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Gururaja R Hejamandy,
Shree Mishra &
Arvind K Pachunoori

About the authors: Shree is working as automation test engineer for ICM team under ECM. Arvind and Guru as automation test engineer for Atlas team under ECM. Reach out to the at shreemis@in.ibm.com, gururajarao@in.ibm.com, and apachuno@in.ibm.com

JENKINS-SETTING UP MASTER SLAVE ENVIRONMENT: CREATING MASTER SLAVE ENVIRONMENT IN JENKINS

: Jenkins is an open-source continuous integration software tool written in the Java programming language for testing and reporting on isolated changes in a larger code base in real time. In such case we can configure multiple nodes as slave machines in Jenkins and setup the QA infrastructure in slave machines without any human intervention. When the number, size and duration of your build jobs starts to increase, the Jenkins master starts to struggle, so slaves are a mechanism to off-load work. This allows to handle the project related activities such as Build download, deployment, setting up DB, configuration of application, initiating automation suite and providing meaningful reports.

Jenkins - Setting up Master Slave environment

Introduction

Jenkins is an open-source continuous integration software tool written in the Java programming language for testing and reporting on isolated changes in a larger code base in real time. The software enables developers to find and solve defects in a code base rapidly and to automate testing of their builds. This allows to handle the project related activities such as Build download, deployment, setting up DB, configuration of application, initiating automation suite and providing meaningful reports

In any service or product based project, the application has to be deployed in different machines with different environments. In such case we can configure multiple nodes as slave machines in Jenkins and setup the QA infrastructure in slave machines without any human intervention. Jenkins works on a 'master->many slaves' principle. The master node is responsible for creating jobs and managing the slave nodes, where the jobs are actually performed. The master node is essentially doing management work and farming out preset jobs to the most appropriate site. Each slave then informs the master of the outcome and all of the job results are collated on the master node for easy viewing.

This article explains the step by step process to configure Master slave environment in Jenkins.

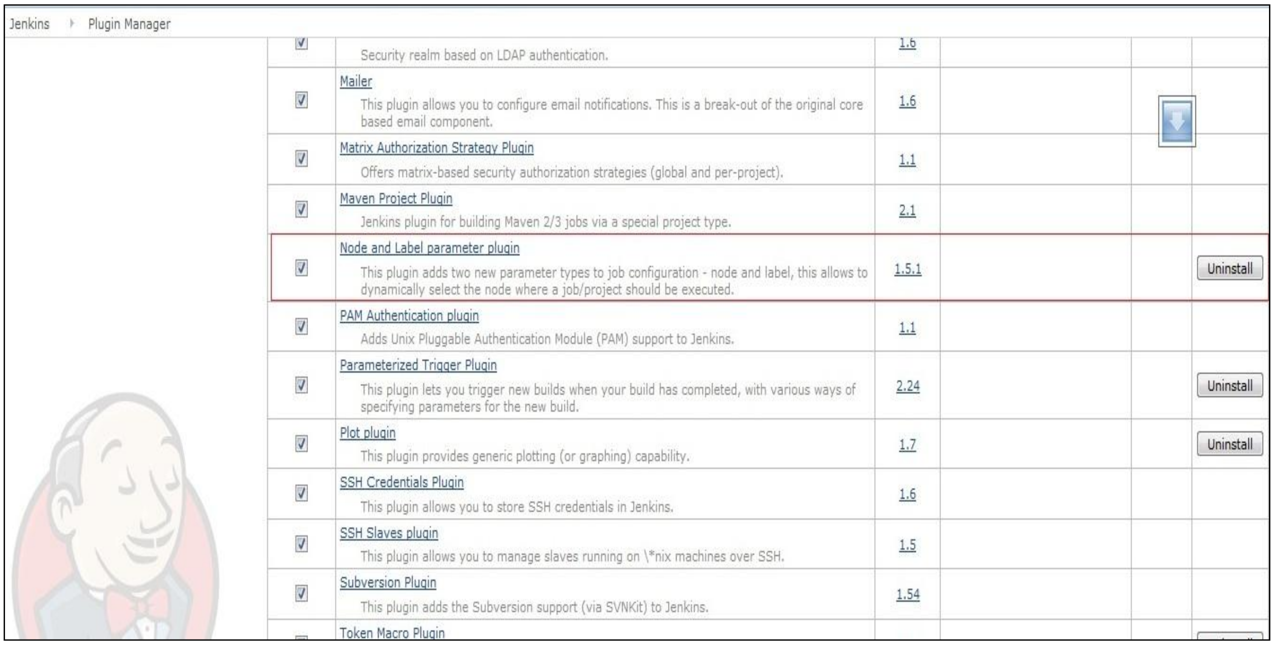
Pre-Requisites

1) Java SDK
2) Download latest Jenkins war file
3) This Jenkins war file has to be started and installed. Refer the following documentation for method to install Jenkins in different OS

