



Monitoring and Observability on AWS

Business Goals

WHY DO YOU NEED OBSERVABILITY?



Create new
revenue streams



Improve Operational
and Financial
efficiency



Lower
Business Risk

What is Observability?



AWS observability tools

► Infrastructure monitoring

Perform real-user monitoring on websites and end-points

Easily correlate logs, metrics and traces to quickly identify service bottle-necks

Dynamic dashboards based on resource tags

► Application monitoring

Fully managed container monitoring platform

Automatically identifies issues using Anomaly Detection and notifies you

Deeper insights into lambda performance and health metric data

Metrics Explorer

Contributor Insights

Container Insights

X-Ray Insights

Lambda Insights

Synthetics

ServiceLens

AWS observability

AWS Services for Observability

CUSTOMER CHOICES

	AWS NATIVE	OPEN SOURCE	PARTNER
INFRASTRUCTURE <i>VMs, Containers, OS</i>	 Amazon CloudWatch	 Amazon Managed Service for Prometheus  Amazon Managed Service for Grafana	APN
AWS SERVICES <i>Vended Monitoring</i>	 Amazon CloudWatch  AWS X-Ray	 Amazon Distro for Open Telemetry	X
APPLICATION PERFORMANCE <i>Tracing and Profiling</i>	 Amazon CloudWatch  AWS X-Ray  Amazon CodeGuru	 Amazon Distro for Open Telemetry	APN
END-USER <i>Synthetic Monitoring</i>	 Amazon CloudWatch	X	APN

Amazon CloudWatch

OBSERVABILITY OF YOUR AWS RESOURCES AND APPLICATIONS



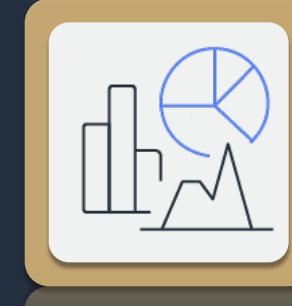
Observability
on a single
platform
across
applications
and
infrastructure



Easiest way to
collect metrics
in AWS and on-
premises



Improve
operational
performance
and resource
optimization



Get
operational
visibility and
insight



Derive
actionable
insights
from logs

Amazon CloudWatch Concepts

- Metrics
- Namespaces
- Dimensions
- Time Stamps
- Units
- Statistics
- Periods
- Aggregation
- Alarms
- Regions

CloudWatch Logs

STORE LOGS IN NEAR REAL-TIME

Collect logs from:

- Amazon EC2 instances
- On-premises servers
- VPC Flow Logs
- AWS CloudTrail
- AWS Lambda
- Other AWS Services

Log data can be stored and accessed indefinitely in highly durable, low-cost storage so you don't have to worry about filling up hard drives.

The screenshot shows the AWS CloudWatch Logs interface. At the top, there's a breadcrumb navigation: CloudWatch > CloudWatch Logs > Log groups > application.log. To the right of the breadcrumb is a link to 'Switch to the original interface.' Below the breadcrumb, the log group name 'application.log' is displayed in a large, bold font. To the right of the name are four buttons: 'Delete', 'Actions ▾', 'Query log group', and 'View all log events'. Underneath the log group name, there's a section titled 'Log group details' containing the following information:

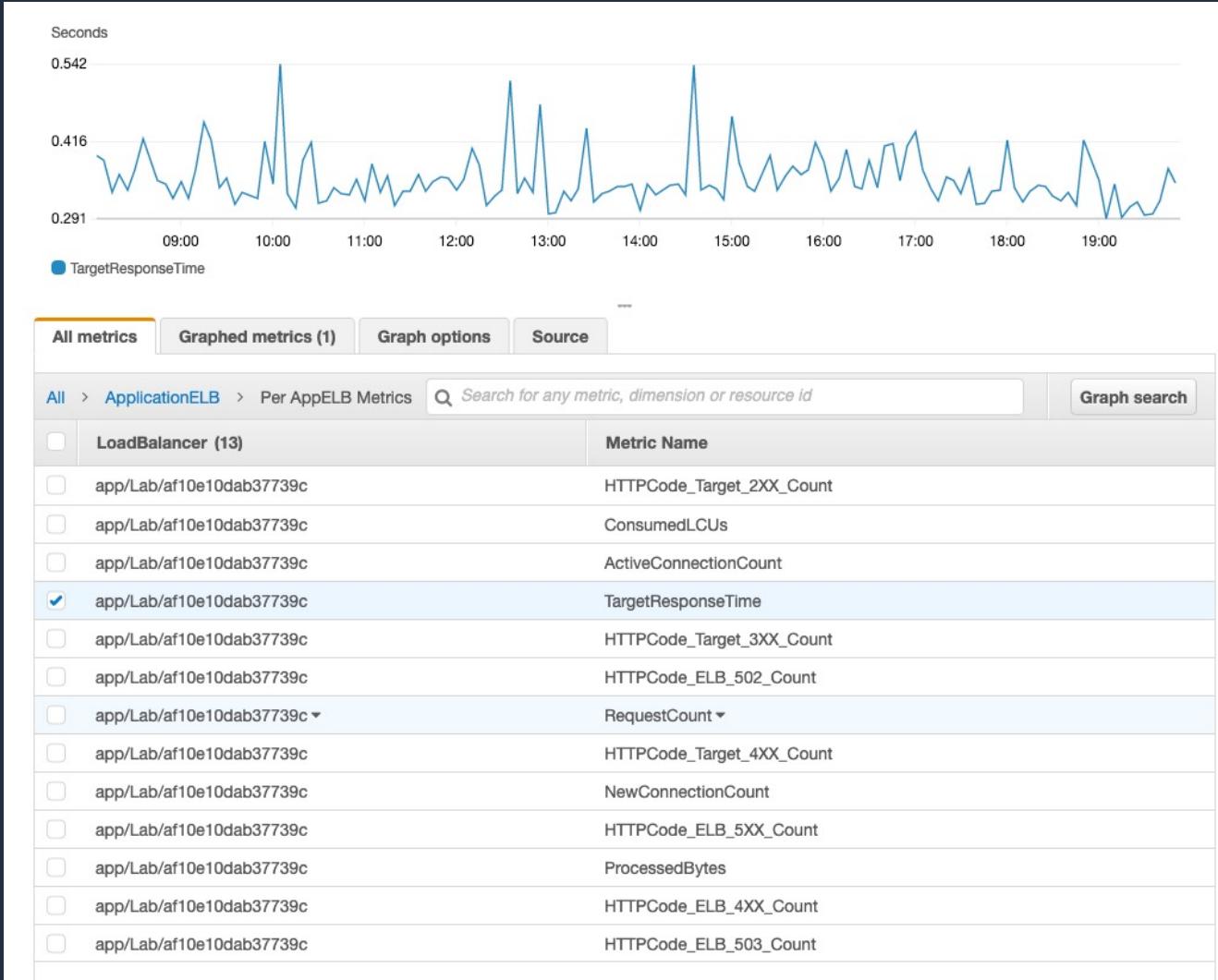
Retention	Creation time	Stored bytes	ARN
Never expire	5 months ago	14.67 MB	arn:aws:logs:eu-west-1:012345678910:log-group:application.log:*
KMS key ID	Metric filters	Subscriptions	Contributor Insights rules
-	1	LambdaStream_centralized-logging-LogStreamer-1A2RQLP14N1TW	-

