Architecture diagrams for power and utilities

HPC Simulation Workload for Renewable Energy Data

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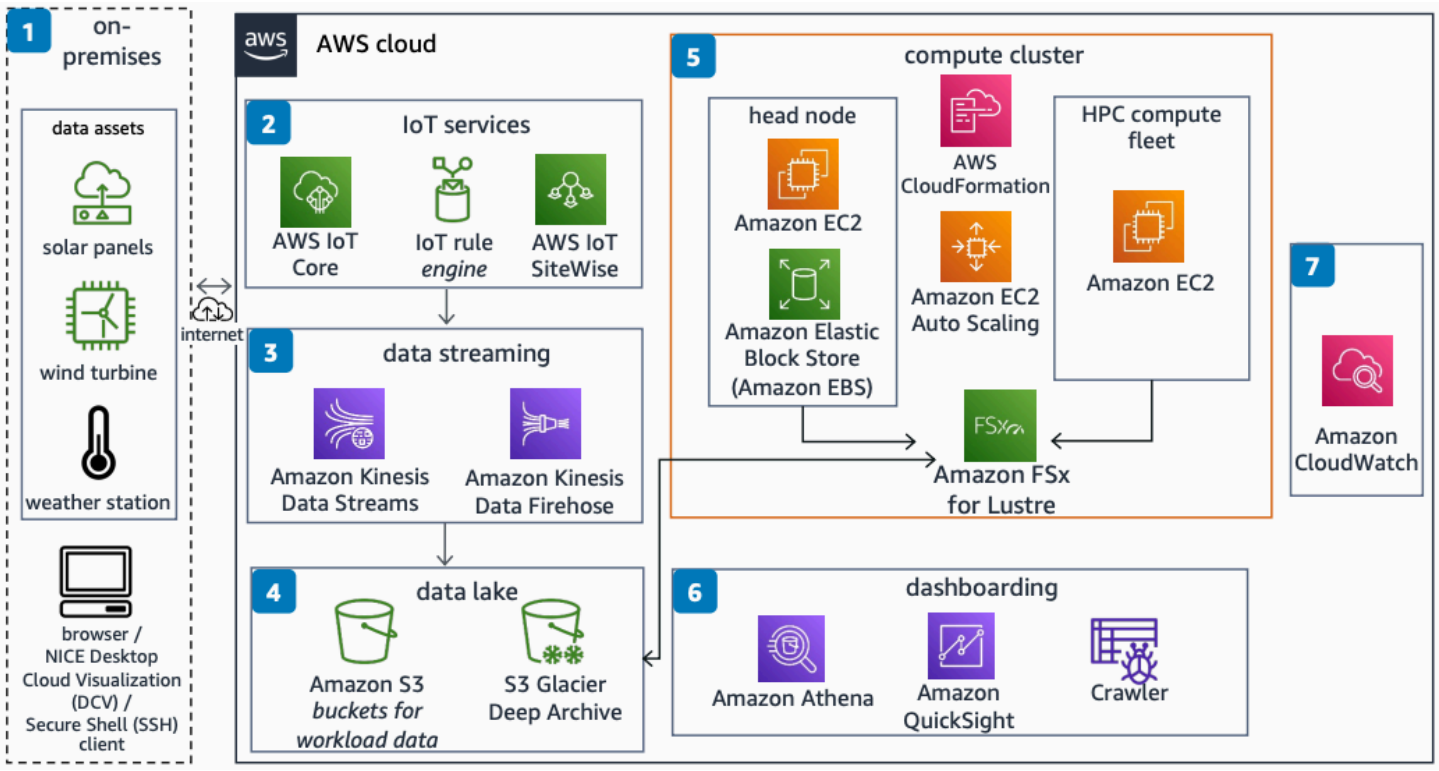
With this architecture, you can ingest data from on-premises renewable energy assets such as weather stations, wind turbines, and solar panels. You can also run high performance computing (HPC) and artificial intelligence/machine learning (AI/ML) workloads on that data. The solution uses AWS IoT Core for device connectivity, AWS ParallelCluster for HPC infrastructure, and Amazon Quick Sight for dashboarding.

HPC simulation workload diagram



The following steps describe the data ingestion, compute, and visualization pipeline for this architecture:

1. Connect on-premises assets such as solar panels, wind turbines, or weather stations.
2. Use AWS IoT Core to connect IoT devices and route messages to AWS services. Use AWS IoT SiteWise to simplify collecting, organizing, and analyzing industry equipment data.

3. Collect and process large streams of data records in real time by using Amazon Kinesis Data Streams. Deliver near-real-time data streams from your source destination by using Amazon Data Firehose.
4. Store processed data in Amazon Simple Storage Service-based central data lake repositories.
5. Use AWS ParallelCluster with AWS CloudFormation templates to create HPC infrastructure. Interface directly with the cluster through NICE DCV or Secure Shell (SSH). Use FSx for Lustre as a high-performance parallel file system for shared storage between the HPC cluster nodes. Integrate FSx for Lustre with Amazon S3 buckets for accessing simulation input and output data.
6. Use Amazon Athena for data preparation and task building views of report data.
7. Use Amazon Quick Sight to query and build visualizations to discover insights into your data. Use an AWS Glue Crawler to discover schemas and store them in the AWS Glue Data Catalog. Classify schemas for common file formats such as JSON and CSV.

Further reading

For additional information, see the following resources:

- AWS Architecture Icons
- AWS Architecture Center
- AWS Well-Architected

Diagram history

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