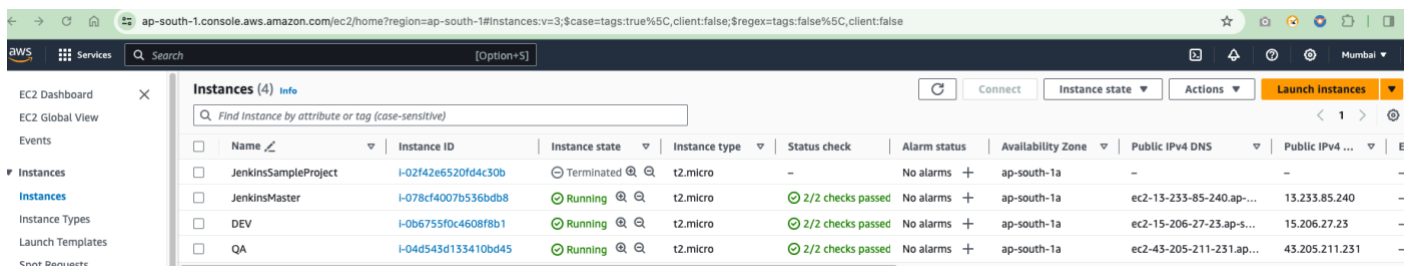


# 💡 Setting Up Jenkins on AWS EC2 with Master-Slave (Master-Agent) Architecture

As a part of the #LearningSeries, here's a detailed tutorial outlining the process of installing Jenkins on an AWS EC2 instance and setting up a resilient master-slave architecture to improve your QA and Dev workflows.

**Master-Slave architecture: This is used for parallel executions. Master delegates the jobs to slaves(agents) based on the labels(ex. qa, dev, production etc..)**

**1** Create multiple EC2 instances as below and set up **Jenkins on Master instance**.



The screenshot shows the AWS Management Console 'Instances' page. It lists four EC2 instances: JenkinsSampleProject (Terminated), JenkinsMaster (Running), DEV (Running), and QA (Running). All running instances are t2.micro type, located in ap-south-1a availability zone, and have 2/2 status checks passed.

Name	Instance ID	Instance state	Instance type	Status check	Alarm status	Availability Zone	Public IPv4 DNS	Public IPv4 ...
JenkinsSampleProject	i-02f42e6520fd4c30b	Terminated	t2.micro	-	No alarms	ap-south-1a	-	-
JenkinsMaster	i-078cf4007b536bdb8	Running	t2.micro	2/2 checks passed	No alarms	ap-south-1a	ec2-13-233-85-240.ap-...	13.233.85.240
DEV	i-0b6755f0c4608fbb1	Running	t2.micro	2/2 checks passed	No alarms	ap-south-1a	ec2-15-206-27-23.ap-s...	15.206.27.23
QA	i-04d543d133410bd45	Running	t2.micro	2/2 checks passed	No alarms	ap-south-1a	ec2-43-205-211-231.ap...	43.205.211.231

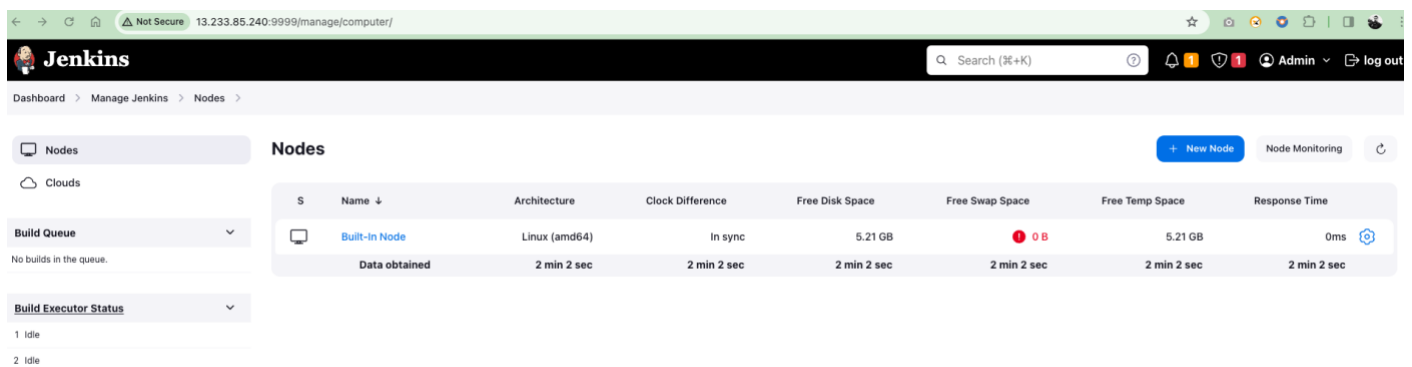
Refer below articles to create EC2 instance and setup Jenkins.