Below the 'Log group details' section, there are three tabs: 'Log streams' (which is selected), 'Metric filters', and 'Contributor Insights'. The 'Log streams' tab displays a table with five entries, each representing a log stream:

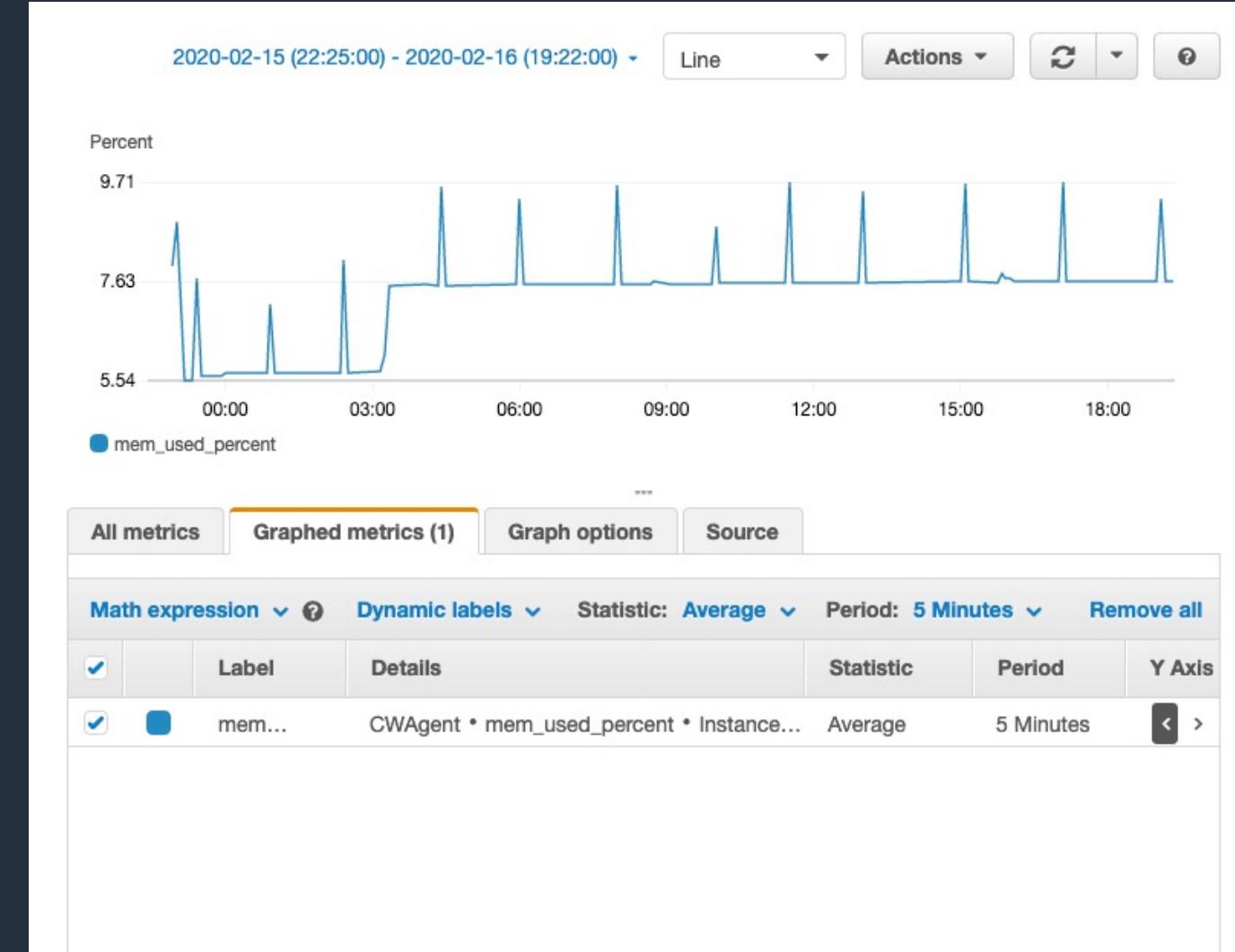
Log stream	Last event time
i-077f7e49ee1c0112c	1/10/2020, 8:00:49 PM
i-03343584efd07d2a6	11/29/2019, 8:03:35 PM
i-09bd407810ebfa83f	11/29/2019, 8:00:52 PM
i-0bf3c984cda70e7c0	9/19/2019, 9:00:35 PM

