FUNDAMENTALS OF RED HAT ENTERPRISE LINUX:
LAB SET-UP INSTRUCTIONS FOR EXERCISES ON AMAZON EC2

INTRODUCTION

The edX course *Fundamentals of Red Hat Enterprise Linux* (RH066x) includes a number of guided exercises and labs, which gives you an opportunity to practice the skills you are learning in the course presentations. To complete these exercises, you will need a practice system running Red Hat Enterprise Linux 7 that you completely control.

One way to get access to a supported Red Hat Enterprise Linux system is to use Amazon EC2 (Elastic Compute Cloud). Red Hat and Amazon Web Services collaborate to provide officially supported Red Hat Enterprise Linux images through Amazon's on-demand public cloud service at free or low cost.

The guided exercises and labs for this course were written assuming that you will set up an account with Amazon Web Services and use it to start a single, simple system running Red Hat Enterprise Linux 7. You will connect to that system securely over the internet and use it to practice commands.

At the time of writing, Amazon Web Services provides an "AWS Free Tier" offering (https://aws.amazon.com/free) which gives new users free access to certain sizes of cloud instances and operating environments (including Red Hat Enterprise Linux 7) for up to 750 hours per month, for 12 months. If you are not eligible for AWS Free Tier or have used up your Free Tier eligibility, a t2.micro-sized instance (cloud computer) running the same software, is currently estimated to cost between US$0.072 and US$0.08 per hour of compute time, depending on the data center in which the instance is started. To conserve compute time and any costs, make sure you shut down your cloud instance when you are not using it, and terminate (delete) it when you are completely finished with it.

This guide focuses on the steps needed to set up a new AWS Free Tier account and to use it to launch a simple Red Hat Enterprise Linux 7 instance for the purposes of this course.

IMPORTANT NOTICE

Amazon EC2 is a convenient way to get access to a Red Hat Enterprise Linux system for the purposes of this course. This service is provided by a third party, Amazon Web Services, not by Red Hat itself (although Red Hat does provide the initial AMI image and support for the operating system provided through the service).

The security of your account, and of any cloud instances that you launch in Amazon EC2, is your responsibility. You are also responsible for charges you may incur, if any, by using this service. The instance that you are running is potentially visible to the public internet, and making changes to your default settings beyond those discussed in the course, such as running network services and opening ports in the firewall provided by AWS, or changing SSH server settings in the cloud instance, may have consequences for the security of the cloud instances you are operating.

CREATING AN "AWS FREE TIER" ACCOUNT

Open a web browser and navigate to https://aws.amazon.com/free/.
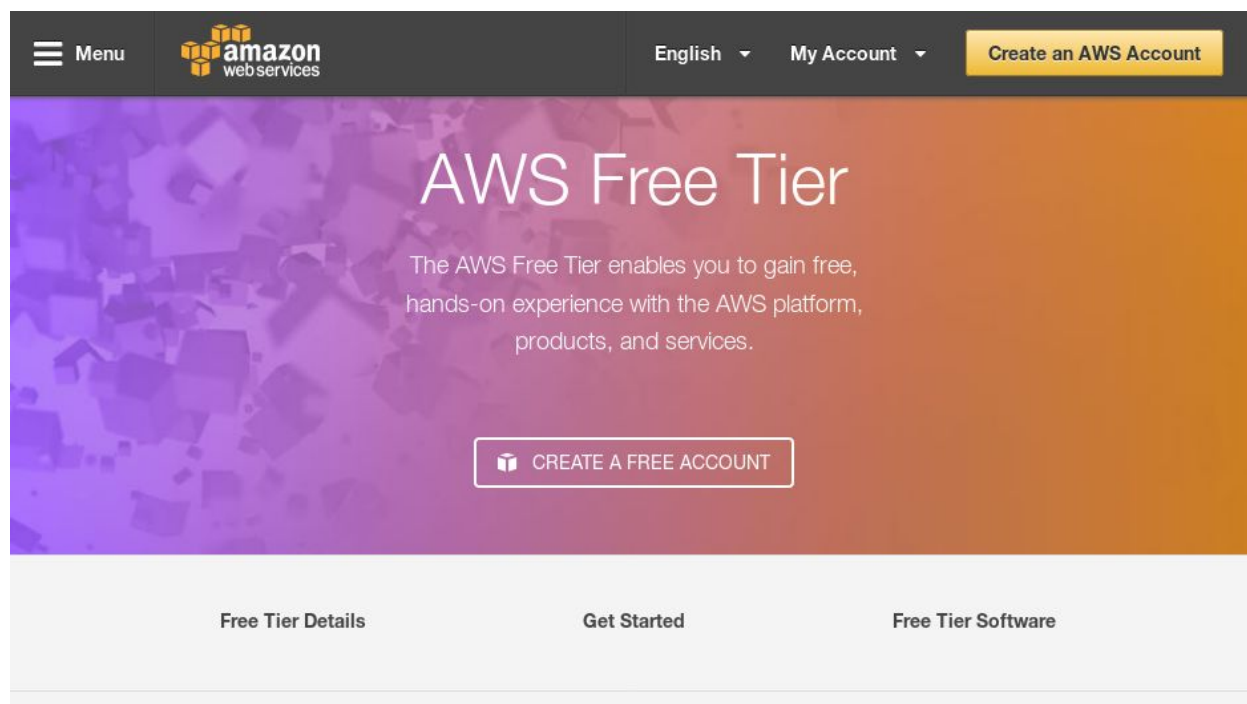
Choose **CREATE A FREE ACCOUNT**.

