

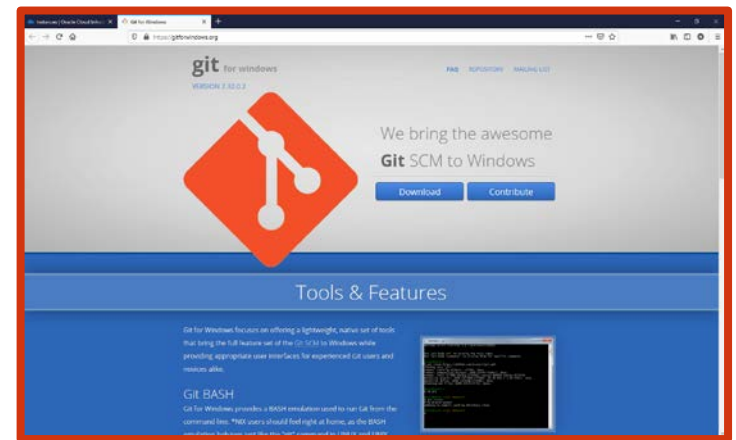
Oracle Academy Cloud Program (OACP) Oracle Cloud Infrastructure (OCI) - Lab 1

- Create and Connect to a Compute VM Instance with Oracle Linux Server
- Install Java JDK
- Create, Compile, and Run a Java Program on Linux Command Line

Section 1: Download and Install Required Software

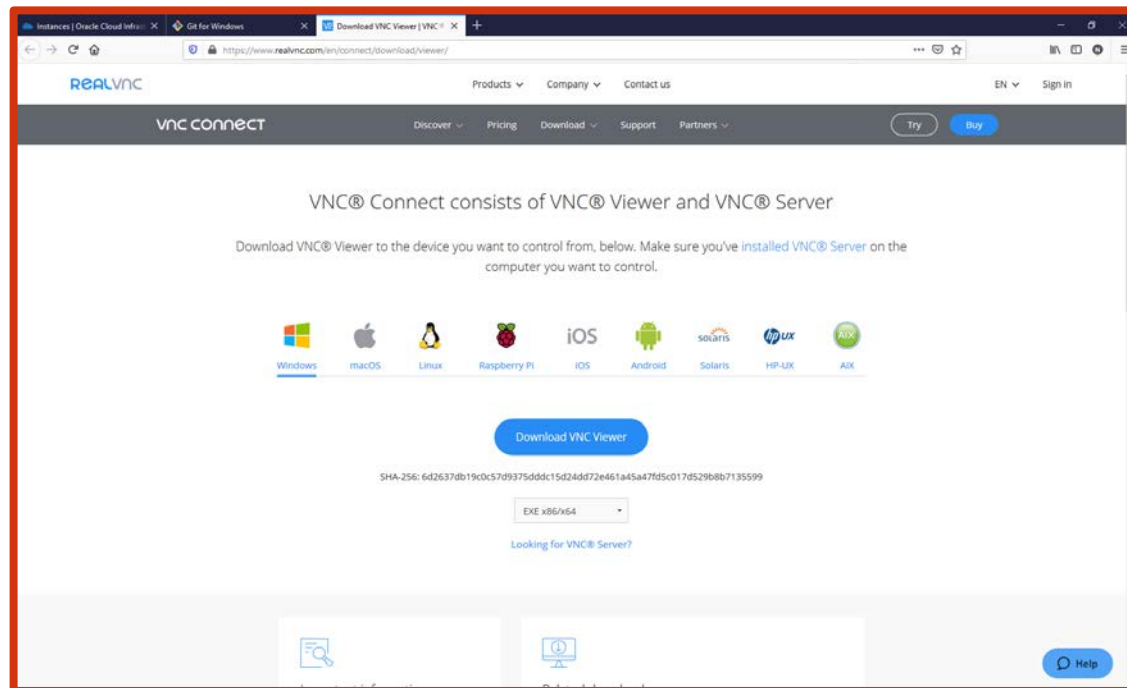
To manage public/private keys we will require Git for Windows
This task will take approximately 10 minutes to complete

1. On your local computer go to <https://gitforwindows.org>
2. Click Download
3. Save the file
4. Open the folder where the file is saved from step 3, and then click the executable file to install
5. Follow the On-Screen Instructions - **accept all default settings**



