

Swinburne University of Technology

COS20019 Cloud Computing Architecture

Module 10 Guided Lab - Automating Infrastructure Deployment with AWS CloudFormation

Saturday 28th October, 2023

Task 1: Deploying a networking layer

In the **AWS Management Console**, from the **Services** menu, choose **CloudFormation**.

Choose **Create stack** and configure these settings.

Step 1: Specify template

- **Template source:** Upload a template file
- **Upload a template file:** Click **Choose file** then select the **lab-network.yaml** file that you downloaded.
- Choose **Next**

The screenshot shows the AWS Management Console interface for the 'Specify template' step of creating a CloudFormation stack. The top navigation bar includes the AWS logo, 'Services' menu, search, and user information. The main content area is titled 'Specify template' and includes a description: 'A template is a JSON or YAML file that describes your stack's resources and properties.' Below this, the 'Template source' section has two options: 'Amazon S3 URL' (unselected) and 'Upload a template file' (selected). Under 'Upload a template file', there is a 'Choose file' button and a text input field containing 'lab-network.yaml'. Below the input field, it says 'JSON or YAML formatted file'. At the bottom of the form, an 'S3 URL' is displayed: 'https://s3.us-east-1.amazonaws.com/cf-templates-7epb66tb60cw-us-east-1/2023-10-28T142025.944Zdnl-lab-network.yaml', with a 'View in Designer' button below it. At the bottom right of the console, there are 'Cancel' and 'Next' buttons.

Step 2: Create Stack

- **Stack name:** lab-network
- Choose **Next**

The screenshot shows the AWS CloudFormation console interface. At the top, the navigation bar includes the AWS logo, 'Services', a search icon, and a user profile 'N. Virg'. The breadcrumb trail is 'CloudFormation > Stacks > Create stack'. On the left, a sidebar lists the steps: 'Step 1: Create stack', 'Step 2: Specify stack details' (which is the active step), 'Step 3: Configure stack options', and 'Step 4: Review lab-network'. The main content area is titled 'Specify stack details'. It contains two sections: 'Stack name' with a text input field containing 'lab-network' and a note that stack names can include letters, numbers, and dashes; and 'Parameters' which states 'No parameters' are defined in the template. At the bottom right, there are three buttons: 'Cancel', 'Previous', and 'Next'.

aws Services 🔍 ⓘ ⚙️ N. Virg ▼ voclabs/user2770782=104222099@student.swin.edu.au ▼

☰ CloudFormation > Stacks > Create stack

Step 1
[Create stack](#)

Step 2
Specify stack details

Step 3
Configure stack options

Step 4
Review lab-network

Specify stack details

Stack name

Stack name

lab-network

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.

