

6. Amazon CloudWatch, AWS X-Ray, and Optimization

Introduction to Observability

Monitoring is a verb.

It's something we do.

We collect metrics.

We collect logs.

We monitor network traffic.

When something seems off,
automatic alerts go out to someone or something to try to remediate.

Monitoring is the act of collecting data.

What types of data we collect, what we do with the data,
and if that data is readily analyzed or available is a different story.

Observability is not a verb.

It's not something we do.

Instead, observability is more of a property of a system.

A system can be observable or it can be unobservable.

An observable system allows you to measure
how well the internal workings of a system are, from the outputs of that system.

A system with observability is what you want.

If you cannot observe the outputs of your application
and know whether things are working well or not,
how can you possibly know whether the changes
you are making to your system are working for your end users or not?

One common way to build observability into a system
is to use **distributed tracing software**.

Tracing software allows you to understand
the flow of traffic through your services.

With API-driven applications,
services call each other to perform tasks.

Tracing allows to collect data on the calls between components
and measure the performance of each individual service
and view the system as a whole regarding latency between these services.

Introduction to X-Ray

X-Ray analyzes and debugs distributed applications,
such as those built using a microservices architecture,
to understand how your application and its underlying services are performing.

X-Ray provides an end-to-end view of requests
as they travel through your application.

And shows a map of your application's underlying components.

Before using X-Ray, there are several concepts that should be covered so that you can have a solid starting foundation.

Segments are the compute resources running your application logic.

These provide the resource's name, details about the request,
and details about the work done.

Segments can break down the data about the work done into **subsegments**.

Subsegments provide more granular details,
such as timing information and downstream calls, made by an application.

The data that an application sends to X-Ray is used to generate a **service graph**.

A service graph is a JSON document that contains information about the services and resources that make up the application.

A **trace** is used to track the path of a request through the application.

It collects all the segments generated by a single request.

X-Ray analyzes an application by
collecting and recording the traces,
and provides you with a service map to see the trace data.

The default sampling rate is fairly conservative,
only recording the first request each second, and 5% of any additional requests.

You have the ability to configure X-Ray to modify the default sampling rule.

The **AWS X-Ray daemon** is a software application that listens for traffic on UDP port 2000, gathers raw segment data, and relays it to the AWS X-Ray API.

Within Amazon API Gateway, two types of tracing can be done:
passive and active.

Passive tracing is the default setting.

This means that the API Gateway is only traced if X-Ray has been enabled on an upstream service.

If passive tracing is used, API Gateway will not be sampling requests automatically, but will only be captured by upstream sampling.

With active tracing,
API Gateway will automatically sample API invocation requests
based on the sampling algorithms set in X-Ray.



Services

Resource Groups



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N. Vir

API Gateway X

APIs

Custom domain names

VPC links

APIs (1)

 Find APIs

Actions

	Name	Description	ID	Protocol	Endpoint type	Created
<input type="radio"/>	dragons		nl18eym14c	REST	Regional	2020-06-29

To enable active tracing, you go through the API stages.



Services

Resource Groups



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Amazon API Gateway

APIs > dragons (nl18eym14c) > Stages > test

Stages

Create

test Stage Editor

Delete

APIs

Custom Domain Names

VPC Links

API: dragons

Resources

Stages

Authorizers

Gateway Responses

Models

Resource Policy

Documentation

Dashboard

Settings

Usage Plans

API Keys

Client Certificates

Settings

Settings

Logs/Tracing

Stage Variables

SDK Generation

Export

Deployment History

Documentation History

Canary

Invoke URL: https://nl18eym14c.execute-api.us-east-1.amazonaws.com/test

Configure logging and tracing settings for the stage.

CloudWatch Settings

Enable CloudWatch Logs ⓘ

Log level INFO

Log full requests/responses data Enable Detailed CloudWatch Metrics ⓘ

Custom Access Logging

Enable Access Logging X-Ray Tracing [Learn more](#)Enable X-Ray Tracing ⓘ

Set X-Ray Sampling Rules



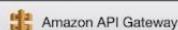
Services

Resource Groups



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APIs > dragons (nl18eym14c) > Stages > test

Stages

Create

Delete

APIs

Custom Domain Names

VPC Links

API: dragons

Resources

Stages

Authorizers

Gateway Responses

Models

Resource Policy

Documentation

Dashboard

Settings

Usage Plans

API Keys

Client Certificates

Settings

test Stage Editor

Invoke URL: <https://nl18eym14c.execute-api.us-east-1.amazonaws.com/test>

Settings Logs/Tracing Stage Variables SDK Generation Export Deployment History Documentation History Canary

Configure logging and tracing settings for the stage.

CloudWatch Settings

Enable CloudWatch Logs ⓘ

Log level INFO

Log full requests/responses data Enable Detailed CloudWatch Metrics ⓘ

Custom Access Logging

Enable Access Logging X-Ray Tracing [Learn more](#)Enable X-Ray Tracing ⓘ

Set X-Ray Sampling Rules

To enable the tracing, enable X Ray Tracing.

The screenshot shows the AWS API Gateway Stage Editor for the 'test' stage of the 'dragons' API. The left sidebar lists various API settings like Resources, Stages, Authorizers, etc. The main area shows the 'Logs/Tracing' tab selected. It includes sections for CloudWatch Settings (Enable CloudWatch Logs checked, Log level set to INFO), Detailed CloudWatch Metrics (unchecked), Custom Access Logging (unchecked), and X-Ray Tracing (checked, with a link to Set X-Ray Sampling Rules). An 'Invoke URL' is also displayed at the top.

To adjust the sampling rules from the default, choose set X-Ray sampling rules, and go into the X-Ray console and configure the rules there.

Lambda trace data is sent to X-Ray automatically.

The upstream service such as API Gateway, samples incoming requests, and adds a tracing header that tells Lambda whether to send traces or not.

This is the passive method.

Lambda supports both passive and active tracing.

If you want to enable active tracing,
this can be done through the functions configuration.



Services ▾

Resource Groups ▾



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Lambda > Functions

Functions (7)



Actions ▾



Filter by tags and attributes or search by keyword

Function name	Description	Runtime	Code size	Last modified
checkName		Node.js 12.x	304 bytes	yesterday
checkAddress		Node.js 12.x	304 bytes	yesterday
iterate		Node.js 12.x	304 bytes	last month
list-dragons		Python 3.6	9.8 MB	last month
example		Node.js 12.x	304 bytes	last month
validate-dragon		Python 3.6	705 bytes	1 hour ago
add-dragon		Python 3.6	565 bytes	last month

lambda functions

Edit monitoring tools

CloudWatch Info

By default, Lambda functions produce a CloudWatch Logs stream and standard metrics.

Logs and metrics (Default)

AWS X-Ray Info

Enable active tracing to allow AWS X-Ray to collect data.

Active tracing

Cancel

Save

active AWS X-Ray

The active tracing enables Lambda to trace a subset of invocations
that have not been sampled by the upstream service.

Once that's all done, you can finally see the service map.



Services

Resource Groups



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AWS Management Console

AWS services

Find Services

You can enter names, keywords or acronyms.



Example: Relational Database Service, database, RDS

Recently visited services



X-Ray



API Gateway



Cloud9



Step Functions



Lambda

All services

Build a solution

Get started with simple wizards and automated workflows.

Launch a virtual machine

With EC2

2-3 minutes



Build a web app

With Elastic Beanstalk

6 minutes



Build using virtual servers

With Lightsail

1-2 minutes



Stay connected to your AWS resources on the-go



Download the AWS Console Mobile App to your iOS or Android mobile device. [Learn more](#)

Explore AWS

Amazon FSx for Windows File Server

Explore the lowest-cost file storage in the cloud for Windows workloads. [Learn more](#)

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Find your most expensive lines of code. [Learn more](#)

go to the X-Ray



AWS X-Ray

Getting started

Service map

Traces

Analytics

Configuration

Sampling

Encryption

Default ▾

Enter service name, annotation, trace ID. Or click the Help icon for additional details.

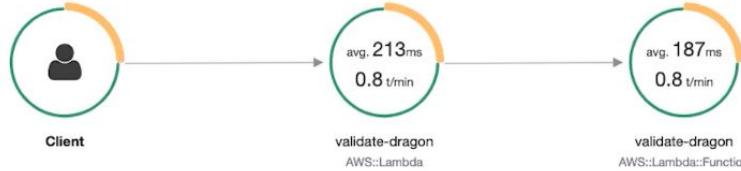


Last

Service map

Updated on 2020-01-01

Enter a service name to find and select the node on map



Service Map



AWS X-Ray

Getting started

Service map

Traces

Analytics

Configuration

Sampling

Encryption

Default ▾

Enter service name, annotation, trace ID. Or click the Help icon for additional details.



Last

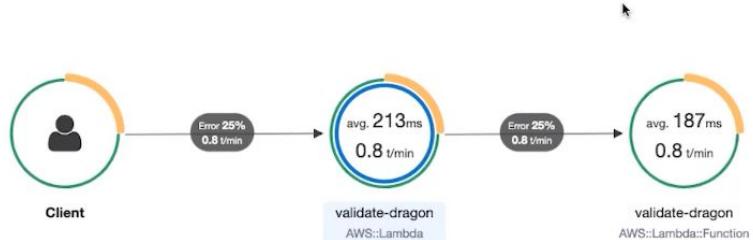
Service map

Updated on 2020-01-01

validate-dragon



Map legend ⓘ

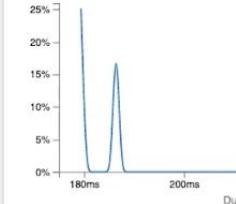
**Service details** ⓘ

Name: validate-dragon

Type: AWS::Lambda

Response distribution

Click and drag to select an area to zoom viewing traces.

**Response status**

Choose response statuses to add to the filter:

 Fault: 0% Throttle: 0%**Analyze traces** ↗

View traces

Close

Selecting one of the components brings up the service details.



AWS X-Ray

Getting started

Service map

Traces

Analytics

Configuration

Sampling

Encryption

Default ▾

Enter service name, annotation, trace ID. Or click the Help icon for additional details.



Trace overview

Group by:

- URL
- StatusCode
- Method
- User
- UserAgent
- ClientIP

Done

URL	Avg Response Time	% of Traces	Response
-	221 ms	100.00%	4 OK, 0 Throttled, 1 Errors, 0 I

Trace list

ID	Age	Method	Response	Response Time	URL	Client IP	Annotations
...17ab8676f9638	4.1 min		200	187 ms			0
...52068e158f798	4.1 min		200	263 ms			0
...1e600e0699d00	4.7 min		200	234 ms			0
...c7e1ae97fb656	4.6 min		200	180 ms			0
...817e7bf42e144	4.7 min		200	240 ms			0

in the Traces, you can organize data based on URL, status code, method, etc.

There is more that you can do to customize the data you're getting,
but that's a deeper level and will require additional coding.

The screenshot shows the AWS Cloud9 IDE interface. The top navigation bar includes tabs for 'AWS Management Console' and 'BuildingModernAppsPython'. The main window has a title bar 'listDragons.py X-Ray Command'. The left sidebar shows the project environment with files like 'Commands.txt', 'listDragons.py', and 'X-Ray Commands.txt'. The central workspace displays a numbered list of 18 steps:

- 1 Download X-Ray SDK
- 2 sudo pip install aws-xray-sdk
- 3
- 4 Import for python script
- 5 from aws_xray_sdk.core import patch_all
- 6
- 7 Call patch all method
- 8 patch_all()
- 9
- 10 Download Xray SDK to target
- 11 sudo pip install --target ./list-dragons-package aws-xray-sdk
- 12 sudo pip install --target ./list-dragons-package boto3
- 13
- 14 Zip up package folder
- 15 zip -r9 \${OLDPWD}/listDragonsPythonFunction.zip .
- 16
- 17 Update Function Code
- 18 aws lambda update-function-code --function-name list-dragons --zip-file fileb://listDragonsPythonFunction.zip

Below the list is a terminal window titled 'bash - "ip-172-31-' with the command 'buildingmodernapps:~/environment/list-dragons \$'.

Steps to add X-Ray to your code

Good Resources:

[What is AWS X-Ray? - AWS X-Ray](#)

[AWS X-Ray daemon](#)

[AWS X-Ray SDK for Python](#)

Amazon CloudWatch Logs

Amazon CloudWatch Logs enables you to
monitor, store and access your log files
from many different sources and enables you to
centralize the logs from all of your systems, applications, any of your services
that you use in a single, highly available service.

CloudWatch Logs enables you to see
all of your logs regardless of their source
as a single and consistent flow of events over time.

You can query them and sort them based on other dimensions,
group them by specific fields,
create custom computations with a query language
and visualize log data in dashboards.

Log event is a record of some activity recorded by the application or resource being monitored.

log stream is a sequence of log events that share the same source.

Log group is a group of log streams that can share the same retention, monitoring and access control settings.

You pay for storing log events.

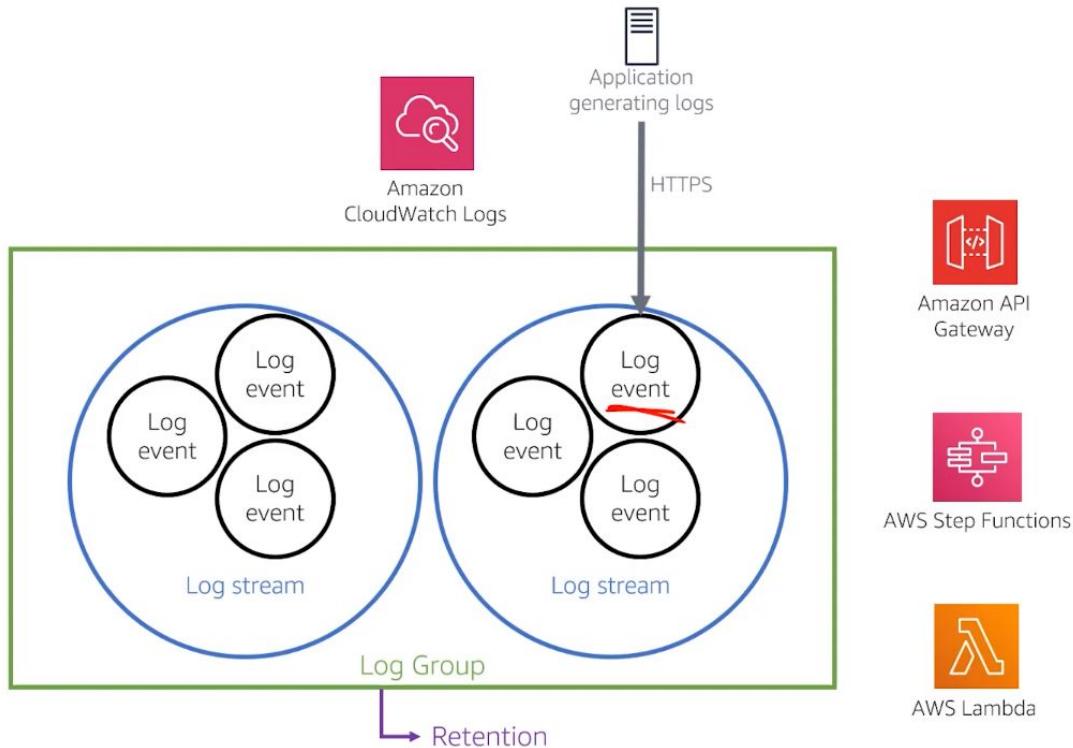
So you may want to get rid of some of these logs after a certain period of time.