To connect a GUI session on our Compute VM Oracle Linux Instance we will require Real VNC Viewer
This task will take approximately 10 minutes to complete

1. On your local computer go to
`https://www.realvnc.com/en/connect/download/viewer/`
2. Click Download VNC Viewer
3. Save the file
4. Open the folder you have saved the file in and click the executable to install
5. Follow the On-Screen Instructions

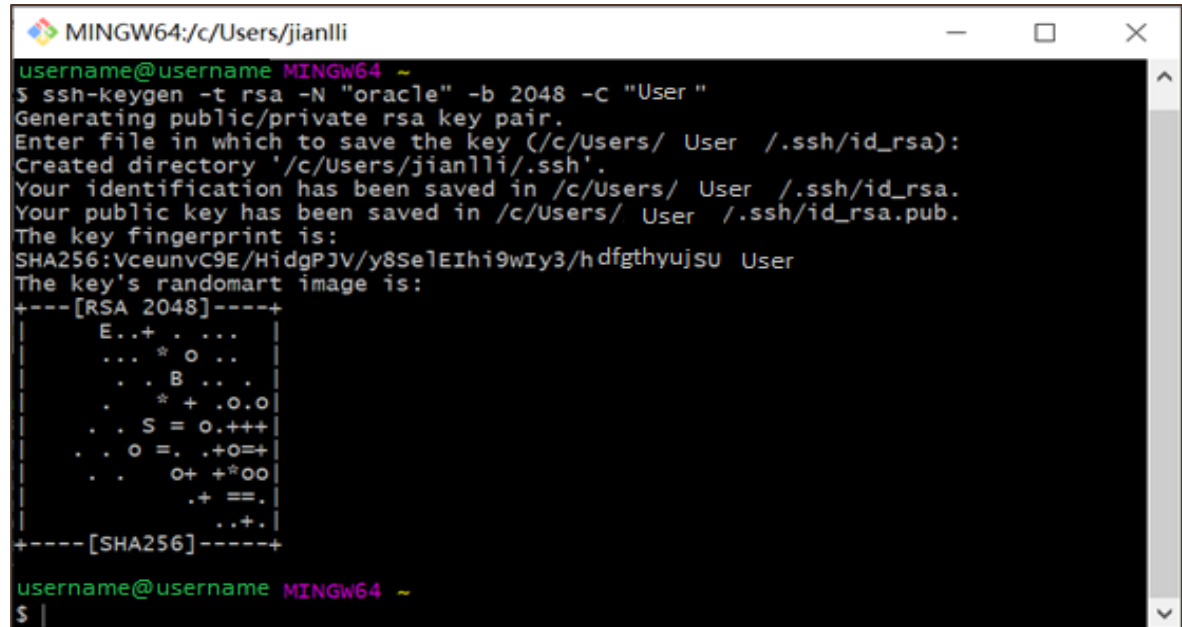


Section 2: Create secure Public/Private Key authentication

If you already have a public private key set, you may skip this section

This task will take approximately 5 minutes to complete

1. Open a Git Bash Terminal window
 - a. Find Git in your programs
 - b. Click Git Bash to open a Terminal window
2. Enter the following command to create the key:
ssh-keygen -t rsa -b 2048
3. You will be Prompted for a Passphrase (or hit enter for blank)
4. You will be Prompted to repeat the Passphrase (or hit enter for blank)
 - a. If you entered a Passphrase, be sure to make note of it
5. You will be Prompted for path (or hit enter for default)
 - a. Default path is `c:\users\username\.ssh\`
 - b. 2 files will be created:
 - i. `id_rsa` (private key)
 - ii. `id_rsa.pub` (public key)
 - c. Make a note of where these files are located
6. Close Git Bash

