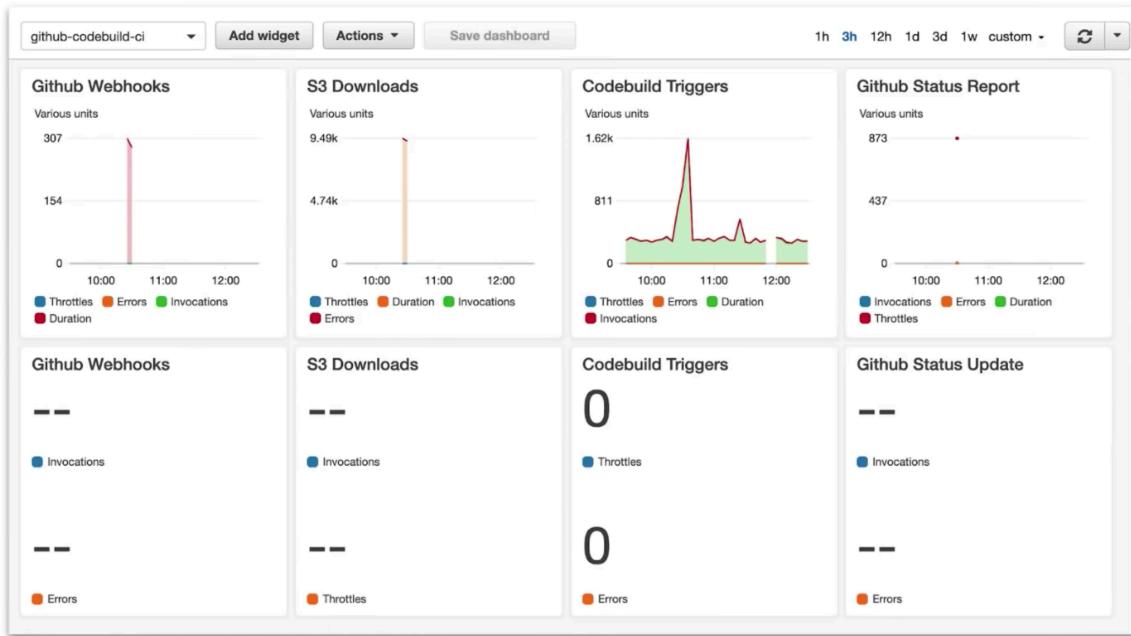




CloudWatch Dashboards

Create **custom dashboards** from CloudWatch Metrics



(A)
SUBSCRIBE



CloudWatch - Availability of Data

How often CloudWatch will collect and make available data.

	EC2	Other services
Basic Monitoring	5 minute interval	1 minute / 3 minute / 5 minute
Detailed Monitoring	1 minute interval	Most services are 1 minute by default



CloudWatch Agent and Host Level Metrics

Some metrics you might think are tracked by default for EC2 instances are not, and require install the **CloudWatch Agent**.



The CloudWatch Agent is a script which can be installed via

Systems Manager Run Command onto the target EC2 instance.

CloudWatch will track at the Host Level by default:

The following require the Agent to get detailed metrics for:

- CPU Usage
- Network Usage
- Disk Usage
- Status Checks
 - Underlying Hypervisor status
 - Underlying EC2 instance status

- **Memory** utilization
- Disk swap utilization
- **Disk space** utilization
- Page file utilization
- Log collection



CloudWatch *CheatSheet*

- CloudWatch is a collection of monitoring services: **Dashboards, Events, Alarms, Logs and Metrics**
- CloudWatch **Logs**: log data from AWS services. eg. CPU Utilization
- CloudWatch **Metrics**: Represents a time-ordered set of data points, A variable to monitor eg. CPU Utilization over time
- CloudWatch **Events**: trigger an event based on a condition eg. ever hour take snapshot of server
- CloudWatch **Alarms**: triggers notifications based on metrics when a defined threshold is breached
- CloudWatch **Dashboards**: create visualizations based on metrics
- EC2 monitors at 5 min intervals and at Detailed Monitoring 1 minute intervals
- Most other service monitor at 1 minute intervals, with intervals of 1 , 3 , 5 minutes.
- Logs must belong to a **Log Group**
- CloudWatch Agent needs to be installed on EC2 host to track **Memory Usage** and **Disk Size**
- You can stream custom log files eg. production.log
- Custom Metrics allow you to track High Resolution Metrics a sub minute intervals all the way down to 1 second.

*Cloud*Watch



**A collection of monitoring services for
logging, reacting and visualizing log data.**



Introduction to CloudWatch

AWS CloudWatch is a **monitoring solution** for your AWS resources

CloudWatch is a **collection of monitoring tools** as follows:

CloudWatch Logs	any custom log data, Memory Usage, Rails Logs, Nginx Logs
CloudWatch Metrics	metrics that are based off of logs eg. Memory Usage
CloudWatch Events	trigger an event based on a condition eg. every hour take snapshot of server
CloudWatch Alarms	triggers notifications based on metrics which breach a defined threshold
CloudWatch Dashboards	create visualizations based on metrics



CloudWatch Logs

CloudWatch Logs is used to monitor, store, and access your log files

A **Log Group** is a collection of logs. Log files must belong to a log group

A Log in a Log Group is called a **Log Stream**

By default, logs are kept indefinitely and never expire

The screenshot shows the CloudWatch Logs console. The top navigation bar includes 'CloudWatch', 'Log Groups', 'production.log', and a timestamp '2019-08-31 (21:34:33)'. Below the navigation is a search bar and a 'Filter events' dropdown. The main area displays a table with two columns: 'Time (UTC -04:00)' and 'Message'. The 'Time' column shows log entries from 2019-08-31 at 19:27:29 to 2019-08-31 at 19:27:30. The 'Message' column contains numerous log entries, each starting with a timestamp like '2019-08-31T23:27:29.423028 #13970 DEBUG -- :'. These entries represent various database operations such as SELECT, UPDATE, and INSERT queries on tables like 'user', 'deck', and 'flashcard'.

