# 5. Selenium Grid



**What is Selenium Grid?**

- Selenium Grid is a part of the Selenium Suite that specializes on running multiple tests across different browsers, operating systems, and machines in parallel.
- Selenium Grid allows us to execute multiple instances of WebDriver or Selenium Remote Control tests in parallel which uses the same code base, hence the code need NOT be present on the system they execute. The selenium-server-standalone package includes Hub, WebDriver, and Selenium RC to execute the scripts in grid.

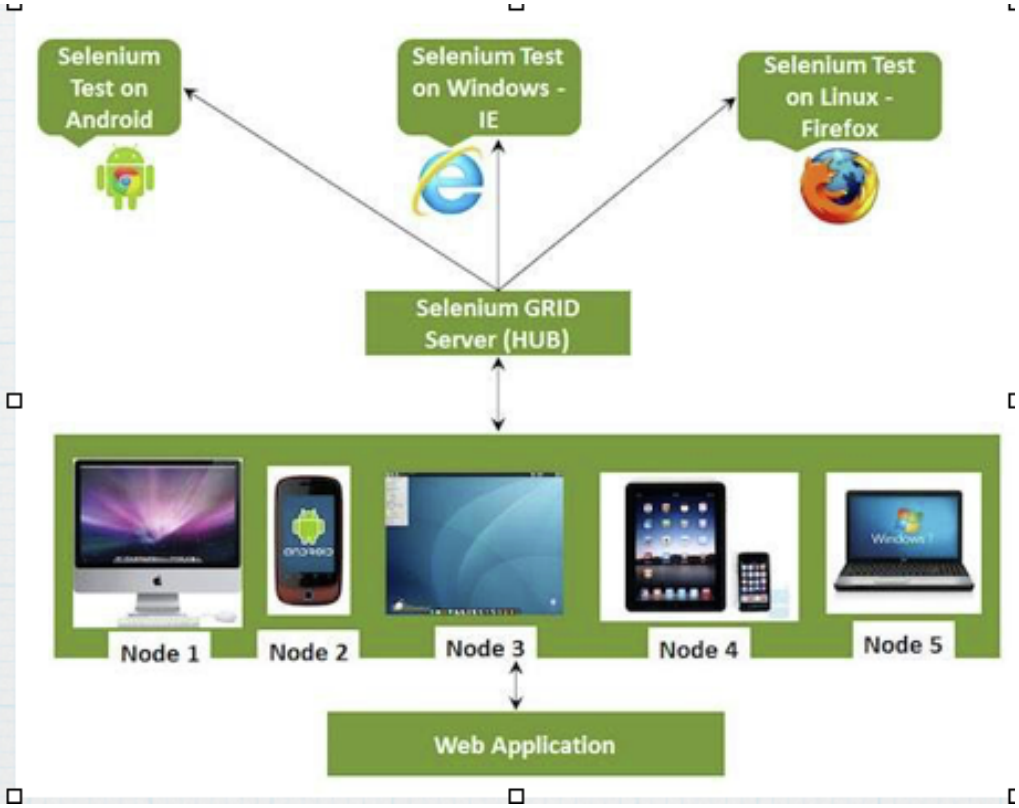
## What is Selenium Grid?

- Selenium Grid has a Hub and a Node.

• **Hub** - The hub can also be understood as a server which acts as the central point where the tests would be triggered. A Selenium Grid has only one Hub and it is launched on a single machine once.

• **Node** - Nodes are the Selenium instances that are attached to the Hub which execute the tests. There can be one or more nodes in a grid which can be of any OS and can contain any of the Selenium supported browsers.

**Architecture**




**Working with Grid**

- In order to work with the Grid, we need to follow certain protocols. Listen below are the major steps involved in this process:
  - Configuring the Hub
  - Configuring the Nodes
  - Develop the Script and Prepare the XML File
  - Test Execution
  - Result Analysis

**Configuring the Hub**

**Step 1** : Download the latest Selenium Server standalone JAR file from http://docs.seleniumhq.org/download/. Download it by clicking on the version as shown below


**Step 2** : Start the Hub by launching the Selenium Server using the following command. Now we will use the port '4444' to start the hub.