On the subsequent page, provide an email address, select **I am a new user**, and click **Sign In using our secure server**.

Sign In or Create an AWS Account

What is your email (phone for mobile accounts)?

E-mail or mobile number:

○ **I am a new user.**

○ **I am a returning user
and my password is:**

Sign in using our secure server ▶

Forgot your password?

**AWS Accounts Include
12 Months of Free Tier Access**

Including use of Amazon EC2,
Amazon S3, and Amazon DynamoDB

Visit aws.amazon.com/free for full offer terms

Learn more about AWS Identity and Access Management and AWS Multi-Factor Authentication, features that provide additional security for your AWS Account. View full AWS Free Usage Tier offer terms.

On the next page, fill out the form with your name, an existing email address for the account, and a secure password. Then click **Create account**.

Login Credentials

Use the form below to create login credentials that can be used for AWS as well as Amazon.com.

My name is:

My e-mail address is:

Type it again:

note: this is the e-mail address that we will use
to contact you about your account

Enter a new password:

Type it again:

Create account

About Amazon.com Sign In

Amazon Web Services uses information from your Amazon.com account to identify you and allow access to Amazon Web Services. Your use of this site is governed by our Terms of Use and Privacy Policy linked below. Your use of Amazon Web Services products and services is governed by the AWS Customer Agreement linked below unless you purchase these products and services from an AWS Value Added Reseller.

Terms of Use   Privacy Policy   AWS Customer Agreement © 1996-2017, Amazon.com, Inc. or its affiliates

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On the next page, provide appropriate contact information, and indicate whether this account is a company or personal account.

Amazon Web Services requires that you have payment information on record with your account, even if you only plan to use the AWS Free Tier. This is in case you want to use more cloud resources than are provided by the AWS Free Tier, or to charge you when your eligibility for AWS Free Tier expires. Enter appropriate payment information.

Amazon Web Services will then verify your contact information and ability to set up this account. You will be asked to provide (or confirm) a phone number. An automated system will immediately call you and provide information so that you can enter a PIN to confirm you received the message.

On the final page, choose a support plan. The Basic plan is free.

You are now registered with Amazon Web Services. Feel free to explore the various tutorials to get oriented to the environment. It may take Amazon up to 24 hours to fully activate your account. Check your email regularly in case any information needs to be clarified.
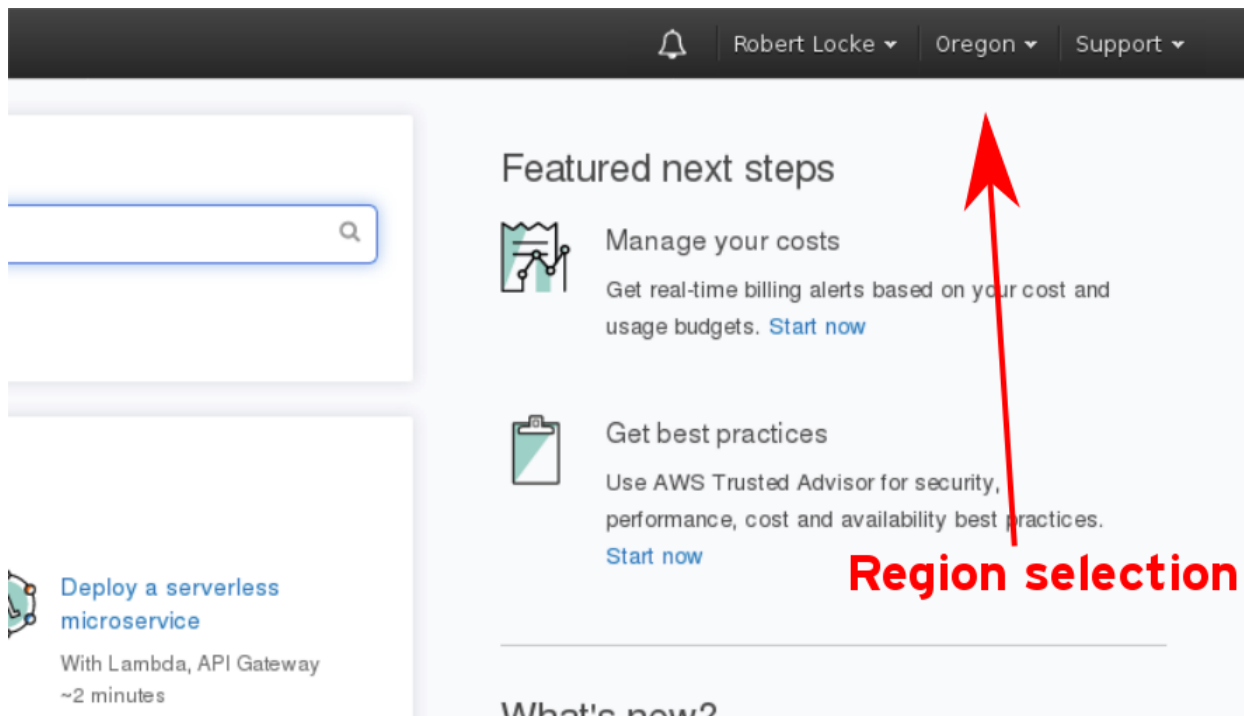
LAUNCH A NEW AMAZON EC2 INSTANCE