The way log events are collected is the same way
as how you communicate with other AWS services
via ???

You pay for storing log events.

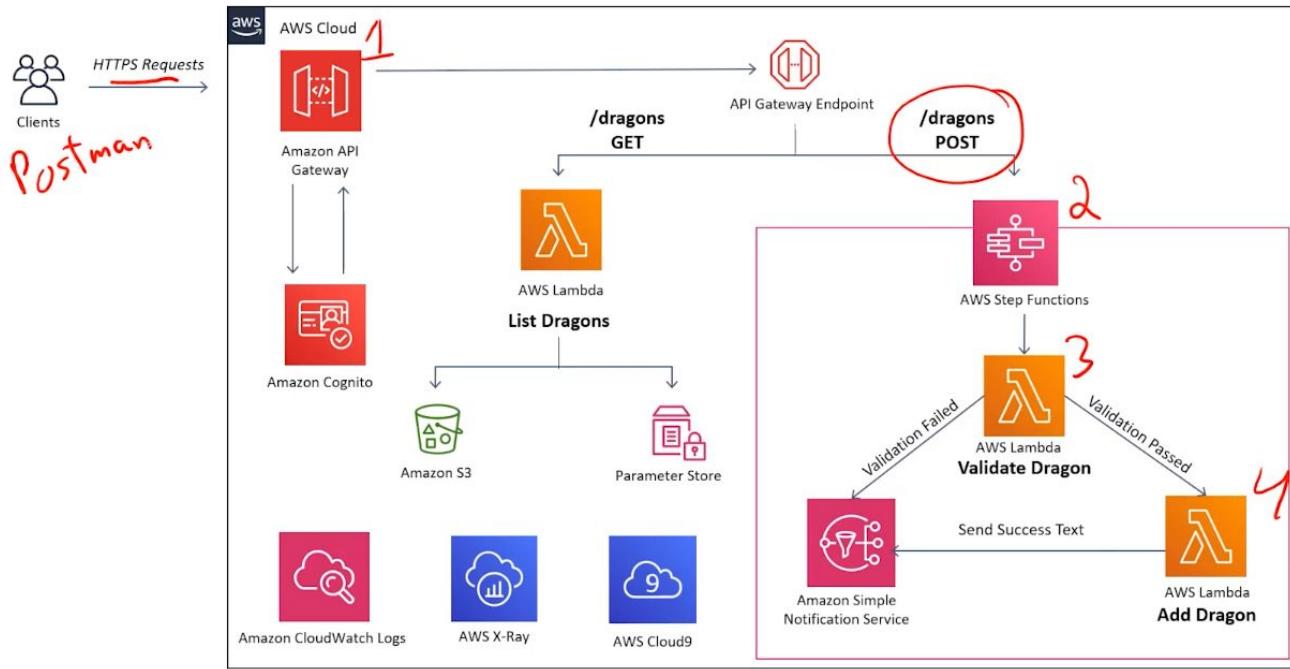
So you may want to get rid of some of these logs after a certain period of time.

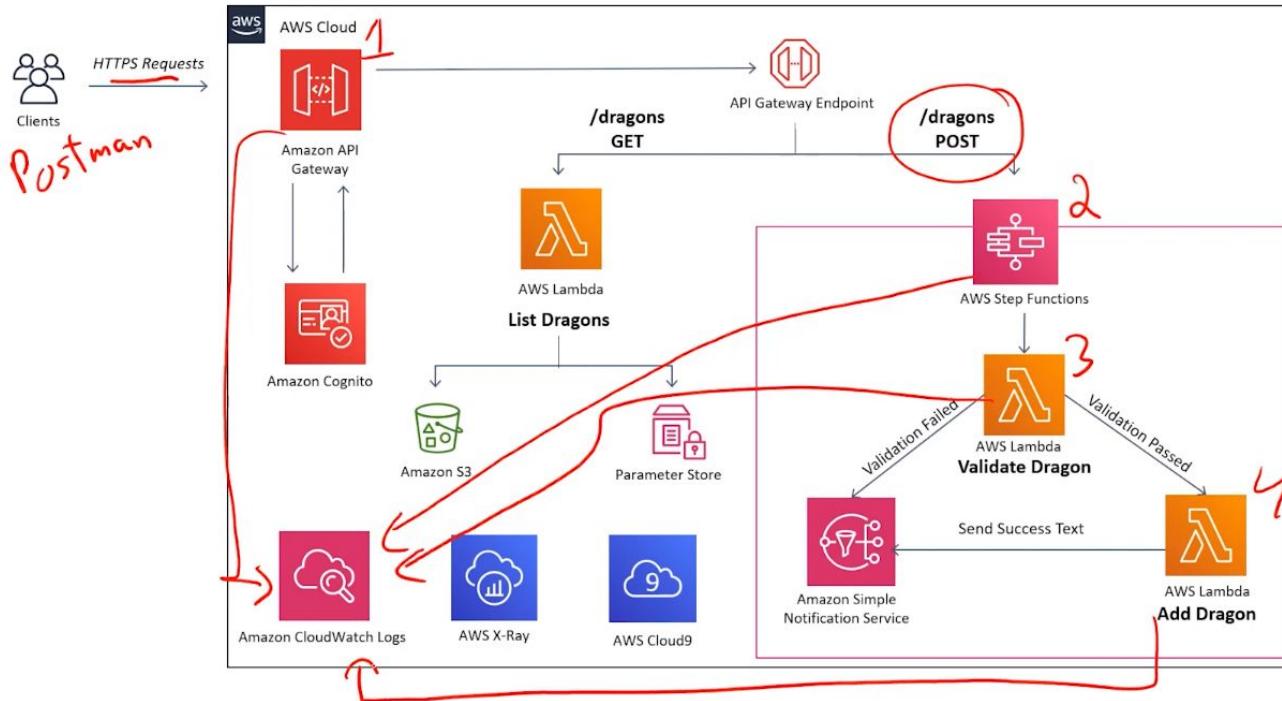
The way log events are collected is the same way
as how you communicate with other AWS services
via an HTTPS request.



all support CloudWatch Logs as a destination for their logs.

Let's say that we want to troubleshoot the POST/dragons.





Let's get into the AWS Management Console to configure all of those of the settings.

Remember that this can be done via the CLI and the SDK.

AWS Management Console

console.aws.amazon.com/console/home?region=us-east-1

AWS Services Resource Groups

buildingmodermaps @ 3022-1... N. Virginia Support

AWS Management Console

AWS services

Find Services
You can enter names, keywords or acronyms.

Recently visited services

- CloudWatch
- Lambda
- API Gateway
- Step Functions
- IAM

All services

Build a solution
Get started with simple wizards and automated workflows.

Launch a virtual machine
With EC2
2-3 minutes

Build a web app
With Elastic Beanstalk
6 minutes

Build using virtual servers
With Lightsail
1-2 minutes

Stay connected to your AWS resources on-the-go

Download the AWS Console Mobile App to your iOS or Android mobile device.
[Learn more](#)

Explore AWS

Take It to the Track
Test your ML skills on the Fumiaki Loop during this months AWS DeepRacer League Virtual Circuit.
[Learn more](#)

Host Static Web Apps in Minutes
AWS Amplify offers a simple Git-based workflow for deploying static web apps on AWS.
[Learn more](#)

Amazon DocumentDB (with MongoDB compatibility)
New role-based access control support helps you enforce least privilege access and build multi-

<https://console.aws.amazon.com/api/latest/wapi/home?region=us-east-1>

First navigate to API Gateway.

API Gateway

console.aws.amazon.com/apigateway/home?region=us-east-1#/settings

Amazon API Gateway Settings Show all hints ?

APIs

Custom Domain Names

VPC Links

API: dragons

- Resources
- Stages
- Authorizers
- Gateway Responses
- Models
- Resource Policy
- Documentation
- Dashboard
- Settings
- Usage Plans
- API Keys
- Client Certificates

Settings

Provide an Identity and Access Management (IAM) role ARN that has write access to CloudWatch logs in your account.

CloudWatch log role ARN* My ARN

Account level throttling Your current account level throttling rate is **10000** requests per second with a burst of **5000** requests. ⓘ

* Required

Save

https://console.aws.amazon.com/apigateway/home?region=us-east-1#/settings

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go to the setting

The first thing that it ask is a CloudWatch log role ARN.

If we don't have one, we must create it first.

API Gateway

console.aws.amazon.com/apigateway/home?region=us-east-1#/settings

Guest

Services ▾ Resource Groups ▾

History

Find a service by name or feature (for example, EC2, S3 or VM, storage).

Group A-Z

Compute

- EC2
- Lightsail
- Lambda
- Batch
- Elastic Beanstalk
- Serverless Application Repository
- AWS Outposts
- EC2 Image Builder

Storage

- S3
- EFS
- FSx
- S3 Glacier
- Storage Gateway
- AWS Backup

Database

- RDS
- DynamoDB
- ElastiCache
- Nutrience

Blockchain

- Amazon Managed Blockchain

Satellite

- Ground Station

Quantum Technologies

- Amazon Braket

Management & Governance

- AWS Organizations
- CloudWatch
- AWS Auto Scaling
- CloudFormation
- CloudTrail
- Config
- OpsWorks
- Service Catalog
- Systems Manager
- AWS AppConfig
- Trusted Advisor
- Control Tower

Analytics

- Athena
- EMR
- CloudSearch
- Elasticsearch Service
- Kinesis
- QuickSight
- Data Pipeline
- AWS Data Exchange
- AWS Glue
- AWS Lake Formation
- MSK

Business Applications

- Alexa for Business
- Amazon Chime
- WorkMail
- Amazon Honeycode

End User Computing

- WorkSpaces
- AppStream 2.0
- WorkDocs
- WorkLink

Security, Identity, & Compliance

- IAM
- Resource Access Manager
- Cognito
- Secrets Manager
- GuardDuty
- Inspector
- Amazon Macie
- AWS Single Sign-On
- Certificate Manager

Internet Of Things

- IoT Core
- FreeRTOS
- IoT 1-Click
- IoT Analytics
- IoT Device Defender
- IoT Device Management
- IoT Events
- IoT Greengrass
- IoT SiteWise
- IoT Things Graph

Save

close

https://console.aws.amazon.com/iam/home?region=us-east-1

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Go to the IAM service

API Gateway x IAM Management Console x +

console.aws.amazon.com/iam/home?region=us-east-1#/home Guest :

aws Services Resource Groups ★

Identity and Access Management (IAM)

Dashboard

Access management

- Groups
- Users
- Roles
- Policies
- Identity providers
- Account settings

Access reports

- Access analyzer
- Archive rules
- Analyzers
- Settings

Credential report

Organization activity

Service control policies (SCPs)

Search IAM

Welcome to Identity and Access Management

IAM users sign-in link:
<https://302211264422.signin.aws.amazon.com/console> | Customize

IAM Resources

Users: 1 Roles: 13
Groups: 0 Identity Providers: 0
Customer Managed Policies: 9

Security Status 2 out of 5 complete.

- ⚠ Activate MFA on your root account
- ✓ Create individual IAM users
- ⚠ Use groups to assign permissions
- ⚠ Apply an IAM password policy
- ✓ Rotate your access keys

Additional Information

IAM best practices
IAM documentation
Web Identity Federation Playground
Policy Simulator
Videos, IAM release history and additional resources

IAM console

API Gateway IAM Management Console

console.aws.amazon.com/iam/home?region=us-east-1#/roles

Guest

warn Services Resource Groups

Identity and Access Management (IAM)

Create role Delete role

Search I

Showing 13 results

Role name	Trusted entities	Last activity
AddDragonLambdaExecutionRole	AWS service: lambda	🕒
Admin	Account: 832211724792	🕒
APIGatewayStepFunctions	AWS service: apigateway	🕒
AWSServiceRoleForAPIGateway	AWS service: ops.apigateway (Service-Linked ...)	🕒
AWSServiceRoleForAWSCloud9	AWS service: cloud9 (Service-Linked role)	🕒
AWSServiceRoleForOrganizations	AWS service: organizations (Service-Linked rol...	🕒
AWSServiceRoleForSupport	AWS service: support (Service-Linked role)	🕒
AWSServiceRoleForTrustedAdvisor	AWS service: trustedadvisor (Service-Linked r...	🕒
IsengardOCRC-C0D6FDC4-426F-449E-931C-EAA6C43BD9...	Account: 727820809195	🕒
IsengardOCRC-C98F6C94-1386-4D35-8272-8AAB672B70...	Account: 727820809195	🕒
ListDragonsLambdaExecutionRole	AWS service: lambda	🕒
StepFunctions-MyStateMachine-role-feb8533b	AWS service: states	🕒
ValidateDragonLambdaExecutionRole	AWS service: lambda	🕒

Search IAM

https://console.aws.amazon.com/iam/home?region=us-east-1#/roles

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go to the Roles and Create a new role

API Gateway x IAM Management Console x +

console.aws.amazon.com/iam/home?region=us-east-1#/roles\$new?step=type

Guest : buildingmodernapps @ 3022-1... Global Support

Services Resource Groups

Create role

1 2 3 4

Select type of trusted entity

AWS service EC2, Lambda and others

Another AWS account Belonging to you or 3rd party

Web identity Cognito or any OpenID provider

SAML 2.0 federation Your corporate directory

Allows AWS services to perform actions on your behalf. Learn more

Choose a use case

Common use cases

EC2
Allows EC2 instances to call AWS services on your behalf.

Lambda
Allows Lambda functions to call AWS services on your behalf.

Or select a service to view its use cases

API Gateway	CodeGuru	ElastiCache	Kinesis	RoboMaker
AWS Backup	CodeStar Notifications	Elastic Beanstalk	Lake Formation	S3
AWS Chatbot	Comprehend	Elastic Container Service	Lambda	SMS
AWS Support	Config	Elastic Transcoder	Lex	SNS
Amplify	Connect	Elastic Load Balancing	License Manager	SWF
AppStream 2.0	DMS	Forecast	Machine Learning	SageMaker

* Required Cancel Next: Permissions

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select that this role is for API Gateway

API Gateway IAM Management Console

console.aws.amazon.com/iam/home?region=us-east-1#/roles\$new?step=permissions&selectedService=APIGateway&selectedUseCase=AWSAmazonAPIGatewayRole

Guest : buildingmodernapps @ 3022-1... Global Support

Services Resource Groups

Create role

Attached permissions policies

The type of role that you selected requires the following policy.

Policy name	Used as	Description
AmazonAPIGatewayPushToCloudWatchLogs	Permissions policy (1)	Allows API Gateway to push logs to user's acco...

Set permissions boundary

* Required

Cancel Previous Next: Tags

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create role for APIGateway to CloudWatchLog.

API Gateway X IAM Management Console X +

console.aws.amazon.com/iam/home?region=us-east-1#/roles\$new?step=permissions&selectedService=APIGateway&selectedUseCase=AWSAmazonAPIGatewayRole

Guest : Global Support

Services Resource Groups

Create role

Attached permissions policies

The type of role that you selected requires the following policy.

