

DevOps Project

Objective: You have been Hired Sr. Devops Engineer in Abode Software. They want to implement Devops Lifecycle in their company. You have been asked to implement this lifecycle as fast as possible. Abode Software is a product-based company, their product is available on this GitHub link.

<https://github.com/hshar/website.git>

Following are the specifications of the lifecycle:

1. Git Workflow has to be implemented

2. Code Build should automatically be triggered once commit is made to master branch or develop branch.

If commit is made to master branch, test and push to prod

If commit is made to develop branch, just test the product, do not push to prod

3. The Code should be containerized with the help of a Dockerfile. The Dockerfile should be built every time there is a push to Git-Hub. Use the following pre-built container for your application: hshar/webapp The code should reside in '/var/www/html'

4. Once the website is built, you have to design a test-case, which will basically check if the website can be opened or not. If yes, the test should pass. This test has to run in headless mode, on the test server.

5. The above tasks should be defined in a Jenkins Pipeline, with the following Job

1 - Building Website Job

2 - Testing Website Job

3 - Push to Production

6. Since you are setting up the server for the first time, ensure the following file exists on both Test and Prod server in /home/ubuntu/config-management/status.txt. This file will be used by a third-party tool. This should basically have the info whether apache is installed on the system or not. The content of this file, should be based on whether git is installed or not.

If apache is installed => Apache is Installed on this System"

If apache is not installed => "Apache is not installed on this System"

7. Create a Monitoring Service for the website on the Production server

Architectural Advice:

Create 3 servers on AWS "t2.micro"

Server1 - should have Jenkins Master, Puppet Master and Nagios Installed

Server 2 - Testing Server, Jenkins Slave

Server 3 - Prod Server, Jenkins Slave

Creation of servers in AWS for master, test and production environment

The screenshot shows the AWS EC2 Instances page. On the left, there's a sidebar with options like EC2 Dashboard, Instances, and Images. The main area displays a table of instances:

	Name	Instance ID	Instance Type	Availability Zone	Instance State	Status Checks	Alarm Status	Public DNS (IPv4)
	master	i-03a599252f61c98e9	t2.micro	us-east-2b	running	2/2 checks ...	None	ec2-3-134-247-103.us-e...
	test	i-0659fbbae2b6183f61	t2.micro	us-east-2b	running	2/2 checks ...	None	ec2-3-19-59-97.us-east-...
	production	i-09f282a79c8930518	t2.micro	us-east-2b	stopped		None	ec2-3-19-59-97.us-east-...

Below the table, details for instance 'test' are shown:

Description	Value
Instance ID	i-0659fbbae2b6183f61
Instance state	running
Instance type	t2.micro
Finding	Opt-in to AWS Compute Optimizer for recommendations. Learn more
Private DNS	ip-172-31-20-24.us-east-2.compute.internal
Private IPs	172.31.20.24
Public DNS (IPv4)	ec2-3-19-59-97.us-east-2.compute.amazonaws.com
IPv4 Public IP	3.19.59.97
IPv6 IPs	-
Elastic IPs	-
Availability zone	us-east-2b
Security groups	all ports open, view inbound rules, view outbound rules

The status bar at the bottom indicates 'Running virus scan...'.

Master server

The screenshot shows a terminal window on a Windows 10 desktop. The command 'java -version' is run, displaying the following output:

```
ubuntu@ip-172-31-24-202:~$ java -version
openjdk version "1.8.0_252"
OpenJDK Runtime Environment (build 1.8.0_252-8u252-b09-1~18.04-b09)
OpenJDK 64-Bit Server VM (build 25.252-b09, mixed mode)
ubuntu@ip-172-31-24-202:~$
```

The terminal window is part of a larger AWS EC2 instance view. The sidebar on the left shows 'Capacity Reservations' and 'Images'. The main area shows the same instance table and details as the first screenshot, including the 'test' instance. The status bar at the bottom indicates 'Running virus scan...'.

Testing server

```
ubuntu@ip-172-31-20-24: ~jenkins/test
Using username "ubuntu".
Authenticating with public key "imported-openssh-key"
Welcome to Ubuntu 18.04.4 LTS (GNU/Linux 5.3.0-1023-aws x86_64)

 * Documentation: https://help.ubuntu.com
 * Management: https://landscape.canonical.com
 * Support: https://ubuntu.com/advantage

 System information as of Sat Aug 1 08:56:21 UTC 2020

 System load: 0.02      Processes: 128
 Usage of /: 48.7% of 7.69GB  Users logged in: 1
 Memory usage: 40%          IP address for eth0: 172.31.20.24
 Swap usage: 0%            IP address for docker0: 172.17.0.1

 * Are you ready for Kubernetes 1.19? It's nearly here! Try RC3 with
   sudo snap install microk8s --channel=1.19/candidate --classic

   https://www.microk8s.io/ has docs and details.

 * Canonical Livepatch is available for installation.
 - Reduce system reboots and improve kernel security. Activate at:
   https://ubuntu.com/livepatch
```

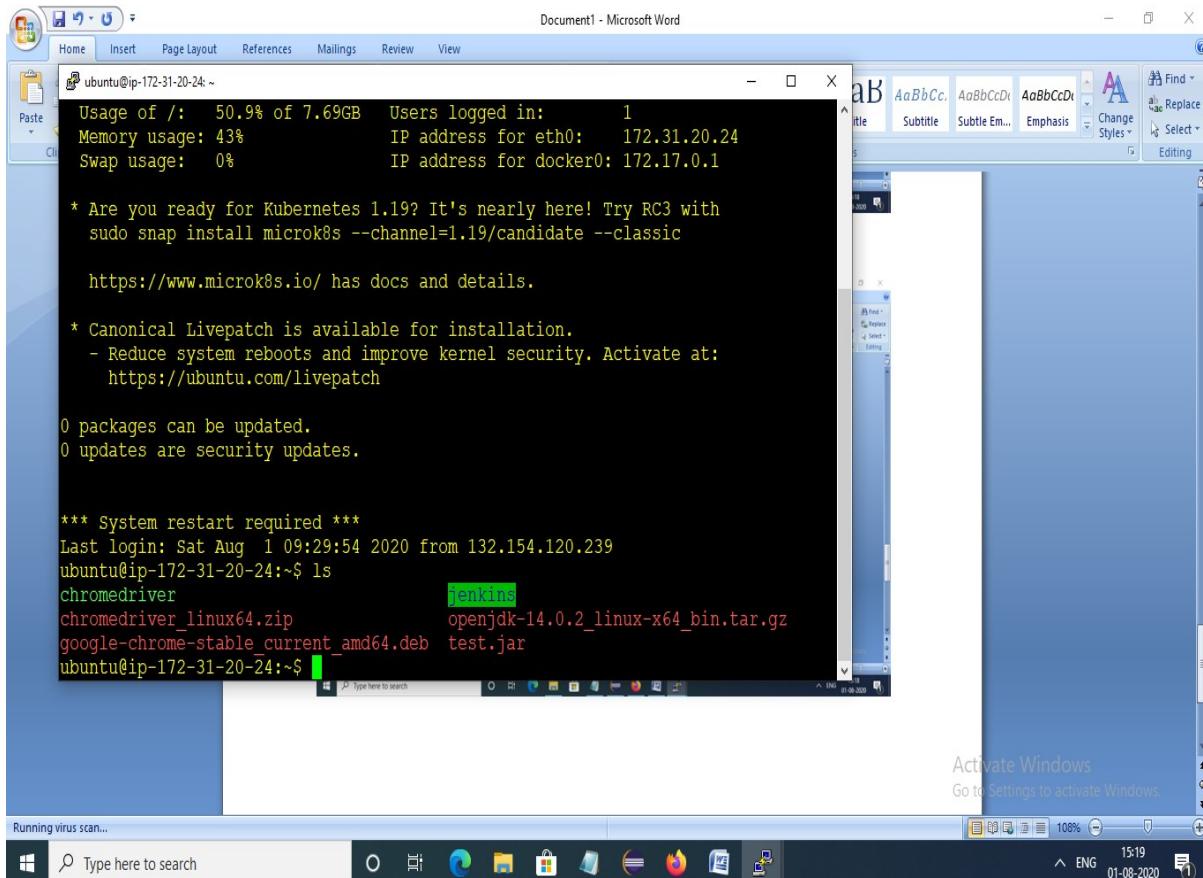
Installation of java Jenkins and docker on master as well as testing server

```
ubuntu@ip-172-31-24-202: /opt
rename      Rename a container
restart     Restart one or more containers
rm         Remove one or more containers
rmi        Remove one or more images
run         Run a command in a new container
save        Save one or more images to a tar archive (streamed to STDOUT by default)
search      Search the Docker Hub for images
start       Start one or more stopped containers
stats       Display a live stream of container(s) resource usage statistics
stop        Stop one or more running containers
tag         Create a tag TARGET_IMAGE that refers to SOURCE_IMAGE
top         Display the running processes of a container
unpause    Unpause all processes within one or more containers
update     Update configuration of one or more containers
version    Show the Docker version information
wait       Block until one or more containers stop, then print their exit codes
es

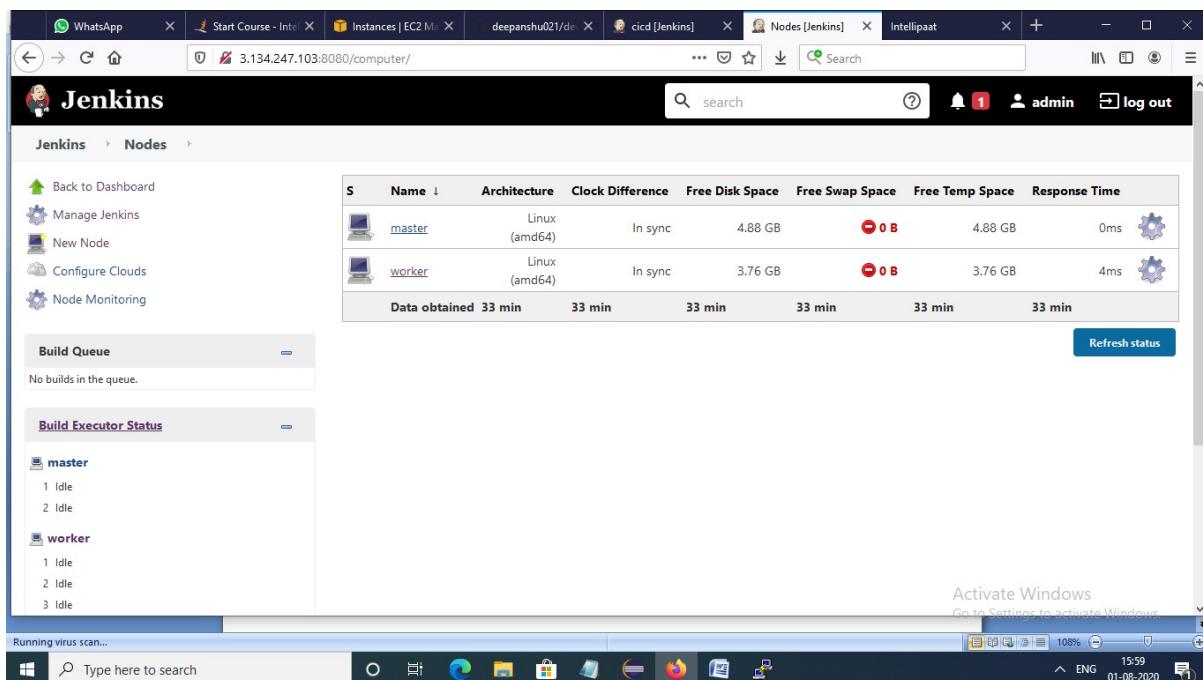
Run 'docker COMMAND --help' for more information on a command.

ubuntu@ip-172-31-24-202:/opt$ docker --version
Docker version 19.03.6, build 369ce74a3c
ubuntu@ip-172-31-24-202:/opt$
```

