Introduction to Amazon CloudWatch

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Course objectives

In this course, you learn the benefits of setting up Amazon CloudWatch dashboards and alarms to monitor AWS services.

By the end of this course, you will be able to do the following:

- Summarize the benefits of monitoring AWS systems using Amazon CloudWatch.
- Describe how Amazon CloudWatch collects, monitors, and visualizes service data.
- Locate the dashboard, logs, and alarms within Amazon CloudWatch.
- Explain the difference between the Amazon CloudWatch free and paid tier offerings.

Amazon CloudWatch Overview

AWS resources create operational data that you can monitor through metrics, logs, network traffic, events, and more. The data can be distributed all over the place. It's difficult to collect all the data if you don't have a centralized place to review it all.

That's where Amazon CloudWatch can help. CloudWatch is a monitoring and observation service that collects your resource data into a dashboard or log and provides insights into your applications. With CloudWatch, you can respond to system-wide performance changes, optimize resource usage, and get a unified view of operational health.

Benefits of Using Amazon CloudWatch

You can use CloudWatch to do the following:

- Identify unusual behavior in your environments.
- Receive notifications for alarms and events to notify you about important changes in your account.

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- Visualize logs and metrics with the AWS Management Console.

- Create event driven automations.

- Detect problems.

- Identify patterns to keep your applications healthy.

How CloudWatch works

Amazon CloudWatch offers complete visibility into your cloud resources and applications. Review each topic to learn more.

Collect:

- Default service metrics collected automatically

- Custom metrics collected using AWS Command Line Interface (AWS CLI) and API (Cloud or on-premises)

- Application logs collected using CloudWatch agent (Cloud or on-premises

Monitor:

- Identifies trends through the use of dashboard visualizations

- Troubleshoots issues by correlating log and metric data

- Sets alerts for quick notifications

Act:

- Employs automated responses to operational changes with Amazon EventBridge and AWS Auto Scaling

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Analyze:

- Interactively searches and analyzes your log data using Amazon CloudWatch Logs Insights
- Identifies potential issue causes and validates deployed fixes

CloudWatch concepts

Metrics are the fundamental concept in Amazon CloudWatch. A metric represents a time-ordered set of data points that are published to CloudWatch. Every metric data point must be associated with a timestamp.

For example, the CPU usage of an EC2 instance is a metric provided by Amazon Elastic Compute Cloud, or Amazon EC2. The CPU usage will filter in to the dashboard with the time that the metric was recorded. Review each metrics.

- **Metric:** Metrics are data about the performances of your systems.
- **Timestamp:** Each metric data point must be associated with a timestamp. If you don't provide a timestamp, CloudWatch will create one based on the time that the data point was received.

CloudWatch agent

You can install the CloudWatch agent on your on-premises and EC2 systems to forward detailed OS-level metrics directly into the CloudWatch service. Metrics collected by the CloudWatch agent are billed as custom metrics.

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CloudWatch custom metrics

You can also publish your own custom application metrics directly in CloudWatch, such as the following:

- Webpage load times
- Number of processes or threads on your instance

CloudWatch dashboards

Dashboards are customizable home pages that you can configure for data visualization for one or more metrics through widgets, such as a graph or text.

 Some things to note about CloudWatch dashboards include the following:

- Dashboard widgets can be graphs or text.
- Dashboards can be automatic or customized.
- Dashboards can use either CloudWatch or custom data sources such as Amazon Relational Database Service (Amazon RDS).

You can build custom CloudWatch dashboards, each one highlighting a distinct view of your environment.

Amazon CloudWatch Logs

CloudWatch Logs is a unified place for logs to be stored and analyzed. With this service, you can track, archive, and retrieve your log files from applications running on AWS and on-premises infrastructure.

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CloudWatch alarms

CloudWatch alarms allow you to create your own customized thresholds for the metrics that you're monitoring. If a metric crosses a boundary threshold and remains out-of-bounds for a period of time that you set, then an alarm will be initiated.

CloudWatch offerings comparison

With Amazon CloudWatch, there's no up-front commitment or minimum fee; you simply pay for what you use. You will be charged at the end of the month for your usage.

Review the following free tier and paid tier offerings.

Free Tier

- Most AWS Services (Like Amazon EC2, Amazon Simple Storage Service (Amazon S3), or Amazon Kinesis) send metrics automatically for no additional charge.

Paid Tier

- Paid tier features extend the functionality of CloudWatch and are billed on a "pay for what you use" monthly basis.
- CloudWatch pricing is calculated based on the features that you use, including the following: dashboards, alarms, logs, and events.

CloudWatch demo

In this example, you explore the different features that Amazon CloudWatch has to offer, including the dashboard, logs, and alarms.

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- *CloudWatch demo: Dashboards*

  A dashboard in CloudWatch is a customizable page in the console that you can use to monitor your different types of resources in a single customized view.

  Today, we explore a CloudWatch custom dashboard. Choose Dashboards on the navigation pane, and then choose Create a dashboard. Then, name your dashboard and choose Create Dashboard. Now, choose which widget to add to the dashboard. Dashboard widgets can be graphs or text. For today, let's choose a bar graph. Now, scroll down and choose S3.

  Resources that are monitored in a CloudWatch dashboard can be spread across different AWS Regions. After you select your metrics, choose Create widget and then Save. To view your custom dashboard, choose it.

  Great! Now, you explored a CloudWatch custom dashboard. Let's move on to CloudWatch logs.

- *CloudWatch demo: Logs*

  CloudWatch Logs allows you to query and filter your log data as a single consistent flow of events ordered by time regardless of the source. CloudWatch Logs lets you create custom alarms and remediation actions based on the data patterns that are revealed by your system and application logs.

  To view your log data that was sent to CloudWatch Logs, choose Log groups in the navigation pane. Now, choose the log group that you want to view. You can use the filter bar to search for and match terms, phrases, or values in your log events.

  Now that we learned more about logs in CloudWatch, let's move on to alarms.

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- *CloudWatch demo: Alarms*

  CloudWatch alarms can automatically initiate actions based on sustained state changes of your metrics. To create an alarm, navigate to the Alarms section and choose Create alarm. Now, choose Metric and choose the namespace in CloudWatch where the metric data resides. Then, select the specific metric of interest. On this page, you can specify metrics and conditions for your alarm. Now, it's time to configure actions. Next, we will add a name and description for our alarm. Now, we are ready to preview and create. After you review your preview, you're ready to choose Create alarm. In this example, you explored the different features that Amazon CloudWatch has to offer, including the dashboard, logs, and alarms.

Summary

In this course, you learned the following skills:

- Summarize the of the benefits of monitoring AWS systems using Amazon CloudWatch.
- Describe how Amazon CloudWatch collects, monitors, and visualizes service data.
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Additional resources

Choose each link to learn more about using Amazon CloudWatch.

[What is Amazon CloudWatch](#)

[How Amazon CloudWatch works](#)

[Amazon CloudWatch](#)

[Amazon CloudWatch Pricing](#)