

Learning Outcomes

- Using the CloudFormation CLI
- Observe the JSON structure used in CloudFormation
- Observe the process of stack creation in CloudFormation

How to do it

- Download the file *CF1.json* and *CF2.json* provided along with this DIY
- Open the AWS Console and navigate to the VPC section
- Note down the ID of the default VPC already created

| Name | VPC ID | State | IPv4 CIDR | IPv6 CIDR | DHCP options set | Main Route table |
|--------------|-----------|---------------|-----------|---------------|------------------|------------------|
| vpc-daa3c5a0 | available | 172.31.0.0/16 | - | dopt-7724270c | rtb-4d2ac733 | |

| Description | | CIDR Blocks | Flow Logs | Tags |
|------------------|---------------|-------------|-----------|-----------------------------------|
| VPC ID | vpc-daa3c5a0 | | | Tenancy: default |
| State | available | | | Default VPC: Yes |
| IPv4 CIDR | 172.31.0.0/16 | | | Classic Link: Disabled |
| IPv6 CIDR | - | | | DNS resolution: Enabled |
| Network ACL | acl-c817deb5 | | | DNS hostnames: Enabled |
| DHCP options set | dopt-7724270c | | | ClassicLink DNS Support: Disabled |
| Route table | rtb-4d2ac733 | | | Owner: 511948551519 |

- Navigate to the subnet section by clicking on “Subnets” on the left side.
- Note down the subnet ID of the default subnet already created for the default VPC

This file is meant for personal use by muratgguzel77@yahoo.com only.

Sharing or publishing the contents in part or full is liable for legal action.

The screenshot shows the AWS VPC Management Subnets page. On the left, there's a sidebar with various VPC-related options like Subnets, Route Tables, Internet Gateways, etc. The main area displays a table of subnets. One subnet, 'subnet-0ca9a503', is selected and shown in detail below the table.

| Name | Subnet ID | State | VPC | IPv4 CIDR | Available IPv4 | IPv6 CIDR | Availability Zone |
|-----------------|-----------|--------------|----------------|-----------|----------------|------------|-------------------|
| subnet-0ca9a503 | available | vpc-daa3c5a0 | 172.31.64.0/20 | 4091 | - | us-east-1f | |

Below the table, a detailed view of the selected subnet ('subnet-0ca9a503') is shown. The 'Description' tab is active, displaying the following information:

- Subnet ID: subnet-0ca9a503
- VPC: vpc-daa3c5a0
- Available IPv4 Addresses: 4091
- Availability Zone: us-east-1f (use1-az5)
- Network ACL: acl-c817deb5
- State: available
- IPv4 CIDR: 172.31.64.0/20
- IPv6 CIDR: -
- Route Table: rtb-4d2ac733
- Default subnet: Yes

- Click on “Create Subnet” at the top of the screen
- Fill in the form as shown below and click on Create

This file is meant for personal use by muratgguzel77@yahoo.com only.

Sharing or publishing the contents in part or full is liable for legal action.

The screenshot shows the AWS VPC Management console with the URL <https://console.aws.amazon.com/vpc/home?region=us-east-1#CreateSubnet:SubnetId=subnet-0ca9a503>. The page is titled "Create subnet". It displays a table of VPC CIDRs with one entry: "172.31.0.0/16" associated with the VPC "vpc-daa3c5a0". Below the table, there are fields for "Availability Zone" (set to "us-east-1f") and "IPv4 CIDR block" (set to "172.31.56.0/22"). At the bottom, there are "Cancel" and "Create" buttons.

| VPC CIDRs | CIDR | Status | Status Reason |
|-----------|---------------|------------|---------------|
| | 172.31.0.0/16 | associated | |

Make sure the IPv4 CIDR block is not being used by any subnet already created, and that the availability zone is a different one than that used by the default subnet.

- Note down the Subnet ID of the subnet just created.

| Name | Subnet ID | State | VPC | IPv4 CIDR | Available IPv4 | IPv6 CIDR | Availability Zone |
|-----------|--------------------------|-----------|--------------|----------------|----------------|-----------|-------------------|
| pb_subnet | subnet-078d3bce2843b1379 | available | vpc-daa3c5a0 | 172.31.56.0/22 | 1019 | - | us-east-1f |
| | subnet-0ca9a503 | available | vpc-daa3c5a0 | 172.31.64.0/20 | 4091 | - | us-east-1f |

- Open the CF1.json file in your preferred text editor
- Change the values marked below in lines 18,23 and 28, with the values of the default VPC ID, default subnet ID and the ID of the created subnet respectively
- Make the above changes in lines 18,23 and 28 for the file CF2.json as well after opening it in a text editor.

This file is meant for personal use by muratgguzel77@yahoo.com only.