Most AWS Services are integrated with CloudWatch Logs. Logging of services sometimes needs to be turned on or requires the IAM Permissions to write to CloudWatch Logs





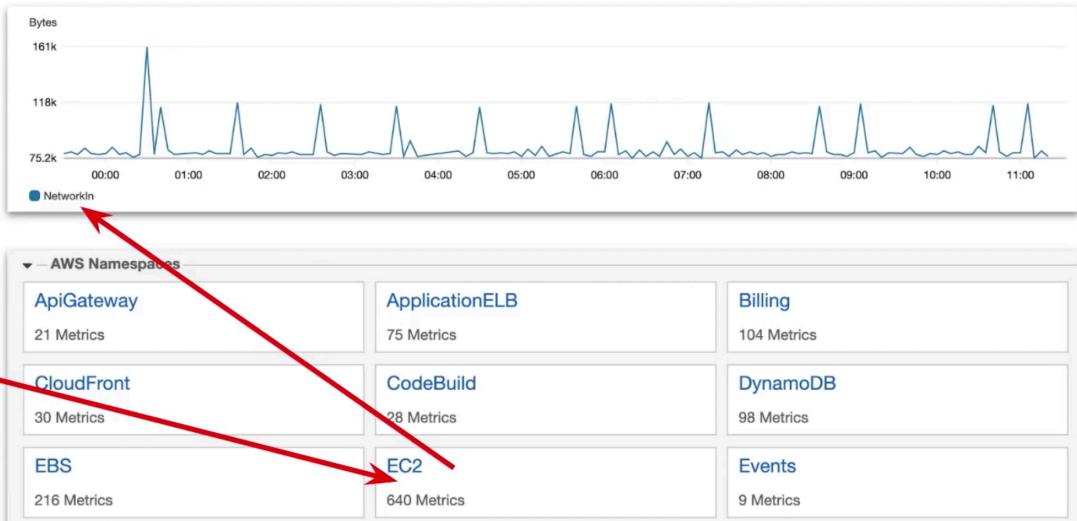
CloudWatch Metrics

Represents a time-ordered set of data points
A variable to monitor

CloudWatch comes with
many **predefined** metrics eg.

EC2 Per-Instance Metrics

- CPUUtilization
- DiskReadOps
- DiskWriteOps
- DiskReadBytes
- DiskWriteBytes
- NetworkIn **NetworkIn**
- NetworkOut
- NetworkPacketsIn
- NetworkPacketsOut





CloudWatch Events

Trigger an event based on a condition or on schedule

Event Source

How to trigger the event

Targets

What to trigger

Event Source

Build or customize an Event Pattern or set a Schedule to invoke Targets.

Event Pattern Schedule

Build event pattern to match events by service

Service Name: CloudFront
Event Type: AWS API Call via CloudTrail

For AWS API call events, CloudWatch Events supports the same read/write APIs as CloudTrail does. Read-only APIs, such as those that begin with List, Get, or Describe are not supported by CloudWatch Events. See more details about which services are supported by CloudTrail.

Any operation Specific operation(s)

Event Source

Build or customize an Event Pattern or set a Schedule to invoke Targets.

Event Pattern Schedule

Fixed rate of 5 Minutes

Cron expression 0/5 * * * ? *

[Learn more about CloudWatch Events schedules.](#)

Targets

Select Target to invoke when an event matches your Event Pattern or when schedule is triggered.

Lambda function

Function* Select function

Configure versi
Configure input

Add target*

Lambda function

ECS task

Event bus in another AWS account

Firehose delivery stream

Inspector assessment template

Kinesis stream

Lambda function

SNS topic

SQS queue

Schedule is like a serverless **Cron tab**

This is a very big list





Custom Metrics and High Resolution Metrics

Using the **AWS CLI or SDK** you can create and publish your own **custom metrics**.

```
aws cloudwatch put-metric-data \
--metric-name Enterprise-D \
--namespace Starfleet \
--unit Bytes \
--value 231434333 \
--dimensions HullIntegrity=100,Shield=70,Thrusters=maximum
```

High Resolution Metrics

When you publish a custom metric, you can define it as either standard resolution or **high resolution**

High resolution lets you track **under 1 minute down to 1 second**.

With High Resolution you can track at:

- **1 second**
- 5 seconds
- 10 seconds
- 30 seconds
- multiple of 60 seconds.



CloudWatch Alarms

Triggers a notifications based on **metrics** which **breach** a defined threshold



1000 USD Billing



OK

EstimatedCharges \geq 1000 for 1 datapoints
within 6 hours

The **Type**

Conditions

Threshold type

Static

Use a value as a threshold

Anomaly detection
Use a band as a threshold

The **Condition**

Whenever EstimatedCharges is...
Define the alarm condition

Greater

$>$ threshold

Greater/Equal

\geq threshold

Lower/Equal

\leq threshold

Lower

$<$ threshold

The **Threshold**

than...

Define the threshold value

10000

USD

Must be a number

