

120A3051

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Batch: E3

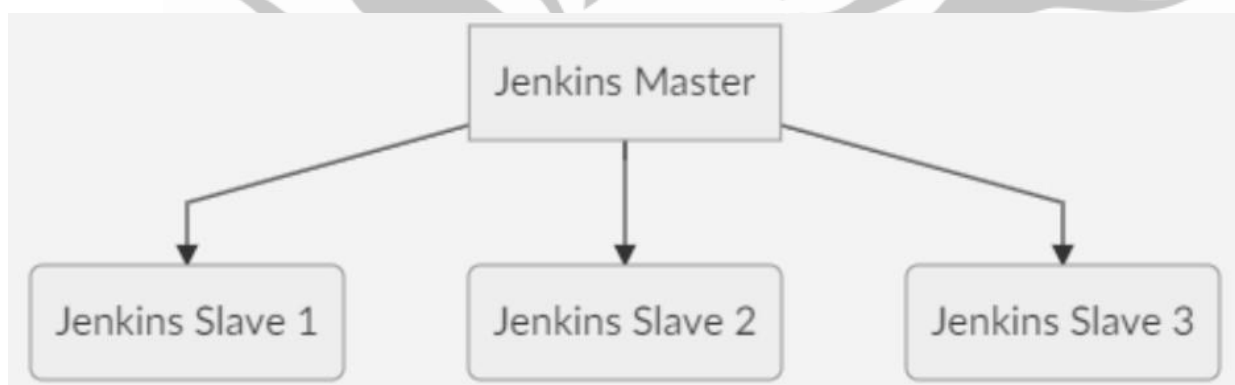
## Experiment No: 6

**AIM:** To study Jenkins Master-Slave Architecture to scale your Jenkins standalone implementation by implementing slave nodes.

### THEORY:

Jenkins is a free and open-source automation server. It helps automate the parts of software development related to building, testing, and deploying, facilitating continuous integration and continuous delivery. It is a server-based system that runs in servlet containers such as Apache Tomcat.

### Jenkins Master and Slave Architecture



The Jenkins master acts to schedule the jobs and assign slaves and send builds to slaves to execute the jobs. It will also monitor the slave state (offline or online) and getting back the build result responses from slaves and the display build results on the console output. The workload of building jobs is delegated to multiple slaves.

### Jenkins Master

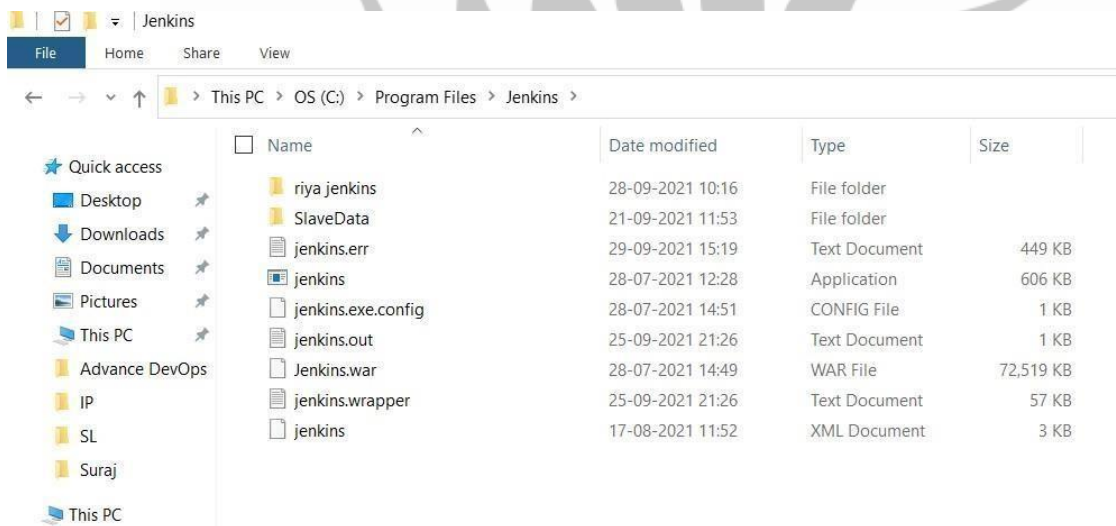
Your main Jenkins server is the Master. The Master's job is to handle:

- Scheduling build jobs.
- Dispatching builds to the slaves for the actual execution.
- Monitor the slaves (possibly taking them online and offline as required).
- Recording and presenting the build results.
- A Master instance of Jenkins can also execute build jobs directly.

