kura labs

COHORT 3

Deployment #4

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Overview

This exercise demonstrated the steps for using Terraform as part of the deployment. It further extends the Pipeline from Deployment #3.

Steps

Jenkins Server setup

Existing Jenkins server from previous deployments was used

Install Terraform on Jenkins Server

Terraform was installed on the Jenkins server.

Configure credentials on Jenkins

AWS credentials were configured on Jenkins server

Create a Pipeline build in Jenkins

Pipeline build was created and run to test integration of Jenkins and Terraform. (see oldTerraform folder in repository)

This test infrastructure was created with an EC2 instance running the "url_shortener" application on "gunicorn". (see Old Pipeline diagram)

Add "Destroy" stage

A destroy stage was included in the Jenkins file to remove the infrastructure that was originally created.

Create a new VPC and add Deployment 3

The intTerraform files were modified to create a new VPC and deploy the repository for Deployment 3 onto this infrastructure. (see New Pipeline diagram)

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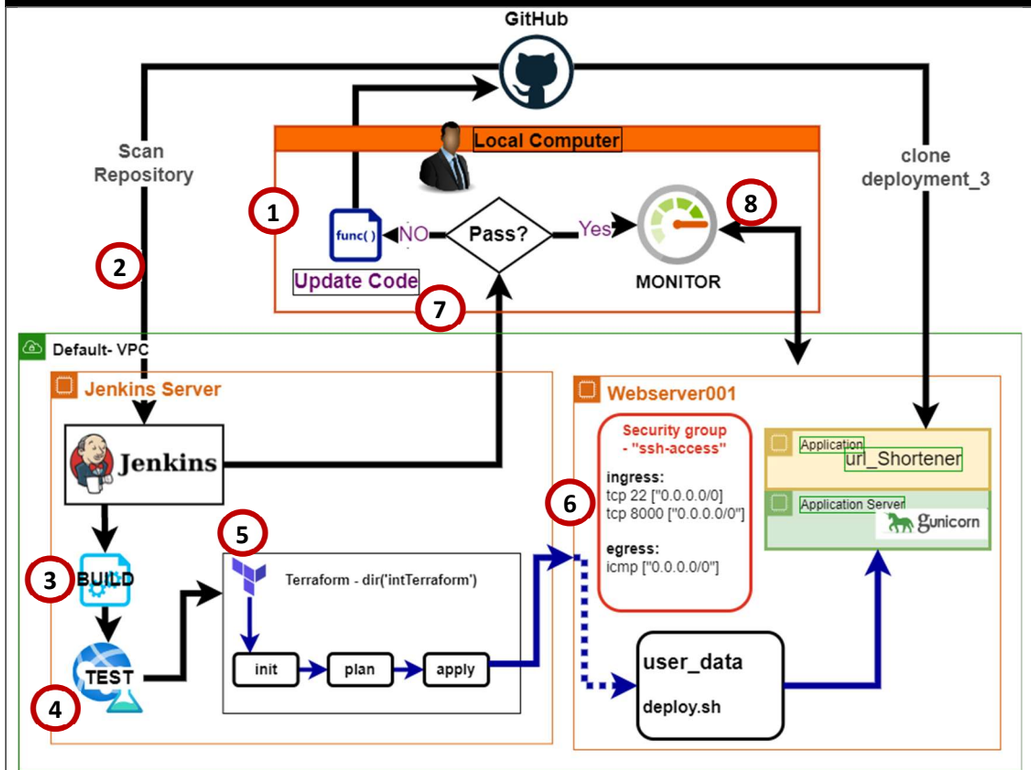
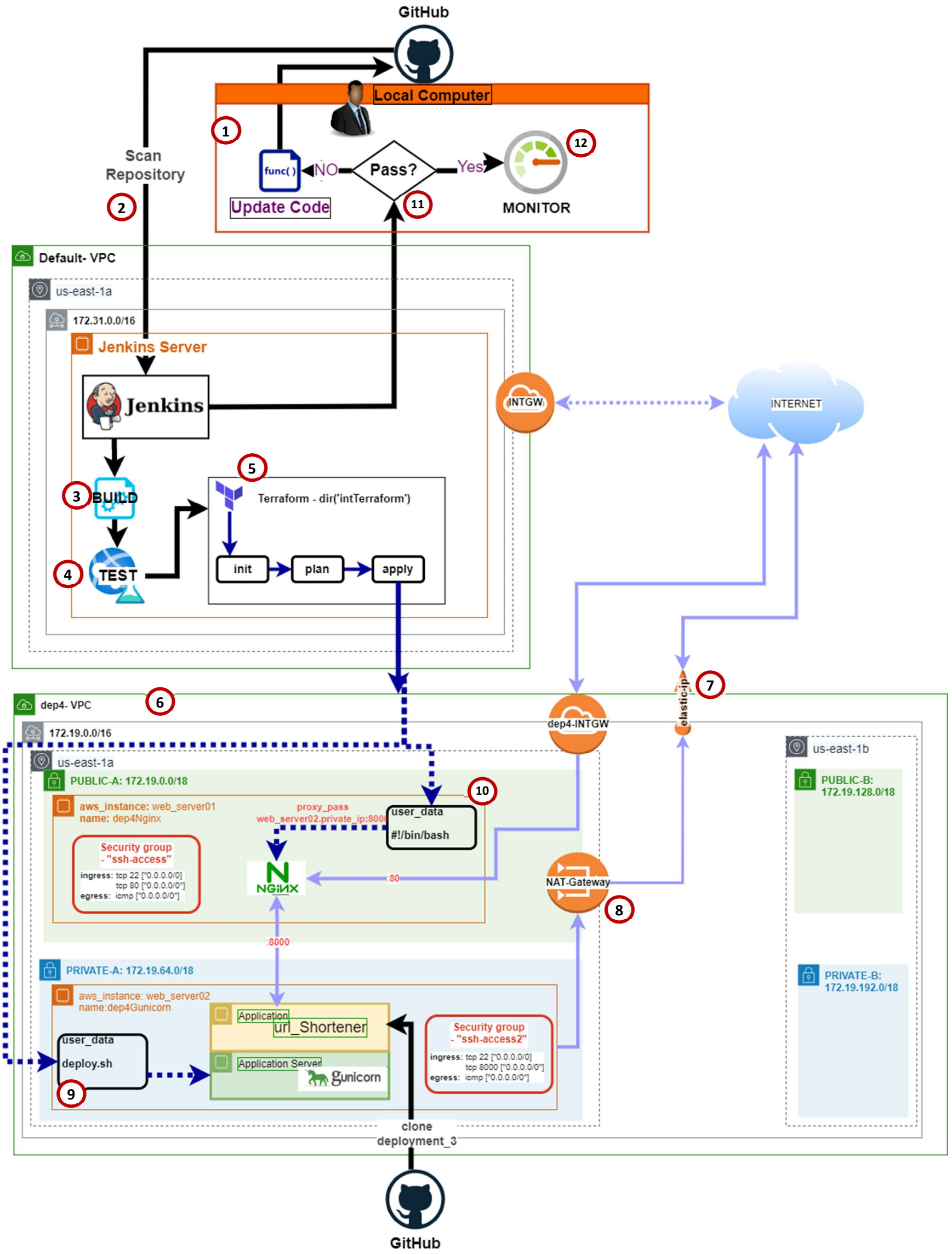
Old Pipeline