Testing server with connection with Jenkins and chrome driver installed and with git initialized with jar file



Node connection in jenkins



All files in testing server

The screenshot shows a Microsoft Word document titled "Document1 - Microsoft Word". Inside the document, there is a terminal window displaying the following output:

```
ubuntu@ip-172-31-20-24: ~jenkins/test
https://www.microk8s.io/ has docs and details.

* Canonical Livepatch is available for installation.
  - Reduce system reboots and improve kernel security. Activate at:
    https://ubuntu.com/livepatch

0 packages can be updated.
0 updates are security updates.

*** System restart required ***
Last login: Sat Aug  1 09:29:54 2020 from 132.154.120.239
ubuntu@ip-172-31-20-24:~$ ls
chromedriver          jenkins
chromedriver_linux64.zip openjdk-14.0.2_linux-x64_bin.tar.gz
google-chrome-stable_current_amd64.deb test.jar
ubuntu@ip-172-31-20-24:~$ cd jenkins
ubuntu@ip-172-31-20-24:~/jenkins$ ls
remoting  remoting.jar  test  workspace
ubuntu@ip-172-31-20-24:~/jenkins$ cd test
ubuntu@ip-172-31-20-24:~/jenkins/test$ ls
Dockerfile  images  index.html  test.jar
ubuntu@ip-172-31-20-24:~/jenkins/test$
```

The terminal window is running on an Ubuntu system with IP address 132.154.120.239. The user has run several commands to check for updates and list files in the jenkins/test directory. The terminal window is titled "ubuntu@ip-172-31-20-24: ~jenkins/test".

Successful builds in jenkins

The screenshot shows the Jenkins dashboard at the URL <http://3.134.247.103:8080>. The dashboard displays the following information:

- Build History:** Shows three successful builds:
 - build-website:** Last success: 8 min 26 sec - #26, Last failure: 9 min 11 sec - #25, Last duration: 1.3 sec.
 - sample-webhook:** Last success: 9 min 17 sec - #11, Last failure: N/A, Last duration: 0.36 sec.
 - test-job:** Last success: 8 min 16 sec - #8, Last failure: 25 min - #6, Last duration: 2.3 sec.
- Build Queue:** No builds in the queue.
- Build Executor Status:** master (1 Idle)

The Jenkins interface includes a sidebar with links like "New Item", "People", "Build History", etc. At the bottom, there are links for "Atom feed for all", "Atom feed for failures", and "Atom feed for just latest builds".

Configuration of node in Jenkins which connected using SSH

The screenshot shows the Jenkins Node configuration page for a node named 'worker'. The configuration details are as follows:

- Name: worker
- Description: worker
- # of executors: 10
- Remote root directory: /home/ubuntu/jenkins
- Labels: worker
- Usage: Only build jobs with label expressions matching this node
- Launch method: Launch agents via SSH
- Host: 3.19.59.97
- Credentials: ubuntu (worker)
- Host Key Verification Strategy: Manually trusted key Verification Strategy

A sidebar on the left lists various node management options: Back to List, Status, Delete Agent, Configure, Build History, Load Statistics, Script Console, Log, System Information, and Disconnect. A 'Build Executor Status' section indicates 10 idle executors. A 'Save' button is located at the bottom center.

This screenshot shows the same Jenkins Node configuration page for the 'worker' node, but with more detailed settings visible:

- Credentials: ubuntu (worker)
- Host Key Verification Strategy: Manually trusted key Verification Strategy
- Require manual verification of initial connection:
- Availability: Keep this agent online as much as possible

Below these settings is a 'Node Properties' section containing three checkboxes:

- Disable deferred wipeout on this node
- Environment variables
- Tool Locations

A 'Save' button is at the bottom. At the very bottom of the page, there is footer text: "Page generated: Aug 1, 2020 10:30:26 AM UTC REST API Jenkins 2.235.3 Go to Settings to activate Windows".

Configuration of build – build-website

The screenshot shows the Jenkins configuration interface for a job named "build-website". The "General" tab is selected. In the "Description" field, there is a placeholder text area. Under "GitHub project", the "Project url" is set to <https://github.com/deepanshu021/devopsproject.git>. There are several optional checkboxes: "Discard old builds", "GitHub project" (which is checked), "This build requires lockable resources", and "This project is parameterized" (which is checked). At the bottom of the configuration section are "Save" and "Apply" buttons.

The screenshot shows the Jenkins configuration interface for the "Source Code Management" tab of the "build-website" job. The "Git" option is selected. Under "Repositories", the "Repository URL" is set to <https://github.com/deepanshu021/devopsproject.git>, and the "Credentials" dropdown is set to "- none -". There is a "Add Repository" button. Under "Branches to build", two branch specifiers are defined: "*/*master" and "*/*develop". At the bottom of the configuration section are "Save" and "Apply" buttons.

The screenshot shows the Jenkins interface for configuring a job named 'build-website'. The 'Build Environment' tab is selected. Under the 'Build' section, there is a 'Execute shell' step defined with the following command:

```
sudo rm -f $(sudo docker ps -a -q)
sudo docker build /home/ubuntu/jenkins/test/. -t build
sudo docker run -it -p 10011:80 -d build
```

Below the command, there is a link to "See the list of available environment variables". At the bottom of the step, there are "Save" and "Apply" buttons.

Configuration of build -sample webhook

The screenshot shows the Jenkins interface for configuring a job named 'sample-webhook'. The 'General' tab is selected. The 'GitHub project' checkbox is checked, and the 'Project url' field contains the value <https://github.com/deepanshu021/devopsproject.git>. Other options shown include:

- This build requires lockable resources
- This project is parameterized
- Throttle builds
- Disable this project
- Execute concurrent builds if necessary
- Restrict where this project can be run

The 'Label Expression' field is set to 'worker'. A note below states: "Label worker is serviced by 1 node. Permissions or other restrictions provided by plugins may prevent this job from running on those nodes." At the bottom, there are "Save" and "Apply" buttons.

Jenkins > sample-webhook >

General Source Code Management Build Triggers Build Environment Build Post-build Actions

Git

Repositories

Repository URL: <https://github.com/deepanshu021/devopsproject.git>

Credentials: - none - Add

Advanced...

Add Repository

Branches to build

Branch Specifier (blank for 'any'): */master

Branch Specifier (blank for 'any'): */develop

Add Branch

Repository browser (Auto)

Save Apply

Activate Windows
Go to Settings to activate Windows.

Type here to search ENG 15:22 01-08-2020

Jenkins > sample-webhook >

General Source Code Management Build Triggers Build Environment Build Post-build Actions

Execute shell

Command: echo testpassed

See [the list of available environment variables](#)

Advanced...