Policy name	Used as	Description
1 ~ { 2 "Version": "2012-10-17", 3 "Statement": [4 { 5 "Effect": "Allow", 6 "Action": [7 "logs:CreateLogGroup", 8 "logs:CreateLogStream", 9 "logs:DescribeLogGroups", 10 "logs:DescribeLogStreams", 11 "logs:PutLogEvents", 12 "logs:GetLogEvents", 13 "logs:FilterLogEvents" 14], 15 "Resource": "*" 16 }]		Showing 1 result

Filter policies Search

Set permissions boundary

* Required Cancel Previous Next: Tags

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This is the IAM policy inside that IAM role which defines access to different logs

API Gateway IAM Management Console

console.aws.amazon.com/iam/home?region=us-east-1#/roles\$new?step=tags&selectedService=APIGateway&selectedUseCase=AWSAmazonAPIGatewayRole

Guest : ▾

Services ▾ Resource Groups ▾ ★

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Create role

1 2 3 4

Add tags (optional)

IAM tags are key-value pairs you can add to your role. Tags can include user information, such as an email address, or can be descriptive, such as a job title. You can use the tags to organize, track, or control access for this role. [Learn more](#)

Key	Value (optional)	Remove
<input type="text" value="Add new key"/>		Remove

You can add 50 more tags.

Cancel Previous **Next: Review**

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you can leave empty if you don't need tag

API Gateway x IAM Management Console x + ← → ↻ [console.aws.amazon.com/iam/home?region=us-east-1#/roles\\$new?step=review&selectedService=APIGateway&selectedUseCase=AWSAmazonAPIGatewayRole](https://console.aws.amazon.com/iam/home?region=us-east-1#/roles$new?step=review&selectedService=APIGateway&selectedUseCase=AWSAmazonAPIGatewayRole) Guest ⋮

Services ▼ Resource Groups ▼ ★ buildingmodernapps @ 3022-1... ▾ Global ▾ Support ▾

Create role

Review

Provide the required information below and review this role before you create it.

Role name* Use alphanumeric and '+=_@-' characters. Maximum 64 characters.

Role description Allows API Gateway to push logs to CloudWatch Logs.
Maximum 1000 characters. Use alphanumeric and '+=_@-' characters.

Trusted entities AWS service: apigateway.amazonaws.com

Policies  [AmazonAPIGatewayPushToCloudWatchLogs](#) 

Permissions boundary Permissions boundary is not set

No tags were added.

* Required Cancel Previous Create role

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give it a name and later use this name

API Gateway IAM Management Console

console.aws.amazon.com/iam/home?region=us-east-1#/roles Guest

aws Services Resource Groups

Identity and Access Management (IAM)

Dashboard

Access management

- Groups
- Users
- Roles**
- Policies
- Identity providers
- Account settings

Access reports

- Access analyzer
- Archive rules
- Analyzers
- Settings

Credential report

Organization activity

Service control policies (SCPs)

Create role Delete role

Search

Showing 14 results

Role name	Trusted entities	Last activity
		Today
		91 days
APIGatewayCWLogs	AWS service: apigateway	None
		Today
		32 days
		Today
		None
		None
		None
		Today
		8 days
		Today

Search IAM

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The screenshot shows the AWS IAM Management Console. A success message at the top states "The role APIGatewayCWLogs has been created." Below this, there is a table listing 14 roles. The table has three columns: Role name, Trusted entities, and Last activity. The "APIGatewayCWLogs" role is highlighted in blue and has "AWS service: apigateway" listed under Trusted entities. The last activity for this role is "None". The "Last activity" column contains various dates including "Today", "91 days", and "8 days". At the bottom of the page, there are links for Feedback and English (US), and a copyright notice from 2008-2020.

open the role and copy ARN

API Gateway IAM Management Console

console.aws.amazon.com/iam/home?region=us-east-1#/roles/APIGatewayCWLogs

Guest

Services Resource Groups

Identity and Access Management (IAM)

Dashboard

Access management

Groups

Users

Roles

Policies

Identity providers

Account settings

Access reports

Access analyzer

Archive rules

Analyzers

Settings

Credential report

Organization activity

Service control policies (SCPs)

Search IAM

Roles > APIGatewayCWLogs

Summary

Delete role

Role ARN: arn:aws:iam::302211264422:role/APIGatewayCWLogs  Copied

Role description: Allows API Gateway to push logs to CloudWatch Logs. | Edit

Instance Profile ARNs: 

Path: /

Creation time: 2020-07-01 02:56 EDT

Last activity: Not accessed in the tracking period

Maximum CLI/API session duration: 1 hour | Edit

Permissions Trust relationships Tags Access Advisor Revoke sessions

▼ Permissions policies (1 policy applied)

Attach policies Add inline policy

Policy name	Policy type
AmazonAPIGatewayPushToCloudWatchLogs	AWS managed policy

▶ Permissions boundary (not set)

Feedback English (US)

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copy the Role ARN

API Gateway IAM Management Console

console.aws.amazon.com/apigateway/home?region=us-east-1#/settings

AWS Services Resource Groups

Amazon API Gateway Settings Show all hints ?

APIs Custom Domain Names VPC Links

API: dragons

- Resources
- Stages
- Authorizers
- Gateway Responses
- Models
- Resource Policy
- Documentation
- Dashboard
- Settings
- Usage Plans
- API Keys
- Client Certificates

Settings

Provide an Identity and Access Management (IAM) role ARN that has write access to CloudWatch logs in your account.

CloudWatch log role ARN* am:aws:iam::302211264422:role/APIGatewayCWLogs

Account level throttling Your current account level throttling rate is **10000** requests per second with a burst of **5000** requests. ⓘ

* Required

Save

Feedback English (US)

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now, back to the API Gateway, we paste the role ARN

API Gateway is now allowed to send log events to CloudWatch Logs.

we still need to tell the Dragons API, when to send those logs.

This configuration is done at the Stage level.

API Gateway IAM Management Console

console.aws.amazon.com/apigateway/home?region=us-east-1#/apis/nl18eym14c/stages/test

AWS Services Resource Groups

Amazon API Gateway APIs > dragons (nl18eym14c) > Stages > test Show all hints ?

test Stage Editor

Invoke URL: <https://nl18eym14c.execute-api.us-east-1.amazonaws.com/test>

Delete Stage Configure Tags

Settings Log/Tracing Stage Variables SDK Generation Export Deployment History Documentation History Canary

Configure logging and tracing settings for the stage.

CloudWatch Settings

Enable CloudWatch Logs ⓘ

Enable Detailed CloudWatch Metrics ⓘ

Custom Access Logging

Enable Access Logging

X-Ray Tracing [Learn more](#)

Enable X-Ray Tracing ⓘ Set X-Ray Sampling Rules

Save Changes

https://console.aws.amazon.com/apigateaway/home?region=us-east-1

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in the stage console, enable the CloudWatch logs

API Gateway IAM Management Console

console.aws.amazon.com/apigateway/home?region=us-east-1#/apis/nl18eym14c/stages/test

AWS Services Resource Groups

Amazon API Gateway APIs > dragons (nl18eym14c) > Stages > test Show all hints ?

test Stage Editor

Invoke URL: https://nl18eym14c.execute-api.us-east-1.amazonaws.com/test

Delete Stage Configure Tags

API: dragons

Resources

Stages

Authorizers

Gateway Responses

Models

Resource Policy

Documentation

Dashboard

Settings

Usage Plans

API Keys

Client Certificates

Settings

Feedback English (US)

APIs Stages Create

Custom Domain Names

VPC Links

Logs/Tracing Stage Variables SDK Generation Export Deployment History Documentation History Canary

Configure logging and tracing settings for the stage.

CloudWatch Settings

Enable CloudWatch Logs 

Log level 
ERROR
INFO

Log full requests/responses data

Enable Detailed CloudWatch Metrics 

Custom Access Logging

Enable Access Logging

X-Ray Tracing [Learn more](#)

Enable X-Ray Tracing  Set X-Ray Sampling Rules

Save Changes

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we can select the level of debugging

API Gateway IAM Management Console

console.aws.amazon.com/apigateway/home?region=us-east-1#/apis/nl18eym14c/stages/test

AWS Services Resource Groups

Amazon API Gateway APIs > dragons (nl18eym14c) > Stages > test Show all hints ?

test Stage Editor

Delete Stage Configure Tags

Invoke URL: https://nl18eym14c.execute-api.us-east-1.amazonaws.com/test

Settings Logs/Tracing Stage Variables SDK Generation Export Deployment History Documentation History Canary

Configure logging and tracing settings for the stage.

CloudWatch Settings

Enable CloudWatch Logs Log level INFO

Log full requests/responses data

Enable Detailed CloudWatch Metrics

Custom Access Logging

Enable Access Logging

X-Ray Tracing [Learn more](#)

Enable X-Ray Tracing Set X-Ray Sampling Rules

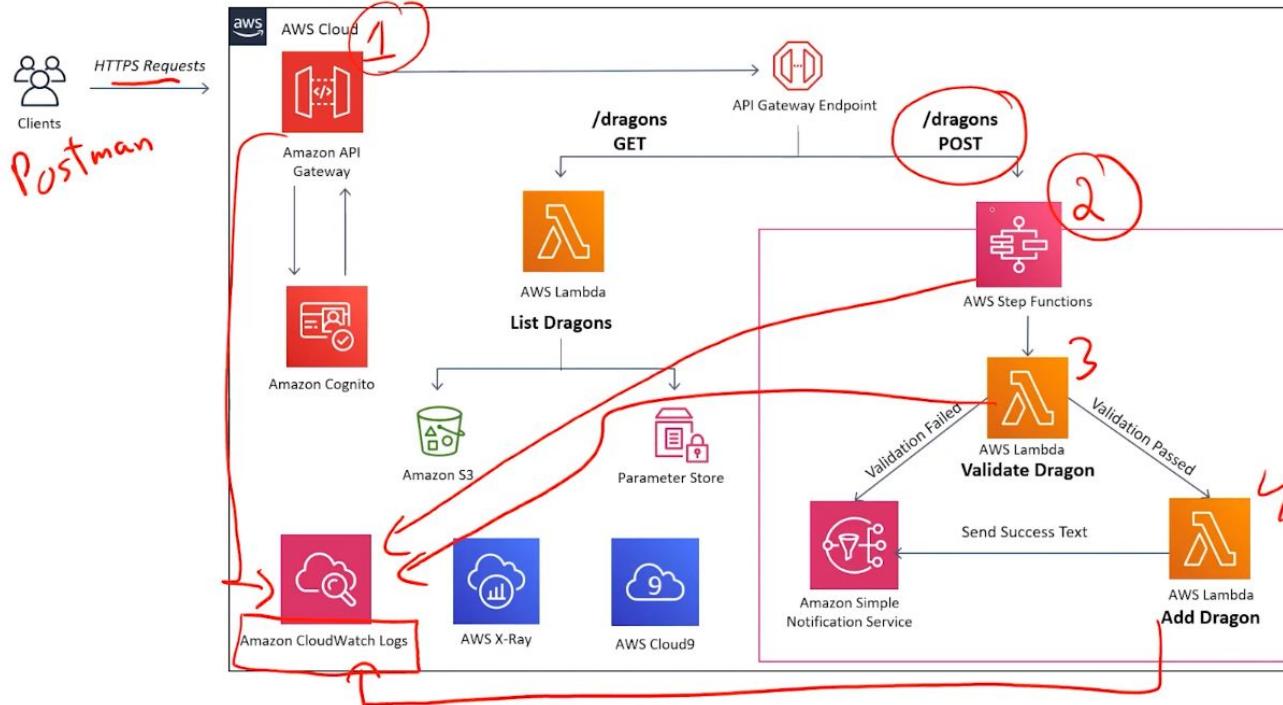
Save Changes

Feedback English (US)

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if you want to see the full log of request/response

The Dragons API is now configured
to send its execution logs to CloudWatch logs.



The next step is to configure Step Functions.

API Gateway | IAM Management Console | Step Functions Management Con... | +

console.aws.amazon.com/states/home?region=us-east-1#/statemachines

AWS Services Resource Groups

Step Functions State machines Activities

NEW! Write state machines in Visual Studio Code
The AWS Toolkit for Visual Studio Code now supports AWS Step Functions, making it easier to create and visualize state machine based workflows without leaving your code editor.

Learn more X ⓘ

Step Functions > State machines

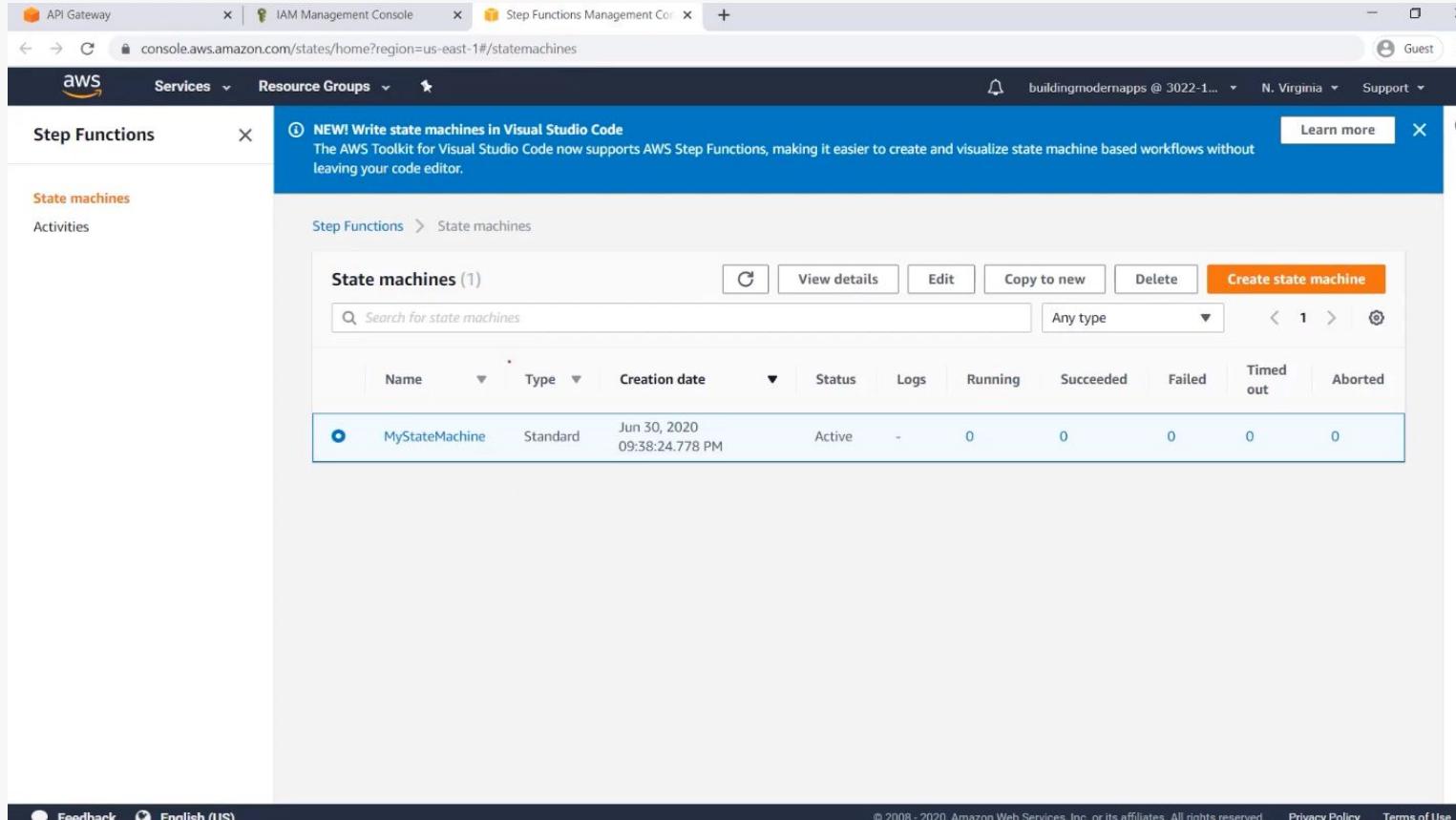
State machines (1)