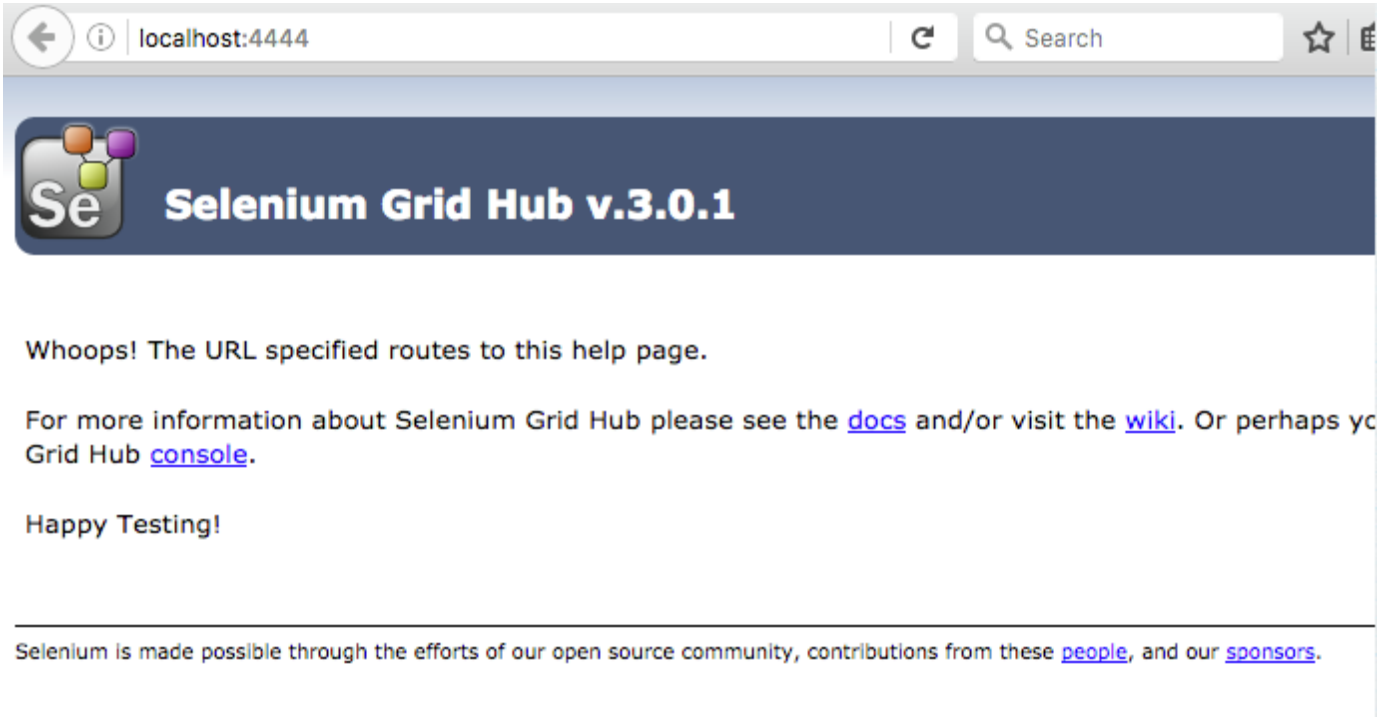
Note : Ensure that there are no other applications that are running on port# 4444.

*- cd to the folder which contains selenium-server-standalone-3.0.1.jar*

*- run terminal*
*java -jar selenium-server-standalone-3.0.1.jar -port 4444 -role hub*

*- cd to the folder which contains selenium-server-standalone-3.0.1.jar*

**Step 3** : Now open the browser and navigate to the URL http//localhost:4444 from the Hub (The system where you have executed Step#2).




**Step 4** : Now click on the 'console' link and click 'view config'. The config of the hub would be displayed as follows. As of now, we haven't got any nodes, hence we will not be able to see the details.