Add build step ▾

Post-build Actions

Build other projects

Projects to build: build-website

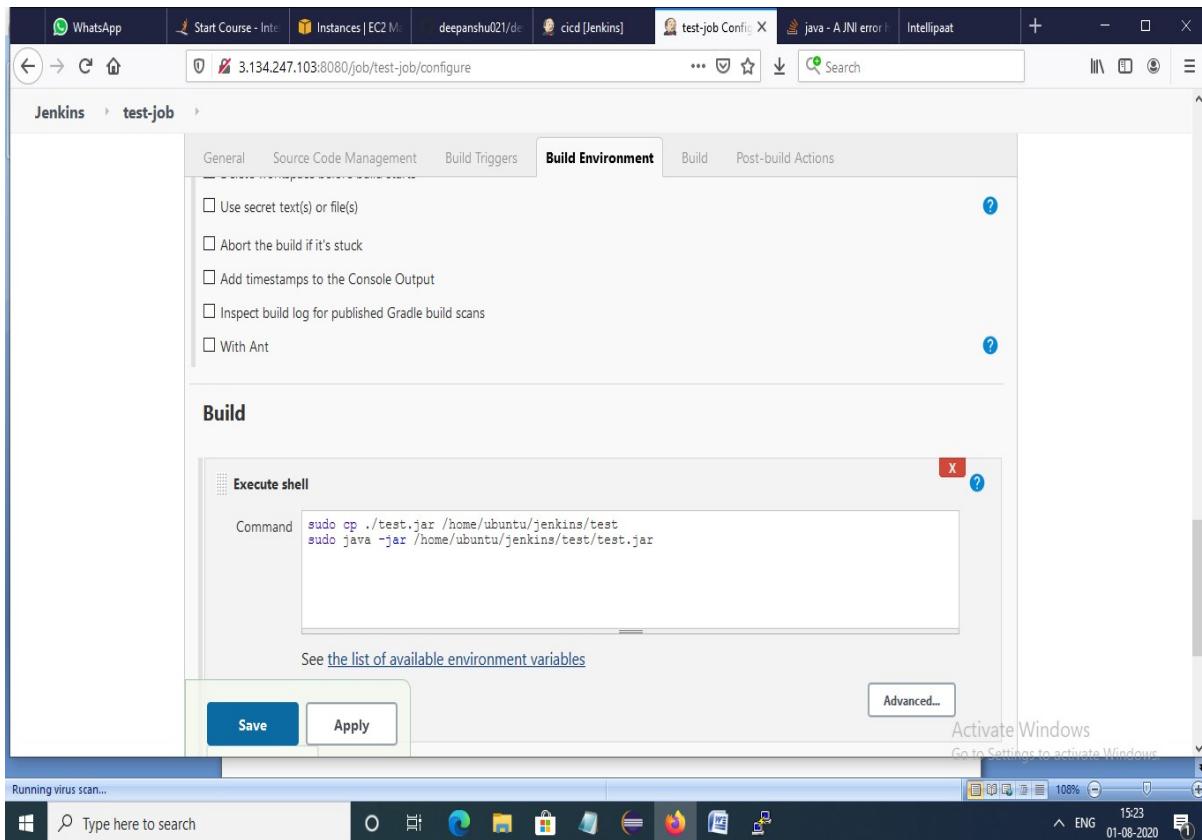
Trigger only if build is stable

Save Apply even if the build is unstable

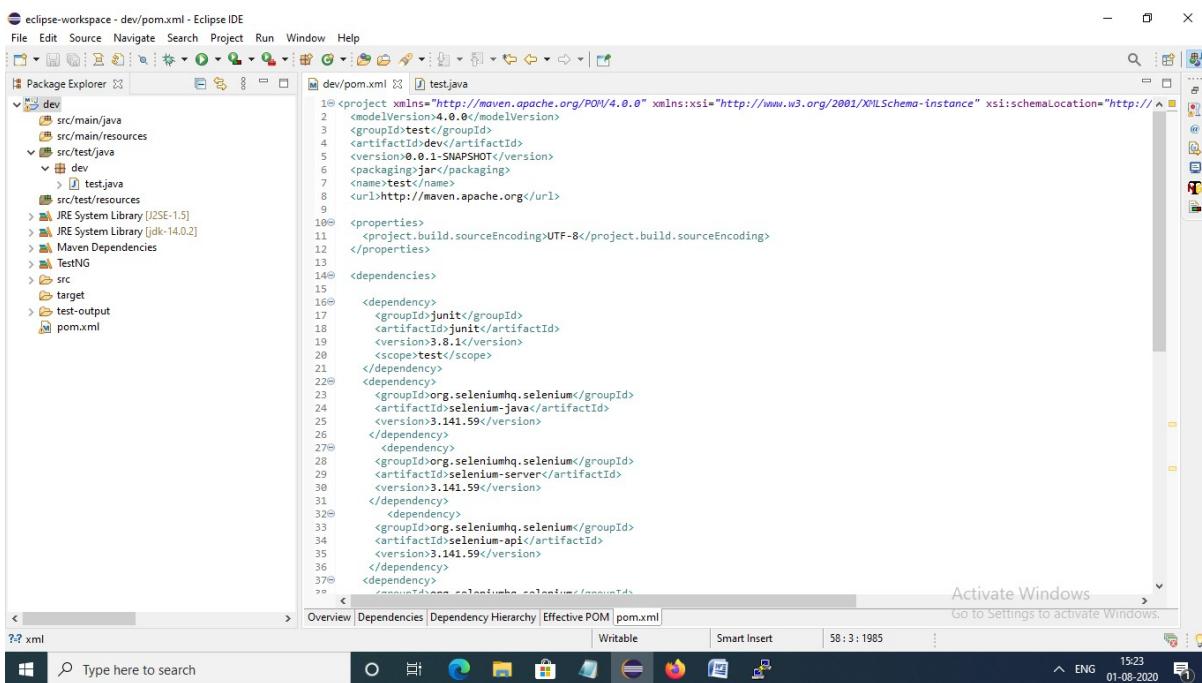
Activate Windows
Go to Settings to activate Windows.

Type here to search ENG 15:22 01-08-2020

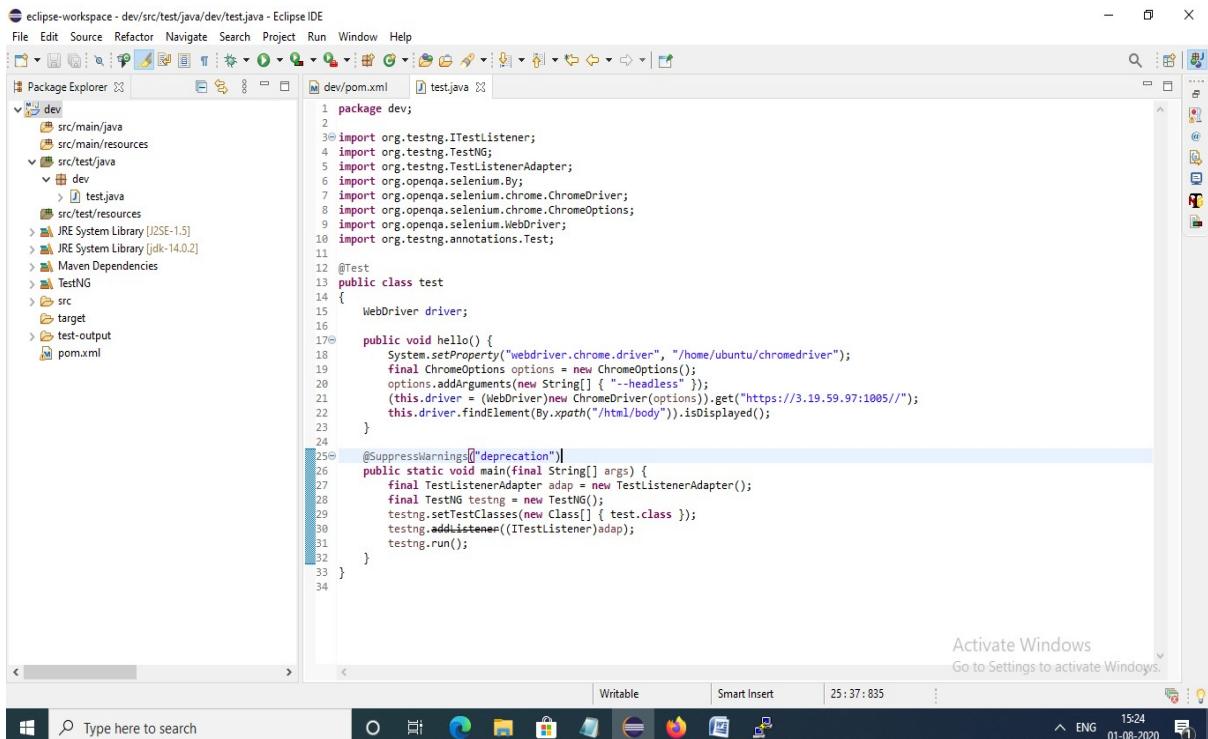
Configuration of build- test job



POM.XML file in eclipse



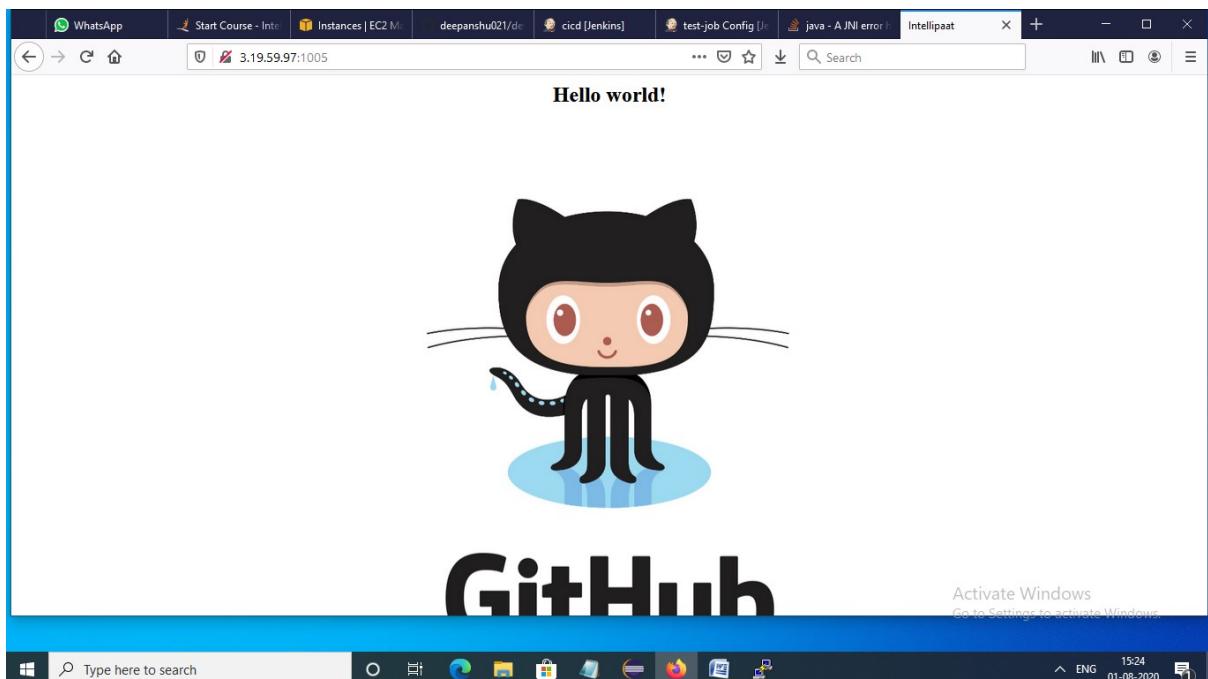
Test.java file in eclipse



The screenshot shows the Eclipse IDE interface with the following details:

- File Explorer (left):** Shows a project structure with a package named "dev". Inside "dev", there are subfolders "src/main/java", "src/main/resources", "src/test/java", and "src/test/resources". There are also JRE System Library entries for "j2se-1.5" and "jdk-14.0.2", Maven Dependencies, and a "pom.xml" file.
- Code Editor (right):** Displays the content of "test.java". The code is a Java test class using Selenium and TestNG. It includes imports for org.openqa.selenium.WebDriver, org.openqa.selenium.chrome.ChromeDriver, org.openqa.selenium.chrome.ChromeOptions, org.openqa.selenium.WebElement, org.openqa.selenium.By, org.testng.ITestListener, org.testng.TestNG, and org.testng.TestListenerAdapter. The class "test" has a constructor that takes a WebDriver parameter. The "hello()" method sets the web driver property to "/home/ubuntu/chromedriver", creates a ChromeOptions object, adds the "-headless" argument, creates a new ChromeDriver instance with these options, and gets the URL "https://3.19.59.97:1005". The "main" method creates a TestNG object, sets the test classes to "test", adds a listener, and runs the test.
- Bottom Status Bar:** Shows "Writable", "Smart Insert", the current time "25:37:835", and the date "01-08-2020".
- Taskbar:** Shows various icons for WhatsApp, Start Course - Inte..., Instances | EC2 M..., cicd [Jenkins], test-job Config [J...], java - A JNI error, and intellipaat. The address bar shows the URL "3.19.59.97:1005".
- System Tray:** Shows the Windows logo, a search icon, and the date/time "01-08-2020 15:24".