CloudWatch Metrics

Built-in metrics



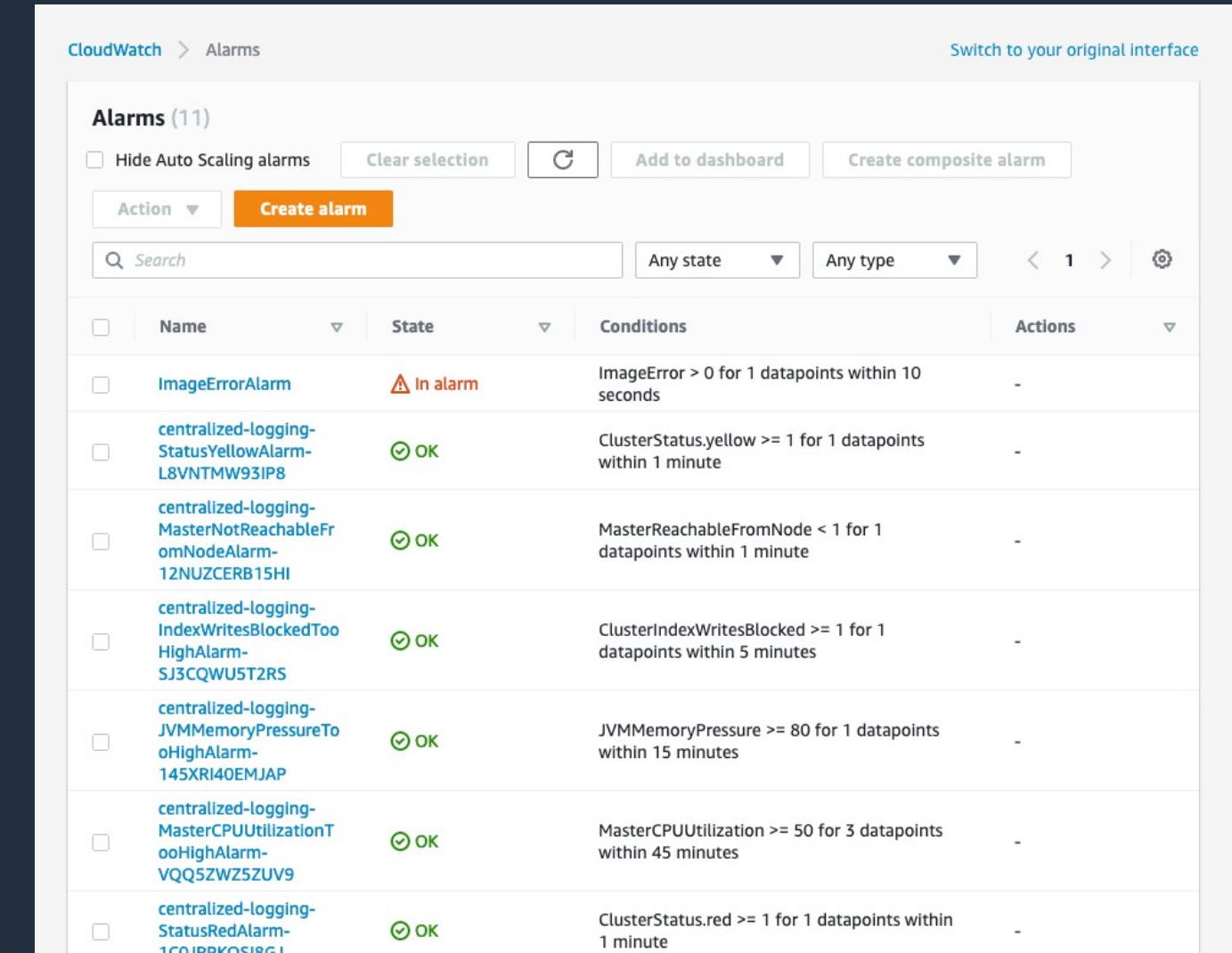
Custom metrics



CloudWatch Alarms

Amazon CloudWatch alarms allow you to set a threshold on metrics and trigger an action.

- Watch a single metric or the result of a math expression
- Perform actions based on the value of metrics
 - Send a notification to an SNS topic
 - Auto Scaling action
 - EC2 Action (Stop, Terminate, Reboot or Recover)
- Add alarms to dashboards to visualize them



The screenshot shows the AWS CloudWatch Alarms console interface. At the top, there are buttons for 'Hide Auto Scaling alarms' (unchecked), 'Clear selection', a search bar, and buttons for 'Add to dashboard' and 'Create composite alarm'. Below this is a search bar and filters for 'Any state' and 'Any type'. The main area displays a table of 11 alarms, each with columns for Name, State, Conditions, and Actions. The alarms listed are:

Name	State	Conditions	Actions
ImageErrorAlarm	In alarm	ImageError > 0 for 1 datapoints within 10 seconds	-
centralized-logging-StatusYellowAlarm-L8VNTMW93IP8	OK	ClusterStatus.yellow >= 1 for 1 datapoints within 1 minute	-
centralized-logging-MasterNotReachableFromNodeAlarm-12NUZCERB15HI	OK	MasterReachableFromNode < 1 for 1 datapoints within 1 minute	-
centralized-logging-IndexWritesBlockedTooHighAlarm-SJ3CQWU5T2RS	OK	ClusterIndexWritesBlocked >= 1 for 1 datapoints within 5 minutes	-
centralized-logging-JVMMemoryPressureTooHighAlarm-145XRI40EMJAP	OK	JVMMemoryPressure >= 80 for 1 datapoints within 15 minutes	-
centralized-logging-MasterCPUUtilizationTooHighAlarm-VQQ5ZWZ5ZUV9	OK	MasterCPUUtilization >= 50 for 3 datapoints within 45 minutes	-
centralized-logging-StatusRedAlarm-1C0JRPKOSI8GJ	OK	ClusterStatus.red >= 1 for 1 datapoints within 1 minute	-

CloudWatch Events

Provides a near real-time stream of system events that describe changes to your AWS resources.

