

## Module 8 Lab 2: Preconfigured Rules w/ Lambda

### CloudFront - General tab

The screenshot shows the AWS CloudFront console's General tab. On the left is a navigation menu with options like Cache statistics, Monitoring, Alarms, Popular objects, Top referers, Usage, Viewers, Security, Origin access identity, Public key, and Field-level encryption. The main area displays various settings for the CloudFront distribution, including Log Prefix, Delivery Method, Cookie Logging, Distribution Status, Comment, Price Class, Alternate Domain Names (CNAMEs), SSL Certificate, Domain Name, Custom SSL Client Support, Security Policy, Supported HTTP Versions, IPv6, Default Root Object, Last Modified, and Log Bucket. The 'CommonAttackProtection' link is highlighted in blue.

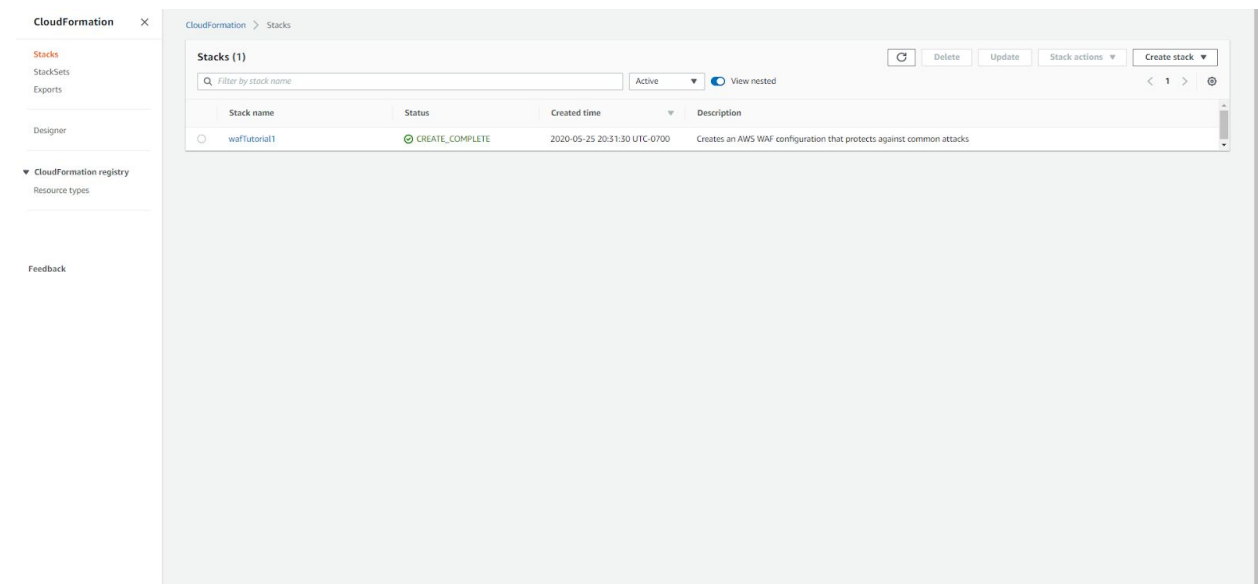
In the previous lab, the CloudFront Distribution was provisioned with CommonAttackProtection WAF. For this lab, that will be replaced with preconfigured rules and lambda called “aws waf security automations”.

### AWS WAF - Web ACL

The screenshot shows the AWS WAF console. At the top, a green notification bar states "CloudFront association removed successfully". The left sidebar contains navigation links for AWS WAF Classic, Switch to new AWS WAF, Web ACLs, Rules, Rule groups, Marketplace, Conditions, Cross-site scripting, Geo match, IP addresses, Size constraints, SQL Injection, String and regex matching, AWS Shield, Summary, Protected resources, Incidents, Global threat environment, AWS Firewall Manager, Getting started, Security policies, and Settings. The main content area is titled "Web ACLs" and shows a list of Web ACLs with a filter set to "Global (CloudFront)". The "CommonAttackProtection" Web ACL is selected. The right pane displays the details for "CommonAttackProtection", including tabs for Requests, Rules, and Logging. The Rules tab is active, showing a table of rules with columns for Order, Rule, Type, and Action. The rules are: 1. CommonAttackProtectionManualIPBlockRule (Regular, Block requests), 2. CommonAttackProtectionLargeBodyMatchRule (Regular, Count requests), 3. CommonAttackProtectionSqlRule (Regular, Block requests), and 4. CommonAttackProtectionXssRule (Regular, Block requests). Below the rules table, there is a section for "Default action" and "The following rules within the rule group will be overridden to count". At the bottom, there is a section for "AWS resources using this web ACL" with a table showing no resources are currently associated with this Web ACL.

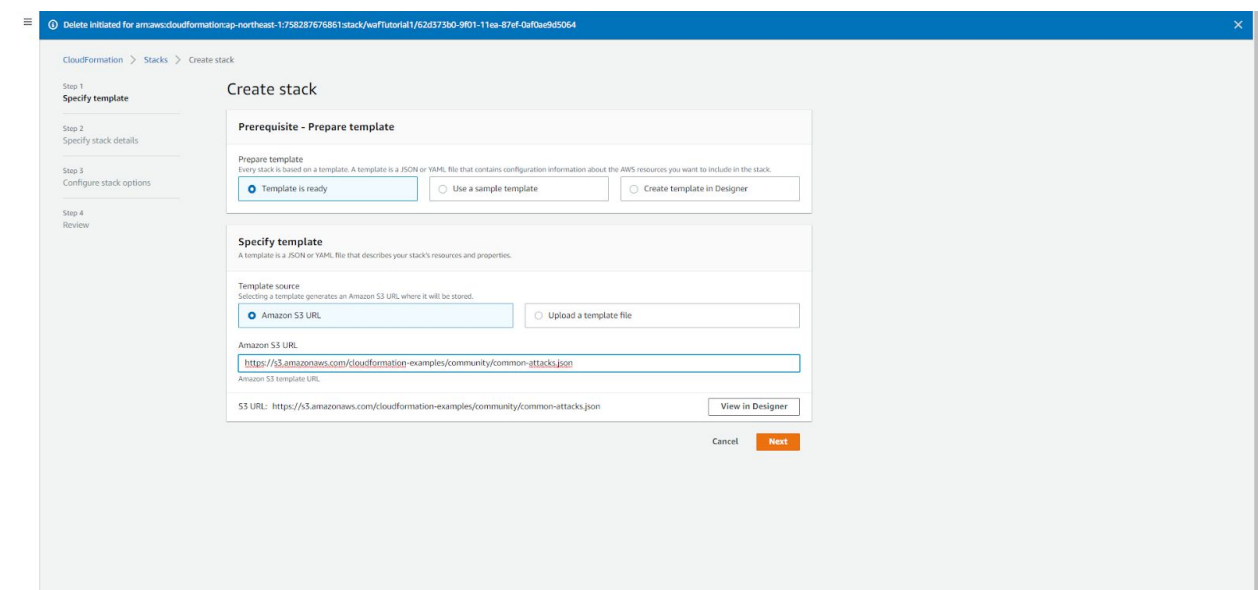
Note there are no resources using this unwanted web ACL.

