



**Day 31**

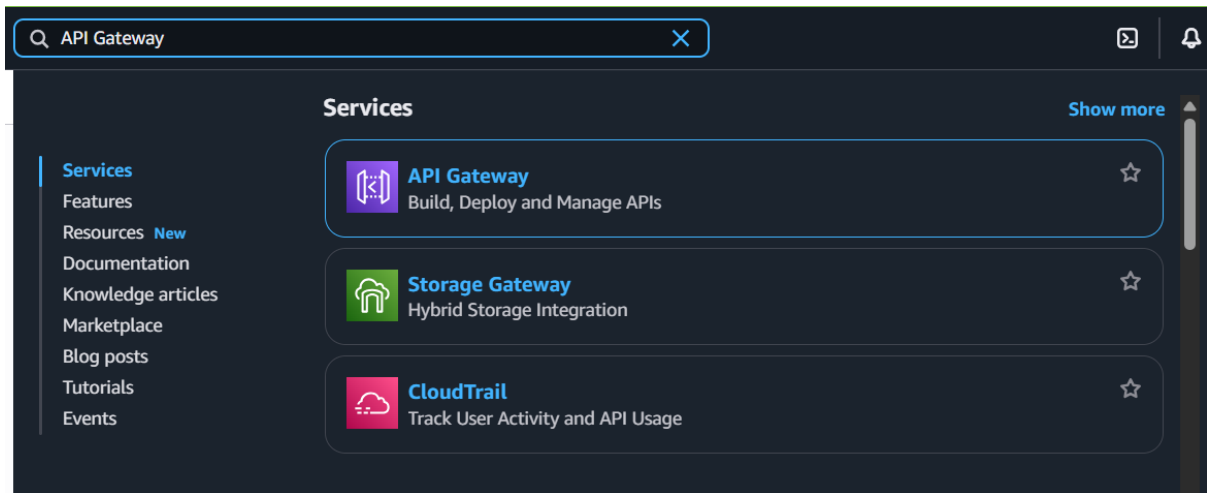


## **“CLOUD SECURITY”**

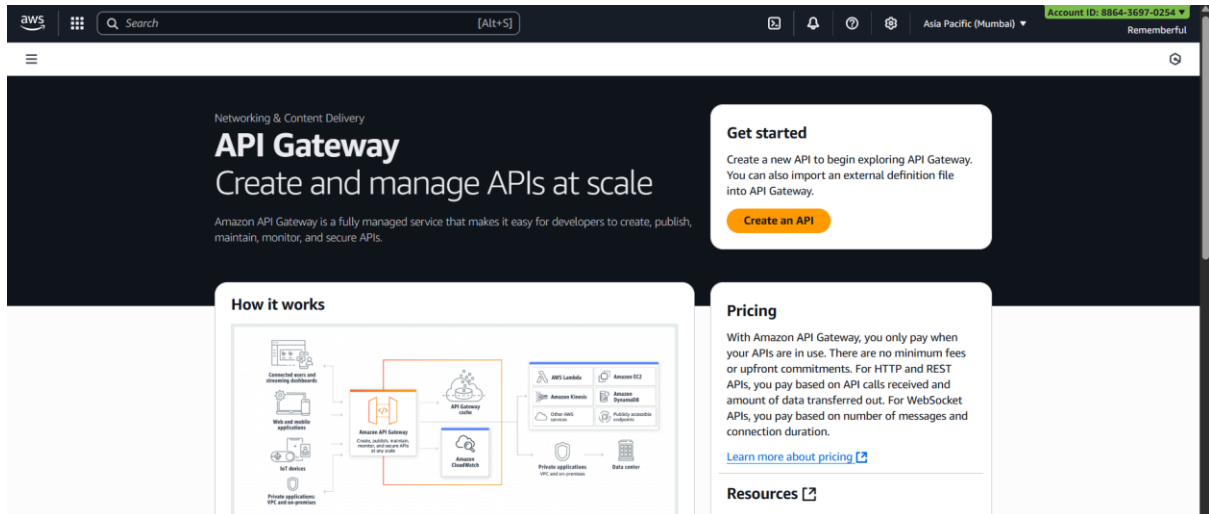
### **Implementing web application firewalls in AWS:**

Steps:

First, we will create a web API in AWS, for which we need to go to API Gateway:



Following window will appear:



Click on the “Create an API” button: following window will appear.

The screenshot shows the AWS API Gateway console with the 'Choose an API type' page. The breadcrumb trail is 'API Gateway > APIs > Create API'. The page title is 'Choose an API type' with an 'info' link. There are two main sections: 'HTTP API' and 'WebSocket API'. The 'HTTP API' section describes it as a low-latency, cost-effective REST API with built-in features like OIDC and OAuth2, and native CORS support. It lists 'Works with the following: Lambda, HTTP backends' and has 'Import' and 'Build' buttons. The 'WebSocket API' section describes it as using persistent connections for real-time use cases like chat or dashboards. It lists 'Works with the following: Lambda, HTTP, AWS Services' and has a 'Build' button.

We will create a REST API Private, so scroll down and click on the “Build” button at the REST API private section:

This screenshot shows the 'REST API Private' section of the AWS API Gateway console. It describes creating a REST API accessible only from within a VPC. It lists 'Works with the following: Lambda, HTTP, AWS Services' and has 'Import' and 'Build' buttons.