In this section, we will briefly outline the process to create and launch a Red Hat Enterprise Linux 7 cloud instance for use as your machine for hands-on exercises.

Open a web browser, navigate to https://aws.amazon.com/free/, and click **Sign In to the Console**. You should see a screen similar to the one below:
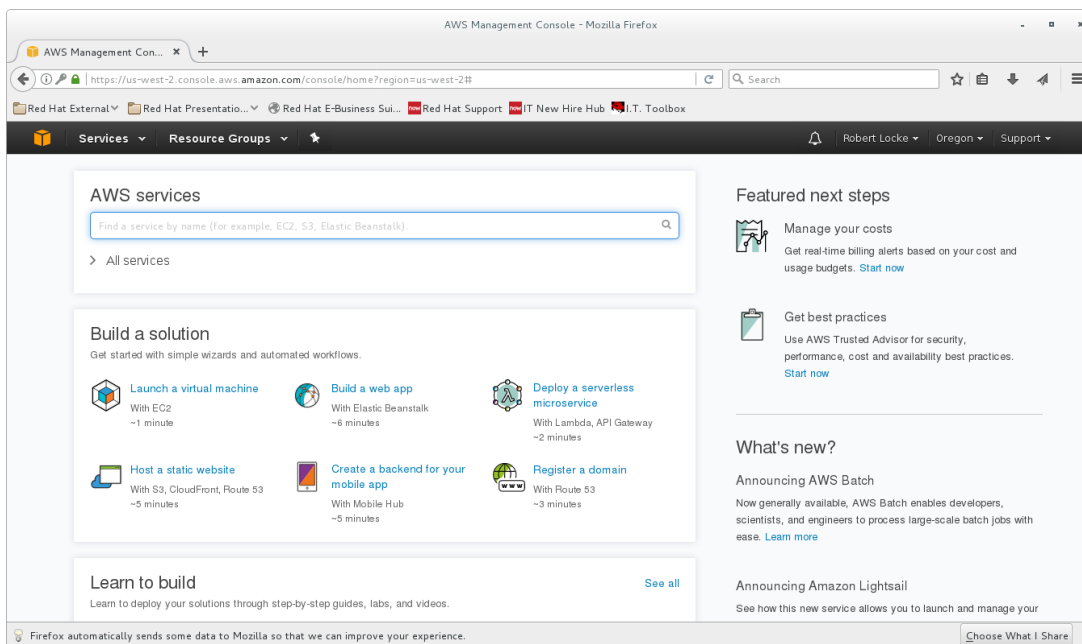

At the time of writing, Amazon appears to set up new accounts to start new virtual machines in the US-West-2 (Oregon) data center by default. This may be far from your network location and result in higher latency for your connection. In the upper right-hand corner of the Console, there is a menu which allows you to set which data center you want to use before you launch your virtual machine as shown in the screenshot below. Select an appropriate location from the menu.