## CloudFormation - Stacks



In CloudFormation, the common attacks WAF stack can now be deleted.

## CloudFormation - Create Stack



The previous WAF S3 template file location is present, replaced with the new S3 URL.

## CloudFormation - Create Stack

**Step 2: Specify stack details**

**Stack name**

Stack name: wafpreConfigDemo  
Stack name can include letters (A-Z and a-z), numbers (0-9), and dashes (-).

**Parameters**

Parameters are defined in your template and allow you to input custom values when you create or update a stack.

**Protection List**

Activate SQL Injection Protection  
Choose yes to enable the component designed to block common SQL injection attacks.  
yes

Activate Cross-site Scripting Protection  
Choose yes to enable the component designed to block common XSS attacks.  
yes

Activate HTTP Flood Protection  
Choose yes to enable the component designed to block HTTP flood attacks.  
yes - AWS WAF rate-based rule

Activate Scanner & Probe Protection  
Choose yes to enable the component designed to block scanners and probes.  
yes - AWS Lambda log parser

Activate Reputation List Protection  
Choose yes to block requests from IP addresses on third-party reputation lists (Spamhaus, TorProject, and EmergingThreats).  
yes

Activate Bad Bot Protection  
Choose yes to enable the component designed to block bad bots and content scrapers.  
yes

**Settings**

Endpoint Type  
Select the type of resource being used.  
CloudFront

Application Access Log Bucket Name  
If you chose yes for the Activate Scanners & Probes Protection parameter, enter a name for the Amazon S3 bucket where you want to store access logs for your CloudFront distribution or Application Load Balancer. Here, about bucket name restrictions here: <http://docs.aws.amazon.com/AmazonS3/latest/dev/bucketnaming.html>. If you chose to deactivate this protection, ignore this parameter.  
wafcloudfrontbucket

**Advanced Settings**

Request Threshold  
If you chose yes for the Activate HTTP Flood Protection parameter, enter the maximum acceptable requests per IP address. Please note that AWS WAF rate-based rule requires values greater than 100. If you chose Lambda log parser option, you can use any value greater than zero. If you chose to deactivate this protection, ignore this parameter.  
100

Note the questions about what to protect. Enter a log bucket name.

## CloudFormation - Create Stack

**CloudFormation > Stacks > Create stack**

**Step 3: Configure stack options**

**Configure stack options**

**Tags**

You can specify tags (key-value pairs) to apply to resources in your stack. You can add up to 50 unique tags for each stack. [Learn more](#)

Key Value Remove

Add tag

**Permissions**

Choose an IAM role to explicitly define how CloudFormation can create, modify, or delete resources in the stack. If you don't choose a role, CloudFormation uses permissions based on your user credentials. [Learn more](#)

**IAM role - optional**

Choose the IAM role for CloudFormation to use for all operations performed on the stack.

IAM role name Sample-role-name Remove

**Advanced options**

You can set additional options for your stack, like notification options and a stack policy. [Learn more](#)

**Stack policy**

Defines the resources that you want to protect from unintentional updates during a stack update.

**Rollback configuration**

Specify alarms for CloudFormation to monitor when creating and updating the stack. If the operation breaches an alarm threshold, CloudFormation rolls it back. [Learn more](#)

**Monitoring time - optional**

Number of minutes after the operation completes that CloudFormation should continue monitoring the specified alarms.

10 Minutes

**CloudWatch alarm - optional**

Amazon Resource Name (ARN) of the alarm to monitor.

Default

Roles are made automatically. All other settings left a default.

## CloudFormation - Create Stack

The screenshot shows the 'Review' step of the AWS CloudFormation console. The breadcrumb navigation at the top reads 'CloudFormation > Stacks > Create stack'. On the left, a sidebar lists the steps: 'Step 1: Specify template' (active), 'Step 2: Specify stack details', 'Step 3: Configure stack options', and 'Step 4: Review'. The main content area is titled 'Review wafpreConfigDemo' and has an 'Edit' button. It is divided into two sections: 'Step 1: Specify template' and 'Step 2: Specify stack details'. The 'Step 1' section shows the 'Template' URL as 'https://s3.amazonaws.com/solutions-reference/aws-waf-security-automations/latest/aws-waf-security-automations.template' and a 'Stack description' that explains the template's purpose and includes a warning about IAM resources. The 'Step 2' section shows 'Parameters (11)' in a table.

Key	Value
ActivateBadBotProtectionParam	yes
ActivateCrossSiteScriptingProtectionParam	yes
ActivateHttpFloodProtectionParam	yes - AWS WAF rate based rule
ActivateReputationListsProtectionParam	yes
ActivateScannersProbesProtectionParam	yes - AWS Lambda log parser
ActivateSqlInjectionProtectionParam	yes
AppAccessLogBucket	wafcloudfrontbucket

Note the Stack description explains what exactly will be created.

## CloudFormation - Create Stack

The screenshot shows the 'Capabilities' section of the AWS CloudFormation console. It includes 'Notification options' (none defined), 'Stack creation options' (Rollback on failure: Enabled, Timeout: -, Termination protection: Disabled), and a 'Quick-create link'. The 'Capabilities' section contains a warning box stating that the template requires IAM and CloudFormation capabilities. Two checkboxes are checked: 'I acknowledge that AWS CloudFormation might create IAM resources with custom names.' and 'I acknowledge that AWS CloudFormation might require the following capability: CAPABILITY\_AUTO\_EXPAND'. At the bottom are buttons for 'Cancel', 'Previous', 'Create change set', and 'Create stack'.

