



Immersion Day

Getting Started with Linux on Amazon EC2



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Overview

Amazon Elastic Compute Cloud (Amazon EC2) is a web service that provides resizable compute capacity in the cloud. Amazon EC2's simple web service interface allows you to obtain and configure capacity with minimal friction. Amazon EC2 reduces the time required to obtain and boot new server instances to minutes, allowing you to quickly scale capacity, both up and down, as your computing requirements change. Amazon EC2 changes the economics of computing by allowing you to pay only for capacity that you actually use.

This lab will walk you through launching, configuring, and customizing an EC2 virtual machine to run a web server. It will walk you through successfully provisioning and starting an EC2 instance using the AWS Management Console.

Create a new Key Pair

In this lab, you will need to create an EC2 instance using an SSH keypair. The following steps outline creating a unique SSH keypair for you to use in this lab.

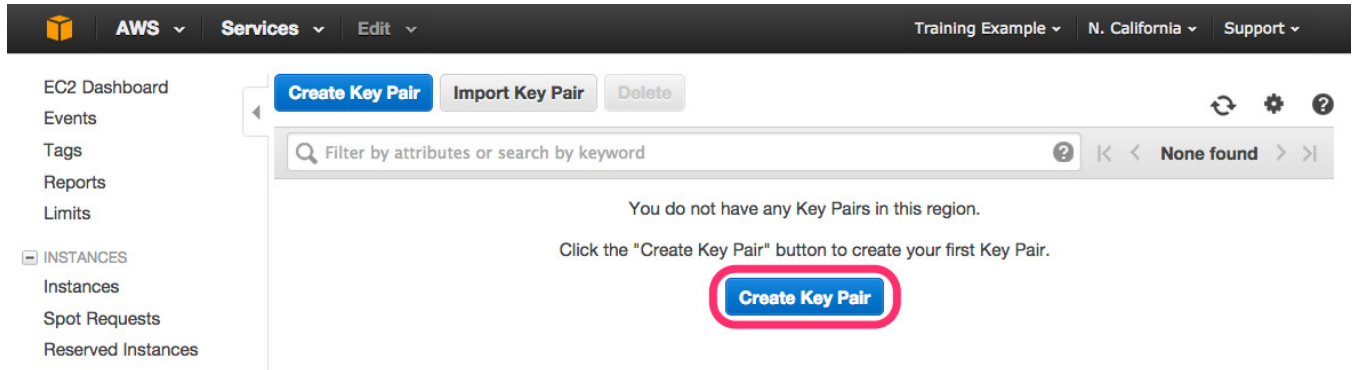
1. Sign into the AWS Management Console and open the Amazon EC2 console at <https://console.aws.amazon.com/ec2>.
2. Click on **Key Pairs** in the NETWORK & SECURITY section near the bottom of the leftmost menu. This will display a page to manage your SSH key pairs.

The screenshot displays the AWS Management Console interface for the Amazon EC2 console. The top navigation bar includes the AWS logo, 'AWS' dropdown, 'Services' dropdown, 'Edit' dropdown, 'Training Example' dropdown, 'N. California' dropdown, and 'Support' dropdown. The left sidebar shows the 'EC2 Dashboard' with various sections: 'Events', 'Tags', 'Reports', 'Limits', 'INSTANCES' (Instances, Spot Requests, Reserved Instances), 'IMAGES' (AMIs, Bundle Tasks), 'ELASTIC BLOCK STORE' (Volumes, Snapshots), 'NETWORK & SECURITY' (Security Groups, Elastic IPs, Placement Groups, Load Balancers, **Key Pairs**, Network Interfaces), and 'AUTO SCALING' (Launch Configurations, Auto Scaling Groups). The 'Key Pairs' link is highlighted with a red arrow. The main content area is divided into several sections: 'Resources' (You are using the following Amazon EC2 resources in the US West (N. California) region: 0 Running Instances, 0 Elastic IPs, 0 Volumes, 0 Snapshots, 0 Key Pairs, 0 Load Balancers, 0 Placement Groups, 1 Security Groups), 'Create Instance' (To start using Amazon EC2 you will want to launch a virtual server, known as an Amazon EC2 instance. Launch Instance button), 'Service Health' (Service Status: US West (N. California): This service is operating normally, Availability Zone Status: us-west-1b: Availability zone is operating normally, us-west-1c: Availability zone is operating normally, Service Health Dashboard link), 'Scheduled Events' (US West (N. California): No events), 'Account Attributes' (Supported Platforms: VPC, Default VPC: vpc-7d886e18, Additional Information: Getting Started Guide, Documentation, All EC2 Resources, Forums, Pricing, Contact Us), and 'AWS Marketplace' (Find free software trial products in the AWS Marketplace from the EC2 Launch Wizard. Or try these popular AMIs: Vyatta Virtual Router/Firewall/VPN, Provided by Vyatta, Inc., Rating ★★★★★, Pay by the hour for software and AWS usage, View all Networking, Alert Logic Threat Manager for AWS). The footer includes copyright information (© 2008 - 2015, Amazon Web Services, Inc. or its affiliates. All rights reserved.), Privacy Policy, Terms of Use, and a Feedback button.

