, 2025
Support for multiple conversations in console chat	You can save and switch between conversations with Amazon Q in the AWS console.	May 14, 2025
Added subscription details	The Subscribe users to Amazon Q Developer Pro across accounts topic now includes information about where to install IAM Identity Center and the Amazon Q Developer profile.	May 13, 2025
Transformation website removed	The Amazon Q Developer transformation website has been taken down, and with it, the related documentation.	May 12, 2025

Updated terminology	Updated the term <i>identity-aware console sessions</i> to <i>identity-enhanced console sessions</i> throughout this guide.	May 10, 2025
Example SCP added	This service control policy (SCP) denies access to Amazon Q outside of EU regions.	May 8, 2025
Amazon Q Developer for GitHub	Information about Amazon Q Developer for GitHub , including concepts and procedures focused on setting up, key features, and configuration.	May 5, 2025
Added context hooks	Added support for context hooks .	May 3, 2025
Managed policy updated	Permission has been added to AmazonQFullAccess .	May 2, 2025
Agentic chat in the IDE	Agentic chat functionality is available in the IDE .	May 1, 2025
Updates to customizations	Customizations now support additional languages .	April 30, 2025
Managed and example policies update	Permissions have been added to AmazonQFullAccess , GitLabDuoWithAmazonQPermissionsPolicy , and Allow administrators to configure plugins .	April 30, 2025

Added MCP support	Added support for MCP in the CLI .	April 29, 2025
Added upgrade details	Added information about how to upgrade from the Free tier to the Pro tier .	April 28, 2025
Support for conversation history	Your conversation history is now saved when you chat with Amazon Q in the IDE.	April 21, 2025
Support for code as context	You can now specify classes, functions, and global variables as context when you chat with Amazon Q in the IDE.	April 21, 2025
Updates to GitLab Duo with Amazon Q onboarding and policy	GitLab Duo with Amazon Q has been updated with changes to onboarding and permissions policy (GitLabDuoWithAmazonQPermissionsPolicy).	April 16, 2025
Updated dashboard permissions	Updated the list of permissions required to view the Amazon Q Developer dashboard.	April 15, 2025
Improved security documentation for command line	Reorganized and enhanced security documentation with comprehensive guidance on security considerations, best practices, and safe usage of tool permissions.	April 13, 2025

Enhanced command-line security and settings	Added a new command-line settings section with configuration options. Enhanced tool permissions documentation with security best practices for sensitive environments.	April 12, 2025
Update to the subscription experience	The workflow to subscribe users to Amazon Q Developer Pro and install the Amazon Q Developer profile has been moved from the Amazon Q console to the Amazon Q Developer console.	April 10, 2025
Inline chat is available in Eclipse	You can chat inline with Amazon Q in Eclipse.	April 10, 2025
Amazon Q Developer profiles are available in Europe (Frankfurt)	When you subscribe to Amazon Q Developer, you can create profiles in the Europe (Frankfurt) Region .	April 10, 2025
/tools feature added to CLI	You can use the /tools command to manage permissions for tools that Amazon Q uses to perform actions on your system.	April 10, 2025
Support for natural languages other than English	You can chat with Amazon Q in the IDE and on the command line .	April 9, 2025

Updates to GitLab Duo with Amazon Q	GitLab Duo with Amazon Q has been updated regarding changes to inline policy, and you can optionally create a CMK policy. The <code>/fix</code> feature has been removed.	April 8, 2025
Email notifications for transformations	You may receive email notifications for updates related to your transformations.	April 8, 2025
New context, prompt, and project rules topics	The Adding context to the chat , Saving prompts , and Creating project rules topics have been added.	April 4, 2025
Updates to subscriptions topics	The Understanding subscriptions , Viewing aggregated subscriptions , and Enabling profile sharing topics have been corrected.	March 25, 2025
Example policy update	The example policies in Allow administrators to use the Amazon Q console and Allow administrators to use the Amazon Q Developer console have been updated with the <code>sso:CreateInstance</code> permission.	March 24, 2025
Support for C++ and C# in customizations	Customizations now support C++ and C#.	March 20, 2025