Other capabilities will be created with this CloudFormation template in order for the stack to work.

## CloudFormation - Stacks

CloudFormation > Stacks > wafpreConfigDemo

Stacks (1)

Filter by stack name

Active View nested

wafpreConfigDemo  
2020-05-25 21:28:36 UTC-0700  
ROLLBACK\_COMPLETE

wafpreConfigDemo

Stack info Events Resources Outputs Parameters Template Change sets

Events (18)

Search events

Timestamp	Logical ID	Status	Status reason
2020-05-25 21:29:34 UTC-0700	wafpreConfigDemo	ROLLBACK_COMPLETE	-
2020-05-25 21:29:33 UTC-0700	LambdaRoleHelper	DELETE_COMPLETE	-
2020-05-25 21:29:30 UTC-0700	LambdaRoleHelper	DELETE_IN_PROGRESS	-
2020-05-25 21:29:29 UTC-0700	Helper	DELETE_COMPLETE	-
2020-05-25 21:29:28 UTC-0700	Helper	DELETE_IN_PROGRESS	-
2020-05-25 21:29:28 UTC-0700	CheckRequirements	DELETE_COMPLETE	-
2020-05-25 21:29:25 UTC-0700	CheckRequirements	DELETE_IN_PROGRESS	-
2020-05-25 21:29:21 UTC-0700	wafpreConfigDemo	ROLLBACK_IN_PROGRESS	-
2020-05-25 21:29:20 UTC-0700	CheckRequirements	CREATE_FAILED	The following resource(s) failed to create: [CheckRequirements]. Rollback requested by user.
2020-05-25 21:29:20 UTC-0700	CheckRequirements	CREATE_IN_PROGRESS	Failed to create resource. Failed to access the existing bucket information. Check if you own this bucket and if it has proper access policy.
2020-05-25 21:29:14 UTC-0700	CheckRequirements	CREATE_IN_PROGRESS	Resource creation initiated
2020-05-25 21:29:09 UTC-0700	Helper	CREATE_COMPLETE	-
2020-05-25 21:29:09 UTC-0700	Helper	CREATE_IN_PROGRESS	Resource creation initiated
2020-05-25 21:29:08 UTC-0700	Helper	CREATE_IN_PROGRESS	-
2020-05-25 21:29:04 UTC-0700	LambdaRoleHelper	CREATE_COMPLETE	-
2020-05-25 21:28:45 UTC-0700	LambdaRoleHelper	CREATE_IN_PROGRESS	Resource creation initiated

The stack creation failed. The S3 bucket may have an existing permission from the previous CloudFormation stack. The location is Tokyo. A new S3 bucket and Cloudfront may be required.

## CloudFormation - Stacks

CloudFormation > Stacks > wafpreConfigDemo

Stacks (1)

Filter by stack name

Active View nested

wafpreConfigDemo  
2020-05-25 21:46:50 UTC-0700  
ROLLBACK\_COMPLETE

wafpreConfigDemo

Stack info Events Resources Outputs Parameters Template Change sets

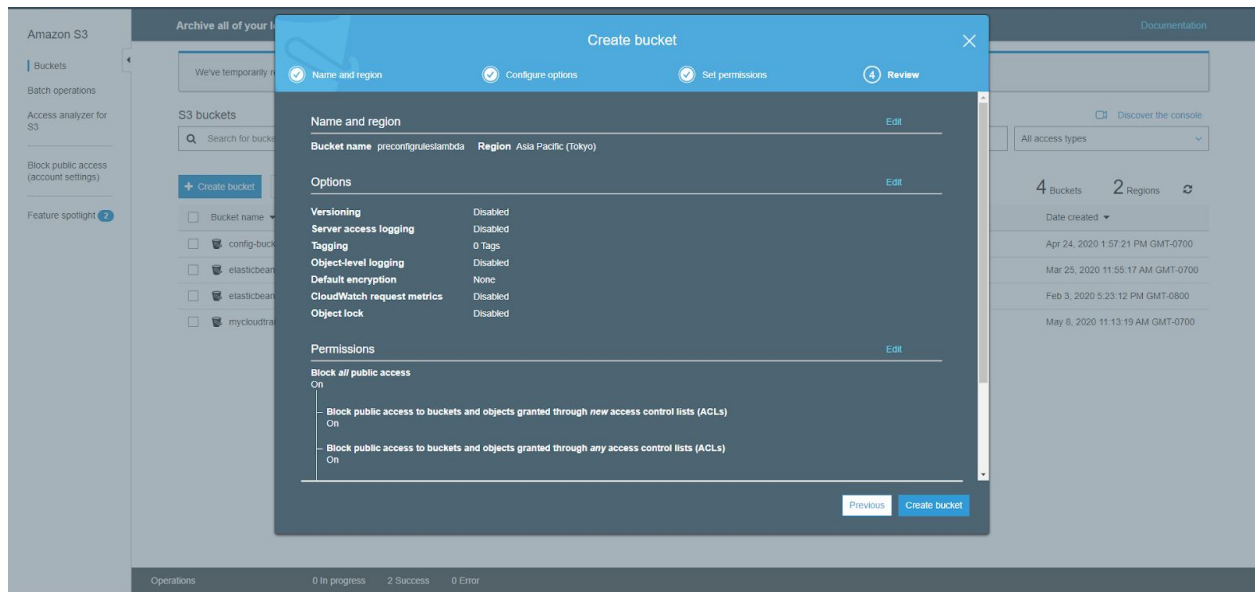
Events (18)