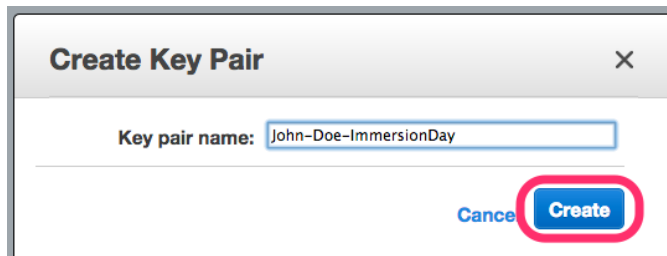
3. To create a new SSH key pair, click the **Create Key Pair** button at the top of the browser window.

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4. In the resulting pop up window, type *[First Name]-[Last Name]-ImmersionDay* into the **Key Pair Name:** text box and click **Create**.



5. The page will download the file "*[Your-Name]-ImmersionDay.pem*" to the local drive. Follow the browser instructions to save the file to the default download location
6. Remember the full path to the file .pem file you just downloaded.

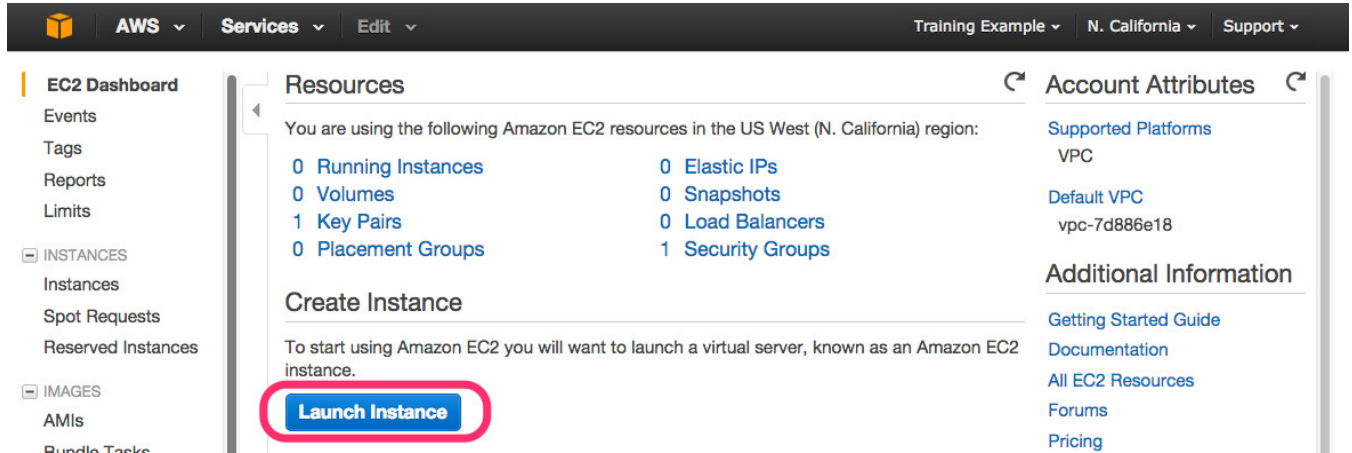


You will use the Key Pair you just created to manage your EC2 instances for the rest of the lab.

Launch a Web Server Instance


In this example we will launch a default Amazon Linux Instance with an Apache/PHP web server installed on initialization.

7. Sign into the AWS Management Console and open the Amazon EC2 console at <https://console.aws.amazon.com/ec2>.
8. Click on **Launch Instance**



9. Select the Amazon Linux AMI and click **Select**

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AWS

Services

Edit

Training Example

N. California

Support

1. Choose AMI

2. Choose Instance Type

3. Configure Instance

4. Add Storage

5. Tag Instance

6. Configure Security Group

7. Review

Step 1: Choose an Amazon Machine Image (AMI)

[Cancel and Exit](#)

An AMI is a template that contains the software configuration (operating system, application server, and applications) required to launch your instance. You can select an AMI provided by AWS, our user community, or the AWS Marketplace; or you can select one of your own AMIs.