Updates to chatting about resources	You can chat with Amazon Q about multiple AWS resources and services to get answers about your AWS infrastructure and configurations.	March 13, 2025
Additional language support for documentation generation	The agent for documentation generation now supports C++ and C# .	March 12, 2025
New subscription-related limit	Updated the Subscribing users to Amazon Q Developer Pro topic to indicate that you can enable Amazon Q Developer in a maximum of 50 AWS accounts within an organization managed by AWS Organizations.	March 6, 2025
Context integration to CLI chat	Amazon Q CLI now has context integration , giving Amazon Q enhanced understanding of use cases and enabling it to provide more relevant and context-aware responses.	March 6, 2025
Policy correction	A JSON syntax error has been corrected in the policy described in Allow administrators to use the Amazon Q console .	February 28, 2025

New version of the command line tool for transformation	The latest version of the command line tool for transformation includes support for authenticating with IAM through the AWS CLI.	February 28, 2025
Upgrading to the Pro tier	Added information about how to upgrade to the Pro tier in the Amazon Q Developer Free tier topic.	February 25, 2025
Customizations policy update	A permission has been added to the customizations policy .	February 25, 2025
New dashboard topic	The following topic has been added: Descriptions of Amazon Q Developer dashboard usage metrics .	February 21, 2025
New cross-region processing topic	The cross-region processing topic describes how Amazon Q Developer processes requests and makes calls across AWS Regions to provide the service.	February 21, 2025
Managed policy update	Permissions have been added to AWSServiceRoleForUserSubscriptions .	February 21, 2025
/doc enhancement	Amazon Q can now generate infrastructure diagrams in response to a /doc command.	February 20, 2025

New subscription topics	Two subscription-related topics were added: Amazon Q Developer subscription statuses and Viewing aggregated Amazon Q Developer subscriptions .	February 19, 2025
Amazon Q Developer in chat applications chapter	Amazon Q Developer in chat applications is now Amazon Q Developer in chat applications. A new chapter describes the supported features.	February 19, 2025
Support for Java 21 transformations	You can upgrade Java applications to Java 21 in the IDE and on the command line .	February 14, 2025
New firewall topic	A Configuring a firewall or proxy server for Amazon Q Developer topic has been added.	February 14, 2025
New version of the command line tool for transformation	The latest version of the command line tool for transformation includes support for converting embedded SQL in Java applications.	February 12, 2025
User activity report correction	The path to the user activity report CSV file has been corrected.	February 10, 2025
Update to the retention period of transformed code	Amazon Q now retains transformed code for 30 days, up from 24 hours.	February 7, 2025

New subscription workflow	The steps to subscribe users to Amazon Q Developer have been improved.	February 6, 2025
New version of the command line tool for transformation	The latest version of the command line for transformation includes the ability to receive your upgraded Java code in multiple commits.	February 3, 2025
/dev enhancement	Amazon Q can now test the code it generates in response to a /dev command.	January 31, 2025
Customizations section update	The Creating your customization topic now indicates you can include any number of repositories in your customization.	January 24, 2025
Prompt logging examples	The Enabling prompt logging section now includes example logs .	January 23, 2025
CloudZero plugin	The CloudZero plugin is available in Amazon Q chat.	January 15, 2025
User activity report update	New metrics have been added to User activity reports .	December 16, 2024
Dashboard update	Information about the old dashboard has been removed from the Amazon Q Developer Pro dashboard section. Information about filters and metrics has been added.	December 16, 2024