Sharing or publishing the contents in part or full is liable for legal action.

```

1 {
2     "AWSTemplateFormatVersion": "2010-09-09",
3     "Description": "Web Servers, Target Groups and Application Load balancer",
4     "Parameters": {
5         "InstanceType": {
6             "Description": "WebServer EC2 instance type",
7             "Type": "String",
8             "Default": "t2.micro"
9         },
10        "InstanceAMI": {
11            "Description": "EC2 instance AMI",
12            "Type": "String",
13            "Default": "ami-0f9cf087c1f27d9b1"
14        },
15        "VPCId": {
16            "Description": "Default VPC Id",
17            "Type": "AWS::EC2::VPC::Id",
18            "Default": "vpc-daa3c5a0" Change this
19        },
20        "Subnets1": {
21            "Description": "VPC Subnet-1 Id",
22            "Type": "AWS::EC2::Subnet::Id",
23            "Default": "subnet-0ca9a503" Change this
24        },
25        "Subnets2": {
26            "Description": "VPC Subnet-2 Id",
27            "Type": "AWS::EC2::Subnet::Id",
28            "Default": "subnet-078d3bce2843b137" Change this
29    }
30 },
31 "Resources": {
32     "WebServerSecurityGroup": {
33         "Type": "AWS::EC2::SecurityGroup",
34         "Properties": {
35             "GroupDescription": "Enable HTTP ingress",
36             "VpcId": {
37                 "Ref": "VPCId"
38             },
39             "SecurityGroupIngress": [
40                 {
41                     "IpProtocol": "tcp",
42                     "FromPort": "80",
43                     "ToPort": "80",
44                     "CidrIp": "0.0.0.0/0"
45                 }
46             ]
47         }
48     },
49     "WebServerInstance1": {
50         "Type": "AWS::EC2::Instance",
51         "Properties": {
52             "InstanceType": {
53                 "Ref": "InstanceType"
54             },
55             "ImageId": {
56                 "Ref": "InstanceAMI"
57             }
58         }
59     }
60 }
61 
```

- Save and close the file
- Open your terminal (assuming AWS CLI is already installed and configured)
- Navigate to the folder where the JSONs file are stored
- Enter the following command and press Enter
`aws cloudformation create-stack --stack-name gltest-stack --template-body file://CF1.json`

Whoops! You get the following error

An error occurred (ValidationError) when calling the CreateStack operation: Template format error: Unresolved resource dependencies [NoSecGroup] in the Resources block of the template

Let's open the file and navigate to line 183. As you can see, the security group for the Load Balancer has been set to "NoSecGroup". However, there is no security group as such created in the JSON file. If you navigate to line 32, you will see that the name of the security group created is "WebServerSecurityGroup".

- Go back to the terminal and type the command
`aws cloudformation create-stack --stack-name gltest-stack --template-body file://CF2.json`

If you open this file and check, you can see that the security group for the load balancer has been correctly set.

- Go back to the AWS console and navigate to CloudFormation

The screenshot shows the AWS CloudFormation Stacks page. At the top, there are buttons for Create, Delete, Update, Stack actions, and a prominent orange Create stack button. Below this is a search bar labeled 'Filter by stack name' and a dropdown for 'Active'. A 'View nested' checkbox is also present. The main table lists one stack:

| Stack name | Status | Created time | Description |
|---------------|--------------------|------------------------------|--|
| gittest-stack | CREATE_IN_PROGRESS | 2019-09-28 15:50:07 UTC+0530 | Web Servers, Target Groups and Application Load balancer |

This file is meant for personal use by muratgguzel77@yahoo.com only.

Sharing or publishing the contents in part or full is liable for legal action.

Proprietary content. ©Great Learning. All Rights Reserved. Unauthorized use or distribution prohibited

- Click on the stack and follow the steps of its creation. Wait for a few minutes for stack

This file is meant for personal use by muratgguzel77@yahoo.com only.

Sharing or publishing the contents in part or full is liable for legal action.

creation to finish.

This file is meant for personal use by muratgguzel77@yahoo.com only.

Sharing or publishing the contents in part or full is liable for legal action.

Proprietary content. ©Great Learning. All Rights Reserved. Unauthorized use or distribution prohibited

The screenshot shows the AWS CloudFormation console with the URL console.aws.amazon.com/cloudformation/home?region=us-east-1#/stacks/stackinfo?filteringText=&filteringStatus=active&viewNested=.... The page displays the 'gltest-stack' details. The stack is currently in the 'CREATE_IN_PROGRESS' state, created on 2019-09-28 at 15:50:07 UTC+0530. The status reason is '-'.

| Stack ID | Description |
|---|--|
| arn:aws:cloudformation:us-east-1:511948551519:stack/gltest-stack/8baaa500-e1d9-11e9-b154-0a182a3cd028 | Web Servers, Target Groups and Application Load balancer |

Overview

| Status | Status reason |
|----------------------|---------------|
| ① CREATE_IN_PROGRESS | - |

| Root stack | Parent stack |
|------------|--------------|
| - | - |

| Created time | Deleted time |
|------------------------------|--------------|
| 2019-09-28 15:50:07 UTC+0530 | - |

| Updated time | - |
|--------------|---|
| - | - |

| Drift status | Last drift check time |
|---------------|-----------------------|
| ⊖ NOT_CHECKED | - |

| Termination protection | IAM role |
|------------------------|----------|
| Disabled | - |

This file is meant for personal use by muratgguzel77@yahoo.com only.

