

EC2 User Data

In this lab, we are creating an EC2 instance using AWS CloudFormation and automating the installation of the Tomcat8 server on it using user data. The process involves:

1. Creating a CloudFormation stack using a provided template.
2. Modifying the AMI ID in the template according to your region.
3. Uploading the template to CloudFormation and configuring the stack's parameters.
4. Waiting for the stack to be created and for the user data script to initialize on the instance.
5. Accessing the Tomcat8 web server via the URL provided in the CloudFormation stack's output section.
6. Deleting the stack after verifying that the web server is running.

The end goal is to demonstrate how to use CloudFormation to automate the setup and configuration of an EC2 instance, including the installation of software via user data scripts.

To begin with the Lab

1. In this lab, we will create a stack in cloud formation using a template to install some user data onto our instance directly.
2. Below you can see the code lines that we will use in our template. You can see that we are using a bash script to install the tomcat8 server onto our instance.
3. Also, you can get this template from GitHub, download the zip file, and open the template to check out the YAML code written in it.
4. Just remember in your template you need to change the AMI ID with respect to your region.

```
MyVMIInstance:  
  Type: AWS::EC2::Instance  
  Properties:  
    ImageId: ami-0e97ea97a2f374e3d  
    InstanceType: !Ref InstanceType  
    KeyName: !Ref KeyName  
    AvailabilityZone: !Ref AvailabilityZone  
    SecurityGroups:  
      - !Ref MySecurityGroup  
  UserData:  
    Fn::Base64: |  
      #!/bin/bash  
      sudo yum update  
      sudo yum -y erase java-1.7.0-openjdk.x86_64  
      sudo yum -y install java-1.8.0-openjdk.x86_64  
      sudo yum -y install java-1.8.0-openjdk-devel  
      sudo yum -y install tomcat8  
      service tomcat8 start  
      mkdir /usr/share/tomcat8/webapps/ROOT  
      touch /usr/share/tomcat8/webapps/ROOT/index.html  
      echo "Cloud Formation Tomcat8" > /usr/share/tomcat8/webapps/ROOT/index.html
```

- Once you are done then go to AWS Console open cloud formation and click on Create Stack.

The screenshot shows the AWS CloudFormation Stacks page. At the top, there's a navigation bar with 'CloudFormation > Stacks'. Below it is a table header with columns: 'Stack name', 'Status', 'Created time', and 'Description'. A message 'No stacks' is displayed above the table, followed by 'No stacks to display'. At the bottom of the page is a large orange 'Create stack' button.

- Then you need to choose the same option as shown below and upload your template.

The screenshot shows the 'Create stack' wizard. Step 1: 'Prerequisite - Prepare template'. It shows three options: 'Choose an existing template' (selected), 'Use a sample template', and 'Build from Application Composer'. Step 2: 'Specify template'. It shows three options: 'Amazon S3 URL', 'Upload a template file' (selected), and 'Sync from Git - new'.

- After that you need to give a name to your stack then in the parameters choose the details for your instance.
- Then just move to the review page and create your stack.

Specify stack details

Provide a stack name

Stack name
Stack-EC2-UserData

Stack name must be 1 to 128 characters, start with a letter, and only contain alphanumeric characters. Character count: 18/128.

Parameters

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

EC2 Instance Configuration

InstanceType
Select the ec2 instance type
t2.micro

Be aware that once keyname is selected we cannot change it unless instance replaced
Key name to SSH to VM's.
CFKeyPair

AvailabilityZone
select the availability zone
ap-southeast-1a

Environment Configuration

Which environment we are planning to create this instance?
Select the environment
dev

9. Here you can see that our stack has been created successfully.

CloudFormation > Stacks > Stack-EC2-UserData					
<input type="button" value="Stacks"/> <input type="button" value="Delete"/> <input type="button" value="Update"/> <input type="button" value="Stack actions ▾"/> <input type="button" value="Create stack ▾"/>					
<input type="button" value="Stack info"/> <input style="background-color: #e0f2e0; border: 1px solid #4CAF50; color: inherit; padding: 2px 10px; font-weight: bold; border-radius: 5px; text-decoration: none; margin-right: 10px;" type="button" value="Events"/> <input type="button" value="Resources"/> <input type="button" value="Outputs"/> <input type="button" value="Parameters"/> <input type="button" value="Template"/> <input type="button" value="Change sets"/> <input type="button" value="Git sync - new"/>					
Events (10)					
Timestamp	Logical ID	Status	Detailed status	Status reason	
2024-07-22 13:52:39 UTC+0530	Stack-EC2-UserData	CREATE_COMPLETE	-	-	
2024-07-22 13:52:37 UTC+0530	MyVMIstance	CREATE_COMPLETE	-	-	
2024-07-22 13:52:17 UTC+0530	Stack-EC2-UserData	CREATE_IN_PROGRESS	CONFIGURATION_COMPLETE	Eventual consistency check initiated	
2024-07-22 13:52:17 UTC+0530	MyVMIstance	CREATE_IN_PROGRESS	CONFIGURATION_COMPLETE	Eventual consistency check initiated	
2024-07-22 13:52:06 UTC+0530	MyVMIstance	CREATE_IN_PROGRESS	-	Resource creation Initiated	
2024-07-22 13:52:04 UTC+0530	MyVMIstance	CREATE_IN_PROGRESS	-	-	
2024-07-22 13:52:04 UTC+0530	MySecurityGroup	CREATE_COMPLETE	-	-	
2024-07-22 13:52:03 UTC+0530	MySecurityGroup	CREATE_IN_PROGRESS	-	Resource creation Initiated	
2024-07-22 13:52:00 UTC+0530	MySecurityGroup	CREATE_IN_PROGRESS	-	-	
2024-07-22 13:51:58 UTC+0530	Stack-EC2-UserData	CREATE_IN_PROGRESS	-	User Initiated	

10. Then in the output section you will find a URL that will take you directly to the web server that we initiated with the user data.

CloudFormation > Stacks > Stack-EC2-UserData					
<input type="button" value="Stacks"/> <input type="button" value="Delete"/> <input type="button" value="Update"/> <input type="button" value="Stack actions ▾"/> <input type="button" value="Create stack ▾"/>					
<input type="button" value="Stack info"/> <input type="button" value="Events"/> <input type="button" value="Resources"/> <input style="background-color: #e0f2e0; border: 1px solid #4CAF50; color: inherit; padding: 2px 10px; font-weight: bold; border-radius: 5px; text-decoration: none; margin-right: 10px;" type="button" value="Outputs"/> <input type="button" value="Parameters"/> <input type="button" value="Template"/> <input type="button" value="Change sets"/> <input type="button" value="Git sync - new"/>					
Outputs (1)					
Key	Value	Description	Export name		
AppURL	http://ec2-13-215-158-183.ap-southeast-1.compute.amazonaws.com:8080/index.html	Tomcat App Access URL	-		

11. Also, you need to wait for at least 5 minutes until your user data gets initialized on your instance after the launch.

12. Then you need to copy this URL and paste it into a new tab, and you will see the web page.
13. Once you are done then just delete your stack.