Successful build of website using dockerfile



CICD pipeline

The screenshot shows the Jenkins interface with the title "Build Pipeline". It displays three active builds:

- #11 sample-webhook: Started Aug 1, 2020 9:38:53 AM, duration 0.36 sec, run by admin.
- #26 build-website: Started Aug 1, 2020 9:39:44 AM, duration 1.3 sec, run by admin. Status: Start date: Aug 1, 2020 9:39:44 AM.
- #8 test-job: Started Aug 1, 2020 9:39:54 AM, duration 2.3 sec, run by admin.

At the bottom right, it says "Page generated: Aug 1, 2020 9:40:11 AM UTC" and "Jenkins 2.235.3". The Windows taskbar at the bottom shows a virus scan is running.

Production server starts

The screenshot shows the AWS EC2 Instances page. The "production" instance (ID: i-09f282a79c8930518) is listed as "running". Other instances "master" and "test" are also listed as "running".

Name	Instance ID	Instance Type	Availability Zone	Instance State	Status Checks	Alarm Status	Public DNS (IPv4)
master	i-03a599252f61c98e9	t2.micro	us-east-2b	running	2/2 checks ...	None	ec2-3-134-247-103.us-e...
test	i-0659fbae2b6183f61	t2.micro	us-east-2b	running	2/2 checks ...	None	ec2-3-19-59-97.us-east-...
production	i-09f282a79c8930518	t2.micro	us-east-2b	running	2/2 checks ...	None	ec2-13-58-115-161.us-e...

At the bottom right, it says "Activate Windows" and "Go to Settings to activate Windows". The Windows taskbar at the bottom shows a virus scan is running.

```

ubuntu@ip-172-31-16-36:~$ https://www.microk8s.io/ has docs and details.

* Canonical Livepatch is available for installation.
- Reduce system reboots and improve kernel security. Activate at:
  https://ubuntu.com/livepatch

22 packages can be updated.
7 updates are security updates.

*** System restart required ***

The programs included with the Ubuntu system are free software;
the exact distribution terms for each program are described in the
individual files in /usr/share/doc/*copyright.

Ubuntu comes with ABSOLUTELY NO WARRANTY, to the extent permitted by
applicable law.

To run a command as administrator (user "root"), use "sudo <command>".
See "man sudo_root" for details.

ubuntu@ip-172-31-16-36:~$ 

```

Production server connected with Jenkins as node using SSH

S	Name	Architecture	Clock Difference	Free Disk Space	Free Swap Space	Free Temp Space	Response Time
	master	Linux (amd64)	In sync	4.88 GB	0 B	4.88 GB	0ms
	prod		N/A	N/A	N/A	N/A	N/A
	worker	Linux (amd64)	In sync	3.76 GB	0 B	3.76 GB	4ms

Build Executor Status

Node	Idle
master	1
master	2
prod	1
prod	2
prod	3

Configuration of production server

The screenshot shows the Jenkins Node configuration page for a node named 'prod'. The left sidebar contains links for Back to List, Status, Delete Agent, Configure, Build History, Load Statistics, Script Console, Log, System Information, and Disconnect. The main configuration area includes fields for Name (prod), Description (production), # of executors (10), Remote root directory (/home/ubuntu/jenkins), Labels (prod), Usage (Use this node as much as possible), Launch method (Launch agents via SSH), Host (13.58.115.161), and Credentials (ubuntu (prod)). A 'Build Executor Status' panel on the left shows 10 idle executors numbered 1 to 10. A 'Save' button is at the bottom. The status bar at the bottom indicates a virus scan is running.

This screenshot shows the same Jenkins Node configuration page for 'prod', but with more detailed settings visible. Under 'Host' and 'Credentials', there is an additional 'Host Key Verification Strategy' dropdown set to 'Manually trusted key Verification Strategy'. Below these, a checkbox for 'Require manual verification of initial connection' is present. In the 'Availability' section, a dropdown menu says 'Keep this agent online as much as possible'. The 'Node Properties' section includes checkboxes for 'Disable deferred wipeout on this node', 'Environment variables', and 'Tool Locations'. A 'Save' button is at the bottom. The status bar at the bottom indicates a virus scan is running.

When production server connected with Jenkins all files automatically copied in production server

```
ubuntu@ip-172-31-16-36: ~jenkins/workspace/prod
https://www.microk8s.io/ has docs and details.

* Canonical Livepatch is available for installation.
- Reduce system reboots and improve kernel security. Activate at:
  https://ubuntu.com/livepatch

12 packages can be updated.
0 updates are security updates.

*** System restart required ***
Last login: Sat Aug 1 10:51:17 2020 from 132.154.120.239
ubuntu@ip-172-31-16-36:~$ ls
jenkins
ubuntu@ip-172-31-16-36:~$ cd jenkins/
ubuntu@ip-172-31-16-36:~/jenkins$ ls
remoting  remoting.jar  workspace
ubuntu@ip-172-31-16-36:~/jenkins$ cd workspace/
ubuntu@ip-172-31-16-36:~/jenkins/workspace$ ls
prod
ubuntu@ip-172-31-16-36:~/jenkins/workspace$ cd prod/
ubuntu@ip-172-31-16-36:~/jenkins/workspace/prod$ ls
Dockerfile  images  index.html  test.jar
ubuntu@ip-172-31-16-36:~/jenkins/workspace/prod$
```

The Jenkins dashboard displays the following build information:

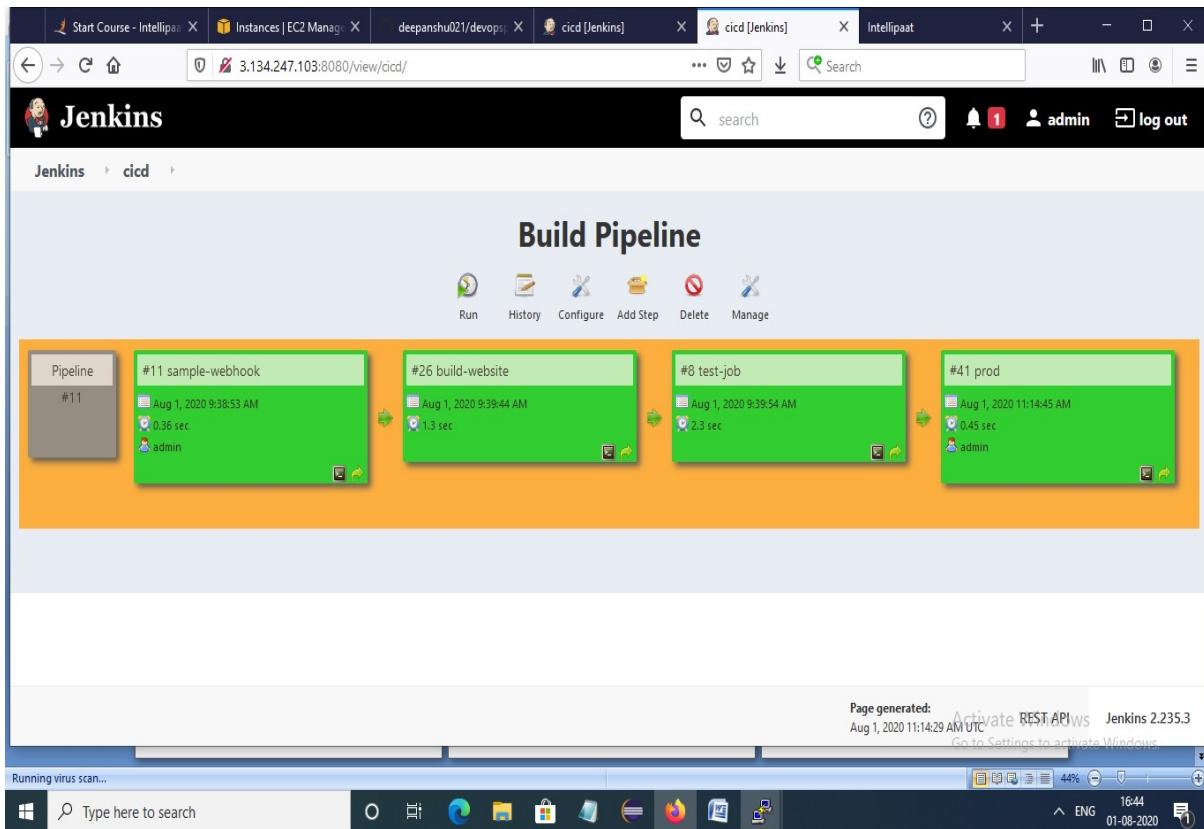
S	W	Name	Last Success	Last Failure	Last Duration
●	cloud	build-website	1 hr 18 min - #26	1 hr 18 min - #25	1.3 sec
●	sun	prod	1.4 sec - #5	N/A	0.33 sec
●	sun	sample-webhook	1 hr 18 min - #11	N/A	0.36 sec
●	cloud	test-job	1 hr 17 min - #8	1 hr 35 min - #6	2.3 sec