DIAGRAM	STEP	DESCRIPTION
	1	The code is update by the developer and the changes are committed and pushed to GitHub
	2	The Jenkins server scans the repository and retrieves the files
	3	The Jenkins server builds the application. If the build passes, we progress to step **4**. If it fails, we move to step **7**.
	4	The Jenkins server tests the application. If the test passes, we progress to step 5. If it fails, we move to step **7**.
	5	The Jenkins server runs the Terraform init, plan and apply steps. We move to step **6**.
	6	The EC2 instance is deployed in the default VPC and the delploy.sh file is passed via “user_data” to: 1. install dependencies. 2. Clone the target repository 3. Install and launch the application server. We move to step **7**.
	7	If all stages are passed, then we proceed to step 8. If there are errors the error logs and reports are reviewed to identify and isolate the issue. Any code related issued including errors in the Jenkins file are corrected and the updates committed and pushed to GitHub i.e. we proceed to step 1.
	8	The deployed application is monitored

New Pipeline

The deployment environment used two Amazon Virtual Private Clouds (Amazon VPCs): The default VPC created with the AWS account and a custom VPC called “dep4-VPC”. The custom VPC consists of four subnets (2 public and 2 private) split across two availability zones. An EC2 was deployed as the application server in one private subnet. Another EC2 was deployed in a public subnet to run a proxy server.