Search events

Timestamp	Logical ID	Status	Status reason
2020-05-25 21:47:57 UTC-0700	wafpreConfigDemo	ROLLBACK_COMPLETE	-
2020-05-25 21:47:56 UTC-0700	LambdaRoleHelper	DELETE_COMPLETE	-
2020-05-25 21:47:53 UTC-0700	LambdaRoleHelper	DELETE_IN_PROGRESS	-
2020-05-25 21:47:52 UTC-0700	Helper	DELETE_COMPLETE	-
2020-05-25 21:47:52 UTC-0700	Helper	DELETE_IN_PROGRESS	-
2020-05-25 21:47:51 UTC-0700	CheckRequirements	DELETE_COMPLETE	-
2020-05-25 21:47:48 UTC-0700	CheckRequirements	DELETE_IN_PROGRESS	-
2020-05-25 21:47:28 UTC-0700	wafpreConfigDemo	ROLLBACK_IN_PROGRESS	-
2020-05-25 21:47:26 UTC-0700	CheckRequirements	CREATE_FAILED	The following resource(s) failed to create: [CheckRequirements]. Rollback requested by user.
2020-05-25 21:47:26 UTC-0700	CheckRequirements	CREATE_IN_PROGRESS	Failed to create resource. Failed to access the existing bucket information. Check if you own this bucket and if it has proper access policy.
2020-05-25 21:47:21 UTC-0700	CheckRequirements	CREATE_IN_PROGRESS	Resource creation initiated
2020-05-25 21:47:17 UTC-0700	Helper	CREATE_COMPLETE	-
2020-05-25 21:47:16 UTC-0700	Helper	CREATE_IN_PROGRESS	Resource creation initiated
2020-05-25 21:47:15 UTC-0700	Helper	CREATE_IN_PROGRESS	-
2020-05-25 21:47:12 UTC-0700	LambdaRoleHelper	CREATE_COMPLETE	-

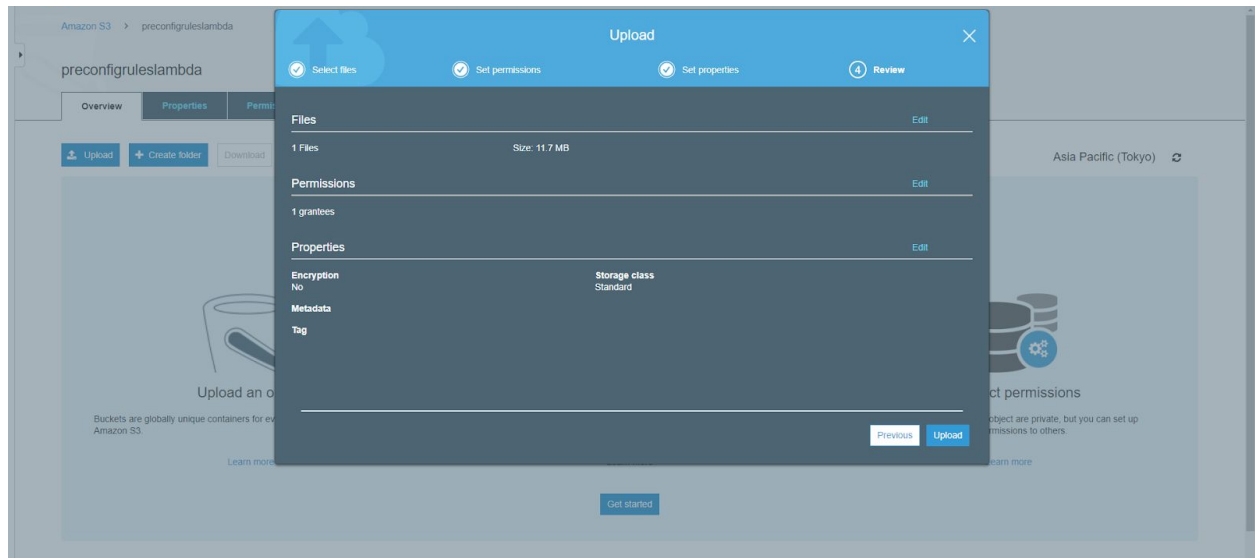
The same error occurred. A new S3 bucket and CloudFront will be created.

## Amazon S3 - Create bucket



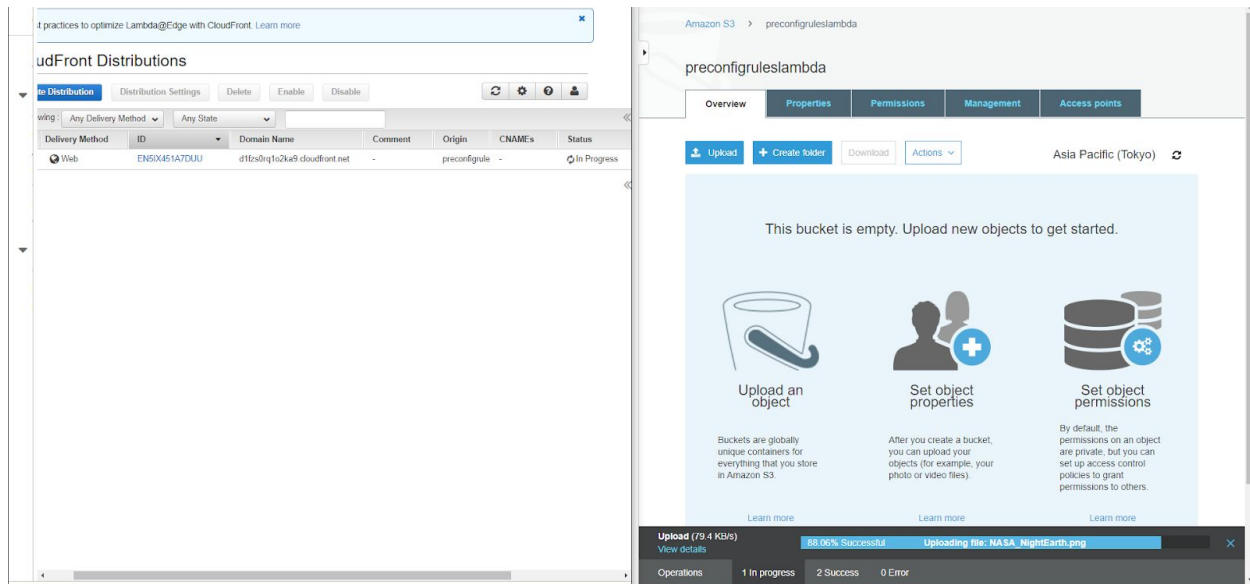
A new S3 bucket was created in the Tokyo region.