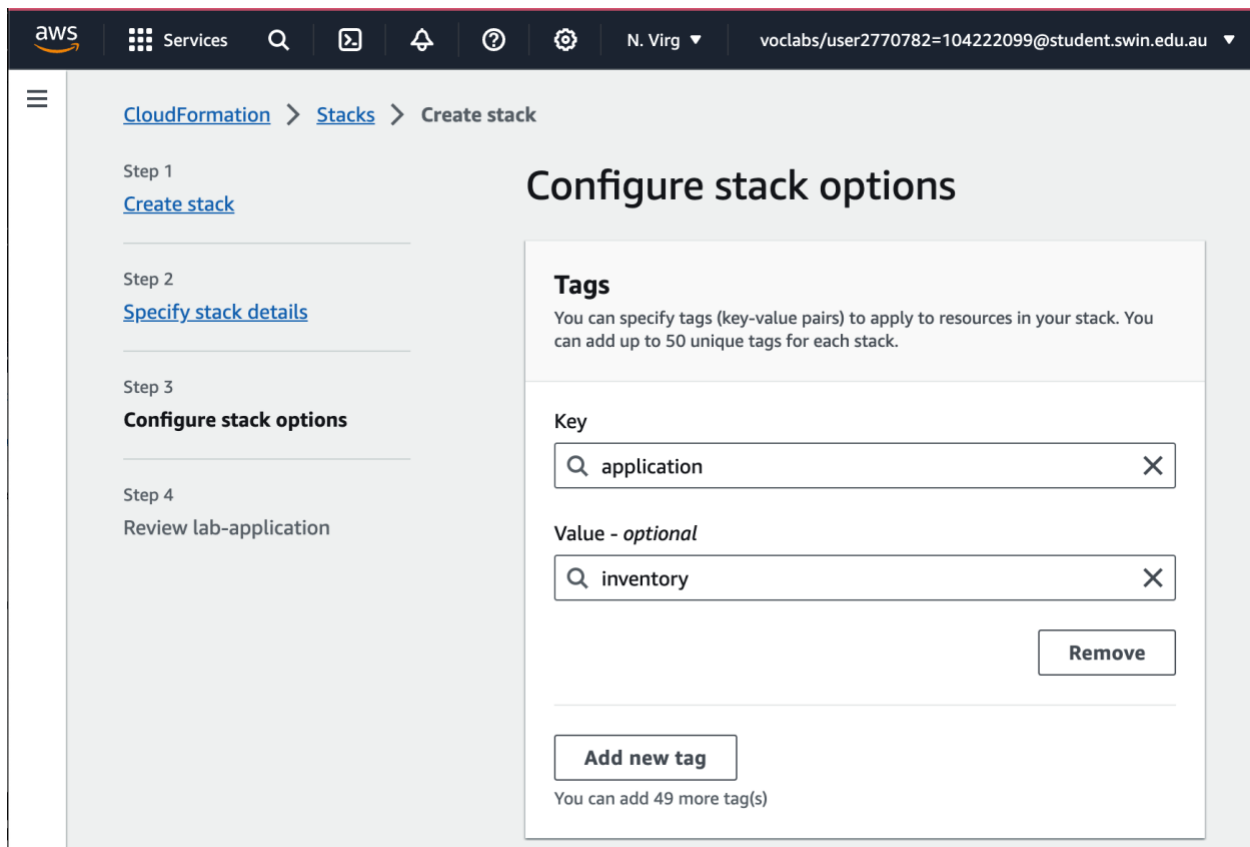
No parameters

There are no parameters defined in your template

Cancel Previous Next

Step 3: Configure stack options

- In the **Tags** section, enter these values.
 - **Key:** application
 - **Value:** inventory
- Choose **Next**



Step 4: Review lab-network

- Choose **Create stack**

Choose the **Stack info** tab.

Wait for the **Status** to change to **CREATE_COMPLETE**.

Choose the **Resources** tab.



Resources (8)



1



Logical ID ▲

Physical ID ▼

InternetGateway

[igw-082325a59af1d0fd4](#)

PublicRoute

rtb-0312a30248706ef19|0.0.0.0/0

PublicRouteTable

rtb-0312a30248706ef19

PublicSubnet

[subnet-0b49b6f728c131e3a](#) PublicSubnetNetworkAcl
Association

aclassoc-048762295c16aaa68

PublicSubnetRouteTable
Association

rtbassoc-06d2601d4ce288f35

Choose the **Events** tab and scroll through the events log.



Events (26)



Timestamp ▼

Logical ID

2023-10-28 21:24:36
UTC+0700

lab-application

2023-10-28 21:24:35
UTC+0700

PublicRoute

2023-10-28 21:24:35 UTC+0700

2023-10-28 21:24:34
UTC+0700

PublicRoute

2023-10-28 21:24:34
UTC+0700PublicSubnetNetworkAcl
Association2023-10-28 21:24:33
UTC+0700

PublicRoute

2023-10-28 21:24:32
UTC+0700

VPCGatewayAttachment

Choose the **Outputs** tab.