Following window will appear:

The screenshot shows the 'Create REST API' form in the AWS API Gateway console. The breadcrumb trail is 'API Gateway > APIs > Create API > Create REST API'. The page title is 'Create REST API' with an 'info' link. The 'API details' section has three radio buttons: 'New API' (selected), 'Clone existing API', and 'Import API'. The 'New API' option has a sub-label 'Create a new REST API.' The 'Clone existing API' option has a sub-label 'Create a copy of an API in this AWS account.' The 'Import API' option has a sub-label 'Import an API from an OpenAPI definition.' Below these is a text input for 'API name' with the value 'My REST API'. There is a text area for 'Description - optional'. At the bottom, the 'API endpoint type' is set to 'Private' in a dropdown menu. A note below the dropdown states: 'Regional APIs are deployed in the current AWS Region. Edge-optimized APIs route requests to the nearest CloudFront Point of Presence. Private APIs are only accessible from VPCs.'

Make changes, as shown or as per the requirement:

The screenshot shows the 'Create REST API' page in the AWS API Gateway console. The breadcrumb trail is 'API Gateway > APIs > Create API > Create REST API'. The page title is 'Create REST API' with an 'Info' link. Under 'API details', there are three radio button options: 'New API' (selected), 'Clone existing API', and 'Example API'. Below these, the 'API name' field contains 'ECCCloudApi'. The 'Description - optional' field contains 'This is REST API'. The 'API endpoint type' dropdown is set to 'Regional'. A note at the bottom states: 'Regional APIs are deployed in the current AWS Region. Edge-optimized APIs route requests to the nearest CloudFront Point of Presence. Private APIs are only accessible from VPCs.'

Following confirmation will occur:

The screenshot shows the 'Resources' page for the 'ECCCloudApi' (ID: 02wmon1e93). A green banner at the top says 'Successfully created REST API 'ECCCloudApi' (02wmon1e93)'. The left sidebar shows the API Gateway navigation menu. The main content area has a 'Resources' section with a 'Create resource' button. To the right, the 'Resource details' section shows the 'Path' as '/' and the 'Resource ID' as 'kOy7h11ft8'. Below this, the 'Methods (0)' section shows 'No methods' and a 'Create method' button. Other buttons like 'API actions', 'Deploy API', 'Update documentation', and 'Enable CORS' are also visible.

Click on the “Create Method” button as shown above:

The screenshot shows the 'Create method' page for the 'ECCCloudApi' (ID: 02wmon1e93). A green banner at the top says 'Successfully created REST API 'ECCCloudApi' (02wmon1e93)'. The page title is 'Create method'. Under 'Method details', the 'Method type' dropdown is set to 'Select a method type'. The 'Integration type' section has five radio button options: 'Lambda function' (selected), 'HTTP', 'Mock', 'AWS service', and 'VPC link'. Each option has a corresponding icon: a Lambda icon for 'Lambda function', an 'HTTP' icon for 'HTTP', a 'Mock' icon for 'Mock', an 'AWS' icon for 'AWS service', and a 'VPC link' icon for 'VPC link'.

Change the options as shown below:

**Create method**

**Method details**

**Method type**

GET

**Integration type**

☐ Lambda function  
Integrate your API with a Lambda function.

☐ HTTP  
Integrate with an existing HTTP endpoint.

☒ Mock  
Generate a response based on API Gateway mappings and transformations.

☐ AWS service  
Integrate with an AWS Service.

☐ VPC link  
Integrate with a resource that isn't accessible over the public internet.

After this, click on the orange button given below, following confirmation will occur:

**API Gateway**

APIs  
Custom domain names  
Domain name access associations  
VPC links

▼ **API: ECCCloudApi**

Resources  
Stages  
Authorizers  
Gateway responses  
Models  
Resource policy  
Documentation  
Dashboard  
API settings

Usage plans

**Resources**

Create resource

/

GET

**/ - GET - Method execution**

ARN: `arn:aws:execute-api:south-1:886436970254:02wmon1e93:/"GET/`

Resource ID: `k0y7h11ft8`

API actions ▼ Deploy API

Update documentation Delete

Client → Method request → Integration request → Mock integration

← Method response ← Integration response

Method request Integration request Integration response Method response Test

Now, click on the “integration responses” section: following option should occur.

**API Gateway**

APIs  
Custom domain names  
Domain name access associations  
VPC links

▼ **API: ECCCloudApi**

Resources  
Stages  
Authorizers  
Gateway responses  
Models  
Resource policy  
Documentation  
Dashboard  
API settings

Usage plans

**Integration responses**

Create response

**Default - Response**

HTTP status regex [Info](#)  
-

Method response status code  
200

Content handling [Learn more](#)  
Passthrough

Default mapping  
True

**Header mappings (0)**

Name ▲ Mapping value ▼

No header mappings

No header mappings defined

**Mapping templates (1)**

Click on the “edit” button: following window will appears.

The screenshot shows the 'Edit integration response' window. The breadcrumb navigation at the top is: API Gateway > APIs > Resources - ECCCloudApi (02wmon1e93) > Edit integration response. The window has three main sections: 1. 'Response details' containing 'HTTP error regex' (empty), 'Method response status code' (200), and 'Content handling' (Passthrough with a 'Learn more' link). 2. 'Header mappings' showing 'No headers for this status code'. 3. 'Mapping templates' which is currently collapsed.

