

Experiment 6

Aim: To understand Jenkins Master-Slave Architecture and scale your Jenkins standalone implementation by implementing slave nodes.

Theory: Jenkins Distributed Architecture:

Jenkins uses a Master-Slave architecture to manage distributed builds. In this architecture, Master and Slave communicate through TCP/IP protocol.

Jenkins Master:

The 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:

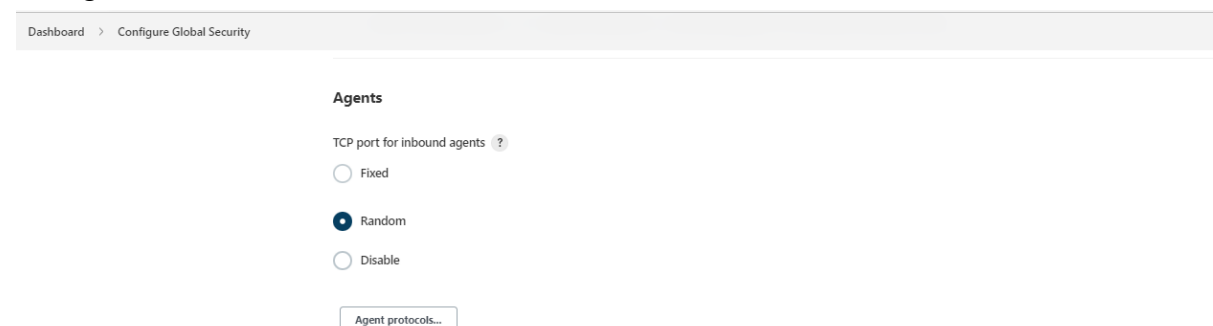
A Slave is a Java executable that runs on a remote machine. Following are the characteristics of Jenkins Slaves:

- 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.
- One 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.

Below are the steps followed to implement the Jenkins Master-Slave architecture:

Output:

Step 1: Start Jenkins and go to Manage Plugins and click on Configure Global Security and Set Agents as Random.



Name: Mrunal Vaidya
Roll : 68

XIE ID: 202003060
Batch: C

Step 2: Create a Node and give the description and remote root directory for your node and click on Save

Dashboard > Nodes > Slave3

↑ Back to List

🔍 Status

🗑️ Delete Agent

⚙️ Configure

📁 Build History

📈 Load Statistics

📄 Script Console

📄 Log

🖨️ System Information

🗑️ Disconnect

Build Executor Status

1 Idle

2 Idle

Name ?

Slave3

Description ?

jenkins Slave3

Number of executors ?

2

Remote root directory ?

C:\Users\IT LAB\Desktop\Slave3

Labels ?

Usage ?

Use this node as much as possible

Launch method ?

Launch agent by connecting it to the controller

Dashboard > Nodes > Slave3

Launch method ?

Launch agent by connecting it to the controller

☐ Disable WorkDir ?

Custom WorkDir path ?

C:\Users\IT LAB\Desktop\Slave3

Internal data directory ?

remoting

☐ Fail if workspace is missing ?

☐ Use WebSocket ?

Advanced...

Availability ?

Keep this agent online as much as possible

Step 3: In Node Properties, add the path of JAVA jdk

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Dashboard > Nodes > Slave3

Availability ?

Keep this agent online as much as possible

Node Properties

☐ Disable deferred wipeout on this node ?

☐ Environment variables

☒ Tool Locations

List of tool locations ?