## Amazon S3 - Upload



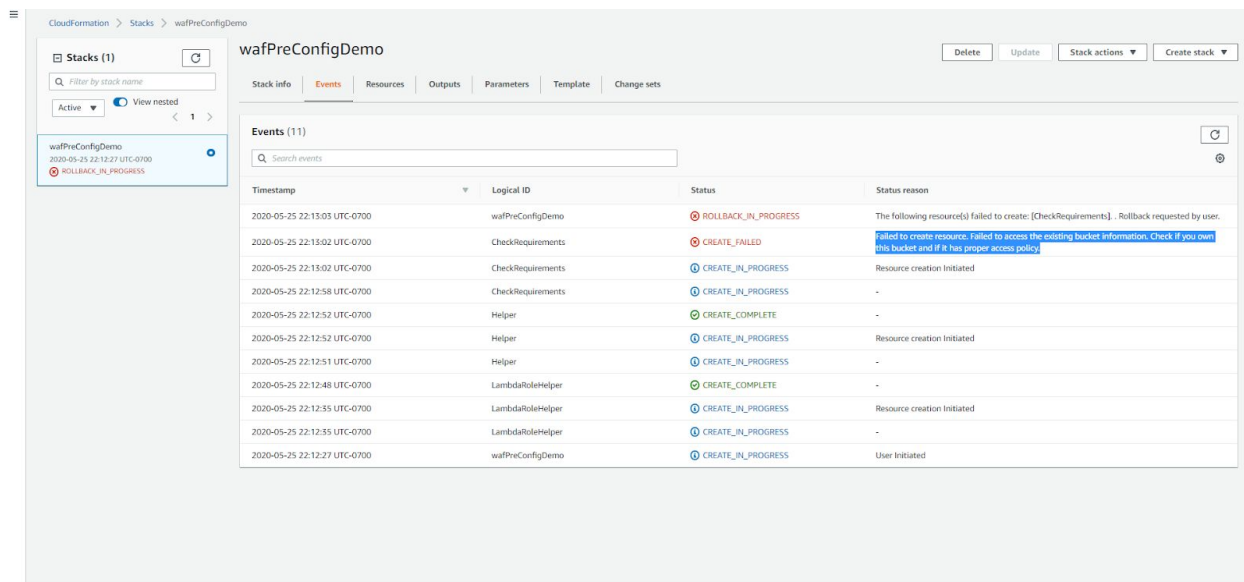
All settings were left at default.

## CloudFront/S3 Upload



Note that the CloudFront distribution and a file upload occurred simultaneously.

## CloudFormation - Stacks



The same error occurred again even with a new S3 bucket and CloudFront distribution.

## AWS web

The screenshot shows the AWS Solutions Implementation overview for AWS WAF Security Automations. It includes a navigation bar with links like Products, Solutions, Pricing, Documentation, Learn, Partner Network, AWS Marketplace, Customer Enablement, Events, Explore More, and a Search icon. The main content area is titled "AWS Solutions Implementation overview" and contains a diagram illustrating the architecture. The diagram shows valid users and attackers sending requests to a web application. The requests pass through an AWS WAF web ACL, which is configured with rules for Whitelist, Blacklist, SQL Injection, XSS, HTTP Flood, Scanners & Probes, IP Reputation Lists, and Bad Bot. The WAF logs are sent to Amazon Kinesis Data Firehose, which then streams the data to Amazon S3. The Amazon S3 bucket is also used for storing WAF logs. The diagram also shows the integration with Amazon CloudFront, Application Load Balancer, Amazon API Gateway, Amazon Lambda, Amazon Athena, and Amazon CloudWatch. A sidebar on the right provides details about the solution, including its version (2.3.2), last updated date (02/2020), author (AWS), estimated deployment time (15 min), and links to source code and CloudFormation template. It also includes buttons for "View deployment guide", "Launch in the AWS Console", and "Deploy with an AWS IQ expert".

Amazon provides a solution with a Launch in the AWS console option.

## CloudFormation - Stacks

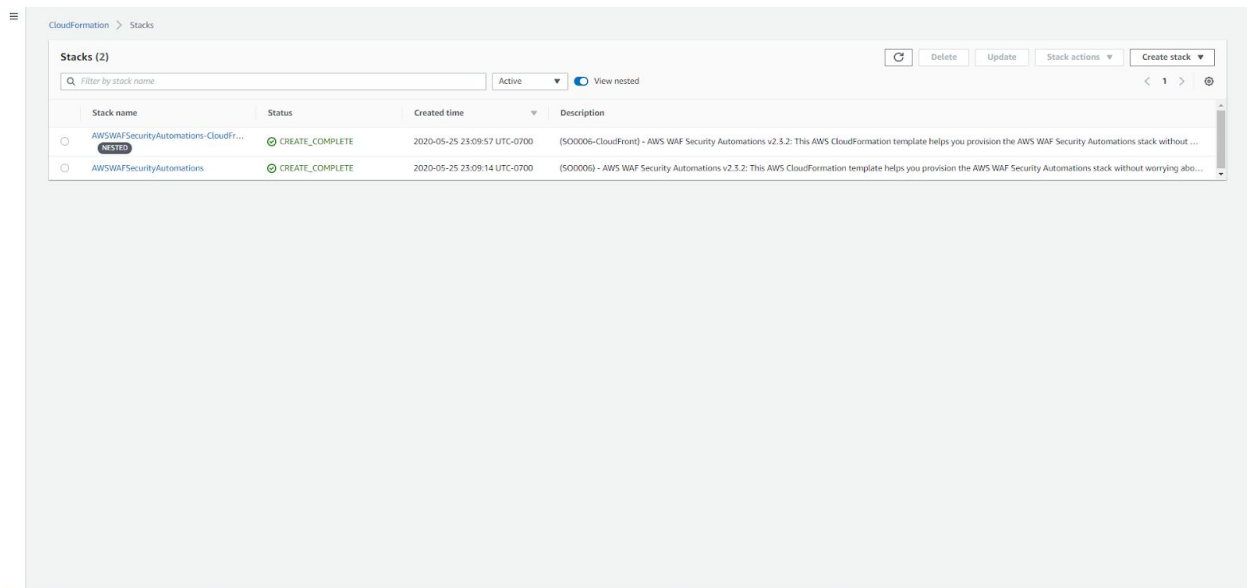
The screenshot shows the AWS CloudFormation console for the stack "AWSWAFSecurityAutomations". The stack is in the "ROLLBACK\_COMPLETE" state. The "Events" tab is selected, showing a list of events. The events table has columns for Timestamp, Logical ID, Status, and Status reason. The events show the stack creation process, including the creation of various resources like CheckRequirements, Helper, LambdaRoleHelper, and the main stack itself. The status of the events is "CREATE\_IN\_PROGRESS" or "CREATE\_FAILED". The status reason for the "CREATE\_FAILED" event is "The following resource(s) failed to create: [CheckRequirements]. Rollback requested by user. failed to create resource. Failed to access the existing bucket information. Check if you own this bucket and if it has proper access policy".