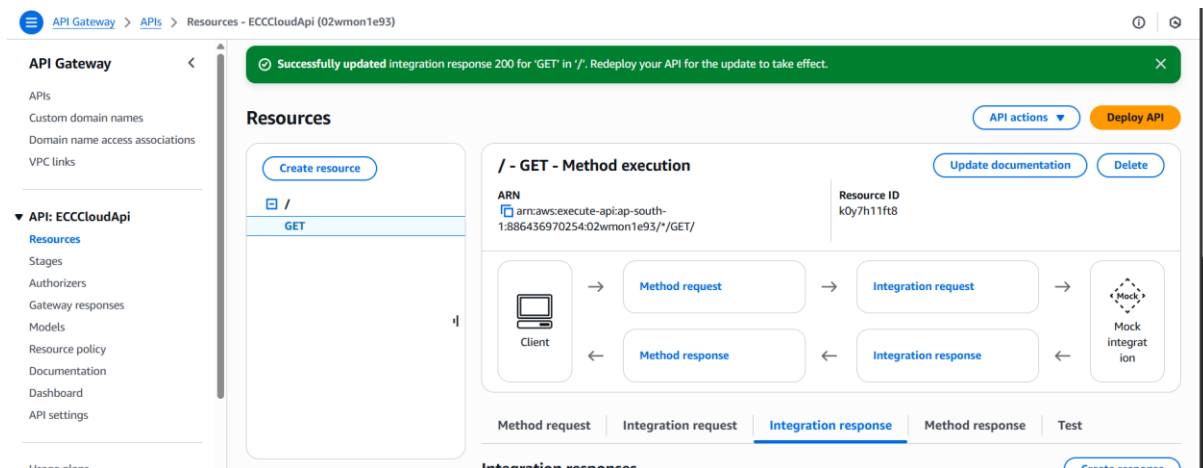
Click on the “Mapping Templates” option:

The screenshot shows the 'Mapping templates' section expanded. It includes: 1. 'Content type' set to 'application/json'. 2. 'Generate template' dropdown menu. 3. 'Template body' editor with a single line containing '1'. A 'Remove' button is visible next to the dropdown.

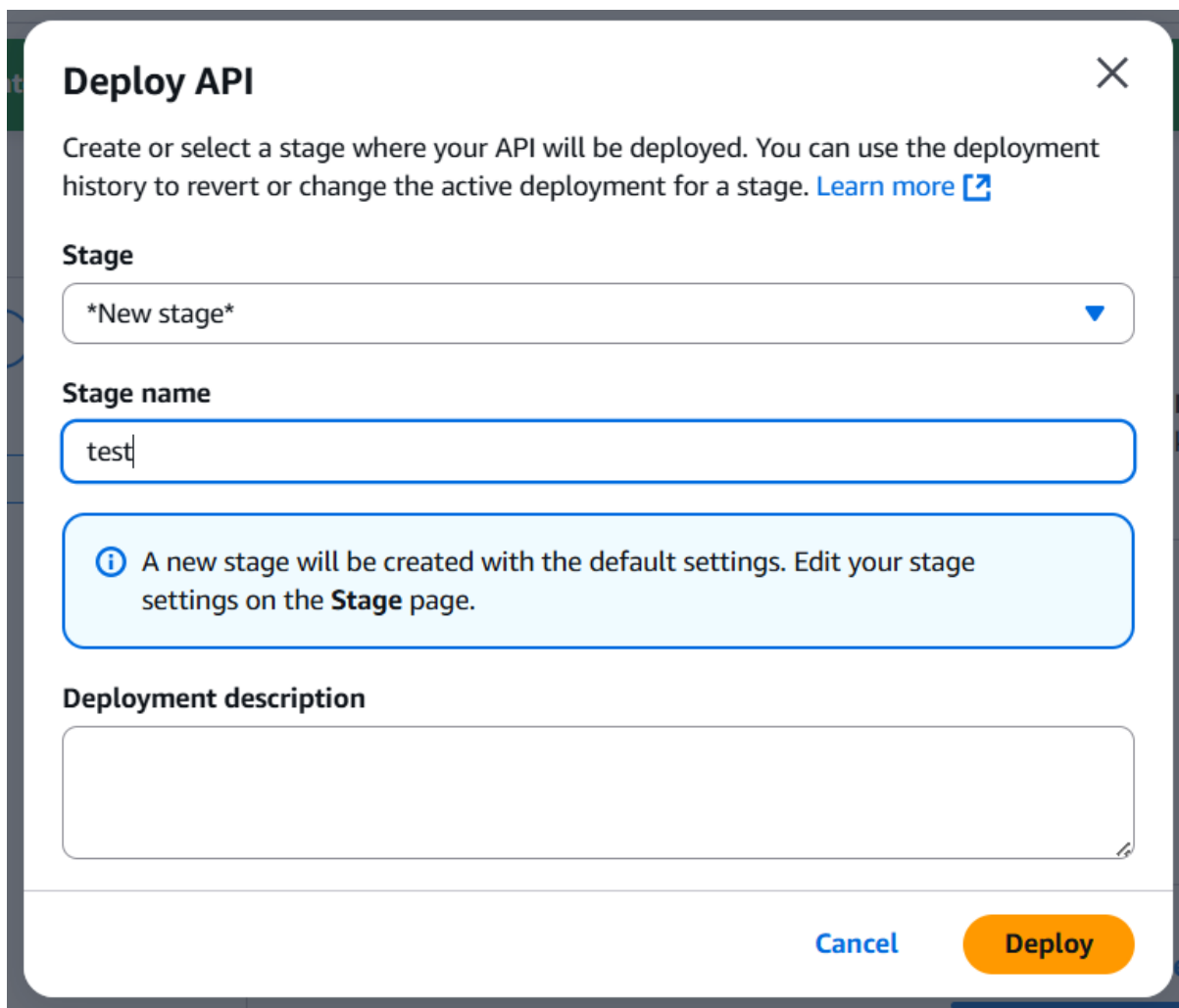
Type the following as shown:

This screenshot shows the 'Mapping templates' section with the template body filled in. The 'Content type' is 'application/json'. The 'Template body' editor contains three lines: 1. {, 2. message:"This is Aditya Demo Api...", 3. }. A 'Remove' button is present next to the dropdown menu.