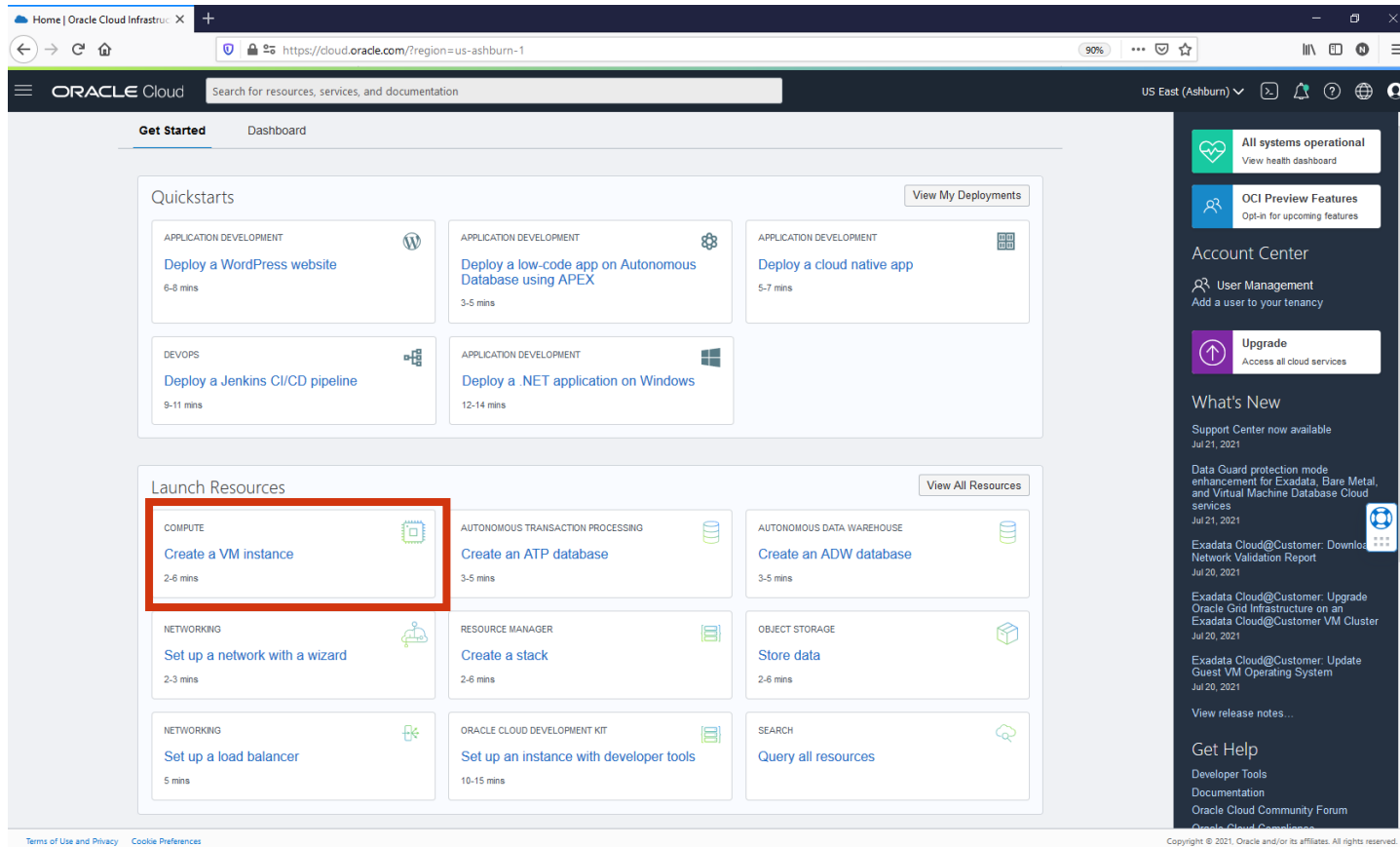


```
MINGW64:/c/Users/jianlli
username@username MINGW64 ~
$ ssh-keygen -t rsa -N "oracle" -b 2048 -C "User "
Generating public/private rsa key pair.
Enter file in which to save the key (/c/Users/ User /.ssh/id_rsa):
Created directory '/c/Users/jianlli/.ssh'.
Your identification has been saved in /c/Users/ User /.ssh/id_rsa.
Your public key has been saved in /c/Users/ User /.ssh/id_rsa.pub.
The key fingerprint is:
SHA256:VceunVC9E/HidgPJV/y8Se1EIhi9wIy3/hdfgthyujSU User
The key's randomart image is:
+---[RSA 2048]---+
|      E..+ . ...      |
|    ... * O ..       |
|      . B . . .      |
|    . * + . O . O     |
|  . . S = O . + + +   |
|  . . O = . + O = +   |
|  . . O + + * O O     |
|    . + = = .         |
|    . . + .           |
+---[SHA256]-----+
username@username MINGW64 ~
$ |
```

Section 3: Create an Always Free Compute Instance with Oracle Linux 7

This task will take approximately 10 minutes to complete. You can create/own 2 (two) **Always Free** Instances.