The screenshot shows the AWS CloudFormation console interface. At the top, the navigation bar includes the AWS logo, 'Services', a search icon, and a user profile 'N. Virg'. The breadcrumb trail indicates the current location: 'CloudFormation > Stacks > lab-application'. The main content area is divided into two sections. The top section, titled 'Stacks (2)', contains a search bar labeled 'Filter by stack name', a 'Filter status' dropdown set to 'Active', and a 'View nested' toggle switch. The bottom section, titled 'lab-application', displays the 'Outputs (2)' for the selected stack. This section includes a search bar labeled 'Search outputs' and a table with two output entries. The table has four columns: 'Key', 'Value', 'Description', and 'Export name'. The first entry is 'PublicSubnet' with a value of 'subnet-0b49b6f728c131e3a' and a description of 'The subnet ID to use for public web servers'. The second entry is 'VPC' with a value of 'vpc-0da9b8ca0544b1258' and a description of 'VPC ID'.

CloudFormation > Stacks > lab-application

Stacks (2)

Filter by stack name

Filter status: Active

View nested

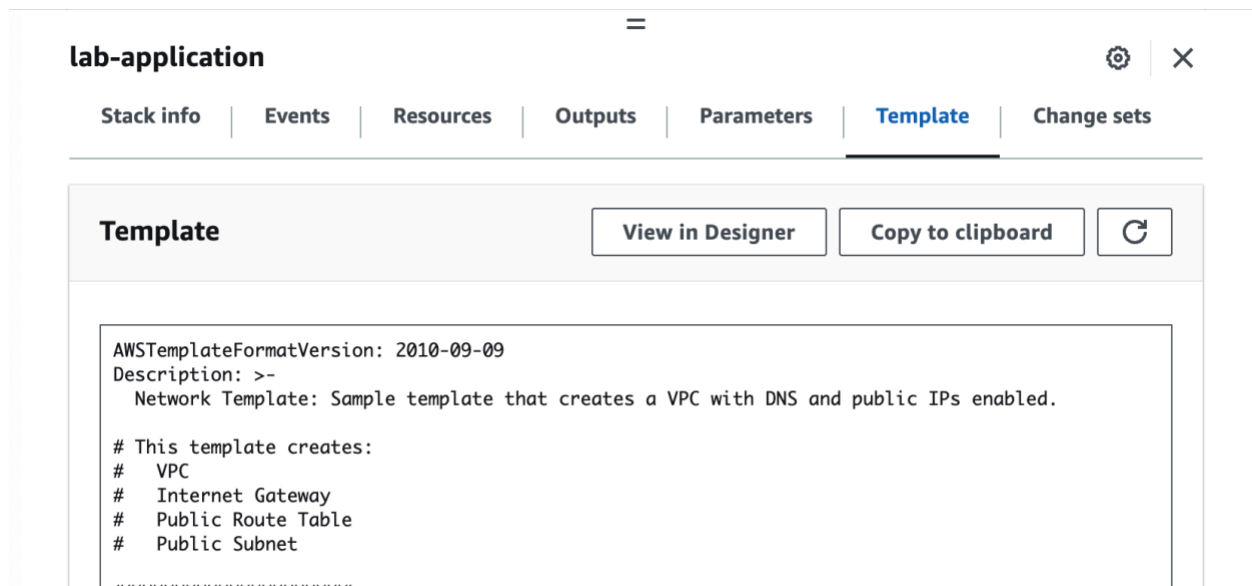
lab-application

Outputs (2)

Search outputs

Key	Value	Description	Export name
PublicSubnet	subnet-0b49b6f728c131e3a	The subnet ID to use for public web servers	lab-application-Subr
VPC	vpc-0da9b8ca0544b1258	VPC ID	lab-application-VPCI

Choose the **Template** tab.



Task 2: Deploying an application layer

In the left navigation pane, choose **Stacks**.

Select **Create stack > With new resources (standard)**, and then configure these settings.

Step 1: Specify template

- **Template source:** Upload a template file
- **Upload a template file:** Click **Choose file** then select the **lab-application.yaml** file that you downloaded.
- Choose **Next**

aws

Services

N. Virg

voclabs/user2770782=104222099@student.swin.edu.au

Specify template

A template is a JSON or YAML file that describes your stack's resources and properties.