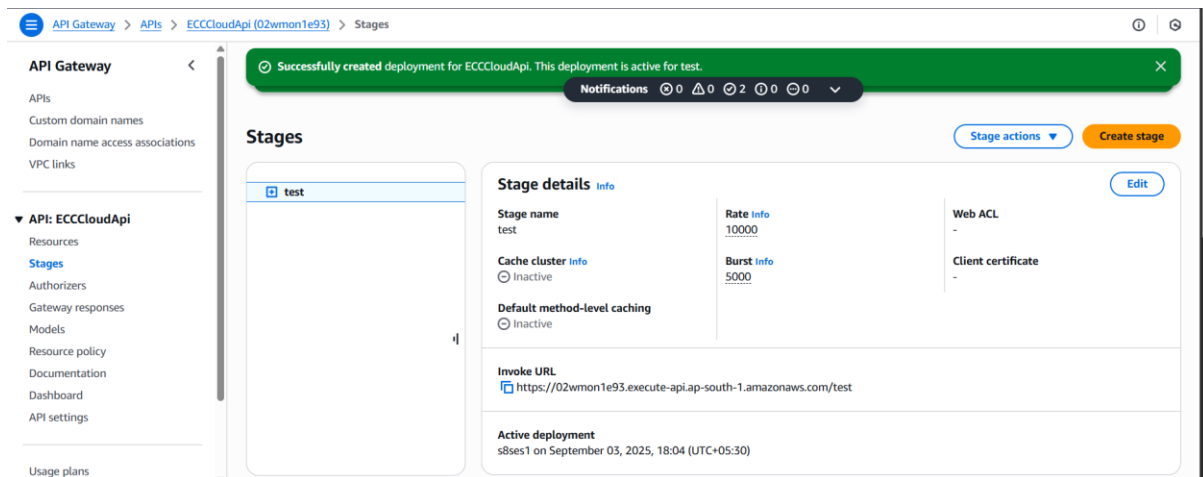
Following confirmation will occur:



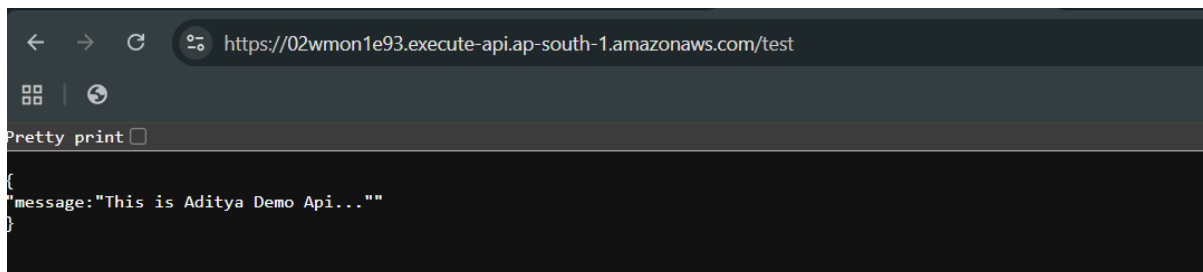
Click on the “Deploy API” button, and then select the stage as “New Stage”: then click on deploy



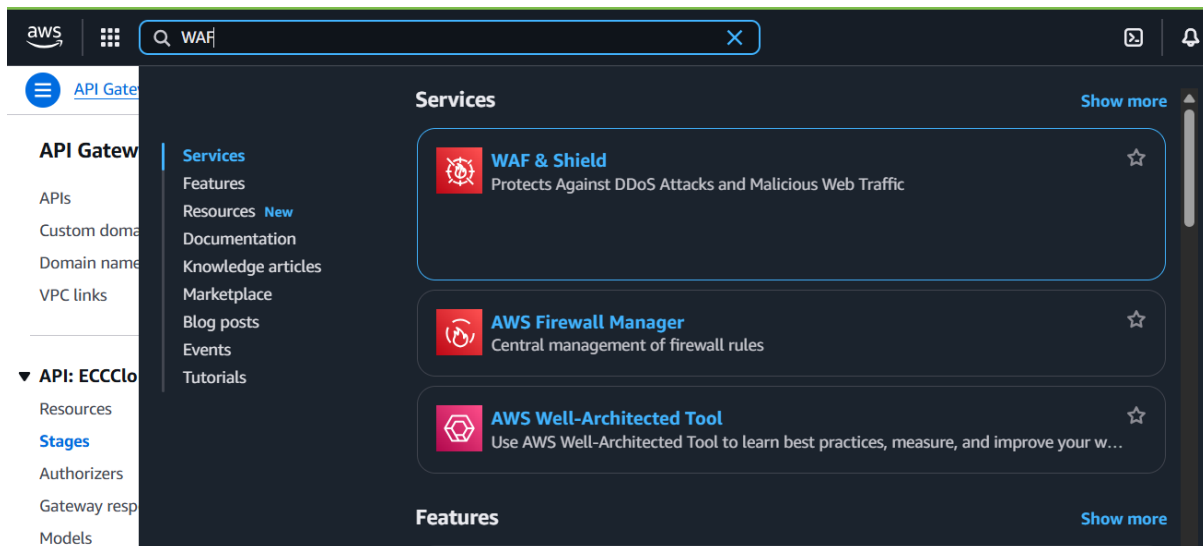
Following confirmation will occur:



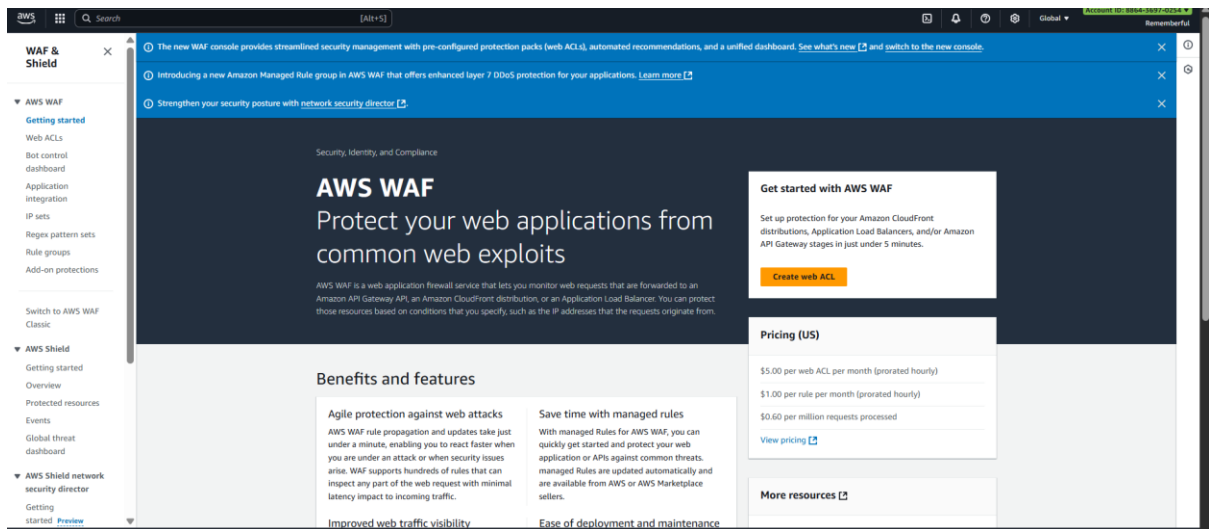
Now, paste the invoke URL which is shown there in new tab: it will show something like this.



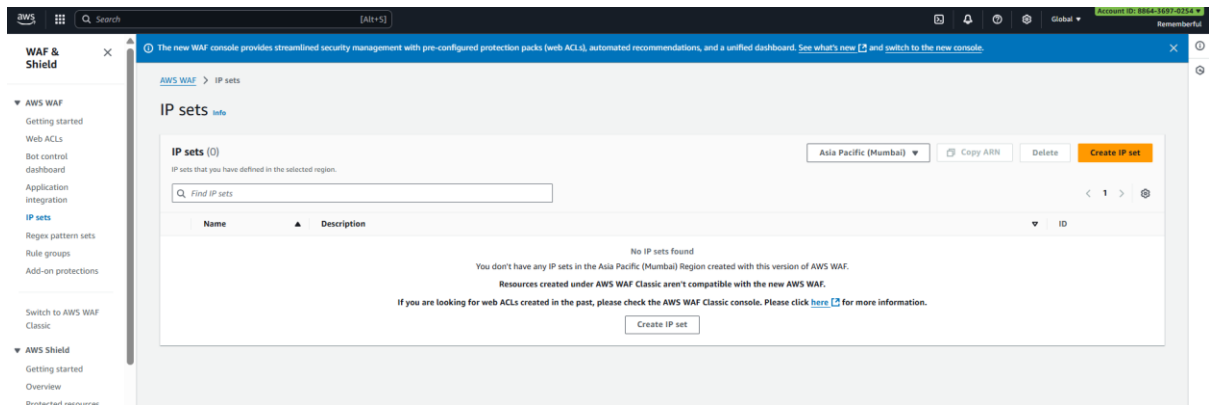
So, API is ready, now we will be protecting this API from the specified IP with WAF:



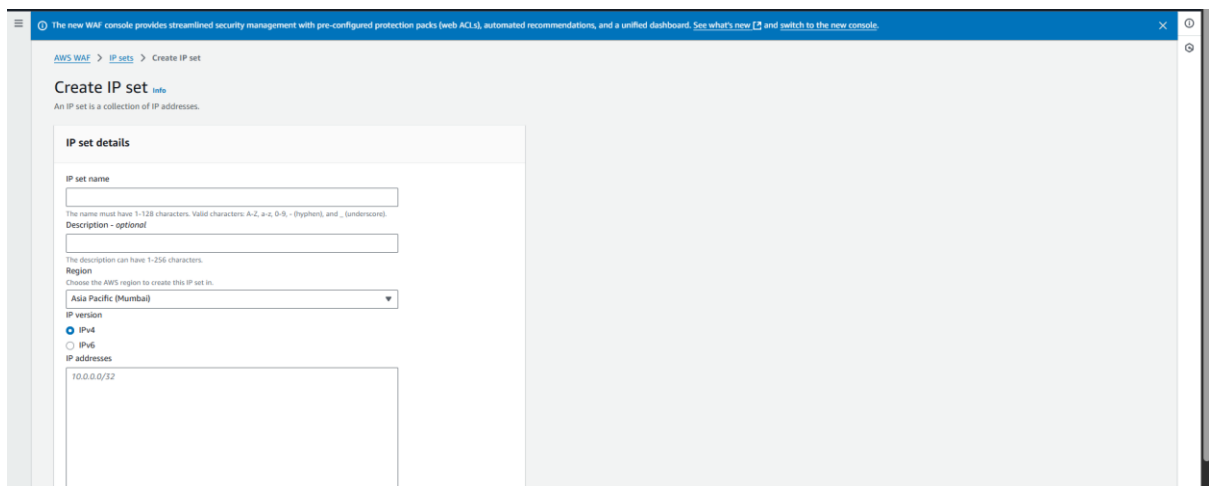
Following window will appear:



Click on the “IP sets” from the left pane:



Click on the “Create IP Set” button: following page occurs.



Specify the name of your choice:



The new WAF console provides streamlined security management with pre-configured protection packs (web ACLs), automated recommendations, and a unified dashboard. [See what's new](#) and [switch to the new console](#).

**Create IP set** info

An IP set is a collection of IP addresses.