C View details Edit Copy to new Delete Create state machine

Search for state machines Any type

Name	Type	Creation date	Status	Logs	Running	Succeeded	Failed	Timed out	Aborted
MyStateMachine	Standard	Jun 30, 2020 09:38:24.778 PM	Active	-	0	0	0	0	0

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A screenshot of the AWS Step Functions console. The top navigation bar shows tabs for API Gateway, IAM Management Console, and Step Functions Management Console. The main title is "Step Functions" with a "State machines" link. A blue banner at the top right says "NEW! Write state machines in Visual Studio Code" and "The AWS Toolkit for Visual Studio Code now supports AWS Step Functions, making it easier to create and visualize state machine based workflows without leaving your code editor." Below the banner are "Learn more" and a close button. The main content area has a breadcrumb "Step Functions > State machines". A table titled "State machines (1)" lists one entry: "MyStateMachine" (Standard type, created Jun 30, 2020 at 09:38:24.778 PM, Active status, 0 running, 0 succeeded, 0 failed, 0 timed out, 0 aborted). There are buttons for "View details", "Edit", "Copy to new", "Delete", and "Create state machine". A search bar and a dropdown for "Any type" are also present. At the bottom, there are links for "Feedback" and "English (US)", and a copyright notice from 2008-2020.

in the Step Function console, select the state machine, and click the Edit

API Gateway IAM Management Console Step Functions Management Con... +

console.aws.amazon.com/states/home?region=us-east-1#/statemachines/edit/arn:aws:states:us-east-1:302211264422:stateMachine:MyStateMachine

Guest

buildingmodernapps @ 3022-1... N. Virginia Support

aws Services Resource Groups

① NEW! Write state machines in Visual Studio Code
The AWS Toolkit for Visual Studio Code now supports AWS Step Functions, making it easier to create and visualize state machine based workflows without leaving your code editor.

Learn more X

Step Functions > State machines > MyStateMachine > Edit

Edit MyStateMachine

Start execution Save

Changes will overwrite previous values. Running executions will continue to use the definition they were started with.

Definition

Generate code snippet ▾ Format JSON

```
1+ {
2  "Comment": "Dragon will be validated, if it fails it will send a failure message. If the dragon is valid it will be added to the data and a success message will be sent",
3  "StartAt": "ValidateDragon",
4  "States": {
5    "ValidateDragon": {
6      "Type": "Task",
7      "Resource": "arn:aws:lambda:us-east-1:302211264422:function:validate-dragon",
8      "Catch": [
9        {
10          "ErrorEquals": [
11            "DragonValidationException"
12          ],
13          "Next": "AlertDragonValidationFailure",
14          "ResultPath": null
15        },
16        {
17          "ErrorEquals": [
18            "States.ALL"
19          ]
20        }
21      ]
22    }
23  }
24}
```

Export ▾ Layout ▾

```
graph TD
    Start((Start)) --> ValidateDragon[ValidateDragon]
    ValidateDragon --> AlertDragonValidationFailure[AlertDragonValidationFailure]
    ValidateDragon --> AddDragon[AddDragon]
    AddDragon --> ConfirmationRequired[ConfirmationRequired]
    AddDragon --> CatchAllFailure[CatchAllFailure]
    ConfirmationRequired --> AlertAddDragonSuccess[AlertAddDragonSuccess]
    ConfirmationRequired --> NoAlertAddDragonSuccess[NoAlertAddDragonSuccess]
    AlertAddDragonSuccess --> End((End))
    NoAlertAddDragonSuccess --> End
    CatchAllFailure --> End
```

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the edit console

API Gateway IAM Management Console Step Functions Management Con... +

console.aws.amazon.com/states/home?region=us-east-1#/statemachines/edit/arn:aws:states:us-east-1:302211264422:stateMachine:MyStateMachine

Guest Support N. Virginia buildingmodernapps @ 3022-1...

Services Resource Groups

12],
13 "Next": "AlertDragonValidationFailure",
14 "ResultPath": null
15 },
16 {
17 "ErrorEquals": [
18 "States.ALL"
19],
20 "Next": "CatchAllFailure"
21 }

```
graph TD; A[AlertDragonValidationFailure] --> E((End)); B[CatchAllFailure] --> E; C[AlertAddDragonSuccess] --> E; D[NoAlertAddDragonSuccess] --> E;
```

Permissions

Execution role

The IAM role that defines which resources your state machine has permission to access during execution. To create a custom role, go to the [IAM console](#)

Create new role
Let Step Functions create a new role for you based on your state machine's definition and configuration details.

Choose an existing role

Enter a role ARN

Existing roles

StepFunctions-MyStateMachine-role-feb8533b

Logging

You can log your state machine's execution history to CloudWatch Logs. For Express state machines, you must enable logging to inspect and debug executions. CloudWatch Logs charges apply. [Learn more](#)

Log level

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it is already has a role. we need to edit this role to add a policy to allow Step Functions to access the CloudWatch Logs.

API Gateway IAM Management Console Step Functions Management Con... +

console.aws.amazon.com/iam/home?region=us-east-1#/policies

AWS Services Resource Groups

buildingmodernapps @ 3022-1... Global Support

Identity and Access Management (IAM)

Create policy Policy actions

Filter policies Search Showing 691 results

	Policy name	Type	Used as	Description
...	AccessAnalyzerServiceRolePol...	AWS managed	None	Allow Access Analyzer to analyze resource metadata
...	AdministratorAccess	Job function	Permissions policy (1)	Provides full access to AWS services and resources.
...	AlexaForBusinessDeviceSetup	AWS managed	None	Provide device setup access to AlexaForBusiness services
...	AlexaForBusinessFullAccess	AWS managed	None	Grants full access to AlexaForBusiness resources and access to related ...
...	AlexaForBusinessGatewayExec...	AWS managed	None	Provide gateway execution access to AlexaForBusiness services
...	AlexaForBusinessLifesizeDeleg...	AWS managed	None	Provide access to Lifesize AVS devices
...	AlexaForBusinessNetworkProf...	AWS managed	None	This policy enables Alexa for Business to perform automated tasks sche...
...	AlexaForBusinessPolyDelegate...	AWS managed	None	Provide access to Poly AVS devices
...	AlexaForBusinessReadOnlyAcc...	AWS managed	None	Provide read only access to AlexaForBusiness services
...	AmazonAPIGatewayAdministrat...	AWS managed	None	Provides full access to create/edit/delete APIs in Amazon API Gateway ...
...	AmazonAPIGatewayInvokeFull...	AWS managed	None	Provides full access to invoke APIs in Amazon API Gateway.
...	AmazonAPIGatewayPushToClo...	AWS managed	Permissions policy (2)	Allows API Gateway to push logs to user's account.
...	AmazonAppFlowFullAccess	AWS managed	None	Provides full access to Amazon AppFlow and access to AWS services su...
...	AmazonAppFlowReadOnlyAcc...	AWS managed	None	Provides read only access to Amazon Appflow flows
...	AmazonAppStreamFullAccess	AWS managed	None	Provides full access to Amazon AppStream via the AWS Management C...
...	AmazonAppStreamReadOnlyA...	AWS managed	None	Provides read only access to Amazon AppStream via the AWS Managem...

Search IAM

https://console.aws.amazon.com/iam/home?region=us-east-1#/policies&new

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going back to the IAM console, we need to create a brand new IAM policy.
click on create Policy

API Gateway IAM Management Console Step Functions Management Con... +

console.aws.amazon.com/iam/home?region=us-east-1#/policies\$new?step=edit

AWS Services Resource Groups

buildingmodernapps @ 3022-1... Global Support

Create policy

1 2

A policy defines the AWS permissions that you can assign to a user, group, or role. You can create and edit a policy in the visual editor and using JSON. [Learn more](#)

Visual editor JSON Import managed policy

```
1 - {  
2     "Version": "2012-10-17",  
3     "Statement": []  
4 }
```

Character count: 39 of 6,744.

Cancel Review policy

https://console.aws.amazon.com/iam/home?region=us-east-1#

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here you can write the policy. you can find the policies in the AWS documentations

Create policy

1 2

A policy defines the AWS permissions that you can assign to a user, group, or role. You can create and edit a policy in the visual editor and using JSON. [Learn more](#)

Visual editor JSON Import managed policy

```
1 {  
2     "Version": "2012-10-17",  
3     "Statement": [  
4         {  
5             "Effect": "Allow",  
6             "Action": [  
7                 "logs:CreateLogDelivery",  
8                 "logs:GetLogDelivery",  
9                 "logs:UpdateLogDelivery",  
10                "logs:DeleteLogDelivery",  
11                "logs>ListLogDeliveries",  
12                "logs:PutResourcePolicy",  
13                "logs:DescribeResourcePolicies",  
14                "logs:DescribeLogGroups"  
15            ],  
16            "Resource": "*"  
17        }  
18    ]  
19}
```

Character count: 287 of 6,144.

Cancel

Review policy

the policy for CloudWatch

API Gateway IAM Management Console Step Functions Management Co... X

console.aws.amazon.com/iam/home?region=us-east-1#/policies\$new?step=review

Guest

Services Resource Groups

buildingmodernapps @ 3022-1... Global Support

Create policy

1 2

Review policy

Name* StepFunctionsCWDelivery
Use alphanumeric and '+=_@-' characters. Maximum 128 characters.

Description Policy for Step Functions to cloudwatch logs delivery
Maximum 1000 characters. Use alphanumeric and '+=_@-' characters.

Summary

Service	Access level	Resource	Request condition
Allow (1 of 233 services) Show remaining 232	Limited: List, Read, Write	All resources	None
CloudWatch Logs	Limited: List, Read, Write	All resources	None

* Required

Cancel Previous **Create policy**

give it a name and create the policy

API Gateway IAM Management Console Step Functions Management Con... +

console.aws.amazon.com/states/home?region=us-east-1#/statemachines/edit/arn:aws:states:us-east-1:302211264422:stateMachine:MyStateMachine

Guest Support

Services Resource Groups

buildingmodernapps @ 3022-1... N. Virginia Support

12
13 "Next": "AlertDragonValidationFailure",
14 "ResultPath": null
15 }
16 {
17 "ErrorEquals": [
18 "States.ALL"
19],
20 "Next": "CatchAllFailure"
21 }
4

```
graph TD; A[AlertDragonValidationFailure] --> End((End)); B[CatchAllFailure] --> End; C[AlertAddDragonSuccess] --> End; D[NoAlertAddDragonSuccess] --> End;
```

Permissions

Execution role

The IAM role that defines which resources your state machine has permission to access during execution. To create a custom role, go to the [IAM console](#)

Create new role
Let Step Functions create a new role for you based on your state machine's definition and configuration details.

Choose an existing role

Enter a role ARN

Existing roles

StepFunctions-MyStateMachine-role-feb8533b

Logging

You can log your state machine's execution history to CloudWatch Logs. For Express state machines, you must enable logging to inspect and debug executions. CloudWatch Logs charges apply. [Learn more](#)

Log level

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just to check the name of the Step Function's role that we want to edit its policies

API Gateway IAM Management Console Step Functions Management Con... - X

console.aws.amazon.com/iam/home?region=us-east-1#roles

aWS Services Resource Groups

Identity and Access Management (IAM)

Dashboard

Access management

- Groups
- Users
- Roles**
- Policies
- Identity providers
- Account settings

Access reports

- Access analyzer
- Archive rules
- Analyzers
- Settings

Credential report

Organization activity

Service control policies (SCPs)

Create role Delete role

Search

Showing 14 results

Role name	Trusted entities	Last activity
StepFunctions-MyStateMachine-role-feb8533b	AWS service: states	8 days
		Today
		91 days
		None
		Today
		32 days
		Today
		None
		Today
		Today

Search IAM

https://console.aws.amazon.com/iam/home?region=us-east-1#roles/StepFunctions-MvStat....

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go to the Rules and select that role

API Gateway IAM Management Console Step Functions Management Co... +

console.aws.amazon.com/iam/home?region=us-east-1#/roles/StepFunctions-MyStateMachine-role-feb8533b

Guest

aWS Services Resource Groups

Identity and Access Management (IAM)

Dashboard

Access management

Groups

Users

Roles

Policies

Identity providers

Account settings

Access reports

Access analyzer

Archive rules

Analyzers

Settings

Credential report

Organization activity

Service control policies (SCPs)

Search IAM

Roles > StepFunctions-MyStateMachine-role-feb8533b

Summary

Role ARN: arn:aws:iam::302211264422:role/service-role/StepFunctions-MyStateMachine-role-feb8533b

Role description: Edit

Instance Profile ARNs: [Edit](#)

Path: /service-role/

Creation time: 2020-05-20 17:00 EDT

Last activity: 2020-06-22 18:08 EDT (8 days ago)

Maximum CLI/API session duration: 1 hour [Edit](#)

Permissions [Trust relationships](#) [Tags](#) [Access Advisor](#) [Revoke sessions](#)

▼ Permissions policies (3 policies applied)

[Attach policies](#) [+ Add inline policy](#)

Policy name	Policy type	X
SnsPublishFullAccessPolicy-1029f7de-1582-4a0f-8e98-b596d16042a4	Managed policy	X
XRayAccessPolicy-ea9197f4-3bca-4274-a5cb-c5e78827bc7c	Managed policy	X

Show 1 more

▼ Permissions boundary (not set)

Feedback English (US) console.aws.amazon.com/iam/home?region=us-east-1#/roles/StepFunctions-MyStateMachine-role-feb8533b

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inside that role, click on the attach policy to add a new policy to this role

API Gateway IAM Management Console Step Functions Management Co... +

console.aws.amazon.com/iam/home?region=us-east-1#/roles/StepFunctions-MyStateMachine-role-feb8533b\$addPermissions?step=policy

Guest

buildingmodernapps @ 3022-1... Global Support

Add permissions to StepFunctions-MyStateMachine-role-feb8533b

Attach Permissions

Create policy

Filter policies ▾

Showing 1 result

	Policy name	Type	Used as
<input checked="" type="checkbox"/>	StepFunctionsCWDelivery	Customer managed	None

StepFunctionsCWDelivery
Policy for Step Functions to cloudwatch logs delivery

Policy summary Edit policy

```
1 = {  
2     "Version": "2012-10-17",  
3     "Statement": [  
4         {  
5             "Effect": "Allow",  
6             "Action": [  
7                 "logs>CreateLogDelivery",  
8                 "logs:GetLogDelivery",  
9                 "logs>UpdateLogDelivery",  
10                "logs>DeleteLogDelivery",  
11                "logs>ListLogDeliveries",  
12                "logs>PutResourcePolicy".  
13            ]  
14        }  
15    ]  
16}
```

Cancel

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add the new policy that we just created and then click on the attach policy

The next step is to configure the state machine to talk to CloudWatch Logs.