Template source

Selecting a template generates an Amazon S3 URL where it will be stored.

☐ Amazon S3 URL

☒ Upload a template file

Upload a template file

lab-application.yaml

JSON or YAML formatted file

S3 URL: <https://s3.us-east-1.amazonaws.com/cf-templates-7epb66tb60cw-us-east-1/2023-10-28T143046.318Z14a-lab-application.yaml>

Cancel

Next

Step 2: Create Stack

- **Stack name:** lab-application
- **NetworkStackName:** lab-network
- Choose **Next**

aws

Services

N. Virg

voclabs/user2770782=104222099@student.swin.edu.au

Step 1
[Create stack](#)

Step 2
Specify stack details

Step 3
Configure stack options

Step 4
Review lab-application

Specify stack details

Stack name

Stack name

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.

AmazonLinuxAMIID

NetworkStackName

Name of an active CloudFormation stack that contains the networking resources, such as the VPC and subnet that will be used in this stack.

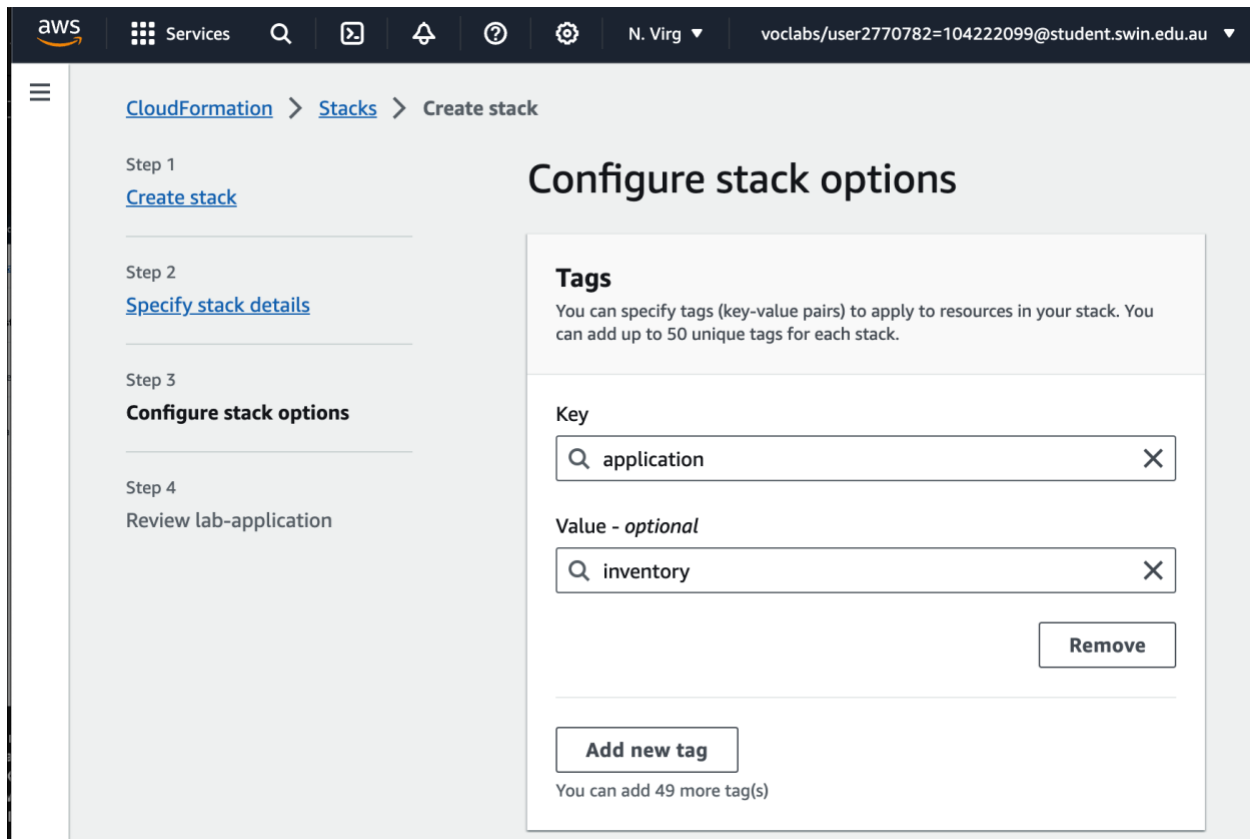
Cancel

Previous

Next

Step 3: Configure stack options

- In the **Tags** section, enter these values.
 - **Key:** application
 - **Value:** inventory
- Choose **Next**



Step 4: Review lab-application

- Choose **Create stack**

In the **Stack info** tab, wait for the **Status** to change to **CREATE_COMPLETE**.

Choose the **Outputs** tab.

lab-application



Delete

Update

Stack actions ▼

Create stack ▼



Events

Resources

Outputs



||

Outputs (1)



Search outputs



1



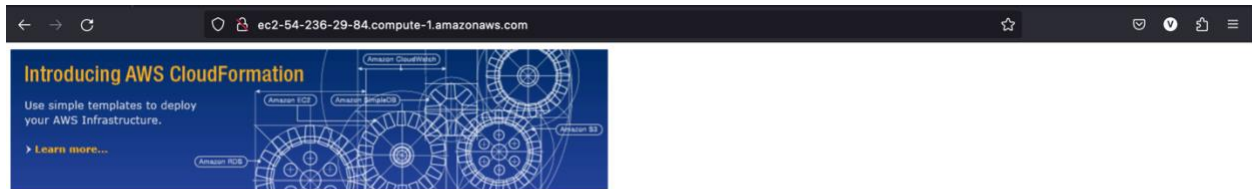
Key ▲

Value

URL

<http://ec2-54-236-29-84.compute-1.amazonaws.com>

Copy the **URL** that is displayed, open a new web browser tab, paste the URL, and press ENTER.



Congratulations, you have successfully launched the AWS CloudFormation sample.

Task 3: Updating a Stack

In the **AWS Management Console**, from the **Services** menu, choose **EC2**.

In the left navigation pane, choose **Security Groups**.

Select the check box for **lab-application-WebServerSecurityGroup....**