Write rules to indicate which events are of interest to your application and what automated actions to take when a rule matches an event.

Rules > ChangInstanceSize Actions ▾

Summary

ARN ⓘ arn:aws:events:eu-west-1:180304385487:rule/ChangInstanceSize

Schedule Cron expression 0 6 ? * 6L *

Next 10 Trigger Date(s) 1. Fri, 28 Feb 2020 06:00:00 GMT
2. Fri, 27 Mar 2020 06:00:00 GMT
3. Fri, 24 Apr 2020 06:00:00 GMT
4. Fri, 29 May 2020 06:00:00 GMT
5. Fri, 26 Jun 2020 06:00:00 GMT
6. Fri, 31 Jul 2020 06:00:00 GMT
7. Fri, 28 Aug 2020 06:00:00 GMT
8. Fri, 25 Sep 2020 06:00:00 GMT
9. Fri, 30 Oct 2020 06:00:00 GMT
10. Fri, 27 Nov 2020 06:00:00 GMT

Status Enabled

Description

Monitoring [Show metrics for the rule](#)

Targets

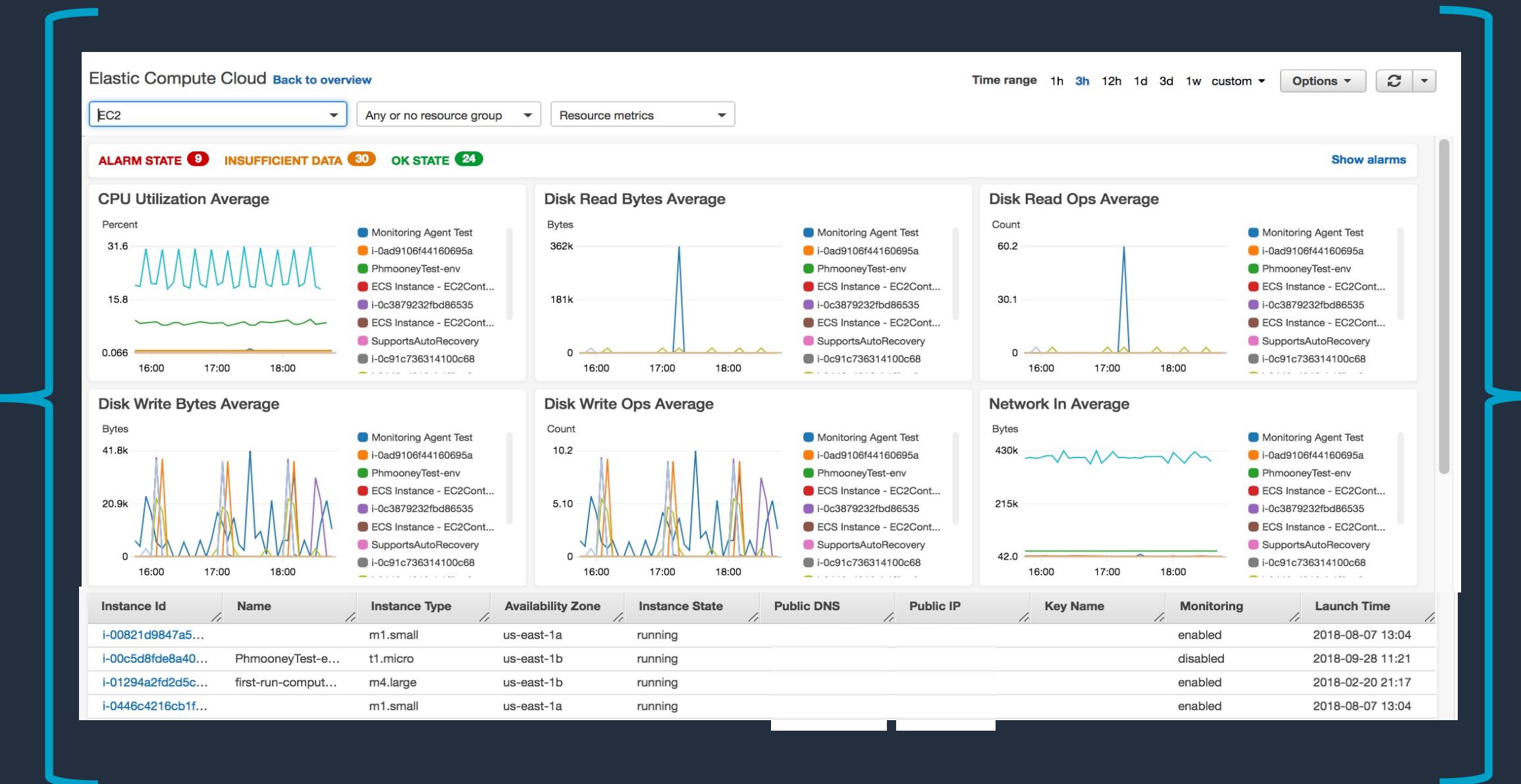
Filter:

Type	Name	Input
SSM Automation	ChangInstanceSize (version \$DEFAULT)	Constant: {"InstanceId": ["i-0cb0104ddf22a"]}

CloudWatch Automatic Dashboards

CloudWatch simplifies infrastructure monitoring with a default, getting started experience.