   https://wiki.jenkins-ci.org/display/JENKINS/Installing+Jenkins

4) For adding any plug-ins , navigate to Jenkins web interface, go to **Manage Jenkins → Manage Plugins** to add plug-ins
5) For setting up client nodes, add following plug-in to Jenkins as shown below
   a. Node and Label Parameter Plug-in

Figure 1. Node and Label Parameter Plug-in



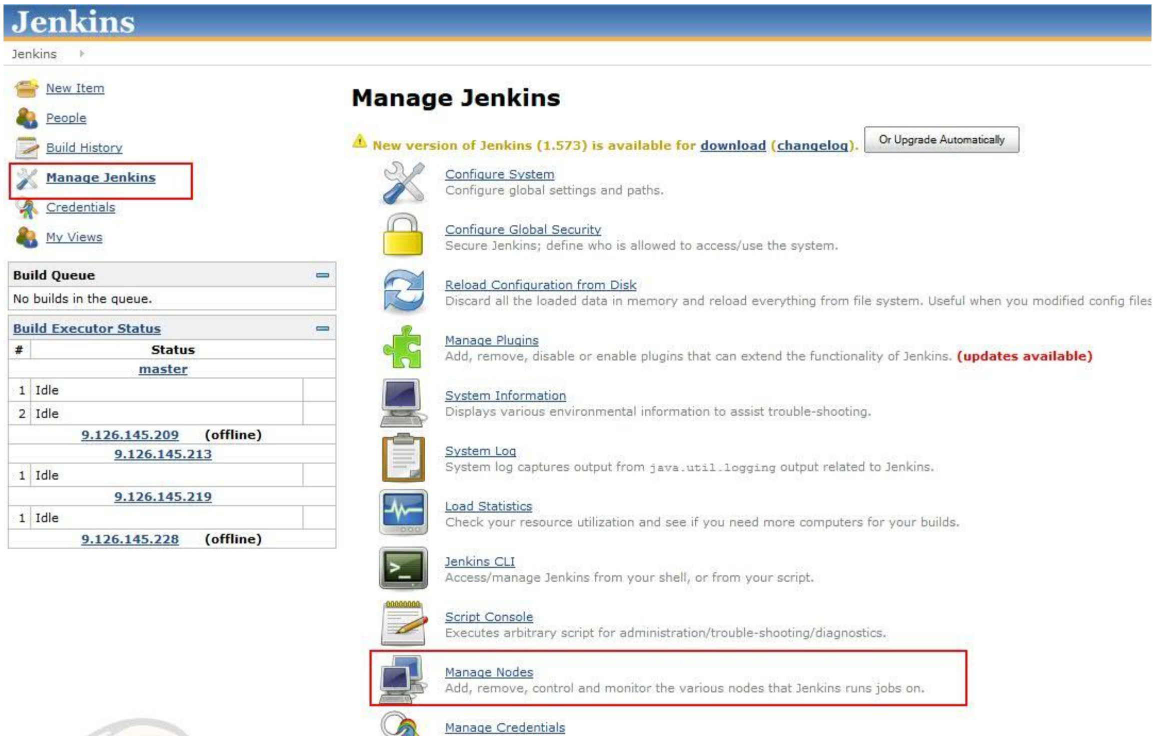
Jenkins › Plugin Manager

☑	Security realm based on LDAP authentication.	1.6	
☑	Mailer This plugin allows you to configure email notifications. This is a break-out of the original core based email component.	1.6	
☑	Matrix Authorization Strategy Plugin Offers matrix-based security authorization strategies (global and per-project).	1.1	
☑	Maven Project Plugin Jenkins plugin for building Maven 2/3 jobs via a special project type.	2.1	
☑	Node and Label parameter plugin This plugin adds two new parameter types to job configuration - node and label, this allows to dynamically select the node where a job/project should be executed.	1.5.1	Uninstall
☑	PAM Authentication plugin Adds Unix Pluggable Authentication Module (PAM) support to Jenkins.	1.1	
☑	Parameterized Trigger Plugin This plugin lets you trigger new builds when your build has completed, with various ways of specifying parameters for the new build.	2.24	Uninstall
☑	Plot plugin This plugin provides generic plotting (or graphing) capability.	1.7	Uninstall
☑	SSH Credentials Plugin This plugin allows you to store SSH credentials in Jenkins.	1.6	
☑	SSH Slaves plugin This plugin allows you to manage slaves running on *nix machines over SSH.	1.5	
☑	Subversion Plugin This plugin adds the Subversion support (via SVNKit) to Jenkins.	1.54	
	Token Macro Plugin		

Setup Guide for master and slave configuration

1) On the master machine go to Manage Jenkins > Manage Nodes.

Figure 2.Manage nodes



No builds in the queue.

#	Status
	master
1	Idle
2	Idle
	9.126.145.209 (offline)
	9.126.145.213
1	Idle
	9.126.145.219
1	Idle
	9.126.145.228 (offline)

Manage Jenkins

New version of Jenkins (1.573) is available for download (changelog).

Configure System
Configure global settings and paths.

Configure Global Security
Secure Jenkins; define who is allowed to access/use the system.

Reload Configuration from Disk
Discard all the loaded data in memory and reload everything from file system. Useful when you modified config files

Manage Plugins
Add, remove, disable or enable plugins that can extend the functionality of Jenkins. **(updates available)**

System Information
Displays various environmental information to assist trouble-shooting.

System Log
System log captures output from `java.util.logging` output related to Jenkins.

Load Statistics
Check your resource utilization and see if you need more computers for your builds.

Jenkins CLI
Access/manage Jenkins from your shell, or from your script.

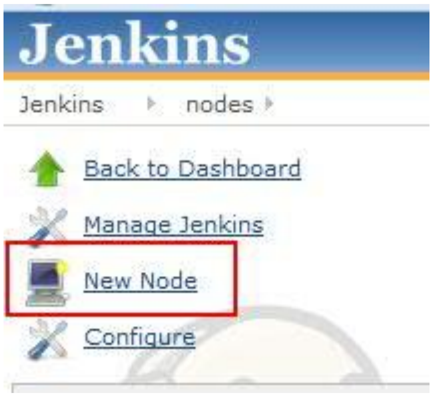
Script Console
Executes arbitrary script for administration/trouble-shooting/diagnostics.

Manage Nodes
Add, remove, control and monitor the various nodes that Jenkins runs jobs on.