1. Sign into your Oracle Cloud Tenancy
2. Select Create a VM Instance



3. Accept defaults for:
 - a. Placement
 - b. Image and shape
 - c. Networking

The screenshot shows the 'Create Compute Instance' page in the Oracle Cloud console. The browser address bar shows the URL: <https://cloud.oracle.com/compute/instances/create?region=us-ashburn-1>. The page title is 'Create Compute Instance'. Below the title, there is a description: 'Create an instance to deploy and run applications, or save as a reusable Terraform stack for creating an instance with Resource Manager.' The form is divided into three main sections: 'Placement', 'Image and shape', and 'Networking'. Each section has an 'Edit' link. The 'Placement' section shows 'Availability Domain: AD-1' (marked 'Always Free Eligible'), 'Capacity Type: On-demand capacity', and 'Fault Domain: Let Oracle choose the best fault domain'. The 'Image and shape' section shows 'Image: Oracle Linux 7.9', 'Image build: 2021.06.20-0', 'Shape: VM.Standard.E2.1.Micro' (marked 'Always Free Eligible'), 'OCPU Count: 1', 'Memory (GB): 1', and 'Network Bandwidth (Gbps): 0.48'. The 'Networking' section shows 'Virtual cloud network: vcn-20210708-0840', 'Subnet: subnet-20210708-0840', 'Launch Options: -', 'Use network security groups to control traffic: No', 'Assign a public IPv4 address: Yes', and 'DNS record: Yes'.

Create Compute Instance

Create an instance to deploy and run applications, or save as a reusable Terraform stack for creating an instance with Resource Manager.

Name: instance-20210729-0850

Create in compartment: Your name appears here

Placement [Edit](#)

Availability Domain: AD-1 **Always Free Eligible** Capacity Type: On-demand capacity

Fault Domain: Let Oracle choose the best fault domain

Image and shape [Edit](#)

Image: Oracle Linux 7.9 Shape: VM.Standard.E2.1.Micro **Always Free Eligible**

Image build: 2021.06.20-0 OCPU Count: 1

Memory (GB): 1

Network Bandwidth (Gbps): 0.48

Networking [Edit](#)

Virtual cloud network: vcn-20210708-0840 Use network security groups to control traffic: No

Subnet: subnet-20210708-0840 Assign a public IPv4 address: Yes

Launch Options: - DNS record: Yes

4. Add SSH keys:

- a. Select Upload public key files (.pub)
- b. Drag **id_rsa.pub** that you saved in Section 2, Step 5 into the “Drop .pub files here”

Add SSH keys

Generate an [SSH key pair](#) to connect to the instance using SSH, or upload a public key that you already have.

☐ Generate a key pair for me ☒ Upload public key files (.pub) ☐ Paste public keys ☐ No SSH keys

SSH public keys

Drop .pub files here. [Or browse.](#)

id_rsa.pub x

Boot volume

Your [boot volume](#) is a detachable device that contains the image used to boot your compute instance.

☐ Specify a custom boot volume size
[Volume performance](#) varies with volume size. Default boot volume size: 46.6 GB. When you specify a custom boot volume size, service limits apply.

☒ Use in-transit encryption
[Encrypts data](#) in transit between the instance, the boot volume, and the block volumes.

☐ Encrypt this volume with a key that you manage
By default, Oracle manages the keys that encrypt this volume, but you can choose a key from a vault that you have access to if you want greater control over the key's lifecycle and how it's used. [Learn more about managing your own encryption keys](#)

[Show advanced options](#)

[Create](#) [Save as Stack](#) [Cancel](#)

[Terms of Use and Privacy](#) [Cookie Preferences](#)

5. Click “Create”

6. Your new Compute VM Instance will now be created
 - a. It may take a few minutes to provision your Compute Instance
 - b. When completed with Provisioning, you will see your Compute Instance in green (Running)
 - c. Once provisioned, **take note of the public IP address assigned to your Instance**

The screenshot displays the Oracle Cloud console interface for a Compute VM Instance. The instance is named 'instance-20210729-1119' and is in a 'RUNNING' state, indicated by a green square icon. The console shows various tabs for instance management, including 'Instance Information', 'Oracle Cloud Agent', and 'Tags'. The 'Instance Information' tab is active, displaying details under three sections: General Information, Instance Details, and Shape Configuration. The 'Instance Access' section on the right provides information on how to connect to the instance via SSH, including the public IP address (150.136.168.7) and the username (opc). The 'Primary VNIC' section lists network-related details such as the private IP address, network security groups, and subnet. The 'Launch Options' section specifies the NIC attachment type, remote data volume, firmware, boot volume type, and in-transit encryption status.

