aws

User Guide

# Migration Hub Strategy Recommendations

# Migration Hub Strategy Recommendations: User Guide

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AWS Migration Hub is no longer open to new customers as of November 7, 2025. For capabilities similar to AWS Migration Hub, explore AWS Transform.

# What is Migration Hub Strategy Recommendations?

Migration Hub Strategy Recommendations helps you plan migration and modernization initiatives by offering migration and modernization strategy recommendations for viable transformation paths for your applications.

Strategy Recommendations can analyze your server inventory, runtime environment, and application binaries for Microsoft IIS and Java Tomcat and Jboss applications to generate anti-pattern reports. In addition, you can configure your source code to allow Strategy Recommendations to perform source code and database analysis of all of your applications. Strategy Recommendations compares this analysis with your business goals, and the transformation preferences of the applications and databases that you provided to recommend:

- The most effective migration strategy for each of your applications.
- Migration and modernization tools or services that you can use.
- Application incompatibilities and anti-patterns to resolve for a specific option.

Migration Hub Strategy Recommendations recommends migration and modernization strategies for rehosting, replatforming, and refactoring with associated deployment destinations, tools, and programs. For information about rehosting, replatforming, and refactoring, see Migration terms - 7 Rs in the *AWS Prescriptive Guidance* glossary.

Strategy Recommendations might recommend straightforward options, such as rehosting on Amazon Elastic Compute Cloud (Amazon EC2) using AWS Application Migration Service (AWS MGN). More optimized recommendations might include replatforming to containers using AWS App2Container, or refactoring to open source technologies such as .NET Core and PostgreSQL.

## Are you a first-time Strategy Recommendations customer?

If this is your first time using Strategy Recommendations, we recommend that you begin by reading the following sections:

- Strategy Recommendations overview
- Setting up Strategy Recommendations
- Getting started with Strategy Recommendations

# Strategy Recommendations overview

You can start the assessment for your portfolio of servers and applications by using Migration Hub Strategy Recommendations from the AWS Migration Hub console. You use the console to set up and perform an assessment. After the assessment, you can use the console to view assessment data for each server and application, along with the recommended transformation tool.

To receive refactoring recommendations and a list of incompatibilities, you can use Strategy Recommendations to assess your application source code and databases.

You can also download the recommendations data in a Microsoft Excel file.

# Related services

- AWS Migration Hub – You use the AWS Migration Hub console to access the Migration Hub Strategy Recommendations console. It also displays information about the servers that you are collecting data from.
- AWS Application Discovery Service – You use Application Discovery Service to collect data about your servers and applications in the AWS Migration Hub console before using Strategy Recommendations.
- AWS Application Migration Service – AWS Application Migration Service is the primary migration service recommended for lift-and-shift migrations to AWS.
- AWS Database Migration Service – AWS Database Migration Service is a web service you can use to migrate data from your database that is on-premises, on an Amazon Relational Database Service (Amazon RDS) DB instance, or in a database on an Amazon Elastic Compute Cloud (Amazon EC2) instance to a database on an AWS service.
- AWS App2Container – AWS App2Container (A2C) is a command line tool for modernizing .NET and Java applications into containerized applications.
- Porting Assistant for .NET – Use for .NET source code analysis. Porting Assistant for .NET is a compatibility scanner that reduces the manual effort required to port Microsoft .NET Framework applications to .NET Core. The Porting Assistant for .NET assesses the .NET application source code and identifies incompatible APIs and third-party packages.
- End-of-Support Migration Program for Windows Server – End-of-Support Migration Program (EMP) for Windows Server includes tooling to migrate your legacy applications from Windows Server 2003, 2008, and 2008 R2 to newer, supported versions on AWS, without any refactoring.

- AWS Schema Conversion Tool – You can use the AWS Schema Conversion Tool (AWS SCT) to convert your existing database schema from one database engine to another.
- Windows Web Application Migration Assistant – The Windows Web Application Migration Assistant for AWS Elastic Beanstalk is an interactive PowerShell utility that migrates ASP.NET and ASP.NET Core applications from on-premises IIS Windows servers to Elastic Beanstalk.
- Babelfish for Aurora PostgreSQL – Babelfish for Aurora PostgreSQL is a new capability for the Amazon Aurora PostgreSQL-Compatible Edition that enables Aurora to understand commands from applications written for the Microsoft SQL server.

# AWS Migration Hub availability change

AWS Migration Hub has stopped accepting new customers as of November 7, 2025. AWS Transform, launched in May 2025, is our next-generation service that provides equivalent capabilities and enhanced migration and modernization capabilities with AI-driven automation. Existing AWS Migration Hub customers can continue using the service to complete their ongoing migration projects. All current Migration Hub features, including Strategy Recommendations for modernization pathway, EC2 Instance Recommendations, Migration Hub Journeys, and Orchestrator, are available in AWS Transform with improved functionality.

While we will not be adding new features to the service, we remain committed to providing security updates and maintaining service availability to ensure your ongoing migration projects continue to run smoothly. Our focus is on ensuring a stable environment for existing customers to complete their in-flight migration initiatives while preparing for the enhanced capabilities available in AWS Transform.

AWS Transform, launched in May 2025, is our recommended solution that brings together all AWS Migration Hub capabilities while introducing new features. It provides a unified experience with AI-powered automation to streamline migration planning and execution. The service enables seamless collaboration between teams, AWS partners, and AWS experts, while offering customizable workflows to match your organization's specific migration needs. With real-time analytics and advanced tracking capabilities, AWS Transform is designed to make your migration journey more efficient and successful.

Transitioning to AWS Transform does not require data migration. Existing migration projects in AWS Migration Hub will continue to function normally until completion. When you are ready to start new migration projects, you can begin using AWS Transform directly - all the familiar capabilities from Migration Hub are available there with enhanced features. To begin using AWS Transform, see the AWS Transform User Guide. Contact AWS Support to assist with AWS Transform or questions about ongoing migration projects.

If you have additional questions, contact AWS Support or read our FAQs:

- **What does this mean for the service (are you going to shut the service down)?**

  AWS Migration Hub will stop accepting new customers starting November 7, 2025. The service will continue to operate for existing customers to complete their ongoing migration projects.
- **How will existing customers be impacted?**

Existing customers will not experience any disruption to their current migration projects. They can continue using AWS Migration Hub as normal until their projects are completed. All historical data and ongoing projects will remain accessible, and security updates will continue to be deployed to maintain service reliability.

- **On November 7, 2025, how can I get help if I have issues?**

  If you're experiencing issues, contact AWS Support.

- **What are alternatives to AWS Migration Hub?**

  AWS Transform is the recommended alternative service. Launched in May 2025, it provides all AWS Migration Hub capabilities with enhanced features, including AI-powered automation, improved collaboration tools, and real-time analytics. It offers a more comprehensive and modern migration experience.

- **How can I migrate off of AWS Migration Hub?**

  No formal migration process is required. Existing projects can continue in AWS Migration Hub until completion. For new projects, you can start directly in AWS Transform, which provides all the familiar capabilities of Migration Hub with enhanced features. No data migration is needed, and AWS Support is available to assist with the transition.

# Setting up Strategy Recommendations

Before you use Migration Hub Strategy Recommendations for the first time, complete the following tasks:

**Topics**



## Sign up for an AWS account

If you do not have an AWS account, complete the following steps to create one.

**To sign up for an AWS account**

1. Open https://portal.aws.amazon.com/billing/signup.
2. Follow the online instructions.

   Part of the sign-up procedure involves receiving a phone call or text message and entering a verification code on the phone keypad.

   When you sign up for an AWS account, an *AWS account root user* is created. The root user has access to all AWS services and resources in the account. As a security best practice, assign administrative access to a user, and use only the root user to perform tasks that require root user access.

AWS sends you a confirmation email after the sign-up process is complete. At any time, you can view your current account activity and manage your account by going to https://aws.amazon.com/ and choosing **My Account**.

## Create a user with administrative access

After you sign up for an AWS account, secure your AWS account root user, enable AWS IAM Identity Center, and create an administrative user so that you don't use the root user for everyday tasks.

### Secure your AWS account root user

1. Sign in to the AWS Management Console as the account owner by choosing **Root user** and entering your AWS account email address. On the next page, enter your password.

   For help signing in by using root user, see Signing in as the root user in the *AWS Sign-In User Guide*.

2. Turn on multi-factor authentication (MFA) for your root user.

   For instructions, see Enable a virtual MFA device for your AWS account root user (console) in the *IAM User Guide*.

### Create a user with administrative access

1. Enable IAM Identity Center.

   For instructions, see Enabling AWS IAM Identity Center in the *AWS IAM Identity Center User Guide*.

2. In IAM Identity Center, grant administrative access to a user.

   For a tutorial about using the IAM Identity Center directory as your identity source, see Configure user access with the default IAM Identity Center directory in the *AWS IAM Identity Center User Guide*.

### Sign in as the user with administrative access

- To sign in with your IAM Identity Center user, use the sign-in URL that was sent to your email address when you created the IAM Identity Center user.

  For help signing in using an IAM Identity Center user, see Signing in to the AWS access portal in the *AWS Sign-In User Guide*.

### Assign access to additional users

1. In IAM Identity Center, create a permission set that follows the best practice of applying least-privilege permissions.

   For instructions, see Create a permission set in the *AWS IAM Identity Center User Guide*.

2. Assign users to a group, and then assign single sign-on access to the group.

   For instructions, see Add groups in the *AWS IAM Identity Center User Guide*.

## Strategy Recommendations users and roles

We recommend that you create two roles for Strategy Recommendations:

- To access the console, create a role with both the `AWSMigrationHubFullAccess` and the `AWSMigrationHubStrategyConsoleFullAccess` managed policies attached.
- To access the Strategy Recommendations application data collector, create a role with the `AWSMigrationHubStrategyCollector` managed policy attached.

IAM managed policies define the level of access to a service by users. The AWS Migration Hub `AWSMigrationHubFullAccess` managed policy grants access to the Migration Hub console. For more information, see Migration Hub Roles and Policies. For information about the `AWSMigrationHubStrategyConsoleFullAccess` and `AWSMigrationHubStrategyCollector` managed policies, see AWS managed policies for Migration Hub Strategy Recommendations.

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*.

# Getting started with Strategy Recommendations

This section describes how to get started with Migration Hub Strategy Recommendations.

**Topics**



# Prerequisites for Strategy Recommendations

The following are the prerequisites for using Migration Hub Strategy Recommendations.

- You must have one or more AWS accounts, and users set up for these accounts. For more information, see Setting up Strategy Recommendations.
- The Strategy Recommendations application data collector client must be able to collect data remotely from servers. This requires that you use a set of credentials that work for all your Windows servers and a set of credentials that work for all of your Linux servers. The credentials must have permissions to create and delete directories in your servers.
- The version of the collector that is deployed in vCenter supports VMware vCenter Server V6.0, V6.5, 6.7 or 7.0.

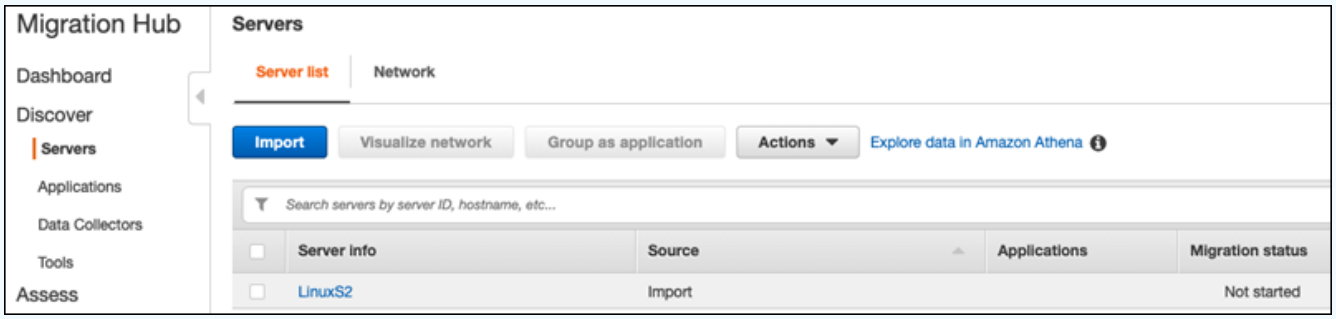
  You can also deploy the collector in an Amazon EC2 instance using the collector AMI.
- Verify that your operating system (OS) environment is supported:
  - **Linux**
    - Amazon Linux 2012.03, 2015.03
    - Amazon Linux 2 (9/25/2018 update and later)
    - Ubuntu 12.04, 14.04, 16.04, 18.04, 20.04
    - Red Hat Enterprise Linux 5.11, 6.10, 7.3, 7.7, 8.1
    - CentOS 5.11, 6.9, 7.3

  - SUSE 11 SP4, 12 SP5
- **Windows**
  - Windows Server 2008 R1 SP2, 2008 R2 SP1
  - Windows Server 2012 R1, 2012 R2
  - Windows Server 2016
  - Windows Server 2019
- For source code analysis, your GitHub and GitHub Enterprise repositories must have a personal access token with the **repo** scope that can be shared with the Strategy Recommendations collector client. For more information about creating a personal access token with the **repo** scope, see Creating a personal access token in the *GitHub Docs*.