API Gateway IAM Management Console Step Functions Management Co

console.aws.amazon.com/states/home?region=us-east-1#/statemachines/edit/arn:aws:states:us-east-1:302211264422:stateMachine:MyStateMachine

Guest N. Virginia Support

Services Resource Groups

```
17 "ErrorEquals": [
18     "States.ALL"
19 ],
20 "Next": "CatchAllFailure"
21 }
22
23 }
```

Permissions

Execution role

The IAM role that defines which resources your state machine has permission to access during execution. To create a custom role, go to the [IAM console](#)

Create new role Let Step Functions create a new role for you based on your state machine's definition and configuration details.

Choose an existing role

Enter a role ARN

Existing roles

StepFunctions-MyStateMachine-role-feb8533b

Logging

You can log your state machine's execution history to CloudWatch Logs. For Express state machines, you must enable logging to inspect and debug executions. CloudWatch Logs charges apply. [Learn more](#)

Log level

Indicates which execution history events to log

OFF

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in the Step Function, go the logging

API Gateway IAM Management Console Step Functions Management Co... +

console.aws.amazon.com/states/home?region=us-east-1#/statemachines/edit/arn:aws:states:us-east-1:302211264422:stateMachine:MyStateMachine

Guest buildingmodernapps @ 3022-1... N. Virginia Support

Services Resource Groups

```
17    "ErrorEquals": [  
18       "States.ALL"  
19     ],  
20     "Next": "CatchAllFailure"  
21 }  
4
```

Permissions

Execution role
The IAM role that defines which resources your state machine has permission to access during execution. To create a custom role, go to the [IAM console](#)

Create new role
Let Step Functions create a new role for you based on your state machine's definition and configuration details.

Choose an existing role

Enter a role ARN

Existing roles

StepFunctions-MyStateMachine-role-feb8533b

ALL
Logging is enabled for all events

ERROR
Logging is enabled for errors only

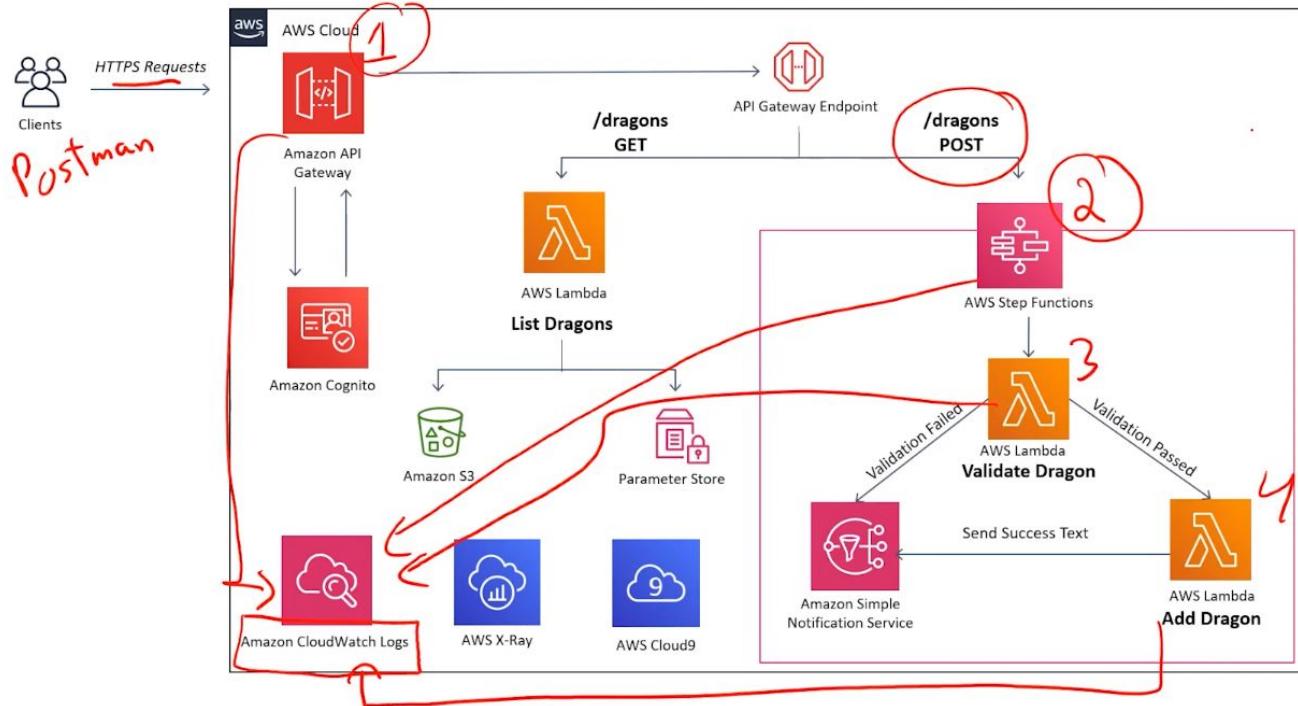
FATAL
Logging is enabled for fatal errors only

OFF
Logging is disabled

For troubleshooting purposes, we normally select error, but in this case, we select ALL to see the all logs. Save the setting and this step is done.

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For troubleshooting purposes, we normally select error, but in this case, we select ALL to see the all logs. Save the setting and this step is done.



the next step is to configure the Validate Dragon Lambda function

API Gateway IAM Management Console Step Functions Management Con... Functions - Lambda

console.aws.amazon.com/lambda/home?region=us-east-1#/functions

AWS Services Resource Groups

AWS Lambda

Lambda > Functions

Functions (3)

Filter by tags and attributes or search by keyword

Actions Create function

Function name	Description	Runtime	Code size	Last modified
list-dragons		Python 3.6	9.8 MB	6 hours ago
validate-dragon		Python 3.6	705 bytes	6 hours ago
add-dragon		Python 3.6	565 bytes	6 hours ago

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AWS Lambda Functions console

The screenshot shows the AWS Lambda function configuration page for 'validate-dragon'. The top navigation bar includes tabs for API Gateway, IAM Management Console, Step Functions Management Console, validate-dragon - Lambda, and a guest account. The main title is 'validate-dragon' under the 'Functions' section. The 'Permissions' tab is selected. At the top right are buttons for Throttle, Qualifiers, Actions, Select a test event, Test, and Save. The ARN is listed as arn:aws:lambda:us-east-1:302211264422:function:validate-dragon. The 'Execution role' section shows a role named 'ValidateDragonLambdaExecutionRole' with an 'Edit' button. The 'Resource summary' section shows an AWS Directory Service resource with 2 actions and 1 resource. It includes a 'View role document' button. Below this, a message says 'To view the resources and actions that your function has permission to access, choose a service.' A 'By action' or 'By resource' filter is present. The 'Actions' table lists 'All resources' with actions 'Allow: ds>CreateComputer' and 'Allow: ds>DescribeDirectories'. The bottom footer includes links for Privacy Policy and Terms of Use.

API Gateway | IAM Management Console | Step Functions Management Console | validate-dragon - Lambda | Guest

console.aws.amazon.com/lambda/home?region=us-east-1#/functions/validate-dragon?tab=permissions

Services Resource Groups

Lambda > Functions > validate-dragon

validate-dragon

ARN - arn:aws:lambda:us-east-1:302211264422:function:validate-dragon

Throttle Qualifiers Actions Select a test event Test Save

Configuration Permissions Monitoring

Execution role

Role name ValidateDragonLambdaExecutionRole [Edit](#)

AWS Directory Service 2 actions, 1 resource [View role document](#)

To view the resources and actions that your function has permission to access, choose a service.

By action By resource

Resource	Actions
All resources	Allow: ds>CreateComputer Allow: ds>DescribeDirectories

https://console.aws.amazon.com/lambda/home?region=us-east-1#functions/validate-dragon?tab=permissions

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in the Permissions tab, there is already a Role and a Resource Summary

API Gateway IAM Management Console Step Functions Management Con... validate-dragon - Lambda

console.aws.amazon.com/lambda/home?region=us-east-1#/functions/validate-dragon?tab=permissions

AWS Services Resource Groups

buildingmodernapps @ 3022-1... N. Virginia Support

validate-dragon

Throttle Qualifiers Actions Select a test event Test Save

Execution role

Role name ValidateDragonLambdaExecutionRole

Resource summary

View role document

Amazon CloudWatch Logs 4 actions, 1 resource

To view the resources and actions that your function has permission to access, choose a service.

By action By resource

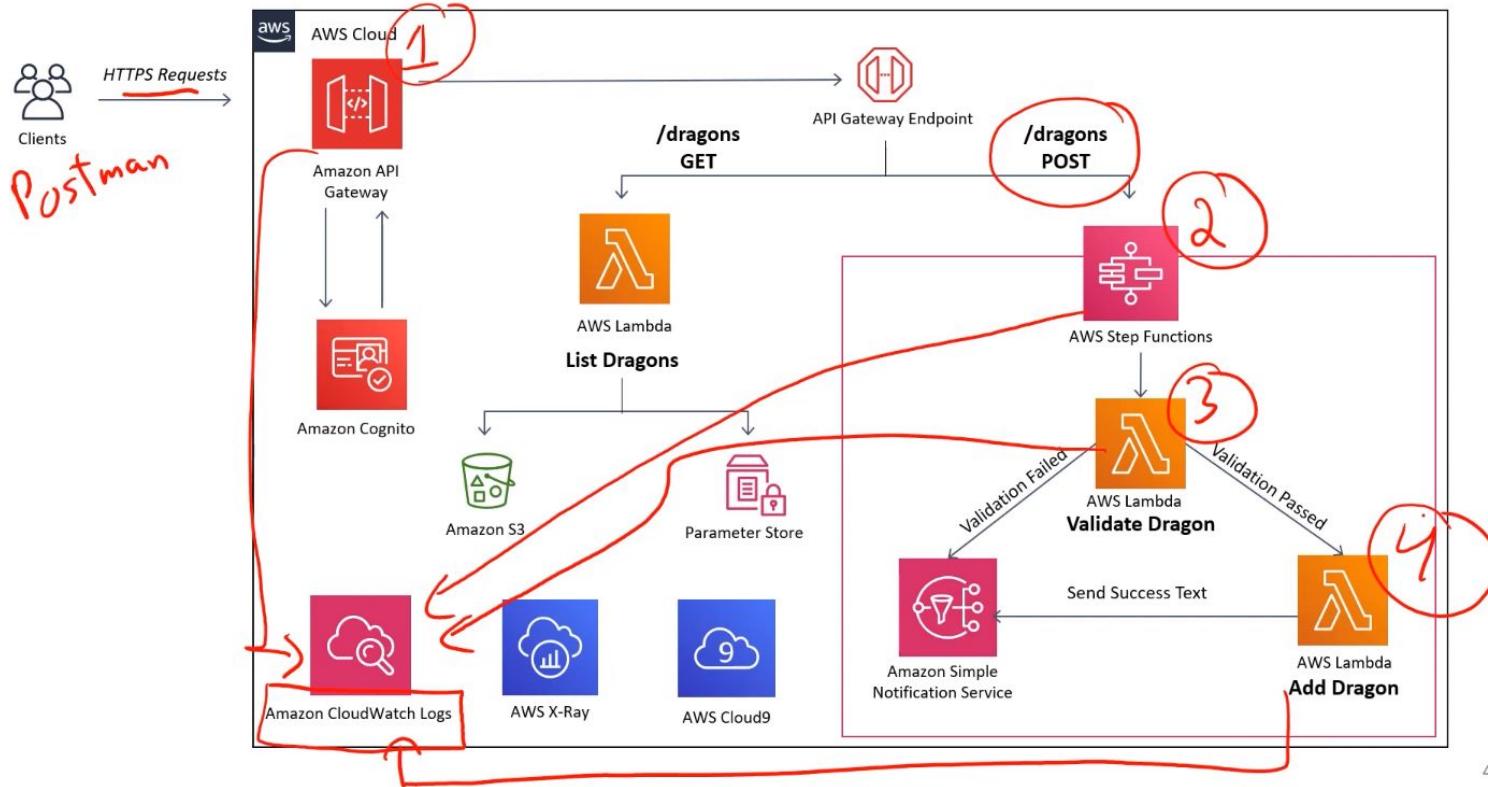
Resource	Actions
All resources	Allow: logs:* Allow: logs>CreateLogGroup Allow: logs>CreateLogStream Allow: logs:PutLogEvents

Info Lambda obtained this information from the following policy statements:

- Managed policy AmazonSSMFullAccess, statement 0

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if you select the Amazon CloudWatch Logs, you can see that the cloudwatch is already configured



next step is configure the Add Dragon which already is configured.

So all that's left now is to use postman to look at the logs.



File Edit View Help

+ New

Import

Runner



My Workspace Invite



Upgrade

Filter

History Collections APIs

Save Responses

You haven't sent any requests

Any request you send in this workspace will appear here.

Show me how

POST https://nl18eym14c.execute-a...

Untitled Request

No Environment

POST https://nl18eym14c.execute-api.us-east-1.amazonaws.com/test/dragons

Send Save

Params Authorization Headers (9) **Body** Pre-request Script Tests Settings

Cookies Code

none form-data x-www-form-urlencoded raw binary GraphQL **JSON**

Beautify

```
1 {
2   "dragonName": "Jon",
3   "description": "Jon dragon",
4   "family": "green",
5   "city": "Toronto",
6   "country": "CA",
7   "state": "ON",
8   "neighborhood": "Downtown",
9   "reportingPhoneNumber": "15555555555",
10  "confirmationRequired": false
11 }
```

Response

Learn how to debug requests and perform manual testing [Start](#)



Bootcamp

Build

Browse



an example of Post Method in the Postman

Postman

File Edit View Help

+ New Import Runner + ... My Workspace Invite Upgrade

Filter

History Collections APIs

Save Responses Clear all

Today

POST https://nl18eym14c.execute-api.us-east-1.amazonaws.com/test/dragons

Untitled Request

Comments 0

POST https://nl18eym14c.execute-api.us-east-1.amazonaws.com/test/dragons

Send Save

Params Authorization Headers (9) Body Pre-request Script Tests Settings Cookies Code

Body (none) form-data x-www-form-urlencoded raw binary GraphQL JSON Beautify

```
1 {
2     "dragonName": "Jon-5",
3     "description": "Jon dragon",
4     "family": "green",
5     "city": "Toronto",
6     "country": "CA",
7     "state": "ON",
8     "neighborhood": "Downtown",
9     "reportingPhoneNumber": "15555555555",
10    "confirmationRequired": false
11 }
```