General Information

- Availability Domain: AD-1
- Fault Domain: FD-3
- Region: iad
- OCID: ...2synca [Show Copy](#)
- Launched: Thu, Jul 29, 2021, 15:26:10 UTC
- Compartment: nancyloffman (root)
- Capacity Type: On-demand

Instance Details

- Virtual Cloud Network: [vcn-20210708-0840](#)
- Maintenance Reboot: -
- Image: [Oracle-Linux-7.9-2021.06.20-0](#)
- Launch Mode: PARAVIRTUALIZED
- Instance Metadata Service: Versions 1 and 2 [Edit](#)
- Live Migration: Use recommended default
- Maintenance Recovery Action: Restore instance

Shape Configuration

- Shape: VM.Standard.E2.1.Micro
- OCPU Count: 1
- Network Bandwidth (Gbps): 0.48
- Memory (GB): 1

Instance Access

You [connect to a running Linux instance](#) using a Secure Shell (SSH) connection. You'll need the private key from the SSH key pair that was used to create the instance.

Public IP Address: 150.136.168.7 [Copy](#)

Username: opc

Primary VNIC

- Private IP Address: 10.0.0.182
- Network Security Groups: None [Edit](#)
- Subnet: [subnet-20210708-0840](#)
- Private DNS record: Enable
- Hostname: instance-20210729-1119
- Internal FQDN: instance-20210729-1119... [Show Copy](#)

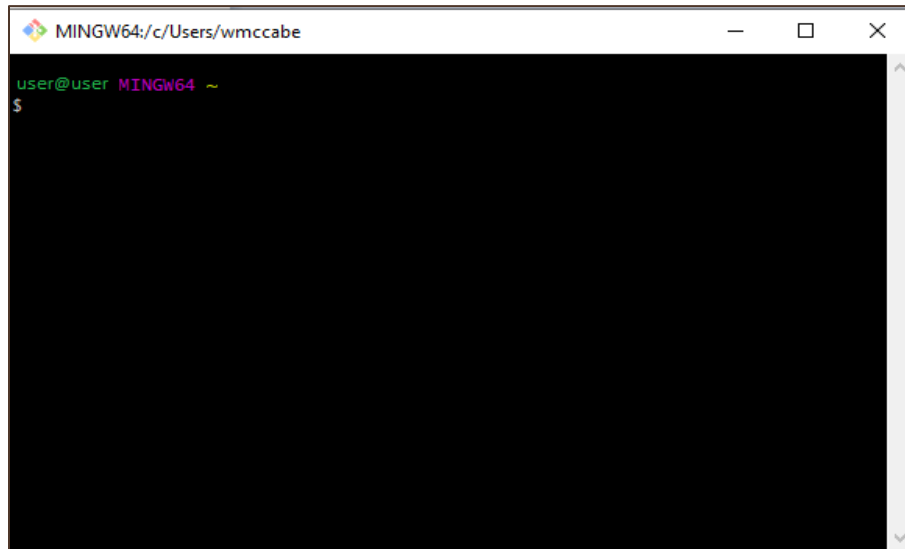
Launch Options

- NIC Attachment Type: PARAVIRTUALIZED
- Remote Data Volume: PARAVIRTUALIZED
- Firmware: UEFI_64
- Boot Volume Type: PARAVIRTUALIZED
- In-transit Encryption: Enabled

Section 4: Connect to the Compute VM Instance

This task will take approximately 5 minutes to complete.

