# How to Lay Down a

# New JVM

# On a Big Data Cluster

By Mason Yu Jr.

In a Hadoop cluster there are many moving parts and a cast of supporting characters. It is not as visual and spectacular as producing an action packed Hollywood movie with a host of A-list actors and beautiful models, however, if the director is out for a period of time, most likely the movie to be made will suffer from a lack of purpose and vision and certainly cant possibly win an Oscar or two.

Working on a project with a small POC, it was discovered that the existing JVM was over two years old. That in itself caused a number of extremely inexplicable errors in the Hadoop system that the only possible way to eliminate the root causes is through laying down a new JVM. It is a job for the faint hearted, but it is an excellent way to understand the technology stack. Big Data means parallel distributed data computation. The corollary to this is Big Data has distributed systems administration. What once was a monolithic operation on a single systems container, it is routine to have dozens of machines. For scalability of systems administration, Puppet and Chef can automate the processes to make the Linux systems administration far less prone for human error and accelerate the deployment process. At time of writing of this paper, a state-of-art deployment tool known as Ansible has been available for general release.

The focus of this write up is to illustrate in detail the number of steps required rather than using a admin automation tool. The starting point of this exercise is at a zero state of entropy where all the Linux daemons are down. This is a permissible state, since the Linux cluster itself is a small development platform.
For a larger Linux cluster, much more coordination and a smaller window of deployment would be necessary.

## Setting the stage

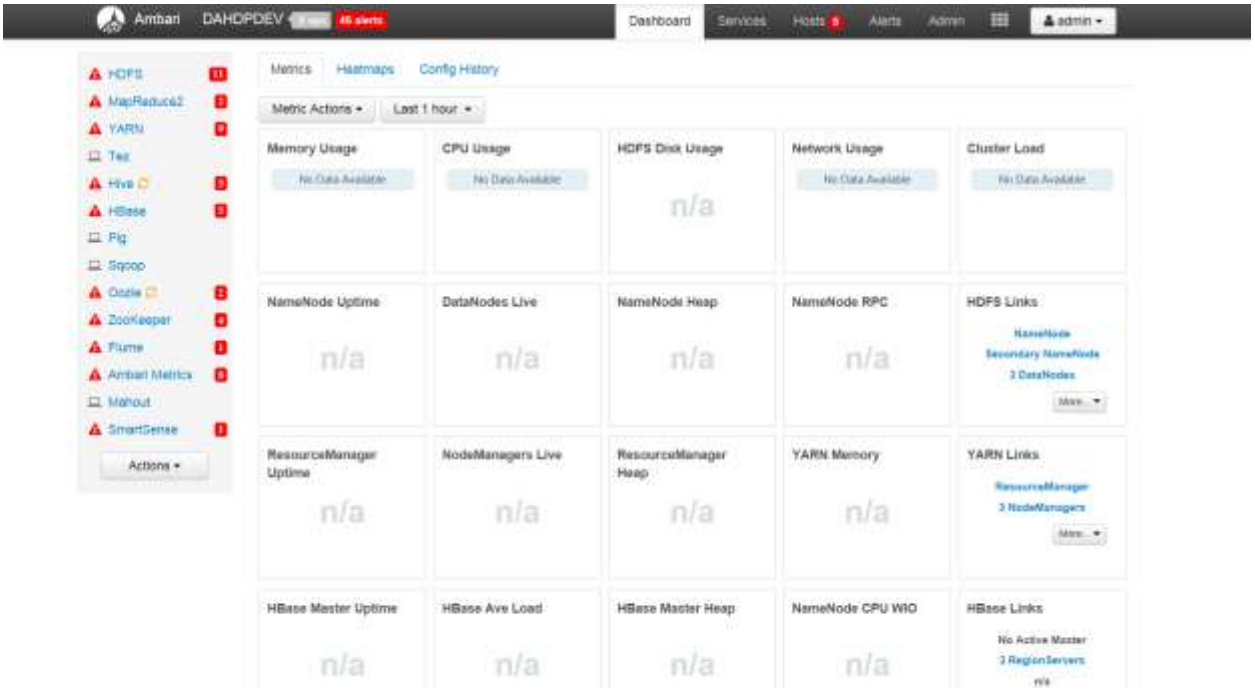
5 Linux instances running Red Hat Enterprise release 6 64 bit

2 Name Nodes, 3 Data Nodes

Remainder of the Hadoop artifacts(refer to the subsequent screenshots)

Hadoop distro – HortonWorks HDP 2.3.2.0

The next page will dive right into the Linux cluster. After the initial login and password, this is the main screen showing the cluster.



Memory Usage: No Data Available
CPU Usage: No Data Available
HDFS Disk Usage: n/a
Network Usage: No Data Available
Cluster Load: No Data Available
NameNode Uptime: n/a
DataNodes Live: n/a
NameNode Heap: n/a
NameNode RPC: n/a
HDFS Links: NameNode, Secondary NameNode, 3 DataNodes, More...
ResourceManager Uptime: n/a
NodeManagers Live: n/a
ResourceManager Heap: n/a
YARN Memory: n/a
YARN Links: ResourceManager, 3 NodeManagers, More...
HBase Master Uptime: n/a
HBase Ave Load: n/a
HBase Master Heap: n/a
NameNode CPU WIO: n/a
HBase Links: No Active Master, 3 RegionServers, n/a

## Swiss army knife

WinSCP - to be downloaded on the Windows machine

Putty – To be downloaded on the Windows machine

Command line skills on Linux

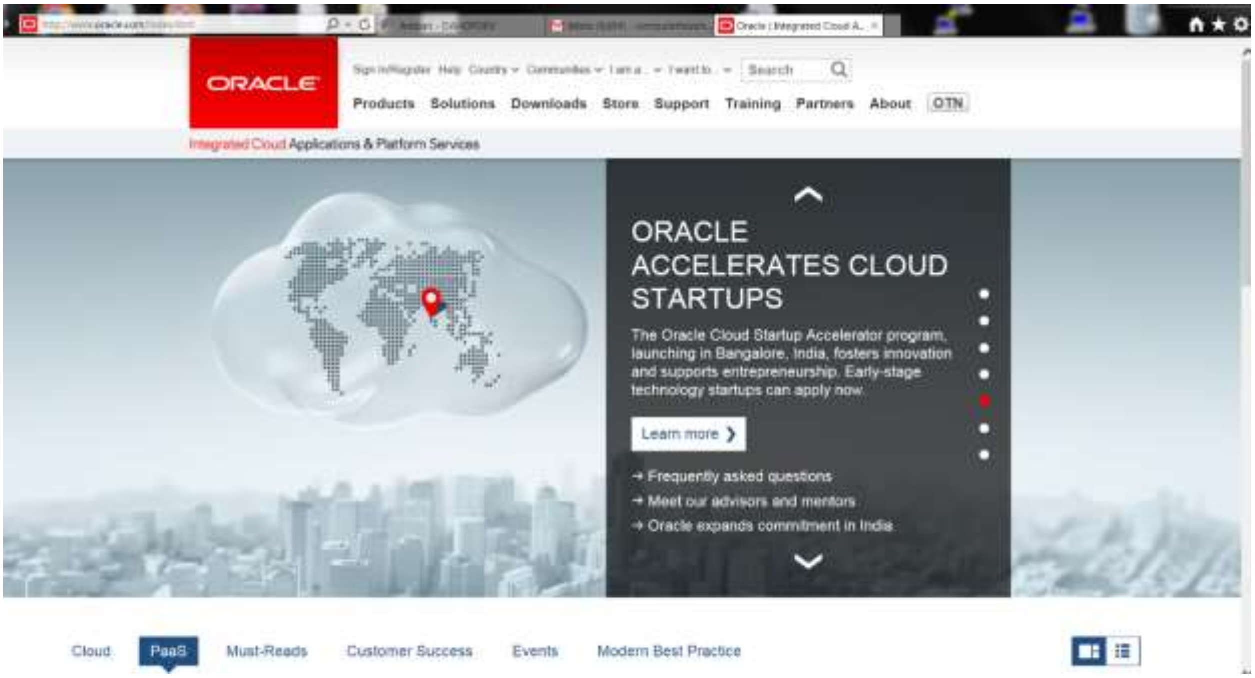
Navigational skills around Ambari

Before creating this document, the entire cluster has been brought down to a ground zero state. This is mandatory, since the Java JVM is the foundation for the Hadoop Big Data services and ecosystem relies upon. This is obvious since the components are written in Java. Over the years, Oracle has continued a long standing effort to enhance the Java packages. In the process of doing so, some of the Java classes and methods have been deprecated. As the authorship and participants in the Apache Open Source group have made software changes using the newest JRE/JDK, the users of the Hadoop system need to upgrade their JRE/JDK systems as well.

Getting back to the main screen, many of the smaller graphs have a n/a. This is because the various Linux daemons representing the Hadoop services have been stopped. The next set of screenshots will lay down the newest JVM/JRE.

The source of the JVM/JRE is none of than Oracle.

On your favorite browser, go to www.oracle.com.  See below: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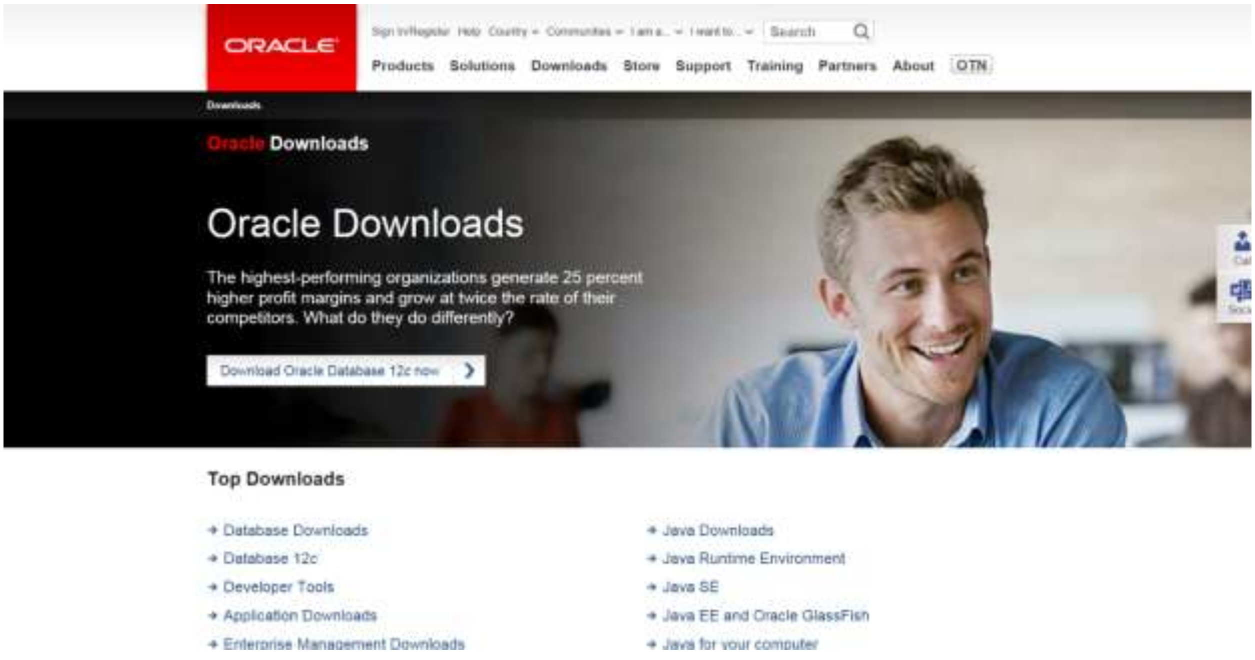
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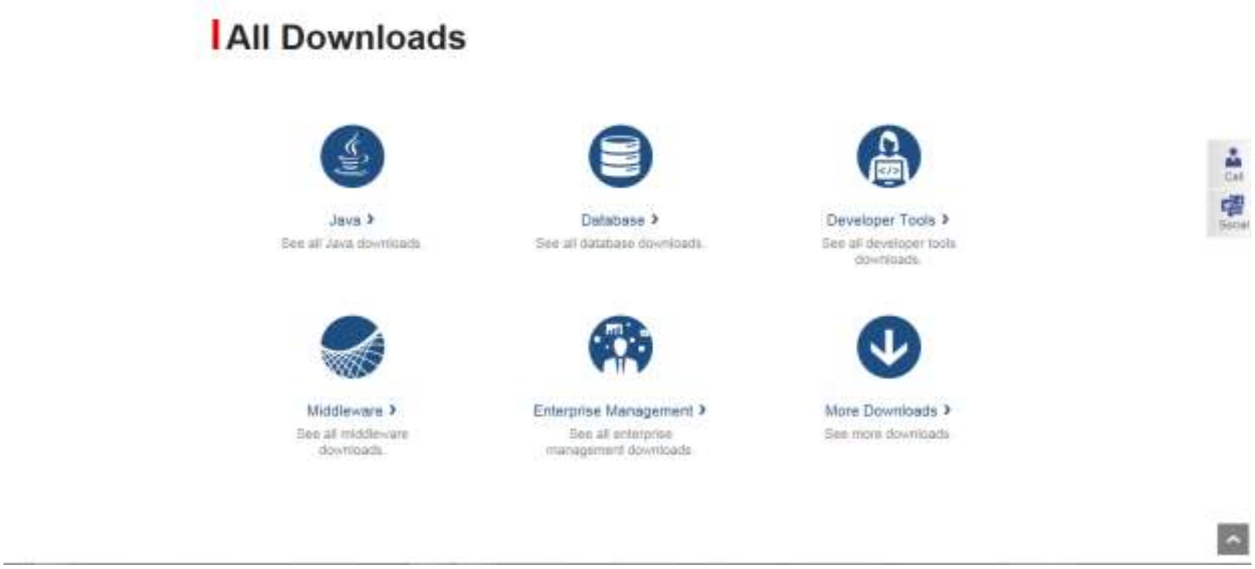

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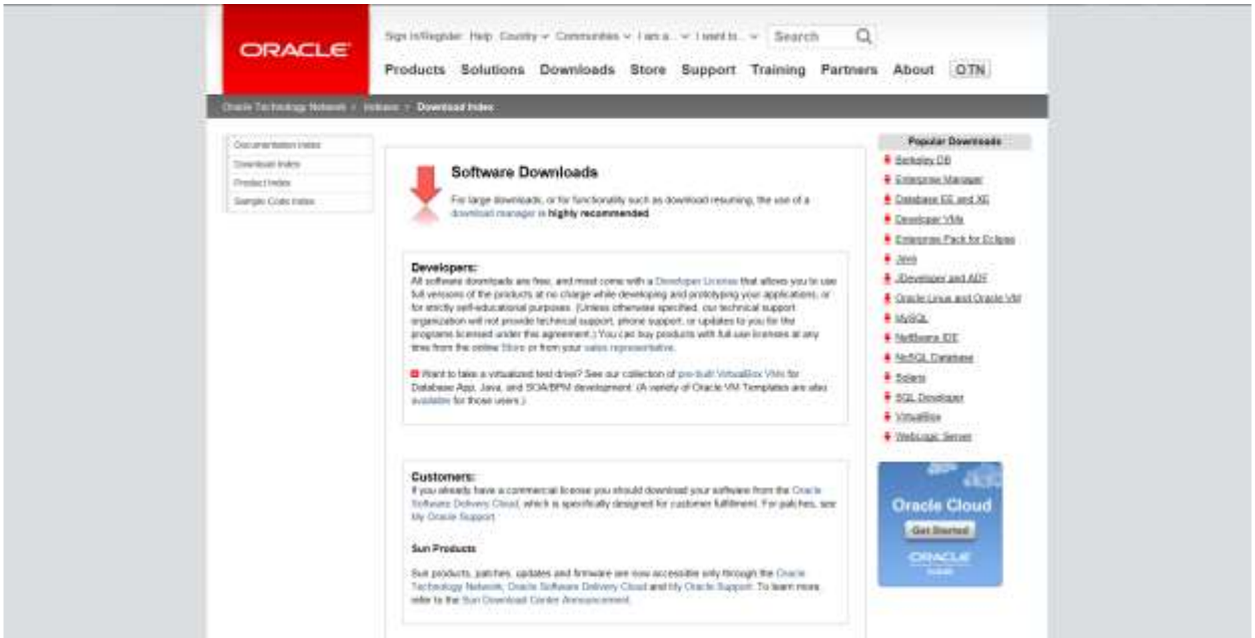

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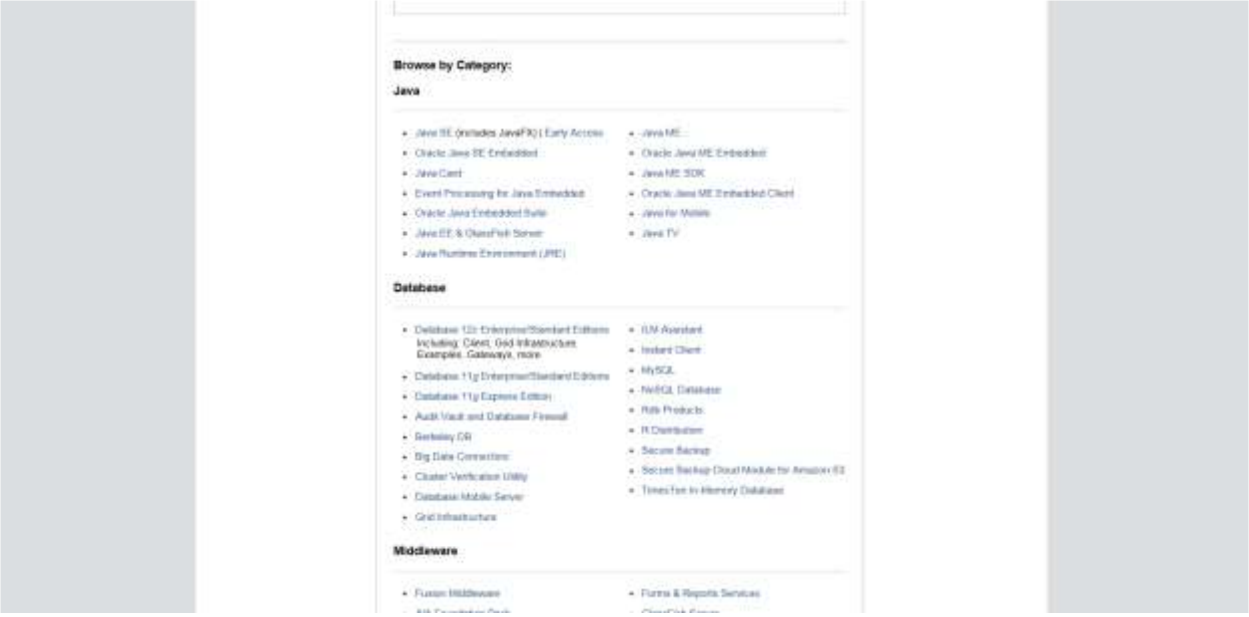

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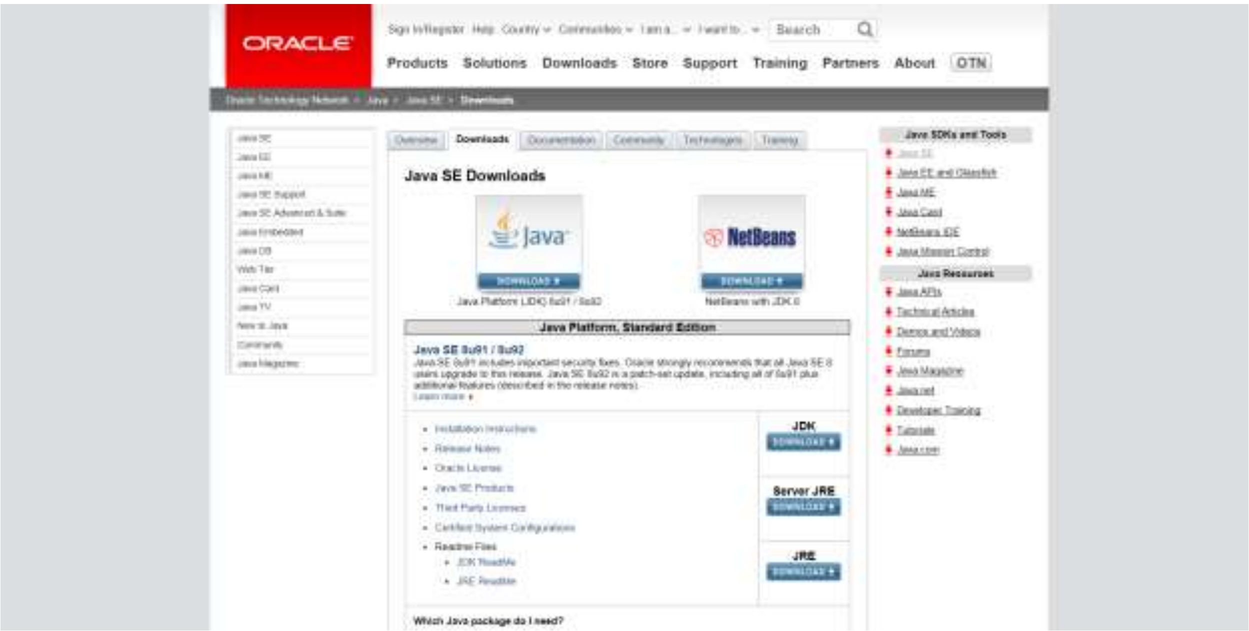

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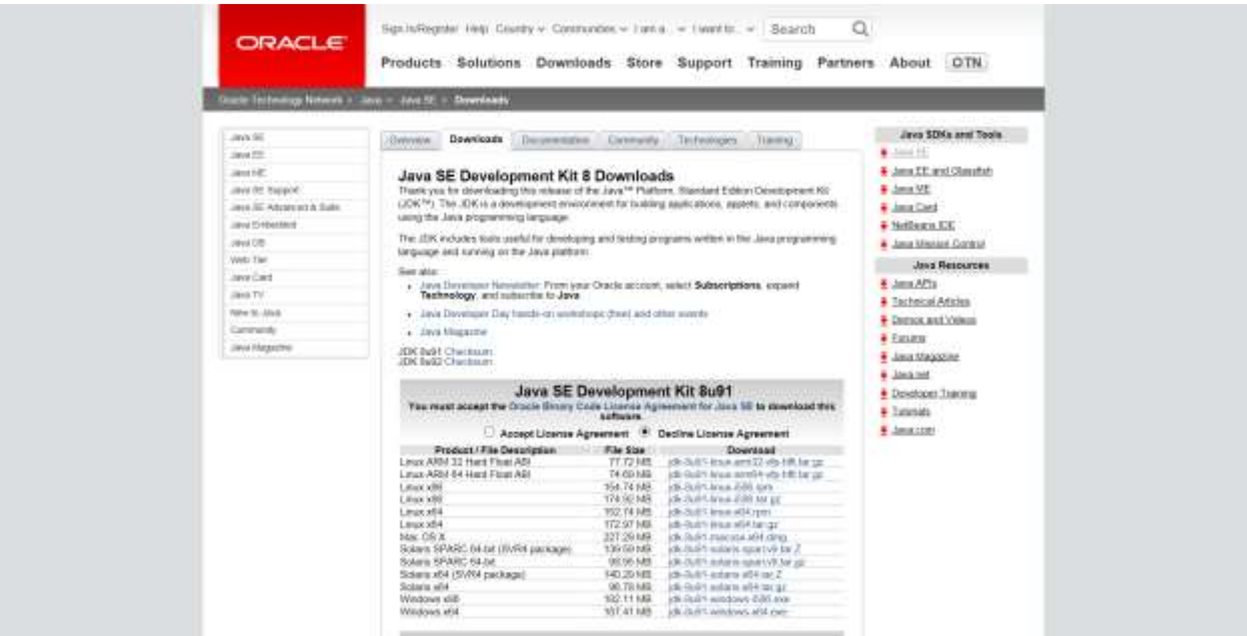

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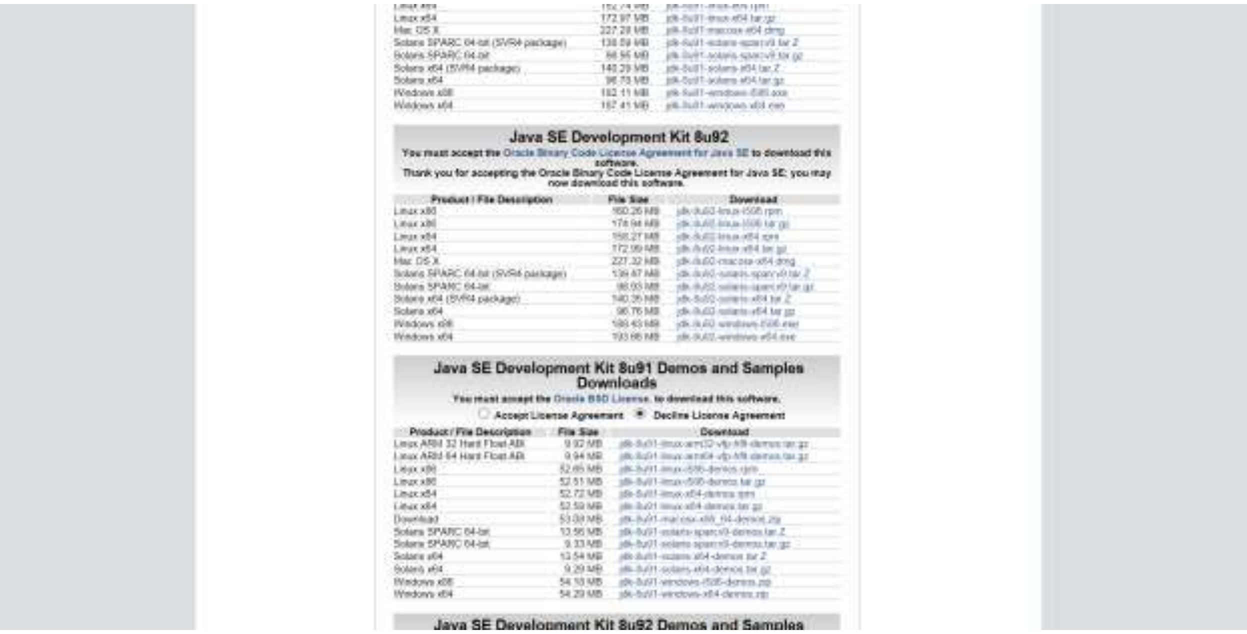