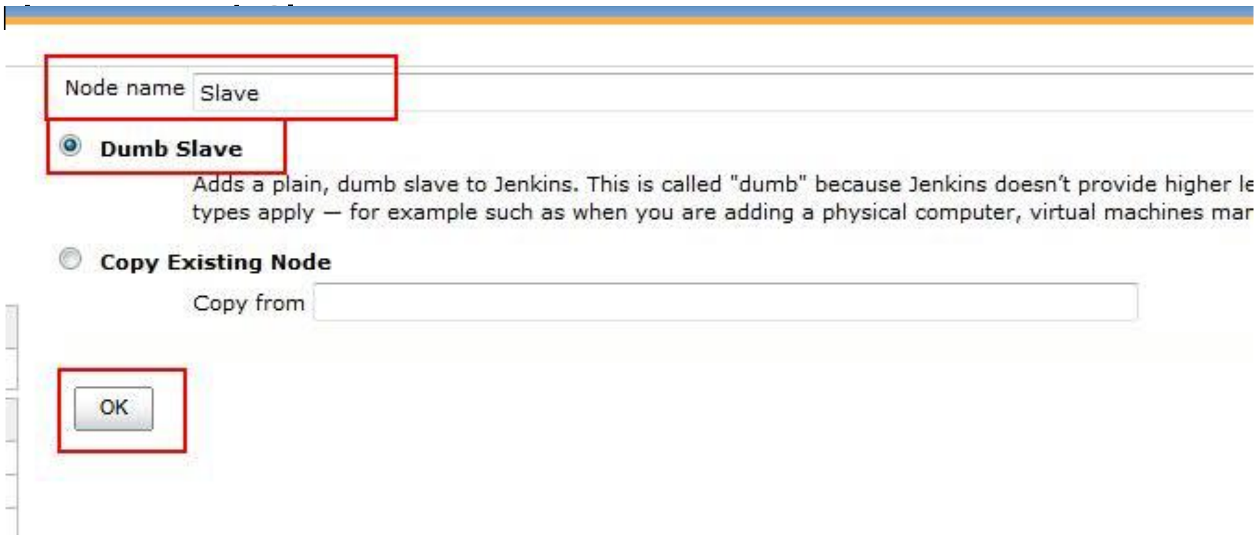
Manage Credentials

2) Click on New Node.

Figure 3. New node



3) Enter the node name and select as Dumb Slave and press OK.



Node name Slave

● **Dumb Slave**

Adds a plain, dumb slave to Jenkins. This is called "dumb" because Jenkins doesn't provide higher le
types apply — for example such as when you are adding a physical computer, virtual machines mar

○ **Copy Existing Node**

Copy from

4) Fill out the following:

   a. Set a **number of executors** (one or more) as needed.
   b. Enter Slave machine for IP (IP address) for (purpose of slave machine) in the description field.