[https://www.linkedin.com/posts/surajkhopkar\\_continuouslearning-automationwithjatin-awscloud-activity-7135000349144211457-0B\\_S?utm\\_source=share&utm\\_medium=member\\_desktop](https://www.linkedin.com/posts/surajkhopkar_continuouslearning-automationwithjatin-awscloud-activity-7135000349144211457-0B_S?utm_source=share&utm_medium=member_desktop)

[https://www.linkedin.com/posts/surajkhopkar\\_continuouslearning-aws-ec2-activity-7136373221200719873-tP76?utm\\_source=share&utm\\_medium=member\\_desktop](https://www.linkedin.com/posts/surajkhopkar_continuouslearning-aws-ec2-activity-7136373221200719873-tP76?utm_source=share&utm_medium=member_desktop)

**2** Navigate to Jenkins URL (<http://13.233.85.240:9999/>) and login.

**3** Navigate to Dashboard > Manage Jenkins > Nodes



The screenshot shows the Jenkins 'Nodes' page. It displays a table with node information. The 'Built-in Node' is shown with details like Architecture (Linux (amd64)), Clock Difference (In sync), Free Disk Space (5.21 GB), Free Swap Space (0 B), Free Temp Space (5.21 GB), and Response Time (0ms).

S	Name	Architecture	Clock Difference	Free Disk Space	Free Swap Space	Free Temp Space	Response Time
	Built-in Node	Linux (amd64)	In sync	5.21 GB	0 B	5.21 GB	0ms
	Data obtained	2 min 2 sec	2 min 2 sec	2 min 2 sec	2 min 2 sec	2 min 2 sec	2 min 2 sec

**4** Click on New Node. Assign Node name and make it as Permanent Agent. Click on Create.

Name <sup>?</sup>

Description <sup>?</sup>

Plain text [Preview](#)

Number of executors <sup>?</sup>

Remote root directory <sup>?</sup>

❗ Remote directory is mandatory

Labels <sup>?</sup>

Usage <sup>?</sup>

Launch method <sup>?</sup>

- Enter Description.
- Number of executors: Number of parallel executions we need. As we are using t2 micro instance which is a free tier having only 1 core available, will keep it as low as possible, say 3.
- Remote directory keep it as empty.
- Enter label as say DEV. (We can have multiple labels)
- Under usage, select "Only build jobs with label expressions matching this node". This will allow to trigger build only when we pass the specific label.
- Under Launch method, select "Launch agent by connecting it to the controller"
- Select "Use WebSocket"WebSocket - Connection technique for two java based applications from different servers.
- Save the changes.