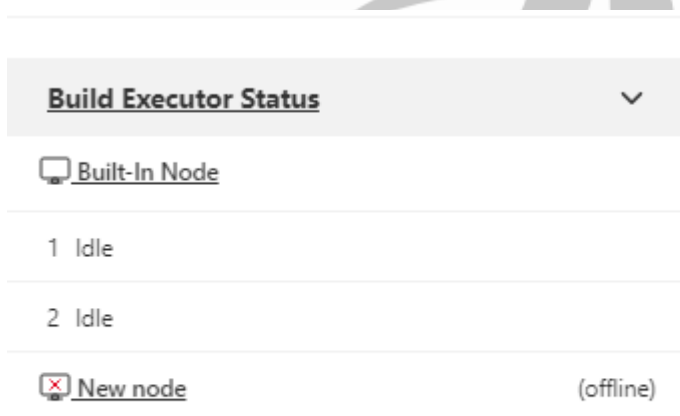
## Jenkins Slave

- A Slave is a Java executable that runs on a remote machine. Following are the characteristics of Jenkins Slaves:
- It hears requests from the Jenkins Master instance.
- Slaves can run on a variety of operating systems.
- The job of a Slave is to do as they are told to, which involves executing build jobs dispatched by the Master.
- You can configure a project to always run on a particular Slave machine or a particular type of Slave machine, or simply let Jenkins pick the next available Slave.

Step 1: Create a workspace by creating a folder anywhere in your system



Step 2: Create a new node with the following configuration:



Nodes [jenkins]

localhost:8080/computer/

Jenkins

Search

Shreya Idate

log out

Dashboard > Nodes >

Back to Dashboard

Manage Jenkins

New Node

Configure Clouds

Node Monitoring

Build Queue

No builds in the queue.

Build Executor Status

Built-In Node

1 Idle

2 Idle

New node (offline)

Manage nodes and clouds

Refresh status

| S | Name ↓        | Architecture       | Clock Difference | Free Disk Space | Free Swap Space | Free Temp Space | Response Time |
|---|---------------|--------------------|------------------|-----------------|-----------------|-----------------|---------------|
|   | Built-In Node | Windows 10 (amd64) | In sync          | 123.25 GB       | 6.82 GB         | 123.25 GB       | 0ms           |
|   | New node      |                    | N/A              | N/A             | N/A             | N/A             | N/A           |
|   | last checked  | 20 min             | 20 min           | 20 min          | 19 min          | 20 min          | 20 min        |

Dashboard &gt; Nodes &gt;

Back to Dashboard

Manage Jenkins

New Node

Configure Clouds

Node Monitoring

Build Queue

No builds in the queue.

Build Executor Status

Built-In Node

1 Idle

2 Idle

New node (offline)

New node

Node name

NewNodeShreya

Type

Permanent Agent

Adds a plain, permanent agent to Jenkins. This is called "permanent" because Jenkins doesn't provide higher level of integration with these agents, such as dynamic provisioning. Select this type if no other agent types apply — for example such as when you are adding a physical computer, virtual machines managed outside Jenkins, etc.

Copy Existing Node

Create

Name ?

NewNodeShreya

Description ?

new node

Number of executors ?

3

Remote root directory ?

C:\Program Files\Jenkins\SlaveData

Labels ?

N1

Usage ?

Use this node as much as possible

Launch method ?

Launch agent by connecting it to the controller

Launch method ?

Launch agent by connecting it to the controller

☐ Disable WorkDir ?

Custom WorkDir path ?

Internal data directory ?

remoting

☐ Fail if workspace is missing ?☒ Use WebSocket ?

Advanced...

Availability ?