Troubleshooting with Amazon Q	An Asking Amazon Q to troubleshoot your resources section has been added.	December 13, 2024
Identity-enhanced sessions update	The instructions for enabling identity-enhanced console sessions have been clarified in the Subscribing users to the Amazon Q Developer Pro tier with an organization instance section.	December 6, 2024
New test generation agent	You can use Amazon Q test generation feature to generate unit tests.	December 3, 2024
Large-scale transformation	Amazon Q can transform .NET, mainframe, and VMware workloads in bulk.	December 3, 2024
GitLab Duo with Amazon Q	Information about GitLab Duo with Amazon Q , including concepts, getting started procedures, and troubleshooting.	December 3, 2024
Documentation generation in the IDE	Amazon Q can generate READMEs for your code in supported IDEs.	December 3, 2024
Code reviews in the IDE	Amazon Q code reviews, previously security scans, can detect and address issues in your code in supported IDEs.	December 3, 2024

.NET transformation in the IDE	Amazon Q can port your .NET applications to Linux-compatible cross-platform applications in Visual Studio, available in preview.	December 3, 2024
Transformation on the command line	You can transform Java applications on the command line , available in preview.	November 27, 2024
Multiple diffs for transformation in the IDE	You can choose to receive transformation changes from Amazon Q in multiple diffs .	November 27, 2024
Amazon Q in Eclipse	The Amazon Q plugin is available in preview in Eclipse.	November 27, 2024
Cost analysis	The cost analysis capability, previously available in preview, is now generally available.	November 26, 2024
Transformation for embedded SQL code	You can convert embedded SQL code in your Java applications with Amazon Q transformation in the IDE.	November 22, 2024
Dashboard update	The Amazon Q Developer Pro dashboard has been updated with new metrics.	November 22, 2024
CodeConnections repositories	When creating a customization using a CodeConnections connection, you can now choose the repositories you want to use.	November 22, 2024

Amazon Q command line now supports Linux	Amazon Q command line supports Linux environments. It supports Ubuntu 22 and 24, and may otherwise work with GNOME v42+ or environments where the display server is Xorg and the input method framework is IBus.	November 21, 2024
Subscribing users	The instructions for subscribing users in Setting up access to the Amazon Q Developer Pro tier have been updated to reflect new user interface (UI) elements.	November 20, 2024
Changes to customizations	The Customization in chat feature is now generally available. Also, customizations can now be created with the following file types: .md, .mdx, .rst, and .txt.	November 20, 2024
Supported IAM Identity Center Regions	A section has been added with information about the Regions where you can set up IAM Identity Center instances for Amazon Q Developer Pro subscriptions.	November 18, 2024
Languages added	Support has been added for Dart, Lua, R, Swift, SystemVerilog, and Powershell, as well as expanded support for JSON and YAML.	November 18, 2024

Customer managed key support	Information about using customer managed keys and the features that can be encrypted with them has been added to the Data encryption topic.	November 18, 2024
Cross-region inference	A topic on cross-region inference in Amazon Q Developer has been added.	November 18, 2024
Amazon Q Developer Pro quotas	A Pro tier quotas section has been added.	November 18, 2024
Updated managed policy: AmazonQFullAccess	Additional permissions have been added to the AmazonQFullAccess policy.	November 13, 2024
Updated managed policy: AmazonQDeveloperAccess	Additional permissions have been added to the AmazonQDeveloperAccess policy.	November 13, 2024
Amazon Q plugins	Plugins enable users to chat with Amazon Q about metrics provided by third party tools.	November 13, 2024
User activity reports	You can now enable user activity reports .	November 8, 2024
Customizations section update	The Preparing your data section now describes file and directory naming limitations.	November 5, 2024
Clarified the Amazon Q Developer Pro section	The instructions for subscribing users to Amazon Q Developer Pro have been clarified.	November 1, 2024