## Nodes

[+ New Node](#) [Node Monitoring](#) [↻](#)

S	Name ↓	Architecture	Clock Difference	Free Disk Space	Free Swap Space	Free Temp Space	Response Time
	Built-in Node	Linux (amd64)	In sync	5.21 GB	<span style="color: red;">❗ 0 B</span>	5.21 GB	0ms 
	DEV		N/A	N/A	N/A	N/A	N/A 
Data obtained		9 ms	8 ms	6 ms	16 min	16 min	16 min

## 5 Navigate to DEV

#### Run from agent command line: (Unix)

```
curl -sO http://13.233.85.240:9999/jnlpJars/agent.jar
java -jar agent.jar -jnlpUrl http://13.233.85.240:9999/computer/DEV/jenkins-agent.jnlp -secret e892c2fcb09fe1db9d3ddaaa7ebfb2c5451347fc584f5fe2ea750b9365f13f5 -workDir ""
```

#### Run from agent command line: (Windows)

```
curl.exe -sO http://13.233.85.240:9999/jnlpJars/agent.jar
java -jar agent.jar -jnlpUrl http://13.233.85.240:9999/computer/DEV/jenkins-agent.jnlp -secret e892c2fcb09fe1db9d3ddaaa7ebfb2c5451347fc584f5fe2ea750b9365f13f5 -workDir ""
```

#### Or run from agent command line, with the secret stored in a file: (Unix)

```
echo e892c2fcb09fe1db9d3ddaaa7ebfb2c5451347fc584f5fe2ea750b9365f13f5 > secret-file
curl -sO http://13.233.85.240:9999/jnlpJars/agent.jar
java -jar agent.jar -jnlpUrl http://13.233.85.240:9999/computer/DEV/jenkins-agent.jnlp -secret @secret-file -workDir ""
```

#### Or run from agent command line, with the secret stored in a file: (Windows)

```
echo e892c2fcb09fe1db9d3ddaaa7ebfb2c5451347fc584f5fe2ea750b9365f13f5 > secret-file
curl.exe -sO http://13.233.85.240:9999/jnlpJars/agent.jar
java -jar agent.jar -jnlpUrl http://13.233.85.240:9999/computer/DEV/jenkins-agent.jnlp -secret @secret-file -workDir ""
```

Note: PowerShell users must use curl.exe instead of curl because curl is a default PowerShell cmdlet alias for Invoke-WebRequest.

#### Projects tied to DEV

Node is added but it is still offline. We will have to execute above commands based on the OS.

**6** Connect to slave instance(Dev) and execute below commands to connect DEV to Master.

*sudo su*

```
curl -sO http://13.233.85.240:9999/jnlpJars/agent.jar
java -jar agent.jar -jnlpUrl http://13.233.85.240:9999/computer/DEV/jenkins-agent.jnlp -secret e892c2fcb09fe1db9d3ddaaa7ebfb2c5451347fc584f5fe2ea750b9365f13f5 -workDir ""
```

```
ubuntu@ip-172-31-38-69:~$ sudo su
root@ip-172-31-38-69:/home/ubuntu# curl -sO http://13.233.85.240:9999/jnlpJars/agent.jar
root@ip-172-31-38-69:/home/ubuntu# ls
agent.jar
root@ip-172-31-38-69:/home/ubuntu# java -jar agent.jar -jnlpUrl http://13.233.85.240:9999/computer/DEV/jenkins-agent.jnlp -secret e892c2fcb09fe1db9d3ddaaa7ebfb2c5451347fc584f5fe2ea750b9365f13f5 -workDir ""
Dec 02, 2023 3:25:47 PM org.jenkinsci.remoting.engine.WorkDirManager initializeWorkDir
INFO: Using /remoting as a remoting work directory
Dec 02, 2023 3:25:47 PM org.jenkinsci.remoting.engine.WorkDirManager setupLogging
INFO: Both error and output logs will be printed to /remoting
Dec 02, 2023 3:25:47 PM hudson.remoting.jnlp.Main createEngine
INFO: Setting up agent: DEV
Dec 02, 2023 3:25:47 PM hudson.remoting.Engine startEngine
INFO: Using Remoting version: 3160.vd76b_9ddd10cc
Dec 02, 2023 3:25:47 PM org.jenkinsci.remoting.engine.WorkDirManager initializeWorkDir
INFO: Using /home/ubuntu/remoting as a remoting work directory
Dec 02, 2023 3:25:48 PM hudson.remoting.jnlp.Main$CuiListener status
INFO: WebSocket connection open
Dec 02, 2023 3:25:48 PM hudson.remoting.jnlp.Main$CuiListener status
INFO: Connected
```