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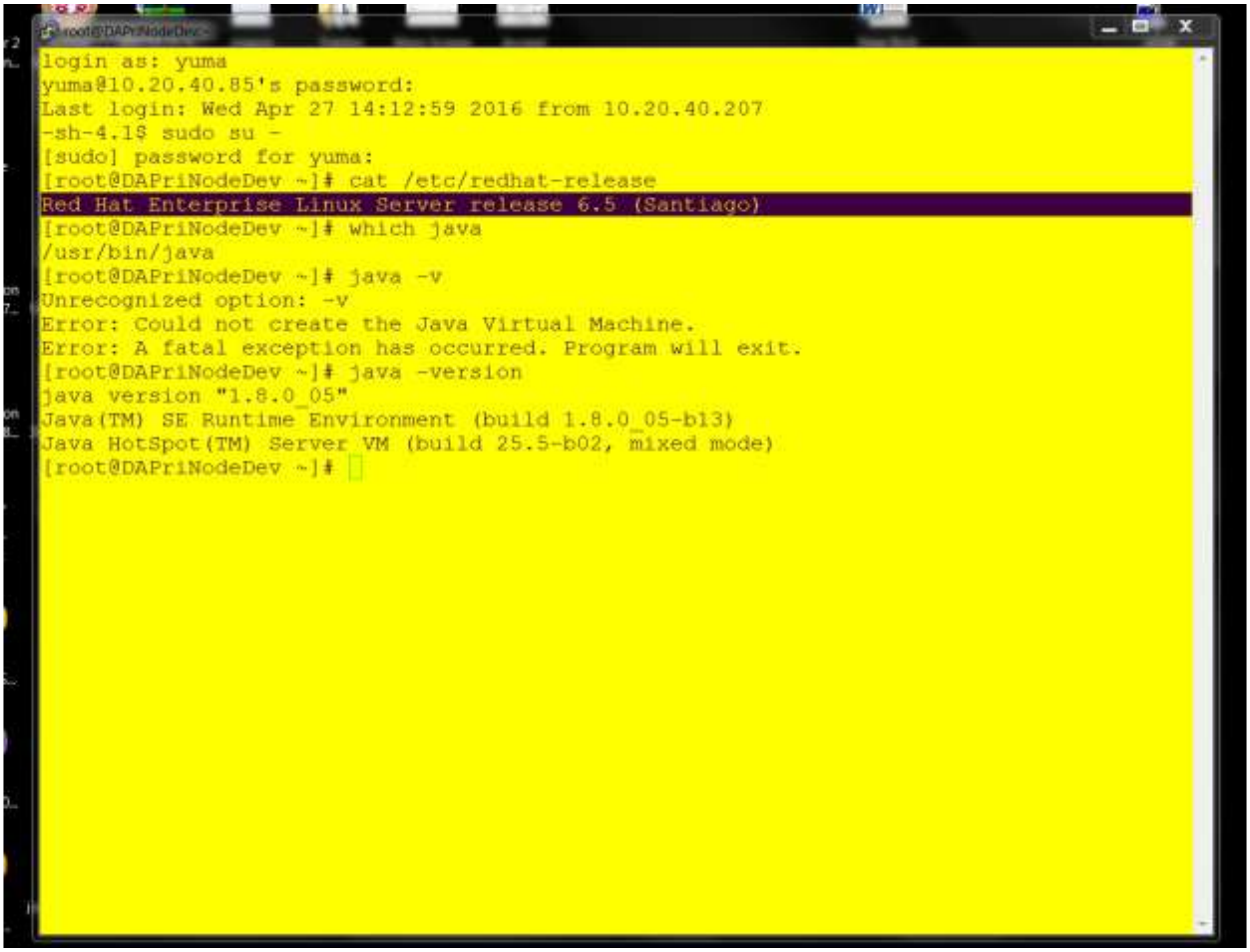
Notice that the radio buttons disappear and in lieu is the statement of acceptance. We need to narrow down the scope of JDK offerings by OS and by word size. Since the Linux cluster is a specific type of OS, note that the target machine is Red Hat Linux Enterprise 6.5(Santiago). Run the command from the Primary Name Node At the command prompt, enter cat /etc/redhat-release.



```
login as: yuma
yuma@10.20.40.85's password:
Last login: Wed Apr 27 14:12:59 2016 from 10.20.40.207
-sh-4.1$ sudo su -
[sudo] password for yuma:
[root@DAPriNodeDev ~]# cat /etc/redhat-release
Red Hat Enterprise Linux Server release 6.5 (Santiago)
[root@DAPriNodeDev ~]# which java
/usr/bin/java
[root@DAPriNodeDev ~]# java -v
Unrecognized option: -v
Error: Could not create the Java Virtual Machine.
Error: A fatal exception has occurred. Program will exit.
[root@DAPriNodeDev ~]# java -version
java version "1.8.0_05"
Java(TM) SE Runtime Environment (build 1.8.0_05-b13)
Java HotSpot(TM) Server VM (build 25.5-b02, mixed mode)
[root@DAPriNodeDev ~]#
```

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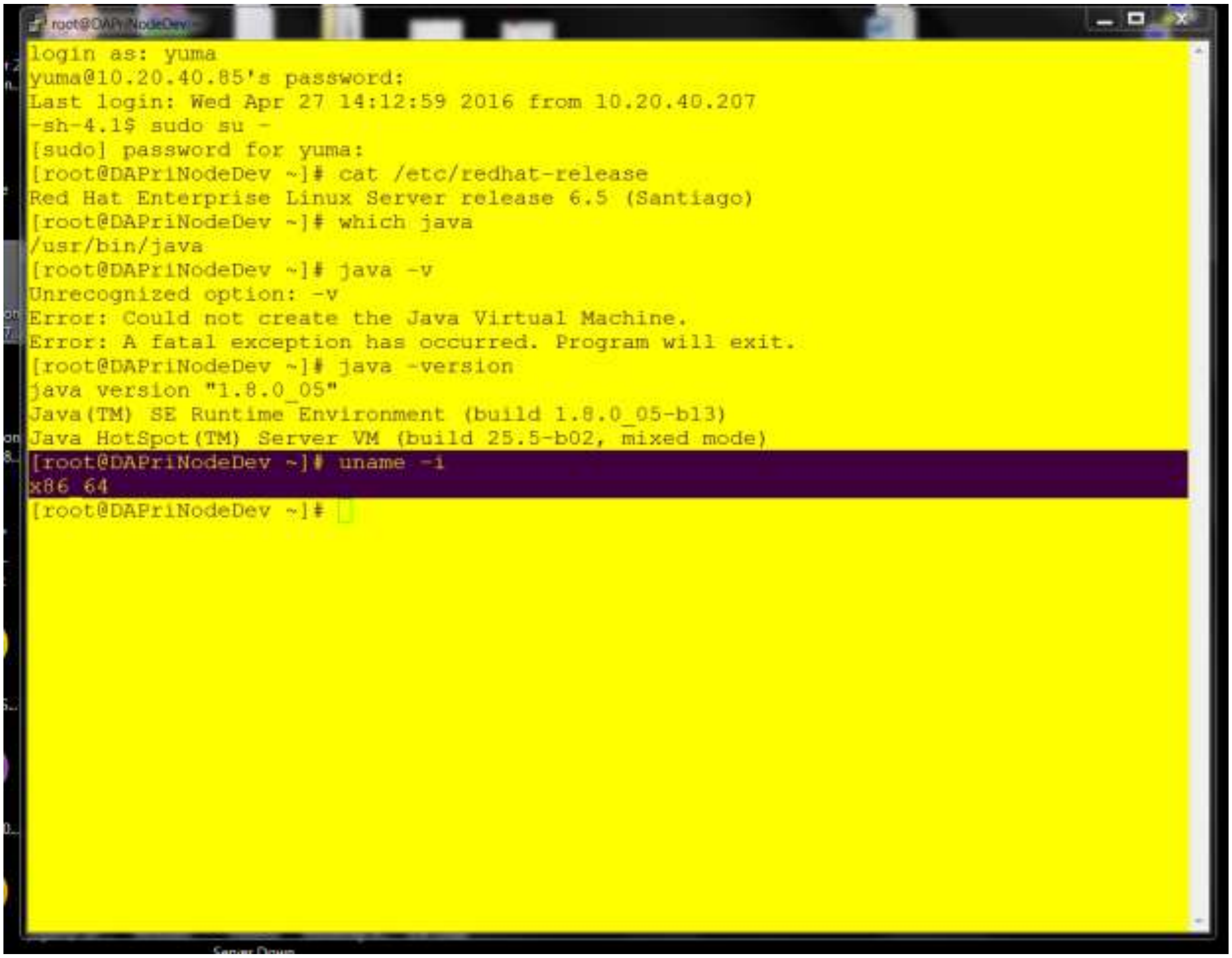

```
login as: yuma
yuma@10.20.40.85's password:
Last login: Wed Apr 27 14:12:59 2016 from 10.20.40.207
-sh-4.1$ sudo su -
[sudo] password for yuma:
[root@DAPriNodeDev ~]# cat /etc/redhat-release
Red Hat Enterprise Linux Server release 6.5 (Santiago)
[root@DAPriNodeDev ~]# which java
/usr/bin/java
[root@DAPriNodeDev ~]# java -v
Unrecognized option: -v
Error: Could not create the Java Virtual Machine.
Error: A fatal exception has occurred. Program will exit.
[root@DAPriNodeDev ~]# java -version
java version "1.8.0_05"
Java(TM) SE Runtime Environment (build 1.8.0_05-b13)
Java HotSpot(TM) Server VM (build 25.5-b02, mixed mode)
[root@DAPriNodeDev ~]# uname -i
x86_64
[root@DAPriNodeDev ~]#
```

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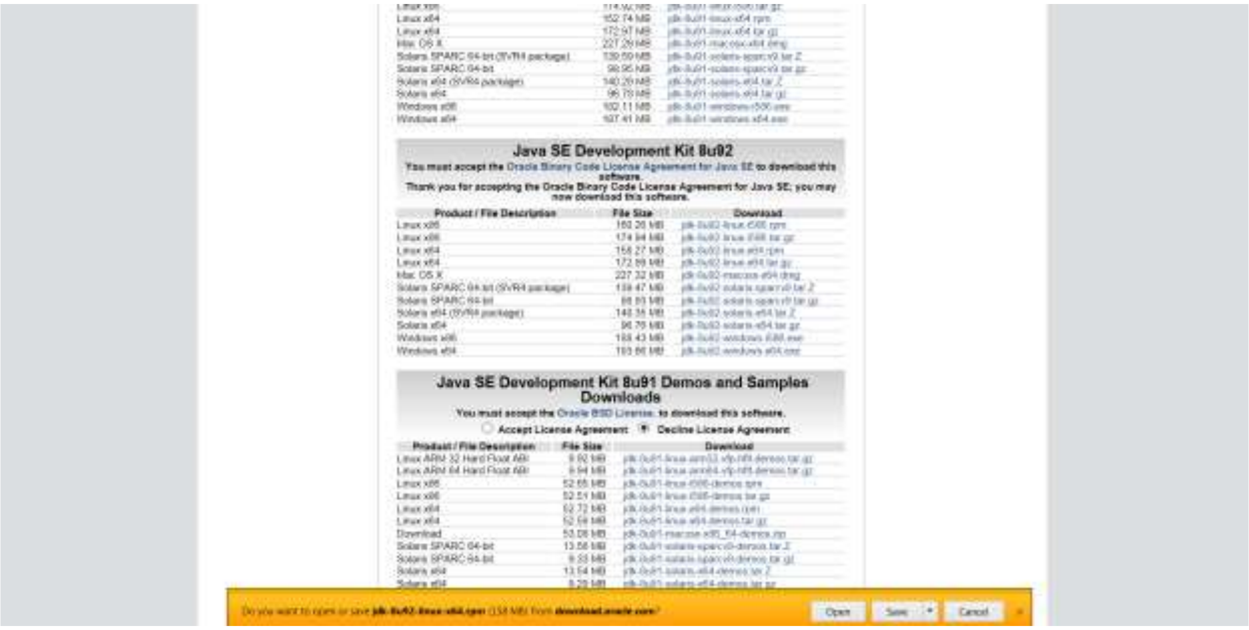

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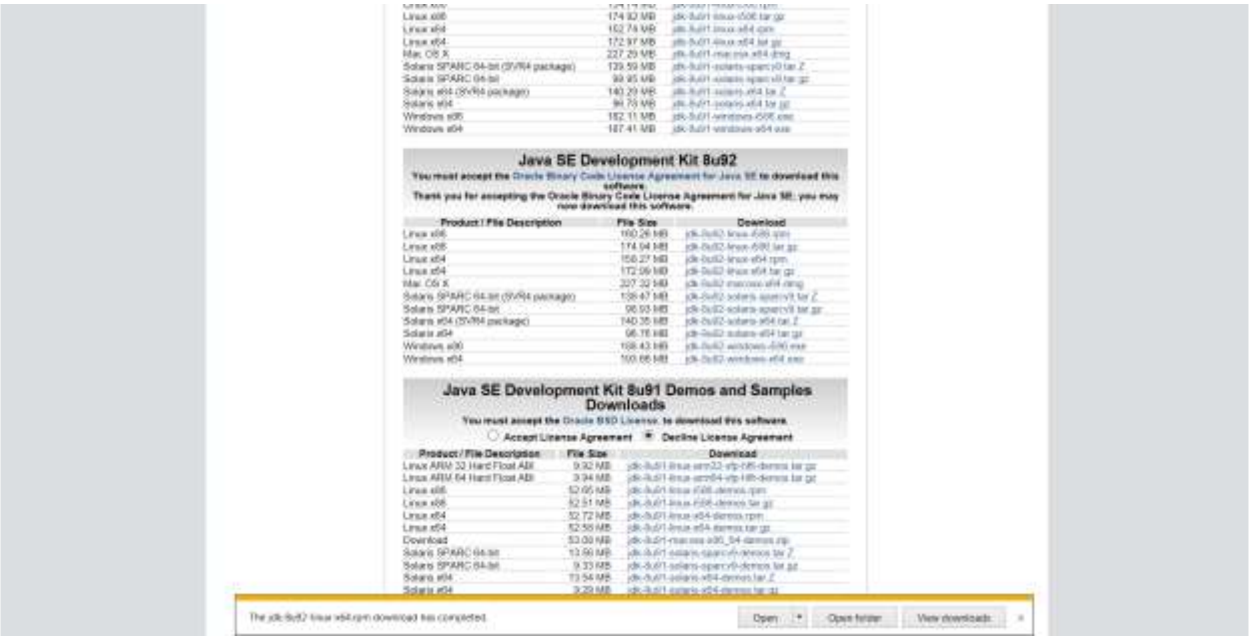

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| Solaris x64 | 96.76 MB | jdk-8u92-solaris-x64.tar.gz |
| Windows x86 | 188.43 MB | jdk-8u92-windows-i586.exe |
| Windows x64 | 193.68 MB | jdk-8u92-windows-x64.exe |

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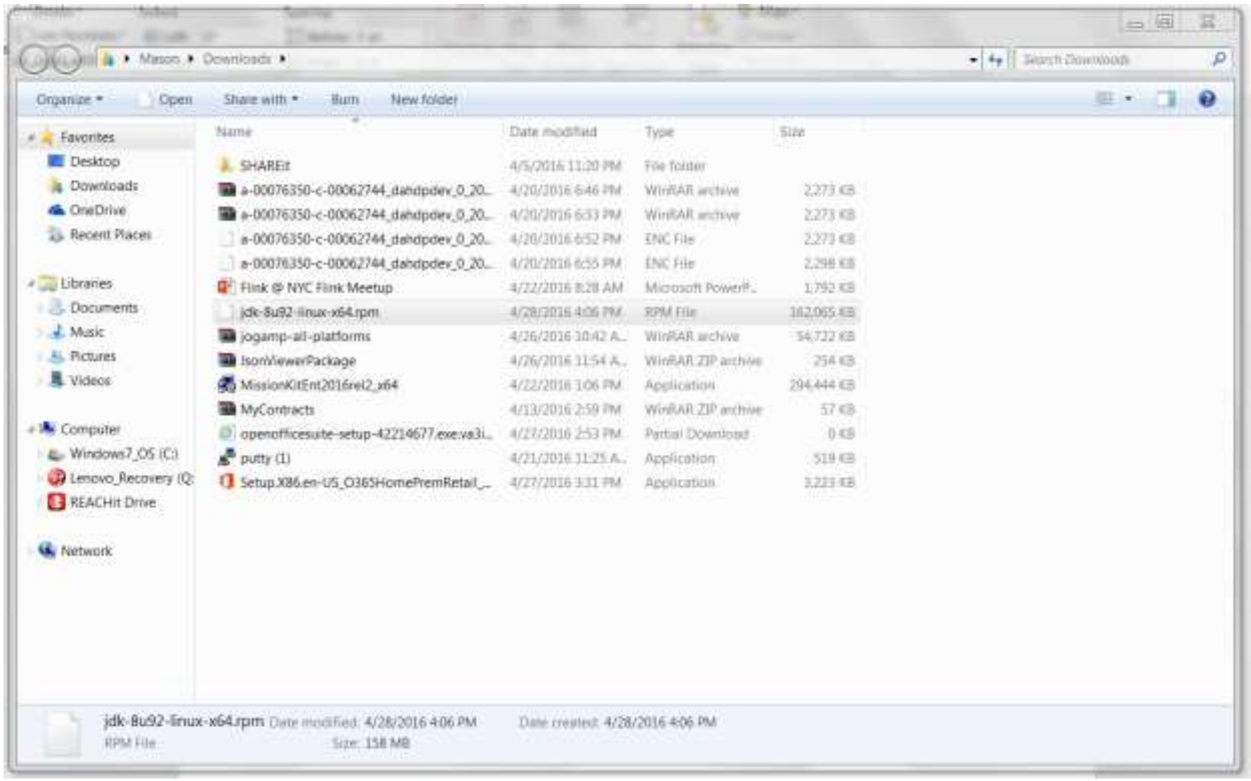
| Linux ARM 64 Hard Float ABI | 9.94 MB | jdk-8u91-linux-arm64-vfp-hflt-demos.tar.gz |
| Linux x86 | 52.65 MB | jdk-8u91-linux-i586-demos.rpm |
| Linux x86 | 52.51 MB | jdk-8u91-linux-i586-demos.tar.gz |
| Linux x64 | 52.72 MB | jdk-8u91-linux-x64-demos.rpm |
| Linux x64 | 52.58 MB | jdk-8u91-linux-x64-demos.tar.gz |
| Download | 53.00 MB | jdk-8u91-macosx-x86_64-demos.zip |
| Solaris SPARC 64-bit | 13.58 MB | jdk-8u91-solaris-sparcv9-demos.tar.Z |
| Solaris SPARC 64-bit | 9.33 MB | jdk-8u91-solaris-sparcv9-demos.tar.gz |
| Solaris x64 | 13.54 MB | jdk-8u91-solaris-x64-demos.tar.Z |
| Solaris x64 | 9.29 MB | jdk-8u91-solaris-x64-demos.tar.gz |

The jdk-8u92-linux-x64.rpm download has completed.

At this juncture in time, depending on the configuration of the Windows local machine, click on the button which says Open folder.

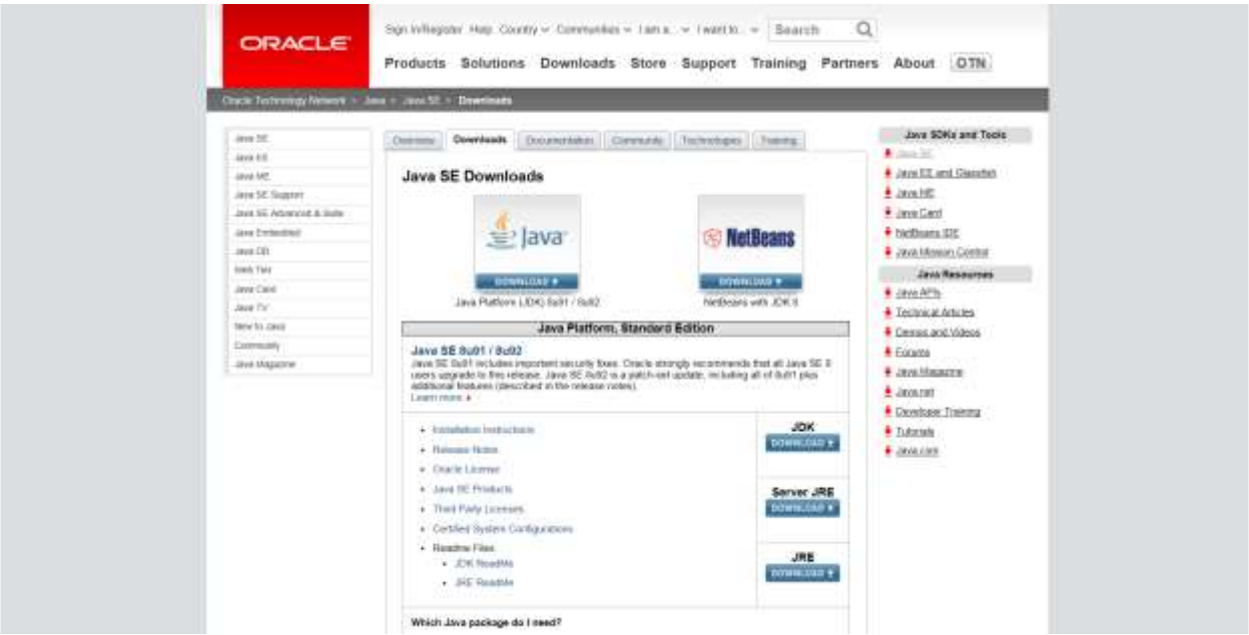


| Name | Date modified | Type | Size |
|---|---|---|---|
| SHAREit | 4/5/2016 11:20 PM | File folder | |
| a-00076350-c-00062744_dahdpdev_0_20... | 4/20/2016 6:46 PM | WinRAR archive | 2,273 KB |
| a-00076350-c-00062744_dahdpdev_0_20... | 4/20/2016 6:33 PM | WinRAR archive | 2,273 KB |
| a-00076350-c-00062744_dahdpdev_0_20... | 4/20/2016 6:52 PM | ENC File | 2,273 KB |
| a-00076350-c-00062744_dahdpdev_0_20... | 4/20/2016 6:55 PM | ENC File | 2,298 KB |
| Flink @ NYC Flink Meetup | 4/22/2016 8:28 AM | Microsoft PowerP... | 1,792 KB |
| jdk-8u92-linux-x64.rpm | 4/28/2016 4:06 PM | RPM File | 162,065 KB |
| jogamp-all-platforms | 4/26/2016 10:42 A... | WinRAR archive | 54,722 KB |
| JsonViewerPackage | 4/26/2016 11:54 A... | WinRAR ZIP archive | 254 KB |
| MissionKitEnt2016rel2_x64 | 4/22/2016 1:06 PM | Application | 294,444 KB |
| MyContracts | 4/13/2016 2:59 PM | WinRAR ZIP archive | 57 KB |
| openofficesuite-setup-42214677.exe.va3i... | 4/27/2016 2:53 PM | Partial Download | 0 KB |
| putty (1) | 4/21/2016 11:25 A... | Application | 519 KB |
| Setup.X86.en-US_O365HomePremRetail_... | 4/27/2016 3:31 PM | Application | 3,223 KB |

jdk-8u92-linux-x64.rpm Date modified: 4/28/2016 4:06 PM Date created: 4/28/2016 4:06 PM
RPM File Size: 158 MB

Notice the highlighted file – we have just downloaded the Linux rpm to the local folder \..\Mason\Downloads.

The next task is to get the companion JRE(Java Runtime Environment). This is a similar procedure. Go to the back page button of your browser, it will look something similar to this ←. Hover the mouse over this icon and then click on it:



Java SE Downloads

Java Platform (JDK) 8u91 / 8u92

NetBeans with JDK 8

Java Platform, Standard Edition

Java SE 8u91 / 8u92

Java SE 8u91 includes important security fixes. Oracle strongly recommends that all Java SE 8 users upgrade to this release. Java SE 8u92 is a patch-set update, including all of 8u91 plus additional features (described in the release notes).

Learn more

- Installation Instructions
- Release Notes
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  - JDK ReadMe
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JDK
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Server JRE
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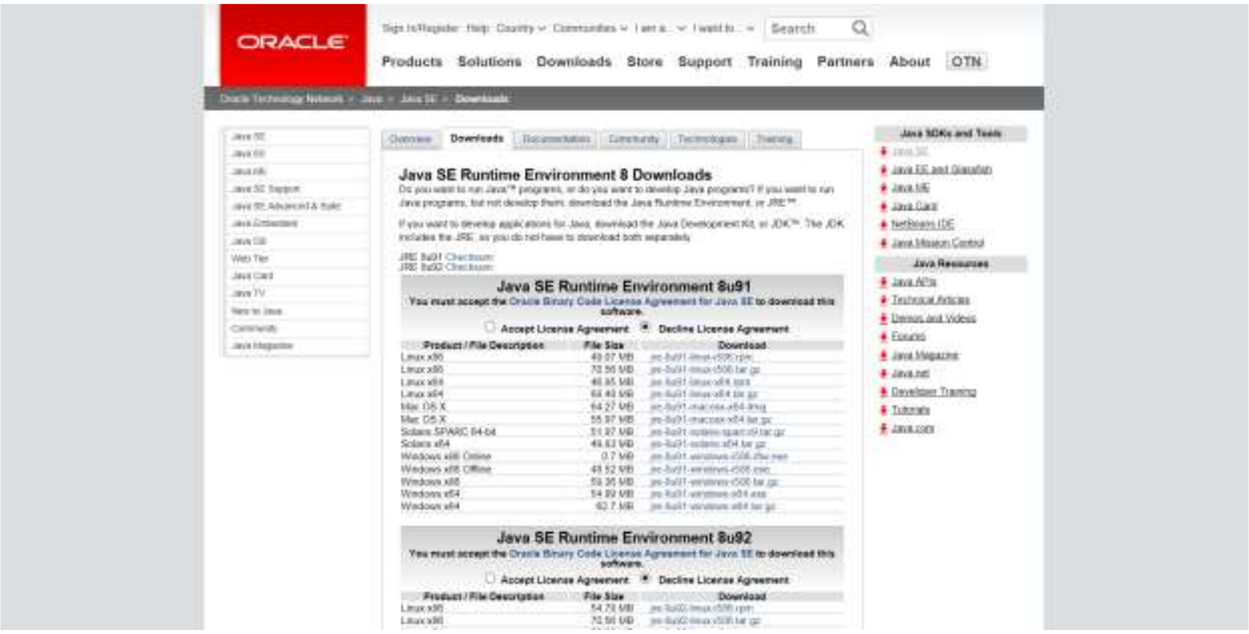
JRE
DOWNLOAD

Which Java package do I need?

Near the bottom of this page there is a prominent button which says on top JRE. Just below it is the download button. Hover the mouse over it and click on this button.



Java SE Runtime Environment 8 Downloads

Do you want to run Java™ programs, or do you want to develop Java programs? If you want to run Java programs, but not develop them, download the Java Runtime Environment, or JRE™

If you want to develop applications for Java, download the Java Development Kit, or JDK™. The JDK includes the JRE, so you do not have to download both separately.