Quick Start

My AMIs

AWS Marketplace

Community AMIs

☐ Free tier only ⓘ



Amazon Linux AMI 2014.09.1 (HVM) - ami-4b6f650e

Amazon Linux


Free tier eligible

The Amazon Linux AMI is an EBS backed image. It includes the 3.14 kernel, Ruby 2.1, PHP 5.5, PostgreSQL 9.3, Docker 1.2, the AWS command line tools, and repository access to many other packages.

Root device type: ebs Virtualization type: hvm

Select

64-bit



Red Hat Enterprise Linux 7.0 (HVM), SSD Volume Type - ami-33cdd876

Red Hat


Free tier eligible

Red Hat Enterprise Linux version 7.0 (HVM), EBS General Purpose (SSD) Volume Type

Root device type: ebs Virtualization type: hvm

Select

64-bit



SUSE Linux Enterprise Server 12 (HVM), SSD Volume Type - ami-b95b4ffc

SUSE Linux


Free tier eligible

SUSE Linux Enterprise Server 12 (HVM), EBS General Purpose (SSD) Volume Type. Public Cloud, Advanced Systems Management, Web and Scripting, and Legacy modules enabled.

Root device type: ebs Virtualization type: hvm

Select

64-bit



Ubuntu Server 14.04 LTS (HVM), SSD Volume Type - ami-076e6542

Ubuntu

Free tier eligible

Ubuntu Server 14.04 LTS (HVM), EBS General Purpose (SSD) Volume Type. Support available from Canonical (<http://www.ubuntu.com/cloud/services>).

Root device type: ebs Virtualization type: hvm

Select

64-bit

10. Select the **Micro (t2.micro)** instance size and click **Next: Configure Instance Details**

Step 2: Choose an Instance Type

Amazon EC2 provides a wide selection of instance types optimized to fit different use cases. Instances are virtual servers that can run applications. They have varying combinations of CPU, memory, storage, and networking capacity, and give you the flexibility to choose the appropriate mix of resources for your applications. [Learn more](#) about instance types and how they can meet your computing needs.

Filter by: **All instance types** **Current generation** [Show/Hide Columns](#)

Currently selected: t2.micro (Variable ECUs, 1 vCPUs, 2.5 GHz, Intel Xeon Family, 1 GiB memory, EBS only)

	Family	Type	vCPUs	Memory (GiB)	Instance Storage (GB)	EBS-Optimized Available	Network Performance
<input checked="" type="checkbox"/>	General purpose	t2.micro <small>Free tier eligible</small>	1	1	EBS only	-	Low to Moderate
<input type="checkbox"/>	General purpose	t2.small	1	2	EBS only	-	Low to Moderate
<input type="checkbox"/>	General purpose	t2.medium	2	4	EBS only	-	Low to Moderate
<input type="checkbox"/>	General purpose	m3.medium	1	3.75	1 x 4 (SSD)	-	Moderate
<input type="checkbox"/>	General purpose	m3.large	2	7.5	1 x 32 (SSD)	-	Moderate
<input type="checkbox"/>	General purpose	m3.xlarge	4	15	2 x 40 (SSD)	Yes	High
<input type="checkbox"/>	General purpose	m3.2xlarge	8	30	2 x 80 (SSD)	Yes	High

[Cancel](#)
[Previous](#)
[Review and Launch](#)
[Next: Configure Instance Details](#)

11. On the **Configure Instance Details** page, expand the **Advanced Details** section and type the following initialization script information (*you can use Shift-Enter to create the necessary line break, or alternatively you could type this into Notepad and copy & paste the results*) into the User Data field (this will automatically install and start the Apache web server on launch) and click **Next: Add Storage**:

```
#include  
https://awstechbootcamp.s3.amazonaws.com/bootstrap.sh
```


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AWS

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1. Choose AMI

2. Choose Instance Type

3. Configure Instance

4. Add Storage

5. Tag Instance

6. Configure Security Group

7. Review

Step 3: Configure Instance Details

Network

vpc-7d886e18 (172.31.0.0/16) (default)

Create new VPC

Subnet

No preference (default subnet in any Availabilit

Create new subnet

Auto-assign Public IP

Use subnet setting (Enable)

IAM role

None

Shutdown behavior

Stop

Enable termination protection

☐ Protect against accidental termination

Monitoring

☐ Enable CloudWatch detailed monitoring

Additional charges apply.