1. Open a Git Bash Terminal window
 - a. Find Git in your programs
 - b. Click Git Bash to open a Terminal window



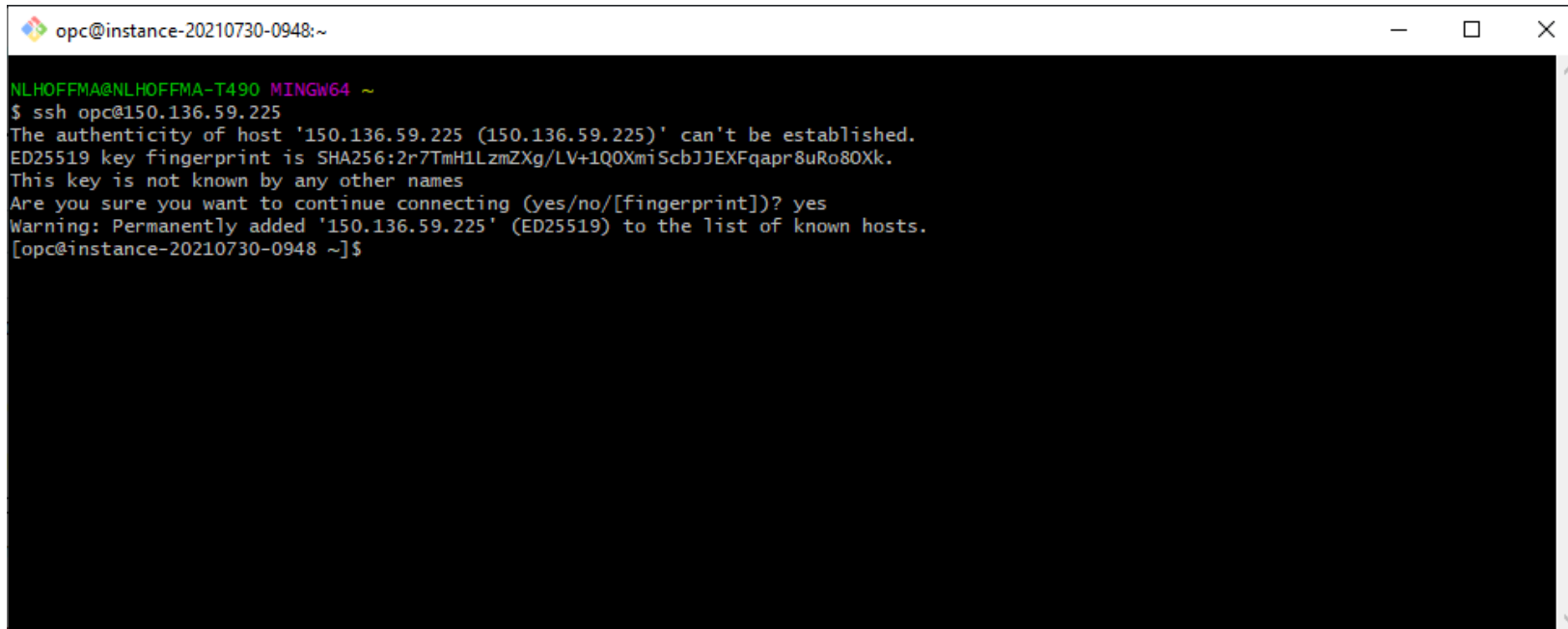
Note: You can have multiple Git Bash Terminal windows open

2. Execute the following command **using your public IP address** (from Section 3, Step 6c) to SSH Connect to your Compute VM Instance:
ssh opc@public IP address

Example: **ssh opc@111.222.33.444**

3. If prompted to continue, enter "yes"

If you entered a Passphrase in Section 2 (Steps 3 and 4), you will be prompted to enter it here



```
opc@instance-20210730-0948:~  
NLHOFFMA@NLHOFFMA-T490 MINGW64 ~  
$ ssh opc@150.136.59.225  
The authenticity of host '150.136.59.225 (150.136.59.225)' can't be established.  
ED25519 key fingerprint is SHA256:2r7TmH1LzmZXg/LV+1Q0XmiScbJJEXFqapr8uRo80Xk.  
This key is not known by any other names  
Are you sure you want to continue connecting (yes/no/[fingerprint])? yes  
Warning: Permanently added '150.136.59.225' (ED25519) to the list of known hosts.  
[opc@instance-20210730-0948 ~]$
```

The first time you connect, you will see a message that the new IP address has been added to a list of known hosts.