Keep this agent online as much as possible

**Node Properties**☐ Disable deferred wipeout on this node ?☐ Environment variables☐ Tool Locations

Save

## Manage nodes and clouds

Refresh  
status

| S            | Name          | Architecture       | Clock Difference | Free Disk Space | Free Swap Space | Free Temp Space | Response Time |
|--------------|---------------|--------------------|------------------|-----------------|-----------------|-----------------|---------------|
|              | Built-In Node | Windows 10 (amd64) | In sync          | 123.25 GB       | 6.82 GB         | 123.25 GB       | 0ms           |
|              | New node      |                    | N/A              | N/A             | N/A             | N/A             | N/A           |
|              | NewNodeShreya |                    | N/A              | N/A             | N/A             | N/A             | N/A           |
| last checked |               | 2 ms               | 24 min           | 24 min          | 24 min          | 24 min          | 24 min        |

Step 3: Click on launch to download Jenkins agent.jar and click on agent.jar to download it

## Agent NewNodeShreya (new node)

Mark this node temporarily offline

Connect agent to Jenkins one of these ways:

- Launch Launch agent from browser
- Run from agent command line:

```
java -jar agent.jar -jnlpUrl http://localhost:8080/computer/NewNodeShreya/jenkins-agent.jnlp -secret 22fe21eccc21e7c34acd555d788dba6c082bde41f8ac4d9a1077200f3d1f5e19 -workDir "C:\Program Files\Jenkins\SlaveData"
```

Run from agent command line, with the secret stored in a file:

```
echo 22fe21eccc21e7c34acd555d788dba6c082bde41f8ac4d9a1077200f3d1f5e19 > secret-file
java -jar agent.jar -jnlpUrl http://localhost:8080/computer/NewNodeShreya/jenkins-agent.jnlp -secret @secret-file -workDir "C:\Program Files\Jenkins\SlaveData"
```

## Labels

N1

## Projects tied to NewNodeShreya

None

Step 4: Run the following commands being on the same file location where you download above files and observe the status as connected.

|  | <input type="checkbox"/> Name | Date modified    | Type                | Size     |
|--|-------------------------------|------------------|---------------------|----------|
|  | agent                         | 21-09-2021 11:50 | Executable Jar File | 1,467 KB |
|  | jenkins-agent                 | 21-09-2021 11:49 | JNLP File           | 1 KB     |
|  | secret-file                   | 21-09-2021 11:51 | File                | 1 KB     |
|  |                               |                  |                     |          |

Step 5 : run commands in cmd of your slave node

```
C:\Windows\System32\cmd.exe - java -jar agent.jar -jnlpUrl http://localhost:8080/computer/NewNodeShreya/jenkins-agent.jnlp -secret 22fe21eccc21e...
Microsoft Windows [Version 10.0.19044.1466]
(c) Microsoft Corporation. All rights reserved.

C:\Users\exam\Downloads>java -jar agent.jar -jnlpUrl http://localhost:8080/computer/NewNodeShreya/jenkins-agent.jnlp -se
cret 22fe21eccc21e7c34acd555d788dba6c082bde41f8ac4d9a1077200f3d1f5e19 -workDir "C:\Program Files\Jenkins\SlaveData"
Sep 12, 2022 9:34:05 AM org.jenkinsci.remoting.engine.WorkDirManager initializeWorkDir
INFO: Using C:\Program Files\Jenkins\SlaveData\remoting as a remoting work directory
Sep 12, 2022 9:34:05 AM org.jenkinsci.remoting.engine.WorkDirManager setupLogging
INFO: Both error and output logs will be printed to C:\Program Files\Jenkins\SlaveData\remoting
WARNING: A terminally deprecated method in java.lang.System has been called
WARNING: System::setSecurityManager has been called by hudson.remoting.jnlp.Main (file:/C:/Users/exam/Downloads/agent.jar)
WARNING: Please consider reporting this to the maintainers of hudson.remoting.jnlp.Main
WARNING: System::setSecurityManager will be removed in a future release
Sep 12, 2022 9:34:06 AM hudson.remoting.jnlp.Main createEngine
INFO: Setting up agent: NewNodeShreya
Sep 12, 2022 9:34:06 AM hudson.remoting.jnlp.Main$CuiListener <init>
INFO: Jenkins agent is running in headless mode.
Sep 12, 2022 9:34:06 AM hudson.remoting.Engine startEngine
INFO: Using Remoting version: 4.13.2
Sep 12, 2022 9:34:06 AM org.jenkinsci.remoting.engine.WorkDirManager initializeWorkDir
INFO: Using C:\Program Files\Jenkins\SlaveData\remoting as a remoting work directory
Sep 12, 2022 9:34:07 AM hudson.remoting.jnlp.Main$CuiListener status
INFO: WebSocket connection open
Sep 12, 2022 9:34:07 AM hudson.remoting.jnlp.Main$CuiListener status
INFO: Connected
```