   c. Set a **Remote FS Root**, a home directory for the master on the slave machine. "C:\Jenkins\"
   d. Select the appropriate **Usage** setting:
      a. For an additional worker: *Utilize this slave as much as possible*
      b. For specialized jobs: *Leave this machine for tied jobs only*
   e. **Launch Method**: Multiple options present. Select any one based on requirement

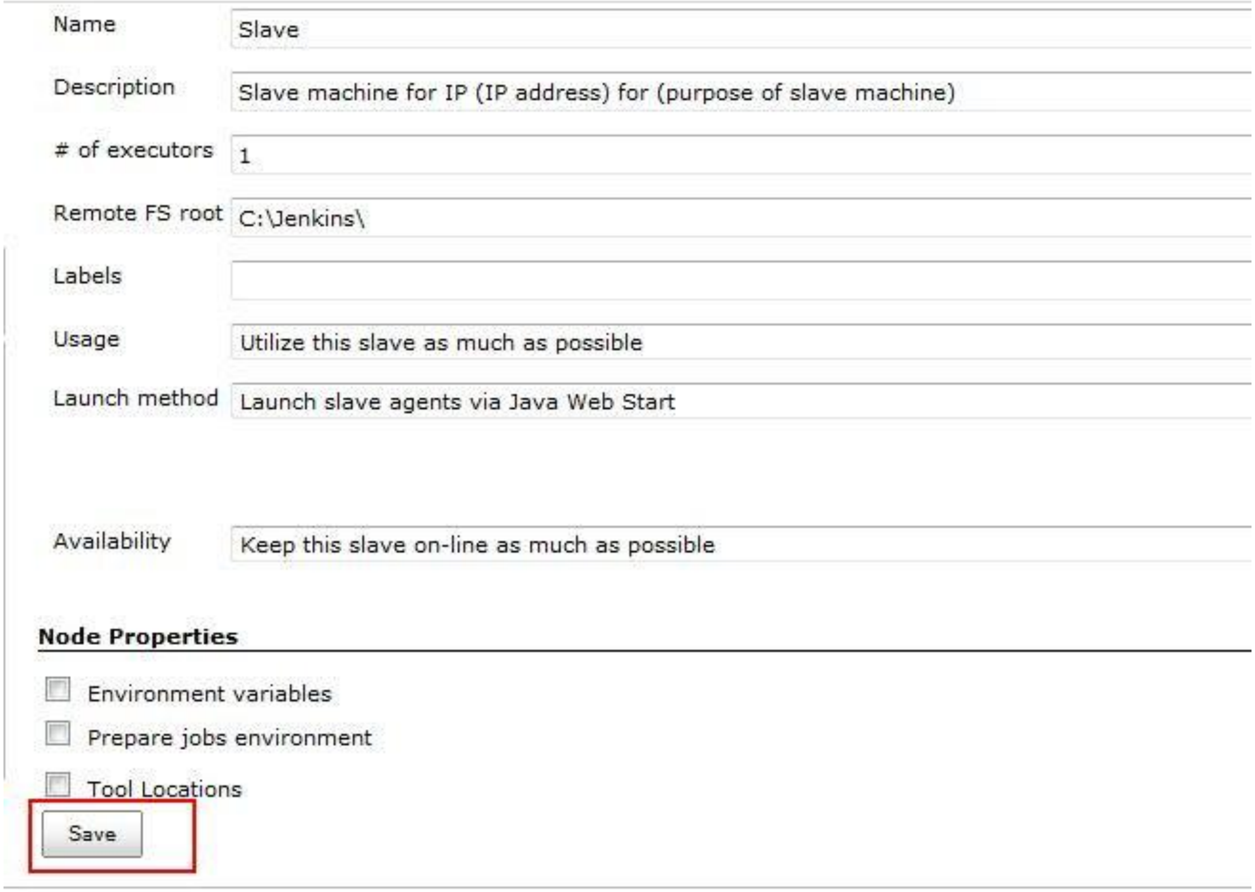
      i. Launch slave agents on Unix machines via SSH **Availability**
      ii. Launch slave agents via Java Web Start
      iii. Launch slave via execution of command on the Master
      iv. Let Jenkins control this Windows slave as a Windows service