Choose the **Inbound** rules tab.

Security Groups (1/3) Info

Actions Export security groups to CSV Create security group

Filter security groups

	Name	Security group ID	Security group name	VPC ID
<input type="checkbox"/>	-	sg-06846a98dddc6f427	default	vpc-0c776eeef9c1c
<input type="checkbox"/>	-	sg-054da0c647b3eab88	default	vpc-0a901b326c02
<input checked="" type="checkbox"/>	Web Server Securit...	sg-0956068d497fae84c	lab-application-WebSe...	vpc-0a901b326c02

Inbound rules (1/1) Manage tags Edit inbound rules

Filter security group rules

	Name	Security group rule...	IP version	Type
<input checked="" type="checkbox"/>	-	sgr-0c673245925320...	IPv4	HTTP

From the **Services** menu, choose **CloudFormation**.

In the **Stacks** list of the **AWS CloudFormation console**, select **lab-application**.

Choose **Update** and configure these settings.

- Select **Replace current template**
- **Template source:** **Upload a template file**
- **Upload a template file:** Click **Choose file** then select the **lab-application2.yaml** file that you downloaded.

The screenshot shows the 'Specify template' dialog box in the AWS CloudFormation console. The dialog has a title bar with the AWS logo and navigation icons. The main content area is titled 'Specify template' and includes a description: 'A template is a JSON or YAML file that describes your stack's resources and properties.' Below this, the 'Template source' section has two options: 'Amazon S3 URL' (unselected) and 'Upload a template file' (selected). Under 'Upload a template file', there is a 'Choose file' button and a text input field containing 'lab-application2.yaml'. Below the input field, it says 'JSON or YAML formatted file'. At the bottom of the dialog, there is an 'S3 URL' field with a long URL and a 'View in Designer' button. The dialog is set against a background of the AWS console interface, showing the 'Stacks' list on the left and the 'lab-application' stack selected.