Build Queue (1): prod

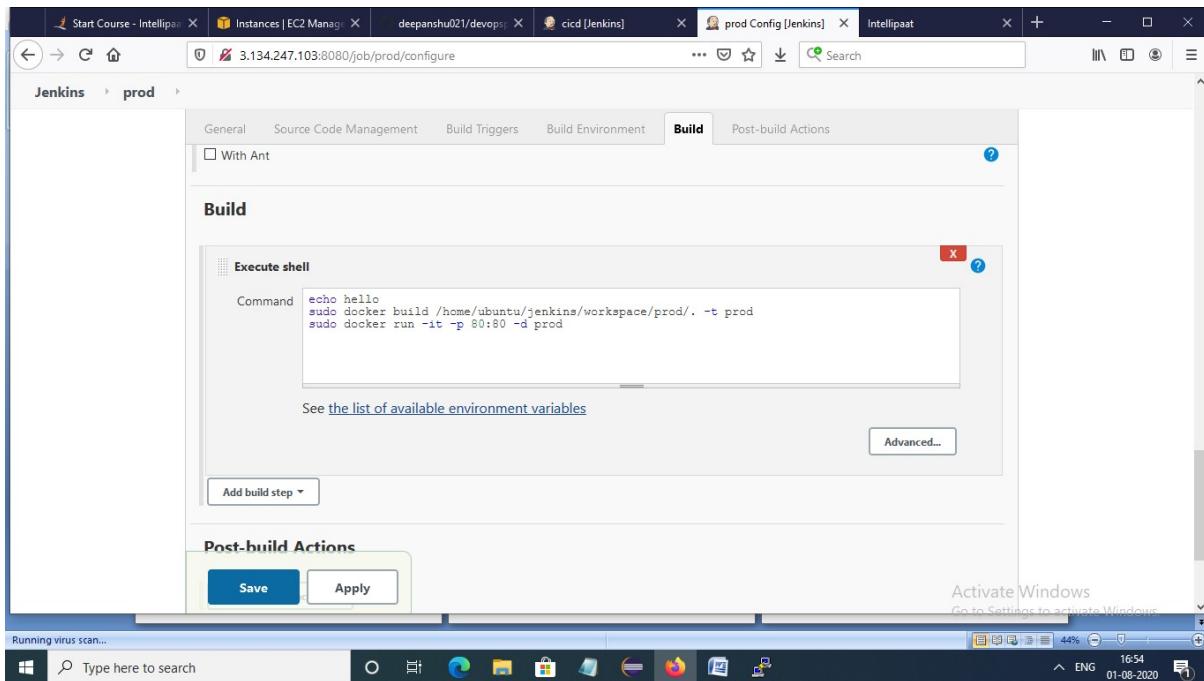
Build Executor Status:

master	Idle
master	1 Idle

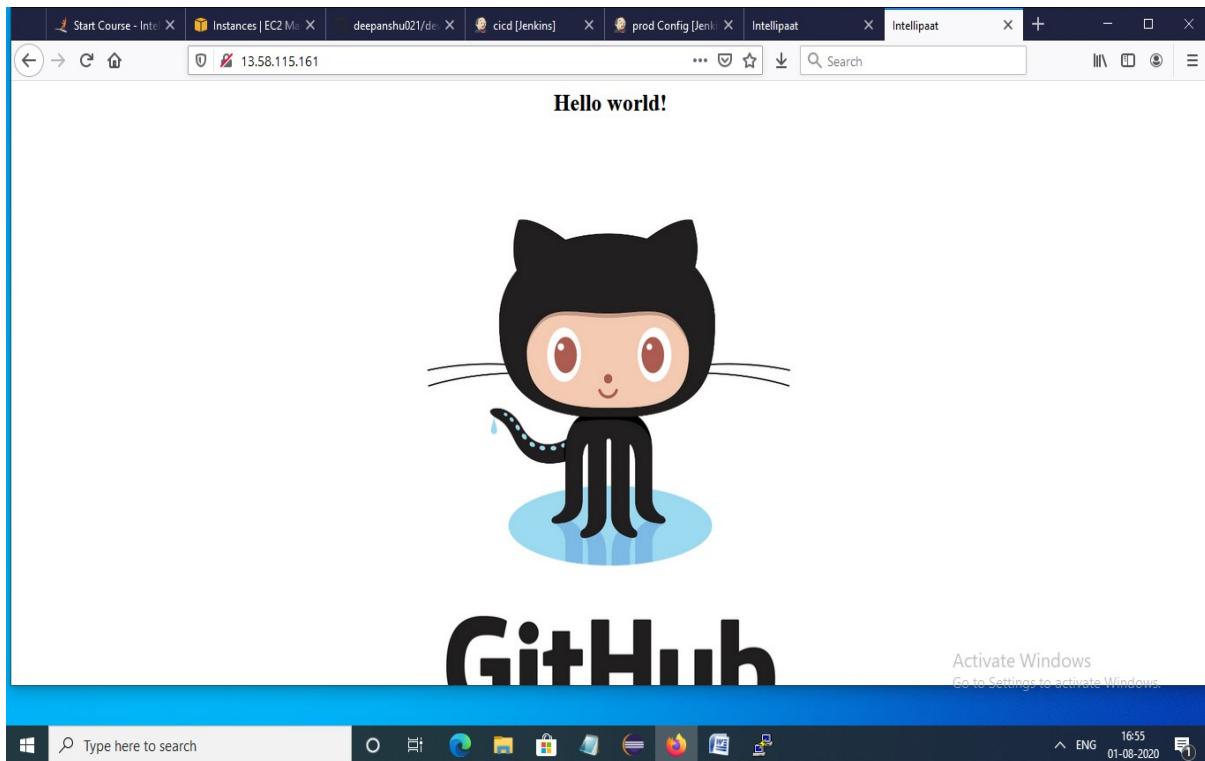
Successful build of CICD pipeline with production server



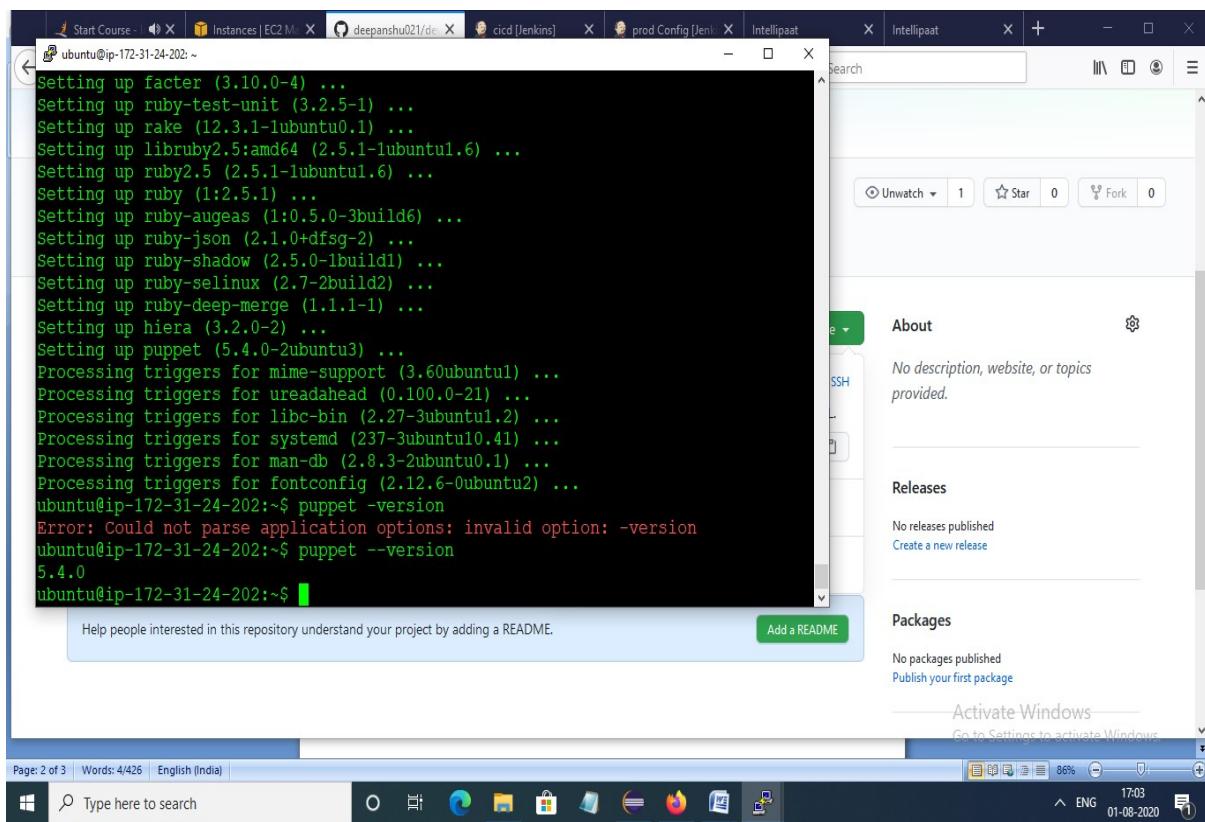
Configuration of production server



Website runs on port 80



Installation of puppet master on master server



Configuration of master server for apache2 using puppet

The screenshot shows a terminal window within the AWS CloudWatch interface. The user is editing a Puppet manifest file named `site.pp` using `GNU nano 2.9.3`. The manifest contains the following code:

```
node default{
  exec['Conditions']:
    command=> '/bin/echo "Apache is installed" > /tmp/software.txt',
    onlyif=> '/bin/which apache2',
  }
  exec['conditions']:
    command=> '/bin/echo "Apache is not installed" > /tmp/software.txt',
    unless=> '/bin/which apache2',
}
```

The terminal also displays a set of keyboard shortcuts at the bottom. Below the terminal, the AWS CloudWatch interface shows a list of instances and their public DNS names.

Test server showing puppet is installed or not

The screenshot shows a terminal window within the AWS CloudWatch interface. The user has run the command `sudo puppet agent --test` on a test instance. The output indicates that the system is up-to-date and no packages need to be updated. It also shows the configuration being applied and the creation of a `software.txt` file containing the text "Apache is not installed".