Click the **Launch a virtual machine** link. This should load the EC2 Quick Launch screen:
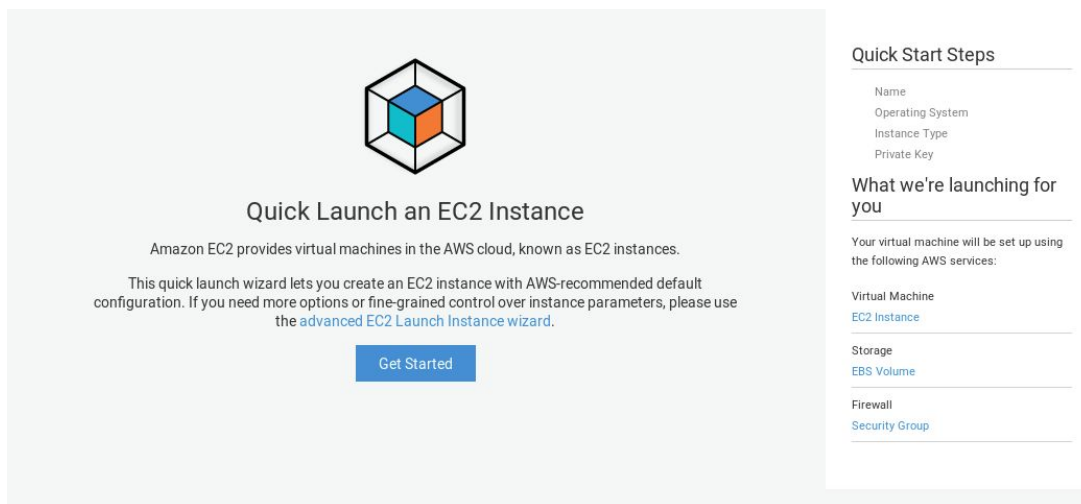
Click **Get Started.**
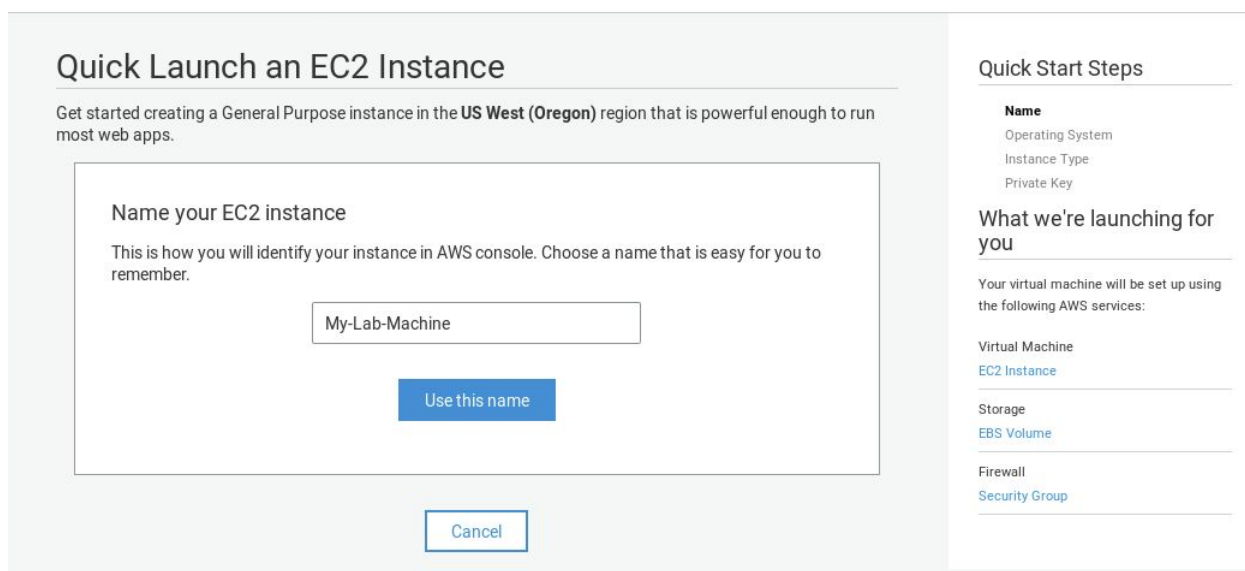
Enter a name for your instance and click **Use this name**. The following screen should appear:

Choose **Red Hat Linux Enterprise 7.2** and click **Next**. (Note that at the time of testing, this actually selected an AMI based on Red Hat Enterprise Linux 7.3, contrary to the label on the interface.)