  To analyze .NET repositories for Porting Assistant for .NET recommendations, you must provide a Windows machine that is set up with the Porting Assistant for .NET porting assessment tool. For more information, see Getting started with Porting Assistant for .NET in the *Porting Assistant for .NET User Guide*.
- To enable Strategy Recommendations for database analysis, you must enter credentials in AWS Secrets Manager. For more information, see Strategy Recommendations database analysis.
- You must use AWS Application Discovery Service to collect data about your servers and applications in the AWS Migration Hub console before using Strategy Recommendations. You can use one of the following methods to collect the data.
  - **Migration Hub import** – With Migration Hub import, you can import information about your on-premises servers and applications into Migration Hub. For more information, see Migration Hub Import in the *Application Discovery Service User Guide*.
  - **AWS Application Discovery Service Agentless Collector** – The Agentless Collector is a VMware appliance that collects information about VMware virtual machines (VMs). For more information, see Agentless Collector in the *Application Discovery Service User Guide*.
  - **AWS Application Discovery Agent** – The Discovery Agent is AWS software that you install on your on-premises servers and VMs to capture system information and details of the network connections between systems. For more information, see AWS Application Discovery Agent in the *Application Discovery Service User Guide*.
- **Strategy Recommendations data collector** – If your servers are hosted in VMware vCenter, and you provide access, Strategy Recommendations can automatically fetch your server inventory. The Strategy Recommendations console will use the collected information to assist with the assessment.

**Note**

To verify that the Migration Hub import completed successfully, in the Migration Hub console navigation pane, under **Discover**, choose **Servers**. All the imported servers should be listed.




# Step 1: Download the Strategy Recommendations collector

Migration Hub Strategy Recommendations application data collector is a virtual appliance that you can install in your on-premises VMware environment. The Strategy Recommendations application data collector is also available as an Amazon Machine Image (AMI). If you want to use the AMI version of the collector to assess AWS applications or for some other reason, you don't need to download the collector. You can skip this section and go to Deploy the Strategy Recommendations collector in an Amazon EC2 instance.

This section describes how to download the collector Open Virtualization Archive (OVA) file that you use to deploy the collector as a virtual machine (VM) in your VMware environment.

**To download the collector OVA file**

1. Using the AWS account that you created in Setting up Strategy Recommendations, sign in to the AWS Management Console and open the Migration Hub console at https://console.aws.amazon.com/migrationhub/.
2. In the Migration Hub console navigation pane, choose **Strategy**.
3. On the **Migration Hub Strategy Recommendations** page, choose **Download data collector**.
4. Optionally, you can choose **Download the import template** if you want to import application data. For more information about importing data, see Importing data into Strategy Recommendations.

5. Click on **Get recommendations** button and choose **Agree** to allow Migration Hub to create a service-linked role (SLR) in your account. When setting up Strategy Recommendations for the first time, you must create the SLR. For more information, see Using service-linked roles for Strategy Recommendations.

## Step 2: Deploy the Strategy Recommendations collector

This section describes how to deploy the Strategy Recommendations application data collector. An application data collector is an agentless data collector that identifies running applications on your servers, performs source code analysis, and analyzes your databases.

> **Note**
>
> The Strategy Recommendations for On-prem customers is in KTLO mode. Existing customers can continue to use it.

There are two ways to deploy the collector:

- Deploy as a virtual machine (VM) in your VMware vCenter Server. For more information, see Deploy the Strategy Recommendations collector in vCenter.
- If you have AWS applications that you want to assess, you can use the Strategy Recommendations collector Amazon Machine Image (AMI). For more information, see Deploy the Strategy Recommendations collector in an Amazon EC2 instance.

## Deploy the Strategy Recommendations collector in vCenter

Migration Hub Strategy Recommendations application data collector is a virtual appliance that you can install in your on-premises VMware environment. This section describes how to deploy the collector Open Virtualization Archive (OVA) file as a virtual machine (VM) in your VMware environment.

The following procedure describes how to deploy the Strategy Recommendations collector in your VMware vCenter Server environment.

**To deploy the collector in vCenter**

1. Sign in to vCenter as a VMware administrator.

2. Deploy the OVA file that you downloaded in Step 1. The OVA file includes the collector and a CLI that can be used to access the Strategy Recommendations API.

   You can also download the OVA file from the following link:

   https://application-data-collector-release.s3.us-west-2.amazonaws.com/ova/latest/AWSMHubApplicationDataCollector.ova

We recommend the following specifications for the VM.

**Strategy Recommendations collector VM specifications**

- **RAM** – a minimum of 8 GB
- **CPUs** – at least 4

> **Note**
>
> To ensure that you are using the latest version of the collector with all the new features and bug fixes, upgrade the collector after you deploy the collector OVA file. For instructions about how to upgrade, see Upgrading the Strategy Recommendations collector.

## Deploy the Strategy Recommendations collector in an Amazon EC2 instance

If you have AWS applications that you would like to assess, you can use the Strategy Recommendations application data collector Amazon Machine Image (AMI).

The following procedure describes how to launch an Amazon EC2 instance from the collector AMI.

**To deploy the collector Amazon EC2 instance**

1. Open the Amazon EC2 console at https://console.aws.amazon.com/ec2/.
2. In the navigation bar at the top of the screen, the current Region is displayed (for example, US East (Ohio)). Choose a Region that suits your needs from the Regions that Strategy Recommendations uses. For a list of these Regions, see Strategy Recommendations endpoints in the *AWS General Reference*.
3. In the navigation pane, under **Images** choose **AMIs**.

4. Choose **Public images** from the **Owned by me** dropdown.
5. Choose the search bar and select **AMI Name** from the menu.
6. Enter the name **AWSMHubApplicationDataCollector**.
7. To ensure that the AMI is from a secure source, verify that the owner of the account is **703163444405**.
8. To launch an instance from this AMI, select it, and then choose **Launch**. For more information about launching an instance using the console, see Launching your instance from an AMI in the *Amazon EC2 User Guide*.

   We recommend the following specifications for the Amazon EC2 instance.

   **Strategy Recommendations collector Amazon EC2 instance specifications**

   - **RAM** – A minimum of 8 GB
   - **CPUs** – At least 4

The Strategy Recommendations AMI includes the collector and a CLI that can be used to access the Strategy Recommendations API.

> **Note**
>
> To ensure that you are using the latest version of the collector with all the new features and bug fixes, upgrade the collector after you deploy the Strategy Recommendations collector as an Amazon EC2 instance. For instructions about how to upgrade, see Upgrading the Strategy Recommendations collector.

## Step 3: Sign in to the Strategy Recommendations collector

This section describes how to sign in to the deployed Migration Hub Strategy Recommendations application data collector. How you sign in to the collector depends on how you deployed it.

- Sign in to the collector deployed in the vCenter based environment
- Sign in to the collector deployed as an Amazon EC2 instance

## Sign in to the collector deployed in the vCenter based environment

**To sign in to the Strategy Recommendations collector deployed in the vCenter based environment**

1. Use the following command to connect to the collector using an SSH client.

   ```
   ssh ec2-user@CollectorIPAddress
   ```

2. When prompted for a password, enter the default password **aq1@WSde3**. You must change the password the first time you sign in.

## Sign in to the collector deployed as an Amazon EC2 instance

**To sign in to the Strategy Recommendations collector deployed as an Amazon EC2 instance**

- Use the following command to connect to the collector using an SSH client.

  ```
  ssh -i "Keyname.pem" ec2-user@CollectorIPAddress
  ```

  Keyname.pem is the private key that was generated when you launched the Amazon EC2 instance from the collector AMI.

# Step 4: Set up the Strategy Recommendations collector

This section describes how to use the command line `collector setup` commands to configure the Migration Hub Strategy Recommendations application data collector. These configurations are stored locally.

Before you can use `collector setup` commands, you must create a bash shell session in the collector Docker container using the following `docker exec` command.

```
docker exec -it application-data-collector bash
```

The `collector setup` command runs all of the following commands in succession but you can run them individually:

- `collector setup --aws-configurations` – Set up AWS configurations.

- `collector setup --vcenter-configurations` – Set up vCenter configurations.

> **Note**
>
> vCenter configuration setup is only available if the collector is hosted on vCenter. However, you can force vCenter configuration setup by using the command `collector setup --vcenter-configurations`.

- `collector setup --remote-server-configurations` – Set up remote server configurations.
- `collector setup --version-control-configurations` – Set up version control configurations.

**To set up all the collector configurations at the same time**

1. Enter the following command.

```
collector setup
```

2. Enter the information for AWS configurations as described in Set up AWS configurations.
3. Enter the information for vCenter configurations as described in Set up vCenter configurations.
4. Enter the information for remote server configurations as described in Set up remote server configurations.
5. Enter the information for version control configurations as described in Set up version control configurations.
6. Prepare your Windows and Linux servers for collector data collection by following the instructions in Prepare your remote Windows and Linux servers for data collection.

## Set up AWS configurations

To set up AWS configurations, when using the `collector setup` command or the `collector setup --aws-configurations` command.

1. Enter **Y** for yes to the **Have you setup IAM permissions...** question. You set up these permissions when you created a user to access the collector using the

`AWSMigrationHubStrategyCollector` managed policy following the steps in Strategy Recommendations users and roles.

2. Enter your access key and secret key from the AWS account that has the user that you created to access the collector following the steps in Strategy Recommendations users and roles.
3. Enter a Region, for example, `us-west-2`. Choose a Region that suits your needs from the Regions that Strategy Recommendations uses. For a list of these Regions, see Strategy Recommendations endpoints in the *AWS General Reference*.
4. Enter **Y** for yes to the **Upload collector related metrics to migration hub strategy service?** question. Metrics information helps AWS provide you with appropriate support.
5. Enter **Y** for yes to the **Upload collector related logs to migration hub strategy service?** question. Information from logs helps AWS provide you with appropriate support.

The following example shows what is displayed, including example entries for the AWS configurations.

```
Have you setup IAM permissions in you AWS account as per the user guide? [Y/N]: Y
Choose one of the following options for providing user credentials:
1. Long term AWS credentials
2. Temporary AWS credentials
Enter your options [1-2]: 2
AWS session token:
AWS access key ID [None]:
AWS secret access Key [None]:
AWS region name [us-west-2]:
AWS configurations are saved successfully
Upload collector related metrics to migration hub strategy service? By default
 collector will upload metrics. [Y/N]: Y
Upload collector related logs to migration hub strategy service? By default collector
 will upload logs. [Y/N]: Y
Application data collector configurations are saved successfully
Start registering application data collector
Application data collector is registered successfully.
```

## Set up vCenter configurations

To set up vCenter configurations, when using the `collector setup` command or the `collector setup --vcenter-configurations` command:

1. Enter **Y** for yes to the **Would you like to authenticate using VMware vCenter credentials** question, if you want to authenticate using VMware vCenter credentials.

   > **Note**
   >
   > Authenticating using VMware vCenter credentials requires that VMware tools are installed on the target servers.

   Enter the **Host Url**, which can be either the vCenter IP address or URL. Then, enter the **Username** and **Password** for VMware vCenter.
2. Enter **Y** for yes to the **Do you have Windows machines managed by VMware vCenter** question, if you want to configure Windows servers.

   Enter the **Username** and **Password** for Windows.

   > **Note**
   >
   > If your Windows Remote Server belongs to an Active Directory domain, you must enter the user name as *`domain-name`**`username`* when using the CLI to provide remote server configurations. For example, if the name of your domain is exampledomain and your user name is Administrator, then the user name you enter in the CLI is **exampledomain\Administrator**.
3. Enter **Y** for yes to the **Setup for Linux using VMware vCenter** question, if you want to configure Linux servers.

   Enter the **Username** and **Password** for Linux.
4. Enter **Y** for yes to the **Would you like to setup credentials for servers outside vCenter using NTLM for Windows** and **SSH/Cert based for Linux** questions, if you want to set up remote server credentials for servers outside of vCenter.
5. For the **Would you like to use the same Windows credentials used during vCenter setup** question, enter **Y** for yes if the credentials for the Windows machines managed outside of vCenter are the same as the credentials provided when configuring credentials for vCenter Windows machines. Otherwise, enter **N** for no.

If you answer **Y** for yes, the following questions are asked.

a. Enter **Y** for yes to the **Are you okay with collector accepting and locally storing server certificates on your behalf during first interaction with windows servers?** question.

b. Enter **1** for the **Enter your options** question, if you want to configure for SSH authentication.

   If you choose to use SSH authentication, you must copy the generated key credentials to your Linux servers. For more information, see Set up key-based authentication on Linux servers.