Specify template
A template is a JSON or YAML file that describes your stack's resources and properties.

Template source
Selecting a template generates an Amazon S3 URL where it will be stored.

☐ Amazon S3 URL

☒ Upload a template file

Upload a template file

lab-application2.yaml

JSON or YAML formatted file

S3 URL: `https://s3.us-east-1.amazonaws.com/cf-templates-7epb66tb60cw-us-east-1/2023-10-28T144816.662Zvez-lab-application2.yaml`

Choose **Next** in each of the next *three* screens to advance to the **Review lab-application** page.
Choose **Update stack**

In the **Stack info** tab, wait for the **Status** to change to **UPDATE_COMPLETE**.

The screenshot displays the AWS CloudFormation console. The left-hand navigation pane shows the 'Stacks' section with a list of three stacks: 'lab-application', 'lab-network', and 'c83328a1775283l5120113t1w79 9164413630'. The 'lab-application' stack is selected and highlighted. The main content area shows the details for the 'lab-application' stack, including buttons for 'Delete', 'Update', 'Stack actions', and 'Create stack'. Below these buttons are tabs for 'Stack info', 'Events', and 'Resources'. The 'Events' tab is active, displaying a list of 16 events. The events table has columns for 'Timestamp' and 'Logical ID'. The events listed are:

Timestamp	Logical ID
2023-10-28 21:49:20 UTC+0700	lab-application
2023-10-28 21:40:03 UTC+0700	lab-application
2023-10-28 21:40:02	DiskMountPoint

Return to the **Amazon EC2 console** and from the left navigation pane, choose **Security Groups**. In the **Security Groups** list, select **lab-application-WebServerSecurityGroup**. The **Inbound rules** tab should display an additional rule that allows *SSH* traffic over *TCP port 22*.

The screenshot displays the AWS Management Console interface for Security Groups. At the top, the navigation bar shows the AWS logo, 'Services' menu, search bar, and user information 'N. Virg' and 'voclabs/user2770782=104222099@student.swin.edu.au'.

The main content area is titled 'Security Groups (1/3) Info'. It includes a 'Create security group' button and a table of existing security groups.

	Name	Security group ID	Security group name	VPC ID
<input checked="" type="checkbox"/>	Web Server Securit...	sg-0956068d497fae84c	lab-application-WebSe...	vpc-0a901b326c02
<input type="checkbox"/>	-	sg-06846a98dddc6f427	default	vpc-0c776eeef9c1c
<input type="checkbox"/>	-	sg-054da0c647b3eab88	default	vpc-0a901b326c02

Below the security groups table, the 'Inbound rules (2)' section is visible. It includes a 'Manage tags' button and a table of inbound rules.

Rule name	IP version	Type	Protocol	Port range
sg-09f4e0	IPv4	SSH	TCP	22
sg-0320...	IPv4	HTTP	TCP	80

Task 4: Exploring templates with AWS CloudFormation Designer

From the **Services** menu, choose **CloudFormation**.

In the left navigation pane, choose **Designer**.

Choose the **File** menu, select **Open > Local file**, and select the **lab-application2.yaml** template that you downloaded previously.

aws Services 🔍 📄 🔔 ? ⚙️ N. Virg voclabs/user2770782=104222099@student.swin.edu.au

📄 ↶ ↷ ⬆️ ☑️ Close ⬇️ ? ↺

Resource types

- ▶️ ACMPCA
- ▶️ APS
- ▶️ AccessAnalyzer
- ▶️ AmazonMQ
- ▶️ Amplify
- ▶️ AmplifyUIBuilder
- ▶️ ApiGateway
- ▶️ ApiGatewayV2
- ▶️ AppConfig

File: 'lab-application2.yaml'

Choose template language: ☐ JSON ☒ YAML ?

```
1 AWSTemplateFormatVersion: 2010-09-09
2 Description: >-
3   Application Template: Demonstrates how to reference resources from a different stack.
4   This template provisions an EC2 instance in a VPC Subnet provisioned in a different stack.
5
6 # This template creates:
7 #   Amazon EC2 instance
8 #   Security Group
9
10 #####
```

Components Template

Experiment with the features of the Designer.