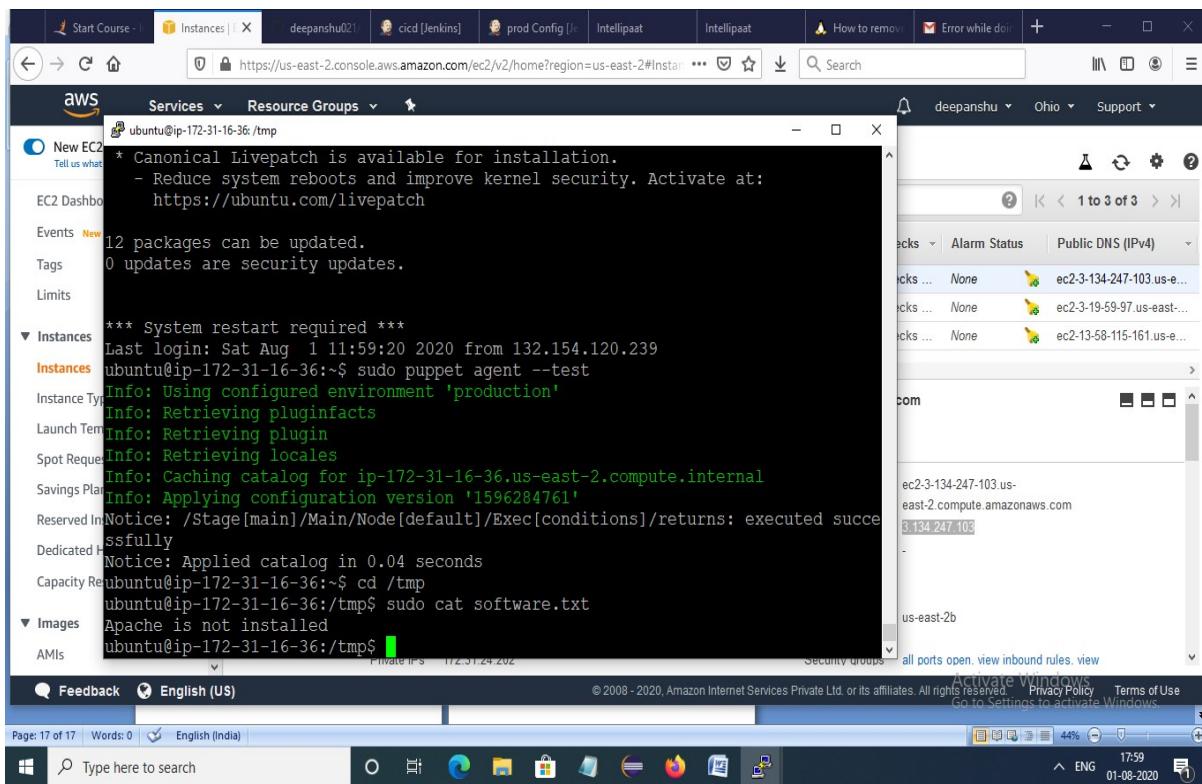
```
* Canonical Livepatch is available for installation.
  - Reduce system reboots and improve kernel security. Activate at:
    https://ubuntu.com/livepatch

0 packages can be updated.
0 updates are security updates.

*** System restart required ***
Last login: Sat Aug  1 12:03:57 2020 from 132.154.120.239
ubuntu@ip-172-31-20-24:~$ sudo puppet agent --test
Info: Using configured environment 'production'
Info: Retrieving pluginfacts
Info: Retrieving plugin
Info: Retrieving locales
Info: Caching catalog for ip-172-31-20-24.us-east-2.compute.internal
Info: Applying configuration version '1596284727'
Notice: /Stage[main]/Main/Node[default]/Exec[conditions]/returns: executed successfully
Notice: Applied catalog in 0.04 seconds
ubuntu@ip-172-31-20-24:~$ cd /tmp
ubuntu@ip-172-31-20-24:/tmp$ sudo cat software.txt
Apache is not installed
ubuntu@ip-172-31-20-24:/tmp$
```

The terminal also displays a set of keyboard shortcuts at the bottom. Below the terminal, the AWS CloudWatch interface shows a list of instances and their public DNS names.

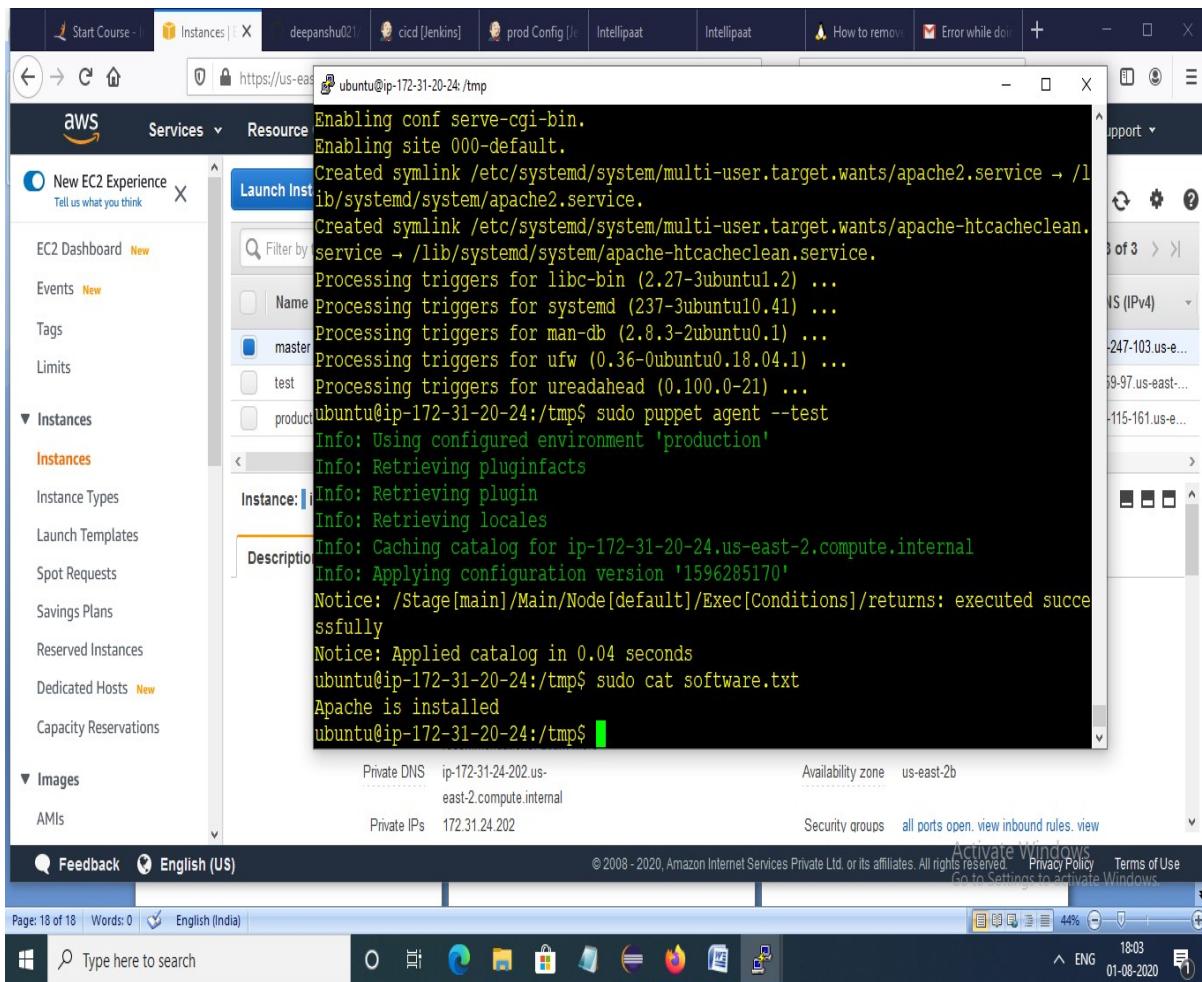
Production server with apache2 installation



The screenshot shows a Windows desktop environment with a browser window open to the AWS Management Console. The browser URL is <https://us-east-2.console.aws.amazon.com/ec2/v2/home?region=us-east-2#Instances>. The main content area displays the terminal session of an EC2 instance (ubuntu@ip-172-31-16-36:/tmp). The logs show the following:

```
* Canonical Livepatch is available for installation.  
- Reduce system reboots and improve kernel security. Activate at:  
  https://ubuntu.com/livepatch  
  
12 packages can be updated.  
0 updates are security updates.  
  
*** System restart required ***  
Last login: Sat Aug 1 11:59:20 2020 from 132.154.120.239  
ubuntu@ip-172-31-16-36:~$ sudo puppet agent --test  
Info: Using configured environment 'production'  
Info: Retrieving pluginfacts  
Info: Retrieving plugin  
Info: Retrieving locales  
Info: Caching catalog for ip-172-31-16-36.us-east-2.compute.internal  
Info: Applying configuration version '1596284761'  
Notice: /Stage/main/Main/Node[default]/Exec[conditions]/returns: executed successfully  
Notice: Applied catalog in 0.04 seconds  
Capacity Reservations  
ubuntu@ip-172-31-16-36:~$ cd /tmp  
ubuntu@ip-172-31-16-36:/tmp$ sudo cat software.txt  
  
Apache is not installed  
ubuntu@ip-172-31-16-36:/tmp$
```

Installation of puppet on testing server



The screenshot shows a Windows desktop environment with a browser window open to the AWS Management Console. The browser URL is <https://us-east-2.console.aws.amazon.com/ec2/v2/home?region=us-east-2#Instances>. The main content area displays the terminal session of an EC2 instance (ubuntu@ip-172-31-20-24:/tmp). The logs show the following:

```
Enabling conf serve-cgi-bin.  
Enabling site 000-default.  
Created symlink /etc/systemd/system/multi-user.target.wants/apache2.service → /lib/systemd/system/apache2.service.  
Created symlink /etc/systemd/system/multi-user.target.wants/apache-htcacheclean.service → /lib/systemd/system/apache-htcacheclean.service.  
Processing triggers for libc-bin (2.27-3ubuntu1.2) ...  
Processing triggers for systemd (237-3ubuntu10.41) ...  
Processing triggers for man-db (2.8.3-2ubuntu0.1) ...  
Processing triggers for ufw (0.36-0ubuntu0.18.04.1) ...  
Processing triggers for ureadahead (0.100.0-21) ...  
ubuntu@ip-172-31-20-24:/tmp$ sudo puppet agent --test  
Info: Using configured environment 'production'  
Info: Retrieving pluginfacts  
Info: Retrieving plugin  
Info: Retrieving locales  
Info: Caching catalog for ip-172-31-20-24.us-east-2.compute.internal  
Info: Applying configuration version '1596285170'  
Notice: /Stage/main/Main/Node[default]/Exec[Conditions]/returns: executed successfully  
Notice: Applied catalog in 0.04 seconds  
ubuntu@ip-172-31-20-24:/tmp$ sudo cat software.txt  
Apache is installed  
ubuntu@ip-172-31-20-24:/tmp$
```

Installation of nagios on master server

The screenshot shows a terminal window titled "ubuntu@ip-172-31-24-202:~" running on an AWS EC2 instance. The terminal displays the following command and its output:

```
Setting up php (1:7.2+6ubuntu1) ...
Processing triggers for systemd (237-3ubuntu10.41) ...
Processing triggers for man-db (2.8.3-2ubuntu0.1) ...
Processing triggers for ufw (0.36-0ubuntu0.18.04.1) ...
Processing triggers for ureadahead (0.100.0-21) ...
Processing triggers for libc-bin (2.27-3ubuntu1.2) ...
ubuntu@ip-172-31-24-202:~$ sudo adduser nagios
Adding user `nagios' ...
Adding new group `nagios' (1001) ...
Adding new user `nagios' (1001) with group `nagios' ...
Creating home directory `/home/nagios' ...
Copying files from `/etc/skel' ...
Enter new UNIX password:
Retype new UNIX password:
passwd: password updated successfully
Changing the user information for nagios
Enter the new value, or press ENTER for the default
      Full Name []: 11
      Room Number []: 22
      Work Phone []: 33
      Home Phone []: 333
      Other []: 333
Is the information correct? [Y/n] y
ubuntu@ip-172-31-24-202:~$
```

The terminal also shows the command `sudo service apache2 restart` at the bottom.