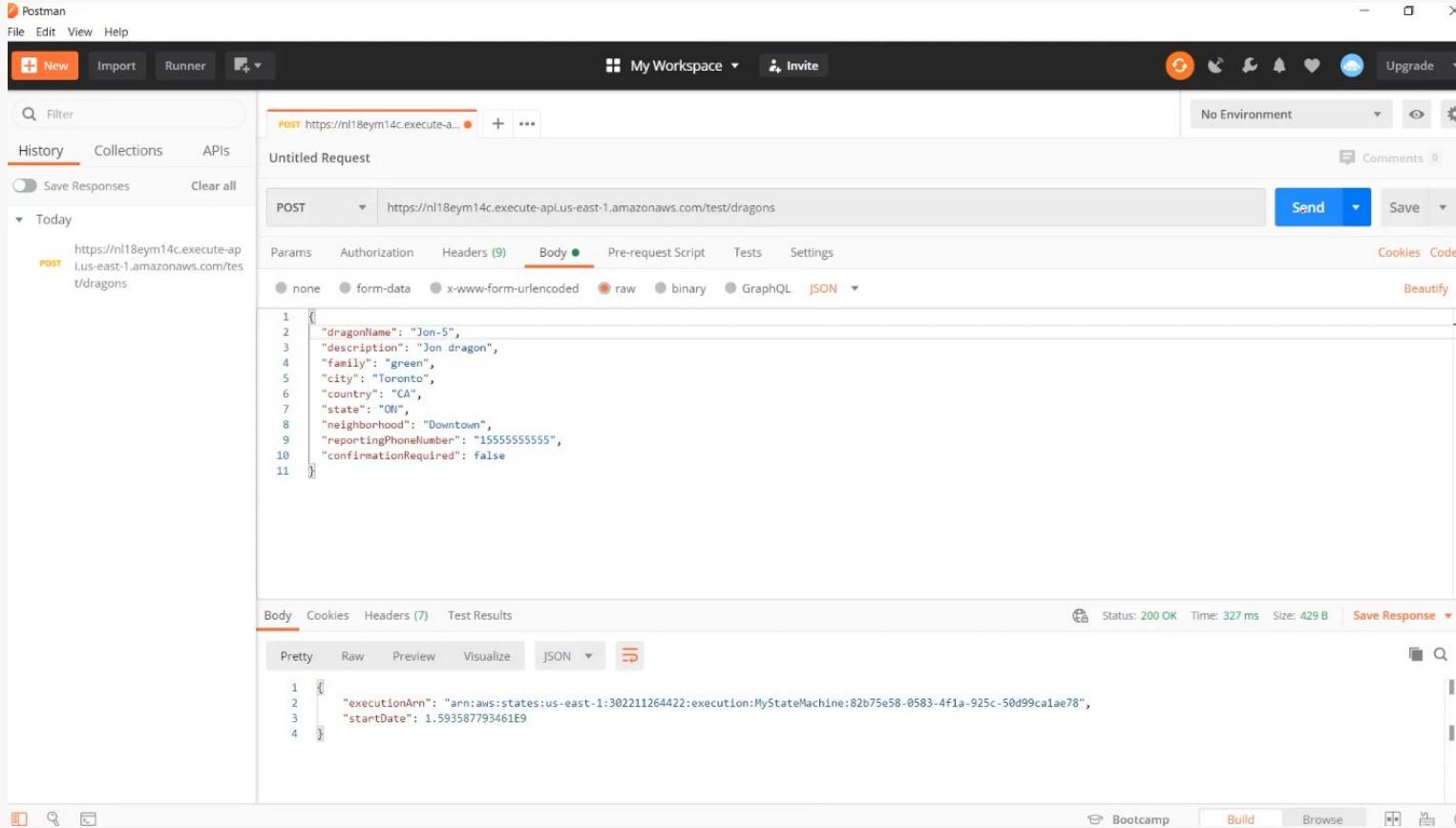
Body Cookies Headers (7) Test Results

Status: 200 OK Time: 327 ms Size: 429 B Save Response

Pretty Raw Preview Visualize JSON

```
1 {
2     "executionArn": "arn:aws:states:us-east-1:302211264422:execution:MyStateMachine:82b75e58-0583-4f1a-925c-50d99ca1ae78",
3     "startDate": 1.593587793461E9
4 }
```

Bootcamp Build Browse



the response is the executionARN which means the step function received the request.

API Gateway IAM Management Console Step Functions Management Co... validate-dragon - Lambda add-dragon - Lambda

console.aws.amazon.com/apigateway/home?region=us-east-1#/apis/nl18eym14c/stages/test

aWS Services Resource Groups

Amazon API Gateway APIs > dragons (nl18eym14c) > Stages > test Show all hints ?

test Stage Editor

Delete Stage Configure Tags

API: dragons

Resources

Stages

Authorizers

Gateway Responses

Models

Resource Policy

Documentation

Dashboard

Settings

Client Certificates

Custom Domain Names

VPC Links

API: dragons

Stages

Create

test

Invoke URL: <https://nl18eym14c.execute-api.us-east-1.amazonaws.com/test>

Settings Logs/Tracing Stage Variables SDK Generation Export Deployment History Documentation History Canary

Configure logging and tracing settings for the stage.

CloudWatch Settings

Enable CloudWatch Logs ⓘ

Log level INFO

Log full requests/responses data

Enable Detailed CloudWatch Metrics ⓘ

Custom Access Logging

Enable Access Logging

X-Ray Tracing [Learn more](#)

Enable X-Ray Tracing ⓘ Set X-Ray Sampling Rules

Save Changes

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now, lets look at the logs in API Gateway. Just keep the Dragons API id in mind.

API Gateway IAM Management Console Step Functions Management Co... validate-dragon - Lambda add-dragon - Lambda

console.aws.amazon.com/apigateway/home?region=us-east-1#/apis/nl18eym14c/stages/test

Guest

Services **Resource Groups**

History

Find a service by name or feature (for example, EC2, S3 or VM, storage).

Group A-Z

Tags

Compute Blockchain Analytics Business Applications

EC2 Amazon Managed Blockchain Athena Alexa for Business

Lightsail Satellite CloudSearch EMR Amazon Chime

Lambda Ground Station Elasticsearch Service WorkMail

Batch Quantum Technologies QuickSight

Elastic Beanstalk Amazon Braket Data Pipeline

Serverless Application Repository AWS Outposts AWS Data Exchange

AWS Outposts AWS Lambda AWS Glue

EC2 Image Builder AWS Lambda@Edge AWS Lake Formation

Storage Management & Governance MSK

S3 AWS Organizations

EFS CloudWatch

FSx AWS Auto Scaling

S3 Glacier CloudFormation

Storage Gateway CloudTrail

AWS Backup Config

Database OpsWorks

RDS Service Catalog

DynamoDB Systems Manager

ElastiCache AWS AppConfig

Nentine Trusted Advisor

Control Tower Certificate Manager

Security, Identity, & Compliance Internet Of Things

IAM Resource Access Manager IoT Core

CloudFormation Cognito FreeRTOS

CloudTrail Inspector IoT 1-Click

Config Secrets Manager IoT Analytics

OpsWorks GuardDuty IoT Device Defender

Service Catalog Inspector IoT Device Management

Systems Manager Amazon Macie IoT Events

AWS AppConfig Trusted Advisor IoT Greengrass

Control Tower AWS Single Sign-On IoT SiteWise

Certificate Manager IoT ThinGranh

Feedback English (US)

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now go to the CloudWatch console

console.aws.amazon.com/cloudwatch/home?region=us-east-1#logsV2:log-groups

aWS Services Resource Groups

CloudWatch Dashboards Alarms ALARM INSUFFICIENT OK Billing Logs Log groups Insights Metrics Events Rules Event Buses ServiceLens Service Map Traces Container Insights BETA Resources Performance Monitoring Synthetics NEW Canaries Contributor Insights Settings Favorites

CloudWatch > CloudWatch Logs > Log groups Switch to the original interface.

We listened to your feedback! In response to your comments on usability, we enhanced our user interface. Please feel free to send us your feedback. [Switch to the original interface.](#) Send us feedback X

Log groups (5)

<input type="checkbox"/> Log group	Retention	Metric filters	Contributor Insights	Subscriptions
/aws/apigateway/welcome	Never expire	-	-	-
/aws/lambda/add-dragon	Never expire	-	-	-
/aws/lambda/validate-dragon	Never expire	-	-	-
/aws/states/MyStateMachine-Logs	Never expire	-	-	-
API-Gateway-Execution-Logs_nl18eym14c/test	Never expire	-	-	-

go to the Log Groups

console.aws.amazon.com/cloudwatch/home?region=us-east-1#logsV2:log-groups

aWS Services Resource Groups

CloudWatch Dashboards Alarms ALARM INSUFFICIENT OK Billing Logs Log groups Insights Metrics Events Rules Event Buses ServiceLens Service Map Traces Container Insights BETA Resources Performance Monitoring Synthetics NEW Canaries Contributor Insights Settings Favorites

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Log groups (5)

<input type="checkbox"/> Log group	Retention	Metric filters	Contributor Insights	Subscriptions
/aws/apigateway/welcome	Never expire	-	-	-
/aws/lambda/add-dragon	Never expire	-	-	-
/aws/lambda/validate-dragon	Never expire	-	-	-
/aws/states/MyStateMachine-Logs	Never expire	-	-	-
API-Gateway-Execution-Logs_n18eym14c/test	Never expire	-	-	-

find that log

Timestamp		Message
There are older events to load. Load more .		
▶	2020-07-01T03:16:33.358-04:00	(de939783-62cf-4110-875e-d2030088f7a5) Extended Request Id: O-28uHvJIAmFXNA=
▶	2020-07-01T03:16:33.359-04:00	(de939783-62cf-4110-875e-d2030088f7a5) Verifying Usage Plan for request: de939783-62cf-4110-875e-d2030088f7a5. API Key: API Stage: n118eym14c/test
▶	2020-07-01T03:16:33.360-04:00	(de939783-62cf-4110-875e-d2030088f7a5) API Key authorized because method 'POST /dragons' does not require API Key. Request will not count against usage plan.
▶	2020-07-01T03:16:33.360-04:00	(de939783-62cf-4110-875e-d2030088f7a5) Usage Plan check succeeded for API Key and API Stage n118eym14c/test
▶	2020-07-01T03:16:33.361-04:00	(de939783-62cf-4110-875e-d2030088f7a5) Starting execution for request: de939783-62cf-4110-875e-d2030088f7a5
▶	2020-07-01T03:16:33.361-04:00	(de939783-62cf-4110-875e-d2030088f7a5) HTTP Method: POST, Resource Path: /dragons
▶	2020-07-01T03:16:33.361-04:00	(de939783-62cf-4110-875e-d2030088f7a5) Method request path: {}
▶	2020-07-01T03:16:33.361-04:00	(de939783-62cf-4110-875e-d2030088f7a5) Method request query string: {}
▶	2020-07-01T03:16:33.361-04:00	(de939783-62cf-4110-875e-d2030088f7a5) Method request headers: {Accept= */*, Cache-Control=no-cache, User-Agent=PostmanRuntime/7.26.1, X-Forwarded-For=127.0.0.1, X-Forwarded-Port=443, X-Forwarded-Proto=https}
▶	2020-07-01T03:16:33.361-04:00	(de939783-62cf-4110-875e-d2030088f7a5) Method request body before transformations: { "dragonName": "Jon-5", "description": "Jon dragon", "color": "red", "size": "large", "type": "fire"}
▶	2020-07-01T03:16:33.361-04:00	(de939783-62cf-4110-875e-d2030088f7a5) Request validation succeeded for content type application/json
▶	2020-07-01T03:16:33.396-04:00	(de939783-62cf-4110-875e-d2030088f7a5) Endpoint request URL: https://states.us-east-1.amazonaws.com/?Action=StartExecution
▶	2020-07-01T03:16:33.396-04:00	(de939783-62cf-4110-875e-d2030088f7a5) Endpoint request headers: {Authorization:*****}
▶	2020-07-01T03:16:33.396-04:00	(de939783-62cf-4110-875e-d2030088f7a5) Endpoint request body after transformations: { "input": { "dragon_name_str": "Jon-5", "description": "Jon dragon", "color": "red", "size": "large", "type": "fire"}}
▶	2020-07-01T03:16:33.396-04:00	(de939783-62cf-4110-875e-d2030088f7a5) Sending request to https://states.us-east-1.amazonaws.com/?Action=StartExecution
▶	2020-07-01T03:16:33.504-04:00	(de939783-62cf-4110-875e-d2030088f7a5) Received response. Status: 200, Integration latency: 108 ms
▶	2020-07-01T03:16:33.504-04:00	(de939783-62cf-4110-875e-d2030088f7a5) Endpoint response headers: {x-amzn-RequestId:69f2ffcf-4d77-4181-9a3a-641fd9c3ffbc, Content-Type=application/json, Date:Mon, 01 Jul 2020 16:33:50 GMT, X-Amzn-Trace-Id:Root-1-5efc3851-0ae3b72a887779f4fd6391a4, X-Amzn-Request-Id:69f2ffcf-4d77-4181-9a3a-641fd9c3ffbc}
▶	2020-07-01T03:16:33.504-04:00	(de939783-62cf-4110-875e-d2030088f7a5) Endpoint response body before transformations: {"executionArn": "arn:aws:states:us-east-1:30221126442:lambdaFunctionName", "status": "SUCCEEDED", "output": "{'dragonName': 'Jon-5', 'description': 'Jon dragon', 'color': 'red', 'size': 'large', 'type': 'fire'}"}
▶	2020-07-01T03:16:33.504-04:00	(de939783-62cf-4110-875e-d2030088f7a5) Method response body after transformations: {"executionArn": "arn:aws:states:us-east-1:30221126442:lambdaFunctionName", "status": "SUCCEEDED", "output": "{'dragonName': 'Jon-5', 'description': 'Jon dragon', 'color': 'red', 'size': 'large', 'type': 'fire'}"}
▶	2020-07-01T03:16:33.504-04:00	(de939783-62cf-4110-875e-d2030088f7a5) Method response headers: {X-Amzn-Trace-Id:Root-1-5efc3851-0ae3b72a887779f4fd6391a4, Content-Type=application/json, Date:Mon, 01 Jul 2020 16:33:50 GMT, X-Amzn-Request-Id:69f2ffcf-4d77-4181-9a3a-641fd9c3ffbc}
▶	2020-07-01T03:16:33.504-04:00	(de939783-62cf-4110-875e-d2030088f7a5) Successfully completed execution
▶	2020-07-01T03:16:33.504-04:00	(de939783-62cf-4110-875e-d2030088f7a5) Method completed with status: 200
▶	2020-07-01T03:16:33.504-04:00	(de939783-62cf-4110-875e-d2030088f7a5) AWS Integration Endpoint RequestId : 69f2ffcf-4d77-4181-9a3a-641fd9c3ffbc

No newer events at this moment. [Auto retry paused](#). [Resume](#)

[Feedback](#) [English \(US\)](#)