Choose **t2.micro** as your instance type (note that it is labeled **FREE TIER ELIGIBLE**) and then click **Next**. You will be prompted to create or select a key pair for authenticating your remote login:
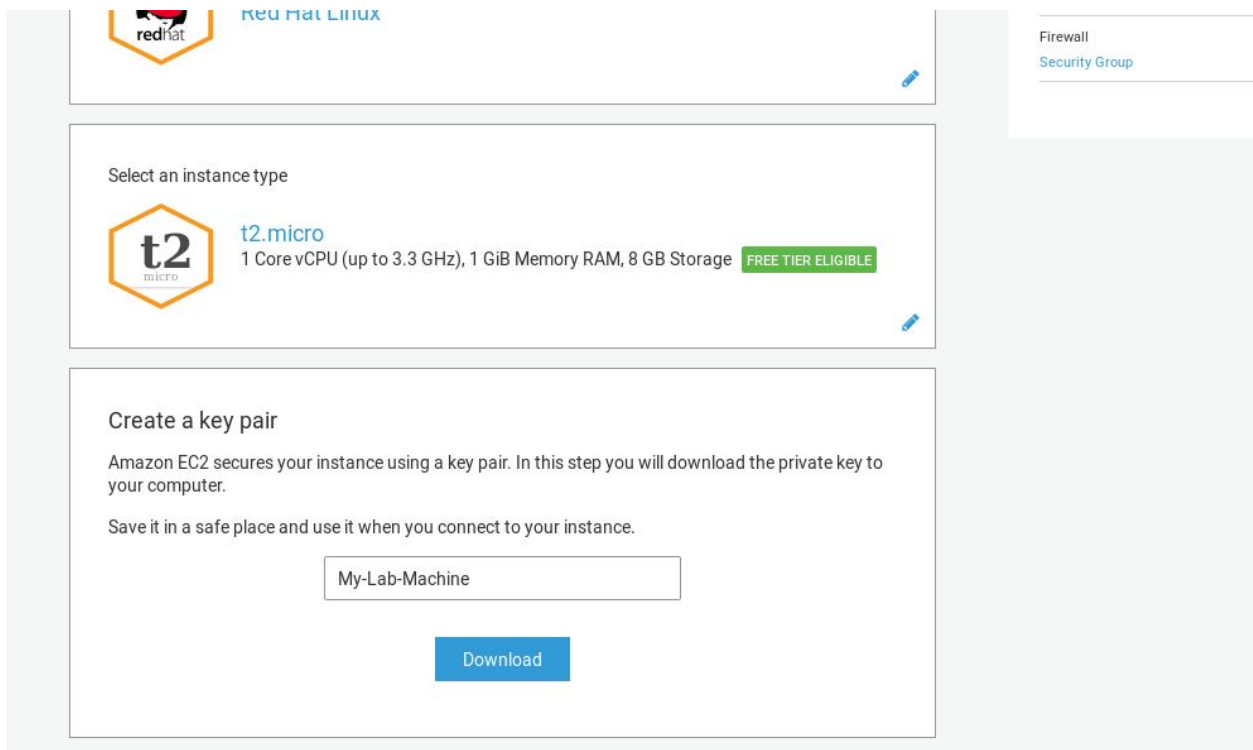
Name the key pair and click **Download**. Note the warning that AWS does not keep a copy of your private key; if you lose this file after download, you will not be able to recover it. Keep this file safe; if anyone else obtains a copy of it, they can use it to log in to your cloud instance. Click **Okay! Start Download** to confirm the download.
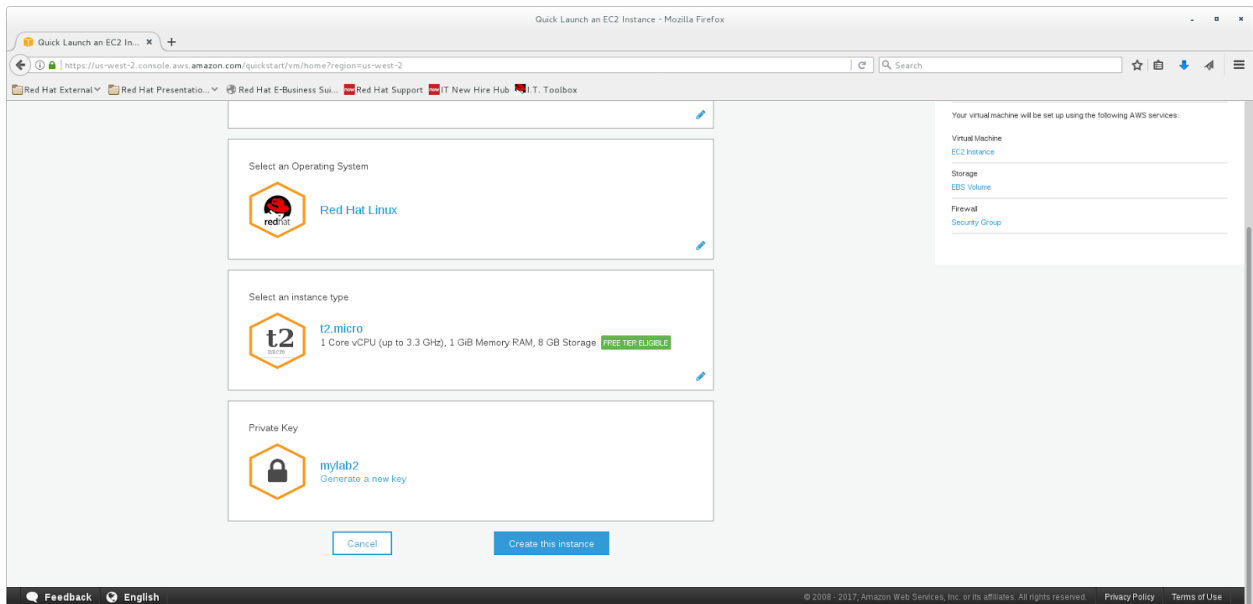
Finally, click **Create this instance** to start your machine for the first time.