**IP set details**

IP set name:   
The name must have 1-128 characters. Valid characters: A-Z, a-z, 0-9, -, (hyphen), and \_ (underscore).

Description - optional:

The description can have 1-256 characters.

Region:   
Choose the AWS region to create this IP set in.

IP version: ☒ IPv4 ☐ IPv6

IP addresses:

Following confirmation will occur:

The new WAF console provides streamlined security management with pre-configured protection packs (web ACLs), automated recommendations, and a unified dashboard. [See what's new](#) and [switch to the new console](#).

**Success**  
You successfully created the IP set **blacklistips**.

**IP sets** info

IP sets (1)  
IP sets that you have defined in the selected region.

Name	Description	ID
<a href="#">blacklistips</a>	-	1296c6d9-4316-48d3-b54d-eab3c6d25d1a

Click on the name of it:

The new WAF console provides streamlined security management with pre-configured protection packs (web ACLs), automated recommendations, and a unified dashboard. [See what's new](#) and [switch to the new console](#).

**blacklistips**

**Info** Edit

Name: **blacklistips** Region: **Asia Pacific (Mumbai)**

Description: IP version: **IPv4**

**IP addresses (0)** Delete Add IP address

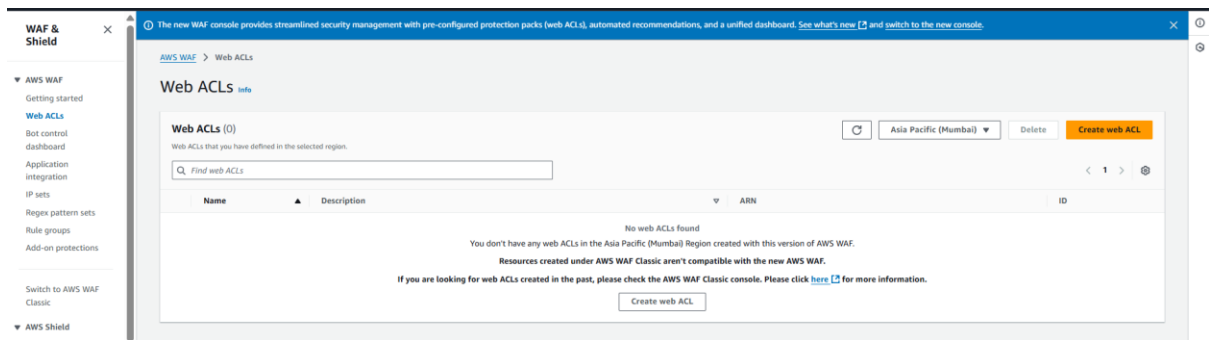
☐ IP addresses

No IP addresses  
No IP addresses to display.  
[Add IP address](#)

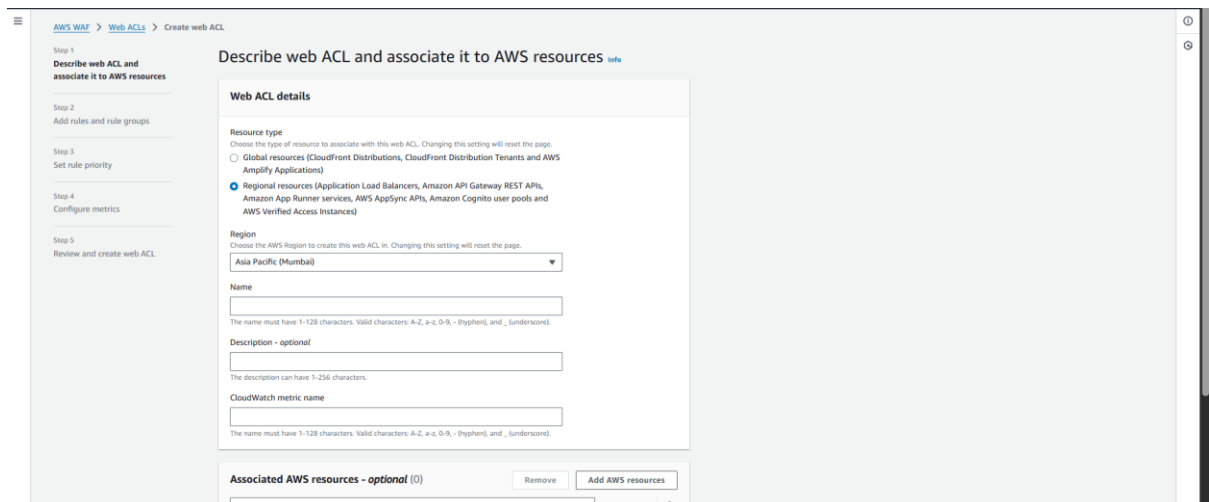
Now, click on the “Add IP address” button:



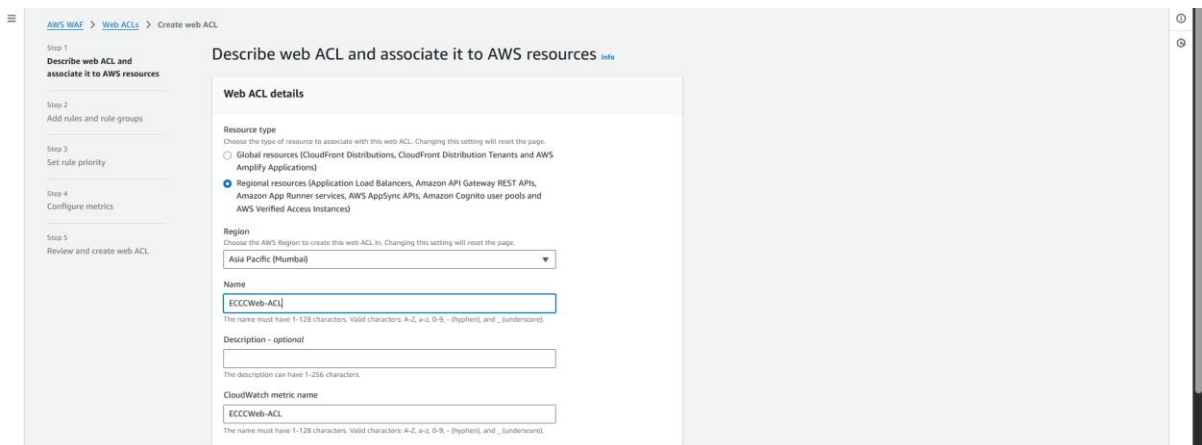
Now, we will be creating WEB ACL in WAF: click on the “Web ACLs” from the left pane.