   f. Availability: Multiple options present. Select any one based on requirement

      i)Keep this slave on-line as much as possible
      ii)Take this slave on-line according to a schedule
      iii)Take this slave on-line when in demand and off-line when idle

   g. Click Save.

Figure 5. Save the node



Name	Slave
Description	Slave machine for IP (IP address) for (purpose of slave machine)
# of executors	1
Remote FS root	C:\Jenkins\
Labels	
Usage	Utilize this slave as much as possible
Launch method	Launch slave agents via Java Web Start
Availability	Keep this slave on-line as much as possible

Node Properties

□ Environment variables

□ Prepare jobs environment

□ Tool Locations

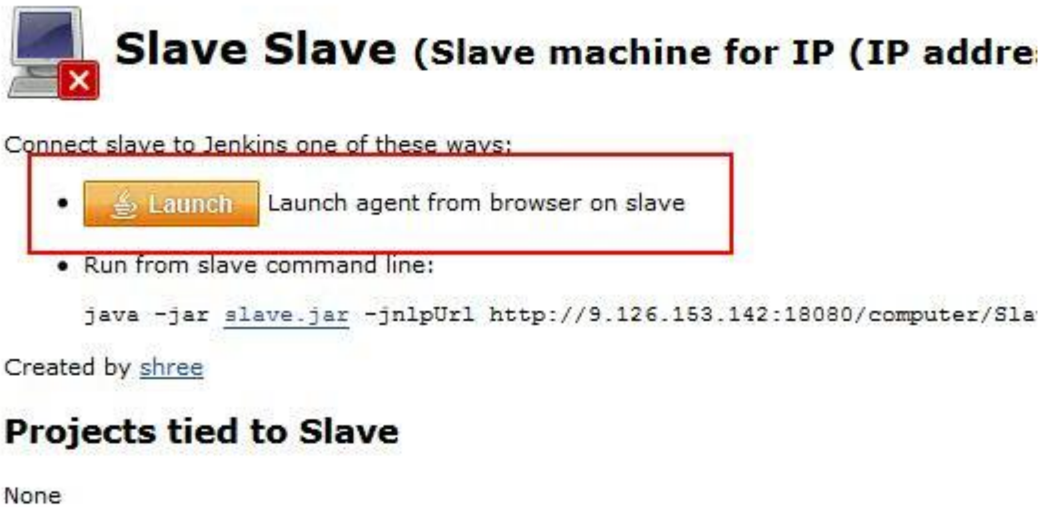
6) Connect the slave machine to the master using the following steps.

i. Open a browser on the **slave machine** and go to the **Jenkins master server** url (http://yourjenkinsmaster:18080).

ii. Go to **Manage Jenkins** > **Manage Nodes**, Click on the newly created slave machine. You will need to login as someone that has the "Connect" Slave permission if you have configured global security.

iii. Click on the **Launch** button to launch agent from browser on slave.