Timestamp	Logical ID	Status	Status reason
2020-05-25 22:33:25 UTC-0700	AWSWAFSecurityAutomations	ROLLBACK_IN_PROGRESS	The following resource(s) failed to create: [CheckRequirements]. Rollback requested by user.
2020-05-25 22:33:25 UTC-0700	CheckRequirements	CREATE_FAILED	failed to create resource. Failed to access the existing bucket information. Check if you own this bucket and if it has proper access policy
2020-05-25 22:33:25 UTC-0700	CheckRequirements	CREATE_IN_PROGRESS	Resource creation Initiated
2020-05-25 22:33:18 UTC-0700	CheckRequirements	CREATE_IN_PROGRESS	-
2020-05-25 22:33:14 UTC-0700	Helper	CREATE_COMPLETE	-
2020-05-25 22:33:14 UTC-0700	Helper	CREATE_IN_PROGRESS	Resource creation Initiated
2020-05-25 22:33:13 UTC-0700	Helper	CREATE_IN_PROGRESS	-
2020-05-25 22:33:09 UTC-0700	LambdaRoleHelper	CREATE_COMPLETE	-
2020-05-25 22:32:55 UTC-0700	LambdaRoleHelper	CREATE_IN_PROGRESS	Resource creation Initiated
2020-05-25 22:32:54 UTC-0700	LambdaRoleHelper	CREATE_IN_PROGRESS	-
2020-05-25 22:32:46 UTC-0700	AWSWAFSecurityAutomations	CREATE_IN_PROGRESS	User Initiated

However the same issue applies.



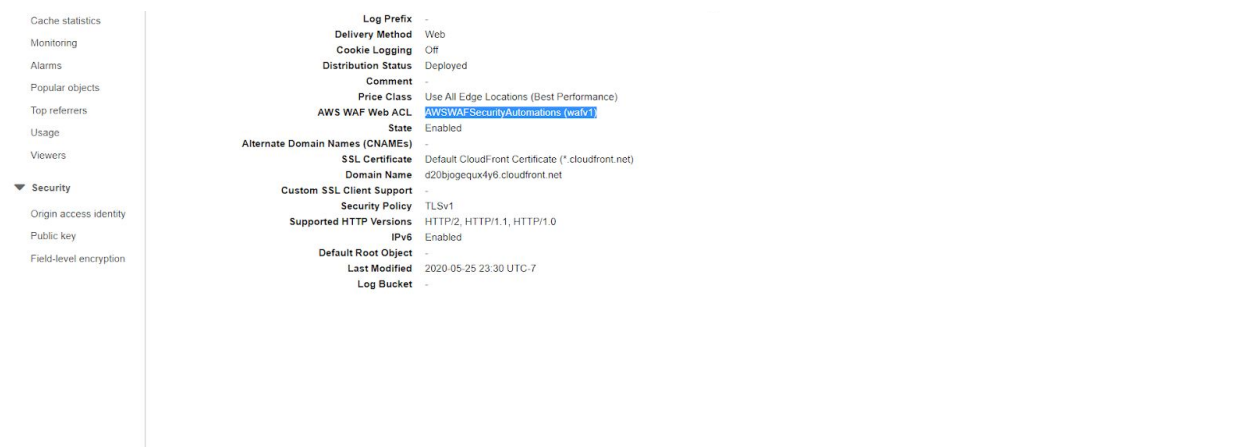
## CloudFormation - Stacks



Stack name	Status	Created time	Description
<a href="#">AWSWAFSecurityAutomations-CloudFront</a> <b>NESTED</b>	CREATE_COMPLETE	2020-05-25 23:09:57 UTC-0700	(S000006-CloudFront) - AWS WAF Security Automations v2.3.2: This AWS CloudFormation template helps you provision the AWS WAF Security Automations stack without ...
<a href="#">AWSWAFSecurityAutomations</a>	CREATE_COMPLETE	2020-05-25 23:09:14 UTC-0700	(S000006) - AWS WAF Security Automations v2.3.2: This AWS CloudFormation template helps you provision the AWS WAF Security Automations stack without worrying abo...

Success! The following changes occurred, N. Virginia bucket, smaller file upload, creating a new CloudFront Distribution, and using the AWS WAF Security Automations Launch in the AWS console option.

## CloudFront - General tab



Cache statistics	Log Prefix	-
Monitoring	Delivery Method	Web
Alarms	Cookie Logging	Off
Popular objects	Distribution Status	Deployed
Top referrers	Comment	-
Usage	Price Class	Use All Edge Locations (Best Performance)
Viewers	AWS WAF Web ACL	<a href="#">AWSWAFSecurityAutomations (wafv1)</a>
▼ Security	State	Enabled
Origin access identity	Alternate Domain Names (CNAMEs)	-
Public key	SSL Certificate	Default CloudFront Certificate (* cloudfront.net)
Field-level encryption	Domain Name	d20bjogequx4y6.cloudfront.net
	Custom SSL Client Support	-
	Security Policy	TLSv1
	Supported HTTP Versions	HTTP/2, HTTP/1.1, HTTP/1.0
	IPv6	Enabled
	Default Root Object	-
	Last Modified	2020-05-25 23:30 UTC-7
	Log Bucket	-

To verify the correct WAF has been set, note that AWS WAF Security Automations is defined.