Click on the “Create Web ACL” button:



Now, specify it as like this:



Now, "Add AWS Resources":

Description - optional

The description can have 1-256 characters.

CloudWatch metric name

The name must have 1-128 characters. Valid characters: A-Z, a-z, 0-9, -, (hyphen), and \_, (underscore).

Associated AWS resources - optional (0) Remove Add AWS resources

< 1 > ⚙

Name	Resource type	Region
No items		
No items to display		

Cancel Next

Following options occur:

**Add AWS resources** ×

**Resource type**  
Select the resource type and then select the resource you want to associate with this web ACL.

☐ Application Load Balancer ☒ Amazon API Gateway REST API ☐ Amazon App Runner service

☐ AWS AppSync API ☐ Amazon Cognito user pool ☐ AWS Verified Access

**Resources (1)** ↻

Select the resource you want to associate with the web ACL.

< 1 > ⚙

<input type="checkbox"/>	Name	
<input type="checkbox"/>	ECCCloudApi - test	▲

Cancel Add

Click on the:

### Add AWS resources

Resource type

Select the resource type and then select the resource you want to associate with this web ACL.

☐ Application Load Balancer

☒ Amazon API Gateway REST API

☐ Amazon App Runner service

☐ AWS AppSync API

☐ Amazon Cognito user pool

☐ AWS Verified Access

Resources (1)

Select the resource you want to associate with the web ACL.

< 1 > ⚙

☒ Name

☒ ECCCloudApi - test

Cancel

Add

Following things shown:

Associated AWS resources - optional (1/1)

Remove Add AWS resources

< 1 > ⚙

Name	Resource type	Region
<input checked="" type="radio"/> ECCCloudApi - test	API Gateway	Asia Pacific (Mumbai)

Web request body inspection - optional [info](#)

The body inspection size limit is the maximum request body size that AWS WAF can inspect. For Application Load Balancer and AppSync, the limit is currently fixed at 8 KB.  
For other resources, the default limit is currently 16 KB, and you can increase the limit for additional costs.  
[AWS WAF Pricing](#)

Body size limit

The AWS WAF default limit is 16 KB. Settings over 16 KB incur additional costs. [Learn more](#)

Amazon API Gateway REST API

Default (16 KB)

Cancel

Next

Following screen will appear:

The screenshot shows the 'Add rules and rule groups' screen in the AWS WAF console. The left sidebar contains a navigation menu with steps: Step 1 (Describe web ACL and associate it to AWS resources), Step 2 (Add rules and rule groups), Step 3 (Set rule priority), Step 4 (Configure metrics), and Step 5 (Review and create web ACL). The main content area has a title 'Add rules and rule groups' with an 'info' icon. Below the title is a paragraph explaining that a rule defines attack patterns and actions, and that rule groups are reusable collections of rules. A table titled 'Rules (0)' shows no rules added. Below this is a section for 'Web ACL capacity units (WCUs) used by your web ACL', stating that the total WCUs for a web ACL can't exceed 5000. At the bottom, there is a section for 'Default web ACL action for requests that don't match any rules', with 'Allow' selected as the default action.

Click on the “Add rules”, click on the “Add my own rules and rule groups”:

This screenshot shows the same 'Add rules and rule groups' screen, but with a dropdown menu open next to the 'Add rules' button. The dropdown menu contains three options: 'Add rules', 'Add managed rule groups', and 'Add my own rules and rule groups'. The 'Add my own rules and rule groups' option is highlighted with a blue border. The rest of the screen content is identical to the previous screenshot.

Following screen appears:

The screenshot shows the 'Add my own rules and rule groups' screen in the AWS WAF console. The left sidebar is the same as in the previous screenshots. The main content area has a title 'Add my own rules and rule groups' with an 'info' icon. Below the title is a 'Rule type' section with three options: 'IP set', 'Rule builder' (selected), and 'Rule group'. Below this is a 'Rule builder' section with two tabs: 'Rule visual editor' (selected) and 'Rule JSON editor'. The 'Rule visual editor' tab shows a 'Rule' form with a 'Name' field, a 'Type' section with 'Regular rule' selected, and a 'Validate' button. At the bottom, there is a dropdown menu with the text 'If a request matches the statement'.

Make following changes:

Step 1  
[Describe web ACL and associate it to AWS resources](#)

Step 2  
**Add my own rules and rule groups**

Step 3  
Set rule priority

Step 4  
Configure metrics

Step 5  
Review and create web ACL

[AWS WAF](#) > [Web ACLs](#) > Create web ACL

## Add my own rules and rule groups [info](#)

**Rule type**

☒ **IP set**  
Use IP sets to identify a specific list of IP addresses.

☐ **Rule builder**  
Use a custom rule to inspect for patterns including query strings, headers, countries, and rate limit violations.

☐ **Rule group**  
Use a rule group to combine rules into a single logical set.