Sharing or publishing the contents in part or full is liable for legal action.

| Timestamp | Logical ID | Status | Status reason |
|------------------------------|-------------------------|--------------------|-----------------------------|
| 2019-09-28 15:50:19 UTC+0530 | WebServerInstance1 | CREATE_IN_PROGRESS | Resource creation Initiated |
| 2019-09-28 15:50:18 UTC+0530 | ApplicationLoadBalancer | CREATE_IN_PROGRESS | Resource creation Initiated |
| 2019-09-28 15:50:18 UTC+0530 | WebServerInstance1 | CREATE_IN_PROGRESS | - |
| 2019-09-28 15:50:17 UTC+0530 | ApplicationLoadBalancer | CREATE_IN_PROGRESS | - |
| 2019-09-28 15:50:16 UTC+0530 | WebServerSecurityGroup | CREATE_COMPLETE | - |
| 2019-09-28 15:50:15 UTC+0530 | WebServerSecurityGroup | CREATE_IN_PROGRESS | Resource creation Initiated |
| 2019-09-28 15:50:10 UTC+0530 | WebServerSecurityGroup | CREATE_IN_PROGRESS | - |

| | | | |
|------------------------|---|-----------------------|--|
| Stack ID | arn:aws:cloudformation:us-east-1:511948551519:stack/gltest-stack/8baaa500-e1d9-11e9-b154-0a182a3cd028 | Description | Web Servers, Target Groups and Application Load balancer |
| Status | CREATE_COMPLETE | Status reason | - |
| Root stack | - | Parent stack | - |
| Created time | 2019-09-28 15:50:07 UTC+0530 | Deleted time | - |
| Updated time | - | | |
| Drift status | NOT_CHECKED | Last drift check time | - |
| Termination protection | Disabled | IAM role | - |

- When stack creation is completed, navigate to the Outputs tab.

This file is meant for personal use by muratgguzel77@yahoo.com only.

Sharing or publishing the contents in part or full is liable for legal action.

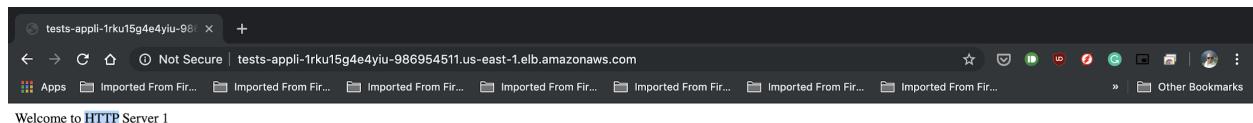
The screenshot shows the AWS CloudFormation console with the stack 'gltest-stack' selected. The 'Outputs' tab is active, showing a single output named 'URL' with the value 'http://gltes-appli-10BUJTJ6F4IO-16605831.us-east-1.elb.amazonaws.com'.

| Key | Value | Description | Export name |
|-----|---|-------------------|-------------|
| URL | http://gltes-appli-10BUJTJ6F4IO-16605831.us-east-1.elb.amazonaws.com | Load Balancer URL | - |

- Click on the URL value to confirm that Apache was installed and hence the load balancer was created successfully using the CloudFormation Template.

This file is meant for personal use by muratgguzel77@yahoo.com only.

Sharing or publishing the contents in part or full is liable for legal action.



- Navigate back to the CloudFormation console, select the stack and click on Delete to delete the stack.

This file is meant for personal use by muratgguzel77@yahoo.com only.

Sharing or publishing the contents in part or full is liable for legal action.

Proprietary content. ©Great Learning. All Rights Reserved. Unauthorized use or distribution prohibited

The screenshot shows the AWS CloudFormation console interface. On the left, there's a sidebar with navigation links: 'Stacks' (selected), 'Stack details', 'Drifts', 'StackSets', 'Exports', and 'Designer'. Below the sidebar are links for 'Previous console' and 'Feedback'. The main content area is titled 'CloudFormation > Stacks' and displays a table of stacks. The table has columns for 'Stack name', 'Status', 'Created time', and 'Description'. One stack is listed: 'gltest-stack' with status 'CREATE_COMPLETE', created on '2019-09-28 15:50:07 UTC+0530', and a description 'Web Servers, Target Groups an...'. At the top of the main area, there are buttons for 'Create stack', 'Delete', 'Update', 'Stack actions', and a dropdown for 'Active'. A search bar at the top says 'Filter by stack name'. The bottom of the page includes standard footer links: 'Feedback', 'English (US)', '© 2008 - 2019, Amazon Internet Services Private Ltd. or its affiliates. All rights reserved.', 'Privacy Policy', and 'Terms of Use'.

This file is meant for personal use by muratgguzel77@yahoo.com only.

Sharing or publishing the contents in part or full is liable for legal action.

Proprietary content. ©Great Learning. All Rights Reserved. Unauthorized use or distribution prohibited