Name

(DK) MY_JAVA

Home

C:\Program Files\Java\jdk-11.0.16

Add

Save

4. Connect the Slave

```
C:\>java -jar C:/agent2.jar -jnlpUrl http://localhost:8080/computer/Slave3/jenkins-agent.jnlp -workDir "C:\Users\IT LAB\Desktop\Slave3"
Sep 30, 2022 10:02:49 AM org.jenkinsci.remoting.engine.WorkDirManager initializeWorkDir
INFO: Using C:\Users\IT LAB\Desktop\Slave3\remoting as a remoting work directory
Sep 30, 2022 10:02:49 AM org.jenkinsci.remoting.engine.WorkDirManager setupLogging
INFO: Both error and output logs will be printed to C:\Users\IT LAB\Desktop\Slave3\remoting
Sep 30, 2022 10:02:49 AM hudson.remoting.jnlp.Main createEngine
INFO: Setting up agent: Slave3
Sep 30, 2022 10:02:49 AM hudson.remoting.jnlp.Main$CuiListener <init>
INFO: Jenkins agent is running in headless mode.
Sep 30, 2022 10:02:49 AM hudson.remoting.Engine startEngine
INFO: Using Remoting version: 4.13.3
Sep 30, 2022 10:02:49 AM org.jenkinsci.remoting.engine.WorkDirManager initializeWorkDir
INFO: Using C:\Users\IT LAB\Desktop\Slave3\remoting as a remoting work directory
Sep 30, 2022 10:02:49 AM hudson.remoting.jnlp.Main$CuiListener status
INFO: Locating server among [http://localhost:8080/]
Sep 30, 2022 10:02:49 AM org.jenkinsci.remoting.engine.JnlpAgentEndpointResolver resolve
INFO: Remoting server accepts the following protocols: [JNLP4-connect, Ping]
Sep 30, 2022 10:02:49 AM hudson.remoting.jnlp.Main$CuiListener status
INFO: Agent discovery successful
Agent address: localhost
Agent port: 54026
Identity: 3f:19:d6:3e:e8:c1:6e:57:65:53:9c:14:73:ed:79:e9
Sep 30, 2022 10:02:49 AM hudson.remoting.jnlp.Main$CuiListener status
INFO: Handshaking
Sep 30, 2022 10:02:49 AM hudson.remoting.jnlp.Main$CuiListener status
INFO: Connecting to localhost:54026
Sep 30, 2022 10:02:49 AM hudson.remoting.jnlp.Main$CuiListener status
INFO: Trying protocol: JNLP4-connect
Sep 30, 2022 10:02:49 AM org.jenkinsci.remoting.protocol.impl.BIONetworkLayer$Reader run
INFO: Waiting for ProtocolStack to start.
Sep 30, 2022 10:02:49 AM hudson.remoting.jnlp.Main$CuiListener status
INFO: Remote identity confirmed: 3f:19:d6:3e:e8:c1:6e:57:65:53:9c:14:73:ed:79:e9
Sep 30, 2022 10:02:49 AM hudson.remoting.jnlp.Main$CuiListener status
INFO: Connected
```

Step 4: Go back to Nodes and now you can find your Slave3 is online

Dashboard > Nodes >

Manage nodes and clouds

Refresh status

Back to Dashboard

Manage Jenkins

New Node

Configure Clouds

Node Monitoring

Build Queue

No builds in the queue.

Build Executor 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	242.70 GB	12.38 GB	242.70 GB	0ms
	Slave 2	Windows 10 (amd64)	In sync	242.70 GB	12.38 GB	242.70 GB	40ms
	Slave1		N/A	N/A	N/A	N/A	N/A
	Slave3	Windows 10 (amd64)	In sync	242.70 GB	12.35 GB	242.70 GB	54ms
Data obtained		35 min	35 min	35 min	35 min	35 min	35 min

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Step 5: Go to Dashboard and click on New item to create a new project

Dashboard > JavaJDKMru >

General

Source Code Management

Build Triggers

Build Environment

Build

Post-build Actions

Description

Jenkins Slave 3

[Plain text] [Preview](#)

☐ Discard old builds ?

☐ GitHub project

☐ This project is parameterized ?

☐ Throttle builds ?

☐ Disable this project ?

☐ Execute concurrent builds if necessary ?

☒ Restrict where this project can be run ?

Label Expression ?

Slave3

Label Slave3 matches 1 node. Permissions or other restrictions provided by plugins may further reduce that list.

General

Source Code Management

Build Triggers

Build Environment

Build

Post-build Actions

Build

≡ Execute Windows batch command ?

Command

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

echo "Hello, this is Experiment 7"

Advanced...

Add build step ▾

Post-build Actions

Add post-build action ▾

Save

Apply

Step 6: Click on Build now and you will get the output as follows

Dashboard > JavaJDKMru > #3

↑ Back to Project

📄 Status

</> Changes

📄 Console Output

📄 View as plain text

⚙️ Edit Build Information

🗑️ Delete build '3'

← Previous Build

✓ Console Output

Started by user [admin](#)
Running as SYSTEM
Building remotely on [Slave3](#) in workspace C:\Users\IT LAB\Desktop\Slave3\workspace\JavaJDKMru
[JavaJDKMru] \$ cmd /c call C:\Users\ITLAB~1\AppData\Local\Temp\jenkins15634415553358720116.bat

C:\Users\IT LAB\Desktop\Slave3\workspace\JavaJDKMru>echo "Hello, this is Experiment 7"
"Hello, this is Experiment 7"

C:\Users\IT LAB\Desktop\Slave3\workspace\JavaJDKMru>exit 0
Finished: SUCCESS

Dashboard > Nodes > Slave3

↑ Back to List

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📄 Build History

📈 Load Statistics

📄 Script Console

🖥️ Agent Slave3 (jenkins Slave3)

Mark this node temporarily offline

Agent is connected.

Projects tied to Slave3

S	W	Name	Last Success	Last Failure	Last Duration
✓	🔄	JavaJDKMru	21 min #3	21 min #2	0.34 sec

Icon: S M L

Atom feed for all Atom feed for failures Atom feed for just latest builds

Conclusion:

From the above Experiment, we have Implemented the Master Slave architecture in Jenkins, which helped to understand the distributed architecture of Jenkins. In order to implement this experiment, two slave agents/nodes were created and tasks were built.Hence, with this experiment we have achieved the Lab Outcome Four (LO4).

POs Achieved: PO1, PO5, PO12