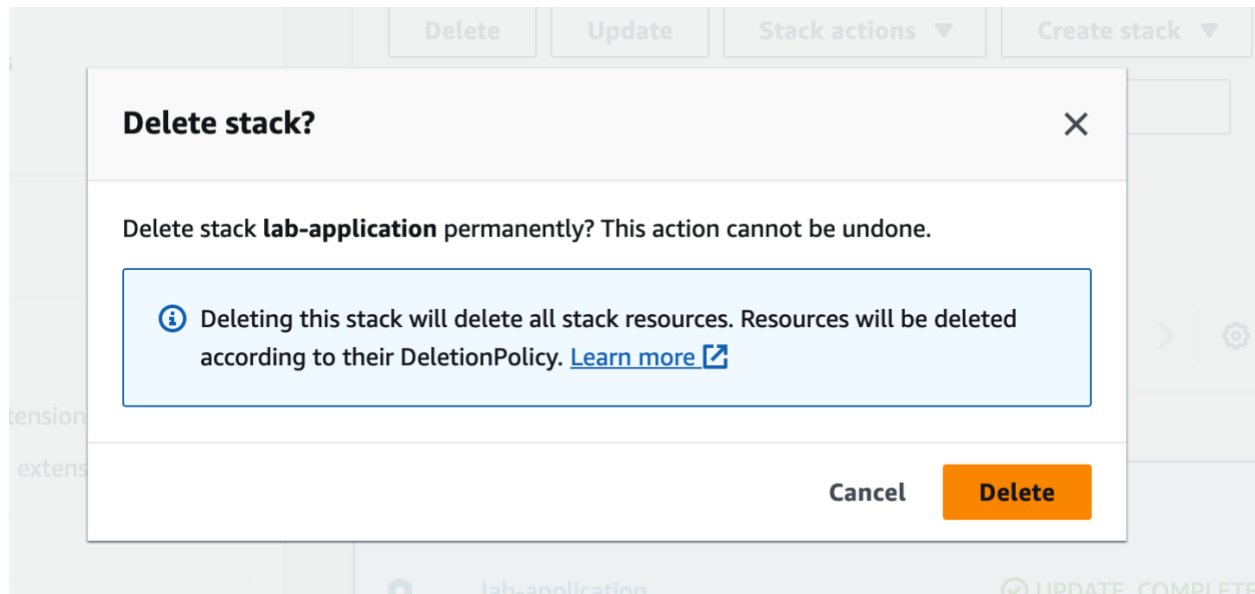
Task 5: Deleting the stack

Return to the main **AWS CloudFormation console** by choosing the Close link at the top of the Designer page (choose **Leave page** if prompted).