Nagios installed

The screenshot shows the official Nagios Core website. The main content area features the Nagios Core logo and the text "Daemon running with PID 22558". Below this, there is a section for "Nagios® Core™ Version 4.4.5" with a release date of August 20, 2019, and a "Check for updates" link. To the left, a sidebar navigation menu includes links for General, Current Status, Reports, and Notifications. The right side of the page contains promotional banners for Nagios XI, Log Server, and Network Analyzer, each with a "Download" button. A "Quick Links" box lists various Nagios resources, and a "Latest News" box mentions a Nagios XI 5.6.6 update. A "Don't Miss..." box highlights a "Monitoring Log Data with Nagios" feature. The bottom of the page includes a "Page tour" button and standard browser navigation controls.

Configuration of nagios

```

# ALLOWED HOST ADDRESSES
# This is an optional comma-delimited list of IP address or hostnames
# that are allowed to talk to the NRPE daemon. Network addresses with a bit mask
# (i.e. 192.168.1.0/24) are also supported. Hostname wildcards are not currently
# supported.

# Note: The daemon only does rudimentary checking of the client's IP
# address. I would highly recommend adding entries in your /etc/hosts.allow
# file to allow only the specified host to connect to the port
# you are running this daemon on.

# NOTE: This option is ignored if NRPE is running under either inetd or xinetd
allowed_hosts=127.0.0.1,::1,3.134.247.103

```

Connection of nagios with production server

The screenshot shows a terminal window on an AWS EC2 instance. The user is editing a Nagios configuration file named 'prod.cfg' using the nano editor. The file contains the following host definition:

```
define host {
    use linux-server
    host_name production
    alias production
    address 13.58.115.161}
```

The terminal interface includes standard nano key bindings at the bottom. To the right of the terminal, the AWS CloudWatch Metrics and CloudWatch Logs dashboards are visible.

The screenshot shows a terminal window on an AWS EC2 instance. The user is viewing the Nagios configuration file 'nagios.cfg'. The file starts with a header and then defines several objects:

```
# OBJECT CONFIGURATION FILE(S)
# These are the object configuration files in which you define hosts,
# host groups, contacts, contact groups, services, etc.
# You can split your object definitions across several config files
# if you wish (as shown below), or keep them all in a single config file.

# You can specify individual object config files as shown below:
cfg_file=/usr/local/nagios/etc/objects/commands.cfg
cfg_file=/usr/local/nagios/etc/objects/contacts.cfg
cfg_file=/usr/local/nagios/etc/objects/timeperiods.cfg
cfg_file=/usr/local/nagios/etc/objects/templates.cfg

# Definitions for monitoring the local (Linux) host
cfg_file=/usr/local/nagios/etc/objects/localhost.cfg
cfg_file=/usr/local/nagios/etc/objects/prod.cfg
# Definitions for monitoring a Windows machine
#cfg_file=/usr/local/nagios/etc/objects/windows.cfg
```

The terminal interface includes standard nano key bindings at the bottom. To the right of the terminal, the AWS CloudWatch Metrics and CloudWatch Logs dashboards are visible.

Production server up and running

Nagios is monitoring initially

The screenshot shows the Nagios web interface at 18.191.149.175/nagios/. The main page displays the "Current Network Status" and "Service Status Details For All Hosts".

Current Network Status:

- Last Updated: Mon Aug 3 17:56:06 UTC 2020
- Updated every 90 seconds
- Nagios® Core™ 4.4.5 - www.nagios.org
- Logged in as `nagiosadmin`

Host Status Totals:

Up	Down	Unreachable	Pending
2	0	0	0

All Problems All Types

Service Status Totals:

Ok	Warning	Unknown	Critical	Pending
8	0	0	1	0

All Problems All Types

Service Status Details For All Hosts:

Host	Service	Status	Last Check	Duration	Attempt	Status Information
localhost	Current Load	OK	08-03-2020 17:54:02	2d 4h 15m 38s	1/4	OK - load average: 0.00, 0.02, 0.04
localhost	Current Users	OK	08-03-2020 17:55:03	2d 4h 15m 0s	1/4	USERS OK - 2 users currently logged in
localhost	HTTP	OK	08-03-2020 17:51:04	2d 4h 14m 23s	1/4	HTTP OK - HTTP/1.1 200 OK - 11192 bytes in 0.000 second response time
localhost	PING	OK	08-03-2020 17:52:04	2d 4h 18m 45s	1/4	PING OK - Packet loss = 0%, RTA = 0.03 ms
localhost	Root Partition	OK	08-03-2020 17:53:02	2d 4h 18m 8s	1/4	DISK OK - free space: /4013 MB (58.69% inode=88%)
localhost	SSH	OK	08-03-2020 17:54:33	2d 4h 17m 30s	1/4	SSH OK - OpenSSH_7_6p1 Ubuntu-4ubuntu0.3 (protocol 2.0)
localhost	Swap Usage	CRITICAL	08-03-2020 17:55:33	2d 5h 1m 53s	4/4	SWAP CRITICAL - 0% free (0 MB out of 0 MB) - Swap is either disabled, not present, or of zero size.
localhost	Total Processes	OK	08-03-2020 17:51:34	2d 4h 16m 15s	1/4	PROCS OK - 38 processes with STATE = R/Z/DT
production	HTTP	OK	08-03-2020 17:55:12	0d 0h 0m 54s	1/3	HTTP OK - HTTP/1.1 200 OK - 463 bytes in 0.001 second response time

Results 1 - 9 of 9 Matching Services

Reports:

- Availability
- Trends (Legacy)
- Alerts
- History
- Summary
- Histogram (Legacy)
- Notifications
- Event Log

System:

- Comments
- Documentation

Activate Windows
Go to Settings to activate Windows.

Page Tour

The screenshot shows the Nagios web interface at 18.191.149.175/nagios/. The main page displays the "Host Status Details For All Host Groups".

Host Status Details For All Host Groups:

Host	Status	Last Check	Duration	Status Information
localhost	UP	08-03-2020 17:53:02	2d 4h 19m 24s	PING OK - Packet loss = 0%, RTA = 0.03 ms
production	UP	08-03-2020 17:52:42	0d 0h 24m 7s	PING OK - Packet loss = 0%, RTA = 0.46 ms

Results 1 - 2 of 2 Matching Hosts

Reports:

- Availability
- Trends (Legacy)
- Alerts
- History
- Summary
- Histogram (Legacy)
- Notifications
- Event Log

System:

- Comments
- Documentation

Activate Windows
Go to Settings to activate Windows.

Page Tour

Document1 - Word (Product Activation Failed)

File Home Insert Design Layout References Mailings Review View Tell me what you want to do...

ubuntu@ip-172-31-16-36:~\$ sudo apt-get update

Hit:1 http://us-east-2.ec2.archive.ubuntu.com/ubuntu bionic InRelease
Get:2 http://us-east-2.ec2.archive.ubuntu.com/ubuntu bionic-updates InRelease [88.7 kB]
Get:3 http://us-east-2.ec2.archive.ubuntu.com/ubuntu bionic-backports InRelease [74.6 kB]
Get:4 http://security.ubuntu.com/ubuntu bionic-security InRelease [88.7 kB]
Hit:5 http://apt.puppetlabs.com bionic InRelease
Get:6 http://us-east-2.ec2.archive.ubuntu.com/ubuntu bionic-updates/main amd64 Packages [1032 kB]
Get:7 http://us-east-2.ec2.archive.ubuntu.com/ubuntu bionic-updates/universe amd64 Packages [1097 kB]
Get:8 http://security.ubuntu.com/ubuntu bionic-security/main amd64 Packages [805 kB]
Get:9 http://security.ubuntu.com/ubuntu bionic-security/universe amd64 Packages [687 kB]
Fetched 3874 kB in 2s (2455 kB/s)
Reading package lists... Done
ubuntu@ip-172-31-16-36:~\$ sudo docker ps

CONTAINER ID	IMAGE	COMMAND	CREATED
fba244a8b55e	build	"/bin/sh -c 'apachec..."	About a minute ago
ubuntu@ip-172-31-16-36:~\$			

Page 1 of 1 0 words English (India)

Search the web and Windows 23:27 03-08-2020

Docker container removed from production server

Instances | EC2 Manager X cicd [Jenkins] X prod [Jenkins] X Start Course - Intellipaat X Nagios: 18.191.149.175 X Intellipaat X

ubuntu@ip-172-31-16-36:~\$

[74.6 kB]
Get:4 http://security.ubuntu.com/ubuntu bionic-security InRelease [88.7 kB]
Hit:5 http://apt.puppetlabs.com bionic InRelease
Get:6 http://us-east-2.ec2.archive.ubuntu.com/ubuntu bionic-updates/main amd64 Packages [1032 kB]
Get:7 http://us-east-2.ec2.archive.ubuntu.com/ubuntu bionic-updates/universe amd64 Packages [1097 kB]
Get:8 http://security.ubuntu.com/ubuntu bionic-security/main amd64 Packages [805 kB]
Get:9 http://security.ubuntu.com/ubuntu bionic-security/universe amd64 Packages [687 kB]
Fetched 3874 kB in 2s (2455 kB/s)
Reading package lists... Done
ubuntu@ip-172-31-16-36:~\$ sudo docker ps

CONTAINER ID	IMAGE	COMMAND	CREATED
fba244a8b55e	build	"/bin/sh -c 'apachec..."	About a minute ago
ubuntu@ip-172-31-16-36:~\$			

Report CONTAINER ID IMAGE COMMAND CREATED

System History Summary Histogram (Legacy) Notifications Event Log

Activate Windows Go to Settings to activate Windows.