The following example shows what is displayed, including example entries for the VMware vCenter configurations.

```
Your Linux remote server configurations are saved successfully.
collector setup –vcenter-configurations
Start setting up vCenter configurations for remote execution
Note: Authenticating using VMware vCenter credentials requires VMware tools to be
 installed on the target servers
Would you like to authenticate using VMware vCenter credentials? [Y/N]: y

NOTE: Your vSphere user must have Guest Operations privileges enabled.

Host Url for VMware vCenter: domain-name
Username for VMware vCenter: username
Password for VMware vCenter: password
Reenter password for VMware vCenter: password
Successfully stored vCenter credentials...
Do you have Windows machines managed by VMware vCenter? [Y/N]: y

NOTE: For the best experience, we recommend that you create a new Active Directory user
 in the Domain Admins group.

Username for Windows (Domain\User): username
Password for Windows: password
Reenter password for Windows: password
Successfully stored windows credentials...
You can verify your setup for vCenter windows machines is correct with "collector diag-
check"
Do you have Linux machines managed by VMWare vCenter? [Y/N]: y
```

```
Username for Linux: username
Password for Linux: password
Reenter password for Linux: password
Successfully stored linux credentials...
You can verify your setup for vCenter linux machines is correct with "collector diag-
check"
Would you like to setup credentials for servers not managed by vCenter using NTLM for
 windows and SSH/Cert based for Linux? [Y/N]: y
Setting up target server for remote execution:
Would you like to setup credentials for servers not managed by vCenter using NLTM for
 Windows [Y/N]: y
Would you like to use the same Windows credentials used during vCenter setup? [Y/N]: y
Are you okay with collector accepting and locally storing server certificates on your
 behalf during first interaction with windows servers? These certificates will be used
 by collector for secure communication with windows servers [Y/N]: y
Successfully stored windows server credentials...
Please note that all windows server certificates are stored in directory /opt/amazon/
application-data-collector/remote-auth/windows/certs

Please note the IP address of the collector and run the script specified in the user
 documentation on all the windows servers in your inventory
You can verify your setup for remote windows machines is correct with "collector diag-
check"
Would you like to setup credentials for servers not managed by vCenter using SSH/Cert
 based for Linux? [Y/N]: y
Choose one of the following options for remote authentication:
1. SSH based authentication
2. Certificate based authentication
Enter your options [1-2]: 1
Would you like to use the same Linux credentials used during vCenter setup? [Y/N]: y
Generating SSH key on this machine...
Successfully generated SSH key pair

SSH key pair path: /opt/amazon/application-data-collector/remote-auth/linux/keys/
id_rsa_assessment
Please add the public key "id_rsa_assessment.pub" to the "$HOME/.ssh/authorized_keys"
 file in your remote machines.
You can verify your setup for remote linux machines is correct with "collector diag-
check
```

## Set up remote server configurations

To set up remote server configurations, when using the `collector setup` command or the `collector setup --remote-server-configurations` command:

1. Enter **Y** for yes to the **Would you like to setup credentials for servers not managed by vCenter using NLTM for Windows** question, if you want to configure Windows servers.

   Enter the **Username** and **Password** for WinRM.

   > **Note**
   >
   > If your Windows Remote Server belongs to an Active Directory domain, you must enter the user name as *`domain-name`*`\`*`username`* when using the CLI to provide remote server configurations. For example, if the name of your domain is exampledomain and your user name is Administrator, then the user name you enter in the CLI is **exampledomain\Administrator**.

   Enter **Y** for yes to the **Are you okay with collector accepting and locally storing server certificates on your behalf during first interaction with windows servers?** question. Windows Server certificates are stored in the directory `/opt/amazon/application-data-collector/remote-auth/windows/certs`.

   You must copy the generated server credentials to your Windows servers. For more information, see Set up remote server configuration on Windows servers.
2. Enter **Y** for yes to the **Setup for Linux using SSH or Cert** question, if you want to configure Linux servers.
3. Enter **1** for the **Enter your options** question, if you want to configure for SSH key based authentication.

   If you choose to use SSH authentication, you must copy the generated key credentials to your Linux servers. For more information, see Set up key-based authentication on Linux servers.
4. Enter **2** for the **Enter your options** question, if you want to configure for certificate-based authentication.

   For information about setting up certificate-based authentication, see Set up certificate-based authentication on Linux servers.

The following example shows what displayed, including example entries for the remote server configurations.

```
Setting up target server for remote execution
Would you like to setup credentials for servers not managed by vCenter using NLTM for
 Windows [Y/N]: y

NOTE: For the best experience, we recommend that you create a new Active Directory user
 in the Domain Admins group.

Username for WinRM (Domain\User): username
Password for WinRM: password
Reenter password for WinRM: password
Are you okay with collector accepting and locally storing server certificates on your
 behalf during first interaction with windows servers? These certificates will be used
 by collector for secure communication with windows servers [Y/N]: Y
Successfully stored windows server credentials...
Please note that all windows server certificates are stored in directory /opt/amazon/
application-data-collector/remote-auth/windows/certs

Please note the IP address of the collector and run the script specified in the user
 documentation on all the windows servers in your inventory
Would you like to setup credentials for servers not managed by vCenter using SSH/Cert
 based for Linux? [Y/N]: Y
Choose one of the following options for remote authentication:
1. SSH based authentication
2. Certificate based authentication
Enter your options [1-2]: 1
User name for remote server: username
Generating SSH key on this machine...
SSH key pair path: /opt/amazon/application-data-collector/remote-auth/linux/keys/
id_rsa_assessment
Please add the public key "id_rsa_assessment.pub" to the "$HOME/.ssh/authorized_keys"
 file in your remote machines.
Your Linux remote server configurations are saved successfully.
```

## Set up version control configurations

To set up version control configurations, when using the `collector setup` command or the `collector setup --version-control-configurations` command:

1. Enter **Y** for yes to the **Set up source code analysis?** question.
2. Enter **1** for the **Enter your options** question, if you want to configure the Git server endpoint.

   Enter **github.com** for the **GIT server endpoint:**.
3. Enter **2** for the **Enter your options** question, if you want to configure a GitHub Enterprise Server.

   Enter the enterprise endpoint without https://, as follows: **GIT server endpoint:** *`git-enterprise-endpoint`*
4. Enter your Git *`username`* and personal access *`token`*.
5. Enter **Y** for yes to the **Do you have any csharp repositories that should be analyzed on a windows machine?** question, if you want to analyze C# code.

   > **Note**
   >
   > To analyze .NET repositories for Porting Assistant for .NET recommendations, you must provide a Windows machine that is set up with the Porting Assistant for .NET porting assessment tool. For more information, see Getting started with Porting Assistant for .NET in the *Porting Assistant for .NET User Guide*.
6. For the **Would you like to reuse existing windows credentials on this machine?** question. Enter **Y** for yes, if the Windows machine for C# source code analysis uses the same credentials as the credentials previously provided as part of setting up `--remote-server-configurations` or `--vcenter-configurations`.

   Enter **N** for no, if you want to enter new credentials.
7. To use **VMWare vCenter Windows Machine** credentials, enter **1** for **Choose one of the following options for windows credentials**.
8. Enter the IP address for the Windows machine.

The following example shows what is displayed, including example entries for the version control configurations.

```
Set up for source code analysis [Y/N]: y
Choose one of the following options for version control type:
1. GIT
```

```
2. GIT Enterprise
3. Azure DevOps - Git
Enter your options [1-3]: 3
Your server endpoint: dev.azure.com (http://dev.azure.com/)
Your DevOps Organization name: <Your organization name>
Personal access token [None]:
Your version control credentials are saved successfully.
Do you have any csharp repositories that should be analyzed on a windows machine? [Y/
N]: y
Would you like to reuse existing windows credentials on this machine? [Y/N]: y
Choose one of the following options for windows credentials:
1. VMWare vCenter Windows Machine
2. Standard Windows Machine
Enter your options [1-2]:
1
Windows machine IP Address: <Your windows machine IP address>
Using VMWare vCenter Windows Machine credentials
Successfully stored windows server credentials...
```

## Prepare your remote Windows and Linux servers for data collection

> **Note**
>
> This step isn't necessary if you setup the Strategy Recommendations applications data collector using vCenter credentials.

After you set up your remote server configurations, if you are using the `collector setup` command or the `collector setup --remote-server-configurations` command, you must prepare your remote servers so that the Strategy Recommendations applications data collector can collect data from them.

> **Note**
>
> You must make sure that the servers are reachable using their private IP address. For further instructions on how to set up the environment through a virtual private cloud (VPC) on AWS for remote running, see the Amazon Virtual Private Cloud User Guide.

To prepare your remote Linux servers, see Prepare remote Linux servers.

To prepare your remote Windows servers, see Set up remote server configuration on Windows servers.

## Prepare remote Linux servers

### Set up key-based authentication on Linux servers

If you choose to set up SSH key-based authentication for Linux when configuring remote server configurations, you must perform the following steps to set up key-based authentication on your servers so that data can be collected by the Strategy Recommendations applications data collector.

**To set up key-based authentication on your Linux servers**

1. Copy the public key generated with the name **id_rsa_assessment.pub** from the following folder in the container:

   **/opt/amazon/application-data-collector/remote-auth/linux/keys**.
2. Append the copied public key in the `$HOME/.ssh/authorized_keys` file for all the remote machines. If there is no file available, create it using the `touch` or `vim` command.
3. Make sure that the home folder on the remote server has permission level `755` or less. If it's `777`, it won't work. You can use the `chmod` command to restrict permissions.

### Set up certificate-based authentication on Linux servers

If you choose to set up certificate-based authentication for Linux when configuring remote server configurations, you must perform the following steps so that data can be collected by the Strategy Recommendations application data collector.

We recommend this option if you already have Certificate Authority (CA) set up for your application servers.

**To set up certificate-based authentication on your Linux servers**

1. Copy the user name that works with all your remote servers.
2. Copy the public key of the collector to the CA.

   The public key for the collector can be found in the following location:

   **/opt/amazon/application-data-collector/remote-auth/linux/keys/id_rsa_assessment.pub**

This public key must be added to your CA for generating the certificate.

3. Copy the certificate generated in the previous step to the following location in the collector:

   **/opt/amazon/application-data-collector/remote-auth/linux/keys**

   The name of the certificate must be **id_rsa_assessment-cert.pub**.

4. Provide the certificate file name during the setup step.

## Set up remote server configuration on Windows servers

If you choose to set up Windows when configuring remote server configurations in the collector setup, you must perform the following steps so that data can be collected by Strategy Recommendations.

> **To understand more about the PowerShell script that is executed on the remote server, read this note.**
>
> The script enables PowerShell remote and disables all authentication methods other than negotiate. This is used for Windows NT LAN Manager (NTLM) and sets the "AllowUnencrypted" WSMan protocol to false to ensure that the newly created listener accepts only encrypted traffic. Using the Microsoft provided script, `New-SelfSignedCertificateEx.ps1`, it creates a self-signed certificate.
> Any WSMan Instance that has a HTTP listener is removed along with existing HTTPS listeners. Then, it creates a new HTTPS listener. It also creates an inbound firewall rule for TCP port 5986. In the final step, the WinRM service is restarted.

### To set up data collection through a remote connection on your Windows 2008 servers

1. Use the following command to check the version of PowerShell installed on your server.

   ```
   $PSVersionTable
   ```

2. If the PowerShell version is not 5.1, then download and install WMF 5.1 by following the instructions at Install and Configure WMF 5.1 in the Microsoft documentation.
3. Use the following command in a new PowerShell window to ensure that PowerShell 5.1 is installed.

```
$PSVersionTable
```

4. Follow the next set of steps, which describe how to set up data collection through a remote connection on Windows 2012 and above.

**To set up data collection through a remote connection on your Windows 2012 and newer servers**

1. Download the setup script from the following URL:

   https://application-data-collector-release.s3.us-west-2.amazonaws.com/scripts/WinRMSetup.ps1

2. Download the `New-SelfSignedCertificateEx.ps1` from the following URL and paste the script into the same folder in which you downloaded `WinRMSetup.ps1`:

   https://github.com/Azure/azure-libraries-for-net/blob/master/Samples/Asset/New-SelfSignedCertificateEx.ps1

3. To complete the setup, run the downloaded PowerShell script on all application servers.

```
.\WinRMSetup.ps1
```

> **Note**
>
> If Windows Remote Management (WinRM) is not set up properly on the Windows Remote Server, an attempt to collect data from that server will fail. If this happens, you must delete the certificate that corresponds to that server from the following location on the container: **/opt/amazon/application-data-collector/remote-auth/windows/certs/*ads-server-id*.cer**
> After you delete the certificate, wait for the data collection process to be retried.

## Verify that your collector and servers are setup for data collection

Verify that your collector and servers are correctly setup for data collection by using the following command.

```
collector diag-check
```

This command conducts a set of diagnostic checks on your server configurations and provides input on failed checks.

When you use the command in `-a` mode, you get the output in a **DiagnosticCheckResult.txt** file after the checks are complete.

```
collector diag-check -a
```

You can perform a diagnostic check on the server configurations of a single server with the IP address of that server.

The following examples show the output of a successful setup.