JRE 8u91 Checksum
JRE 8u92 Checksum

Java SE Runtime Environment 8u91

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| Linux x64 | 46.85 MB | jre-8u91-linux-x64.rpm |
| Linux x64 | 68.40 MB | jre-8u91-linux-x64.tar.gz |
| Mac OS X | 64.27 MB | jre-8u91-macosx-x64.dmg |
| Mac OS X | 55.97 MB | jre-8u91-macosx-x64.tar.gz |
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| Solaris x64 | 49.63 MB | jre-8u91-solaris-x64.tar.gz |
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| Windows x86 Offline | 48.52 MB | jre-8u91-windows-i586.exe |
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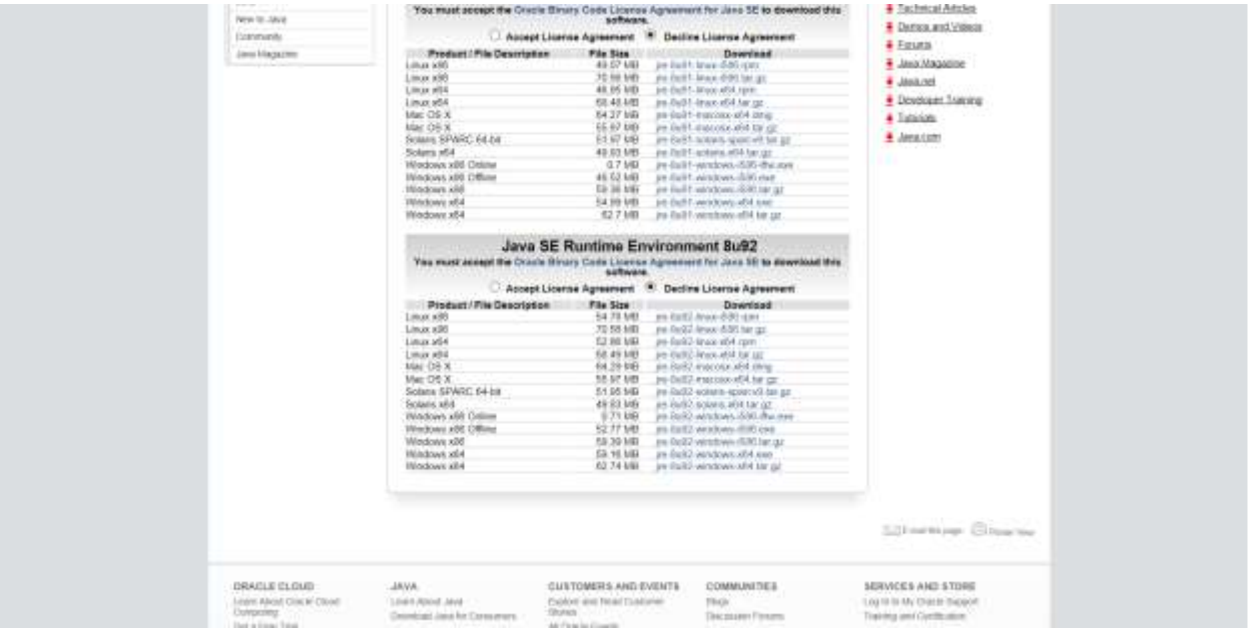
This last screen is déjà vu. Once again there is rich choice of JREs, CPU widthsize, type of operating system, etc. Since we selected the 8u_92 version of the Java jdk, the version of he JRE must match. Scroll midway down this Web page and find the section of the JREs which are 8u_92. We need to accept the license agreement. Hover the mouse over the radio button which has the words Access license agreement next to it. Click to accept.



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| Mac OS X | 64.37 MB | jre-8u91-macosx-x64.dmg |
| Mac OS X | 55.97 MB | jre-8u91-macosx-x64.tar.gz |
| Solaris SPARC 64-bit | 51.97 MB | jre-8u91-solaris-sparcv9.tar.gz |
| Solaris x64 | 49.83 MB | jre-8u91-solaris-x64.tar.gz |
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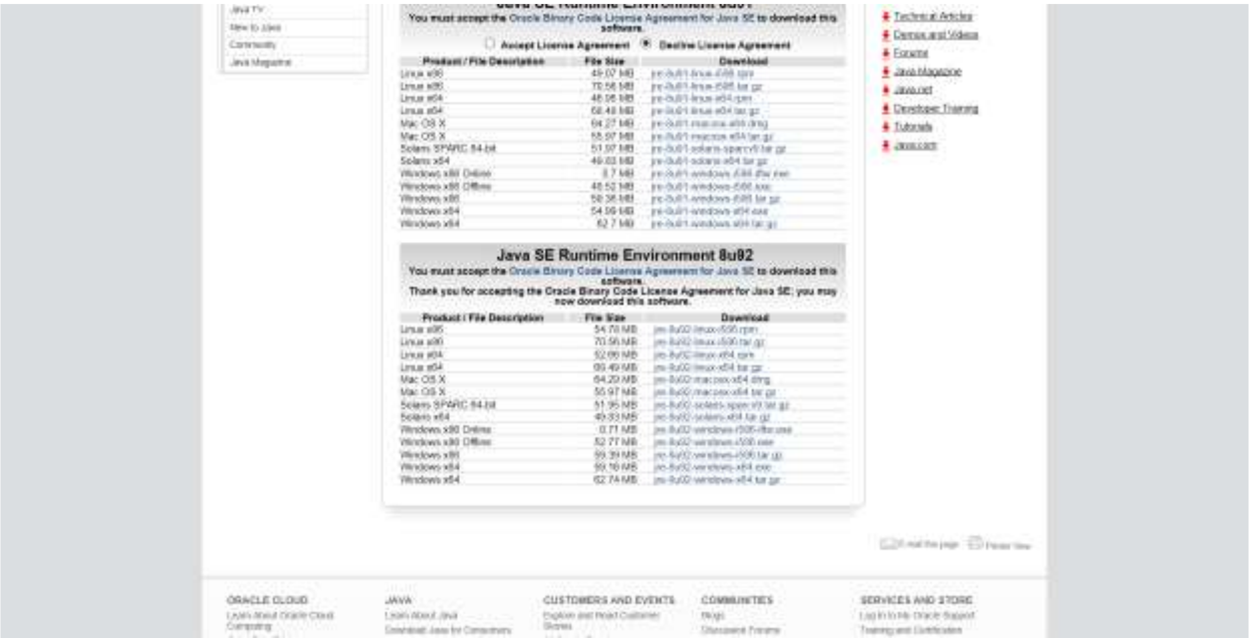
Once this is done, the Web page will now display a courteous thank you note. Now we can select the appropriate JRE for the Linux cluster we plan to upgrade.



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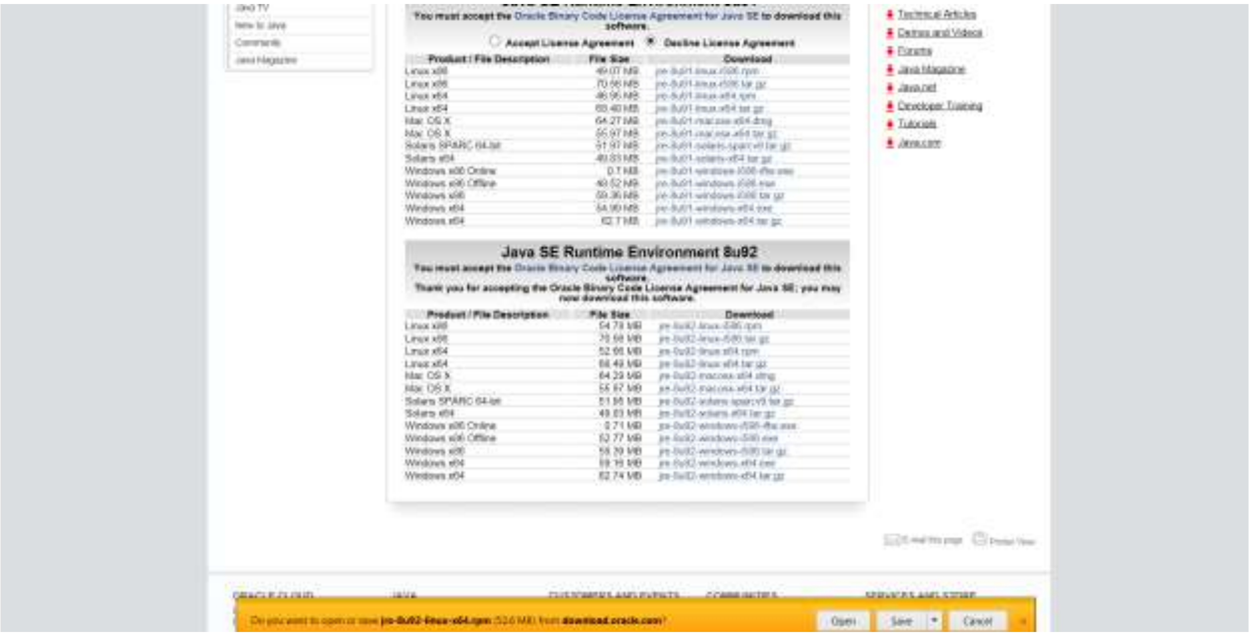
Under the Download column for JRE 8u 92, look for the file entry jre-linux-8u_92_x64.rpm. Hover the mouse over this specific file and click on it.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| Solaris x64 | 49.03 MB | jre-8u91-solaris-x64.tar.gz |
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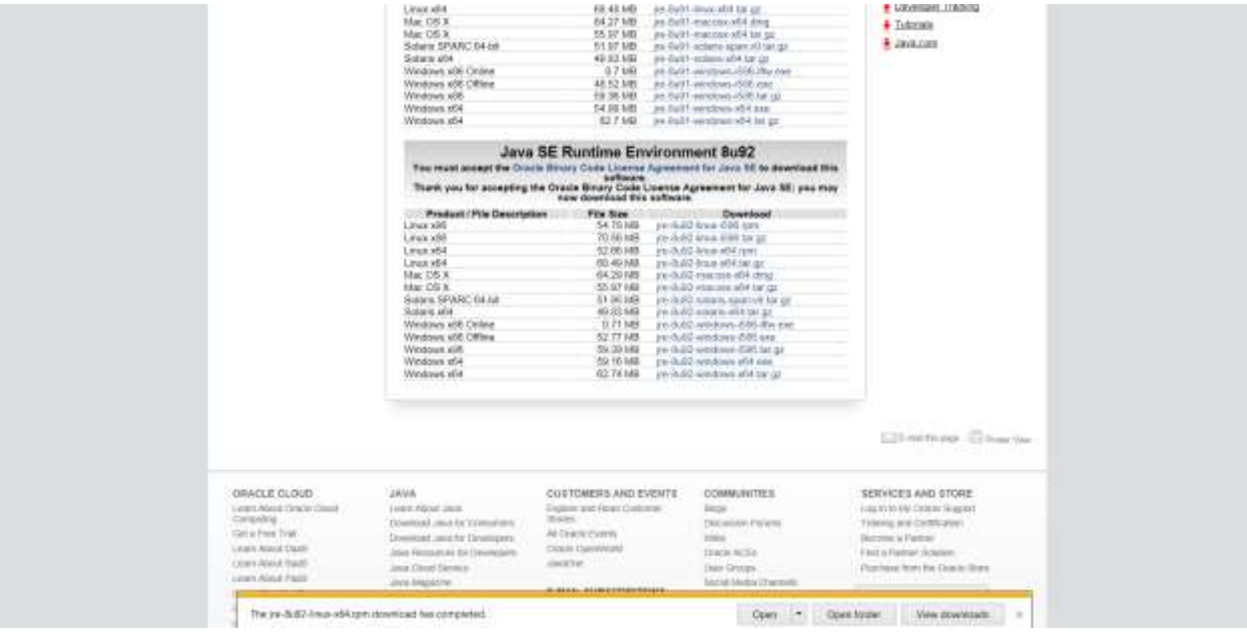

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| Mac OS X | 64.29 MB | jre-8u92-macosx-x64.dmg |
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| Solaris x64 | 49.93 MB | jre-8u92-solaris-x64.tar.gz |
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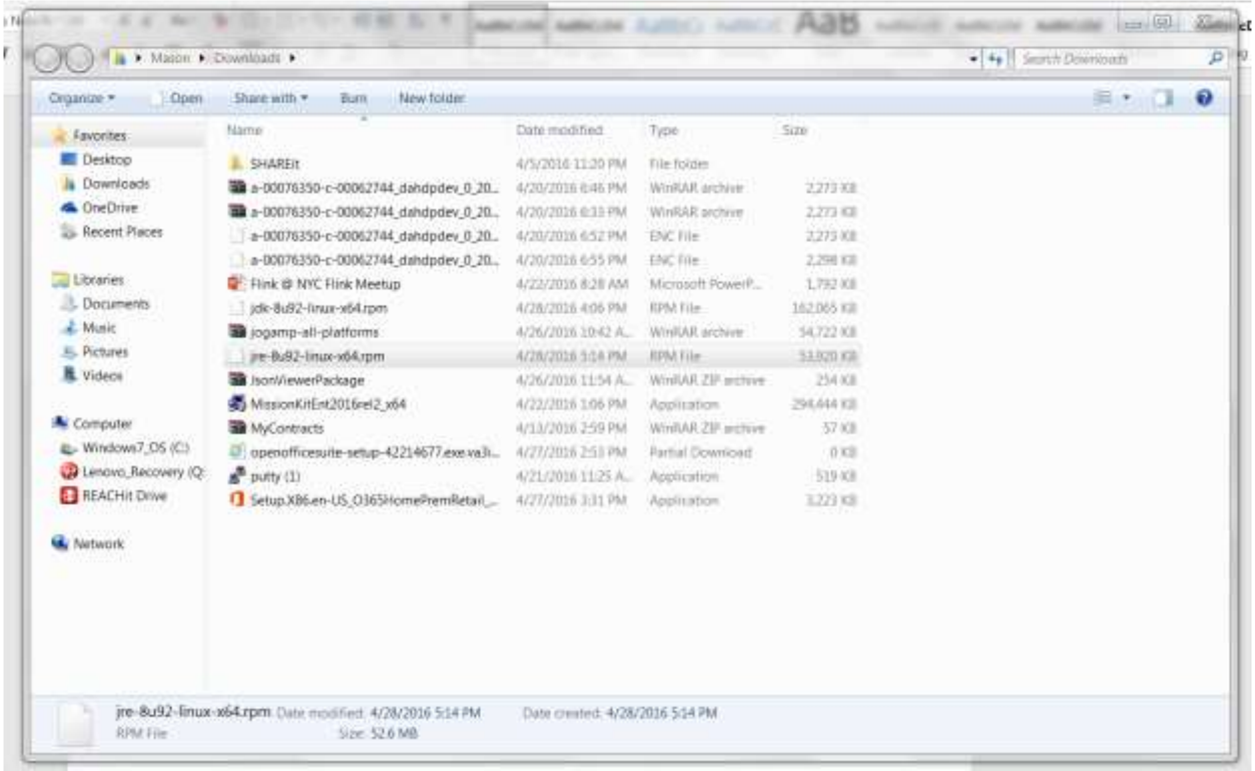
Just to make sure we have the second Linux rpm file, hover the mouse over the bottom of this page and click on the middle button Open folder.



| Name | Date modified | Type | Size |
|---|---|---|---|
| SHAREit | 4/5/2016 11:20 PM | File folder | |
| a-00076350-c-00062744_dahdpdev_0_20... | 4/20/2016 6:46 PM | WinRAR archive | 2,273 KB |
| a-00076350-c-00062744_dahdpdev_0_20... | 4/20/2016 6:33 PM | WinRAR archive | 2,273 KB |
| a-00076350-c-00062744_dahdpdev_0_20... | 4/20/2016 6:52 PM | ENC File | 2,273 KB |
| a-00076350-c-00062744_dahdpdev_0_20... | 4/20/2016 6:55 PM | ENC File | 2,298 KB |
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| jogamp-all-platforms | 4/26/2016 10:42 A... | WinRAR archive | 54,722 KB |
| jre-8u92-linux-x64.rpm | 4/28/2016 5:14 PM | RPM File | 53,920 KB |
| JsonViewerPackage | 4/26/2016 11:54 A... | WinRAR ZIP archive | 254 KB |
| MissionKitEnt2016rel2_x64 | 4/22/2016 1:06 PM | Application | 294,444 KB |
| MyContracts | 4/13/2016 2:59 PM | WinRAR ZIP archive | 57 KB |
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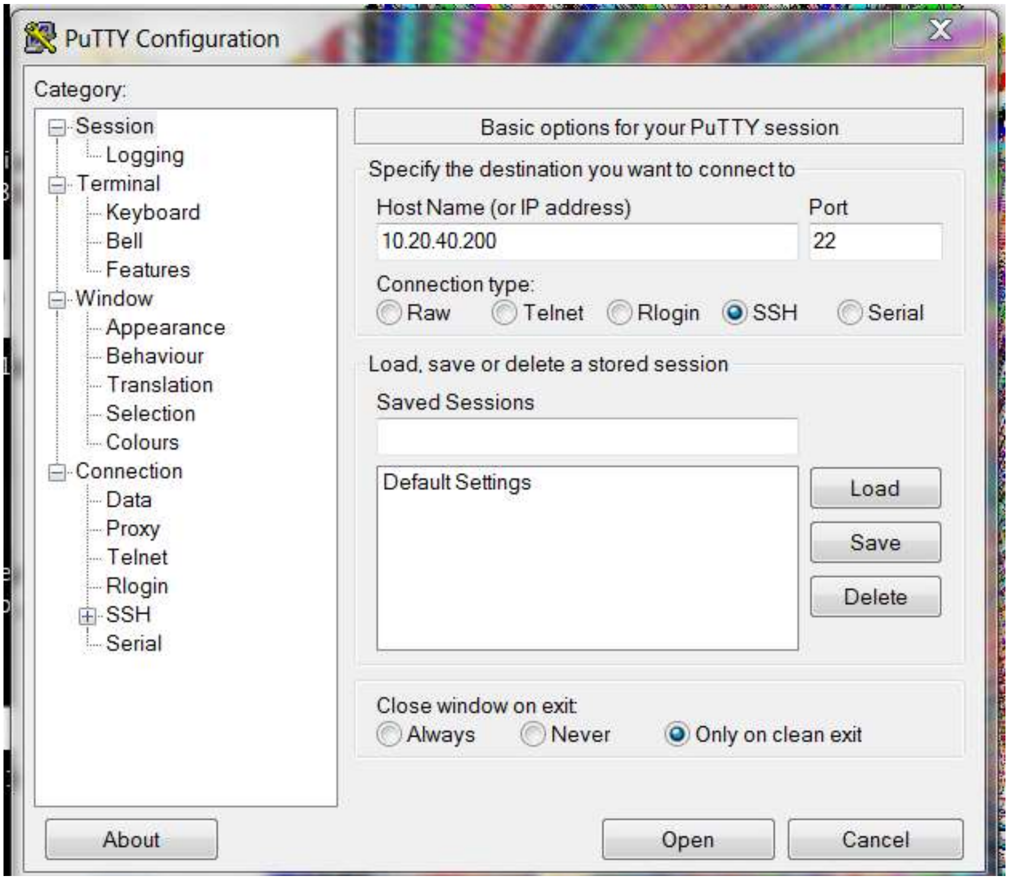
| putty (1) | 4/21/2016 11:25 A... | Application | 519 KB |
| Setup.X86.en-US_O365HomePremRetail_... | 4/27/2016 3:31 PM | Application | 3,223 KB |

jre-8u92-linux-x64.rpm Date modified: 4/28/2016 5:14 PM Date created: 4/28/2016 5:14 PM
RPM File Size: 52.6 MB

Now we have to switch gears and insure the Linux cluster has Java environment variables set up properly. Since a putty session is already open on one of the Linux instances, we will now turn our attention to this.

There are several variables which need to be validated and changed – JRE_HOME, JAVA_HOME and CLASSPATH. This must be done on all 5 Linux instances. The profile bash script needs to be adjusted. Also, to execute these commands and to insure that the Java artifacts are installed correctly, root privileges are mandatory.

We will focus on the primary Name Node, login in to Linux instance with the Windows Putty utility, place the Class C IP 4 address in the text box, hit enter:



PuTTY Configuration

Category:

Basic options for your PuTTY session

Specify the destination you want to connect to

Host Name (or IP address): 10.20.40.200

Port: 22

Connection type:
○ Raw ○ Telnet ○ Rlogin ● SSH ○ Serial

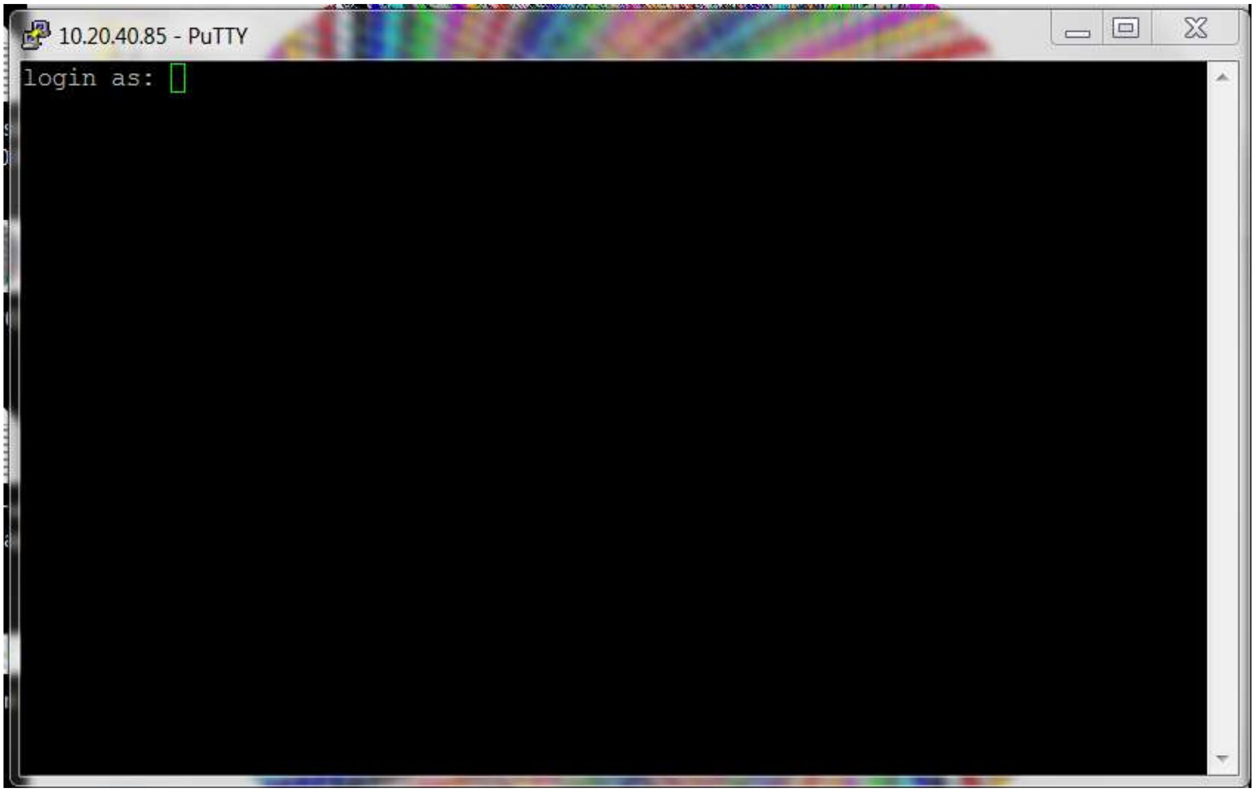
Load, save or delete a stored session

Saved Sessions

Default Settings

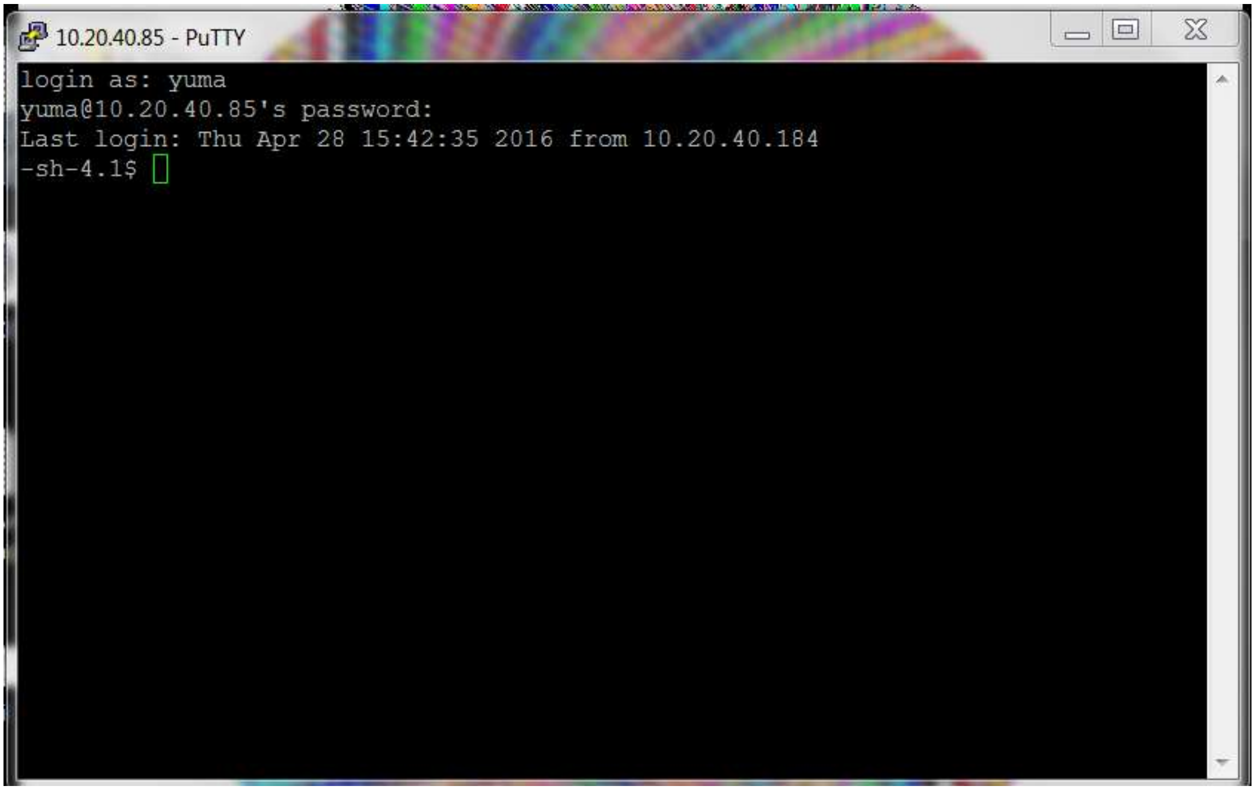
Close window on exit:
○ Always ○ Never ● Only on clean exit

Hove the mouse over the button labeled Open at the bottom of this utility, then click enter on the screen:



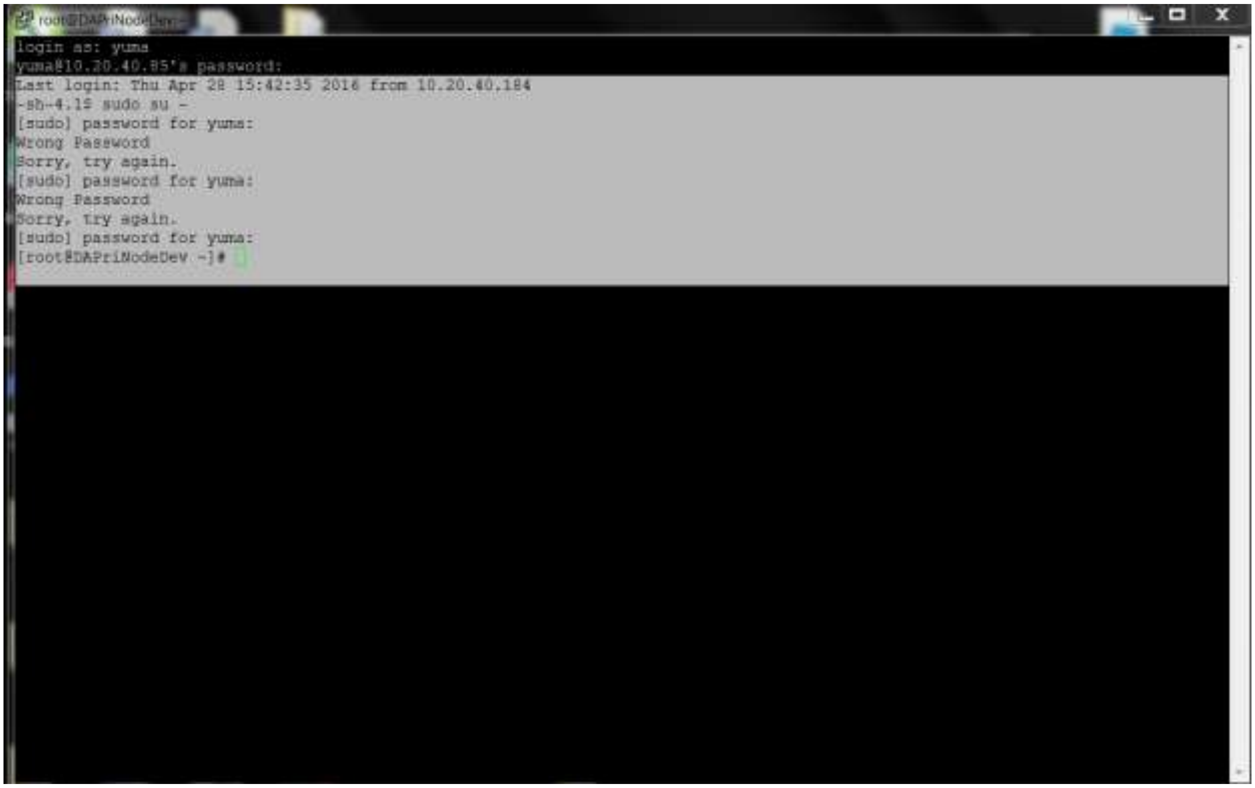
```
login as: 
```

There not much to this, your Linux administrator will have set this access to the Linux environment. Type in your login id. Then hit enter.



```
login as: yuma
yuma@10.20.40.85's password:
Last login: Thu Apr 28 15:42:35 2016 from 10.20.40.184
-sh-4.1$
```

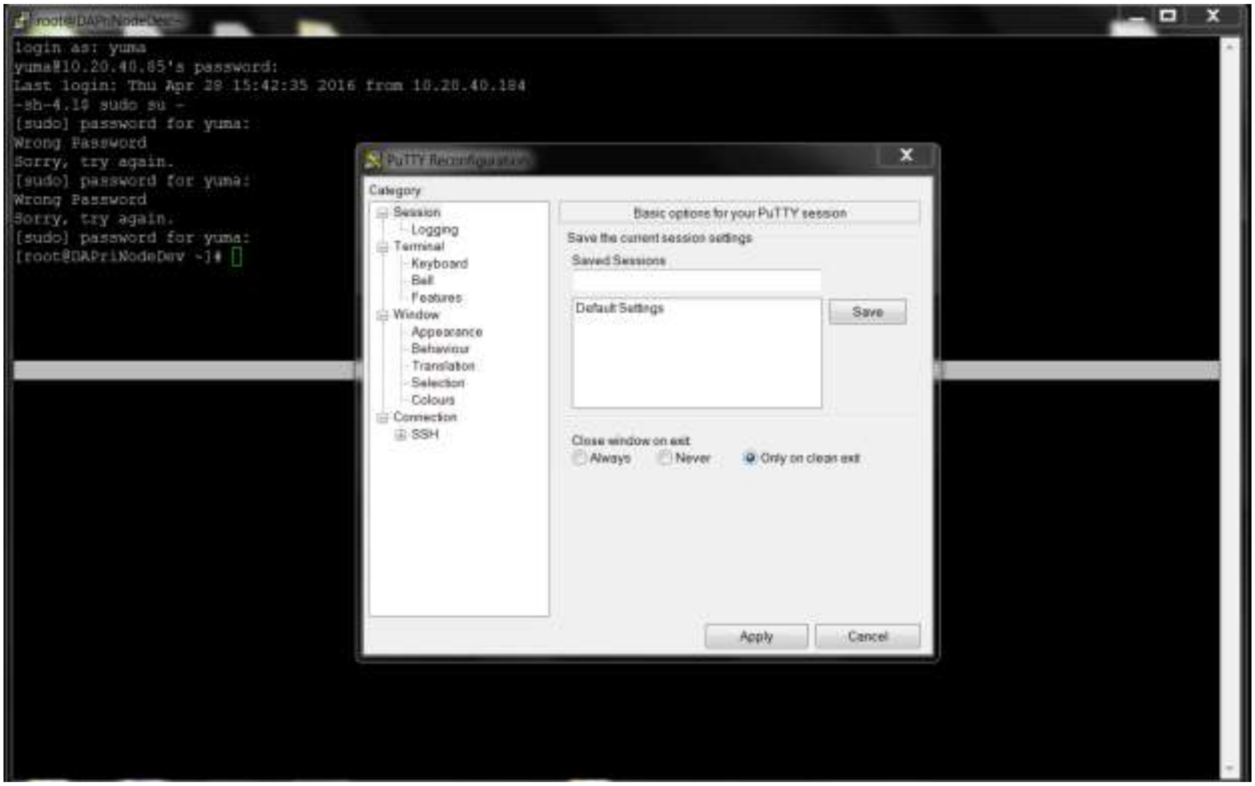
As mentioned earlier, the JVM changes must be executed with root privileges. From the prompt, type sudo su - Then hit the enter key.



```
login as: yuma
yuma@10.20.40.85's password:
Last login: Thu Apr 28 15:42:35 2016 from 10.20.40.184
-sh-4.1$ sudo su -
[sudo] password for yuma:
Wrong Password
Sorry, try again.
[sudo] password for yuma:
Wrong Password
Sorry, try again.
[sudo] password for yuma:
[root@DAPriNodeDev ~]#
```

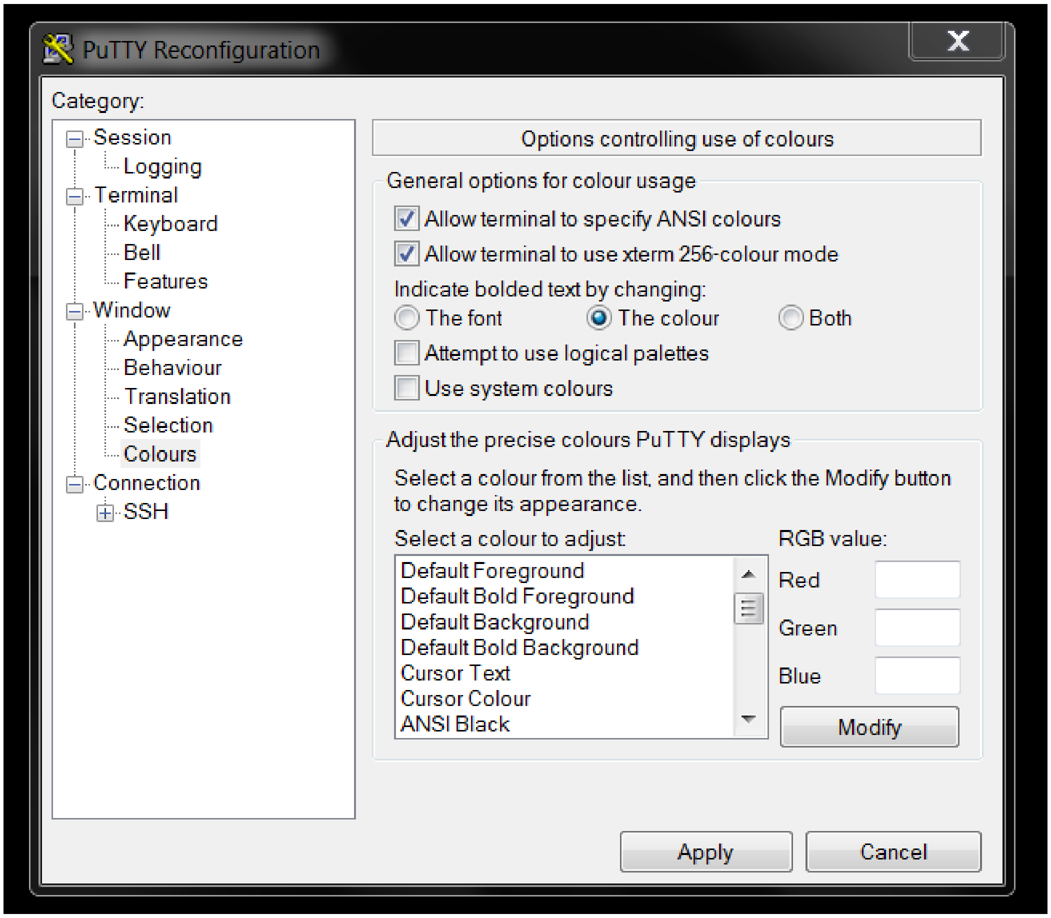
Despite several attempts of getting the right password, the third time worked. The key thing to note is that before the prompt, there is a [root], indicating this login is now signed in as root.

To pretty this session, Putty has a nice feature. Move the mouse along the top of the Putty window bar. Next right click the mouse and a drop down menu appears. Scroll past half way down, there will be an option Change Settings… Left click on this entry. The resultant window look like this:



```
login as: yuma
yuma@10.20.40.85's password:
Last login: Thu Apr 28 15:42:35 2016 from 10.20.40.184
-sh-4.1$ sudo su -
[sudo] password for yuma:
Wrong Password
Sorry, try again.
[sudo] password for yuma:
Wrong Password
Sorry, try again.
[sudo] password for yuma:
[root@DAPriNodeDev ~]#
```

It looks very familiar. This is original screen in Putty. Under Category, look past halfway down this column for Colours. Click on this entry.



Options controlling use of colours

General options for colour usage

☑ Allow terminal to specify ANSI colours

☑ Allow terminal to use xterm 256-colour mode

Indicate bolded text by changing:

○ The font ● The colour ○ Both

□ Attempt to use logical palettes

□ Use system colours

Adjust the precise colours PuTTY displays

Select a colour from the list, and then click the Modify button to change its appearance.

Select a colour to adjust:

Default Foreground
Default Bold Foreground
Default Background
Default Bold Background
Cursor Text
Cursor Colour
ANSI Black

RGB value:

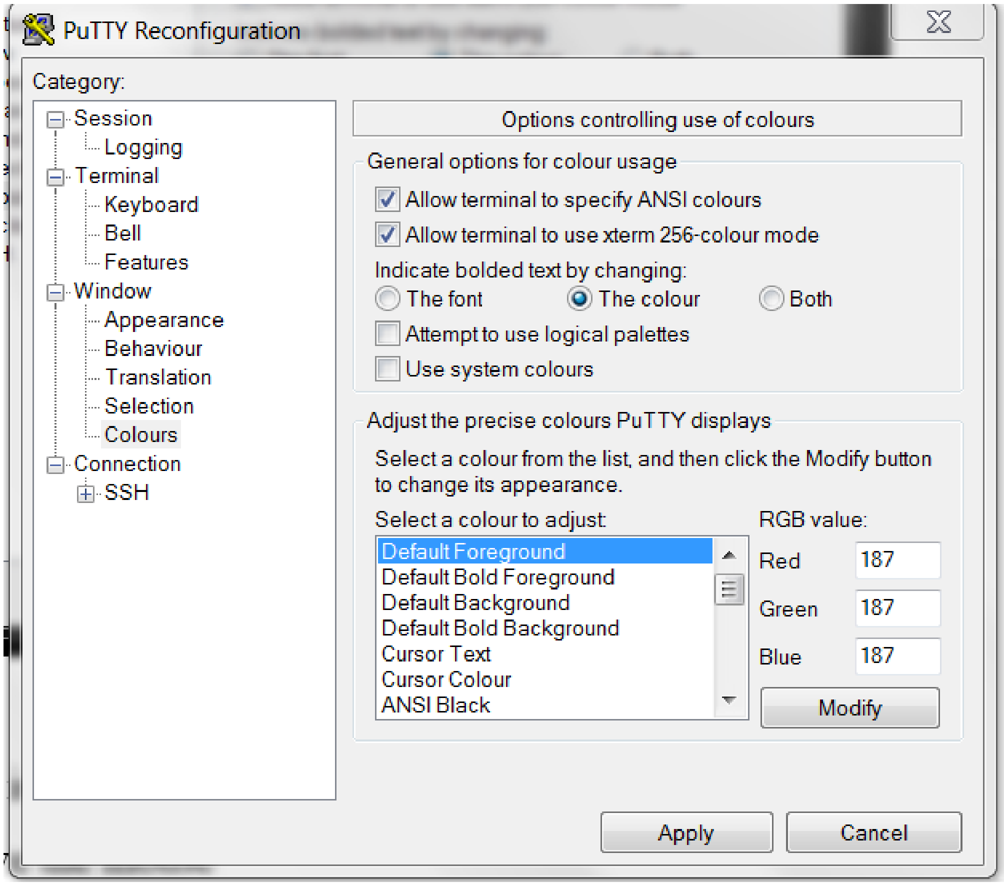
Red

Green

Blue

The plan is to have a yellow background with dark blue letters.

First move the mouse to the top entry in the box entitled Select a colour to adjust. With the mouse click on the entry which says Default foreground.



Options controlling use of colours

General options for colour usage

☑ Allow terminal to specify ANSI colours

☑ Allow terminal to use xterm 256-colour mode

Indicate bolded text by changing:

○ The font ● The colour ○ Both

□ Attempt to use logical palettes

□ Use system colours

Adjust the precise colours PuTTY displays

Select a colour from the list, and then click the Modify button to change its appearance.

Select a colour to adjust:

- Default Foreground
- Default Bold Foreground
- Default Background
- Default Bold Background
- Cursor Text
- Cursor Colour
- ANSI Black

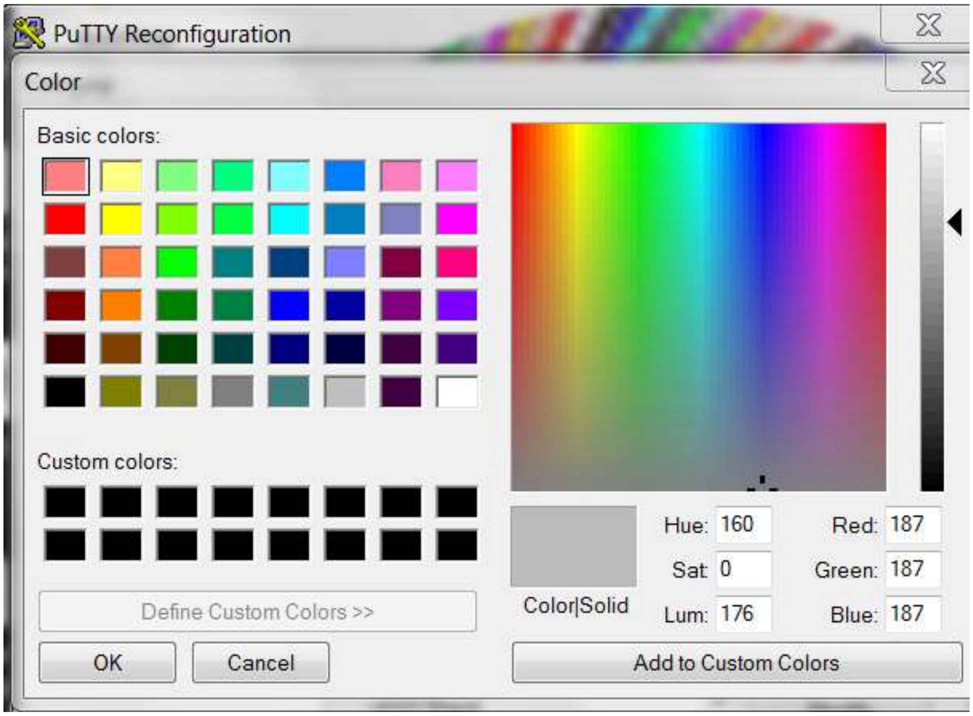
RGB value:

Red 187

Green 187

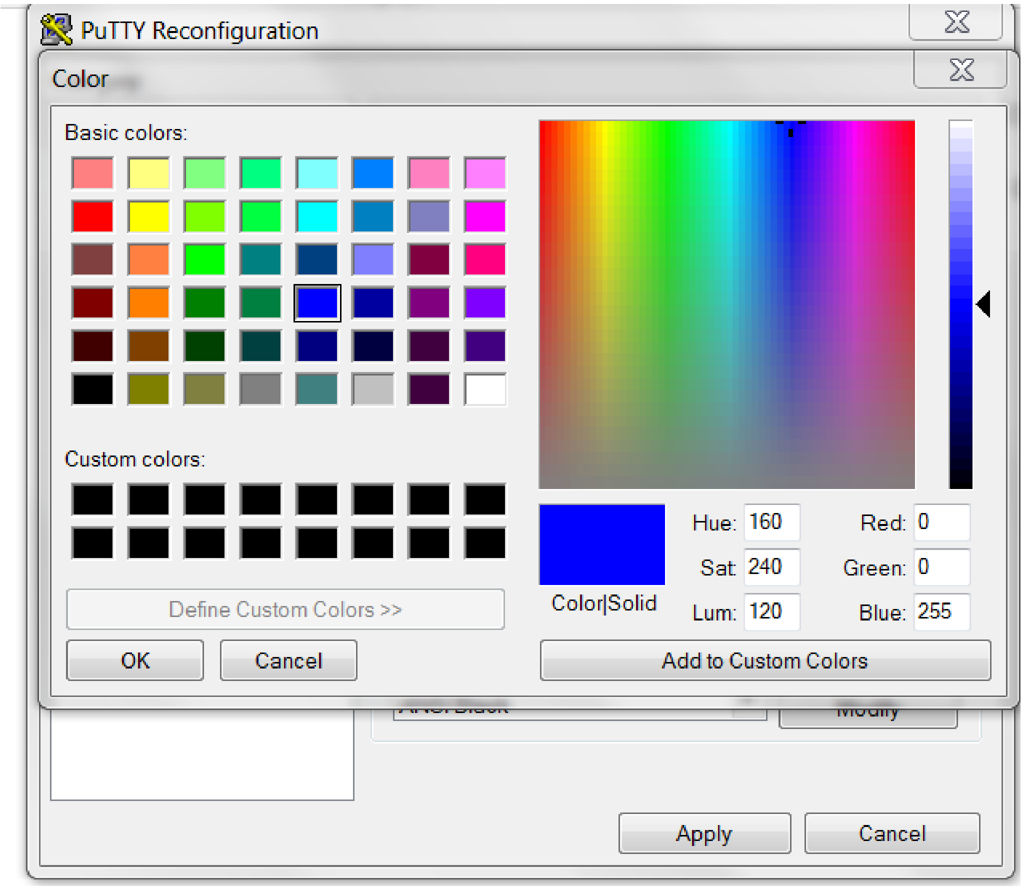
Blue 187

You will see a 187 in 3 textboxes, ignore these and click on the button labeled Modify.



Hue: 160
Sat: 0
Lum: 176
Red: 187
Green: 187
Blue: 187

Note that the color rectangle default is a light gray above the word Color/Solid. Now move the mouse and hover over the color closest to blue and click on the selection.



Hue: 160

Sat: 240

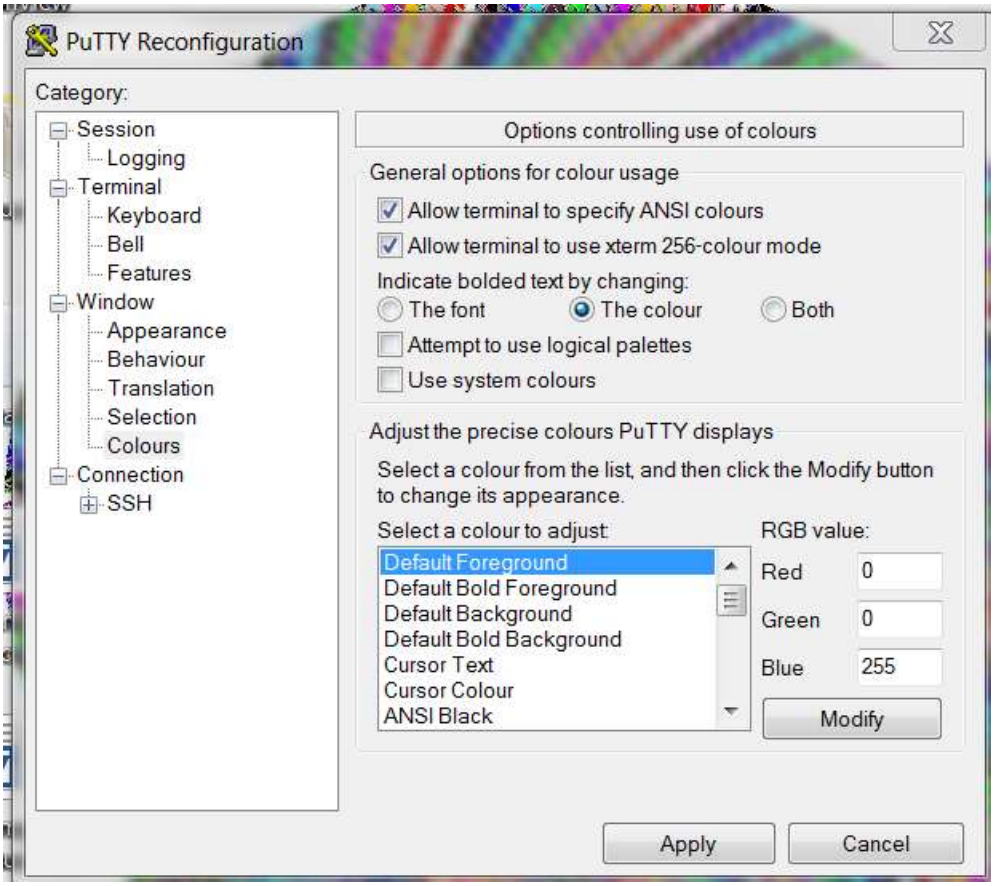
Lum: 120

Red: 0

Green: 0

Blue: 255

Now hover the mouse and click on the button OK.



Options controlling use of colours

General options for colour usage

☑ Allow terminal to specify ANSI colours

☑ Allow terminal to use xterm 256-colour mode

Indicate bolded text by changing:

○ The font ● The colour ○ Both

□ Attempt to use logical palettes

□ Use system colours

Adjust the precise colours PuTTY displays

Select a colour from the list, and then click the Modify button to change its appearance.

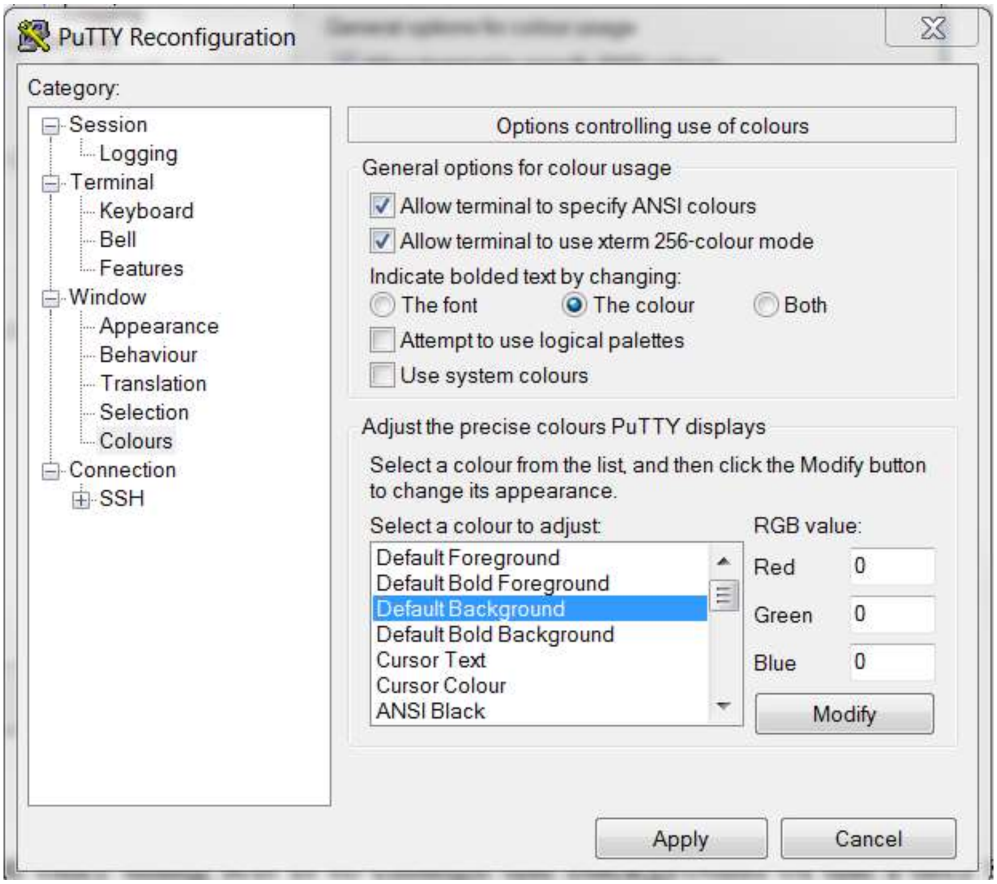
Select a colour to adjust:

- Default Foreground
- Default Bold Foreground
- Default Background
- Default Bold Background
- Cursor Text
- Cursor Colour
- ANSI Black

| RGB value: | |
|---|---|
| Red | 0 |
| Green | 0 |
| Blue | 255 |

The only thing left is to change the background of the Putty screen.

Move the mouse to the entry Default background, click this entry.



Options controlling use of colours

General options for colour usage

☑ Allow terminal to specify ANSI colours
☑ Allow terminal to use xterm 256-colour mode

Indicate bolded text by changing:
○ The font ● The colour ○ Both

□ Attempt to use logical palettes
□ Use system colours

Adjust the precise colours PuTTY displays

Select a colour from the list, and then click the Modify button to change its appearance.