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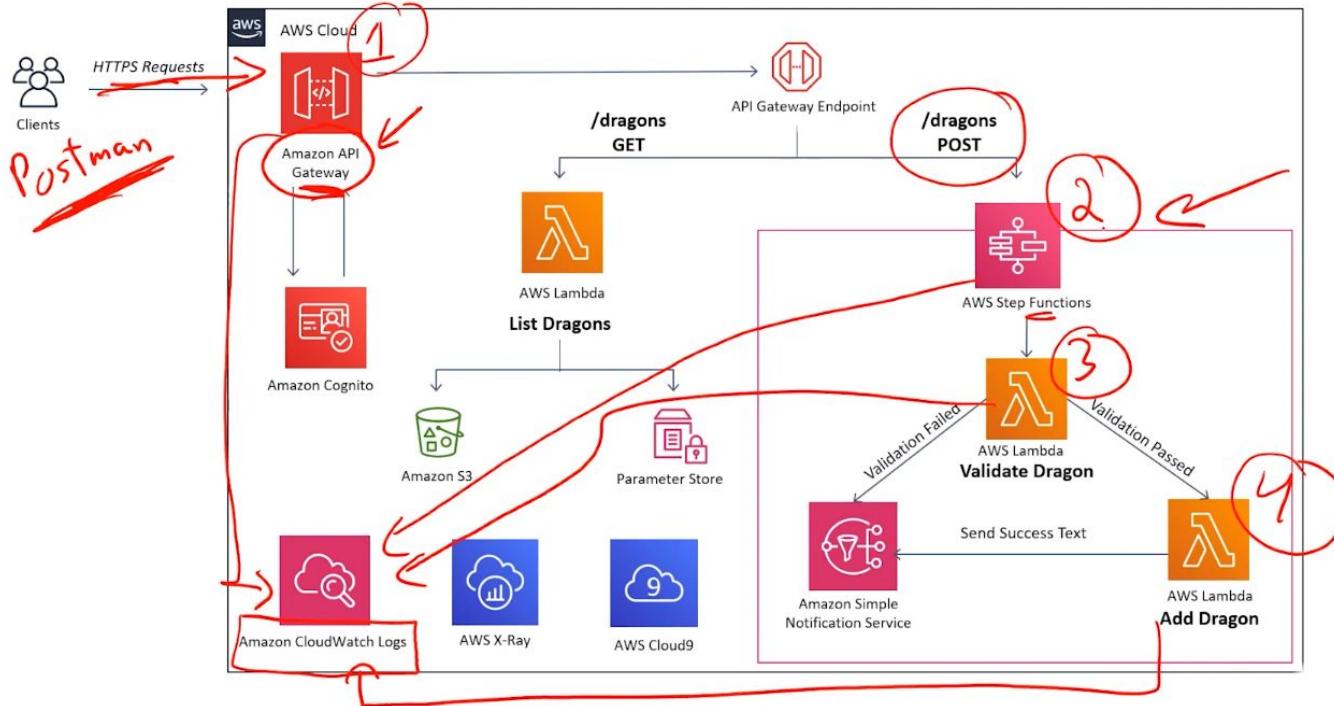
we can see all logs

Message

There are older events to load. [Load more.](#)

```
58-04:00 (de939783-62cf-4110-875e-d2030088f7a5) Extended Request Id: O-28uHVjIAMFXNA=
59-04:00 (de939783-62cf-4110-875e-d2030088f7a5) Verifying Usage Plan for request: de939783-62cf-4110-875e-d2030088f7a5. API Key: API St
60-04:00 (de939783-62cf-4110-875e-d2030088f7a5) API Key authorized because method 'POST /dragons' does not require API Key. Request wil
60-04:00 (de939783-62cf-4110-875e-d2030088f7a5) Usage Plan check succeeded for API Key and API Stage nl18eym14c/test
61-04:00 (de939783-62cf-4110-875e-d2030088f7a5) Starting execution for request: de939783-62cf-4110-875e-d2030088f7a5
61-04:00 (de939783-62cf-4110-875e-d2030088f7a5) HTTP Method: POST, Resource Path: /dragons
61-04:00 (de939783-62cf-4110-875e-d2030088f7a5) Method request path: {}
61-04:00 (de939783-62cf-4110-875e-d2030088f7a5) Method request query string: {}
61-04:00 (de939783-62cf-4110-875e-d2030088f7a5) Method request headers: {Accept= */*, Cache-Control=no-cache, User-Agent=PostmanRuntime/
61-04:00 (de939783-62cf-4110-875e-d2030088f7a5) Method request body before transformations:
{
    "dragonName": "Jon-5",
    "description": "Jon dragon",
    "family": "green",
    "city": "Toronto",
    "country": "CA",
    "state": "ON",
    "neighborhood": "Downtown",
    "reportingPhoneNumber": "15555555555",
    "confirmationRequired": false
}
61-04:00 (de939783-62cf-4110-875e-d2030088f7a5) Request validation succeeded for content type application/json
96-04:00 (de939783-62cf-4110-875e-d2030088f7a5) Endpoint request URI: https://states.us-east-1.amazonaws.com/?Action=StartExecution
```

even each log's details



now, we can look at the AWS Step Function logs

API Gateway CloudWatch Management CloudWatch Management Step Functions Management validate-dragon - Lambda add-dragon - Lambda Guest

console.aws.amazon.com/cloudwatch/home?region=us-east-1#logsV2:log-groups

aWS Services Resource Groups

CloudWatch Dashboards Alarms ALARM INSUFFICIENT OK Billing Logs Log groups Insights Metrics Events Rules Event Buses ServiceLens Service Map Traces Container Insights BETA Resources Performance Monitoring Synthetics NEW Canaries Contributor Insights Settings Favorites

CloudWatch > CloudWatch Logs > Log groups Switch to the original interface.

We listened to your feedback! In response to your comments on usability, we enhanced our user interface. Please feel free to send us your feedback. [Switch to the original interface.](#) Send us feedback X

Log groups (5)

<input type="checkbox"/> Log group	Retention	Metric filters	Contributor Insights	Subscriptions
/aws/apigateway/welcome	Never expire	-	-	-
/aws/lambda/add-dragon	Never expire	-	-	-
/aws/lambda/validate-dragon	Never expire	-	-	-
/aws/states/MyStateMachine-Logs	Never expire	-	-	-
API-Gateway-Execution-Logs_n18eym14c/test	Never expire	-	-	-

Filter log groups Exact match < 1 > Create log group

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You can select the State Machine logs and Lambda Function logs in one place

Try CloudWatch Logs Insights

CloudWatch Logs Insights allows you to search and analyze your logs using a new, purpose-built query language. To learn more, read the [AWS blog](#) or visit our documentation.

Try Logs Insights

Log events

Step Machine logs

Message

There are older events to load. [Load more.](#)

```
{  
  "id": "1",  
  "type": "ExecutionStarted",  
  "details": {  
    "input": " { \"dragon_name_str\": \"Jon-5\", \"description_str\": \"Jon dragon\", \"family_str\": \"green\", \"location\": \"Westeros\", \"name\": \"Jon\", \"roleArn\": \"arn:aws:iam::302211264422:role/service-role/StepFunctions-MyStateMachine-role-feb8533b\" } ",  
    "roleArn": "arn:aws:iam::302211264422:role/service-role/StepFunctions-MyStateMachine-role-feb8533b"  
  },  
  "previous_event_id": "0",  
  "event_timestamp": "1593587793461",  
  "execution_arn": "arn:aws:states:us-east-1:302211264422:execution:MyStateMachine:82b75e58-0583-4f1a-925c-50d99ca1ae78"  
}  
  
{  
  "id": "2", "type": "TaskStateEntered", "details": {"input": " { \"dragon_name_str\": \"Jon-5\", \"description_str\": \"Jon dragon\", \"family_str\": \"green\", \"location\": \"Westeros\", \"name\": \"Jon\", \"roleArn\": \"arn:aws:iam::302211264422:role/service-role/StepFunctions-MyStateMachine-role-feb8533b\" } "},  
  "id": "3", "type": "LambdaFunctionScheduled", "details": {"input": " { \"dragon_name_str\": \"Jon-5\", \"description_str\": \"Jon dragon\", \"family_str\": \"green\", \"location\": \"Westeros\", \"name\": \"Jon\", \"roleArn\": \"arn:aws:iam::302211264422:role/service-role/StepFunctions-MyStateMachine-role-feb8533b\" } "},  
  "id": "4", "type": "LambdaFunctionStarted", "details": {}, "previous_event_id": "3", "event_timestamp": "1593587793540", "execution_arn": "arn:aws:lambda:us-east-1:302211264422:function:ValidateDragon", "function_version": "2020-08-18T12:00:00Z", "log_group": "/aws/lambda/ValidateDragon", "log_stream": "2020-08-18T12:00:00Z", "memory_size": 128, "timeout": 3, "invocation_type": "RequestResponse", "request_id": "12345678901234567890123456789012", "start_time": "1593587793540", "status": "RUNNING", "status_reason": "", "status_message": ""},  
  "id": "5", "type": "LambdaFunctionSucceeded", "details": {"output": "\"Dragon Validated\""}, "previous_event_id": "4", "event_timestamp": "1593587793540", "execution_arn": "arn:aws:states:us-east-1:302211264422:execution:MyStateMachine:82b75e58-0583-4f1a-925c-50d99ca1ae78", "function_version": "2020-08-18T12:00:00Z", "log_group": "/aws/lambda/ValidateDragon", "log_stream": "2020-08-18T12:00:00Z", "memory_size": 128, "timeout": 3, "invocation_type": "RequestResponse", "request_id": "12345678901234567890123456789012", "start_time": "1593587793540", "status": "SUCCEEDED", "status_reason": "", "status_message": ""},  
  "id": "6", "type": "TaskStateExited", "details": {"name": "ValidateDragon", "output": " { \"dragon_name_str\": \"Jon-5\", \"description_str\": \"Dragon Validated\", \"family_str\": \"green\", \"location\": \"Westeros\", \"name\": \"Jon\", \"roleArn\": \"arn:aws:iam::302211264422:role/service-role/StepFunctions-MyStateMachine-role-feb8533b\" } "},  
  "id": "7", "type": "TaskStateEntered", "details": {"input": " { \"dragon_name_str\": \"Jon-5\", \"description_str\": \"Dragon Validated\", \"family_str\": \"green\", \"location\": \"Westeros\", \"name\": \"Jon\", \"roleArn\": \"arn:aws:iam::302211264422:role/service-role/StepFunctions-MyStateMachine-role-feb8533b\" } "},  
  "id": "8", "type": "LambdaFunctionScheduled", "details": {"input": " { \"dragon_name_str\": \"Jon-5\", \"description_str\": \"Dragon Validated\", \"family_str\": \"green\", \"location\": \"Westeros\", \"name\": \"Jon\", \"roleArn\": \"arn:aws:iam::302211264422:role/service-role/StepFunctions-MyStateMachine-role-feb8533b\" } "},  
  "id": "9", "type": "LambdaFunctionStarted", "details": {}, "previous_event_id": "8", "event_timestamp": "1593587794568", "execution_arn": "arn:aws:lambda:us-east-1:302211264422:function:ValidateDragon", "function_version": "2020-08-18T12:00:00Z", "log_group": "/aws/lambda/ValidateDragon", "log_stream": "2020-08-18T12:00:00Z", "memory_size": 128, "timeout": 3, "invocation_type": "RequestResponse", "request_id": "12345678901234567890123456789012", "start_time": "1593587794568", "status": "RUNNING", "status_reason": "", "status_message": ""},  
  "id": "10", "type": "LambdaFunctionSucceeded", "details": {"output": "null"}, "previous_event_id": "9", "event_timestamp": "1593587795632", "execution_arn": "arn:aws:states:us-east-1:302211264422:execution:MyStateMachine:82b75e58-0583-4f1a-925c-50d99ca1ae78", "function_version": "2020-08-18T12:00:00Z", "log_group": "/aws/lambda/ValidateDragon", "log_stream": "2020-08-18T12:00:00Z", "memory_size": 128, "timeout": 3, "invocation_type": "RequestResponse", "request_id": "12345678901234567890123456789012", "start_time": "1593587795632", "status": "SUCCEEDED", "status_reason": "", "status_message": ""}
```

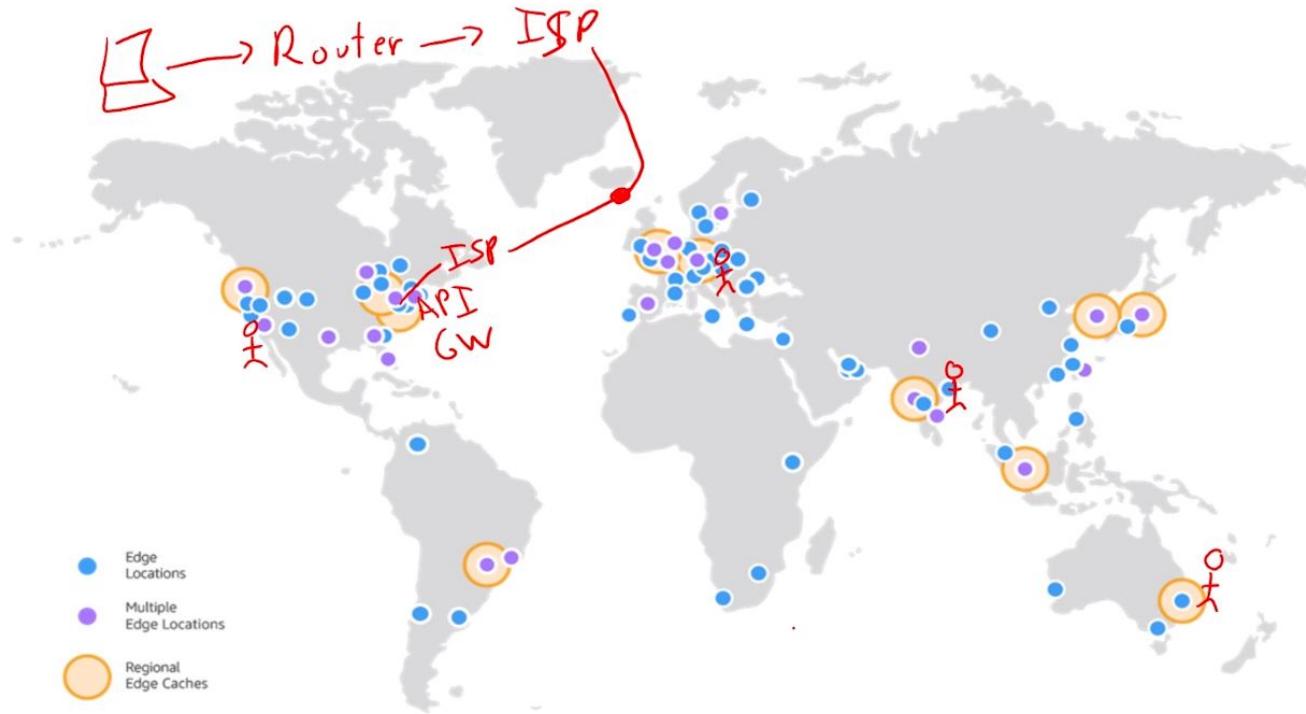
with dateils

Good Resources:

[AWS Lambda function logging in Python](#)

[Setting up CloudWatch logging for a REST API in API Gateway](#)