**Linux server**

```
            Provide your test server IP address: IP address
-------------------------------------------------------------
Start checking connectivity & credentials...
Connectivity and Credential Checks succeeded
-------------------------------------------------------------
Start checking permissions...
Permission Check succeeded
-------------------------------------------------------------
Start checking OS version...
OS version check succeeded
-------------------------------------------------------------
Start checking Linux Bash installation...
Linux Bash installation check succeeded
-------------------------------------------------------------
All diagnostic checks complete successfully.
This server is correctly set up and ready for data collection.
```

**Windows server**

```
            Windows PowerShell Version Check succeeded
```

```
Provide your test server IP address: IP address
------------------------------------------------------------
Start checking connectivity & credentials...
Connectivity and Credential Checks succeeded
------------------------------------------------------------
Start checking permissions...
Permission Check succeeded
------------------------------------------------------------
Start checking OS version...
OS version check succeeded
------------------------------------------------------------
Start checking Windows architecture type...
Windows Architecture Type Check succeeded
------------------------------------------------------------
All diagnostic checks complete successfully.
This server is correctly set up and ready for data collection.
```

The following example shows an error message that is displayed when your remote server credentials are incorrect.

```
Unable to authenticate the server credentials with IP address ${IPAddress}.
Ensure that your credentials are accurate and the server is configured correctly.
Use the following command to reset incorrect credentials.
collector setup –remote-server-configurations
```

# Step 5: Use Strategy Recommendations in the Migration Hub console to get recommendations

This section describes how to use Strategy Recommendations in the Migration Hub console to get migration recommendations for the first time.

**To get recommendations**

1. Using the AWS account that you created in Setting up Strategy Recommendations, sign in to the AWS Management Console and open the Migration Hub console at https://console.aws.amazon.com/migrationhub/.
2. In the Migration Hub console navigation pane, choose **Strategy**.

3. On the **Migration Hub Strategy Recommendations** page, choose **Get recommendations**.
4. Choose **Agree** if you agree to allow Migration Hub to create a service-linked role (SLR) in your account. For more information about the SLR, see Using service-linked roles for Strategy Recommendations.
5. **Configure data sources**

   a. On the **Configure data sources** page, you must choose the source of your servers to analyze from the following options:

      i. **Strategy Recommendations application data collector** – You can use the Strategy Recommendations collector to retrieve information about VMs hosted in VMware vCenter automatically. Using this option, you don't need to perform additional setup.

      ii. **Manual import** – If you want to bring in data about your servers and applications independently, you can use the Strategy Recommendations import template. The import template is a JSON file in which you can fill out the available information for your VMs.

      iii. **Application Discovery Service** – You can use Application Discovery Service to gather information about your on-premises applications and servers. In the Migration Hub console, under the **Tools** section, you can choose from multiple options under **Discovery tools**. For example, you can choose **Application Discovery Service Agentless Collector**, **AWS Discovery Agent**, or **Import** (for CSV files).

   b. The **Servers** table lists all of the available servers based on your selection in the data source section.

   c. Under Registered application data collectors, the application data collectors that you've set up are listed. If you haven't set up any data collectors, you can download the data collector and then deploy it. For more information, see Step 1: Download the Strategy Recommendations collector and Step 2: Deploy the Strategy Recommendations collector.

      > **Note**
      >
      > To get strategy recommendations, you must set up at least one application data collector or perform an application data import. If you want to add your application-level data without setting up a collector, you can use the application data import template. You can add additional data sources later.

   d. If you selected **Manual import**, under **Import details**, choose **Add new import**.

e. For **Import name**, enter a name for your import.

f. For **S3 bucket URI**, enter the S3 bucket URI for your import JSON file to upload to.

> **Important**
>
> The S3 bucket name must start with a prefix of **`migrationhub-strategy`**.

g. Choose **Next**.

6. **Specify preferences**

a. On the **Specify preferences** page, set up your business goals and migration preferences. Strategy Recommendations recommends the optimal strategy for migrating and modernizing your applications and databases based on the preferences that you specify. You can change these preferences at a later time.

b. Choose **Next**.

7. **Review and submit**.

a. Review your configured data sources and migration preferences.

b. If everything looks correct, choose **Start data analysis**. This will perform an analysis of your server inventory and runtime environment and the application binaries for your Microsoft IIS and Java applications.

> **Note**
>
> The status of the binary analysis is not displayed in the console. When the analysis completes, you will either see a link to the anti-pattern report or a message indicating that the analysis was not successful.

# Strategy Recommendations recommendations

This section describes how to view Strategy Recommendations migration and modernization recommendations for servers and applications in your migration portfolio.

**Topics**



# Viewing strategy recommendations in Strategy Recommendations

This section describes how to use Strategy Recommendations in the AWS Migration Hub console to view migration strategy recommendations.

**To view strategy recommendations**

1. Using the AWS account that you created in Setting up Strategy Recommendations, sign in to the AWS Management Console and open the Migration Hub console at https://console.aws.amazon.com/migrationhub/.
2. In the Migration Hub console navigation pane, choose **Strategy** and then choose **Recommendations**.
3. On the **Recommendations** page, you can view and export summary recommendations of your portfolio and detailed migration "R" strategy recommendations. You can also view migration and modernization tools and destinations, and anti-patterns for your servers and application components.

   Anti-patterns are a list of known issues found in your portfolio that are categorized by severity. High severity anti-patterns represent incompatibilities that need to be resolved, medium severity anti-patterns represent warnings, and low severity anti-patterns represent informational issues. For information about the "R" strategy, see Migration terms - 7 Rs in the *AWS Prescriptive Guidance* glossary.

- If a change occurs in your data center or if you update your preferences, we recommend reanalyzing your data. To reanalyze your data to get new recommendations, choose **Reanalyze data**.

  Until the reanalyze process completes, your recommendation data results can be a mix of prior data and new data.

  To download a report file with the recommendations, Choose **Export recommendations**.

4. On the **Application components** tab, you can view the recommendations for application components in your migration portfolio. For more information, see Strategy Recommendations application component recommendations.
5. On the **Servers** tab, you can view the recommendations for the servers in your migration portfolio. For more information, see Strategy Recommendations server recommendations.
6. On the **Preferences** tab, you can edit the preferences you specified in Step 5: Get recommendations. For information about editing your preferences, see Strategy Recommendations preferences.

# Strategy Recommendations application component recommendations

This section describes how to use Strategy Recommendations in the Migration Hub console to view and analyze migration strategy recommendations for application components.

**Topics**

- Working with application components in Strategy Recommendations
- Strategy Recommendations source code analysis
- Strategy Recommendations database analysis
- Strategy Recommendations binary analysis

## Working with application components in Strategy Recommendations

This section describes how to use Migration Hub Strategy Recommendations in the Migration Hub console to view and configure migration and modernization strategy recommendations.

**Topics**

- Viewing application component recommendations
- Configure source code analysis for an application component
- Configure database analysis for an application component

## Viewing application component recommendations

This section describes how to use Strategy Recommendations in the Migration Hub console to view migration strategy recommendations for application components.

**To view recommendations details for application components**

1. Using the AWS account that you created in Setting up Strategy Recommendations, sign in to the AWS Management Console and open the Migration Hub console at https://console.aws.amazon.com/migrationhub/.
2. In the Migration Hub console navigation pane, choose **Strategy** and then choose **Recommendations**.
3. On the **Recommendations** page, choose the **Application components** tab.

    a. Under **Application components summary**, is an overview of the various types of application components that you are running in your server portfolio.

    b. Under **Application components**, you view component name, component type, and migration "R" strategy recommendations. You can also view the migration destination, and the migration and modernization tools to use for various application components that are running in your server portfolio. For information about the "R" strategy, see Migration terms - 7 Rs in the *AWS Prescriptive Guidance* glossary.
4. To view the details for an application component, select an application component and then choose **View details**.
5. On the application component details page (the page with the component's name as the heading) under **Recommendation summary**, you can view **Recommendations** for the application component. You can also view identified **Anti-patterns**. Anti-patterns are a list of known issues found in your portfolio that are categorized by severity.
6. Choose the **Strategy options** tab to view the migration recommendation for the application component. You can override the recommended strategy by selecting a different strategy and then choosing **Set preferred**.
7. Depending on which type of application component you are viewing, there is a **Source configuration** or a **Database configuration** tab. For information about **Source configuration**,

see Configure source code analysis for an application component. For information about **Database configuration**, see Configure database analysis for an application component.

## Configure source code analysis for an application component

This section describes how to use Strategy Recommendations in the Migration Hub console to configure source code analysis for an application component.

**To configure source code analysis for an application component**

1. In the Migration Hub console navigation pane, choose **Strategy** and then choose **Recommendations**.
2. On the **Recommendations** page, choose the **Application components** tab.
3. From the list of components under **Application components**, select an application component with a component type of **java**, **dotnetframework**, or **IIS**, and then choose **View details**.
4. On the application component details page (the page with the component's name as the heading), choose the **Source code configuration** tab.
5. Under **Source code configuration details**, choose **Analyze source code**.
6. On the **Analyze source code** page, provide the repository name, branch name, and project name (if applicable) that stores the source code for the application component. Select the type of GitHub source code version control that you want to use, and then choose **Analyze**.

   After the analysis is complete, you can view the updated recommendations on the application component details page.

For more information about source code analysis, see Strategy Recommendations source code analysis.

## Configure database analysis for an application component

This section describes how to use Strategy Recommendations in the Migration Hub console to configure database analysis for an application component.

**To configure database analysis for an application component**

1. In the Migration Hub console navigation pane, choose **Strategy** and then choose **Recommendations**.

2. On the **Recommendations** page, choose the **Application components** tab.
3. From the list of components under **Application components**, select an application component with component type **SQLServer** and then choose **View details**.
4. On the application component details page (the page with the component's name as the heading), choose the **Database configuration** tab.
5. Under **Database configuration details**, choose **Analyze database details**.
6. Choose a secret name from the dropdown menu that you created in AWS Secrets Manager to use for database credentials, and then choose **Analyze**.

   After the analysis is complete, you can view the updated recommendations on the application component details page.

For more information about database analysis and setting up a secret name, see Strategy Recommendations database analysis.

## Strategy Recommendations source code analysis

Migration Hub Strategy Recommendations automatically identifies the applications in your portfolio and creates application components for them. For example, if there is a Java application in your portfolio, it's identified as an application component with a component type of **java**.

Strategy Recommendations analyzes the source code for the application components if you configure it to do so. For information about configuring an application component for source code analysis, see Configure source code analysis for an application component.

Strategy Recommendations performs source code analysis for the Java and C# programming languages.

For information about the prerequisites for using Strategy Recommendations source code analysis, see Prerequisites for Strategy Recommendations.

## Strategy Recommendations database analysis

Strategy Recommendations automatically identifies the database servers in your portfolio and creates application components for them. For example, if there is a SQL Server database in your portfolio, it's identified as application component **sqlservr.exe**.

Strategy Recommendations analyzes individual databases in the identified SQL Server application component, sqlservr.exe, using the AWS Schema Conversion Tool. Strategy Recommendations also

identifies incompatibilities in migrating the databases to AWS databases such as Amazon Aurora MySQL-Compatible Edition, Amazon Aurora PostgreSQL-Compatible Edition, Amazon RDS for MySQL, and Amazon RDS for PostgreSQL.

Currently, Strategy Recommendations database analysis is only available for SQL Server.

To configure Strategy Recommendations to analyze your databases, you must provide credentials for the Strategy Recommendations application data collector to connect to your databases. To do this, create a secret in AWS Secrets Manager in your AWS account.

For information about the permissions and privileges of the credentials that you provide, see Privileges needed for AWS Schema Conversion Tool credentials. For information about creating a secret with the credentials, see Creating a secret in Secrets Manager for database credentials.

After you set up the credentials and secret, you can configure AWS Schema Conversion Tool analysis on the database server. For more information, see Configure database analysis for an application component.

After you configure database analysis for the application component, a AWS Schema Conversion Tool inventory task is scheduled. After this task completes, you'll see the new application components being created for every individual database on that database server. For example, if your SQL Server has two databases (exampledbs1 and exampledbs2), an application component is created for each of the databases with the names exampledbs1 and exampledbs2.

If you would like to see anti-patterns in migrating each identified database to AWS databases, set up analysis for each database following the steps in Configure database analysis for an application component.

## Privileges needed for AWS Schema Conversion Tool credentials

The sign-in credentials that you provide to AWS Secrets Manager only needs `VIEW SERVER STATE` and `VIEW ANY DEFINITION` privileges.

You can provide any login name and password that you want when creating the SQL Server login.

## Creating a secret in Secrets Manager for database credentials

After the credentials are ready for the Strategy Recommendations application data collector to connect to a database, create a secret in AWS Secrets Manager in your AWS account as described in the following procedure.

**To create a secret with AWS Secrets Manager in your AWS account**

1. Using the AWS account that you created in Setting up Strategy Recommendations, sign in to the AWS Management Console and open the AWS Secrets Manager console at https://console.aws.amazon.com/secretsmanager/.
2. Choose **Store a new secret**.
3. Select the secret type as **Other type of secrets**.
4. Under **Key/value pairs**, enter the following information.

   username - *your-username*

   Then choose **+ Add row** and enter following information.

   password - *your-password*
5. Choose **Next**.
6. Enter **Secret name** as any string with the prefix **migrationhub-strategy-**. For example, **migrationhub-strategy-one**.

   > **Note**
   >
   > Store your secret name in a safe place for later use.
7. Choose **Next**, and then choose **Next** again.
8. Choose **Store**.

You can use the secret you created for database credentials when setting up database analysis in Strategy Recommendations.