## AWS WAF Classic - Rules

AWS WAF Classic

Switch to new AWS WAF

Web ACLs

Rules

Rule groups

Marketplace

Conditions

Cross-site scripting

Geo match

IP addresses

Size constraints

SQL Injection

String and regex matching

AWS Shield

Summary

Protected resources

Incidents

Global threat environment

AWS Firewall Manager

Getting started

Security policies

Settings

Rules

Create rule Delete

Filter Global (CloudFront)

Viewing 1 to 8 of 8 Rule Results per page 10

Name	Type	ID
<input type="radio"/> AWSWAFSecurityAutomations - Bad Bot Rule	Regular	edd30395-13b8-4785-a23a-3aaf13275b58
<input type="radio"/> AWSWAFSecurityAutomations - Blacklist Rule	Regular	15023025-3699-4f5e-96d0-d33499407a45
<input type="radio"/> AWSWAFSecurityAutomations - SQL Injection Rule	Regular	52217ae8-83bb-4e1a-825a-1d0c6078eeec2
<input type="radio"/> AWSWAFSecurityAutomations - Scanners & Probes Rule	Regular	be94e3f8-e9e8-41c2-a80b-1e70a79884ac
<input type="radio"/> AWSWAFSecurityAutomations - WAF IP Reputation Lists Rule	Regular	676206e-ca3a-4474-879a-33b17e27d83
<input type="radio"/> AWSWAFSecurityAutomations - Whitelist Rule	Regular	92669f3-14d1-4cad-a9f5-077c7ae64404
<input type="radio"/> AWSWAFSecurityAutomations - XSS Rule	Regular	20435993-94f0-4ac9-a1c9-0aef9f1b0bc
<input type="radio"/> AWSWAFSecurityAutomations HTTP Flood Rule	Rate-based	d49d54f6-c24d-4e02-b849-e0c2e4dcd476

The rule sets have been created.

## AWS WAF Classic - Web ACLs

AWS WAF Classic

Switch to new AWS WAF

Web ACLs

Rules

Rule groups

Marketplace

Conditions

Cross-site scripting

Geo match

IP addresses

Size constraints

SQL Injection

String and regex matching

AWS Shield

Summary

Protected resources

Incidents

Global threat environment

AWS Firewall Manager

Getting started

Security policies

Settings

Web ACLs

Create web ACL Delete

Filter Global (CloudFront)

Name

AWSWAFSecurityAutomations

CloudFront association added successfully

AWSWAFSecurityAutomations

Requests Rules Logging

If a request matches all of the conditions in a rule, take the corresponding action Edit web ACL

Order	Rule	Type	Action
1	AWSWAFSecurityAutomations - Whitelist Rule	Regular	Allow requests
2	AWSWAFSecurityAutomations - Blacklist Rule	Regular	Block requests
3	AWSWAFSecurityAutomations - SQL Injection Rule	Regular	Block requests
4	AWSWAFSecurityAutomations - XSS Rule	Regular	Block requests
5	AWSWAFSecurityAutomations HTTP Flood Rule	Rate-based	Block requests
6	AWSWAFSecurityAutomations - Scanners & Probes Rule	Regular	Block requests
7	AWSWAFSecurityAutomations - WAF IP Reputation Lists Rule	Regular	Block requests
8	AWSWAFSecurityAutomations - Bad Bot Rule	Regular	Block requests

If a request doesn't match any rules, take the default action

Default action Allow all requests that don't match any rules

The following rules within the rule group will be overridden to count

Rule group name	Status
No rules within the rule group will be overridden to count.	

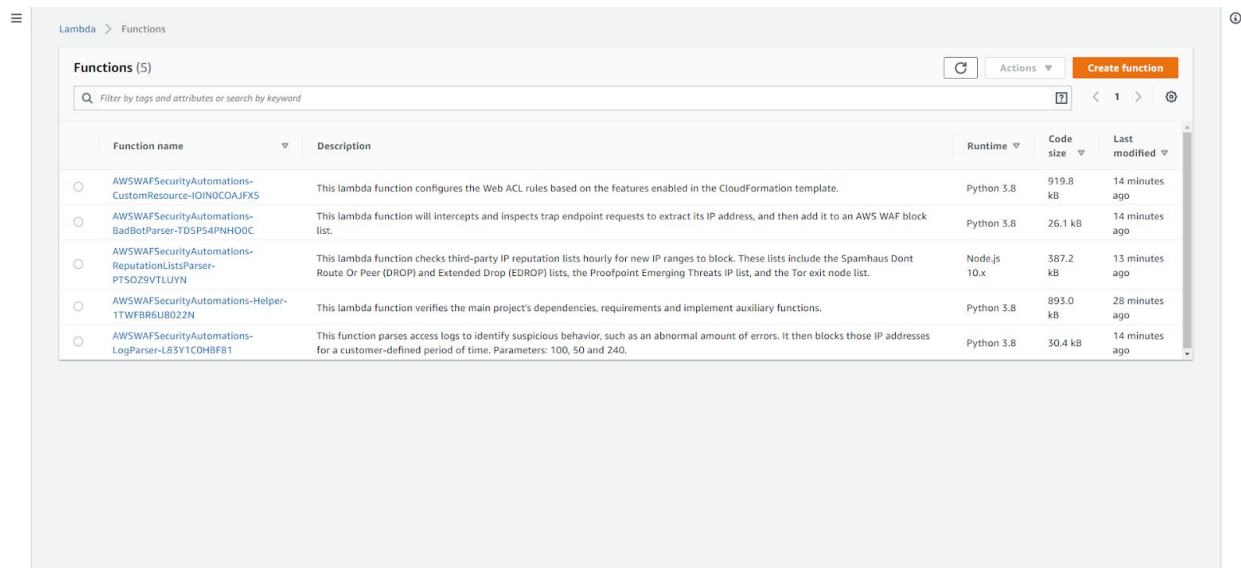
AWS resources using this web ACL

Add association

Resource	Type
E1B2UDD6V9QGD - d20bjogexu4y6 cloudfront.net	CloudFront distribution

The CloudFront resource successfully added.