Dynamic, self-updating AWS infrastructure dashboards

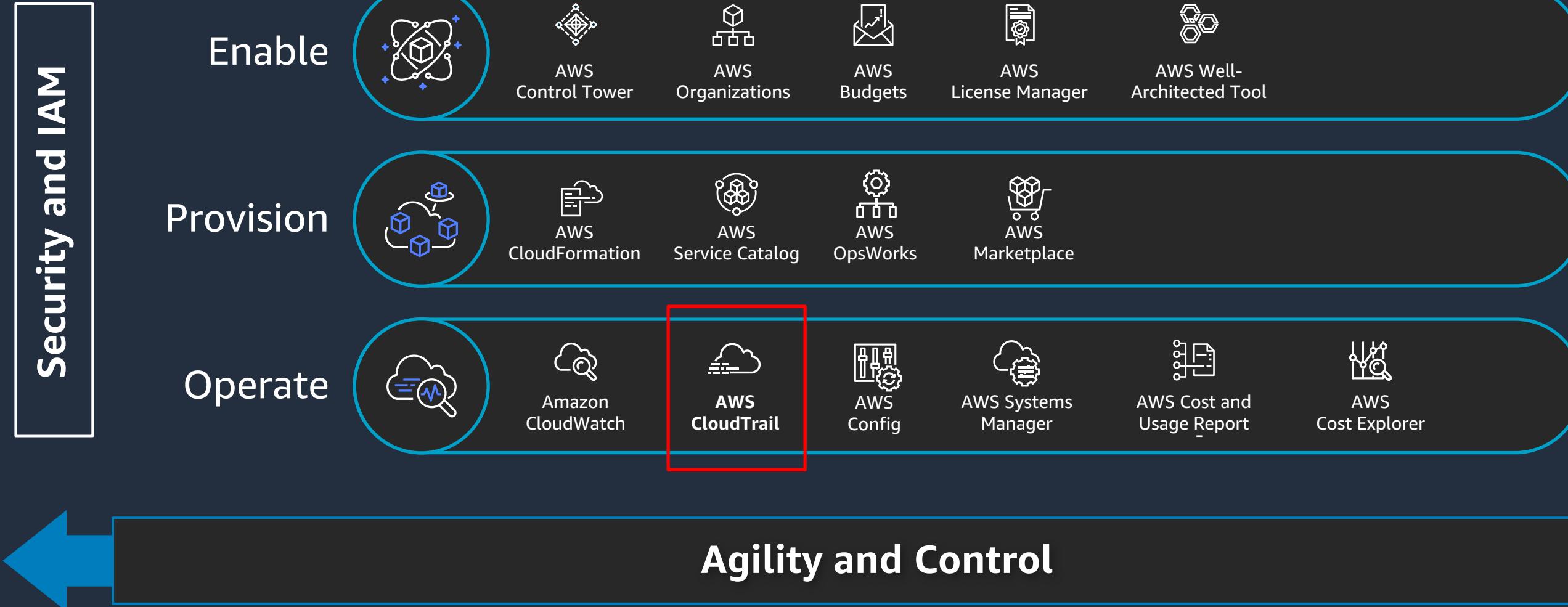




AWS CloudTrail & CloudTrail Insights

AWS CloudTrail

OPERATE YOUR CLOUD AT SCALE BY PROVIDING AUDIT LOGS FOR AWS



AWS CloudTrail

- Track user and resource activity across your AWS infrastructure and resources for governance and auditing.
- Identify and respond to unusual usage based on automated analysis.