## Strategy Recommendations binary analysis

Migration Hub Strategy Recommendations automatically identifies the applications in your portfolio and the application components that belong to them. For example, if there is a Java application in your portfolio, Strategy Recommendations identifies it as an application component with a component type **java**. Without you configuring access to the source code, Strategy Recommendations can perform binary analysis. by inspecting the IIS application DLLs on Windows or application JAR files on Linux and provide anti-pattern reports or incompatibility reports. An anti-pattern report is a list of known issues that Strategy Recommendations finds in your portfolio,

categorized by severity. An incompatibility report contains a subset of the anti-patterns, which are API compatibility, Nuget Package, and Porting Action.

Strategy Recommendations performs analysis for Windows IIS and Java Tomcat and Jboss applications. If you have an IIS application, Strategy Recommendations generates an incompatibility report by default; you must configure source code access to receive the full anti-pattern report. If you have a Java application, Strategy Recommendations generates the full anti-pattern report by default.

The incompatible or anti-pattern report is displayed after the analysis is complete. If the analysis is not successful, you can try running a source code analysis by providing source code access as described in Set up version control configurations.

## Strategy Recommendations server recommendations

This section describes how to use Migration Hub Strategy Recommendations in the Migration Hub console to view migration strategy recommendations for the servers in your migration portfolio.

**To view recommendations for servers**

1. Using the AWS account that you created in Setting up Strategy Recommendations, sign in to the AWS Management Console and open the Migration Hub console at https://console.aws.amazon.com/migrationhub/.
2. In the Migration Hub console navigation pane, choose **Strategy** and then choose **Recommendations**.
3. On the **Recommendations** page, choose the **Servers** tab.

    a. Under **Server summary**, you view an overview of the various types of servers that you are running in your portfolio.

    b. Under **Servers**, you view server and operating system details and migration "R" strategy recommendations. You can also view the migration destination and the number of anti-patterns identified on your servers, which are based on the recommendations. For information about the "R" strategy, see Migration terms - 7 Rs in the *AWS Prescriptive Guidance* glossary.
4. To view in-depth recommendation details for a server, select the server from the list, and then choose **View details**. You can view the metadata collected for the server, along with in-depth analysis and recommendations for it, which are based on the application components found running on the server.

5. On the server details page (the page with the server's name as the heading), under **Recommendation summary**, you can see an overview of **Strategy recommendations** for the server. You can also view identified **Anti-patterns**. Anti-patterns are a list of known issues found in your portfolio that are categorized by severity.
6. Choose the **Strategy options** tab to view the migration recommendation for the server. You can override the recommended strategy by selecting a different strategy and then choosing **Set preferred**.
7. Choose the **Application components** tab to view the list of application components associated with the server.
8. To view details about the application component, select the component from the list and then choose **View details.** For more information about application components, see Working with application components.

# Strategy Recommendations preferences

This section describes how to view and edit Migration Hub Strategy Recommendations preferences in the Migration Hub console.

You choose your recommendation preferences when you first set up Strategy Recommendations as described in Step 5: Get recommendations. You can edit these preferences.

**To edit recommendation preferences**

1. Using the AWS account that you created in Setting up Strategy Recommendations, sign in to the AWS Management Console and open the Migration Hub console at https://console.aws.amazon.com/migrationhub/.
2. In the Migration Hub console navigation pane, choose **Strategy** and then choose **Recommendations**.
3. On the **Recommendations** page, choose the **Preferences** tab.
4. Under **Prioritized business goals**, you can drag and drop the business goals to rearrange them.
5. Choose the **Application preferences** and **Database preferences** that you want, and then choose **Save changes**.

If you change your preferences, a banner is displayed to remind you to choose **Reanalyze data**.

# Strategy Recommendations data sources

This section describes the data sources that Strategy Recommendations uses.

**Topics**



# Viewing Strategy Recommendations data sources

This section describes how to view Strategy Recommendations data sources in the AWS Management Console.

**To view data sources**

1. Using the AWS account that you created in Setting up Strategy Recommendations, sign in to the AWS Management Console and open the Migration Hub console at https://console.aws.amazon.com/migrationhub/.
2. In the Migration Hub console navigation pane, choose **Strategy** and then choose **Data sources**.
3. On the **Collectors** tab, you can view the Strategy Recommendations application data collectors that you set up. For more information about the collector, see Strategy Recommendations application data collector.
4. On the **Imports** tab, you can import data and view your data imports. For more information, see Importing data into Strategy Recommendations.
5. On the **Tools** tab, you can download the collector and application import data template.

# Strategy Recommendations application data collector

This section describes how to use the Strategy Recommendations application data collector.

For information about downloading and setting up an application data collector, see Step 1: Download the Strategy Recommendations collector.

**Topics**



## Data collected by the Strategy Recommendations collector

This section describes the type of data that the Migration Hub Strategy Recommendations application data collector collects. An application data collector is an agentless data collector that identifies running applications on your servers, performs source code analysis, and analyzes your databases.

| Data field | Description |
|---|---|
| OS type | Windows or Linux |
| OS version | The specific version of the OS. For example, Windows Server 2003, RHEL 5.2. |
| OS architecture | 32-bit or 64-bit OS |
| Is Server VM | The server is a VM or a physical machine. |
| Virtualization software | For example, vCenter, Hyper-V. |
| Location | For example, Amazon Elastic Compute Cloud console (Amazon EC2), or on-premises. |
| Is dualBoot | Allows booting into multiple OSs |
| Firmware type | BIOS, UEFI |
| Boot loader | GRUB, GRUB 2 |
| Partition table type | MBR, GPT |
| CPU speed | CPU speed in GHz. For example, 2.4 GHz. |
| **Windows OS data** | |
| Windows Edition | Standard, Data Center, Enterprise |

| Data field | Description |
| --- | --- |
| .NET framework version | The version of the .NET framework installed. |
| .NET Core version | The version of .NET Core installed. |
| **Linux data** | |
| Linux OS distribution | RHEL, CentOS, SUSE, and so on. |
| Kernel version | uname -r output, such as `4.9.217-0.1.ac.205.84.332.metal1.x86_64` |
| **For each disk volume** | |
| File system type | FAT32, NTFS, ReFS, ext4, jfs, and so on. |
| Disk volume size | Total disk size |
| Disk volume free space | Free disk space |
| Virtual disk image format | vmdk, vhd, vhdx |
| Disk type (Windows) | Basic, Dynamic |
| **Application level data** | |
| Application name | The name of the running process. For example, SQLServr.exe, MSdtsservr.exe, and so on. |
| Application type | IIS, JBoss, Tomcat, and so on. |
| Programming language & version | C#, Java |
| JDK version | The version of the JDK installed. |
| Is source code available | If you provide a source code repository, it indicates that source code is available. |
| Application bit size | 16-bit, 32-bit, 64-bit |

| Data field | Description |
| --- | --- |
| **Windows** | |
| .NET framework version used by app | The version of the .NET framework DLL being loaded at runtime for the application. |
| .NET Core version | The version .NET Core DLL being loaded at runtime for the application. |
| Uses WPF framework ? | Determines if the .NET based application is a type of WPF app or not. |
| Uses WCF framework ? | Determines if the .NET based application is a type of WCF app or not. |
| ASP.NET version | The version of ASP.NET. |
| IIS version | The version of IIS server installed on the Windows machine. |
| Application OS drivers bit size | 32-bit, 64-bit |
| Windows registry usage | Queries the registry keys of the machine to find information like database version, Java version, .NET version, and so on. |
| All DLLs used by the application | Fetches the list of all the DLLs loaded at runtime by a Windows process. |
| PowerShell version | Checks the PowerShell version installed on the machine, which should be 5.1 or later. |
| **Linux** | |
| Application framework type | Tomcat, Spring Boot, JBoss, WebLogic, WebSphere |
| Application framework version | The version of the application framework. |
| **Database** | |

| Data field | Description |
| --- | --- |
| Database type | MS SQL, Oracle, MySQL, and so on. |
| Database version | The version of the database. |

### Remove your data from Strategy Recommendations

To have all your data removed from Strategy Recommendations, contact AWS Support and request full data deletion.

## Upgrading the Strategy Recommendations collector

The Migration Hub Strategy Recommendations application data collector upgrades automatically. You can use the following procedure to manually upgrade the collector, if needed.

**To upgrade the Strategy Recommendations collector**

1. Use the following command to connect to the collector VM using an SSH client.

```
ssh ec2-user@CollectorIPAddress
```

2. Change to the upgrade directory in the collector VM as shown in the following example.

```
cd  /home/ec2-user/collector/upgrades
```

3. Use the following command to run the upgrade script.

```
sudo bash application-data-collector-upgrade
```

# Importing data into Strategy Recommendations

As an alternative to using the application data collector, you can import information about the applications and servers for which you want migration and modernization recommendations.

When you import data, the recommendations are not as in-depth as they are when you use the data collector. For example, you cannot use source code analysis on imported data.

This section describes how to use the application import template to import data into Strategy Recommendations in the Migration Hub console.

**To import data**

1. Using the AWS account that you created in Setting up Strategy Recommendations, sign in to the AWS Management Console and open the Migration Hub console at https://console.aws.amazon.com/migrationhub/.
2. In the Migration Hub console navigation pane, choose **Strategy** and then choose **Data sources**.
3. Choose the **Imports** tab.
4. Choose **Download import template** to download the application import template.
5. Fill out the template and upload it to an Amazon S3 bucket. Ensure that name of the bucket begins with the prefix `migrationhub-strategy`.
6. Return to the **Imports** tab and then choose **Import**.
7. Enter a name for your import, enter the Amazon S3 object URI for your filled out data template and then choose **Start import**.

## The Strategy Recommendations import template

The import template that you download is a `.json` file as shown in the following example.

```
{
    "ImportFormatVersion": 1,
    "Resources": [
        {
            "ResourceType": "SERVER",
            "ResourceName": "",
            "ResourceId": "",
            "IpAddress": "",
            "OSDistribution": "",
            "OSType": "",
            "HostName": "",
            "OSVersion": "",
            "CPUArchitecture": ""
        },
        {
            "ResourceType": "PROCESS",
            "ResourceName": "",
            "ResourceId": "",
```

```
            "ApplicationType": "",
            "DotNetFrameworkVersion": "",
            "ApplicationVersion": "",
            "DotNetCoreVersion": "",
            "JdkVersion": "",
            "ProgrammingLanguage": "",
            "DatabaseType": "",
            "DatabaseVersion": "",
            "DatabaseEdition": "",
            "AssociatedServerIds": []
        }
    ]
}
```

To help you fill out the import template, the valid values for the data fields are listed in the following tables.

The required fields for servers are listed in the following table.

| Name | Description | Type | Required | Valid values |
|---|---|---|---|---|
| ResourceId | A unique ID for the resource | String | Yes | Any unique string |
| ResourceName | The name of the resource | String | Yes | Any string |
| ResourceType | The type of resource to import | String | Yes | "Server", "Process" |
| OSDistribution | Windows, Windows Server, Ubuntu | String | Yes | **Windows:** "Windows PC" , "Windows Server"<br><br>**Linux:** "Ubuntu", "RHEL", "Amazon Linux", "DEBIAN", "SLES", "CENT_OS" , "ORACLE_LINUX", "FEDORA", "KALI" |

| Name | Description | Type | Required | Valid values |
|---|---|---|---|---|
| OSType | The type of operating system | String | Yes | "Windows", "Linux" |
| OSVersion | The kernel version | String | Yes | See the HTML version of the documentation. |
| CPUArchitecture | The CPU architecture | String | No | "32bit", "64bit" |
| IpAddress | The IP address of the server | Array | No | In the format xxx.xxx.xxx.xxx |
| MacAddresses | The Mac addresses associated with the server | Array | No | In the format xx:xx:xx:xx:xx:xx |
| Hostname | The name of the host | String | No | Any string |

The required fields for processes are listed in the following table.