You now have a fully functioning Oracle Linux 7 Server

Section 5: Install JDK 8

To Install JDK 8 follow these steps:

1. In the Git Bash terminal window execute the following command to install the latest version of the repository:

```
sudo yum install -y --enablerepo=ol7_ociyum_config oci-included-release-el7
```

2. Once step 1 is completed, execute the following command to list the available JDK versions:

```
yum list jdk*
```

Note: As of this writing, the repository contains Oracle Java 8, 11,12,13, 14, 15, 16

```
[opc@instance-20210729-1119 ~]$ yum list jdk*
Loaded plugins: langpacks, ulninfo
Available Packages
jdk-11.0.10.x86_64                2000:11.0.10-ga                ol7_oci_included
jdk-11.0.11.0.1.x86_64           2000:11.0.11.0.1-ga            ol7_oci_included
jdk-11.0.12.x86_64               2000:11.0.12-ga                ol7_oci_included
jdk-11.0.3.x86_64                2000:11.0.3-ga                 ol7_oci_included
jdk-11.0.4.x86_64                2000:11.0.4-ga                 ol7_oci_included
jdk-11.0.5.x86_64                2000:11.0.5-ga                 ol7_oci_included
jdk-11.0.7.x86_64                2000:11.0.7-ga                 ol7_oci_included
jdk-11.0.8.x86_64                2000:11.0.8-ga                 ol7_oci_included
jdk-11.0.9.x86_64                2000:11.0.9-ga                 ol7_oci_included
jdk-12.0.1.x86_64                2000:12.0.1-ga                 ol7_oci_included
jdk-12.0.2.x86_64                2000:12.0.2-ga                 ol7_oci_included
jdk-13.x86_64                    2000:13-ga                     ol7_oci_included
jdk-13.0.1.x86_64                2000:13.0.1-ga                 ol7_oci_included
jdk-14.x86_64                    2000:14-ga                     ol7_oci_included
jdk-14.0.1.x86_64                2000:14.0.1-ga                 ol7_oci_included
jdk-14.0.2.x86_64                2000:14.0.2-ga                 ol7_oci_included
jdk-15.x86_64                    2000:15-ga                     ol7_oci_included
jdk-15.0.1.x86_64                2000:15.0.1-ga                 ol7_oci_included
jdk-15.0.2.x86_64                2000:15.0.2-ga                 ol7_oci_included
jdk-16.x86_64                    2000:16-ga                     ol7_oci_included
jdk-16.0.1.0.1.x86_64            2000:16.0.1.0.1-ga            ol7_oci_included
jdk-16.0.2.x86_64                2000:16.0.2-ga                 ol7_oci_included
jdk1.8.x86_64                    2000:1.8.0_301-fcs             ol7_oci_included
```

3. To install Oracle Java 8, version 1.8.0 Execute the following command

```
sudo yum install jdk1.8.x86_64
```

Follow the on-screen instructions to download and install. If prompted to accept download size – type y.

```
[opc@instance-20210729-1119 ~]$ sudo yum install jdk1.8.x86_64
Loaded plugins: langpacks, ulninfo
Resolving Dependencies
--> Running transaction check
---> Package jdk1.8.x86_64 2000:1.8.0_301-fcs will be installed
--> Finished Dependency Resolution

Dependencies Resolved

=====
Package                Arch             Version           Repository
=====
Installing:
jdk1.8                  x86_64           2000:1.8.0_301-fcs  ol7_oci_included

Transaction Summary
=====
Install 1 Package

Total download size: 109 M
Installed size: 253 M
Is this ok [y/d/N]: y
Downloading packages:
jdk-8u301-linux-x64.rpm
Running transaction check
Running transaction test
Transaction test succeeded
Running transaction
  Installing : 2000:jdk1.8-1.8.0_301-fcs.x86_64
Unpacking JAR files...
  tools.jar...
  plugin.jar...
  javaws.jar...
  deploy.jar...
  rt.jar...
  jsse.jar...
  charsets.jar...
  localedata.jar...
Verifying : 2000:jdk1.8-1.8.0_301-fcs.x86_64

Installed:
jdk1.8.x86_64 2000:1.8.0_301-fcs

Complete!
```

4. To confirm the Java version, execute the following command

```
java -version
```

```
complete.  
[opc@instance-20210729-1119 ~]$ java -version  
java version "1.8.0_301"  
Java(TM) SE Runtime Environment (build 1.8.0_301-b09)  
Java HotSpot(TM) 64-Bit Server VM (build 25.301-b09, mixed mode)  
[opc@instance-20210729-1119 ~]$ |
```