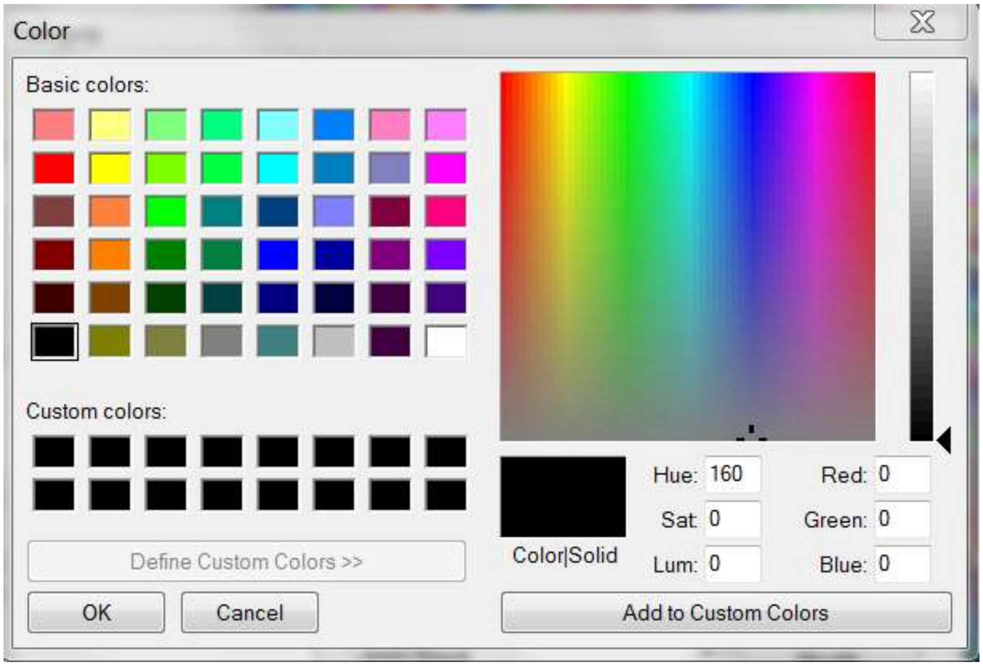
Select a colour to adjust:

- Default Foreground
- Default Bold Foreground
- Default Background
- Default Bold Background
- Cursor Text
- Cursor Colour
- ANSI Black

RGB value:

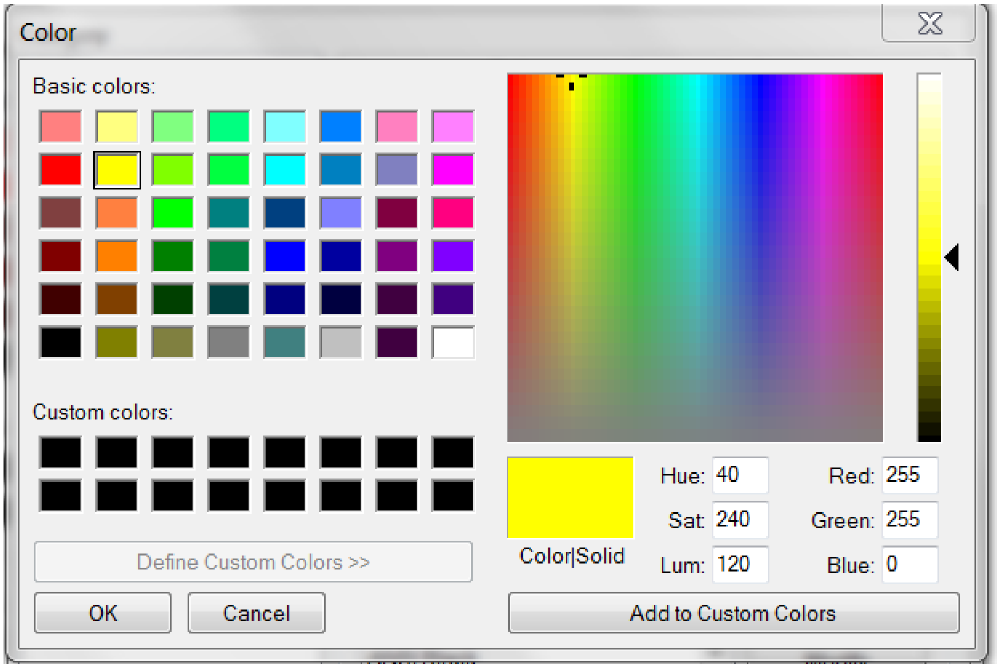
| | |
|---|---|
| Red | 0 |
| Green | 0 |
| Blue | 0 |

We will pick yellow, hover the mouse over the button Modify, then click on this entry.



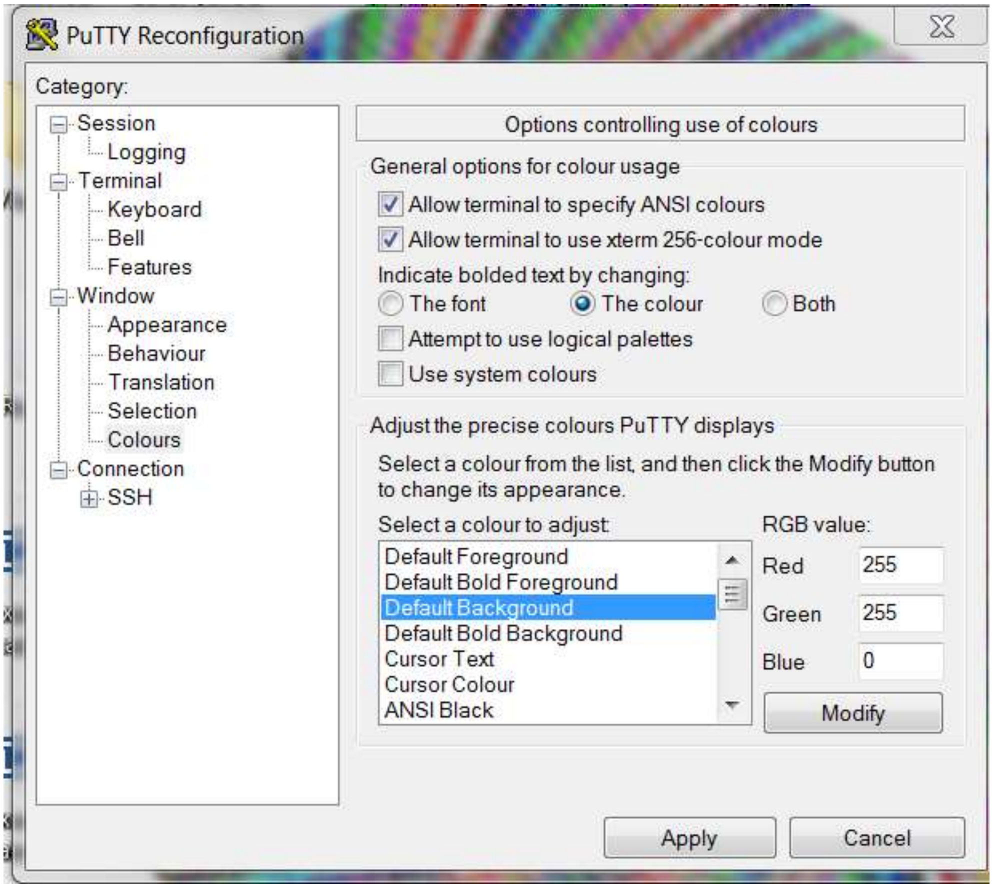
Hue: 160 Red: 0
Sat: 0 Green: 0
Lum: 0 Blue: 0

Now hover the mouse over the color square yellow; click on this color square.



Hue: 40 Red: 255
Sat: 240 Green: 255
Lum: 120 Blue: 0

Notice that the rectangle labeled Color/Solid has now changed to yellow. Now close out this dialog box – hover the mouse over the button OK, click on it.



PuTTY Reconfiguration

Options controlling use of colours

General options for colour usage

☑ Allow terminal to specify ANSI colours

☑ Allow terminal to use xterm 256-colour mode

Indicate bolded text by changing:

○ The font ● The colour ○ Both

□ Attempt to use logical palettes

□ Use system colours

Adjust the precise colours PuTTY displays

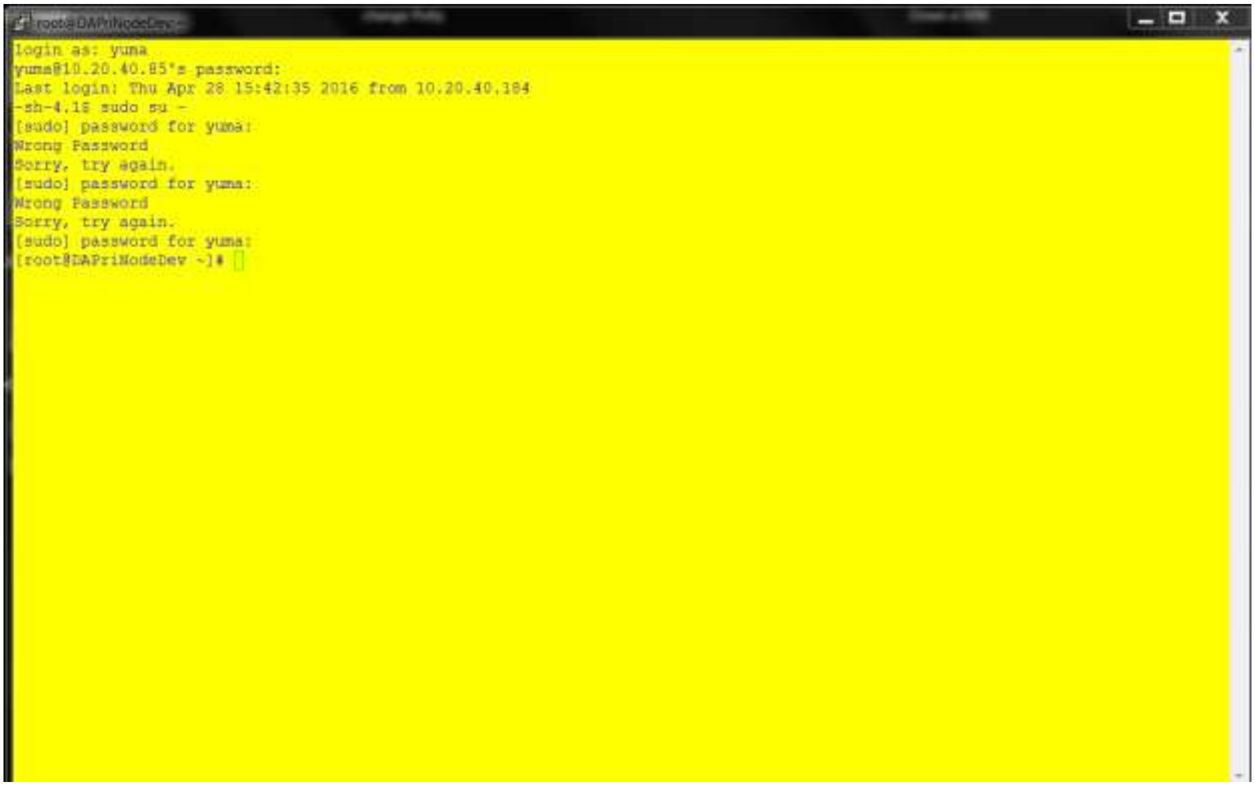
Select a colour from the list, and then click the Modify button to change its appearance.

Select a colour to adjust: Default Background

RGB value:

| | |
|---|---|
| Red | 255 |
| Green | 255 |
| Blue | 0 |

Last step, hover the mouse over the button entitled Apply, then click on it.

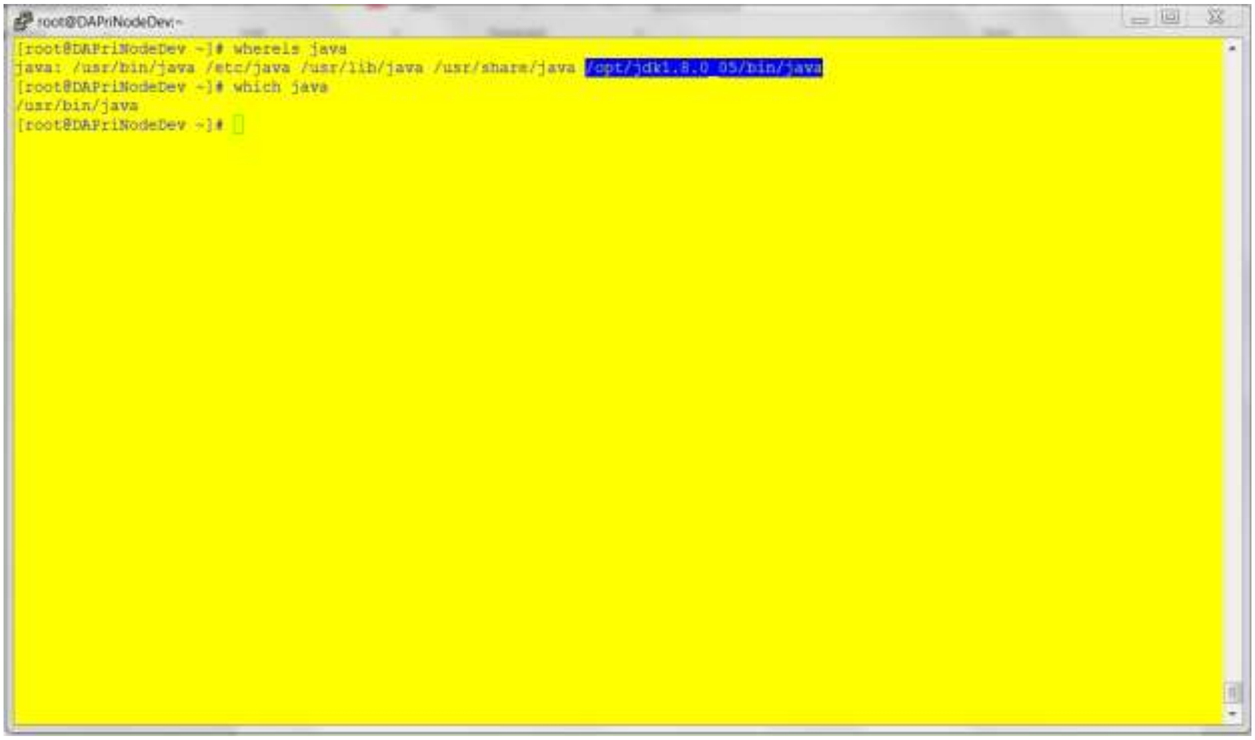


```
login as: yuma
yuma@10.20.40.85's password:
Last login: Thu Apr 28 15:42:35 2016 from 10.20.40.184
-sh-4.1$ sudo su -
[sudo] password for yuma:
Wrong Password
Sorry, try again.
[sudo] password for yuma:
Wrong Password
Sorry, try again.
[sudo] password for yuma:
[root@DAPriNodeDev ~]#
```

Now we are working with bright lights.

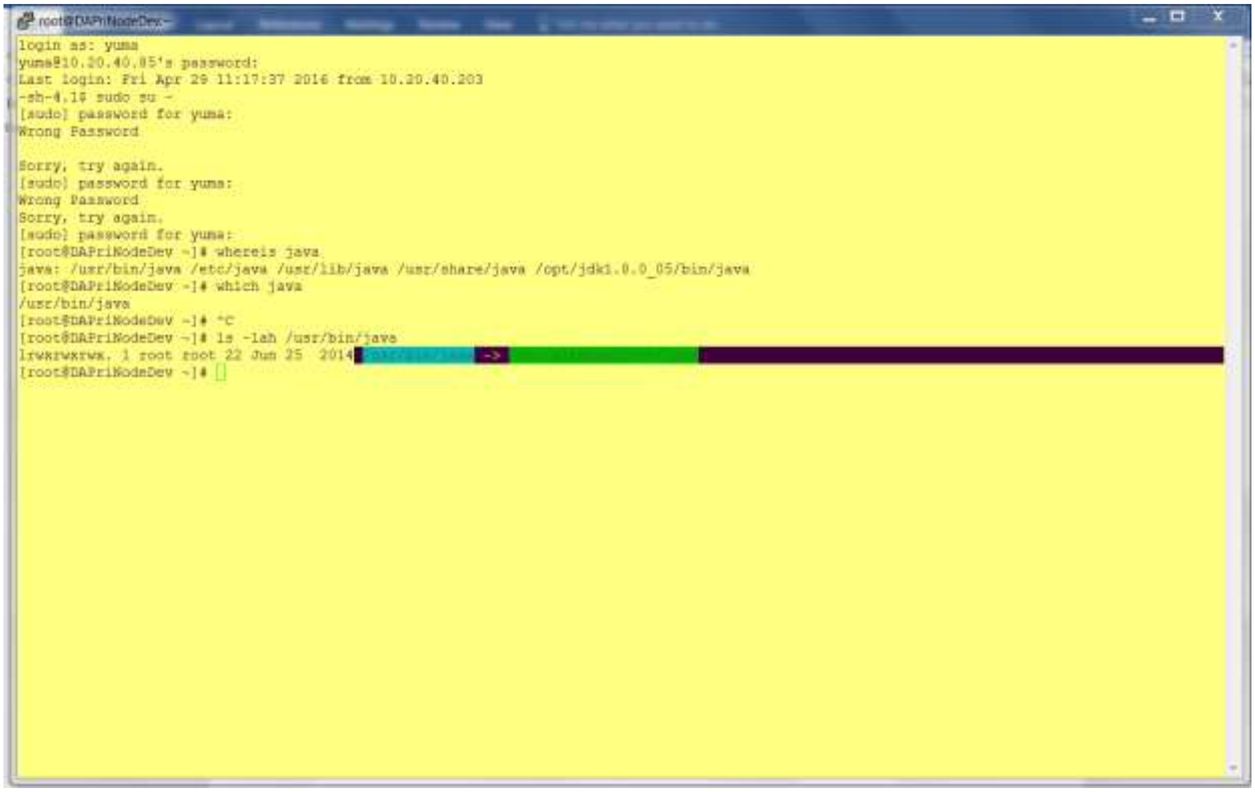
Because Linux comes in a variety of distros as the number of scripting languages, it important to know the specific distro – the syntax varies ever so slightly, so commands which may look convincing on paper, may not necessarily work for the technology stack.
Typically a man page ought to illuminate any discrepancies.
Just type man *the name of the command*, e.g., man iostat.

From the command line of the Putty window, type clear and then hit enter. Next, we need to find out where is the actual Java jdk is parked. Every system has its own quirks. Execute a command which java. Execute another command whereis java. In both cases, hit the enter key.



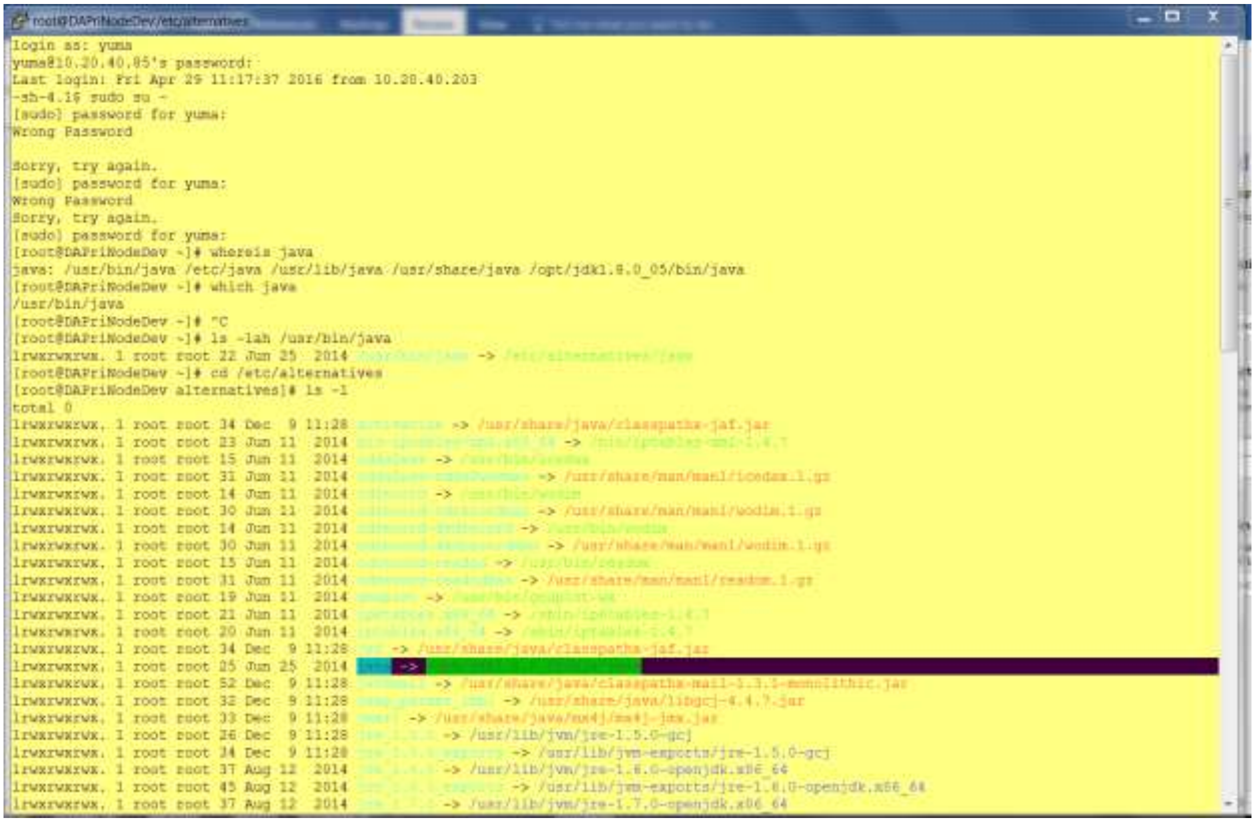
```
[root@DAPriNodeDev ~]# whereis java
java: /usr/bin/java /etc/java /usr/lib/java /usr/share/java /opt/jdk1.8.0_05/bin/java
[root@DAPriNodeDev ~]# which java
/usr/bin/java
[root@DAPriNodeDev ~]#
```

There are several more commands to help piece the puzzle here. Since there was another group which had development access to this Linux cluster, we need to find out where Java resides and whether there are symbolic links. From the command line, issue/type the following:
ls -lah /usr/bin/java. /usr/bin/java is the resultant response from the previous Linux command which java.



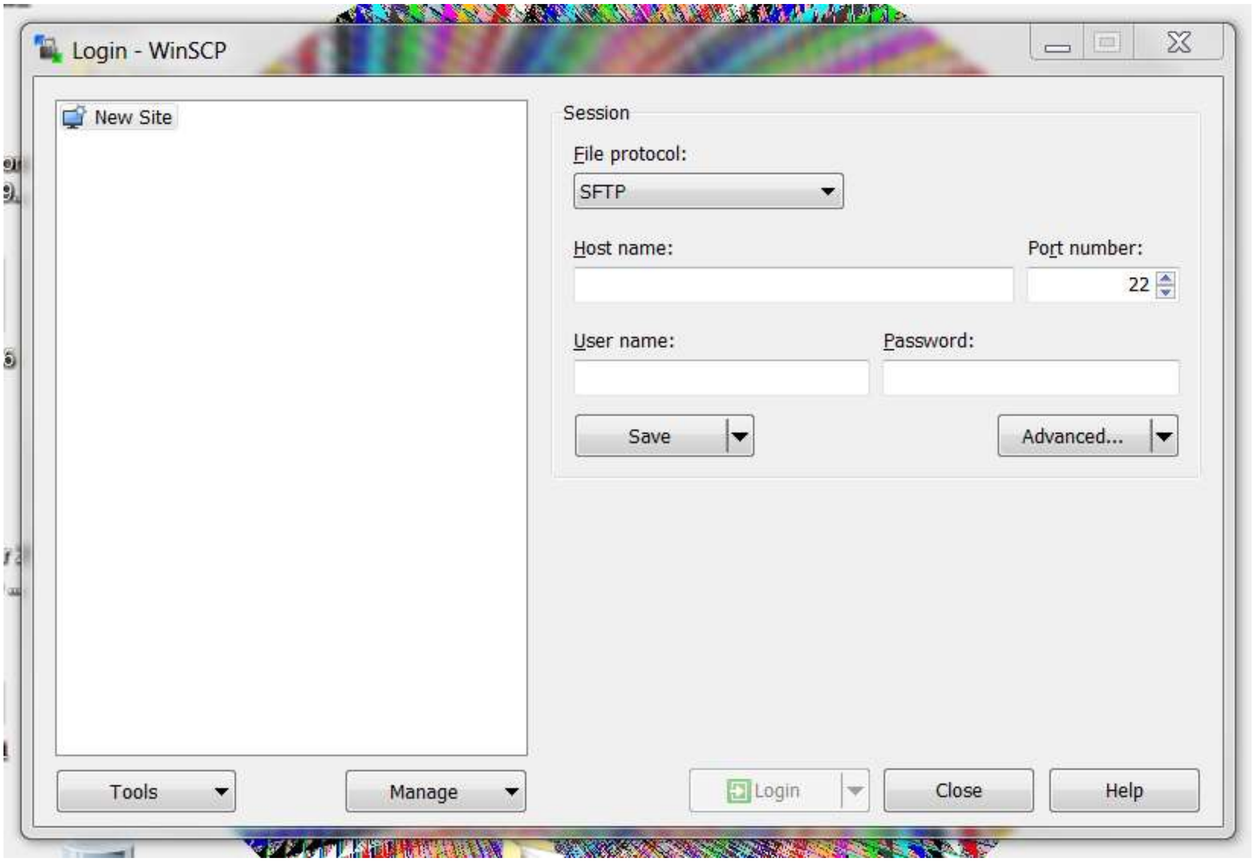
```
login as: yuma
yuma@10.20.40.85's password:
Last login: Fri Apr 29 11:17:37 2016 from 10.20.40.203
-sh-4.1$ sudo su -
[sudo] password for yuma:
Wrong Password

Sorry, try again.
[sudo] password for yuma:
Wrong Password
Sorry, try again.
[sudo] password for yuma:
[root@DAPriNodeDev ~]# whereis java
java: /usr/bin/java /etc/java /usr/lib/java /usr/share/java /opt/jdk1.8.0_05/bin/java
[root@DAPriNodeDev ~]# which java
/usr/bin/java
[root@DAPriNodeDev ~]# ^C
[root@DAPriNodeDev ~]# ls -lah /usr/bin/java
lrwxrwxrwx. 1 root root 22 Jun 25  2014 /usr/bin/java -> /etc/alternatives/java
[root@DAPriNodeDev ~]# 
```