| Name | Description | Type | Required | Valid values |
|---|---|---|---|---|
| ResourceId | A unique ID for the resource | String | Yes | Any unique string |
| ResourceName | The name of the resource | String | Yes | Any string |

| Name | Description | Type | Required | Valid values |
|---|---|---|---|---|
| ResourceType | The type of resource to import | String | Yes | "Server", "Process" |
| AssociatedServerIds | A list of server IDs on which the process is running. | String | Yes | The ResourceId from the "ResourceType": "SERVER" that you defined. |
| ApplicationType | The type of application | String | Yes | "Tomcat", "JBoss", "Spring", "IIS", "Mongo DB", "DB2", "Maria DB", "MySQL", "Oracle", "SQLServer", "Sybase", "PostgreSQLServer", "Cassandra", "IBM WebSphere", "Oracle WebLogic", "Java Generic" |
| ApplicationVersion | The version of the application | String | Yes | "IIS 1.0", "IIS 2.0", "IIS 3.0", "IIS 4.0", "IIS 5.0", "IIS 5.1", "IIS 6.0", "IIS 7.0", "IIS 7.5", "IIS 8.0", "IIS 8.5", "IIS 10.0" |
| ProgrammingLanguage | The programming language for the application | String | No | "Java", "CSharp" |

| Name | Description | Type | Required | Valid values |
|---|---|---|---|---|
| DotNetFrameworkVersion | The version of .NET Framework if the application is .NET Framework based | String | No | "DotnetFramework 1.0", "DotnetFramework 1.0 SP1", "DotnetFramework 1.0 SP2", "DotnetFramework 1.0 SP3", "DotnetFramework 1.1", "DotnetFramework 1.1 SP1", "DotnetFramework 2.0", "DotnetFramework 2.0 SP1", "DotnetFramework 2.0 SP2", "DotnetFramework 3.0", "DotnetFramework 3.0 SP1", "DotnetFramework 3.0 SP2", "DotnetFramework 3.5", "DotnetFramework 3.5 SP1", "DotnetFramework 4.0", "DotnetFramework 4.5", "DotnetFramework 4.5.1", "DotnetFramework 4.5.2", "DotnetFramework 4.6", "DotnetFramework 4.6.1", "DotnetFramework 4.6.2", "DotnetFramework 4.7", "DotnetFramework 4.7.1", "DotnetFramework 4.7.2", "DotnetFramework 4.8" |
| DotNetCoreVersion | The version of .NET Core if the application is .NET Core based | String | No | ".NET Core 1.0", ".NET Core 1.1", ".NET Core 2.0", ".NET Core 2.1", ".NET Core 2.2", ".NET Core 3.0", ".NET Core 3.1" |

| Name | Description | Type | Required | Valid values |
|---|---|---|---|---|
| JdkVersion | The version of the JDK, if the application uses the JDK | String | No | "JDK1.0", "JDK2.0", "JDK3.0", …, "JDK11.0" |
| DatabaseType | The type database | String | No | "SQLServer", "Oracle", "Sybase", "Mongo DB", "Maria DB", "Apache Cassandra", "MySQL", "IBM DB2", "PostgreSQLServer" |
| DatabaseEdition | The edition of the database | String | No | |
| DatabaseVersion | The version of the database | String | No | See the HTML version of the documentation. |

# Removing your data from Strategy Recommendations

To have all your data removed from Migration Hub Strategy Recommendations, contact AWS Support.

# Security in Migration Hub Strategy Recommendations

Cloud security at AWS is the highest priority. As an AWS customer, you benefit from data centers and network architectures that are 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 Migration Hub Strategy Recommendations, 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 Strategy Recommendations. The following topics show you how to configure Strategy Recommendations to meet your security and compliance objectives. You also learn how to use other AWS services that help you to monitor and secure your Strategy Recommendations resources.

**Topics**



# Data protection in Migration Hub Strategy Recommendations

The AWS shared responsibility model applies to data protection in Migration Hub Strategy Recommendations. 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 IAM Identity Center or 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 require TLS 1.2 and recommend TLS 1.3.
- Set up API and user activity logging with AWS CloudTrail. For information about using CloudTrail trails to capture AWS activities, see Working with CloudTrail trails in the *AWS CloudTrail User Guide*.
- 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 140-3 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) 140-3.

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 Strategy Recommendations or other AWS services using the console, API, 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. If you provide a URL to an external server, we strongly recommend that you do not include credentials information in the URL to validate your request to that server.

## Encryption at rest

All data stored in Strategy Recommendations' database is encrypted.

## Encryption in transit

Strategy Recommendations internetwork communications support TLS 1.2 encryption between all components and clients.

# Identity and access management for Migration Hub Strategy Recommendations

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 Strategy Recommendations resources. IAM is an AWS service that you can use with no additional charge.

**Topics**



## Audience

How you use AWS Identity and Access Management (IAM) differs based on your role:

- **Service user** - request permissions from your administrator if you cannot access features (see Troubleshooting Migration Hub Strategy Recommendations identity and access)
- **Service administrator** - determine user access and submit permission requests (see How Migration Hub Strategy Recommendations works with IAM)

- **IAM administrator** - write policies to manage access (see Identity-based policy examples for Migration Hub Strategy Recommendations)

## Authenticating with identities

Authentication is how you sign in to AWS using your identity credentials. You must be authenticated as the AWS account root user, an IAM user, or by assuming an IAM role.

You can sign in as a federated identity using credentials from an identity source like AWS IAM Identity Center (IAM Identity Center), single sign-on authentication, or Google/Facebook credentials. For more information about signing in, see How to sign in to your AWS account in the *AWS Sign-In User Guide*.

For programmatic access, AWS provides an SDK and CLI to cryptographically sign requests. For more information, see AWS Signature Version 4 for API requests in the *IAM User Guide*.

### AWS account root user

When you create an AWS account, you begin with one sign-in identity called the AWS account *root user* that has complete access to all AWS services and resources. We strongly recommend that you don't use the root user for everyday tasks. For tasks that require root user credentials, see Tasks that require root user credentials in the *IAM User Guide*.

### Federated identity

As a best practice, require human users to use federation with an identity provider to access AWS services using temporary credentials.

A *federated identity* is a user from your enterprise directory, web identity provider, or Directory Service that accesses AWS services using credentials from an identity source. Federated identities assume roles that provide temporary credentials.

For centralized access management, we recommend AWS IAM Identity Center. For more information, see What is IAM Identity Center? in the *AWS IAM Identity Center User Guide*.

### IAM users and groups

An *IAM user* is an identity with specific permissions for a single person or application. We recommend using temporary credentials instead of IAM users with long-term credentials. For more

information, see Require human users to use federation with an identity provider to access AWS using temporary credentials in the *IAM User Guide*.

An *IAM group* specifies a collection of IAM users and makes permissions easier to manage for large sets of users. For more information, see Use cases for IAM users in the *IAM User Guide*.

### IAM roles

An *IAM role* is an identity with specific permissions that provides temporary credentials. You can assume a role by switching from a user to an IAM role (console) or by calling an AWS CLI or AWS API operation. For more information, see Methods to assume a role in the *IAM User Guide*.

IAM roles are useful for federated user access, temporary IAM user permissions, cross-account access, cross-service access, and applications running on Amazon EC2. For more information, see Cross account resource access in IAM 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 defines permissions when associated with an identity or resource. AWS evaluates these policies when a principal makes a request. Most policies are stored in AWS as JSON documents. For more information about JSON policy documents, see Overview of JSON policies in the *IAM User Guide*.

Using policies, administrators specify who has access to what by defining which **principal** can perform **actions** on what **resources**, and under what **conditions**.

By default, users and roles have no permissions. An IAM administrator creates IAM policies and adds them to roles, which users can then assume. IAM policies define permissions regardless of the method used to perform the operation.

### Identity-based policies

Identity-based policies are JSON permissions policy documents that you attach to an identity (user, group, or role). These policies control what actions identities 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*.

Identity-based policies can be *inline policies* (embedded directly into a single identity) or *managed policies* (standalone policies attached to multiple identities). To learn how to choose between

managed and inline policies, see Choose 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. Examples include 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. You must specify a principal in a resource-based policy.

Resource-based policies are inline policies that are located in that service. You can't use AWS managed policies from IAM in a resource-based policy.

## Other policy types

AWS supports additional policy types that can set the maximum permissions granted by more common policy types:

- **Permissions boundaries** – Set the maximum permissions that an identity-based policy can grant to an IAM entity. For more information, see Permissions boundaries for IAM entities in the *IAM User Guide*.
- **Service control policies (SCPs)** – Specify the maximum permissions for an organization or organizational unit in AWS Organizations. For more information, see Service control policies in the *AWS Organizations User Guide*.
- **Resource control policies (RCPs)** – Set the maximum available permissions for resources in your accounts. For more information, see Resource control policies (RCPs) in the *AWS Organizations User Guide*.
- **Session policies** – Advanced policies passed as a parameter when creating a temporary session for a role or federated user. 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 Migration Hub Strategy Recommendations works with IAM

Before you use IAM to manage access to Strategy Recommendations, learn what IAM features are available to use with Strategy Recommendations.

**IAM features you can use with Migration Hub Strategy Recommendations**

| IAM feature | Strategy Recommendations 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 Strategy Recommendations 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 Strategy Recommendations

**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. 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 Strategy Recommendations**

To view examples of Strategy Recommendations identity-based policies, see Identity-based policy examples for Migration Hub Strategy Recommendations.

## Resource-based policies within Strategy Recommendations

**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. For more information, see Cross account resource access in IAM in the *IAM User Guide*.

## Policy actions for Strategy Recommendations

**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. Include actions in a policy to grant permissions to perform the associated operation.

To see a list of Strategy Recommendations actions, see Actions Defined by Migration Hub Strategy Recommendations in the *Service Authorization Reference*.

Policy actions in Strategy Recommendations use the following prefix before the action:

```
migrationhub-strategy
```

To specify multiple actions in a single statement, separate them with commas.

```
"Action": [
      "migrationhub-strategy:action1",
      "migrationhub-strategy:action2"
         ]
```

To view examples of Strategy Recommendations identity-based policies, see Identity-based policy examples for Migration Hub Strategy Recommendations.

## Policy resources for Strategy Recommendations

**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. As a best practice, specify a resource using its Amazon Resource Name (ARN). For actions that don't support resource-level permissions, use a wildcard (*) to indicate that the statement applies to all resources.

```
"Resource": "*"
```

To see a list of Strategy Recommendations resource types and their ARNs, see Resources Defined by Migration Hub Strategy Recommendations in the *Service Authorization Reference*. To learn with which actions you can specify the ARN of each resource, see Actions Defined by Migration Hub Strategy Recommendations .

To view examples of Strategy Recommendations identity-based policies, see Identity-based policy examples for Migration Hub Strategy Recommendations.

## Policy condition keys for Strategy Recommendations

**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 specifies when statements execute based on defined criteria. 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. To see all AWS global condition keys, see AWS global condition context keys in the *IAM User Guide*.

To see a list of Strategy Recommendations condition keys, see Condition Keys for Migration Hub Strategy Recommendations in the *Service Authorization Reference*. To learn with which actions and resources you can use a condition key, see Actions Defined by Migration Hub Strategy Recommendations .

To view examples of Strategy Recommendations identity-based policies, see Identity-based policy examples for Migration Hub Strategy Recommendations.

## Access control lists (ACLs) in Strategy Recommendations

**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.

## Attribute-based access control (ABAC) with Strategy Recommendations

**Supports ABAC (tags in policies):** No

Attribute-based access control (ABAC) is an authorization strategy that defines permissions based on attributes called tags. You can attach tags to IAM entities and AWS resources, then design ABAC policies to allow operations when the principal's tag matches the tag on the resource.

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 Strategy Recommendations

**Supports temporary credentials:** Yes

Temporary credentials provide short-term access to AWS resources and are automatically created when you use federation or switch roles. AWS recommends that you dynamically generate temporary credentials instead of using long-term access keys. For more information, see Temporary security credentials in IAM and AWS services that work with IAM in the *IAM User Guide*.

## Cross-service principal permissions for Strategy Recommendations

**Supports forward access sessions (FAS):** Yes

Forward access sessions (FAS) use the permissions of the principal calling an AWS service, combined with the requesting AWS service to make requests to downstream services. For policy details when making FAS requests, see Forward access sessions.

## Service roles for Strategy Recommendations

**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 Strategy Recommendations functionality. Edit service roles only when Strategy Recommendations provides guidance to do so.

## Service-linked roles for Strategy Recommendations

**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 Strategy Recommendations service-linked roles, see Using service-linked roles for Strategy Recommendations.

## AWS managed policies for Migration Hub Strategy Recommendations

To add permissions to users, groups, and roles, it is easier to use AWS managed policies than to write policies yourself. It takes time and expertise to create IAM customer managed policies that provide your team with only the permissions they need. To get started quickly, you can use our AWS managed policies. These policies cover common use cases and are available in your AWS account. For more information about AWS managed policies, see AWS managed policies in the *IAM User Guide*.

AWS services maintain and update AWS managed policies. You can't change the permissions in AWS managed policies. Services occasionally add additional permissions to an AWS managed policy to support new features. This type of update affects all identities (users, groups, and roles) where the policy is attached. Services are most likely to update an AWS managed policy when a new feature is launched or when new operations become available. Services do not remove permissions from an AWS managed policy, so policy updates won't break your existing permissions.

Additionally, AWS supports managed policies for job functions that span multiple services. For example, the **ReadOnlyAccess** AWS managed policy provides read-only access to all AWS services and resources. When a service launches a new feature, AWS adds read-only permissions for new operations and resources. For a list and descriptions of job function policies, see AWS managed policies for job functions in the *IAM User Guide*.

### AWS managed policy: AWSMigrationHubStrategyConsoleFullAccess

You can attach the `AWSMigrationHubStrategyConsoleFullAccess` policy to your IAM identities.

The `AWSMigrationHubStrategyConsoleFullAccess` policy grants a user full access to the Strategy Recommendations service through the AWS Management Console.

**Permissions details**

This policy includes the following permissions.

- `discovery` – Grants the user access to get discovery summary in Application Discovery Service.
- `iam` – Allows a service-linked role to be created for the user, which is a requirement for using Strategy Recommendations.
- `migrationhub-strategy` – Grants the user full access to Strategy Recommendations.
- `s3` – Allows the user to create and read from the S3 buckets used by Strategy Recommendations.
- `secretsmanager` – Allows the user to list secrets access in the Secrets Manager.