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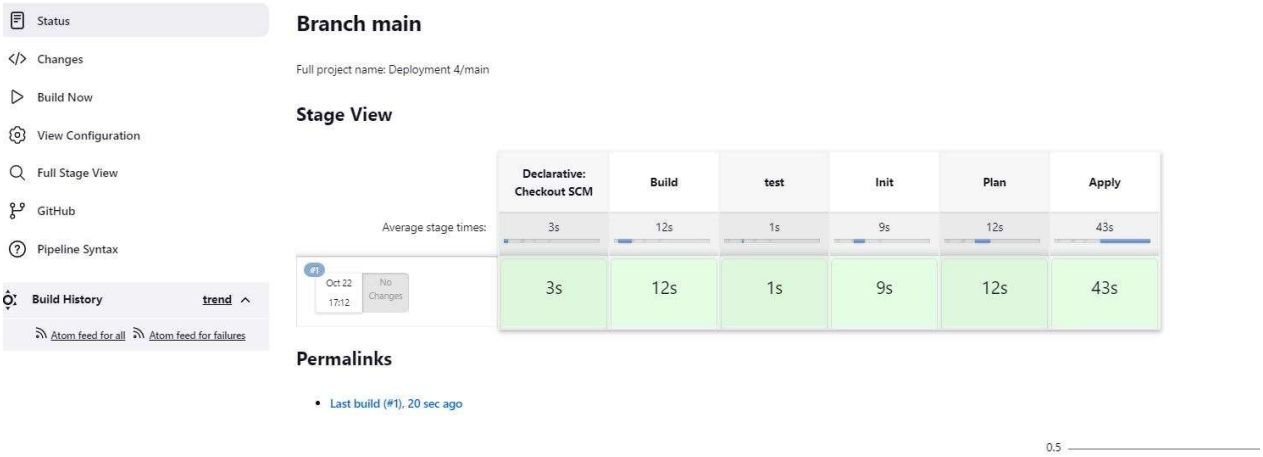
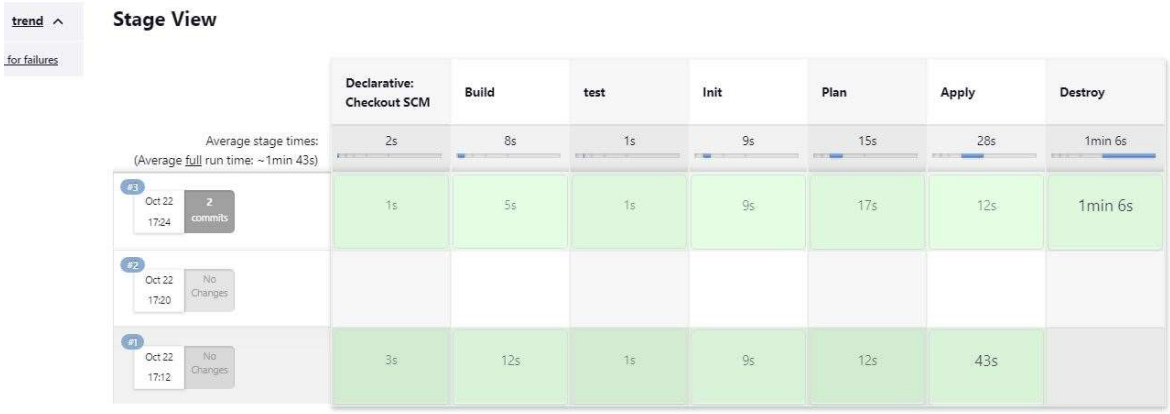
STEP	DESCRIPTION
1	The code is update by the developer and the changes are committed and pushed to GitHub
2	The Jenkins server scans the repository and retrieves the files
3	The Jenkins server builds the application. If the build passes, we progress to step **4**. If it fails, we move to step **7**.
4	The Jenkins server tests the application. If the test passes, we progress to step 5. If it fails, we move to step **7**.
5	The Jenkins server runs the Terraform init, plan and apply steps. We move to step **6**.
6	The VPC named dep4-VPC is created. This VPC consists of: 1. 2 availability zones a. us-east-1a b. us-east-1b 2. Four subnets a. PUBLIC-A:172.19.0.0/18 b. PRIVATE-A:172.19.64.0/18 c. PUBLIC-B:172.19.128.0/18 d. PRIVATE-B:172.19.192.0/18 3. Internet Gateway 4. Private route table 5. Public route table 6. 2 Security groups a. For public web server : ssh-access allowing tcp 22 and 80 b. For private application server: ssh-access2 allowing tcp 22 and 8000
7	An elastic ip address is created
8	The NAT gateway is created and the elastic ip is associated to it