Nodes

Clouds

Build Queue

Build Executor Status

Nodes

S	Name ↓	Architecture	Clock Difference	Free Disk Space	Free Swap Space	Free Temp Space
	Built-In Node	Linux (amd64)	In sync	5.21 GB	0 B	5.21 GB
	DEV	Linux (amd64)	4.2 sec ahead	N/A	N/A	N/A
Data obtained		62 ms	0.22 sec	12 min	12 min	12 min

Built-In Node

- 1 Idle
- 2 Idle

DEV

- 1 Idle
- 2 Idle
- 3 Idle

We can above, under DEV we have 3 executors added(maximum parallel executions possible). Built-in node is Master node.

Let's repeat Steps 4 and 5 for QA instance.

Dashboard > Manage Jenkins > Nodes

### Nodes

[+ New Node](#) [Node Monitoring](#)

Name	Architecture	Clock Difference	Free Disk Space	Free Swap Space	Free Temp Space	Response Time
Built-in Node	Linux (amd64)	In sync	5.21 GB	0 B	5.21 GB	0ms
DEV	Linux (amd64)	In sync	5.60 GB	0 B	5.60 GB	297ms
QA	Linux (amd64)	In sync	5.60 GB	0 B	5.60 GB	141ms

**Build Queue**  
No builds in the queue.

**Build Executor Status**

- Built-in Node**
  - 1 Idle
  - 2 Idle
- DEV**
  - 1 Idle
  - 2 Idle
  - 3 Idle
- QA**
  - 1 Idle
  - 2 Idle

**Summary:**  
Data obtained: 1 sec, Clock Difference: 0.97 sec, Free Disk Space: 0.97 sec, Free Swap Space: 0.96 sec, Free Temp Space: 0.97 sec, Response Time: 0.99 sec

## 7 Create a sample freestyle project in Jenkins.

- Click on New Item -> Enter Project Name -> Click OK

Dashboard > SampleProject > Configuration

### Configure

**General** [Source Code Management](#) [Build Triggers](#) [Build Environment](#) [Build Steps](#) [Post-build Actions](#)

Enabled [?](#)

Description: this is sample project

Plain text [Preview](#)

- ☐ Discard old builds [?](#)
- ☐ GitHub project
- ☐ This project is parameterized [?](#)
- ☐ Throttle builds [?](#)
- ☐ Execute concurrent builds if necessary [?](#)
- ☒ Restrict where this project can be run [?](#)
  - Label Expression: DEV
  - Label DEV matches 1 node. Permissions or other restrictions provided by plugins may further reduce that list.

- Under configuration, enable "Restrict where project can be run" and add label as DEV.

### Build Steps

**Execute shell** [?](#)

Command

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

```
pwd
ls
echo 'this is sample project'
```

Advanced [v](#)

Add build step [v](#)

- Add basic build steps to execute and Save the changes.

\*\*\* When we click Build Now, Master will delegate the job to DEV(slave) as per the label passed and build will be executed.

Dashboard > SampleProject > #2 > Console Output

Status

</> Changes

 Console Output

 View as plain text

 Edit Build Information

 Delete build '#2'

 Previous Build

 Console Output

```
Started by user Admin
Running as SYSTEM
Building remotely on DEV in workspace /home/ubuntu/workspace/SampleProject
[SampleProject] $ /bin/sh -xe /tmp/jenkins256980424796425412.sh
+ pwd
/home/ubuntu/workspace/SampleProject
+ ls
+ echo this is sample project
this is sample project
Finished: SUCCESS
```

Do reach out to me in case of any Questions. Happy Learning. 😊