Quick Launch an EC2 Instance

Get started creating a General Purpose instance in the **US West (Oregon)** region that is powerful enough to run most web apps.

My-Lab-Instance

Select an Operating System

Red Hat Linux

Select an instance type

t2.micro
1 Core vCPU (up to 3.3 GHz), 1 GiB Memory RAM, 8 GB Storage   FREE TIER ELIGIBLE

Private Key

My-Lab-Instance
Generate a new key

Cancel   Create this instance

What we're launching for you

Your virtual machine will be set up using the following AWS services:

Virtual Machine
EC2 Instance

Storage
EBS Volume

Firewall
Security Group

Your Instance is Launching!

Amazon EC2 is launching your instance. This process should only take a few minutes.
You can proceed to the EC2 Console while this process takes place.

My-Lab-Machine
Status: In progress...

While you wait, learn more about...

Managing your Instance

You can manage your instance in the EC2 console. Click on your instance and explore available options in the console.

Connecting to your Instance

You can connect to your instance with your client. In the EC2 console, select your instance and click 'Connect' for detailed instructions.

Securing your Instance

To protect your instance, we've configured a security group (a firewall) to only accept connections from your current IP (50.157.84.43). To enable other connections, such as HTTP, add rules to the security group.

See your instance in EC2 console   Go to EC2 console   Configure security group

Proceed to EC2 console

What we're launching for you

Your virtual machine will be set up using the following AWS services:

Virtual Machine
EC2 Instance

Storage
EBS Volume

Firewall
Security Group

You can immediately click **Proceed to EC2 console** or wait until the instance shows **Status: Completed** to make sure that it is running.
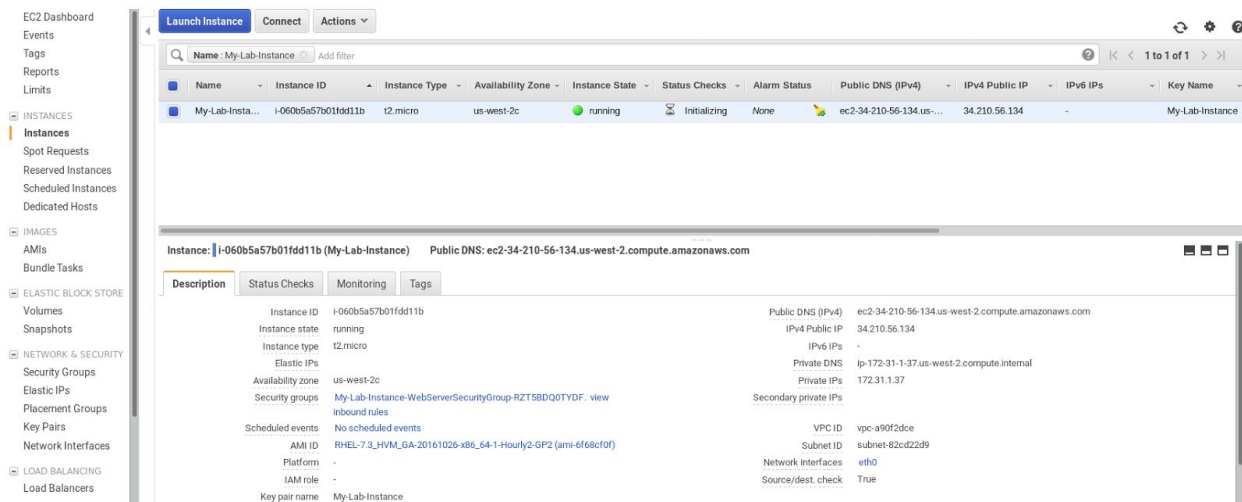
When the **Instance State** for your instance is **running**, you can connect to your Red Hat Enterprise Linux 7 instance.

CONNECTING TO YOUR RED HAT ENTERPRISE LINUX INSTANCE ON AMAZON EC2

The recommended way to access your Red Hat Enterprise Linux cloud instance for this course is to use Secure Shell (**ssh**) to get an interactive shell on the system.

Step 1: Getting SSH

If you are using macOS or Linux: The OpenSSH command (**ssh**) should already be installed on your computer. Start a terminal program to get a shell, and proceed to the next step.