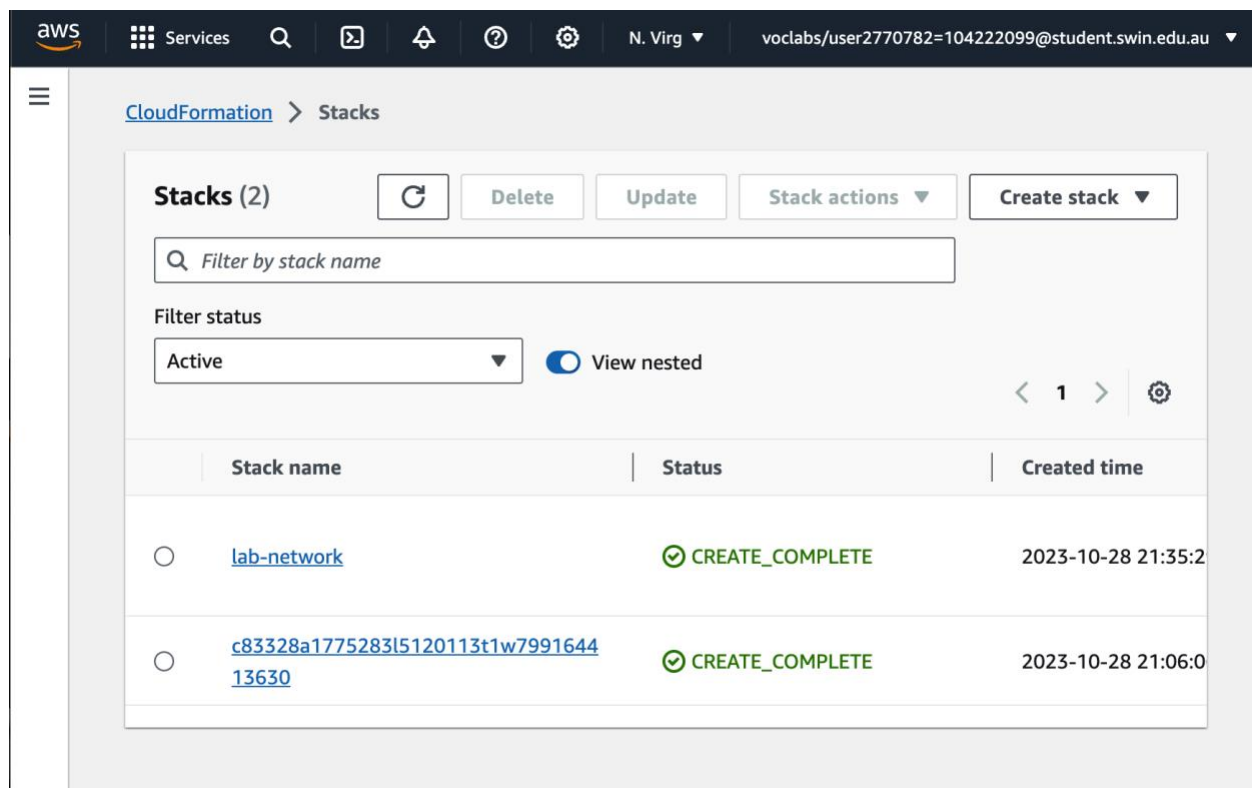
In the list of stacks, choose the **lab-application** link.

Choose **Delete**

Choose **Delete stack**



Wait for the stack to be deleted. It will disappear from the stacks list.



From the **Services** menu, choose **EC2**.

In the left navigation pane, choose **Snapshots**.

You should see a snapshot with a **Started** time in the last few minutes.

h

[Option+S]

N. Virginia

voclabs/user2770782=104222099@student.swin.edu.au @ 7991-6441...

Snapshots (1/1) Info

Owned by me

Search

Recycle Bin

Actions

Create snapshot

<

1

>

<input checked="" type="checkbox"/>	Name	Sna...	Volume size	De...	Storage tier	Snapshot status	Started	Progress
<input checked="" type="checkbox"/>	Web Data	snap-0...	100 GiB	-	Standard	Completed	2023/10/28 21:57 GMT+7	Available (10

Snapshot ID: snap-013c29fe484ceb07a (Web Data)

Details

Permissions

Storage tier

Tags

Snapshot ID snap-013c29fe484ceb07a (Web Data)	Volume size 100 GiB	Progress Available (100%)	Snapshot status Completed
Owner 799164413630	Volume ID vol-0f2667e85fc4ab390	Started Sat Oct 28 2023 21:57:07 GMT+0700 (Indochina Time)	Product codes -
Encryption Not encrypted	KMS key ID -	KMS key alias -	KMS key ARN -

Submit the lab.

ENDLAB.