Capture

Record activity as CloudTrail events



Store

Retain events logs in secure S3 bucket



Act

Trigger actions when important events are detected



Review

Analyze findings or recent and historical activity

AWS CloudTrail Features



**Compliance
Aid**



**Visibility
into Activity**



**Anomaly
Detection**



**Detect Data
Exfiltration**



**Automate
Security
Analysis**



**Analyze
Permissions**

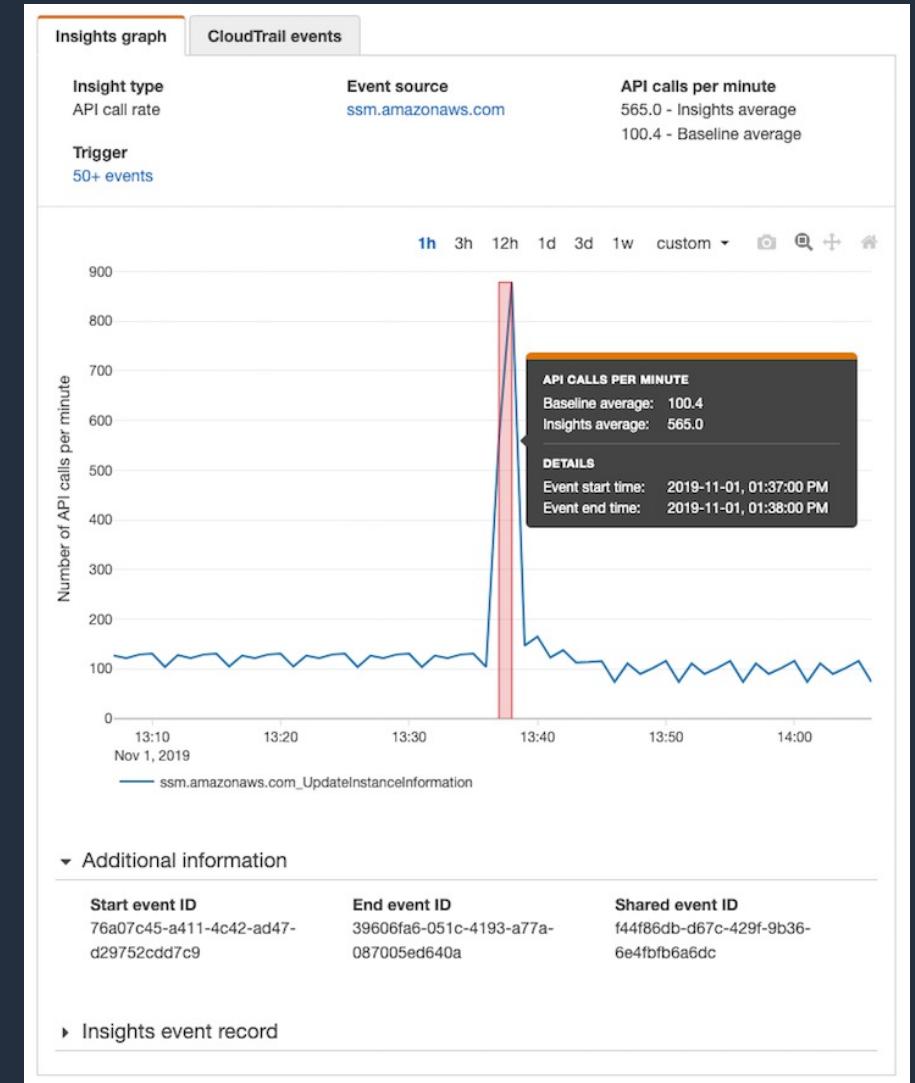


**Detect Unusual
Activity**

CloudTrail Insights



- Identify and respond to unusual operational activity
 - Unexpected spikes in resource provisioning
 - Bursts of IAM management actions
 - Gaps in periodic maintenance activity
- Automatic analysis of API calls and usage patterns
- Alerts when unusual activity is detected



What you can do with CloudTrail today

- Identify users logged in during an incident, and all actions taken during that period
- Notify when admin privileges are granted or console logins occur
- Detect access from authorized networks or IP addresses
- Identify when a file or object has changes to public access, and who made the change
- Understand top user, role, or service callers of API calls or Lambda functions
- Get alerted when you misconfigure your autoscaling script
- Comply with internal and regulatory compliance requirements with the immutable history of all AWS activity

Partner Integrations with Amazon CloudTrail



&
consulting
partners



Cost Monitoring

Tags

Key	Value
name	Jane_Doe
group	dev
costcenter	4004
use	image_svr

Key (Attribute): 127 Unicode characters

Value (Detail/Description): 255 Unicode characters

Tags per resource: 50 tags

Types of Tags

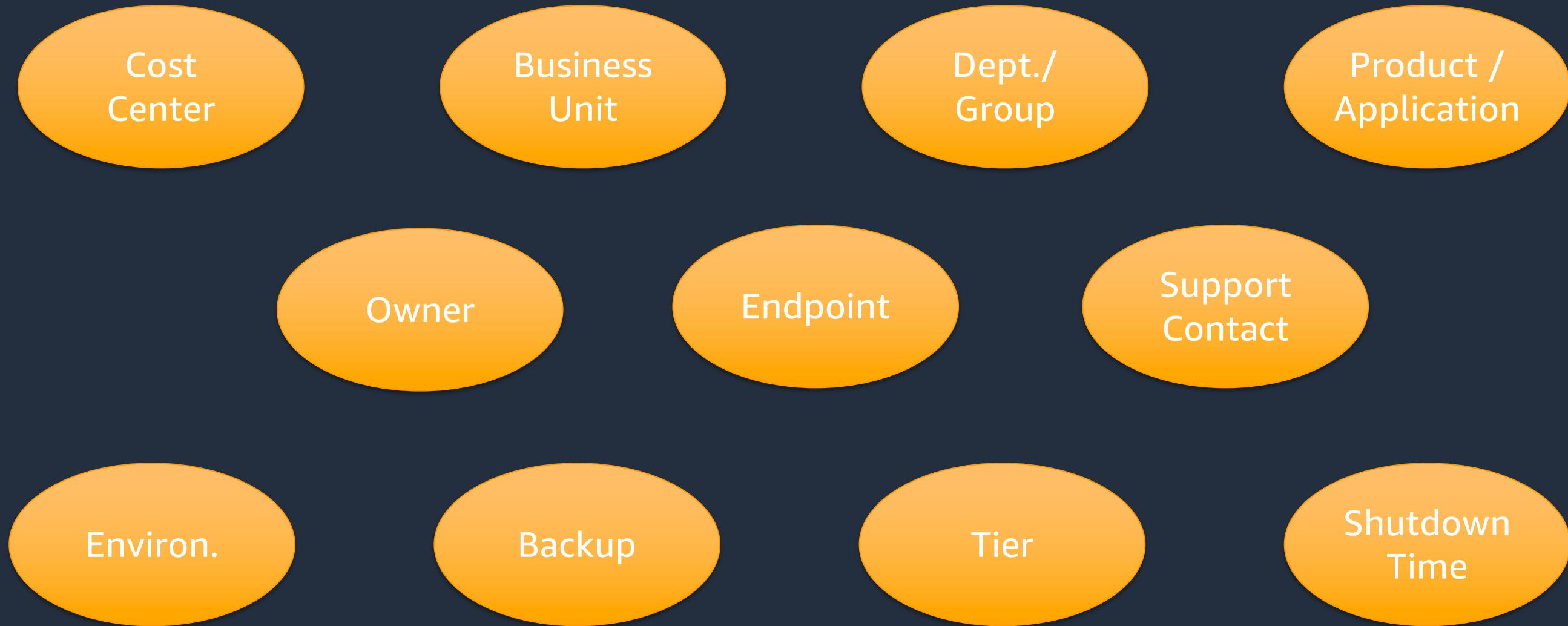
Resource Tags

- Provide the ability to organize and search within and across resources
- Filterable and Searchable
- Do not appear in Detail Billing Report

Cost Allocation Tags

- Information presented in Detailed Billing Report and Cost Explorer
- Available on certain services or limited to components within a service (e.g. S3 bucket but not objects)