If you are using Microsoft Windows, you will need to get an SSH client as follows:

- Option 1: Download **Git for Windows** from https://git-scm.com/download/win and install it using the default settings. When it is installed, right-click on your desktop (not an icon or a file) and select **Git Bash Here** to open a **Git Bash** command prompt. An SSH client is provided with **Git Bash** and you can continue with Step 2.

- Option 2: If you have the PuTTY client, which can be downloaded from http://www.chiark.greenend.org.uk/~sgtatham/putty/, and you are familiar with that tool, you can use that to connect to your instance. AWS provides a tutorial on this at https://docs.aws.amazon.com/AWSEC2/latest/UserGuide/putty.html.

Step 2: Connecting to your instance with SSH

From the Amazon EC2 console, in the left-side menu under **INSTANCES**, click **Instances** to display a list of the instances you have running. This is probably just the one you set up for this course. Select its checkbox and click **Connect:**

Launch Instance   Connect   Actions ▾

Name : My-Lab-Instance   Add filter

	Name	Instance ID	Instance Type	Availability Zone	Instance State
☑	My-Lab-Insta...	i-060b5a57b01fdd11b	t2.micro	us-west-2c	● running

Instance: ▌i-060b5a57b01fdd11b (My-Lab-Instance)   Public DNS: ec2-34-210-56-134.us-west-2.compu

Description   Status Checks   Monitoring   Tags

Instance ID	i-060b5a57b01fdd11b
Instance state	running
Instance type	t2.micro
Elastic IPs	
Availability zone	us-west-2c

This should display a box with instructions on how to use your SSH client to connect to the selected instance, similar to the following:

Connect To Your Instance   ✕

I would like to connect with   ◉ A standalone SSH client
◯ A Java SSH Client directly from my browser (Java required)

To access your instance:

1. Open an SSH client. (find out how to connect using PuTTY)
2. Locate your private key file (My-Key-Pair.pem). The wizard automatically detects the key you used to launch the instance.
3. Your key must not be publicly viewable for SSH to work. Use this command if needed:

        chmod 400 My-Key-Pair.pem

4. Connect to your instance using its Public DNS:

        ec2-52-26-146-90.us-west-2.compute.amazonaws.com

Example:

        ssh -i "My-Key-Pair.pem" ec2-user@ec2-52-26-146-90.us-west-2.compute.amazonaws.com

Please note that in most cases the username above will be correct, however please ensure that you read your AMI usage instructions to ensure that the AMI owner has not changed the default AMI username.

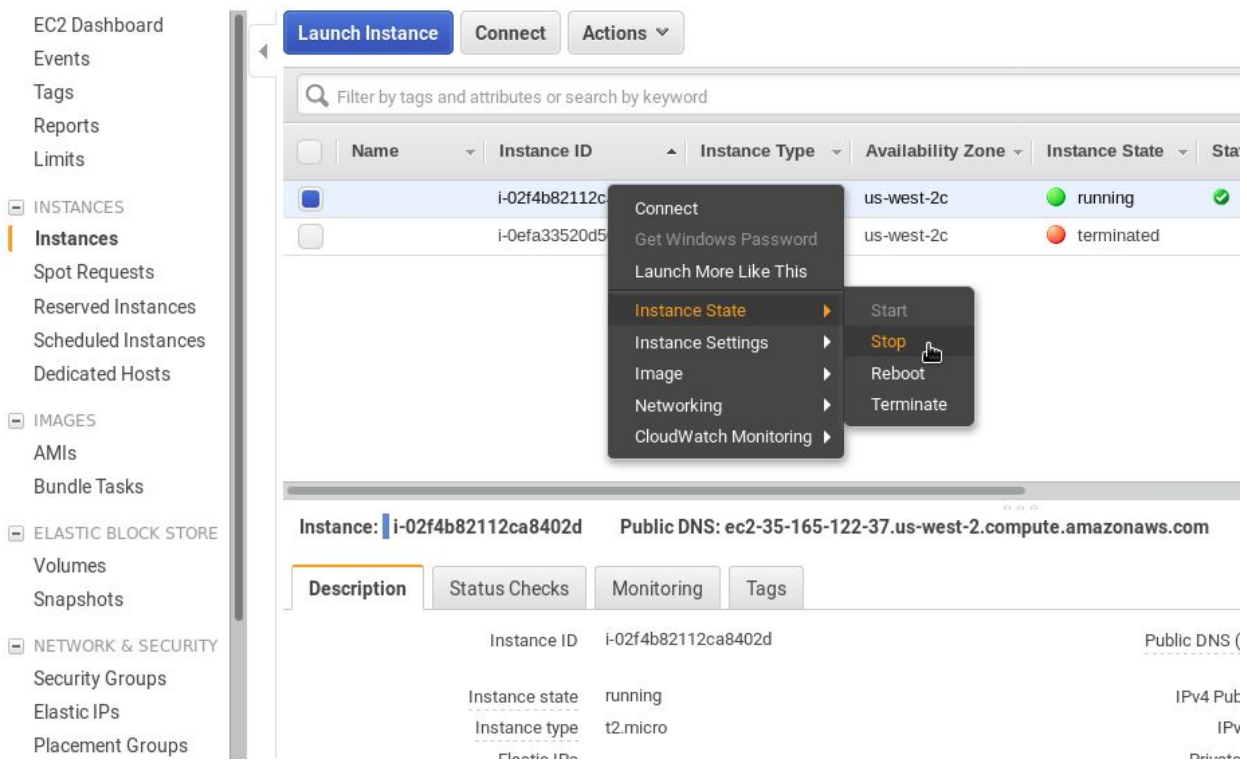If you need any assistance connecting to your instance, please see our connection documentation.