Edge-Optimized Endpoints



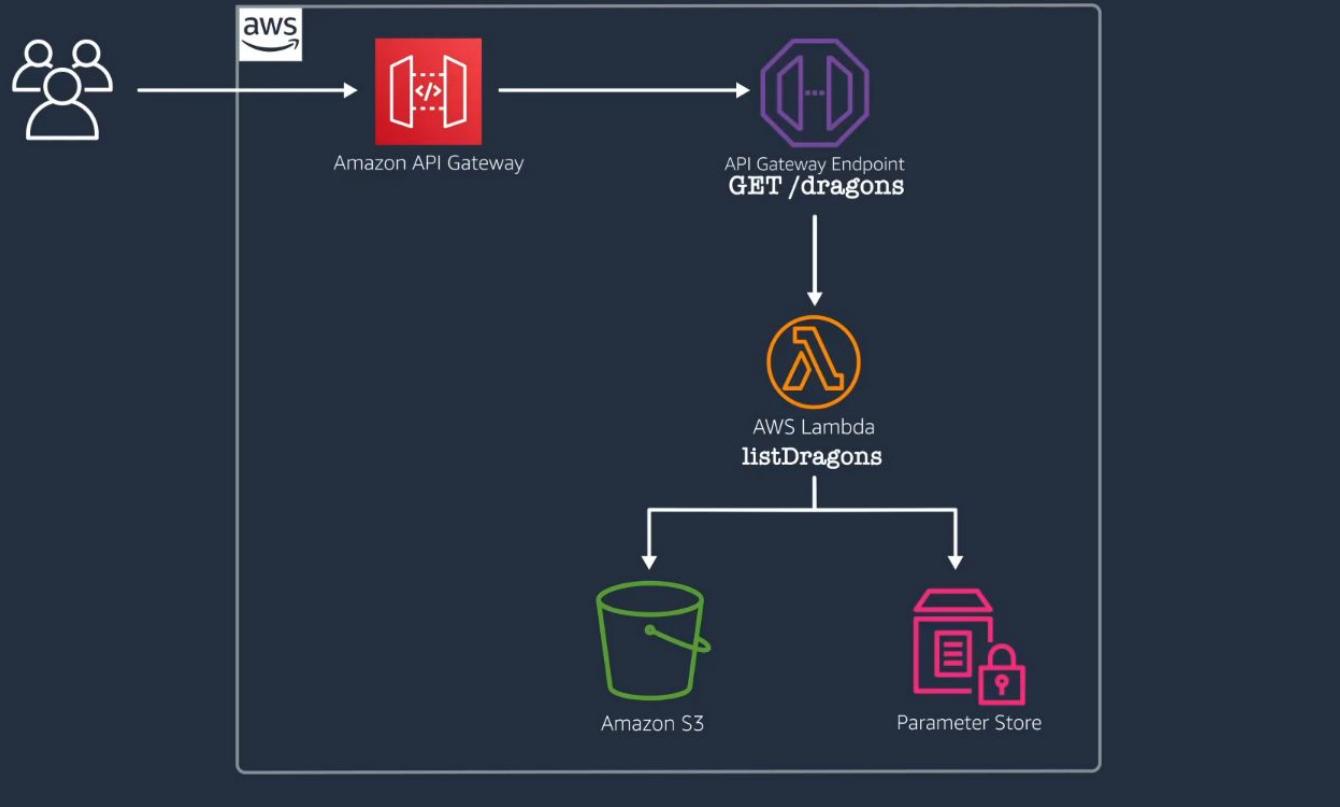
Amazon Edges

An edge optimized API endpoint is best for geographically distributed clients.

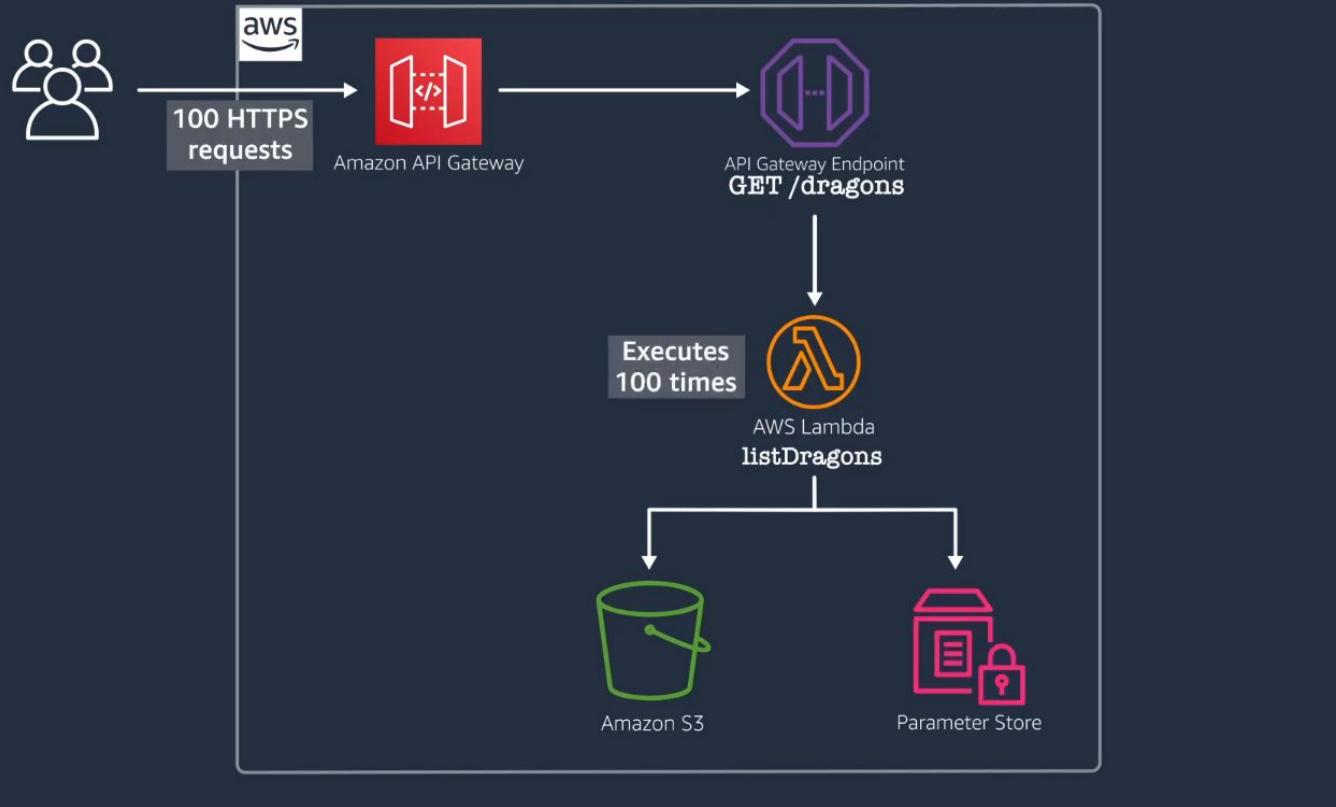
API requests are routed to the nearest CloudFront point of presence.

We can speed up the API's performance using
a feature of API Gateway called Response Caching.

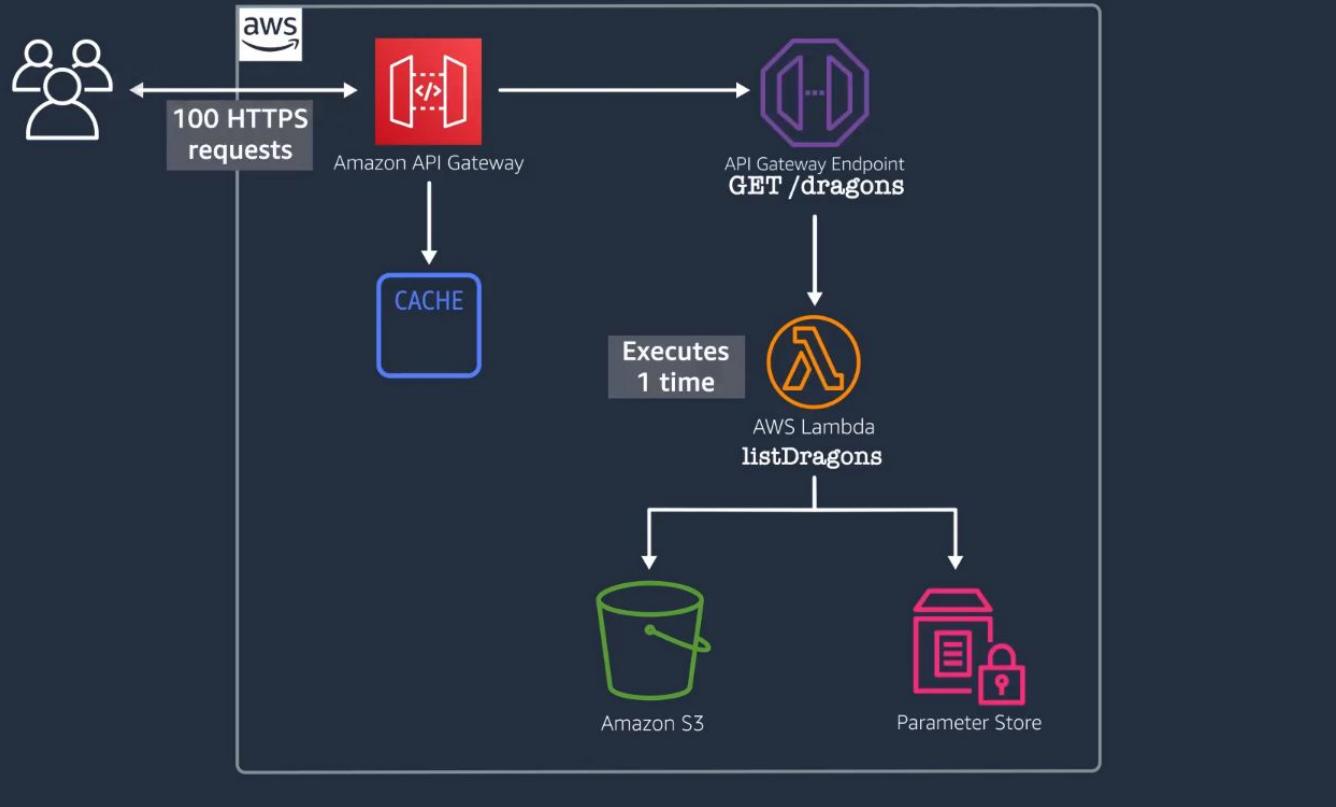
It cache the end points' responses and improves the latency.



By default, when an API is deployed to a stage, responses are not cached.



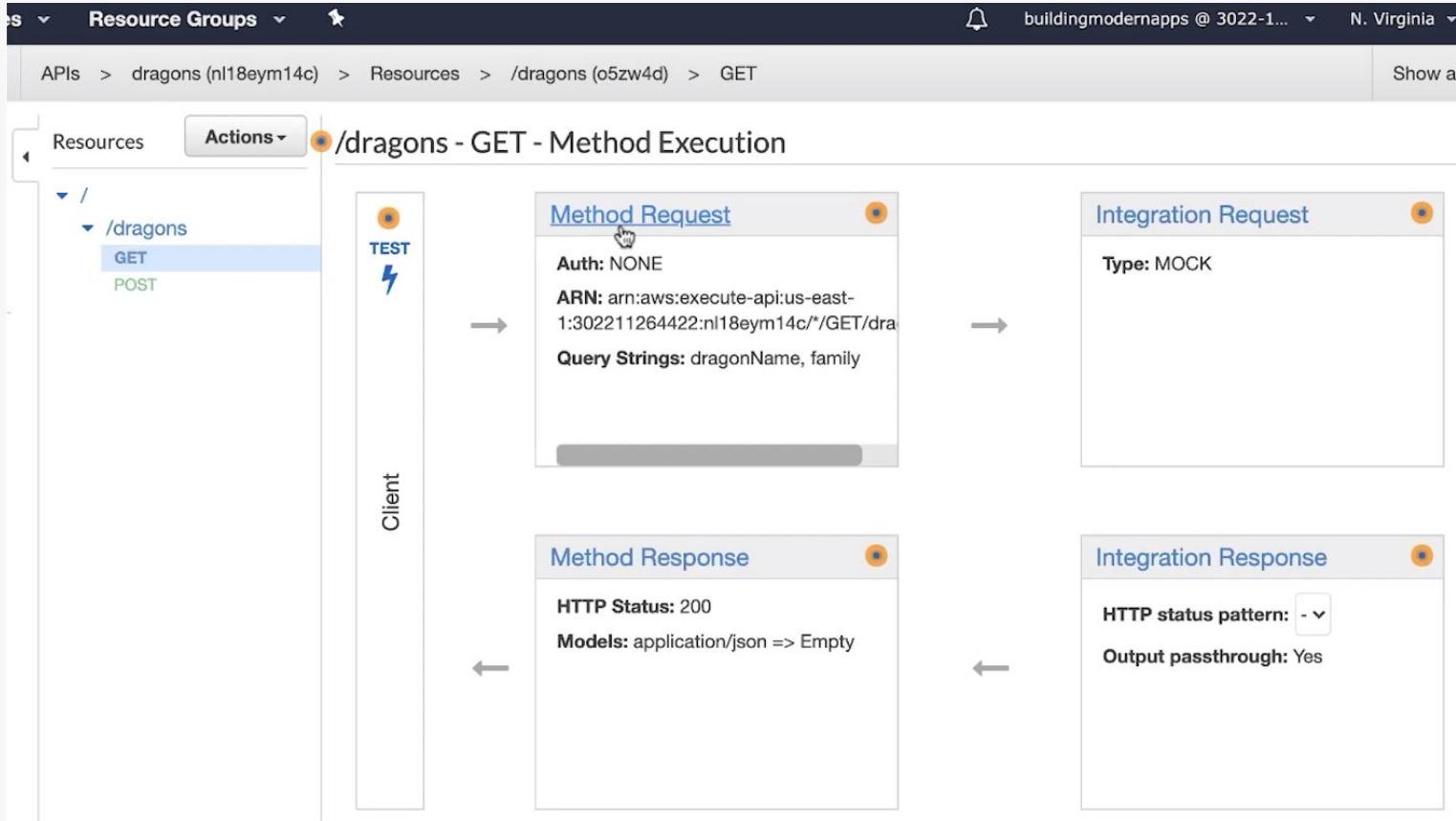
with 100 GET requests, the backend Lambda function will be executed 100 times (and 100 times for S3). We have to pay 100 times for calls.



use response caching turned on for production and not for your development environment, because of cost implications.

When you enable caching, you must choose a cache capacity.

In general, a larger cache capacity gives a better performance
because you can cache more data,
but also it costs more.



For our dragon API setting up caching just on the GET method make sense.

▼ /
 ▼ /dragons
 GET
 POST

Provide information about this method's authorization settings and the parameters it can receive.

Settings

Authorization NONE  

Request Validator NONE  

API Key Required false 

▼ URL Query String Parameters

Name	Required	Caching
dragonName	<input type="checkbox"/>	<input checked="" type="checkbox"/>
family	<input type="checkbox"/>	

 [Add query string](#)

▶ HTTP Request Headers

▶ Request Body

enable caching for specific query parameters

Turning on API Gateway response caching is a great way to optimize an API.

We can configure the time to live for caching in seconds per stage, which allows to control how long objects are kept in the cache.

It is a great feature to take advantage of in a high volume scenario where the data is relatively static.

Lambda@Edge is a feature of Amazon CloudFront
that lets to run code closer to the users,
and improve performance and reduce latency.



Upload code

Upload your code in Lambda or use Lambda@Edge blueprints



Pay for what you use

Just pay for the compute time you use

how to set up a lambda function to use the Lambda@Edge

Keep in mind that Lambda@Edge has service requirements and limits that are more restrictive and you should check the documentation.

Good Resources:

[Low-Latency Content Delivery Network \(CDN\) - Amazon CloudFront](#)

[Enabling API caching to enhance responsiveness - Amazon API Gateway](#)

[Edge Computing | CDN, Global Serverless Code, Distribution | AWS Lambda@Edge](#)

[Using AWS Lambda with CloudFront Lambda@Edge](#)

Exercise 6

<https://aws-tc-largeobjects.s3.amazonaws.com/DEV-AWS-MO-BuildingRedux/exercise-6-optimizing.html>