To view the permissions for this policy, see AWSMigrationHubStrategyConsoleFullAccess in the *AWS Managed Policy Reference Guide*.

## AWS managed policy: AWSMigrationHubStrategyCollector

You can attach the `AWSMigrationHubStrategyCollector` policy to your IAM identities.

**Permissions details**

This policy includes the following permissions.

- `application-transformation` – Grants permissions to upload log and metric data for application transformation operations and work with porting compatibility assessments and recommendations.
- `execute-api` – Allows the user to access Amazon API Gateway to upload logs and metrics to AWS.
- `migrationhub-strategy` – Grants the user access to register messages, send messages, upload log data, and upload metric data to Strategy Recommendations.
- `s3` – Grants the user access to list buckets and their locations. Users are also granted access to write to, retrieve objects from, add objects to, return the access control list (ACL) of, create, access, configure encryption for, modify the `PublicAccessBlock` configuration for, set the versioning state for, and create or replace a lifecycle configuration for the S3 buckets used by Strategy Recommendations.

- `secretsmanager` – Allows the user to access secrets in the Secrets Manager that are used by Strategy Recommendations.

To view the permissions for this policy, see AWSMigrationHubStrategyCollector in the *AWS Managed Policy Reference Guide*.

## Strategy Recommendations updates to AWS managed policies

View details about updates to AWS managed policies for Strategy Recommendations since this service began tracking these changes. For automatic alerts about changes to this page, subscribe to the RSS feed on the Strategy Recommendations Document history page.

| Change | Description | Date |
| --- | --- | --- |
| AWSMigrationHubStrategyCollector – Update to an existing policy | This policy is updated to include the `PutLogData` , `StartPortingCompatibilityAssessment` , `GetPortingCompatibilityAssessment` , `StartPortingRecommendationAssessment` and `GetPortingRecommendationAssessment` application transformation actions to allow the application transformation service to send logs and metrics to the service. The `ListBucket` and `GetBucketLocation` were added for Amazon Simple Storage Service (Amazon S3) to support log and metric uploads. | April 1, 2024 |

| Change | Description | Date |
| --- | --- | --- |
| | The `PutLogData` and `PutMetricData` were also added to allow the Strategy Recommendations collector to send logs and metrics to the service's endpoint. | |
| AWSMigrationHubStrategyCollector – Update to an existing policy | This policy is updated with the `PutMetricData` and `PutLogData` actions. These actions grant uploading log and metric data for application transformation operations. This update also adds conditions to ensure that the `aws:ResourceAccount` is equal to the `aws:PrincipalAccount` for permission to use the included Amazon Simple Storage Service and AWS Secrets Manager actions. | February 5, 2024 |
| AWSMigrationHubStrategyCollector – Update to an existing policy | This policy is updated with the following Amazon S3 APIs – `CreateBucket`, `PutEncryptionConfiguration`, `PutBucketPublicAccessBlock`, `PutBucketPolicy`, `PutBucketVersioning`, and `PutLifecycleConfiguration`. | September 15, 2023 |

| Change | Description | Date |
| --- | --- | --- |
| AWSMigrationHubStrategyCollector – Update to an existing policy | This policy update grants permissions that allow analysis of source code. | March 8, 2023 |
| AWSMigrationHubStrategyConsoleFullAccess – Update to an existing policy | This policy is updated with three AWS Application Discovery Service APIs – `DescribeConfigurations` , `DescribeTags` , and `ListConfigurations` . | November 10, 2022 |
| AWSMigrationHubStrategyCollector – Update to an existing policy | This policy is updated with the `UpdateCollectorConfiguration` action. This action stores the configuration of your collector for easy retrieval. | September 07, 2022 |
| AWSMigrationHubStrategyConsoleFullAccess – New policy made available at launch | `AWSMigrationHubStrategyConsoleFullAccess` grants a user full access to the Strategy Recommendations service through the AWS Management Console. | October 25, 2021 |

| Change | Description | Date |
| --- | --- | --- |
| AWSMigrationHubStrategyCollector – New policy made available at launch | `AWSMigrationHubStrategyCollector` grants a user access to the Strategy Recommendations service and read/write access to the S3 buckets that are related to the service. It also grants Amazon API Gateway access to upload logs and metrics to AWS, and AWS Secrets Manager access to fetch credentials. | October 25, 2021 |
| AWSMigrationHubStrategyServiceRolePolicy – New policy made available at launch | The `AWSMigrationHubStrategyServiceRolePolicy` service-linked role policy provides access to AWS Migration Hub and AWS Application Discovery Service. This policy also grants permissions for storing reports in Amazon Simple Storage Service (Amazon S3). | October 25, 2021 |
| Strategy Recommendations started tracking changes | Strategy Recommendations started tracking changes for its AWS managed policies. | October 25, 2021 |

## Identity-based policy examples for Migration Hub Strategy Recommendations

By default, users and roles don't have permission to create or modify Strategy Recommendations resources. To grant users permission to perform actions on the resources that they need, an IAM administrator can create IAM policies.

To learn how to create an IAM identity-based policy by using these example JSON policy documents, see Create IAM policies (console) in the *IAM User Guide*.

For details about actions and resource types defined by Strategy Recommendations, including the format of the ARNs for each of the resource types, see Actions, Resources, and Condition Keys for Migration Hub Strategy Recommendations in the *Service Authorization Reference*.

**Topics**



## Policy best practices

Identity-based policies determine whether someone can create, access, or delete Strategy Recommendations 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 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*.

## Using the Strategy Recommendations console

To access the Migration Hub Strategy Recommendations console, you must have a minimum set of permissions. These permissions must allow you to list and view details about the Strategy Recommendations resources in your AWS account. If you create an identity-based policy that is more restrictive than the minimum required permissions, the console won't function as intended for entities (users or roles) with that policy.

You don't need to allow minimum console permissions for users that are making calls only to the AWS CLI or the AWS API. Instead, allow access to only the actions that match the API operation that they're trying to perform.

To ensure that users and roles can still use the Strategy Recommendations console, also attach the Strategy Recommendations `ConsoleAccess` or `ReadOnly` AWS managed policy to the entities. For more information, see Adding permissions to a user in the *IAM User Guide*.

## Allow users to view their own 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": "*"
        }
    ]
}
```

## Accessing one Amazon S3 bucket

In this example, you want to grant an IAM user in your AWS account access to one of your Amazon S3 buckets, `amzn-s3-demo-bucket`. You also want to allow the user to add, update, and delete objects.

In addition to granting the `s3:PutObject`, `s3:GetObject`, and `s3:DeleteObject` permissions to the user, the policy also grants the `s3:ListAllMyBuckets`, `s3:GetBucketLocation`, and `s3:ListBucket` permissions. These are the additional permissions required by the console. Also, the `s3:PutObjectAcl` and the `s3:GetObjectAcl` actions are required to be able to copy, cut, and paste objects in the console. For an example walkthrough that grants permissions to users and

tests them using the console, see An example walkthrough: Using user policies to control access to your bucket.

JSON

```
{
   "Version":"2012-10-17",
   "Statement":[
      {
         "Sid":"ListBucketsInConsole",
         "Effect":"Allow",
         "Action":[
            "s3:ListAllMyBuckets"
         ],
         "Resource":"arn:aws:s3:::*"
      },
      {
         "Sid":"ViewSpecificBucketInfo",
         "Effect":"Allow",
         "Action":[
            "s3:ListBucket",
            "s3:GetBucketLocation"
         ],
         "Resource":"arn:aws:s3:::amzn-s3-demo-bucket"
      },
      {
         "Sid":"ManageBucketContents",
         "Effect":"Allow",
         "Action":[
            "s3:PutObject",
            "s3:PutObjectAcl",
            "s3:GetObject",
            "s3:GetObjectAcl",
            "s3:DeleteObject"
         ],
         "Resource":"arn:aws:s3:::amzn-s3-demo-bucket/*"
      }
   ]
}
```

# Troubleshooting Migration Hub Strategy Recommendations identity and access

Use the following information to help you diagnose and fix common issues that you might encounter when working with Strategy Recommendations and IAM.

**Topics**



## I am not authorized to perform an action in Strategy Recommendations

If the AWS Management Console tells you that you're not authorized to perform an action, then you must contact your administrator for assistance. Your administrator is the person that provided you with your user name and password.

The following example error occurs when the `mateojackson` IAM user tries to use the console to view details about a fictional *`my-example-widget`* resource but does not have the fictional `migrationhub-strategy:`*`GetWidget`* permissions.

```
User: arn:aws:iam::123456789012:user/mateojackson is not authorized to perform:
 migrationhub-strategy:GetWidget on resource: my-example-widget
```

In this case, Mateo asks his administrator to update his policies to allow him to access the *`my-example-widget`* resource using the `migrationhub-strategy:`*`GetWidget`* action.

## I am not authorized to perform iam:PassRole

If you receive an error that you're not authorized to perform the `iam:PassRole` action, your policies must be updated to allow you to pass a role to Strategy Recommendations.

Some AWS services allow you to pass an existing role to that service instead of creating a new service role or service-linked role. To do this, you must have permissions to pass the role to the service.

The following example error occurs when an IAM user named `marymajor` tries to use the console to perform an action in Strategy Recommendations. However, the action requires the service to have permissions that are granted by a service role. Mary does not have permissions to pass the role to the service.

```
User: arn:aws:iam::123456789012:user/marymajor is not authorized to perform:
 iam:PassRole
```

In this case, Mary's policies must be updated to allow her to perform the `iam:PassRole` action.

If you need help, contact your AWS administrator. Your administrator is the person who provided you with your sign-in credentials.

## I want to view my access keys

After you create your IAM user access keys, you can view your access key ID at any time. However, you can't view your secret access key again. If you lose your secret key, you must create a new access key pair.

Access keys consist of two parts: an access key ID (for example, `AKIAIOSFODNN7EXAMPLE`) and a secret access key (for example, `wJalrXUtnFEMI/K7MDENG/bPxRfiCYEXAMPLEKEY`). Like a user name and password, you must use both the access key ID and secret access key together to authenticate your requests. Manage your access keys as securely as you do your user name and password.

> **Important**
>
> Do not provide your access keys to a third party, even to help find your canonical user ID. By doing this, you might give someone permanent access to your AWS account.

When you create an access key pair, you are prompted to save the access key ID and secret access key in a secure location. The secret access key is available only at the time you create it. If you lose your secret access key, you must add new access keys to your IAM user. You can have a maximum of two access keys. If you already have two, you must delete one key pair before creating a new one. To view instructions, see Managing access keys in the *IAM User Guide*.

## I'm an administrator and want to allow others to access Strategy Recommendations

To allow others to access Strategy Recommendations, you must grant permission to the people or applications that need access. If you are using AWS IAM Identity Center to manage people and applications, you assign permission sets to users or groups to define their level of access. Permission sets automatically create and assign IAM policies to IAM roles that are associated with the person or application. For more information, see Permission sets in the *AWS IAM Identity Center User Guide*.

If you are not using IAM Identity Center, you must create IAM entities (users or roles) for the people or applications that need access. You must then attach a policy to the entity that grants them the correct permissions in Strategy Recommendations. After the permissions are granted, provide the credentials to the user or application developer. They will use those credentials to access AWS. To learn more about creating IAM users, groups, policies, and permissions, see IAM Identities and Policies and permissions in IAM in the *IAM User Guide*.

## I want to allow people outside of my AWS account to access my Strategy Recommendations resources

You can create a role that users in other accounts or people outside of your organization can use to access your resources. You can specify who is trusted to assume the role. For services that support resource-based policies or access control lists (ACLs), you can use those policies to grant people access to your resources.

To learn more, consult the following:

- To learn whether Strategy Recommendations supports these features, see How Migration Hub Strategy Recommendations works with IAM.
- To learn how to provide access to your resources across AWS accounts that you own, see Providing access to an IAM user in another AWS account that you own in the *IAM User Guide*.
- To learn how to provide access to your resources to third-party AWS accounts, see Providing access to AWS accounts owned by third parties in the *IAM User Guide*.
- To learn how to provide access through identity federation, see Providing access to externally authenticated users (identity federation) in the *IAM User Guide*.
- To learn the difference between using roles and resource-based policies for cross-account access, see Cross account resource access in IAM in the *IAM User Guide*.

# Using service-linked roles for Strategy Recommendations

Migration Hub Strategy Recommendations 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 Strategy Recommendations. Service-linked roles are predefined by Strategy Recommendations and include all the permissions that the service requires to call other AWS services on your behalf.

A service-linked role makes setting up Strategy Recommendations easier because you don't have to manually add the necessary permissions. Strategy Recommendations defines the permissions of its service-linked roles, and unless defined otherwise, only Strategy Recommendations 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.

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 Role** column. Choose a **Yes** with a link to view the service-linked role documentation for that service.

## Service-linked role permissions for Strategy Recommendations

Strategy Recommendations uses the service-linked role named **AWSServiceRoleForMigrationHubStrategy** and associates it with **AWSMigrationHubStrategyServiceRolePolicy** IAM policy – Provides access to AWS Migration Hub and AWS Application Discovery Service. This policy also grants permissions for storing reports in Amazon Simple Storage Service (Amazon S3).

The **AWSServiceRoleForMigrationHubStrategy** service-linked role trusts the following services to assume the role:

- `migrationhub-strategy.amazonaws.com`

The role permissions policy allows Strategy Recommendations to complete the following actions.

AWS Application Discovery Service actions