Page Tour

Search the web and Windows 23:28 03-08-2020

Website not able to connect with port 80

Instances | EC2 Manager x Jenkins x prod [Jenkins] x Start Course - Intellipaat x Nagios: 18.191.49.175 x Problem loading page x + - ×

3.135.62.107

...

Unable to connect

Firefox can't establish a connection to the server at 3.135.62.107.

- The site could be temporarily unavailable or too busy. Try again in a few moments.
- If you are unable to load any pages, check your computer's network connection.
- If your computer or network is protected by a firewall or proxy, make sure that Firefox is permitted to access the Web.

Try Again

Activate Windows
Go to Settings to activate Windows.
02.08.2020

Nagios shows critical in monitoring

Instances | EC2 Manager X Jenkins X Jenkins X Start Course - Intellipaat X Nagios: 18.191.149.175 X Problem loading page X + -

18.191.149.175/nagios/ ... ⚡ ⚡

Nagios®

General

Home Documentation

Current Status

Tactical Overview

Map (Legacy)

Hosts Services Host Groups Summary Grid Service Groups Summary Grid Problems Services (Unhandled) Hosts (Unhandled) Network Outages

Quick Search:

Reports

Availability Trends (Legacy) Alerts History Summary Histogram (Legacy) Notifications Event Log

System

Comments

Search the web and Windows

Current Network Status

Last Updated: Mon Aug 3 17:59:25 UTC 2020
Updated every 90 seconds
Nagios® Core™ 4.4.5 - www.nagios.org
Logged in as nagiosadmin

View History For All hosts
View Notifications For All Hosts
View Host Status Detail For All Hosts

Host Status Totals

Up	Down	Unreachable	Pending
2	0	0	0

All Problems All Types

0	2
---	---

Service Status Totals

Ok	Warning	Unknown	Critical	Pending
7	0	0	2	0

All Problems All Types

2	9
---	---

Service Status Details For All Hosts

Limit Results: 100

Host	Service	Status	Last Check	Duration	Attempt	Status Information
localhost	Current Load	OK	08-03-2020 17:59:02	2d 4h 18m 57s	1/4	OK - load average: 0.00, 0.00, 0.01
localhost	Current Users	OK	08-03-2020 17:55:03	2d 4h 18m 19s	1/4	USERS OK - 2 users currently logged in
localhost	HTTP	CRITICAL	08-03-2020 17:56:04	2d 4h 17m 42s	1/4	HTTP OK: HTTP/1.1 200 OK - 11192 bytes in 0.000 second response time
localhost	PING	OK	08-03-2020 17:57:04	2d 4h 22m 4s	1/4	PING OK - Packet loss = 0%, RTA = 0.04 ms
localhost	Root Partition	OK	08-03-2020 17:58:02	2d 4h 21m 27s	1/4	DISK OK - free space: /4613 MB (58.69% inode=88%);
localhost	SSH	CRITICAL	08-03-2020 17:54:33	2d 4h 20m 49s	1/4	SSH OK - OpenSSH_7.6p1 Ubuntu-4ubuntu0.3 (protocol 2.0)
localhost	Swap Usage	CRITICAL	08-03-2020 17:55:33	2d 5h 5m 12s	4/4	SWAP CRITICAL - 0% free (0 MB out of 0 MB) - Swap is either disabled, not present, or of zero size.
localhost	Total Processes	OK	08-03-2020 17:58:34	2d 4h 19m 34s	1/4	PROCS OK: 38 processes with STATE = RZD/T
production	HTTP	CRITICAL	08-03-2020 17:59:12	0d 0h 0m 13s	1/3	connect to address 3.135.62.107 and port 80: Connection refused

Results 1 - 9 of 9 Matching Services

Activate Windows
Go to Settings to activate Windows.

Page Tour

Again docker container is created

ubuntu@ip-172-31-16-36:~\$ sudo docker ps

CONTAINER ID	IMAGE	COMMAND	CREATED
692e4608a257	build	"/bin/sh -c 'apache...' "	2 minutes ago
692e4608a257		Up 2 minutes 0.0.0.0:80->80/tcp unruffled_jang	

ubuntu@ip-172-31-16-36:~\$ sudo docker rm -f 692e4608a257

ubuntu@ip-172-31-16-36:~\$ sudo docker ps

CONTAINER ID	IMAGE	COMMAND	CREATED
b3bf82a85b6f6ce2298c0a1036fc58ec942d6ec87b896e464c0c4e320f0d769c	build	"/bin/sh -c 'apache...' "	10 seconds ago
b3bf82a85b6f		Up 9 seconds 0.0.0.0:80->80/tcp loving_wiles	

ubuntu@ip-172-31-16-36:~\$

Nagios again start working

Current Network Status

Last Updated: Mon Aug 3 18:03:45 UTC 2020
Updated every 90 seconds
Nagios® Core™ 4.4.5 - www.nagios.org
Logged in as nagiosadmin

Host Status Totals

Up	Down	Unreachable	Pending
2	0	0	0

All Problems All Types

Ok	Warning	Unknown	Critical	Pending
8	0	0	1	0

All Problems All Types

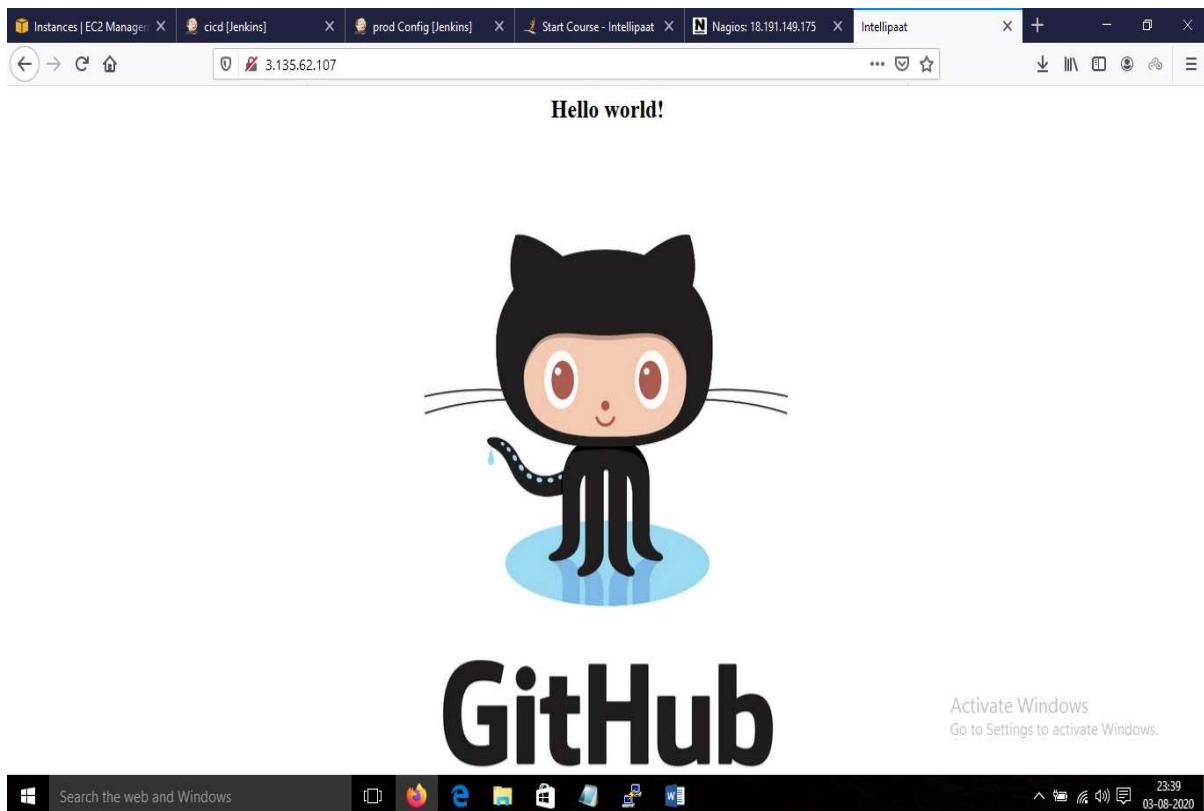
1	9
---	---

Service Status Details For All Hosts

Host	Service	Status	Last Check	Duration	Attempt	Status Information
localhost	Current Load	OK	08-03-2020 17:59:02	2d 4h 23m 17s	1/4	OK - load average: 0.00, 0.00, 0.01
	Current Users	OK	08-03-2020 18:00:03	2d 4h 22m 39s	1/4	USERS OK - 2 users currently logged in
	HTTP	OK	08-03-2020 18:01:04	2d 4h 22m 2s	1/4	HTTP OK: HTTP/1.1 200 OK - 11192 bytes in 0.000 second response time
	PING	OK	08-03-2020 18:02:04	2d 4h 26m 24s	1/4	PING OK - Packet loss = 0%, RTA = 0.04 ms
	Root Partition	OK	08-03-2020 18:03:02	2d 4h 25m 47s	1/4	DISK OK - free space: / 4813 MB (58.69% inode=88%)
	SSH	OK	08-03-2020 17:59:33	2d 4h 25m 9s	1/4	SSH OK - OpenSSH_7.6p1 Ubuntu-A�buntu0.3 (protocol 2.0)
	Swap Usage	CRITICAL	08-03-2020 18:00:33	2d 5h 9m 32s	4/4	SWAP CRITICAL - 0% free (0 MB out of 0 MB) - Swap is either disabled, not present, or of zero size.
	Total Processes	OK	08-03-2020 18:01:34	2d 4h 23m 54s	1/4	PROCS OK: 38 processes with STATE = RSZDT
production	HTTP	OK	08-03-2020 18:03:12	0d 0h 3m 33s	1/3	HTTP OK: HTTP/1.1 200 OK - 463 bytes in 0.002 second response time

Results 1 - 9 of 9 Matching Services

Website is up and running



Thank you