Tag Key Examples



AWS Cost Explorer

CONSOLE-BASED COST AND USAGE REPORTING



Filter/Group your data



Save your progress



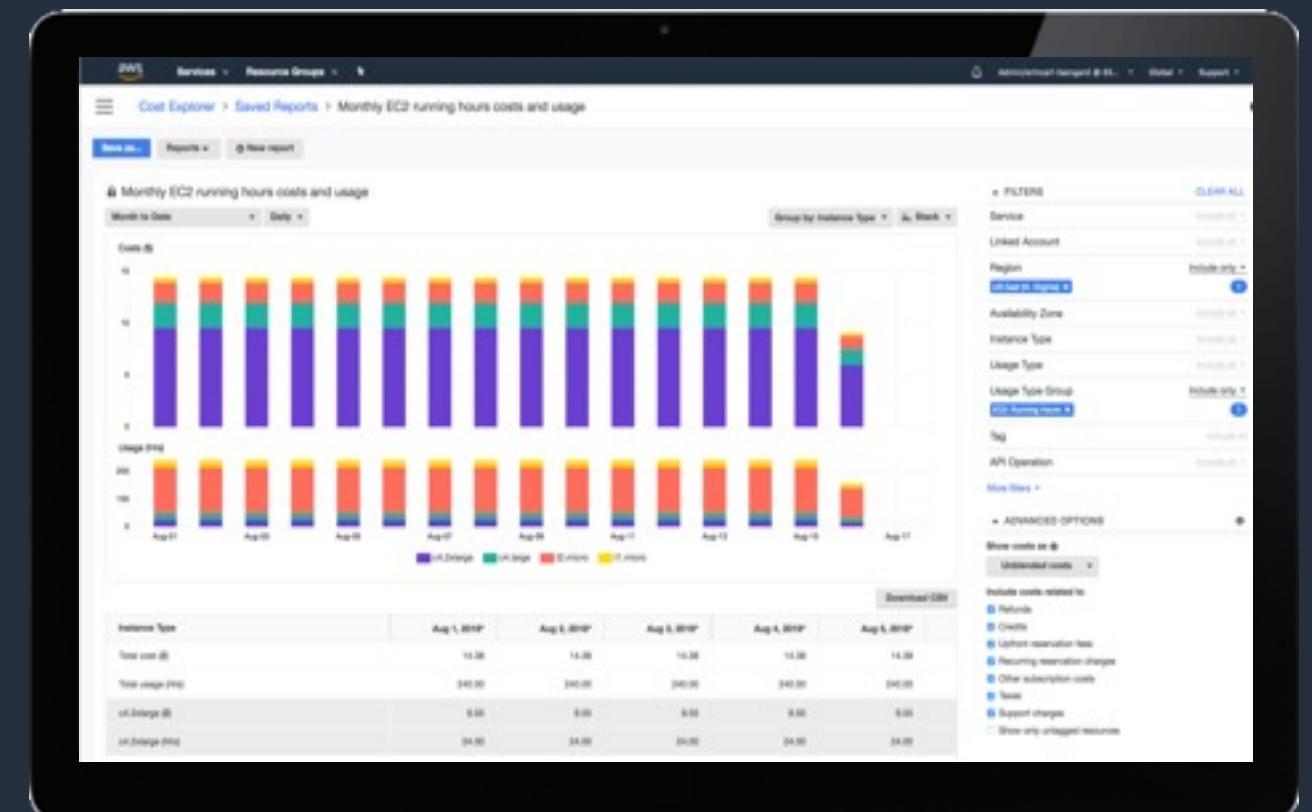
Set time interval and granularity



Forecast future costs and usage



Build custom applications

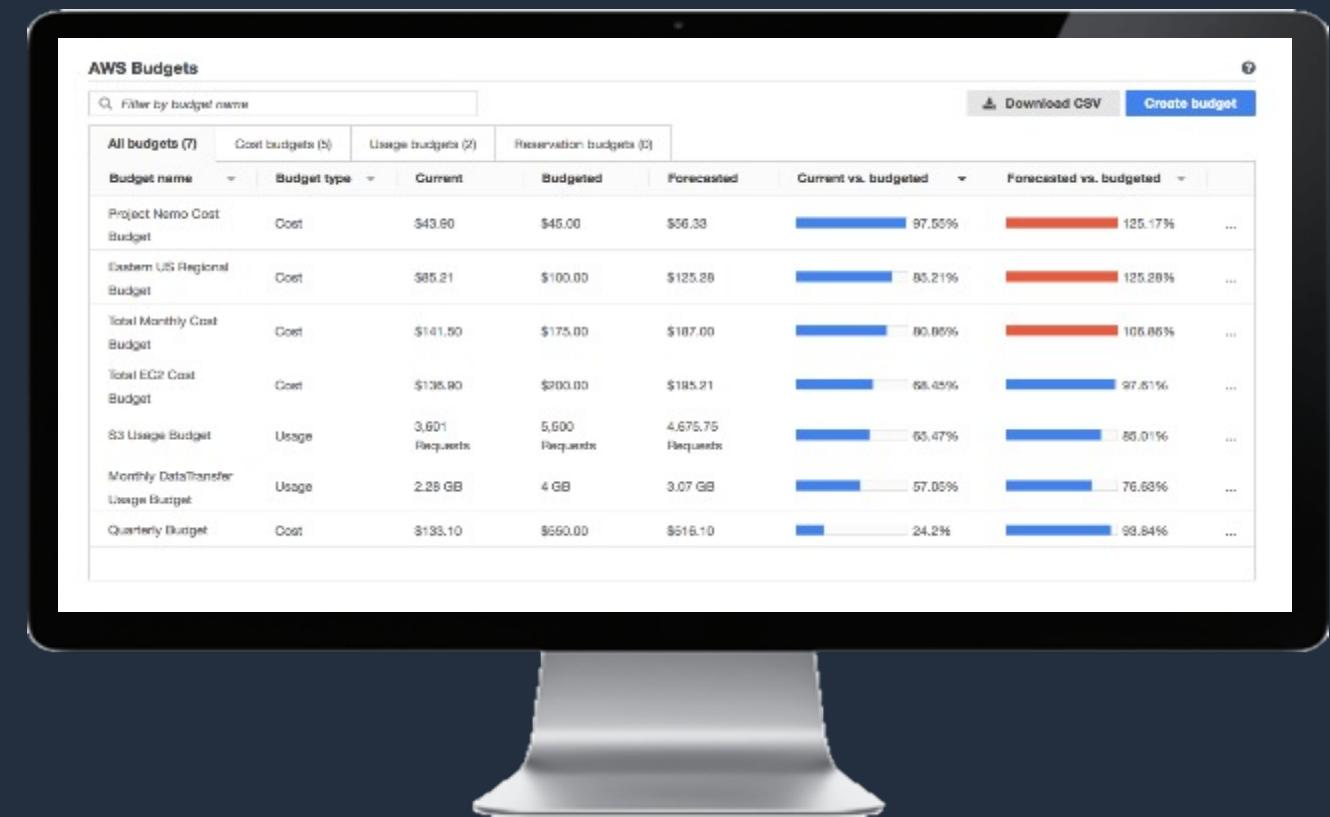


AWS Budgets

AWS Budgets gives you the ability to set custom budgets that alert you when your cost or usage exceed (or are forecasted to exceed) your budgets amount.

Benefits

- Customizable budgets
- Ongoing monitoring and alert notification
- Flexible Automation



AWS Budgets Reports

- Set up daily, weekly, or monthly AWS Budgets Reports emails
- For stakeholders with limited or no access to AWS Cost Management dashboard

Dear AWS Customer,

You requested that we provide a daily update on the status of the following budgets.

Budget Name	Budget Type	Current	Budgeted	Forecasted	Current vs. Budgeted	Forecasted vs. Budgeted
SG EC2 Product Budget	Cost	\$0.00	\$5.00	-	0.00%	-
Monthly EC2 Budget	Cost	\$148.46	\$75.00	\$501.90	197.94%	669.20%
Monthly budget for EC2	Cost	\$166.83	\$84.43	\$562.54	197.60%	666.28%
SG EC2 Usage	Cost	\$0.00	\$100.00	-	0.00%	-
e.g., My Monthly EC2 Budget 17	Cost	\$148.46	\$100.00	\$501.90	148.46%	501.90%
Monthly EC2 Budget	Cost	\$190.80	\$200.00	\$643.99	95.40%	321.99%
Monthly EC2 Costs	Cost	\$266.01	\$584.62	\$871.89	45.50%	149.14%
My Monthly EC2 Budget	Cost	\$0.00	\$1,000.00	-	0.00%	-
EC2 Data Transfer	Usage	0.12 GB	0.50 GB	0.42 GB	23.80%	84.40%
Daily EC2 Utilization	RI Utilization	100.00%	100.00%	-	100.00%	-