**Configuring the Nodes**

**Step 1** : Logon to the node (where you would like to execute the scripts) and place the 'selenium-server-standalone-3.0.1.jar' in a folder. We need to point to the selenium-server-standalone JAR while launching the nodes.

*- cd to the folder which contains selenium-server-standalone-3.0.1.jar*

*- open other terminal*
*java -jar selenium-server-standalone-3.0.1.jar -port 5555 -role node -hub http://localhost:4444/grid/register -browser "browserName=firefox, maxInstances=10, platform=ANY, seleniumProtocol=WebDriver*

**Step 2** : After executing the command, come back to the Hub. Navigate to the URL - http://localhost:4444 and the Hub would now display the node attached to it.


- Chrome

*MAC: java -Dwebdriver.chrome.=/Users/nguyenthihongthuy/Documents/Teaching/chromedriver -jar selenium-server-standalone-3.0.1.jar -role webdriver -hub http://localhost:4444/grid/register -browser browserName=chrome,platform=ANY -port 5557*

*Windows: java -Dwebdriver.chrome.driver=D:\chromedriver.exe -jar D:\JAR\ selenium-server-standalone-3.0.1.jar -role webdriver -hub http://10.30.217.157:4444/grid/register -browser browserName=chrome,platform=WINDOWS -port 5557*


- IE

*MAC: java -Dwebdriver.ie.driver=D:\IEDriverServer.exe -jar D:\JAR\ selenium-server-standalone-3.0.1.jar -role webdriver -hub http://localhost:4444/grid/register -browser browserName=ie,platform=ANY -port 5558*

*Windows: java -Dwebdriver.ie.driver=D:\IEDriverServer.exe -jar D:\JAR\ selenium-server-standalone-3.0.1.jar -role webdriver -hub http://10.30.217.157:4444/grid/register -browser browserName=ie,platform=WINDOWS -port 5558*

**Codes**

```
if (browser.equalsIgnoreCase("firefox"))

      {

         System.out.println(" Executing on FireFox");

         String Node = "http://10.112.66.52:5555/wd/hub";

         DesiredCapabilities cap = DesiredCapabilities.firefox();

         cap.setBrowserName("firefox");



         driver = new RemoteWebDriver(new URL(Node), cap);

         // Puts an Implicit wait, Will wait for 10 seconds before
throwing exception

         driver.manage().timeouts().implicitlyWait(10,
TimeUnit.SECONDS);



         // Launch website

         driver.navigate().to(URL);

         driver.manage().window().maximize();

      }
```

```
else if (browser.equalsIgnoreCase("chrome"))

      {

         System.out.println(" Executing on CHROME");

         DesiredCapabilities cap = DesiredCapabilities.chrome();

         cap.setBrowserName("chrome");

         String Node = "http://10.112.66.52:5557/wd/hub";

         driver = new RemoteWebDriver(new URL(Node), cap);

         driver.manage().timeouts().implicitlyWait(10,
TimeUnit.SECONDS);



         // Launch website

         driver.navigate().to(URL);

         driver.manage().window().maximize();

      }
```

```
else if (browser.equalsIgnoreCase("ie"))

      {

         System.out.println(" Executing on IE");

         DesiredCapabilities cap = DesiredCapabilities.chrome();

         cap.setBrowserName("ie");

         String Node = "http://10.112.66.52:5558/wd/hub";

         driver = new RemoteWebDriver(new URL(Node), cap);

         driver.manage().timeouts().implicitlyWait(10,
TimeUnit.SECONDS);



         // Launch website

         driver.navigate().to(URL);

         driver.manage().window().maximize();

      }

      else

      {

         throw new IllegalArgumentException("The Browser Type is
Undefined");

      }
```

**Preference**

https://www.tutorialspoint.com/selenium/selenium_grids.htm

http://www.seleniumeasy.com/selenium-tutorials/how-to-configure-selenium-grid

http://www.guru99.com/introduction-to-selenium-grid.html