## Manage nodes and clouds

[Refresh status](#)

| S            | Name 1        | Architecture       | Clock Difference | Free Disk Space | Free Swap Space | Free Temp Space | Response Time |
|--------------|---------------|--------------------|------------------|-----------------|-----------------|-----------------|---------------|
|              | Built-in Node | Windows 10 (amd64) | In sync          | 123.18 GB       | 4.38 GB         | 123.18 GB       | 0ms           |
|              | New node      |                    | N/A              | N/A             | N/A             | N/A             | N/A           |
|              | NewNodeShreya | Windows 10 (amd64) | In sync          | 123.18 GB       | 4.35 GB         | 123.18 GB       | 48ms          |
| last checked |               | 1 min 52 sec       | 1 min 52 sec     | 1 min 52 sec    | 1 min 52 sec    | 1 min 52 sec    | 1 min 52 sec  |

Step 6: Create a new job / item and select the label expression of your slave node under `_Restrict` where this project can be run‘

Enter an item name

» Required field

**Freestyle project**  
This is the central feature of Jenkins. Jenkins will build your project, combining any SCM with any build system, and this can be even used for something other than software build.

**Pipeline**  
Orchestrates long-running activities that can span multiple build agents. Suitable for building pipelines (formerly known as workflows) and/or organizing complex activities that do not easily fit in free-style job type.

**Multi-configuration project**  
Suitable for projects that need a large number of different configurations, such as testing on multiple environments, platform-specific builds, etc.

**Folder**  
Creates a container that stores nested items in it. Useful for grouping things together. Unlike view, which is just a filter, a folder creates a separate namespace, so you can have multiple things of the same name as long as they are in different folders.

**Multibranch Pipeline**  
Creates a set of Pipeline projects according to detected branches in one SCM repository.

**Organization Folder**  
Creates a set of multibranch project subfolders by scanning for repositories.

If you want to create a new item from other existing, you can use this option:

OK

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

**Description**

job to run on node1

[Plain text] [Preview](#)

☐ Discard old builds ?

☐ GitHub project

☐ This project is parameterised ?

☐ Throttle builds ?

☐ Disable this project ?

☐ Execute concurrent builds if necessary ?

☒ Restrict where this project can be run ?

Label Expression ?

N1

Label N1 matches 1 node. Permissions or other restrictions provided by plugins may further reduce that list.

Advanced...

Save

Apply

**Build**

≡ Execute Windows batch command ?

Command

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

echo "node 1 job"

Advanced...

Add build step ▾

**Post-build Actions**

Add post-build action ▾

Save

Apply

## Step 7: Build

### Console Output

```
Started by user Shreya Idate
Running as SYSTEM
Building remotely on NewNodeShreya (N1) in workspace C:\Program Files\Jenkins\SlaveData\workspace\node1job
[node1job] $ cmd /c call C:\Users\exam\AppData\Local\Temp\jenkins17347901884557968340.bat

C:\Program Files\Jenkins\SlaveData\workspace\node1job>echo "node 1 job"
"node 1 job"

C:\Program Files\Jenkins\SlaveData\workspace\node1job>exit 0
Finished: SUCCESS
```

**CONCLUSION:** Successfully studied Jenkins Master-Slave Architecture and scaled Jenkins standalone implementation by implementing slave node.