Figure 6. Launch Button



Slave Slave (Slave machine for IP (IP addre

Connect slave to Jenkins one of these ways:

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

```
java -jar slave.jar -jnlpUrl http://9.126.153.142:18080/computer/Sla
```

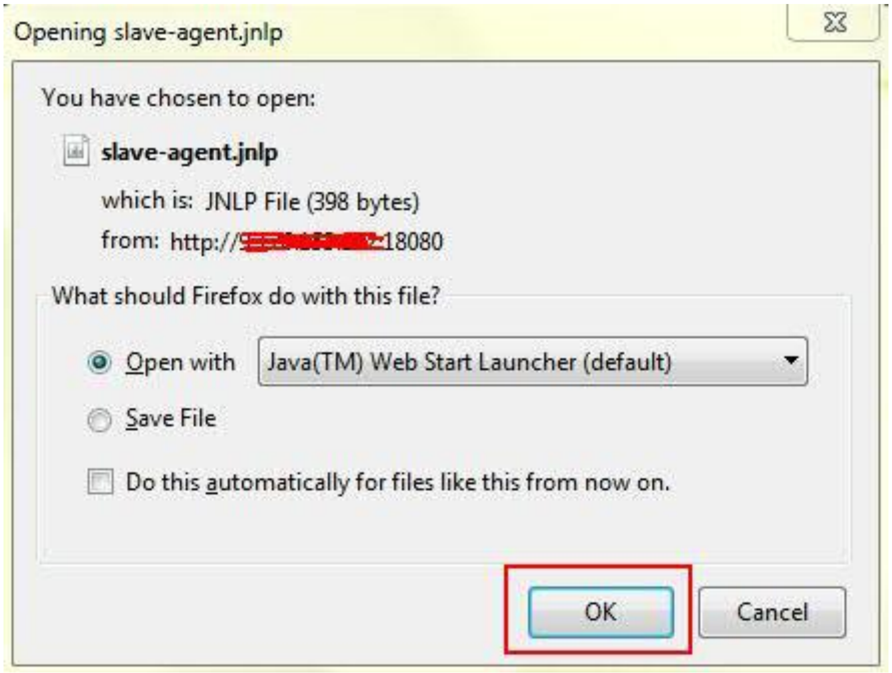
Created by shree

Projects tied to Slave

None

a. Run the program

Figure 7. Run the slave agent.



Opening slave-agent.jnlp

You have chosen to open:

slave-agent.jnlp

which is: JNLP File (398 bytes)

from: http://[redacted]18080

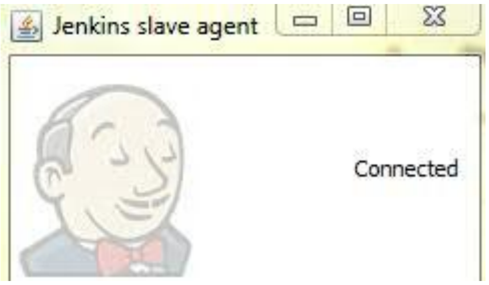
What should Firefox do with this file?

● Open with Java(TM) Web Start Launcher (default)

○ Save File

□ Do this automatically for files like this from now on.

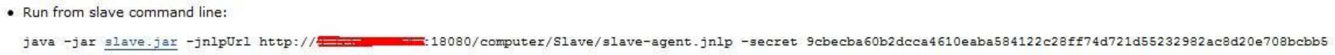
Figure 8. Status of jenkins slave agent



7) Add the slave.jar file under C:\Jenkins.

8) Run from slave command prompt.

Figure 9. Slave command line

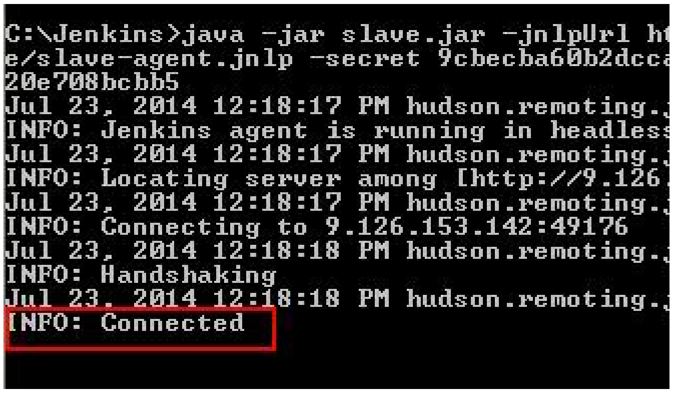


- Run from slave command line:

```
java -jar slave.jar -jnlpUrl http://[redacted]:18080/computer/Slave/slave-agent.jnlp -secret 9cbecba60b2dcca4610eaba584122c28ff74d721d55232982ac8d20e708bcbb5
```

Goto c:\Jenkins in command prompt and paste the above command.