## Lambda - Functions

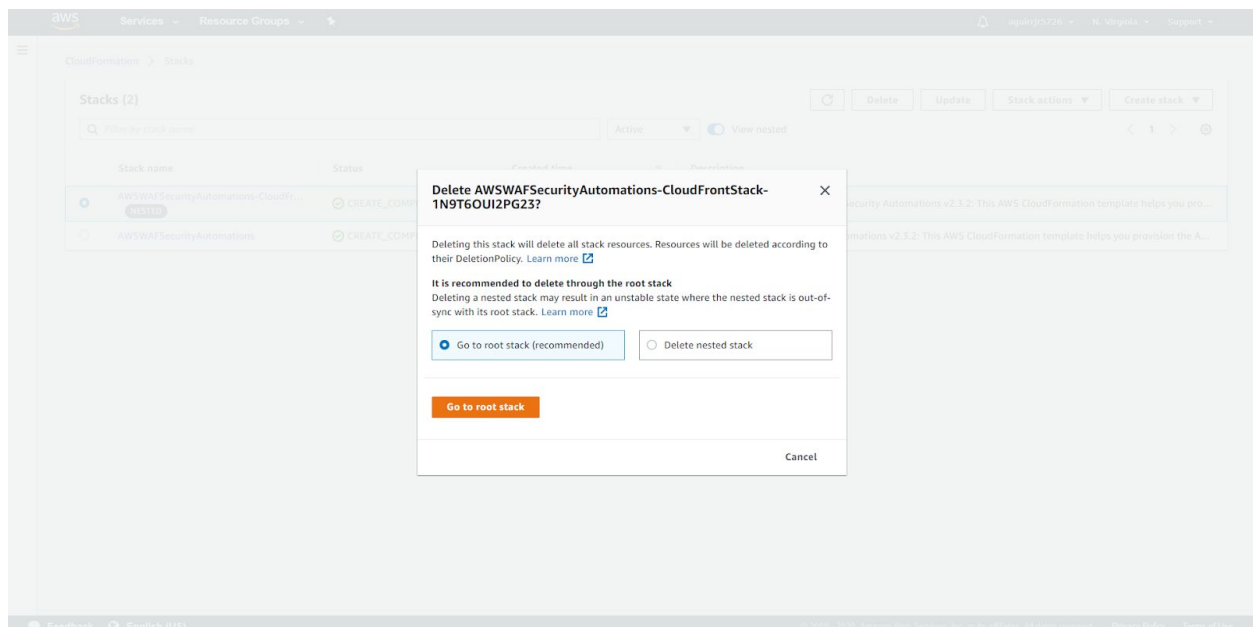


The screenshot shows the AWS Lambda console with a list of 5 functions. The table includes columns for Function name, Description, Runtime, Code size, and Last modified. The functions are related to AWS WAF Security Automations.

	Function name	Description	Runtime	Code size	Last modified
<input type="radio"/>	AWSWAFSecurityAutomations-CustomResource-IOINOCOAJFX5	This lambda function configures the Web ACL rules based on the features enabled in the CloudFormation template.	Python 3.8	919.8 kB	14 minutes ago
<input type="radio"/>	AWSWAFSecurityAutomations-BadBotParser-TD5P54PNH0OC	This lambda function will intercepts and inspects trap endpoint requests to extract its IP address, and then add it to an AWS WAF block list.	Python 3.8	26.1 kB	14 minutes ago
<input type="radio"/>	AWSWAFSecurityAutomations-ReputationListsParser-PTSOZ9VTLUYN	This lambda function checks third-party IP reputation lists hourly for new IP ranges to block. These lists include the Spamhaus Dont Route Or Peer (DROP) and Extended Drop (EDROP) lists, the Proofpoint Emerging Threats IP list, and the Tor exit node list.	Node.js 10.x	387.2 kB	13 minutes ago
<input type="radio"/>	AWSWAFSecurityAutomations-Helper-1TWFB6U8022N	This lambda function verifies the main project's dependencies, requirements and implement auxiliary functions.	Python 3.8	893.0 kB	28 minutes ago
<input type="radio"/>	AWSWAFSecurityAutomations-LogParser-L83Y1COH8FB1	This function parses access logs to identify suspicious behavior, such as an abnormal amount of errors. It then blocks those IP addresses for a customer-defined period of time. Parameters: 100, 50 and 240.	Python 3.8	30.4 kB	14 minutes ago

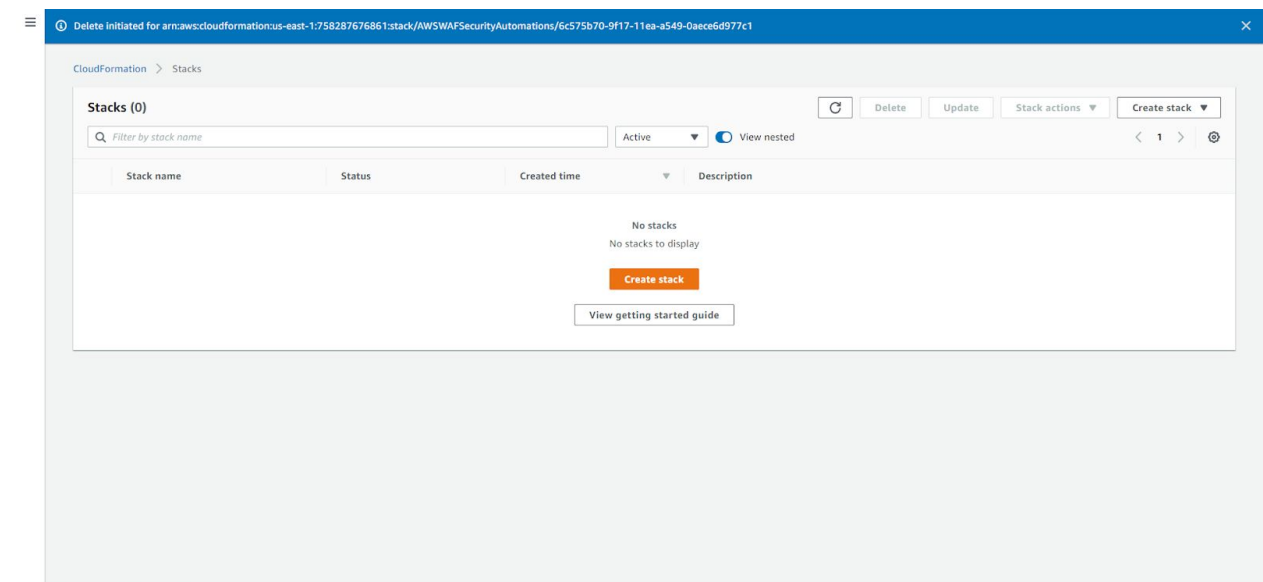
The lambda functions that are at the heart of the autonomous application.

## Nested Stack Warning



Deleting a stack containing a nested stack requires deleting the root stack first.

## CloudFormation - Stacks



All stacks deleted.