Notice that /usr/bin/java points to /etc/alternatives/java. We need a little more gumshoe effort. Now type cd /etc/alternatives, hit enter. Then type ls -l, hit enter.



```
login as: yuma
yuma@10.20.40.85's password:
Last login: Fri Apr 29 11:17:37 2016 from 10.20.40.203
-sh-4.1$ sudo su -
[sudo] password for yuma:
Wrong Password

Sorry, try again.
[sudo] password for yuma:
Wrong Password
Sorry, try again.
[sudo] password for yuma:
[root@DAPriNodeDev ~]# whereis java
java: /usr/bin/java /etc/java /usr/lib/java /usr/share/java /opt/jdk1.8.0_05/bin/java
[root@DAPriNodeDev ~]# which java
/usr/bin/java
[root@DAPriNodeDev ~]# ^C
[root@DAPriNodeDev ~]# ls -lah /usr/bin/java
lrwxrwxrwx. 1 root root 22 Jun 25  2014 /usr/bin/java -> /etc/alternatives/java
[root@DAPriNodeDev ~]# cd /etc/alternatives
[root@DAPriNodeDev alternatives]# ls -l
total 0
lrwxrwxrwx. 1 root root 34 Dec  9 11:28 [illegible] -> /usr/share/java/classpathx-jaf.jar
lrwxrwxrwx. 1 root root 23 Jun 11  2014 [illegible] -> /bin/iptables-xml-1.4.7
lrwxrwxrwx. 1 root root 15 Jun 11  2014 cdda2wav -> /usr/bin/icedax
lrwxrwxrwx. 1 root root 31 Jun 11  2014 cdda2wav-cdda2wavman -> /usr/share/man/man1/icedax.1.gz
lrwxrwxrwx. 1 root root 14 Jun 11  2014 cdrecord -> /usr/bin/wodim
lrwxrwxrwx. 1 root root 30 Jun 11  2014 cdrecord-cdrecordman -> /usr/share/man/man1/wodim.1.gz
lrwxrwxrwx. 1 root root 14 Jun 11  2014 cdrecord-dvdrecord -> /usr/bin/wodim
lrwxrwxrwx. 1 root root 30 Jun 11  2014 cdrecord-dvdrecordman -> /usr/share/man/man1/wodim.1.gz
lrwxrwxrwx. 1 root root 15 Jun 11  2014 cdrecord-readcd -> /usr/bin/readom
lrwxrwxrwx. 1 root root 31 Jun 11  2014 cdrecord-readcdman -> /usr/share/man/man1/readom.1.gz
lrwxrwxrwx. 1 root root 19 Jun 11  2014 gnuplot -> /usr/bin/gnuplot-wx
lrwxrwxrwx. 1 root root 21 Jun 11  2014 ip6tables.x86_64 -> /sbin/ip6tables-1.4.7
lrwxrwxrwx. 1 root root 20 Jun 11  2014 iptables.x86_64 -> /sbin/iptables-1.4.7
lrwxrwxrwx. 1 root root 34 Dec  9 11:28 jaf -> /usr/share/java/classpathx-jaf.jar
lrwxrwxrwx. 1 root root 25 Jun 25  2014 java -> [illegible]
lrwxrwxrwx. 1 root root 52 Dec  9 11:28 javamail -> /usr/share/java/classpathx-mail-1.3.1-monolithic.jar
lrwxrwxrwx. 1 root root 32 Dec  9 11:28 jaxp_parser_impl -> /usr/share/java/libgcj-4.4.7.jar
lrwxrwxrwx. 1 root root 33 Dec  9 11:28 jmxri -> /usr/share/java/mx4j/mx4j-jmx.jar
lrwxrwxrwx. 1 root root 26 Dec  9 11:28 jre_1.5.0 -> /usr/lib/jvm/jre-1.5.0-gcj
lrwxrwxrwx. 1 root root 34 Dec  9 11:28 jre_1.5.0_exports -> /usr/lib/jvm-exports/jre-1.5.0-gcj
lrwxrwxrwx. 1 root root 37 Aug 12  2014 jre_1.6.0 -> /usr/lib/jvm/jre-1.6.0-openjdk.x86_64
lrwxrwxrwx. 1 root root 45 Aug 12  2014 jre_1.6.0_exports -> /usr/lib/jvm-exports/jre-1.6.0-openjdk.x86_64
lrwxrwxrwx. 1 root root 37 Aug 12  2014 jre_1.7.0 -> /usr/lib/jvm/jre-1.7.0-openjdk.x86_64
```

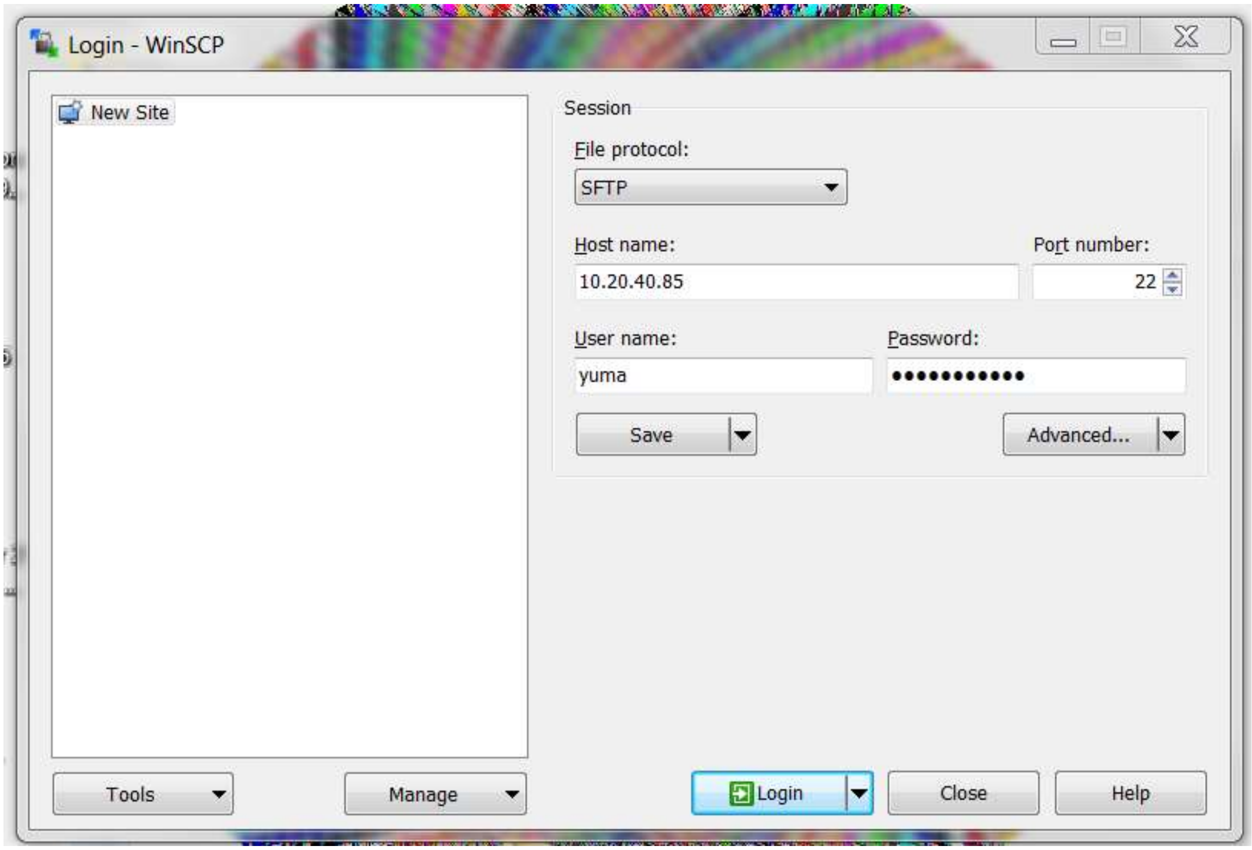
The symbolic link highlighted shows java → /opt/jdk1.8.0_5/bin/java. Now that we know the lay of the land, we will transport the Linux rpm binary of the latest Java JDK from the local Windows machine into the target Linux instance 10.20.40.85. Click on the icon for WinSCP.



File protocol: SFTP

Port number: 22

Now type in the Linux host IP address, the designated login and password assigned to you. Hove the mouse over the button entitled Login, click on it.



Session

File protocol: SFTP

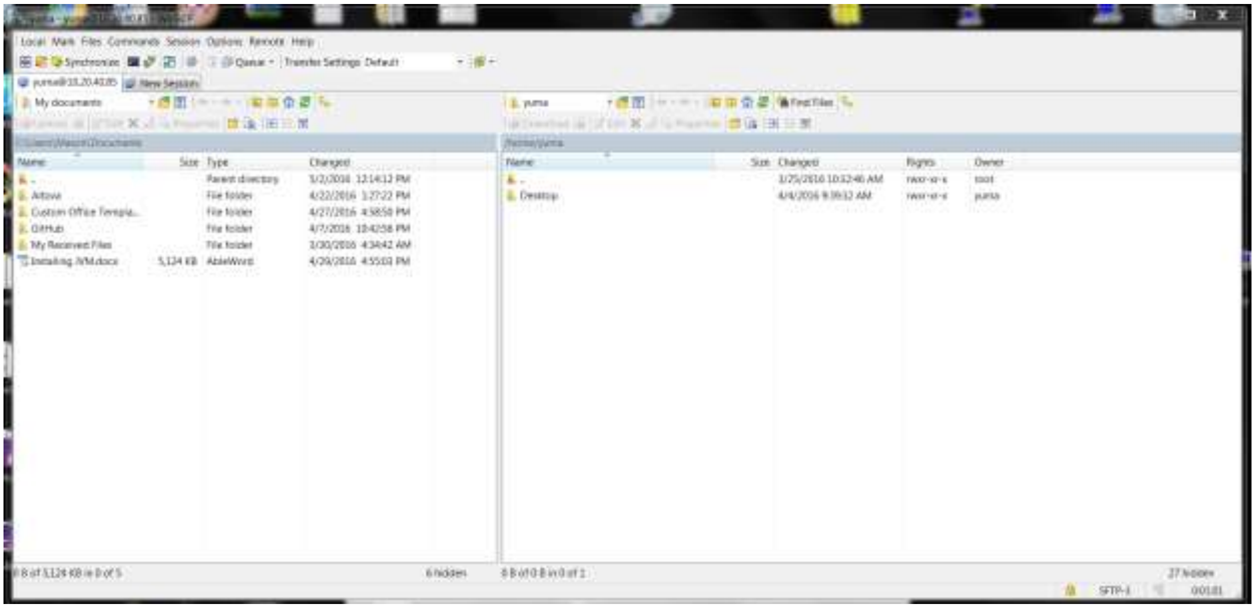
Host name: 10.20.40.85

Port number: 22

User name: yuma

Password: ••••••••••••

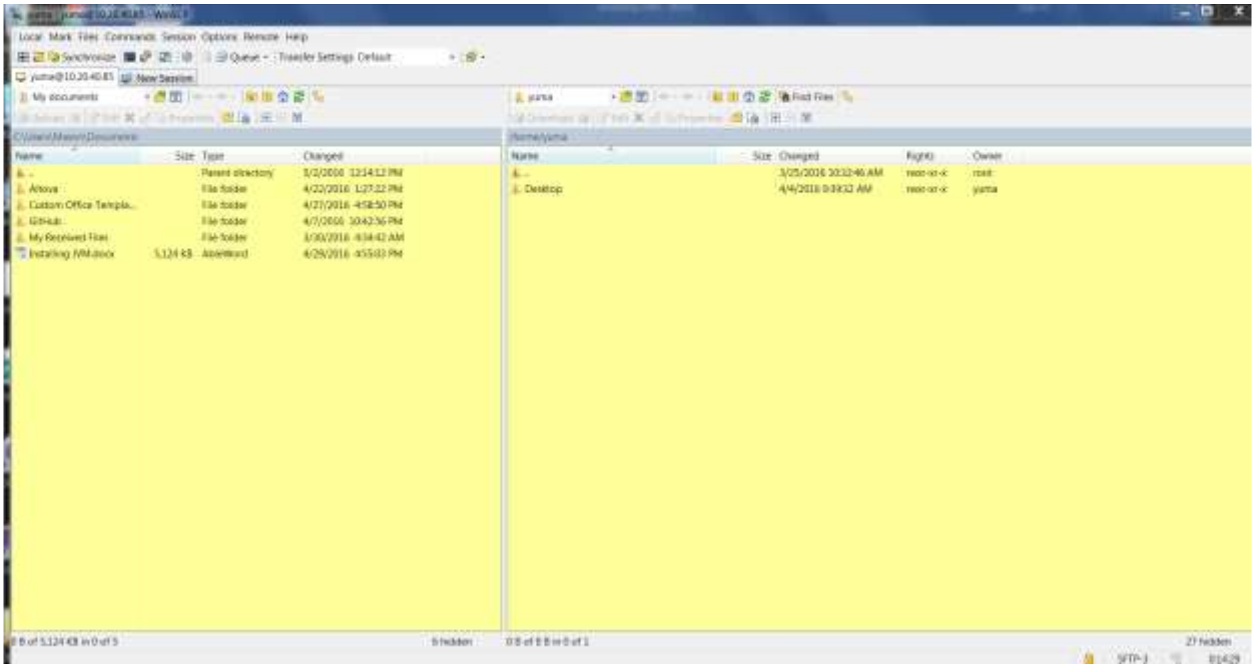
What you see next is the main screen of WinSCP. This is undoubtedly one of the best tools for cross platform work between Windows and Linux. Others tout FileZilla, so it is really a matter of practicality and features. Refer to the next screen.


Local Mark Files Commands Session Options Remote Help
Synchronize
Queue
Transfer Settings Default
yuma@10.20.40.85
New Session
My documents
yuma
Find Files

| Name | Size | Type | Changed |
|---|---|---|---|
| .. | | Parent directory | 5/2/2016 12:14:12 PM |
| Altova | | File folder | 4/22/2016 1:27:22 PM |
| Custom Office Templa... | | File folder | 4/27/2016 4:58:50 PM |
| GitHub | | File folder | 4/7/2016 10:42:58 PM |
| My Received Files | | File folder | 3/30/2016 4:34:42 AM |
| Installing JVM.docx | 5,124 KB | AbleWord | 4/29/2016 4:55:03 PM |

| Name | Size | Changed | Rights | Owner |
|---|---|---|---|---|
| .. | | 3/25/2016 10:32:46 AM | rwxr-xr-x | root |
| Desktop | | 4/4/2016 9:39:32 AM | rwxr-xr-x | yuma |

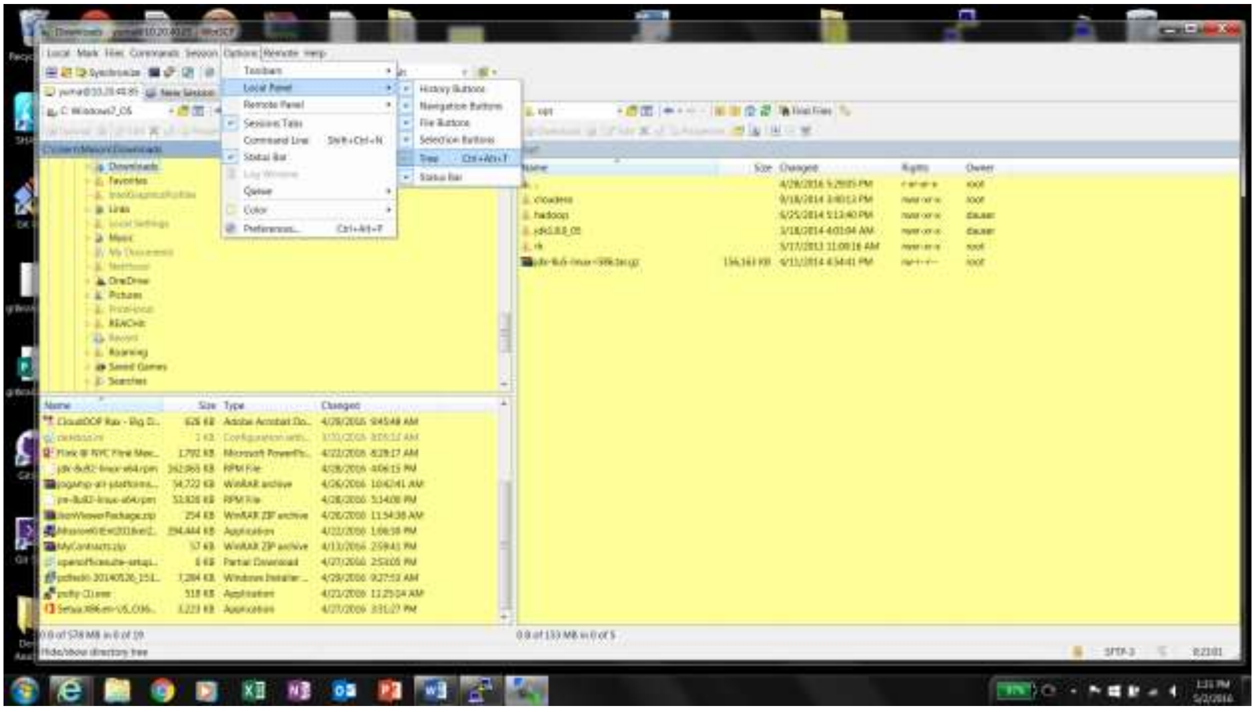
On the left panel is the local Windows file system and on the right is the Linux instance. We will make the screen is little more colorful. Navigate to the top, locate the word Options, click on it so that the drop down list appears, scroll to the near the bottom of this list, select the option Colors, scroll the mouse to the far right until the color palette appears, select the small color square and then click on top of it.



| Name | Size | Type | Changed |
|---|---|---|---|
| .. |  | Parent directory | 5/2/2016 12:14:12 PM |
| Altova |  | File folder | 4/22/2016 1:27:22 PM |
| Custom Office Templa... |  | File folder | 4/27/2016 4:58:50 PM |
| GitHub |  | File folder | 4/7/2016 10:42:36 PM |
| My Received Files |  | File folder | 3/30/2016 4:34:42 AM |
| Installing JVM.docx | 5,124 KB | AbleWord | 4/29/2016 4:55:03 PM |

| Name | Size | Changed | Rights | Owner |
|---|---|---|---|---|
| .. |  | 3/25/2016 10:32:46 AM | rwxr-xr-x | root |
| Desktop |  | 4/4/2016 0:09:32 AM | rwxr-xr-x | yuma |

To assist locating the two .rpm files already downloaded from the Oracle Web site, hover the mouse near the top of the WinSCP window, locate the word Options, click on it to open the dropdown list. Locate the option Local Panel, move the mouse to the far right until another drop down list appears, hover the mouse until it is on top of the entry Tree, then click on this. Notice the left panel is now split into two sub panes.



| Name | Size | Type | Changed |
|---|---|---|---|
| CloudDOP Rax - Big D... | 626 KB | Adobe Acrobat Do... | 4/28/2016 9:45:48 AM |
| desktop.ini | 1 KB | Configuration sett... | 3/21/2016 3:05:12 AM |
| Flink @ NYC Flink Mee... | 1,792 KB | Microsoft PowerPo... | 4/22/2016 8:28:17 AM |
| jdk-8u92-linux-x64.rpm | 162,065 KB | RPM File | 4/28/2016 4:06:15 PM |
| jogamp-all-platforms... | 54,722 KB | WinRAR archive | 4/26/2016 10:42:41 AM |
| jre-8u92-linux-x64.rpm | 53,826 KB | RPM File | 4/28/2016 5:14:08 PM |
| JsonViewerPackage.zip | 254 KB | WinRAR ZIP archive | 4/26/2016 11:54:38 AM |
| [illegible] | 294,444 KB | Application | 4/22/2016 1:06:38 PM |
| MyContacts.zip | 57 KB | WinRAR ZIP archive | 4/13/2016 2:59:41 PM |
| openofficesuite-setup... | 6 KB | Partial Download | 4/27/2016 2:53:05 PM |
| pdfedit-20140526_151... | 7,284 KB | Windows Installer ... | 4/29/2016 9:27:53 AM |
| putty-CI.exe | 518 KB | Application | 4/21/2016 11:25:04 AM |
| Setup.X86.en-US_O36... | 3,223 KB | Application | 4/27/2016 3:31:27 PM |

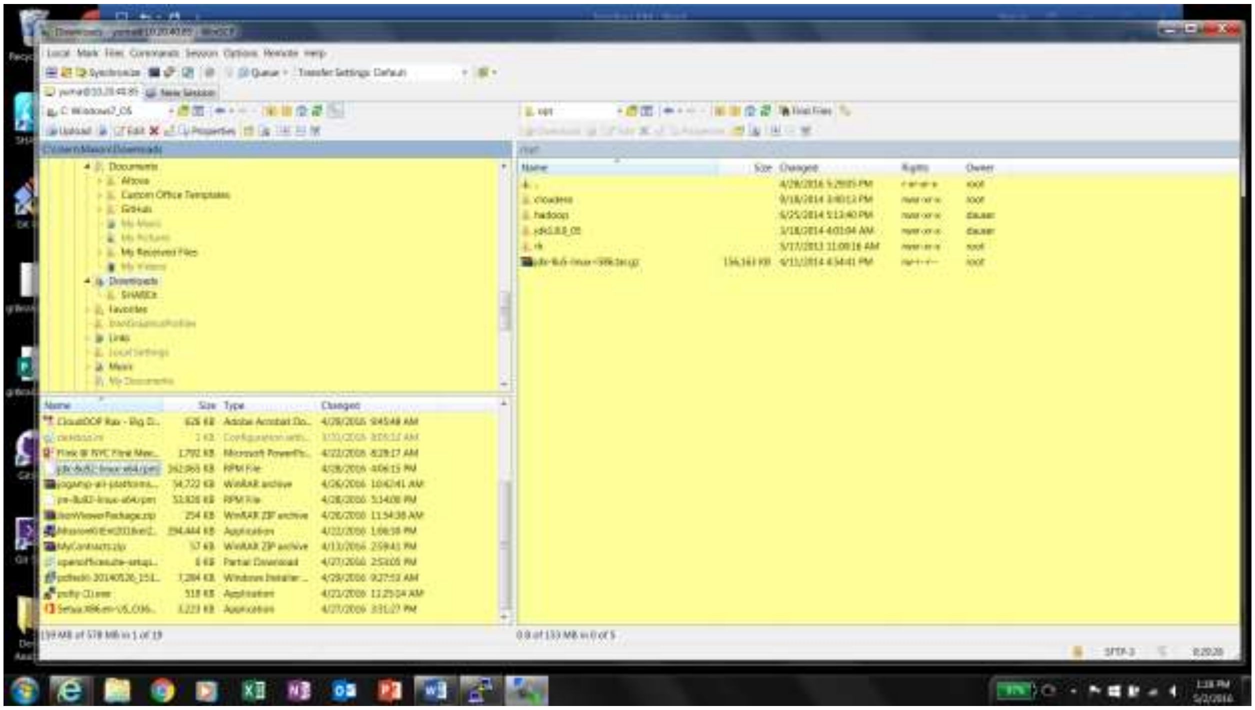
0.0 of 578 MB in 0 of 19

Hide/show directory tree

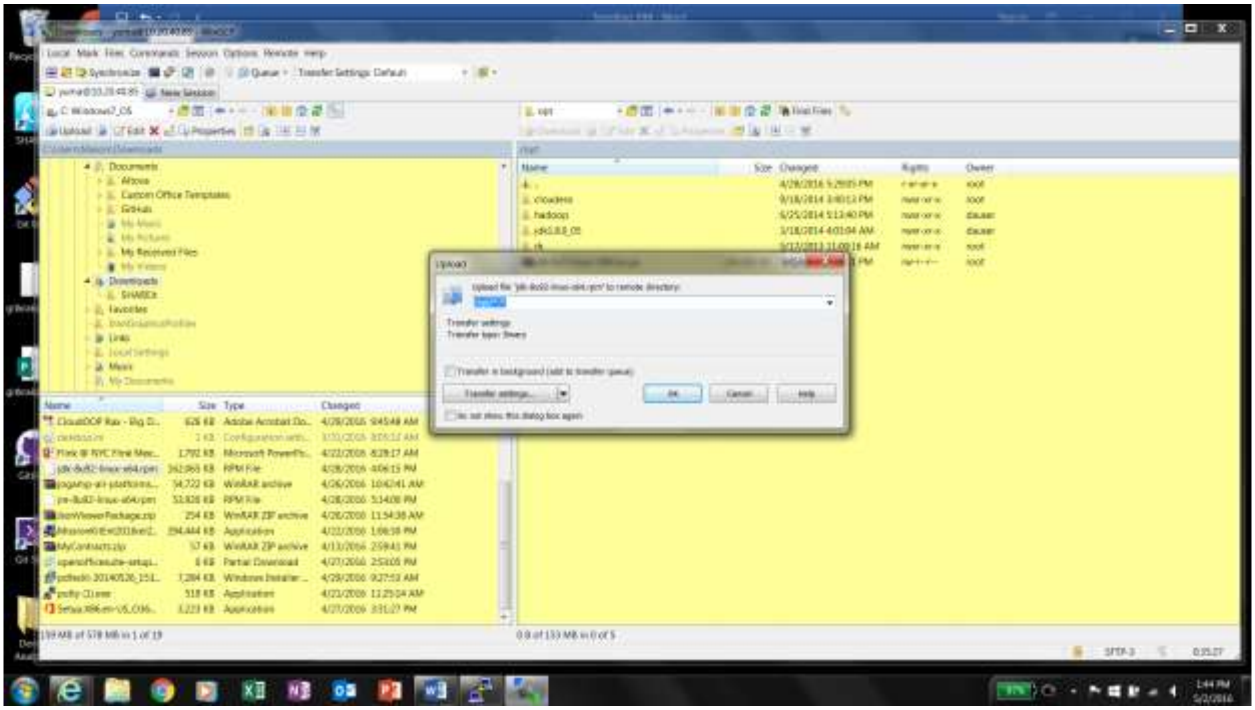
| Name | Size | Changed | Rights | Owner |
|---|---|---|---|---|
| .. | | 4/28/2016 5:28:05 PM | r-xr-xr-x | root |
| cloudera | | 9/18/2014 3:40:13 PM | rwxr-xr-x | root |
| hadoop | | 6/25/2014 5:13:40 PM | rwxr-xr-x | dauser |
| jdk1.8.0_05 | | 3/18/2014 4:03:04 AM | rwxr-xr-x | dauser |
| rh | | 5/17/2013 11:08:16 AM | rwxr-xr-x | root |
| jdk-8u5-linux-i586.tar.gz | 156,161 KB | 6/11/2014 4:34:41 PM | rw-r--r-- | root |

0.0 of 153 MB in 0 of 5

Now locate the rpm file for the jdk. In the lower right sub pane, highlight this entry.



Make sure that the remote(Linux) directory is where the new jdk is to be parked. In this exercise, the new jdk will be parked under the /opt directory on the remote Linux instance. Now hover the mouse over the local jdk……rpm file entry. Next, right lick on this entry and a drop down list will appear. Look for the option Upload. Then click on it.