```
discovery:ListConfigurations
```

```
discovery:DescribeConfigurations
```

AWS Migration Hub actions

```
mgh:GetHomeRegion
```

Amazon S3 actions

```
s3:GetBucketAcl

s3:GetBucketLocation

s3:GetObject

s3:ListAllMyBuckets

s3:ListBucket

s3:PutObject

s3:PutObjectAcl
```

To view the permissions for this policy, see AWSMigrationHubStrategyServiceRolePolicy in the *AWS Managed Policy Reference Guide*.

To view the update history of this policy, see Strategy Recommendations updates to AWS managed policies.

You must configure permissions to allow an IAM entity (such as a user, group, or role) 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 Strategy Recommendations

You don't need to manually create a service-linked role. When you agree to allow Migration Hub to create a service-linked role (SLR) in your account in the AWS Management Console, Strategy Recommendations 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 agree to allow Migration Hub to create a service-linked role (SLR) in your account, Strategy Recommendations creates the service-linked role for you again.

## Editing a service-linked role for Strategy Recommendations

Strategy Recommendations does not allow you to edit the **AWSServiceRoleForMigrationHubStrategy** 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 the Strategy Recommendations console, CLI, or API.

### Deleting a service-linked role for Strategy Recommendations

#### To manually delete the service-linked role using IAM

Use the IAM console, the AWS CLI, or the AWS API to delete the **AWSServiceRoleForMigrationHubStrategy** service-linked role. For more information, see Deleting a Service-Linked Role in the *IAM User Guide*.

When deleting Strategy Recommendations resources used by the **AWSServiceRoleForMigrationHubStrategy** SLR, you cannot have any running assessments (tasks for generating recommendations). No background assessments can be running, either. If assessments are running, the SLR deletion fails in the IAM console. If the SLR deletion fails, you can retry the deletion after all background tasks have completed. You don't need to clean up any created resources before you delete the SLR.

### Supported Regions for Strategy Recommendations service-linked roles

Strategy Recommendations supports using service-linked roles in all of the regions where the service is available. For more information, see AWS Regions and Endpoints.

## Migration Hub Strategy Recommendations and interface VPC endpoints (AWS PrivateLink)

You can establish a private connection between your VPC and Migration Hub Strategy Recommendations by creating an *interface VPC endpoint*. Interface endpoints are powered by AWS PrivateLink. With AWS PrivateLink, you can privately access Strategy Recommendations API operations without an internet gateway, NAT device, VPN connection, or Direct Connect connection. Instances in your VPC don't need public IP addresses to communicate with Strategy Recommendations API operations. Traffic between your VPC and Strategy Recommendations stays within 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 Strategy Recommendations VPC endpoints

Before you set up an interface VPC endpoint for Strategy Recommendations, ensure that you review Interface endpoint properties and limitations and AWS PrivateLink quotas in the *Amazon VPC User Guide*.

Strategy Recommendations supports making calls to all of its API actions from your VPC. To use all of Strategy Recommendations, you must create a VPC endpoint.

## Creating an interface VPC endpoint for Strategy Recommendations

You can create a VPC endpoint for Strategy Recommendations 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 a VPC endpoint for Strategy Recommendations using the following service name:

- `com.amazonaws.region.migrationhub-strategy`

If you use private DNS for the endpoint, you can make API requests to Strategy Recommendations using its default DNS name for the Region. For example, you can use the name `migrationhub-strategy.us-east-1.amazonaws.com`.

For more information, see Accessing a service through an interface endpoint in the *Amazon VPC User Guide*.

## Creating a VPC endpoint policy for Strategy Recommendations

You can attach an endpoint policy to your VPC endpoint that controls access to Strategy Recommendations. The policy specifies the following information:

- The principal that can perform actions.
- The actions that can be performed.
- The resources on which these actions can be performed.

For more information, see Controlling access to services with VPC endpoints in the *Amazon VPC User Guide*.

**Example: VPC endpoint policy for Strategy Recommendations actions**

The following is an example of an endpoint policy for Strategy Recommendations. When attached to an endpoint, this policy grants access to the listed Strategy Recommendations actions for all principals on all resources.

```
{
   "Statement":[
      {
         "Principal":"*",
         "Effect":"Allow",
         "Action":[
            "migrationhub-strategy:ListContacts",
         ],
         "Resource":"*"
      }
   ]
}
```

# Compliance validation for Migration Hub Strategy Recommendations

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. For more information about your compliance responsibility when using AWS services, see AWS Security Documentation.

# Working with other services

This section describes other AWS services that interact with Migration Hub Strategy Recommendations.

**Topics**



# Logging Strategy Recommendations API calls with AWS CloudTrail

Migration Hub Strategy Recommendations is integrated with AWS CloudTrail, a service that provides a record of actions taken by a user, role, or an AWS service in Strategy Recommendations. CloudTrail captures API calls for Strategy Recommendations as events. The calls captured include calls from the Strategy Recommendations console and code calls to the Strategy Recommendations API operations.

If you create a trail, you can enable continuous delivery of CloudTrail events to an Amazon S3 bucket, including events for Strategy Recommendations. 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 Strategy Recommendations, the IP address from which the request was made, who made the request, when it was made, and additional details.

To learn more about CloudTrail, see the AWS CloudTrail User Guide.

## Strategy Recommendations information in CloudTrail

CloudTrail is enabled on your AWS account when you create the account. When activity occurs in Strategy Recommendations, 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.

For an ongoing record of events in your AWS account, including events for Strategy Recommendations, 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:

- Overview for creating a trail
- CloudTrail supported services and integrations
- Configuring Amazon SNS notifications for CloudTrail
- Receiving CloudTrail log files from multiple regions and Receiving CloudTrail log files from multiple accounts

Strategy Recommendations supports logging the following actions as events in CloudTrail log files:

- GetApplicationComponentStrategies
- GetApplicationComponentDetails
- GetAssesment
- GetImportFileTask
- GetPortfolioPreferences
- GetPortfolioSummary
- GetServerDetails
- GetServerStrategies
- ListApplicationComponents
- ListCollectors
- ListImportFileTask
- ListServers
- PutPortfolioPreferences
- StartAssessment
- StartImportFileTask
- StopAssessment
- UpdateApplicationComponetConfig
- UpdateServerConfig

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 the CloudTrail userIdentity element.

## Understanding Strategy Recommendations 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.

The following example shows a CloudTrail log entry that demonstrates the GetServerDetails action.

```
{
    "eventVersion": "1.08",
    "userIdentity": {
        "type": "AssumedRole",
        "principalId": "777777777777",
        "arn": "arn:aws:sts::111122223333:assumed-role/myUserName/...",
        "accountId": "111122223333",
        "accessKeyId": "AKIAIOSFODNN7EXAMPLE",
        "sessionContext": {
            "sessionIssuer": {
                "type": "Role",
                "principalId": "777777777777",
                "arn": "arn:aws:iam::111122223333:role/myUserName",
                "accountId": "111122223333",
                "userName": "myUserName"
            },
            "webIdFederationData": {},
            "attributes": {
                "creationDate": "2021-09-20T01:07:16Z",
                "mfaAuthenticated": "false"
            }
        }
    },
```

```
    "eventTime": "2021-09-20T01:07:43Z",
    "eventSource": "migrationhub-strategy.amazonaws.com",
    "eventName": "GetServerDetails",
    "awsRegion": "us-west-2",
    "sourceIPAddress": "",
    "userAgent": "",
    "requestParameters": {
        "serverId": "ads-server-006"
    },
    "responseElements": null,
    "requestID": "07D681279BD94AED",
    "eventID": "cdc4b7ed-e171-4cef-975a-ad829d4123e8",
    "readOnly": true,
    "eventType": "AwsApiCall",
    "managementEvent": true,
    "recipientAccountId": "111122223333",
    "eventCategory": "Management"
}
```

# Quotas for Migration Hub Strategy Recommendations

Your AWS account has default quotas, formerly referred to as limits, for each AWS service. Unless otherwise noted, each quota is Region-specific. You can request increases for some quotas, and other quotas cannot be increased.

To view a list of the quotas for Migration Hub Strategy Recommendations, see Strategy Recommendations service quotas.

You can also view the quotas for Strategy Recommendations, by opening the Service Quotas console. In the navigation pane, choose **AWS services** and select **Migration Hub Strategy Recommendations**.

To request a quota increase, see Requesting a Quota Increase in the *Service Quotas User Guide*. If the quota is not yet available in Service Quotas, use the limit increase form.

# Release notes

### Topics



## November 17, 2023

### New features

- Collector v1.1.47
- Support for .NET 8 applications.

## October 12, 2023

### New features

- Collector v1.1.45
- Support for Multi-data sources.

# April 17, 2023

### New features

- Collector v1.1.22
- Upgrade script enhancements. This requires the latest version of the Collector.

# March 17, 2023

### New feature

Added binary analysis, which provides anti-patterns and incompatibilities detection without source code.

# November 07, 2022

### New feature

- Application filtering for applications
- Server filtering by AWS Application Discovery Service tags

# September 27, 2022

### New feature

- Collector v1.1.12
  - SCT version 667
  - EMPAnalyzer 2.2.0.368
- Added `diag check` commands for server insights.
- Added support for *Potential* recommendations.
- Enhanced user interface to check configuration and assessment status.

### Bug fixes

- Porting assistant translator and other fixes.

# June 30, 2022

### New feature

- Collector v1.1.11
  - Added VMware API support.
  - A2C requested changes to add user header while downloading the binary file.
  - Added Linux home path, default shell, and remote termination of all shells.
- A2C v1.17 public binary
  - Added support for Azure DevOps as a pipeline deployment target.

# April 18, 2022

### New feature

- Collector v1.1.7
- Added the capability to dynamically download A2C binary from the public URL.

### Bug fixes

- A2C v1.1.5

# February 25, 2022

### Bug fixes

- SCT v5.6.9
- A2C v1.1.2
- Collector v1.1.4

# February 10, 2022

### Bug fixes

- SCT v5.6.8

- A2C v1.1.1
  - Added a check for the **tar** command on Linux.
  - Fixed the issue of checking application images in Amazon ECR.
  - Fixed the issue requiring container removal for pre-validation.
- Collector v1.1.3
  - Fixed the 4xx error for remote 32-bit machine.
  - Updated the A2C error codes.
  - Validated the IP address in C# for source code analysis of the remote machine.

# January 28, 2022

### New feature

- Collector v1.1.2
- Added Azure DevOps Git repository support for source code analysis.

# January 14, 2022

### New feature

- Collector v1.1.1
- Added Babelfish recommendations for SQL databases.

# December 21, 2021

### Issue resolved

- Collector v1.1.0
- Database analysis has been restored.

# December 15, 2021

### Known issue

- Collector v1.0.4
- Database analysis is currently unsupported (CVE-2021-44228).

# October 25, 2021

### New feature

- Collector v1.0.0
- Initial release of the Migration Hub Strategy Recommendations User Guide.

# Document and version history

The following table describes the documentation releases for Strategy Recommendations. For more information, see Release notes.

| Change | Description | Date |
| --- | --- | --- |
| AWS managed policy updates - update to AWSMigrationHubStrategyCollector | Updated the AWSMigrationHubStrategyCollector policy to include new `s3`, `application-transformation` , and `migrationhub-strategy` actions. | April 1, 2024 |
| AWS managed policy updates - update to AWSMigrationHubStrategyCollector | Updated the AWSMigrationHubStrategyCollector policy to include new `application-transformation` actions. This update also adds conditions to restrict various actions where `aws:ResourceAccount` must be equal to the `aws:PrincipalAccount` . | February 5, 2024 |
| New feature | Strategy Recommendations application data collector client v1.1.47 is available with support for .NET 8 applications. | November 17, 2023 |
| New feature | Strategy Recommendations application data collector client v1.1.45 is available with | October 12, 2023 |

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| | support for Multiple data sources. | |
| AWS managed policy updates - update to AWSMigrationHubStrategyCollector | Updated the AWSMigrationHubStrategyCollector policy to include new Amazon S3 APIs. | September 15, 2023 |
| AWS managed policy updates - update to AWSMigrationHubStrategyCollector | Updated the AWSMigrationHubStrategyCollector policy to include new analyzers for source code. | March 8, 2023 |
| IAM best practices updates | For more information, see Security best practices in IAM. | February 25, 2023 |
| AWS managed policy updates - update to an existing policy | Migration Hub Strategy Recommendations added three AWS Application Discovery Service APIs added to an existing policy. | November 10, 2022 |
| Security updates | Establish a private connection with interface VPC endpoint. | March 07, 2022 |
| New feature | Added Azure DevOps Git repository support for source code analysis. | January 28, 2022 |
| New feature | Added Babelfish recommendations for SQL databases. | January 14, 2022 |
| Initial release | Initial release of the Migration Hub Strategy Recommendations User Guide. | October 25, 2021 |