Section 6: Create, Compile and Run a Java Program

1. Create a new folder in your user directory (opc) by entering the command:

```
mkdir java
```

2. Change to that folder, enter the command

```
cd java
```

3. To start the vi editor and open a .java file, enter the command

```
vi HelloWorld.java
```

4. To begin editing the file, enter Insert Mode by typing the letter "i"

```
i
```

5. Enter the following code exactly as follows:

```
public class HelloWorld
{
    public static void main(String[] args)
    {
        System.out.println("Hello, World!");
    }
}
```

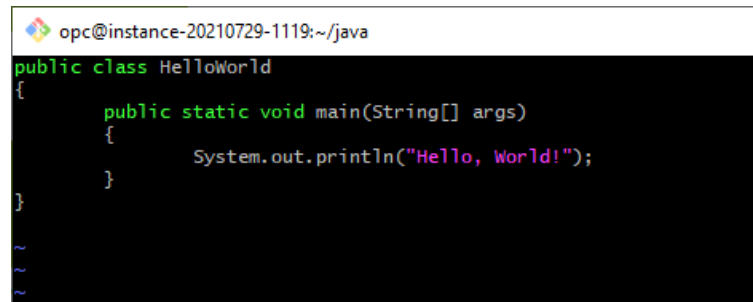
6. To complete editing, exit Insert mode - press **Esc**

7. To write the file to your java directory, enter the command

```
:w
```

8. To quit the vi editor, enter the command

```
:q
```

A screenshot of a terminal window with a black background and green text. The terminal title bar shows 'opc@instance-20210729-1119:~/java'. The code displayed is a Java class named 'HelloWorld' with a 'main' method that prints 'Hello, World!'.

```
opc@instance-20210729-1119:~/java
public class HelloWorld
{
    public static void main(String[] args)
    {
        System.out.println("Hello, World!");
    }
}
```

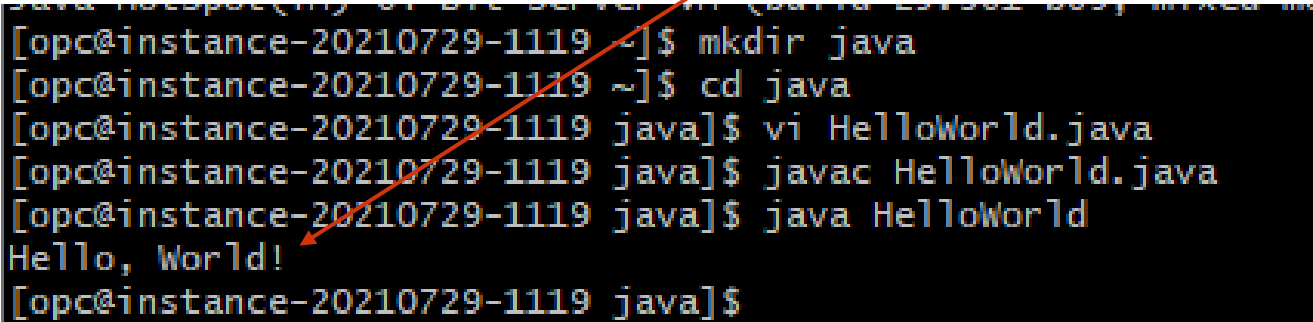
9. To compile the .java program, enter the command

```
javac HelloWorld.java
```

10. To run the program, enter the command

```
java HelloWorld
```

11. You should see `Hello, World!` displayed in the command line like below:



A terminal window screenshot with a black background and white text. The prompt is `[opc@instance-20210729-1119 ~]`. The user enters `mkdir java`, `cd java`, `vi HelloWorld.java`, `javac HelloWorld.java`, and `java HelloWorld`. The output `Hello, World!` is displayed. A red arrow points from the text 'Hello, World!' in the instruction above to the output in the terminal.

```
[opc@instance-20210729-1119 ~]$ mkdir java
[opc@instance-20210729-1119 ~]$ cd java
[opc@instance-20210729-1119 java]$ vi HelloWorld.java
[opc@instance-20210729-1119 java]$ javac HelloWorld.java
[opc@instance-20210729-1119 java]$ java HelloWorld
Hello, World!
[opc@instance-20210729-1119 java]$
```