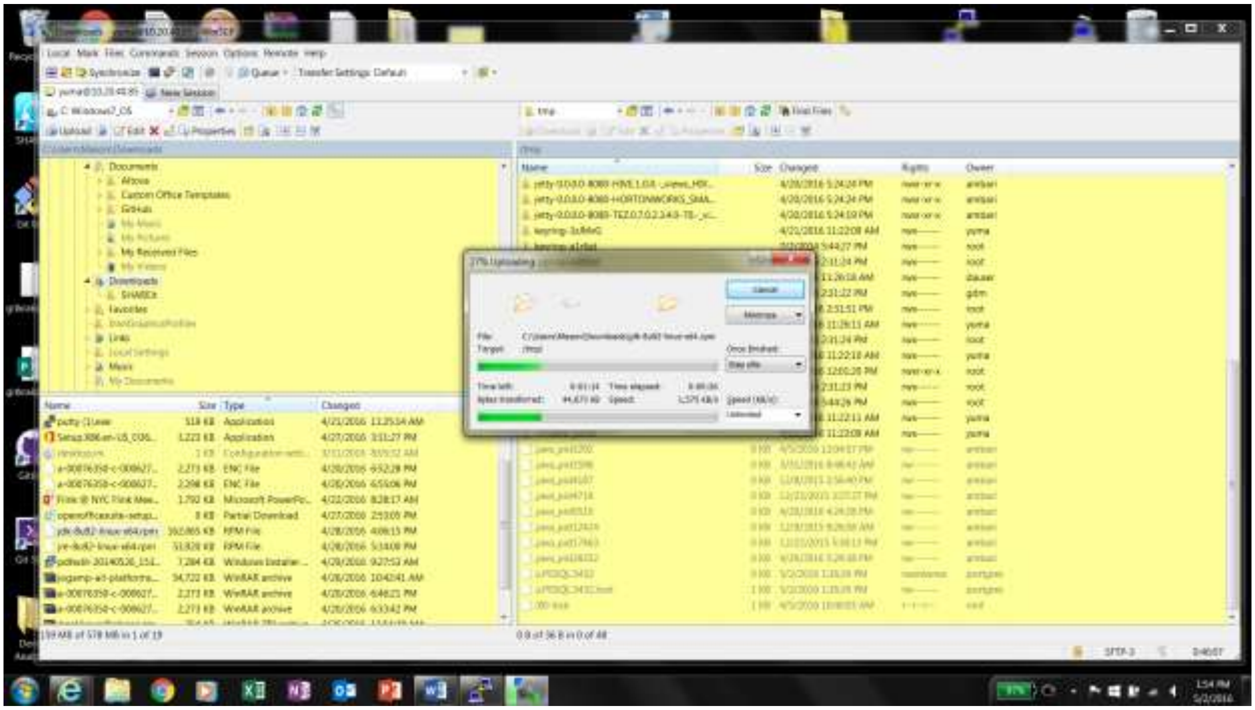
Upload file 'jdk-8u92-linux-x64.rpm' to remote directory:

Transfer settings
Transfer type: Binary

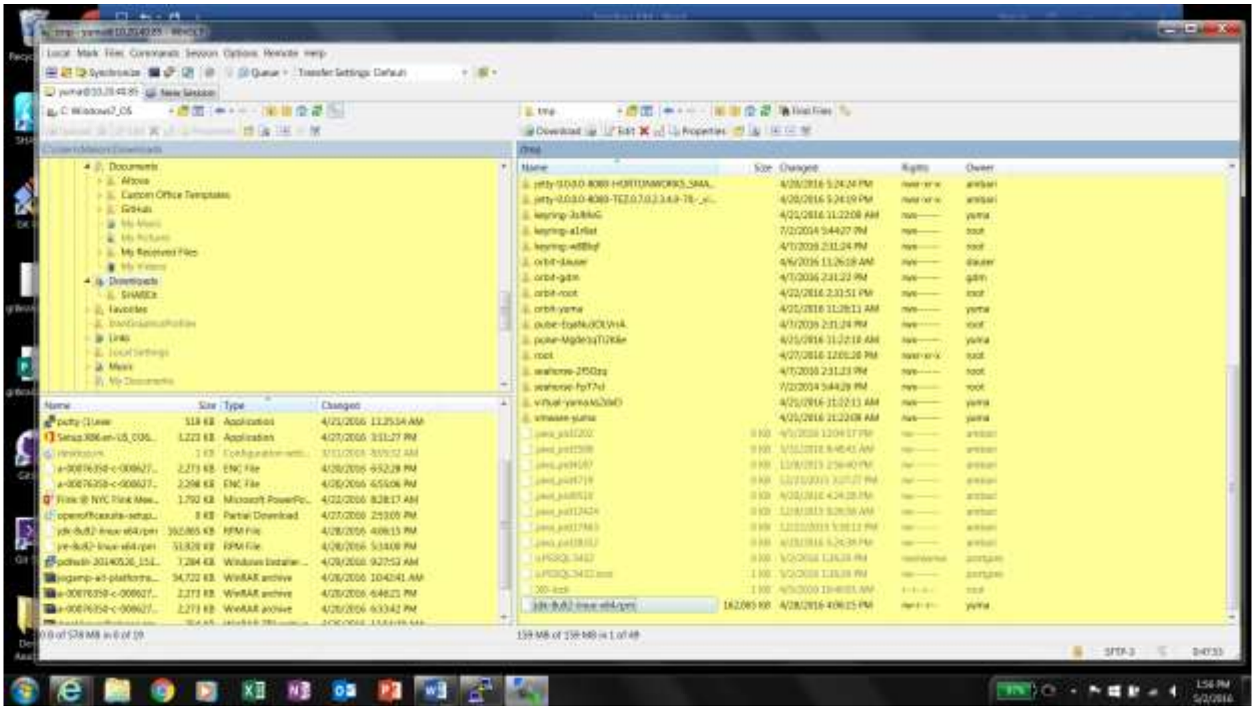
☐ Transfer in background (add to transfer queue)

☐ Do not show this dialog box again

In case the permissions becomes a roadblock, go back to the remote machine and execute from the command line, chmod 755 /opt -R. Replace /opt with the name of the remote directory of where the jdk …rpm will be landing. If this does not work, navigate to the /tmp directory. Then Upload the rpm file.

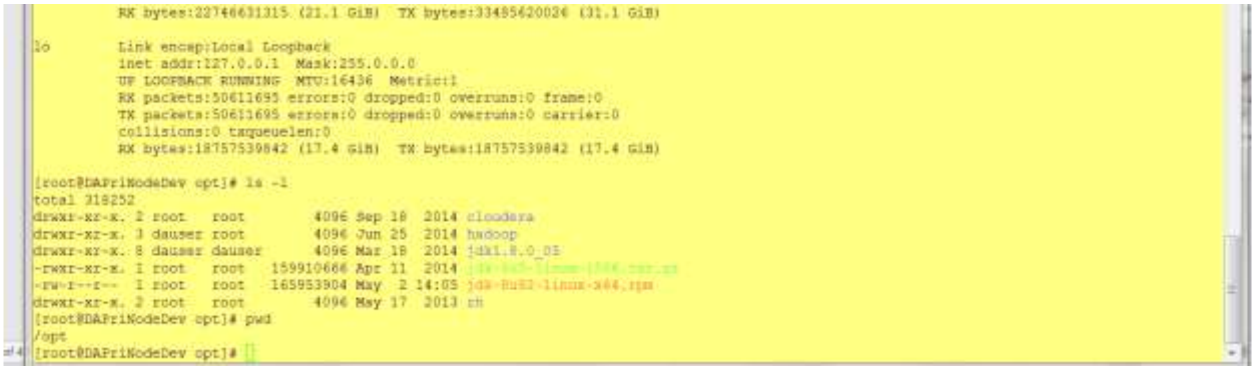


Once the data transfer is completed successfully, locate the file Jdk….rpm on the remote directory /tmp. Refer to the screen on the next page. Notice the bottom most entry on the right pane. That is the jdk we just uploaded !!!

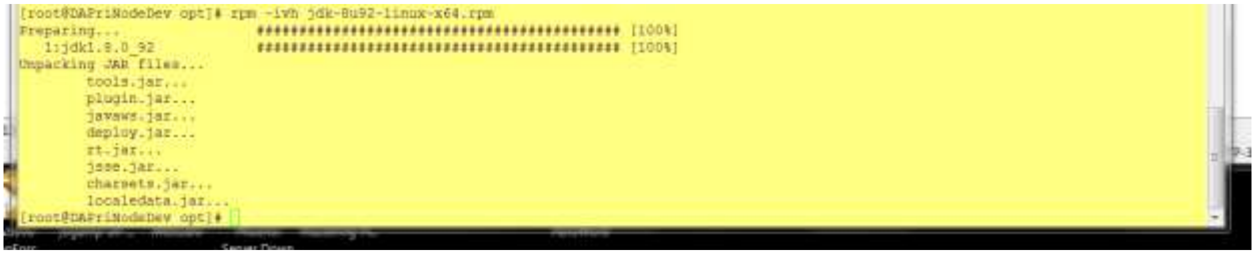

| Name | Size | Changed | Rights | Owner |
|---|---|---|---|---|
| jetty-0.0.0.0-8080-HORTONWORKS_SMA... |  | 4/28/2016 5:24:24 PM | rwxr-xr-x | ambari |
| jetty-0.0.0.0-8080-TEZ.0.7.0.2.3.4.0-78-_vi... |  | 4/28/2016 5:24:19 PM | rwxr-xr-x | ambari |
| keyring-3u8RkG |  | 4/21/2016 11:22:08 AM | rwx------ | yuma |
| keyring-a1rfat |  | 7/2/2014 5:44:27 PM | rwx------ | root |
| keyring-w8Bhyf |  | 4/7/2016 2:31:24 PM | rwx------ | root |
| orbit-dauser |  | 4/6/2016 11:26:19 AM | rwx------ | dauser |
| orbit-gdm |  | 4/7/2016 2:31:22 PM | rwx------ | gdm |
| orbit-root |  | 4/22/2016 2:33:51 PM | rwx------ | root |
| orbit-yuma |  | 4/21/2016 11:28:11 AM | rwx------ | yuma |
| pulse-[illegible] |  | 4/7/2016 2:31:24 PM | rwx------ | root |
| pulse-[illegible] |  | 4/21/2016 11:22:18 AM | rwx------ | yuma |
| root |  | 4/27/2016 12:01:28 PM | rwxr-xr-x | root |
| seahorse-2f50zq |  | 4/7/2016 2:31:23 PM | rwx------ | root |
| seahorse-[illegible] |  | 7/2/2014 5:44:29 PM | rwx------ | root |
| virtual-yuma.[illegible] |  | 4/21/2016 11:22:11 AM | rwx------ | yuma |
| vmware-yuma |  | 4/21/2016 11:22:08 AM | rwx------ | yuma |
| [illegible] | [illegible] | [illegible] | [illegible] | [illegible] |
| jdk-8u92-linux-x64.rpm | 162,085 KB | 4/28/2016 4:06:15 PM | rw-r--r-- | yuma |

159 MB of 159 MB in 1 of 48

Next, copy the rpm file from /tmp to /opt or to the target directory of where the jdk needs to be. Execute from the command line, cp /tmp/*.rpm /opt. This is assuming there is no other .rpm file. Then execute a cd /opt, then run a ls -l. The jdk…prm will be there as planned.

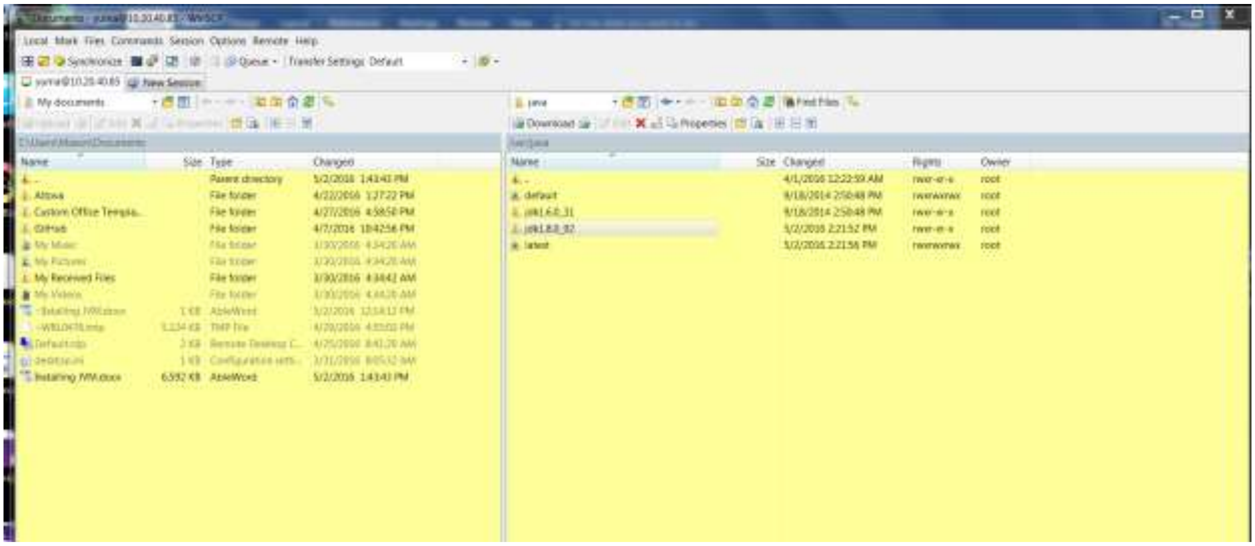

```
          RX bytes:22746631315 (21.1 GiB)  TX bytes:33485620026 (31.1 GiB)

lo        Link encap:Local Loopback
          inet addr:127.0.0.1  Mask:255.0.0.0
          UP LOOPBACK RUNNING  MTU:16436  Metric:1
          RX packets:50611695 errors:0 dropped:0 overruns:0 frame:0
          TX packets:50611695 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:0
          RX bytes:18757539842 (17.4 GiB)  TX bytes:18757539842 (17.4 GiB)

[root@DAPriNodeDev opt]# ls -l
total 318252
drwxr-xr-x. 2 root   root        4096 Sep 18  2014 cloudera
drwxr-xr-x. 3 dauser root        4096 Jun 25  2014 hadoop
drwxr-xr-x. 8 dauser dauser      4096 Mar 18  2014 jdk1.8.0_05
-rwxr-xr-x. 1 root   root   159910666 Apr 11  2014 jdk-8u5-linux-i586.tar.gz
-rw-r--r--  1 root   root   165953904 May  2 14:05 jdk-8u92-linux-x64.rpm
drwxr-xr-x. 2 root   root        4096 May 17  2013 rh
[root@DAPriNodeDev opt]# pwd
/opt
[root@DAPriNodeDev opt]#
```

Next from the command line, execute rpm -ivh jdk.1.8.0_92.rpm.



```
[root@DAPriNodeDev opt]# rpm -ivh jdk-8u92-linux-x64.rpm
Preparing...                ########################################### [100%]
   1:jdk1.8.0_92            ########################################### [100%]
Unpacking JAR files...
        tools.jar...
        plugin.jar...
        javaws.jar...
        deploy.jar...
        rt.jar...
        jsse.jar...
        charsets.jar...
        localedata.jar...
[root@DAPriNodeDev opt]#
```

Where is the newest jdk ??? Though the command was executed in the /opt directory, the installation unpacked all the binaries into /usr/java. We ran whereis java and which java earlier, that gave us a clue where it would be.



Documents - yumal@10.20.40.83 - WinSCP
Local Mark Files Commands Session Options Remote Help
Synchronize
Queue
Transfer Settings Default
yumal@10.20.40.83
New Session
My documents
java
Find Files
Upload
Edit
Properties
Download

C:\Users\Mason\Documents\

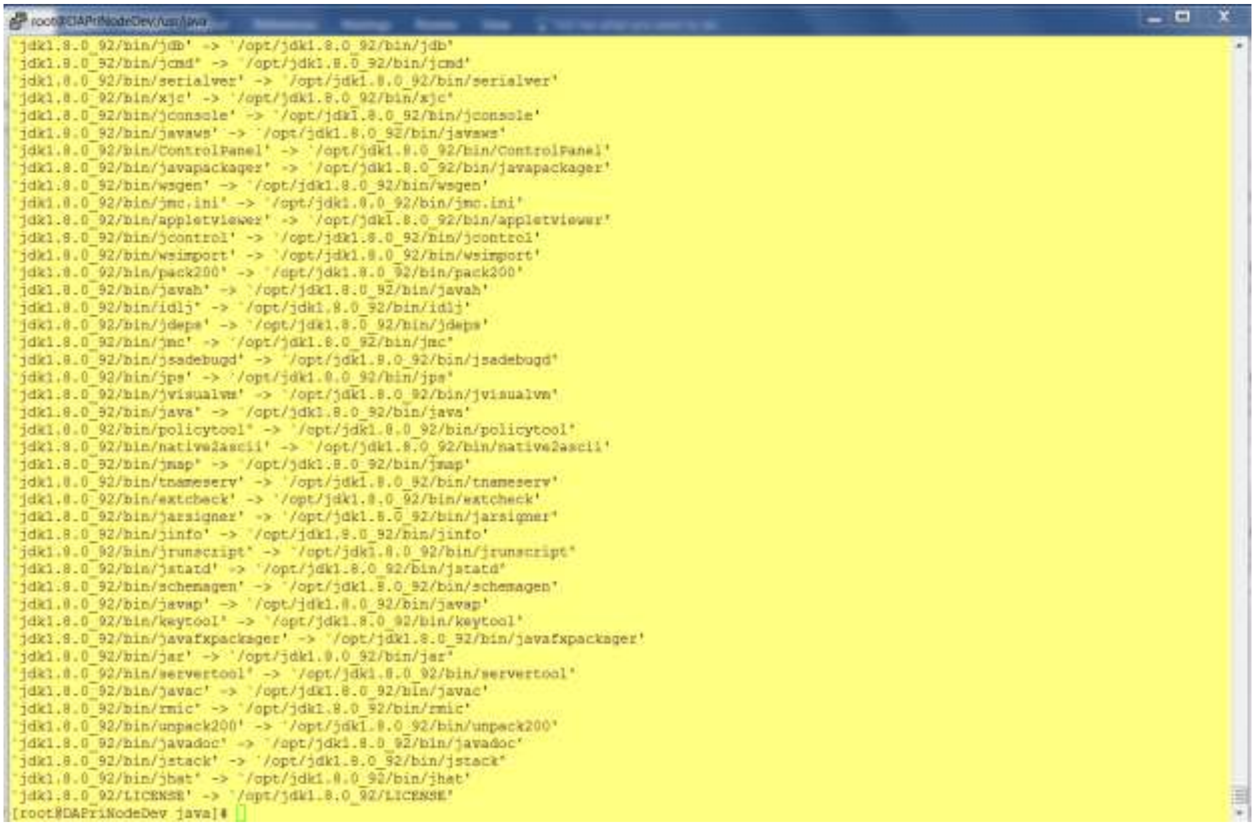
| Name | Size | Type | Changed |
|---|---|---|---|
| .. | | Parent directory | 5/2/2016 1:43:43 PM |
| Altova | | File folder | 4/22/2016 1:27:22 PM |
| Custom Office Templa... | | File folder | 4/27/2016 4:58:50 PM |
| GitHub | | File folder | 4/7/2016 10:42:56 PM |
| My Music | | File folder | 3/30/2016 4:34:26 AM |
| My Pictures | | File folder | 3/30/2016 4:34:26 AM |
| My Received Files | | File folder | 3/30/2016 4:38:42 AM |
| My Videos | | File folder | 3/30/2016 4:44:26 AM |
| ~$stalling JVM.docx | 1 KB | AbleWord | 5/2/2016 12:14:12 PM |
| ~WRL0478.tmp | 5,124 KB | TMP File | 4/29/2016 4:33:02 PM |
| Default.rdp | 2 KB | Remote Desktop C... | 4/25/2016 8:41:26 AM |
| desktop.ini | 1 KB | Configuration setti... | 3/31/2016 8:05:32 AM |
| Installing JVM.docx | 6,592 KB | AbleWord | 5/2/2016 1:43:43 PM |

/usr/java

| Name | Size | Changed | Rights | Owner |
|---|---|---|---|---|
| .. | | 4/1/2016 12:22:59 AM | rwxr-xr-x | root |
| default | | 8/18/2014 2:50:48 PM | rwxrwxrwx | root |
| jdk1.6.0_31 | | 8/18/2014 2:50:48 PM | rwxr-xr-x | root |
| jdk1.8.0_92 | | 5/2/2016 2:21:52 PM | rwxr-xr-x | root |
| latest | | 5/2/2016 2:21:56 PM | rwxrwxrwx | root |

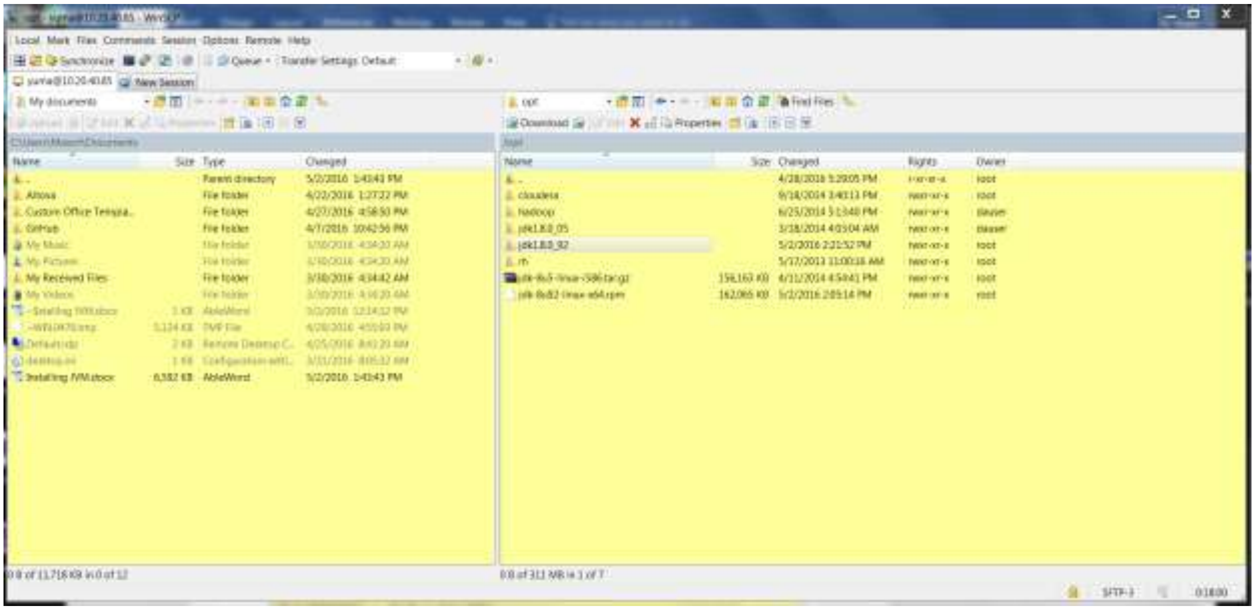
Next we need to copy everything in this latest jdk from /user/java to

/opt. Execute the command cp -avr jdk1.8.0_92 /opt. The screen below is the results of the tail end of this execution.



```
`jdk1.8.0_92/bin/jdb' -> `/opt/jdk1.8.0_92/bin/jdb'
`jdk1.8.0_92/bin/jcmd' -> `/opt/jdk1.8.0_92/bin/jcmd'
`jdk1.8.0_92/bin/serialver' -> `/opt/jdk1.8.0_92/bin/serialver'
`jdk1.8.0_92/bin/xjc' -> `/opt/jdk1.8.0_92/bin/xjc'
`jdk1.8.0_92/bin/jconsole' -> `/opt/jdk1.8.0_92/bin/jconsole'
`jdk1.8.0_92/bin/javaws' -> `/opt/jdk1.8.0_92/bin/javaws'
`jdk1.8.0_92/bin/ControlPanel' -> `/opt/jdk1.8.0_92/bin/ControlPanel'
`jdk1.8.0_92/bin/javapackager' -> `/opt/jdk1.8.0_92/bin/javapackager'
`jdk1.8.0_92/bin/wsgen' -> `/opt/jdk1.8.0_92/bin/wsgen'
`jdk1.8.0_92/bin/jmc.ini' -> `/opt/jdk1.8.0_92/bin/jmc.ini'
`jdk1.8.0_92/bin/appletviewer' -> `/opt/jdk1.8.0_92/bin/appletviewer'
`jdk1.8.0_92/bin/jcontrol' -> `/opt/jdk1.8.0_92/bin/jcontrol'
`jdk1.8.0_92/bin/wsimport' -> `/opt/jdk1.8.0_92/bin/wsimport'
`jdk1.8.0_92/bin/pack200' -> `/opt/jdk1.8.0_92/bin/pack200'
`jdk1.8.0_92/bin/javah' -> `/opt/jdk1.8.0_92/bin/javah'
`jdk1.8.0_92/bin/idlj' -> `/opt/jdk1.8.0_92/bin/idlj'
`jdk1.8.0_92/bin/jdeps' -> `/opt/jdk1.8.0_92/bin/jdeps'
`jdk1.8.0_92/bin/jmc' -> `/opt/jdk1.8.0_92/bin/jmc'
`jdk1.8.0_92/bin/jsadebugd' -> `/opt/jdk1.8.0_92/bin/jsadebugd'
`jdk1.8.0_92/bin/jps' -> `/opt/jdk1.8.0_92/bin/jps'
`jdk1.8.0_92/bin/jvisualvm' -> `/opt/jdk1.8.0_92/bin/jvisualvm'
`jdk1.8.0_92/bin/java' -> `/opt/jdk1.8.0_92/bin/java'
`jdk1.8.0_92/bin/policytool' -> `/opt/jdk1.8.0_92/bin/policytool'
`jdk1.8.0_92/bin/native2ascii' -> `/opt/jdk1.8.0_92/bin/native2ascii'
`jdk1.8.0_92/bin/jmap' -> `/opt/jdk1.8.0_92/bin/jmap'
`jdk1.8.0_92/bin/tnameserv' -> `/opt/jdk1.8.0_92/bin/tnameserv'
`jdk1.8.0_92/bin/extcheck' -> `/opt/jdk1.8.0_92/bin/extcheck'
`jdk1.8.0_92/bin/jarsigner' -> `/opt/jdk1.8.0_92/bin/jarsigner'
`jdk1.8.0_92/bin/jinfo' -> `/opt/jdk1.8.0_92/bin/jinfo'
`jdk1.8.0_92/bin/jrunscript' -> `/opt/jdk1.8.0_92/bin/jrunscript'
`jdk1.8.0_92/bin/jstatd' -> `/opt/jdk1.8.0_92/bin/jstatd'
`jdk1.8.0_92/bin/schemagen' -> `/opt/jdk1.8.0_92/bin/schemagen'
`jdk1.8.0_92/bin/javap' -> `/opt/jdk1.8.0_92/bin/javap'
`jdk1.8.0_92/bin/keytool' -> `/opt/jdk1.8.0_92/bin/keytool'
`jdk1.8.0_92/bin/javafxpackager' -> `/opt/jdk1.8.0_92/bin/javafxpackager'
`jdk1.8.0_92/bin/jar' -> `/opt/jdk1.8.0_92/bin/jar'
`jdk1.8.0_92/bin/servertool' -> `/opt/jdk1.8.0_92/bin/servertool'
`jdk1.8.0_92/bin/javac' -> `/opt/jdk1.8.0_92/bin/javac'
`jdk1.8.0_92/bin/rmic' -> `/opt/jdk1.8.0_92/bin/rmic'
`jdk1.8.0_92/bin/unpack200' -> `/opt/jdk1.8.0_92/bin/unpack200'
`jdk1.8.0_92/bin/javadoc' -> `/opt/jdk1.8.0_92/bin/javadoc'
`jdk1.8.0_92/bin/jstack' -> `/opt/jdk1.8.0_92/bin/jstack'
`jdk1.8.0_92/bin/jhat' -> `/opt/jdk1.8.0_92/bin/jhat'
`jdk1.8.0_92/LICENSE' -> `/opt/jdk1.8.0_92/LICENSE'
[root@DAPriNodeDev java]#
```

Go back to the WinSCP to validate the jdk folder transfer.