Close

Note that the **-i** option to the **ssh** command expects the appropriate relative or absolute path to the file in which your private key is stored.

In your shell prompt (using **Terminal** on macOS or Linux, or **Git Bash** on Windows or other program), use these instructions to connect to your Red Hat Enterprise Linux instance on Amazon EC2.

STOPPING YOUR RED HAT ENTERPRISE LINUX INSTANCE ON AMAZON EC2

When you are not using your Red Hat Enterprise Linux instance for lab exercises, you should stop it in order to conserve your compute time (or to control costs if you are not using AWS Free Tier).

To do this, log in to your AWS account and go to the EC2 Console, and select the **Instances** view as discussed above. Right-click on the instance you want to stop to display the following menu:

Under **Instance State**, click **Stop**. Click **Yes, Stop** to confirm that you want to stop the instance. We do not use the ephemeral storage in this course.

Watch the status of the instance in the EC2 Console to ensure that it actually stops. It should transition to the state **stopping** and then **stopped**.

Stopping your instance temporarily shuts it down, but does not remove the machine from Amazon EC2. You can still restart it later.

RESTARTING YOUR RED HAT ENTERPRISE LINUX INSTANCE IN AMAZON EC2

Restarting a stopped instance is very similar to stopping one. Log in to your AWS account and go to the EC2 Console, and select the **Instances** view as discussed above. Right-click the instance you want to start to display the submenu, and under **Instance State**, click **Start**. Click **Yes, Start** to confirm you want to start the instance.

Watch the status of the instance in the EC2 Console to ensure that it starts. It should transition to the state **pending** and then **running**.

Your Red Hat Enterprise Linux instance will have a different public host name and IP address than it did before it was stopped, so you will need to select it and click **Connect** to confirm the new SSH command to use.

TERMINATING YOUR RED HAT ENTERPRISE LINUX INSTANCE IN AMAZON EC2

At the end of the course, you should stop and completely terminate your instance to remove it from Amazon EC2 permanently. This avoids such things as any risk of charges for long term storage (beyond the term of your AWS Free Tier initial year, for example).

To terminate an instance, log in to your AWS account and go to the EC2 Console, and select the **Instances** view as discussed above. Right-click the instance you want to terminate to display the submenu, and under **Instance State**, click **Terminate**. You will be warned that this will remove all local storage.

Warning: The next step is permanent and irreversible. Click **Yes, Terminate** to confirm you want to destroy the instance.

Watch the status of the instance in the EC2 Console to ensure that it is terminated. It should transition to the state **terminated**.

LOGGING OUT OF AMAZON EC2

You are responsible for the security of your Amazon EC2 account. You should ensure that you log out of Amazon Web Services when you are finished using it. Click your username at the top of the web dashboard, and click **Sign Out** in the menu.

Warning: Signing out of the web console DOES NOT automatically stop or terminate any running Amazon EC2 instances. They will continue to run until you stop or terminate them.

ADDITIONAL REFERENCES

How to Launch a Linux Virtual Machine on the Cloud:
https://aws.amazon.com/getting-started/tutorials/launch-a-virtual-machine/

Amazon Elastic Compute Cloud User Guide for Linux Instances:

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http://docs.aws.amazon.com/AWSEC2/latest/UserGuide/concepts.html

You might want to look into taking additional steps to secure your AWS account with two-factor authentication, or to limit which hosts can contact your instances by using Security Groups. See the AWS documentation for details.

The AMI providing the Red Hat Enterprise Linux 7.3 operating system tested for this course was **ami-6f68cf0f** (RHEL-7.3_HVM_GA-20161026-x86_64-1-Hourly2-GP2). It is expected that this course will function with other official Red Hat Enterprise Linux 7 AMIs as well.