**Rule**

Name

Rule1

The name must have 1-128 characters. Valid characters: A-Z, a-z, 0-9, - (hyphen), and \_ (underscore).

**IP set**

IP set

blacklistips

IP address to use as the originating address

When a request comes through a CDN or other proxy network, the source IP address identifies the proxy and the original IP address is sent in a header. Use caution with the option, IP address in header, because headers can be handled inconsistently by proxies and they can be modified to bypass inspection.

☒ **Source IP address**

☐ IP address in header

Also, ensure:

**Action**

Choose an action to take when a request originates from one of the IP addresses in this IP set.

☐ Allow

☒ **Block**

☐ Count

☐ CAPTCHA [customize](#)

☐ Challenge

▶ Custom response - *optional*

Cancel

Add rule

Click on “add rule” button:

Step 1  
[Describe web ACL and associate it to AWS resources](#)

Step 2  
**Add rules and rule groups**

Step 3  
[Set rule priority](#)

Step 4  
[Configure metrics](#)

Step 5  
[Review and create web ACL](#)

[AWS WAF](#) > [Web ACLs](#) > Create web ACL

## Add rules and rule groups Info

A rule defines attack patterns to look for in web requests and the action to take when a request matches the patterns. Rule groups are reusable collections of rules. You can use managed rule groups offered by AWS and AWS Marketplace sellers. You can also write your own rules and use your own rule groups.

Rules (1/1)

EditDeleteAdd rules ▼

If a request matches a rule, take the corresponding action. The rules are prioritized in order they appear.

<input checked="" type="checkbox"/>	Name	Capacity	Action
<input checked="" type="checkbox"/>	Rule1	1	Block

### Web ACL capacity units (WCUs) used by your web ACL

The WCUs used by the web ACL will be less than or equal to the sum of the capacities for all of the rules in the web ACL.

The total WCUs for a web ACL can't exceed 5000. Using over 1500 WCUs affects your costs. [AWS WAF Pricing](#)

1/5000 WCUs

### Default web ACL action for requests that don't match any rules

Default action

☒ Allow

☐ Block

► Custom request - optional

Click on the “next” button:

Step 1  
[Describe web ACL and associate it to AWS resources](#)

Step 2  
[Add rules and rule groups](#)

Step 3  
[Set rule priority](#)

Step 4  
**Configure metrics**

Step 5  
[Review and create web ACL](#)

[AWS WAF](#) > [Web ACLs](#) > Create web ACL

## Configure metrics Info

### Amazon CloudWatch metrics

CloudWatch metrics allow you to monitor web requests, web ACLs, and rules.

Rules	CloudWatch metric name
<input checked="" type="checkbox"/> Rule1	<input type="text" value="Rule1"/>

### Request sampling options

If you disable request sampling, you can't view requests that match your web ACL rules.

Options

☒ Enable sampled requests

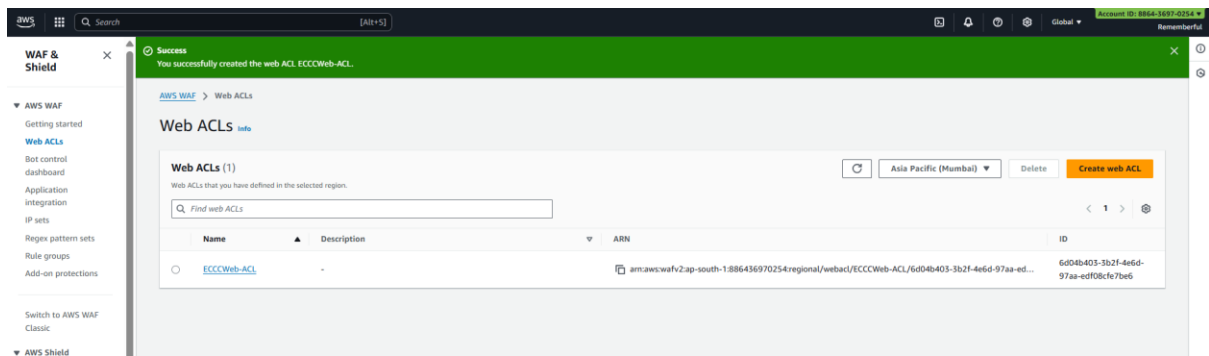
☐ Disable sampled requests

☐ Enable sampled requests with exclusions

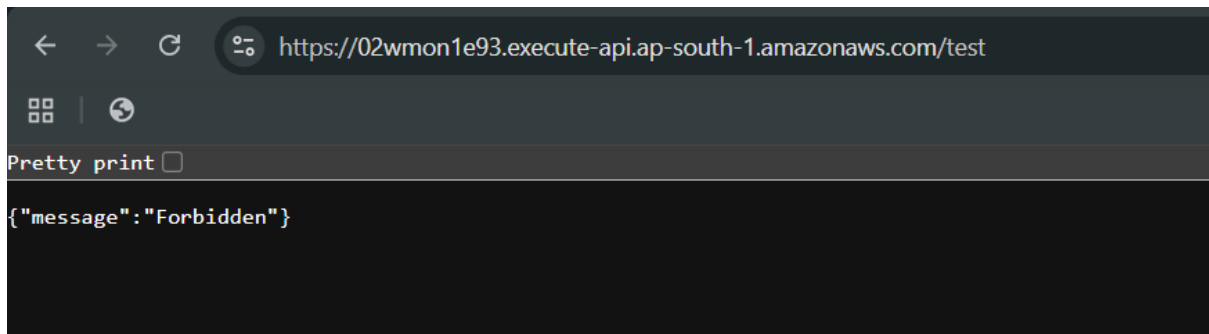
CancelPreviousNext



Following confirmation will occur:



Reopen the Invoke URL: clearly it worked.



--The End--