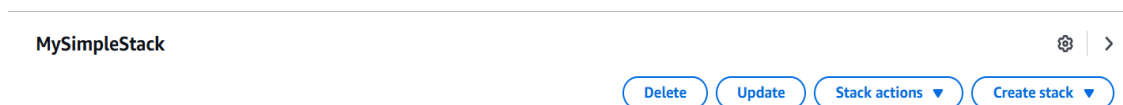


Resource Linking with REF

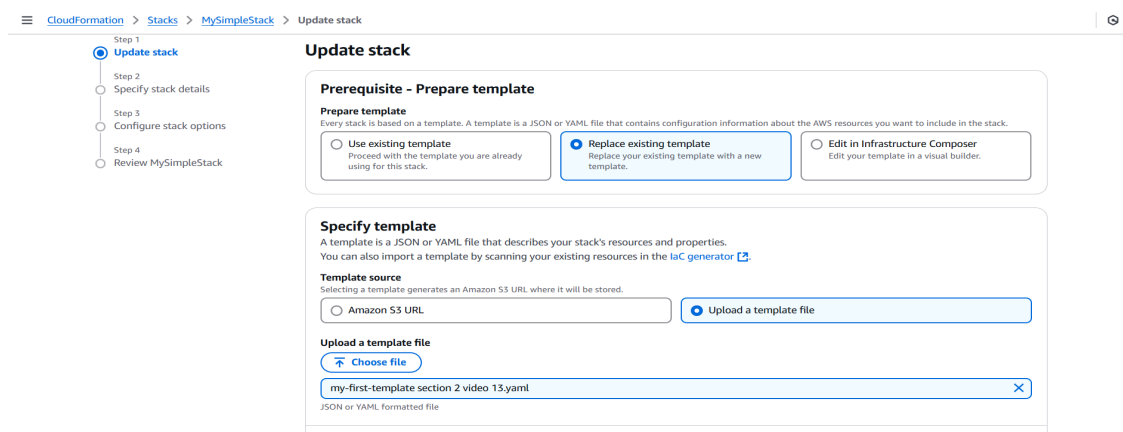
The process involves updating and managing CloudFormation stacks to observe how changes affect resources, especially those causing replacements or dependencies. You update the stack by replacing the template, monitor the update progress, and verify that resources like EC2 instances or security groups are correctly updated or replaced. By altering dependencies in templates, you explore resource creation and deletion order, both parallel and sequential, and the impact of DependsOn. The end goal is to understand how CloudFormation handles stack updates, resource replacements, and dependency-driven ordering, ensuring infrastructure changes are predictable, accurate, and efficient.

Activity

1. You can Find the template files in our GitHub repository under the same name as the heading for easy access and edits. Open the stack details and click 'Update'.



2. Choose to replace the template and upload the latest version.



3. Click 'Next' on the parameters page. Skip stack options and click 'Next' again. Review changes, noting conditional replacement for resources. Click 'Submit' to update the stack(you can take reference from the “cloudformation stack workflow” documentation in the drive).

- Monitor the **'UPDATE_IN_PROGRESS'** state and refresh events. Wait for **'UPDATE_COMPLETE'** state after the cleanup.

The screenshot shows the AWS CloudFormation console for a stack named 'MySimpleStack'. The 'Events' tab is selected, displaying a list of 24 events. The events are filtered by status, showing 'UPDATE_IN_PROGRESS', 'UPDATE_COMPLETE', and 'DELETE_COMPLETE' states. The 'Stack actions' menu is visible at the top right.

Timestamp	Logical ID	Status	Detailed status	Status reason
2024-11-30 00:10:35 UTC+0530	MySimpleStack	UPDATE_IN_PROGRESS	-	User Initiated
2024-11-30 00:02:59 UTC+0530	MySimpleStack	UPDATE_COMPLETE	-	-
2024-11-30 00:02:59 UTC+0530	WebServerInstance	DELETE_COMPLETE	-	-
2024-11-30 00:01:48 UTC+0530	WebServerInstance	DELETE_IN_PROGRESS	-	-
2024-11-30 00:01:47 UTC+0530	MySimpleStack	UPDATE_COMPLETE_CLEANUP_IN_PROGRESS	-	-

- Verify the updated resource in the **'Resources'** tab. Confirm the security group and configurations are correct.

The screenshot shows the AWS CloudFormation console for a stack named 'MySimpleStack'. The 'Resources' tab is selected, displaying a list of 2 resources. The resources are 'WebServerInstance' and 'WebServerSecurityGroup', both with a status of 'CREATE_COMPLETE'.