Inline chat	You can transform code using the new inline chat feature.	October 29, 2024
Updated managed policies: AmazonQFullAccess and AmazonQDeveloperAccess	Additional permissions have been added to the AmazonQFullAccess policy and AmazonQDeveloperAccess policy.	October 28, 2024
Customizations section correction	The Creating your customization section now indicates that your codebase must reside in a folder in Amazon S3, not the bucket's root.	October 28, 2024
Prompt logging section clarification	The Enabling prompt logging section's wording was clarified .	October 24, 2024
Amazon S3 bucket policy fix	The Amazon S3 bucket policy shown in Enabling prompt logging contained a JSON syntax error that was fixed.	October 22, 2024
Expanded features chapter	The chapter describing various Amazon Q Developer features has been significantly expanded.	October 3, 2024
Console-to-Code	Console-to-Code, previously available in preview as a feature of Amazon EC2, is now generally available as a feature of Amazon Q Developer. It integrates with Amazon EC2, Amazon VPC, and Amazon RDS.	October 3, 2024

New policy: Use Amazon Q CLI with AWS CloudShell	Identity-based policy allows users to use Amazon Q CLI with AWS CloudShell .	October 2, 2024
Prompt logging	You can log your users' IDE prompts in an Amazon S3 bucket.	September 16, 2024
Setup content updated	The Getting started chapter has been significantly simplified and restructured.	August 15, 2024
CodeWhisperer endpoint needed for IDE VPC access	Access from a Amazon VPC must include both <code>q</code> and <code>codewhisperer</code> endpoints.	July 18, 2024
New endpoint	Endpoints can now use the string <code>q</code> instead of <code>codewhisperer</code> .	July 12, 2024
Customizations are GA	The customizations feature is generally available.	July 10, 2024
Chatting about customizations (Preview)	In Preview, you can use the customizations feature to ask questions related to your codebase.	July 10, 2024
Updated managed policy: AmazonQFullAccess	Additional permissions have been added to the AmazonQFullAccess policy.	July 9, 2024
New managed policy: AmazonQDeveloperAccess	The AmazonQDeveloperAccess managed policy provides full access to enable interactions with Amazon Q Developer , without administrator access.	July 9, 2024

Updated Amazon Q Developer admin policy	The policy for empowering Amazon Q Developer administrators has been updated to include sso:ListProfiles .	June 19, 2024
Trusted access section	A new section more clearly explains how a Amazon Q Developer administrator can share settings with member accounts.	June 19, 2024
Updated setup procedures	There's an improved Getting started chapter that includes support for account instances .	June 6, 2024
Updated code examples	The code examples now include C and C++, and have improved examples for C#.	June 6, 2024
Updated managed policy: AmazonQFullAccess	Additional permissions have been added to the AmazonQFullAccess policy.	April 30, 2024
New service-linked role: AWSServiceRoleForUserSubscriptions	The AWSServiceRoleForUserSubscriptions service-linked role provides access for User Subscriptions to your IAM Identity Center resources to automatically update your subscriptions.	April 30, 2024
New service-linked role: AWSServiceRoleForAmazonQDeveloper	The AWSServiceRoleForAmazonQDeveloper service-linked role grants permission to access and emit data, and to create reports.	April 30, 2024

New managed policy: AWSServiceRoleForUserSubscriptionPolicy	The AWSServiceRoleForUserSubscriptionPolicy allows principals to track IAM Identity Center directory and AWS Organizations changes.	April 30, 2024
New managed policy: AWSServiceRoleForAmazonQDeveloperPolicy	The AWSServiceRoleForAmazonQDeveloperPolicy allows Amazon Q Developer to call CloudWatch and CodeGuru on your behalf.	April 30, 2024
GA release	Amazon Q Developer is available for general audiences.	April 30, 2024
Amazon CodeWhisperer merge	Amazon CodeWhisperer is now a part of Amazon Q Developer.	April 30, 2024
New guide name	This service and accompanying user guide have been renamed Amazon Q Developer.	March 29, 2024
New permission	The ListConversations action is required to chat with Amazon Q in the console.	March 5, 2024
New data protection topic	Amazon Q now uses content for service improvement purposes .	January 25, 2024

[New topic](#)

Added instructions for how to [add Amazon Q to Slack and Microsoft Teams channels](#) that are configured with Amazon Q Developer in chat applications.

January 18, 2024

[Preview release](#)

This is the initial preview release of the *Amazon Q Developer User Guide*.

November 28, 2023