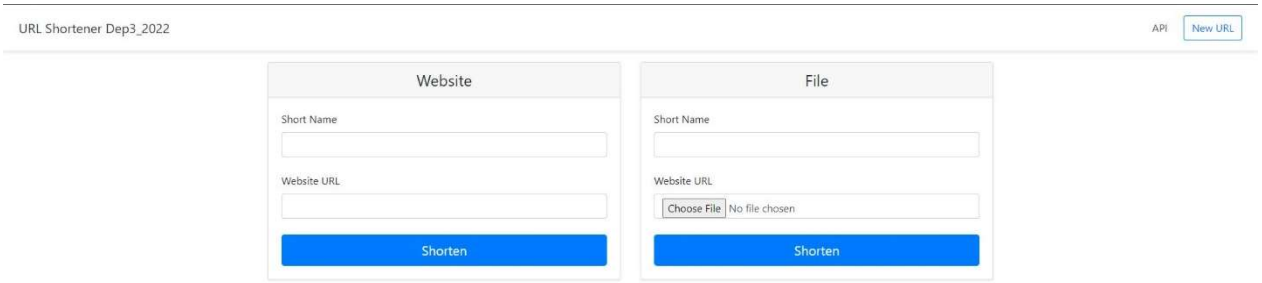
<table>
<tr><th>STEP</th><th>DESCRIPTION</th></tr>
<tr><td>9</td><td>The EC2 designated to be the application server is created in subnet PRIVATE-A after the NAT gateway is fully provisioned. This is necessary for the EC2 to be able to access the internet and install all the dependencies when it is created.
This is enforced by including the following line in the terraform file (see line 16 in instances.tf):
<pre> depends_on = [aws_nat_gateway.nat_gateway_prob]</pre>The deploy.sh referenced in the user_data field (see line 10 in instances.tf) installs the required dependencies, clones the repository and launches the web application and associates with the default tcp port 8000
<pre> user_data = "${file("deploy.sh")}"</pre></td></tr>
<tr><td>10</td><td>The EC2 designated to be the proxy server is created in subnet PUBLIC-A after the application server has it’s private ip assigned. This is necessary for the proxy EC2 to be configured to point to the application server.
This is enforced by including the following line in the terraform file (see line 52 in instances.tf):
<pre> depends_on = [aws_instance.web_server02]</pre>Bash commands are passed via user_data to:
1. install the required dependencies (see line 29 to 39 in instances.tf)
2. install nginx (see line 38 in instances.tf)
3. configure the “/etc/nginx/sites-enabled/default” file so that the nginx server acts as a reverse proxy that points to the application server’s private ip address (see line 40 to 42 in instances.tf)
<pre>sed -i "s/# First attempt to serve request as file, then/proxy_pass http:\/\/${aws_instance.web_server02.private_ip}:8000;/" /etc/nginx/sites-enabled/default</pre>This variable passes the private ip address of the application server into the script
4. restart the nginx server</td></tr>
<tr><td>11</td><td>If all stages are passed, then we proceed to step 12.
If there are errors the error logs and reports are reviewed to identify and isolate the issue. Any code related issued including errors in the Jenkins file are corrected and the updates committed and pushed to GitHub i.e. we proceed to step 1.</td></tr>
<tr><td>12</td><td>The deployed application is monitored</td></tr>
</table>