Logical ID	Physical ID	Type	Status	Module
WebServerInstance	i-01177dc9d1ddff2ea	AWS::EC2::Instance	CREATE_COMPLETE	-
WebServerSecurityGroup	sg-0efcbb1613d75220c	AWS::EC2::SecurityGroup	CREATE_COMPLETE	-

Stack Updates Causing Resource Replacements

- Save the attached template locally, open it in VS Code for edits, and upload it during stack creation. Open the CloudFormation stack and access the details.
- Check the EC2 instance's subnet by clicking its physical ID and viewing the Networking tab.

The screenshot shows the AWS Management Console for an EC2 instance named 'web-server'. The 'Networking' tab is selected, displaying details such as the public IP address, private IP address, and VPC ID.

Name	Instance ID	Instance state	Instance type	Status check	Alarm status	Availability Zone	Public IP
web-server	i-01d8565c2c4370ee8	Running	t2.micro	Initializing	View alarms	eu-west-1b	ec2-3-252-95-154.eu-west-1.compute.amazonaws.com

i-01d8565c2c4370ee8 (web-server)

Networking details	Private IP addresses	VPC ID
Public IPv4 address: 3.252.95.154	Private IP addresses: 172.31.27.190	VPC ID: vpc-0b0c8badfef0024a4
Public IPv4 DNS: ec2-3-252-95-154.eu-west-1.compute.amazonaws.com	Private IP DNS name (IPv4 only): ip-172-31-27-190.eu-west-1.compute.internal	
Subnet ID: subnet-0619479663b4084af	IPv6 addresses: -	Secondary private IPv4 addresses: -

- Remove filters and select a different subnet from the list, noting its availability zone. Copy the new subnet ID, replace the current SubnetId property in the CloudFormation template, and save it.

The screenshot shows the AWS Subnets console. At the top, there's a list of subnets with columns: Name, Subnet ID, State, VPC, Block Public Access, and IPv4 CIDR. Three subnets are listed, all in 'Available' state. The second subnet, 'subnet-08c772de46d053876', is selected. Below the list, the 'Details' tab for this subnet is open, showing various properties like Subnet ID, Subnet ARN, State, IPv4 CIDR, Availability Zone, Network ACL, and VPC.

- Return to the stack, upload the updated template, and proceed through the update wizard without changing options. On the review page, confirm the WebServerInstance will be replaced. Submit the stack update and monitor the process via the events tab.

The screenshot shows the AWS CloudFormation console for a stack named 'MySamplestack'. The 'Events' tab is selected, displaying a list of events. The events show the stack being updated, the 'WebServerInstance' being deleted, and the stack being updated again. The 'Status' column shows 'UPDATE_COMPLETE' for the stack and 'DELETE_COMPLETE' for the instance.

- for the original EC2 instance to terminate during the cleanup phase. Confirm that the stack resource now points to the new EC2 instance in the updated availability zone.

The screenshot shows the AWS EC2 console. At the top, there's a list of instances with columns: Name, Instance ID, Instance state, Instance type, Status check, Alarm status, and Availability Zone. One instance is listed with the name 'web-server' and Instance ID 'i-01d8565c2c4370ee8'. The instance state is 'Terminated'.

- Test stack updates in a separate environment and use AWS documentation to anticipate replacements.

7. Clean up by deleting the sample stack from the CloudFormation console.

MySamplestack

Stack info | **Events - updated** | Resources | Outputs | Parameters | Template | Change sets | Git sync

Table view | Timeline view - new

Events (30)

Search events

Timestamp	Logical ID	Status	Detailed status	Status reason
2024-12-04 13:51:32 UTC+0530	MySamplestack	✔ DELETE_COMPLETE	-	-
2024-12-04 13:51:31 UTC+0530	WebServerSecurityGroup	✔ DELETE_COMPLETE	-	-
2024-12-04 13:51:30 UTC+0530	WebServerSecurityGroup	ⓘ DELETE_IN_PROGRESS	-	-

Order of Resource Creations

1. Save the attached template locally, open it in VS Code for edits, and upload it during stack creation. Reviewed the previous template and stack creation process. Commented out SecurityGroupIds in the EC2 resource to remove dependency and change the Image Id, Subnet id and Vpc id according to your region.

```
8 WebServerInstance:
9   Type: AWS::EC2::Instance
10  Properties:
11    ImageId: ami-04bd4a6a67aa8e86e
12    InstanceType: t2.micro
13    SubnetId: subnet-08c772de46d053876
14    # SecurityGroupIds:
15    # - !Ref WebServerSecurityGroup
16  Tags:
```

2. Created a new stack and observed parallel resource creation.

Specify stack details

Provide a stack name

Stack name

NoDependentStack

Stack name must be 1 to 128 characters, start with a letter, and only contain alphanumeric characters. Character count: 16/128.