Daily EC2 RI Coverage	RI Coverage	20.90%	100.00%	-	20.90%	-
Daily EC2 Coverage	RI Coverage	20.90%	100.00%	-	20.90%	-

[Go to AWS Budgets Report Dashboard](#)

AWS Budgets | Alerting

▼ Alert #1

Set alert threshold

Threshold

When should this alert be triggered?

 80 % of budgeted amount

Trigger

How should this alert be triggered?

 Actual

Notification preferences - *Optional*

Select one or more notification preferences to receive alerts.

Email recipients

Specify the email recipients you want to notify when the threshold has exceeded.

Separate email addresses using commas

Maximum number of email recipients is 10.

► [Amazon SNS Alerts](#) Info

► [Amazon Chatbot Alerts](#)

Budget Notification: Total Monthly Cost Budget is in Alarm State

 no-reply-aws@amazon.com <no-reply-aws@amazon.com>

Tuesday, August 1, 2017 at 6:55 PM

To: Carlson, Erin



08/02/2017
AWS Budget Notification

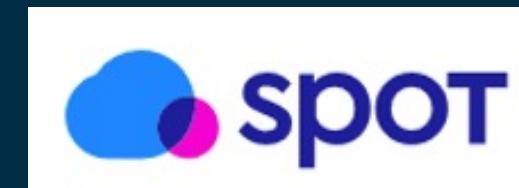
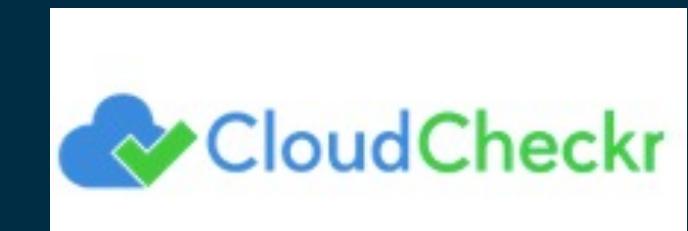
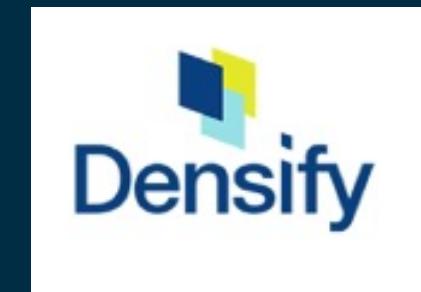
Dear AWS Customer,

You requested that we notify you when your **Forecasted Cost** for your budget "**Total Monthly Cost Budget**" is **greater than \$150.00**. Your **Forecasted Cost** for this budget is now **\$199.28**. You can find further details below and by accessing your AWS Budgets dashboard.

Budget Name	Budget Type	Budgeted Value	Notification Threshold	Forecasted Value
Total Monthly Cost Budget	Forecasted	\$150.00	> \$150.00	\$199.28

[Go to AWS Budgets Dashboard](#)

Cost Management Competency Partners



<https://aws.amazon.com/products/management-tools/partner-solutions/>



Q&A