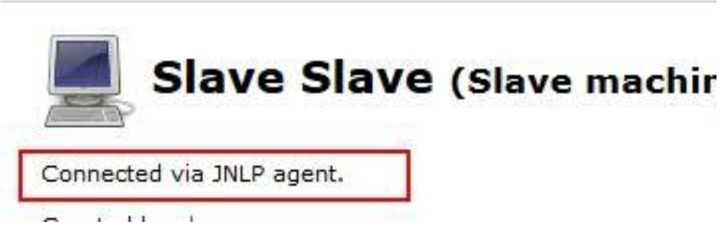
Figure 10. Slave command line status



```
C:\Jenkins>java -jar slave.jar -jnlpUrl ht
e/slave-agent.jnlp -secret 9cbecba60b2dcca
20e708bcbb5
Jul 23, 2014 12:18:17 PM hudson.remoting.j
INFO: Jenkins agent is running in headless
Jul 23, 2014 12:18:17 PM hudson.remoting.j
INFO: Locating server among [http://9.126.
Jul 23, 2014 12:18:17 PM hudson.remoting.j
INFO: Connecting to 9.126.153.142:49176
Jul 23, 2014 12:18:18 PM hudson.remoting.j
INFO: Handshaking
Jul 23, 2014 12:18:18 PM hudson.remoting.j
INFO: Connected
```

9) The slave status is connected under Nodes in jenkins

Figure 11. Jenkins node for slave



Slave Slave (Slave machir

Connected via JNLP agent.

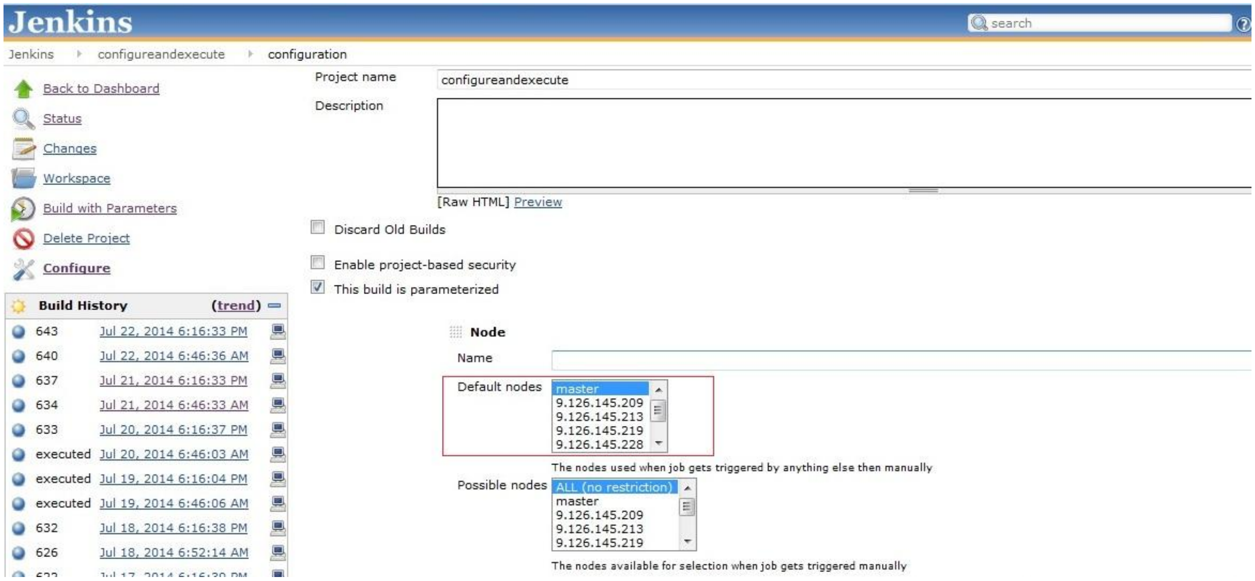
Running Tasks in Slave Node

Once the connection is established between master and slave nodes, the following steps need to be followed to run a task on slave machine