Local Mark Files Commands Session Options Remote Help
Synchronize
Queue
Transfer Settings Default
New Session
My documents
opt
Find Files
Download
Properties

| Name | Size | Type | Changed |
|---|---|---|---|
| .. | | Parent directory | 5/2/2016 1:40:43 PM |
| Altova | | File folder | 4/22/2016 1:27:22 PM |
| Custom Office Templa... | | File folder | 4/27/2016 4:58:50 PM |
| GitHub | | File folder | 4/7/2016 10:42:56 PM |
| My Music | | File folder | 3/30/2016 4:34:20 AM |
| My Pictures | | File folder | 3/30/2016 4:34:20 AM |
| My Received Files | | File folder | 3/30/2016 4:34:42 AM |
| My Videos | | File folder | 3/30/2016 4:36:20 AM |
| ~$stalling JVM.docx | 1 KB | AbleWord | 5/2/2016 12:14:32 PM |
| ~WRL0470.tmp | 5,124 KB | TMP File | 4/28/2016 4:55:03 PM |
| Default.rdp | 2 KB | Remote Desktop C... | 4/25/2016 8:43:20 AM |
| desktop.ini | 1 KB | Configuration setti... | 3/31/2016 8:05:32 AM |
| Installing JVM.docx | 6,382 KB | AbleWord | 5/2/2016 1:40:43 PM |

0 B of 11,716 KB in 0 of 12

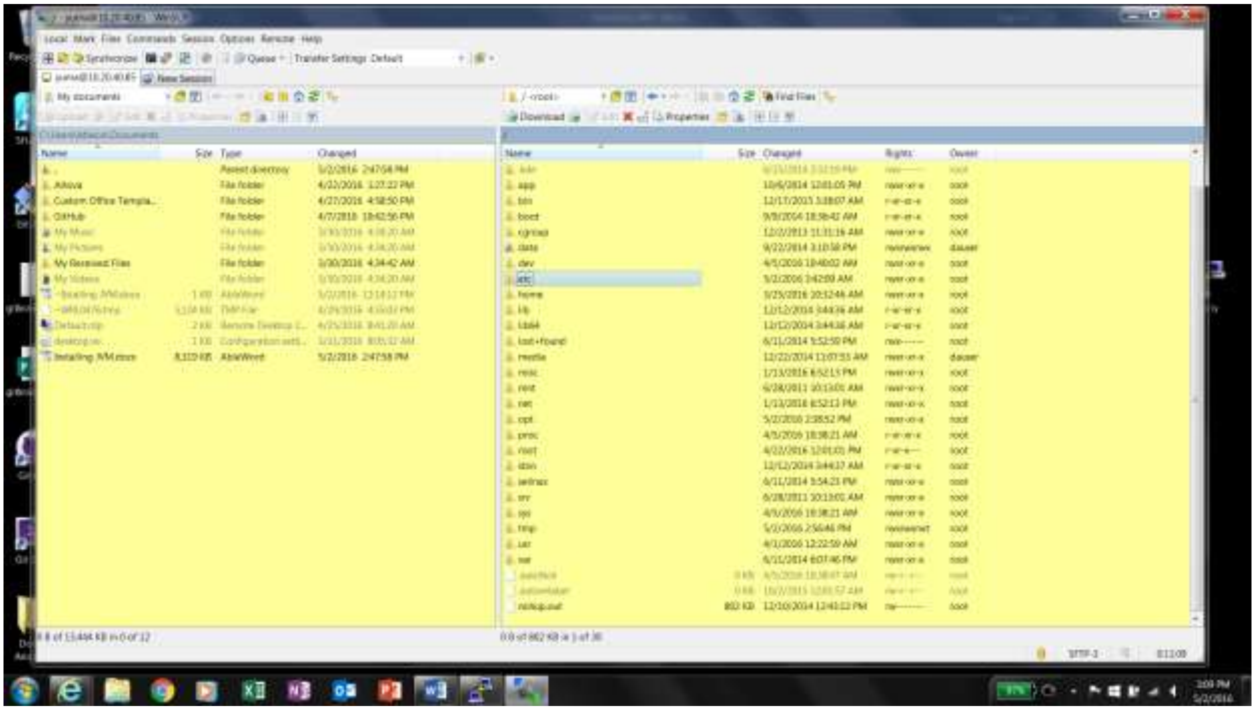
/opt

| Name | Size | Changed | Rights | Owner |
|---|---|---|---|---|
| .. | | 4/28/2016 5:29:05 PM | r-xr-xr-x | root |
| cloudera | | 9/18/2014 3:40:13 PM | rwxr-xr-x | root |
| hadoop | | 6/25/2014 5:13:40 PM | rwxr-xr-x | hduser |
| jdk1.8.0_05 | | 3/18/2014 4:03:04 AM | rwxr-xr-x | hduser |
| jdk1.8.0_92 | | 5/2/2016 2:21:52 PM | rwxr-xr-x | root |
| rh | | 5/17/2013 11:00:16 AM | rwxr-xr-x | root |
| jdk-8u5-linux-i586.tar.gz | 156,163 KB | 4/11/2014 4:54:41 PM | rwxr-xr-x | root |
| jdk-8u92-linux-x64.rpm | 162,065 KB | 5/2/2016 2:05:14 PM | rwxr-xr-x | root |

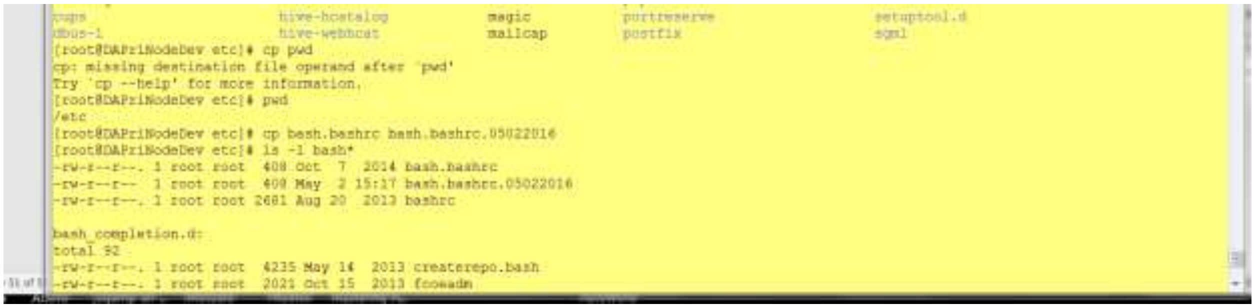
0 B of 311 MB in 1 of 7

SFTP-3 0:18:00

We have just installed the latest jdk on the remote Linux instance. We now have to fix the Java environment variables. Going back to active WinSCP session, navigate to the remote panel(right side), click on the left most forward slash. It is located just above the Name column. The file listing will exhibit all the folders in the / directory. Locate the etc folder and click on it.

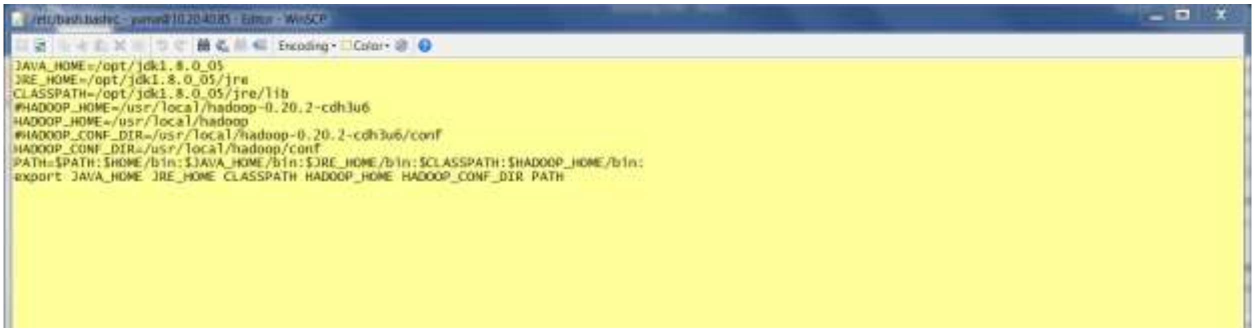


Scroll down and look for either file /etc/profile or /etc/bash.bashrc. Exploring both files in this instance, the bash.bashrc will be changed. Be sure to make a backup copy. Execute the following commands, cd /etc, then cp bash.bashrc bash.bashrc.MMDDYYYY. Then run a command, ls -l | grep bash.



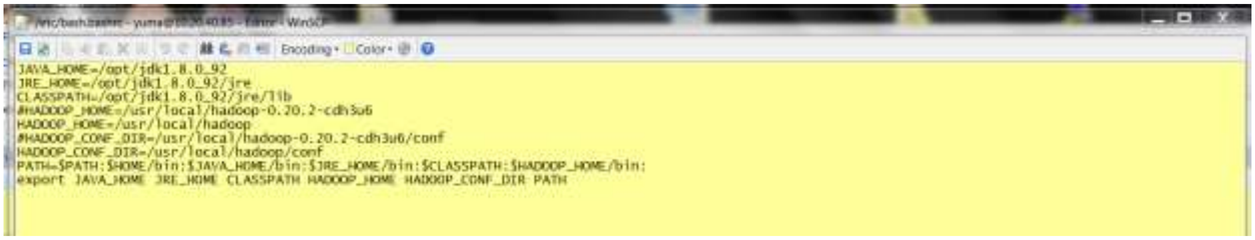
```
cups                    hive-hcatalog        magic        portreserve          setuptool.d
dbus-1                  hive-webhcat         mailcap      postfix              sgml
[root@DAPriNodeDev etc]# cp pwd
cp: missing destination file operand after `pwd'
Try `cp --help' for more information.
[root@DAPriNodeDev etc]# pwd
/etc
[root@DAPriNodeDev etc]# cp bash.bashrc bash.bashrc.05022016
[root@DAPriNodeDev etc]# ls -l bash*
-rw-r--r--. 1 root root  408 Oct  7  2014 bash.bashrc
-rw-r--r--  1 root root  408 May  2 15:17 bash.bashrc.05022016
-rw-r--r--. 1 root root 2681 Aug 20  2013 bashrc

bash_completion.d:
total 92
-rw-r--r--. 1 root root  4235 May 14  2013 createrepo.bash
-rw-r--r--. 1 root root  2021 Oct 15  2013 fcoeadm
```

Now switch back to WinSCP, click on the entry bash.bashrc.



```
JAVA_HOME=/opt/jdk1.8.0_05
JRE_HOME=/opt/jdk1.8.0_05/jre
CLASSPATH=/opt/jdk1.8.0_05/jre/lib
#HADOOP_HOME=/usr/local/hadoop-0.20.2-cdh3u6
HADOOP_HOME=/usr/local/hadoop
#HADOOP_CONF_DIR=/usr/local/hadoop-0.20.2-cdh3u6/conf
HADOOP_CONF_DIR=/usr/local/hadoop/conf
PATH=$PATH:$HOME/bin:$JAVA_HOME/bin:$JRE_HOME/bin:$CLASSPATH:$HADOOP_HOME/bin:
export JAVA_HOME JRE_HOME CLASSPATH HADOOP_HOME HADOOP_CONF_DIR PATH
```

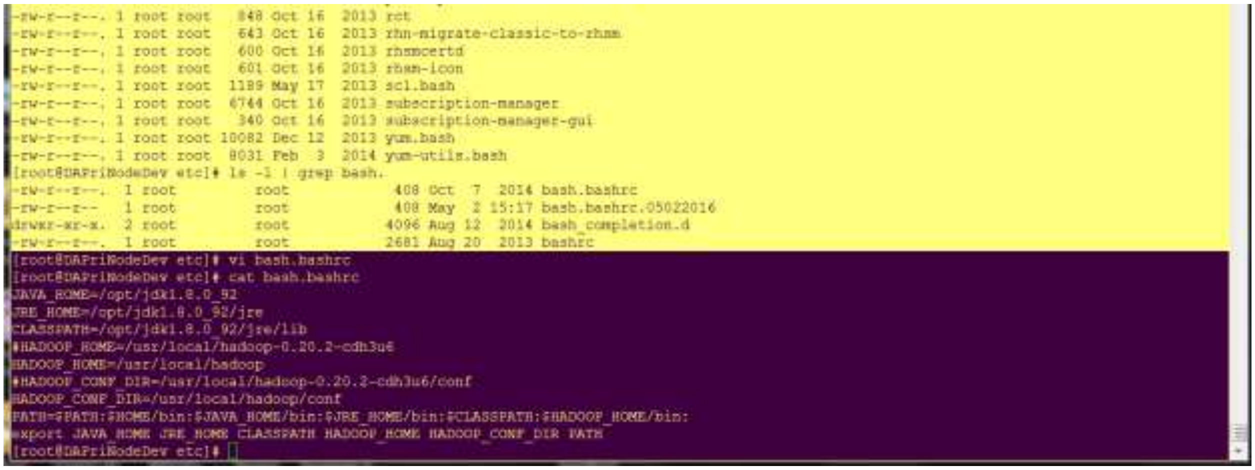
Notice it has all the well Java environment variables we need to change.



```
JAVA_HOME=/opt/jdk1.8.0_92
JRE_HOME=/opt/jdk1.8.0_92/jre
CLASSPATH=/opt/jdk1.8.0_92/jre/lib
#HADOOP_HOME=/usr/local/hadoop-0.20.2-cdh3u6
HADOOP_HOME=/usr/local/hadoop
#HADOOP_CONF_DIR=/usr/local/hadoop-0.20.2-cdh3u6/conf
HADOOP_CONF_DIR=/usr/local/hadoop/conf
PATH=$PATH:$HOME/bin:$JAVA_HOME/bin:$JRE_HOME/bin:$CLASSPATH:$HADOOP_HOME/bin:
export JAVA_HOME JRE_HOME CLASSPATH HADOOP_HOME HADOOP_CONF_DIR PATH
```

So the JAVA_HOME, JRE_HOME and CLASSPATH have been changed. Don’t forget, click on the little floppy disk icon in the NW corner of this windows to save the changes made to this file.

Go to the Putty screen and validate the text line changes. If the edits can not be made in WinSCP, drop back to vi, then use cat to validate changes.

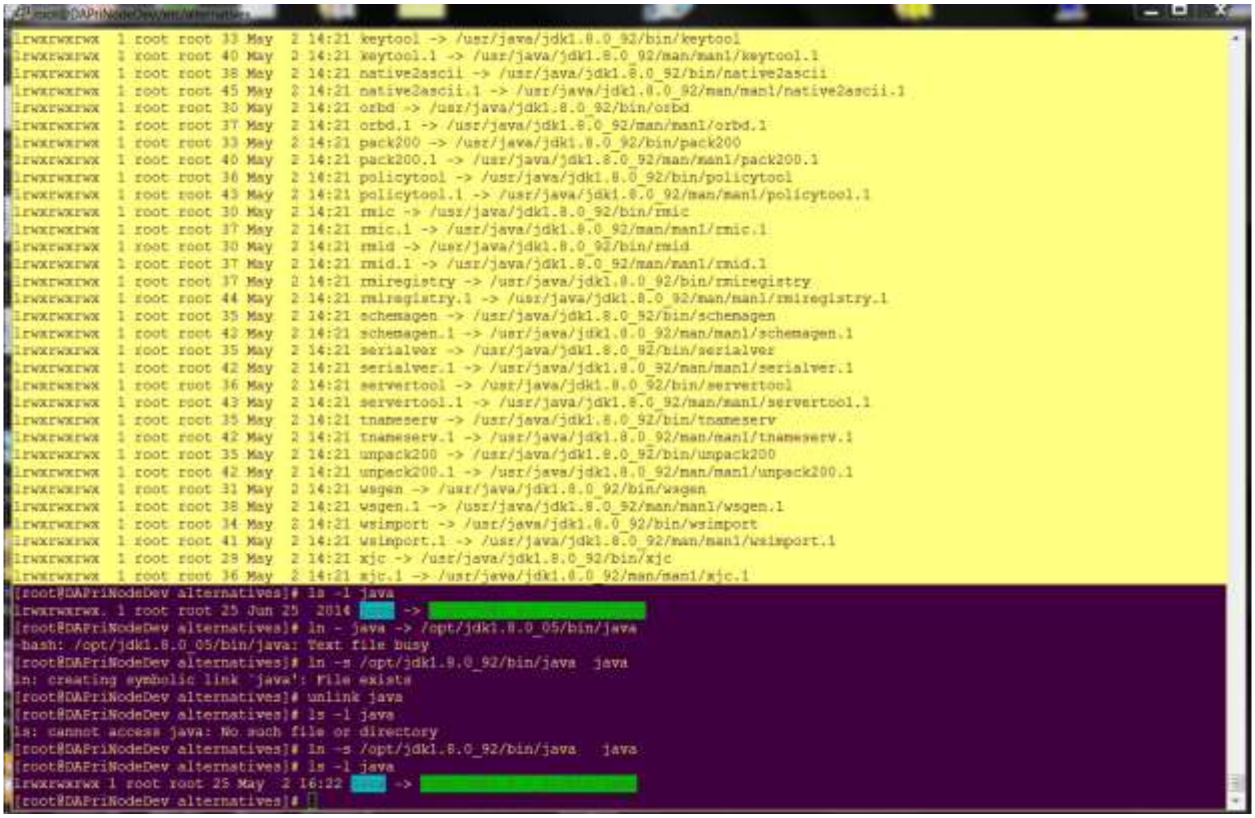


```
-rw-r--r--. 1 root root   848 Oct 16  2013 rct
-rw-r--r--. 1 root root   643 Oct 16  2013 rhn-migrate-classic-to-rhsm
-rw-r--r--. 1 root root   600 Oct 16  2013 rhsmcertd
-rw-r--r--. 1 root root   601 Oct 16  2013 rhsm-icon
-rw-r--r--. 1 root root  1189 May 17  2013 scl.bash
-rw-r--r--. 1 root root  6744 Oct 16  2013 subscription-manager
-rw-r--r--. 1 root root   340 Oct 16  2013 subscription-manager-gui
-rw-r--r--. 1 root root 10082 Dec 12  2013 yum.bash
-rw-r--r--. 1 root root  8031 Feb  3  2014 yum-utils.bash
[root@DAPriNodeDev etc]# ls -l | grep bash.
-rw-r--r--.  1 root         root            408 Oct  7  2014 bash.bashrc
-rw-r--r--   1 root         root            408 May  2 15:17 bash.bashrc.05022016
drwxr-xr-x.  2 root         root           4096 Aug 12  2014 bash_completion.d
-rw-r--r--.  1 root         root           2681 Aug 20  2013 bashrc
[root@DAPriNodeDev etc]# vi bash.bashrc
[root@DAPriNodeDev etc]# cat bash.bashrc
JAVA_HOME=/opt/jdk1.8.0_92
JRE_HOME=/opt/jdk1.8.0_92/jre
CLASSPATH=/opt/jdk1.8.0_92/jre/lib
#HADOOP_HOME=/usr/local/hadoop-0.20.2-cdh3u6
HADOOP_HOME=/usr/local/hadoop
#HADOOP_CONF_DIR=/usr/local/hadoop-0.20.2-cdh3u6/conf
HADOOP_CONF_DIR=/usr/local/hadoop/conf
PATH=$PATH:$HOME/bin:$JAVA_HOME/bin:$JRE_HOME/bin:$CLASSPATH:$HADOOP_HOME/bin:
export JAVA_HOME JRE_HOME CLASSPATH HADOOP_HOME HADOOP_CONF_DIR PATH
[root@DAPriNodeDev etc]# 
```

Earlier in the paper, we have to look for /etc/alternatives for a symbolic link. The existing symbolic link points to the old JVM _05. We need to have the java symbolic link point to the new one we just installed in the /opt directory.

First execute a ls -l java to verify the symbolic link.

Next run a unlink java command. This the command to remove the actual link. Run another ls -l java command to make sure the link is removed. Next we will create a new java link. Execute a ln -s /opt/jdk1.8.0_92/bin/java java. This command creates a new symbolic link to the newly installed jdk accomplished earlier in this endeavor. Last, run another ls -l java to insure the new symbolic link is there. See the screenshot below.



```
lrwxrwxrwx  1 root root 33 May  2 14:21 keytool -> /usr/java/jdk1.8.0_92/bin/keytool
lrwxrwxrwx  1 root root 40 May  2 14:21 keytool.1 -> /usr/java/jdk1.8.0_92/man/man1/keytool.1
lrwxrwxrwx  1 root root 38 May  2 14:21 native2ascii -> /usr/java/jdk1.8.0_92/bin/native2ascii
lrwxrwxrwx  1 root root 45 May  2 14:21 native2ascii.1 -> /usr/java/jdk1.8.0_92/man/man1/native2ascii.1
lrwxrwxrwx  1 root root 30 May  2 14:21 orbd -> /usr/java/jdk1.8.0_92/bin/orbd
lrwxrwxrwx  1 root root 37 May  2 14:21 orbd.1 -> /usr/java/jdk1.8.0_92/man/man1/orbd.1
lrwxrwxrwx  1 root root 33 May  2 14:21 pack200 -> /usr/java/jdk1.8.0_92/bin/pack200
lrwxrwxrwx  1 root root 40 May  2 14:21 pack200.1 -> /usr/java/jdk1.8.0_92/man/man1/pack200.1
lrwxrwxrwx  1 root root 36 May  2 14:21 policytool -> /usr/java/jdk1.8.0_92/bin/policytool
lrwxrwxrwx  1 root root 43 May  2 14:21 policytool.1 -> /usr/java/jdk1.8.0_92/man/man1/policytool.1
lrwxrwxrwx  1 root root 30 May  2 14:21 rmic -> /usr/java/jdk1.8.0_92/bin/rmic
lrwxrwxrwx  1 root root 37 May  2 14:21 rmic.1 -> /usr/java/jdk1.8.0_92/man/man1/rmic.1
lrwxrwxrwx  1 root root 30 May  2 14:21 rmid -> /usr/java/jdk1.8.0_92/bin/rmid
lrwxrwxrwx  1 root root 37 May  2 14:21 rmid.1 -> /usr/java/jdk1.8.0_92/man/man1/rmid.1
lrwxrwxrwx  1 root root 37 May  2 14:21 rmiregistry -> /usr/java/jdk1.8.0_92/bin/rmiregistry
lrwxrwxrwx  1 root root 44 May  2 14:21 rmiregistry.1 -> /usr/java/jdk1.8.0_92/man/man1/rmiregistry.1
lrwxrwxrwx  1 root root 35 May  2 14:21 schemagen -> /usr/java/jdk1.8.0_92/bin/schemagen
lrwxrwxrwx  1 root root 42 May  2 14:21 schemagen.1 -> /usr/java/jdk1.8.0_92/man/man1/schemagen.1
lrwxrwxrwx  1 root root 35 May  2 14:21 serialver -> /usr/java/jdk1.8.0_92/bin/serialver
lrwxrwxrwx  1 root root 42 May  2 14:21 serialver.1 -> /usr/java/jdk1.8.0_92/man/man1/serialver.1
lrwxrwxrwx  1 root root 36 May  2 14:21 servertool -> /usr/java/jdk1.8.0_92/bin/servertool
lrwxrwxrwx  1 root root 43 May  2 14:21 servertool.1 -> /usr/java/jdk1.8.0_92/man/man1/servertool.1
lrwxrwxrwx  1 root root 35 May  2 14:21 tnameserv -> /usr/java/jdk1.8.0_92/bin/tnameserv
lrwxrwxrwx  1 root root 42 May  2 14:21 tnameserv.1 -> /usr/java/jdk1.8.0_92/man/man1/tnameserv.1
lrwxrwxrwx  1 root root 35 May  2 14:21 unpack200 -> /usr/java/jdk1.8.0_92/bin/unpack200
lrwxrwxrwx  1 root root 42 May  2 14:21 unpack200.1 -> /usr/java/jdk1.8.0_92/man/man1/unpack200.1
lrwxrwxrwx  1 root root 31 May  2 14:21 wsgen -> /usr/java/jdk1.8.0_92/bin/wsgen
lrwxrwxrwx  1 root root 38 May  2 14:21 wsgen.1 -> /usr/java/jdk1.8.0_92/man/man1/wsgen.1
lrwxrwxrwx  1 root root 34 May  2 14:21 wsimport -> /usr/java/jdk1.8.0_92/bin/wsimport
lrwxrwxrwx  1 root root 41 May  2 14:21 wsimport.1 -> /usr/java/jdk1.8.0_92/man/man1/wsimport.1
lrwxrwxrwx  1 root root 29 May  2 14:21 xjc -> /usr/java/jdk1.8.0_92/bin/xjc
lrwxrwxrwx  1 root root 36 May  2 14:21 xjc.1 -> /usr/java/jdk1.8.0_92/man/man1/xjc.1
[root@DAPriNodeDev alternatives]# ls -l java
lrwxrwxrwx. 1 root root 25 Jun 25  2014 [illegible] -> [illegible]
[root@DAPriNodeDev alternatives]# ln - java -> /opt/jdk1.8.0_05/bin/java
-bash: /opt/jdk1.8.0_05/bin/java: Text file busy
[root@DAPriNodeDev alternatives]# ln -s /opt/jdk1.8.0_92/bin/java  java
ln: creating symbolic link `java': File exists
[root@DAPriNodeDev alternatives]# unlink java
[root@DAPriNodeDev alternatives]# ls -l java
ls: cannot access java: No such file or directory
[root@DAPriNodeDev alternatives]# ln -s /opt/jdk1.8.0_92/bin/java   java
[root@DAPriNodeDev alternatives]# ls -l java
lrwxrwxrwx 1 root root 25 May  2 16:22 [illegible] -> [illegible]
[root@DAPriNodeDev alternatives]#
```