Parameters

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

No parameters

There are no parameters defined in your template

Cancel Previous Next

Events (12)

Search events

Timestamp	Logical ID	Status	Detailed status	Status reason
2024-12-04 15:46:08 UTC+0530	NoDependentStack	✔ CREATE_COMPLETE	-	-
2024-12-04 15:46:07 UTC+0530	SampleTopic	✔ CREATE_COMPLETE	-	-

3. After that, Deleted the stack and noted parallel deletion of resources.

Events (16)

Detect root cause

Search events

Timestamp	Logical ID	Status	Detailed status	Status reason
2024-12-04 15:46:29 UTC+0530	WebServerSecurityGroup	DELETED_COMPLETE	-	-
2024-12-04 15:46:28 UTC+0530	WebServerSecurityGroup	DELETE_IN_PROGRESS	-	-
2024-12-04 15:46:28 UTC+0530	SampleTopic	DELETE_IN_PROGRESS	-	-
2024-12-04 15:46:26 UTC+0530	NoDependentStack	DELETE_IN_PROGRESS	-	User Initiated
2024-12-04 15:46:08 UTC+0530	NoDependentStack	CREATE_COMPLETE	-	-
2024-12-04 15:46:07 UTC+0530	SampleTopic	CREATE_COMPLETE	-	-
2024-12-04 15:46:07 UTC+0530	SampleTopic	CREATE_IN_PROGRESS	-	Resource creation Initiated
2024-12-04 15:46:06 UTC+0530	SampleTopic	CREATE_IN_PROGRESS	-	-

4. Re-enabled SecurityGroupIds to introduce an implicit dependency.Made changes in the template and update it.

```
8      InstanceType: t2.micro
9      SubnetId: subnet-08c772de46d053876
10     SecurityGroupIds:
11       - !Ref WebServerSecurityGroup
12     Tags:
```

5. Create a new stack like you’ve done above to observe sequential resource creation and after that, Delete the stack and observe reverse deletion based on dependencies.

Specify stack details

Provide a stack name

Stack name

DependentStack

Stack name must be 1 to 128 characters, start with a letter, and only contain alphanumeric characters. Character count: 14/128.

Parameters

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

No parameters

There are no parameters defined in your template

Cancel

Previous

Next

Events (14)

Detect root cause

Search events

Timestamp	Logical ID	Status	Detailed status	Status reason
2024-12-04 15:53:10 UTC+0530	DependentStack	DELETED_COMPLETE	-	-
2024-12-04 15:53:10 UTC+0530	WebServerSecurityGroup	DELETED_COMPLETE	-	-
2024-12-04 15:53:09 UTC+0530	WebServerSecurityGroup	DELETE_IN_PROGRESS	-	-
2024-12-04 15:53:08 UTC+0530	WebServerInstance	DELETED_COMPLETE	-	-
2024-12-04 15:52:24 UTC+0530	WebServerInstance	DELETE_IN_PROGRESS	-	-
2024-12-04 15:52:23 UTC+0530	DependentStack	DELETE_IN_PROGRESS	-	User Initiated
2024-12-04 15:52:15 UTC+0530	DependentStack	CREATE_COMPLETE	-	-
2024-12-04 15:52:14 UTC+0530	WebServerInstance	CREATE_COMPLETE	-	-

- Again, Make changes in the template and Add an SNS Topic resource to the template. Apply DependsOn to set an explicit dependency on the EC2 resource.

```
3 Resources:
4   SampleTopic:
5     Type: AWS::SNS::Topic
6     DependsOn: WebServerInstance
7
8   WebServerInstance:
9     Type: AWS::EC2::Instance
```

- Create a new stack and validate ordered resource creation. After that, Delete the stack and confirm ordered resource deletion.

ExampleStack ⚙️ >

Delete Update Stack actions ▼ Create stack ▼

Stack info Events - updated Resources Outputs Parameters Template Change sets Git sync

Table view Timeline view - new

Events (19) Detect root cause ⚙️

Timestamp	Logical ID	Status	Detailed status	Status reason
2024-12-04 16:02:50 UTC+0530	ExampleStack	✔️ DELETE_COMPLETE	-	-
2024-12-04 16:02:49 UTC+0530	WebServerSecurityGroup	✔️ DELETE_COMPLETE	-	-
2024-12-04 16:02:48 UTC+0530	WebServerSecurityGroup	🔄 DELETE_IN_PROGRESS	-	-
2024-12-04 16:02:48 UTC+0530	WebServerInstance	✔️ DELETE_COMPLETE	-	-
2024-12-04 16:02:20 UTC+0530	WebServerInstance	🔄 DELETE_IN_PROGRESS	-	-

- Concluded with CloudFormation's handling of resource dependencies.