- In slave machine copy all the scripts and relevant files associated with the task
- In Jenkins, select the task to be performed on slave machine
- In Configure page, select the Default Node as IP of slave node where the task need to be run and save
- Select **Build with Parameter link** and select the IP of slave node and Build

Following are the screen shot for Configure page select default Node

Figure 12. Configure the slave



Project name: configureandexecute

Description

[Raw HTML] Preview

□ Discard Old Builds

□ Enable project-based security

☑ This build is parameterized

Node

Name

Default nodes: master (selected), 9.126.145.209, 9.126.145.213, 9.126.145.219, 9.126.145.228

The nodes used when job gets triggered by anything else then manually

Possible nodes: ALL (no restriction) (selected), master, 9.126.145.209, 9.126.145.213, 9.126.145.219

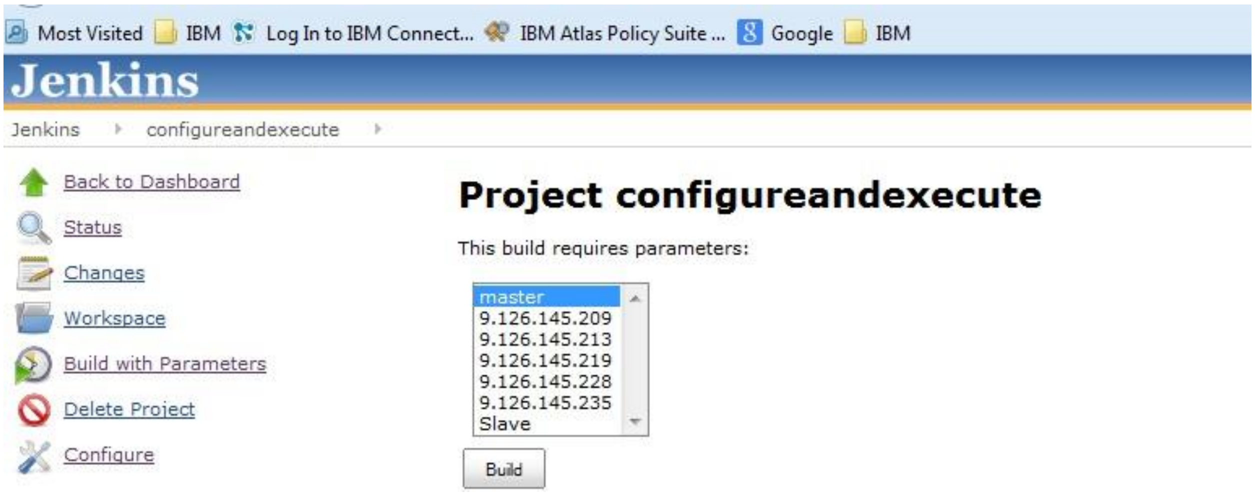
The nodes available for selection when job gets triggered manually

Build History (trend)

643	Jul 22, 2014 6:16:33 PM
640	Jul 22, 2014 6:46:36 AM
637	Jul 21, 2014 6:16:33 PM
634	Jul 21, 2014 6:46:33 AM
633	Jul 20, 2014 6:16:37 PM
executed	Jul 20, 2014 6:46:03 AM
executed	Jul 19, 2014 6:16:04 PM
executed	Jul 19, 2014 6:46:06 AM
632	Jul 18, 2014 6:16:38 PM
626	Jul 18, 2014 6:52:14 AM

To initiate a new job, the slave machine under “**Build with Parameters**” section in the Jenkins needs to be selected as shown in Figure 13.

Figure 13. Project configure and execute



Project configureandexecute

This build requires parameters:

master
9.126.145.209
9.126.145.213
9.126.145.219
9.126.145.228
9.126.145.235
Slave

The task will be initialized in the slave node. Simultaneously tasks can be initiated on multiple slave nodes.

Using this solution, a project or a product can initiate the process of involving different architecture in development as well testing cycle.

Resources

- https://wiki.jenkins-ci.org
- https://wiki.jenkins-ci.org/display/JENKINS/Installing+Jenkins