Screen Capture

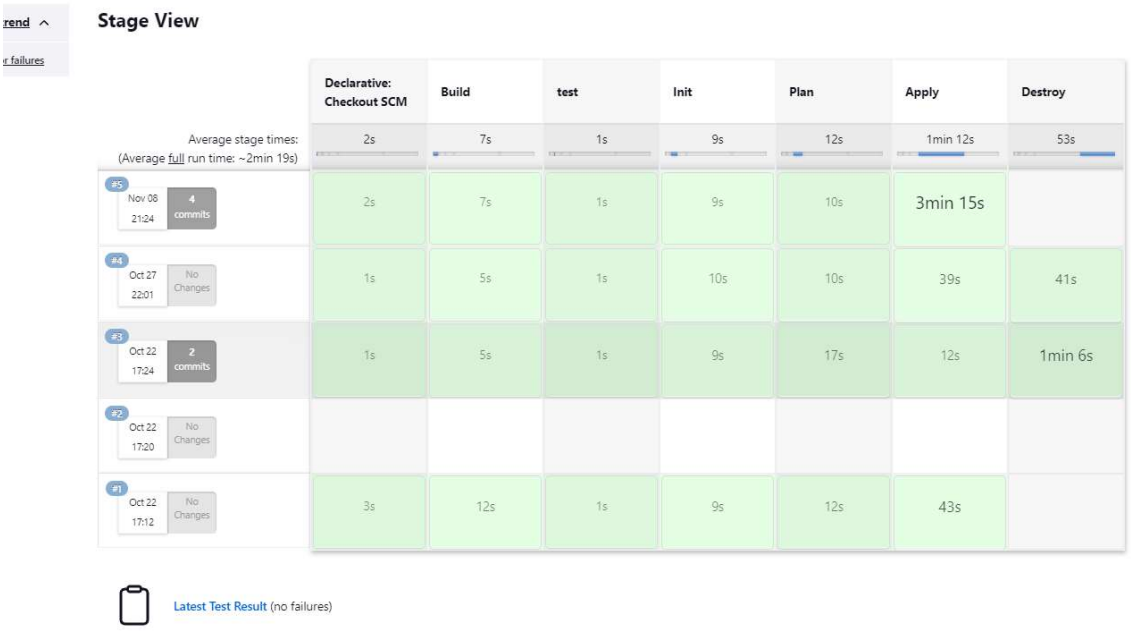
Old Pipeline

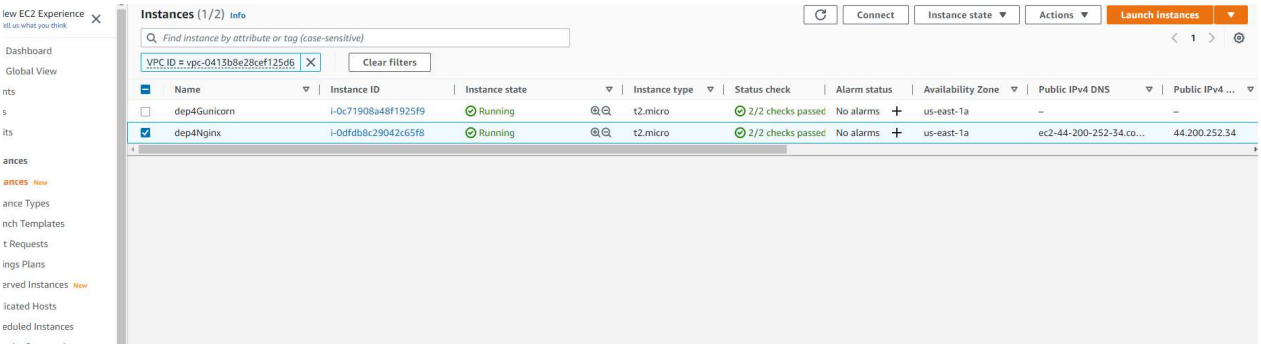


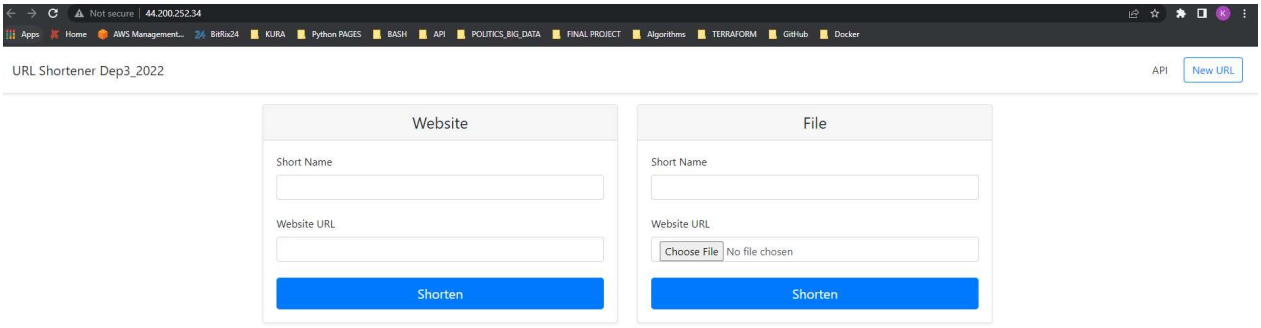


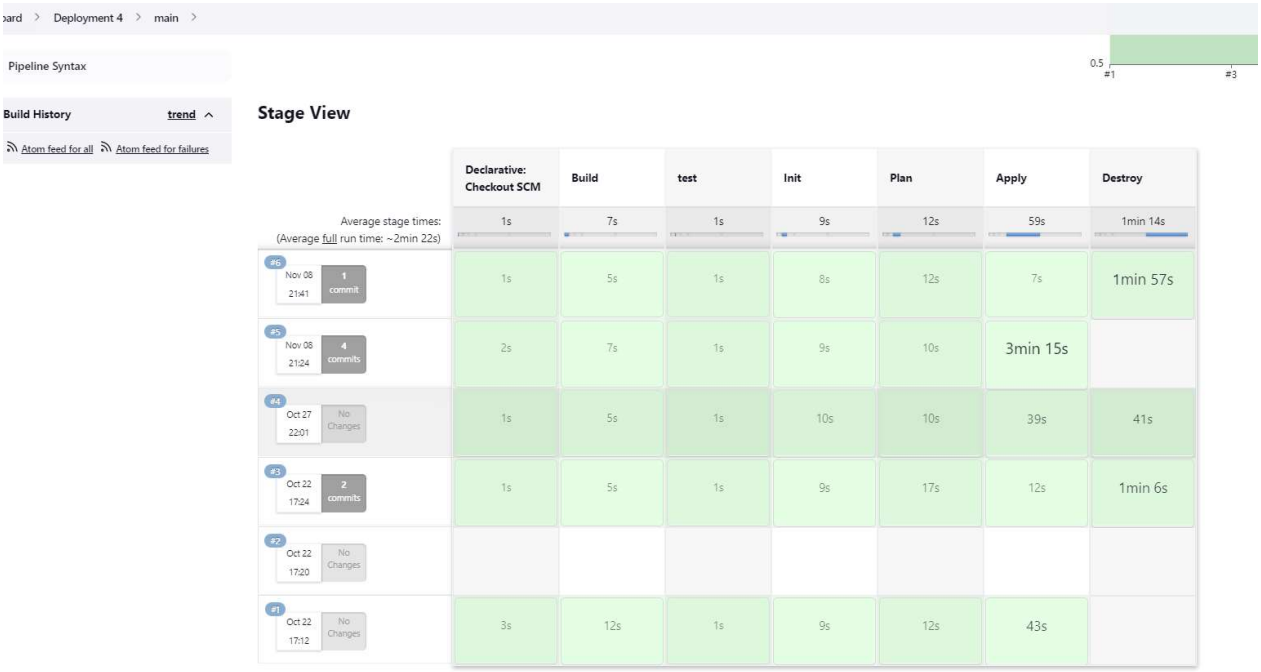


New Pipeline








ard > Deployment 4 > main >
Pipeline Syntax
Build History trend
Atom feed for all Atom feed for failures
0.5
#1
#3
Stage View
Declarative: Checkout SCM
Build
test
Init
Plan
Apply
Destroy
Average stage times:
(Average full run time: ~2min 22s)
1s 7s 1s 9s 12s 59s 1min 14s
#6 Nov 08 21:41 1 commit
1s 5s 1s 8s 12s 7s 1min 57s
#5 Nov 08 21:24 4 commits
2s 7s 1s 9s 10s 3min 15s
#4 Oct 27 22:01 No Changes
1s 5s 1s 10s 10s 39s 41s
#3 Oct 22 17:24 2 commits
1s 5s 1s 9s 17s 12s 1min 6s
#2 Oct 22 17:20 No Changes
#1 Oct 22 17:12 No Changes
3s 12s 1s 9s 12s 43s