Tenancy

Shared tenancy (multi-tenant hardware)

Additional charges will apply for dedicated tenancy.

Advanced Details

User data

☒ As text ☐ As file ☐ Input is already base64 encoded

#include
https://awstechbootcamp.s3.amazonaws.com/bootstrap.sh

Cancel

Previous

Review and Launch

Next: Add Storage

12. Click **Next: Tag Instance** to accept the default Storage Device Configuration.

AWS
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Training Example
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Support

1. Choose AMI
2. Choose Instance Type
3. Configure Instance
4. Add Storage
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7. Review

Step 4: Add Storage

Your instance will be launched with the following storage device settings. You can attach additional EBS volumes and instance store volumes to your instance, or edit the settings of the root volume. You can also attach additional EBS volumes after launching an instance, but not instance store volumes. [Learn more](#) about storage options in Amazon EC2.

Type	Device	Snapshot	Size (GiB)	Volume Type	IOPS	Delete on Termination	Encrypted
Root	/dev/xvda	snap-14cff4d5	8	General Purpose (SSD)	24 / 3000	<input checked="" type="checkbox"/>	Not Encrypted

[Add New Volume](#)

Free tier eligible customers can get up to 30 GB of EBS General Purpose (SSD) or Magnetic storage. [Learn more](#) about free usage tier eligibility and usage restrictions.

[Cancel](#)
[Previous](#)
[Review and Launch](#)
[Next: Tag Instance](#)

Next, choose a “friendly name” for your instance. This name, more correctly known as a tag, will appear in the console once the instance launches. It makes it easy to keep track of running machines in a complex environment. Name yours according to this format: “[Your Name] Web Server.”

Then click **Next: Configure Security Group**.

Step 5: Tag Instance

A tag consists of a case-sensitive key-value pair. For example, you could define a tag with key = Name and value = Webserver. [Learn more](#) about tagging your Amazon EC2 resources.

Key (127 characters maximum)
Value (255 characters maximum)

Name
John Doe Web Server

[Create Tag](#) (Up to 10 tags maximum)

[Cancel](#)
[Previous](#)
[Review and Launch](#)
[Next: Configure Security Group](#)

13. You will be prompted to create a new security group, which will be your firewall rules. On the assumption that we are building out a Web server, name your group “[Your Name] Web

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Tier”, and open ports 22 and 80. Click the **Review and Launch** button after configuring the security group.

AWS
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1. Choose AMI
2. Choose Instance Type
3. Configure Instance
4. Add Storage
5. Tag Instance
6. Configure Security Group
7. Review

Step 6: Configure Security Group

A security group is a set of firewall rules that control the traffic for your instance. On this page, you can add rules to allow specific traffic to reach your instance. For example, if you want to set up a web server and allow Internet traffic to reach your instance, add rules that allow unrestricted access to the HTTP and HTTPS ports. You can create a new security group or select from an existing one below. [Learn more](#) about Amazon EC2 security groups.

Assign a security group: ☒ Create a new security group ☐ Select an existing security group

Security group name:

Description:

Type	Protocol	Port Range	Source
SSH	TCP	22	Anywhere 0.0.0.0/0
HTTP	TCP	80	Anywhere 0.0.0.0/0

[Add Rule](#)

Warning
Rules with source of 0.0.0.0/0 allow all IP addresses to access your instance. We recommend setting security group rules to allow access from known IP addresses only.

[Cancel](#)
[Previous](#)
[Review and Launch](#)

14. Review your choices, and then click **Launch**.

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1. Choose AMI
2. Choose Instance Type
3. Configure Instance
4. Add Storage
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7. Review

Step 7: Review Instance Launch

Please review your instance launch details. You can go back to edit changes for each section. Click **Launch** to assign a key pair to your instance and complete the launch process.

Improve your instances' security. Your security group, John-Doe-WebTier, is open to the world.
Your instances may be accessible from any IP address. We recommend that you update your security group rules to allow access from known IP addresses only. You can also open additional ports in your security group to facilitate access to the application or service you're running, e.g., HTTP (80) for web servers. [Edit security groups](#)

AMI Details [Edit AMI](#)
Amazon Linux AMI 2014.09.1 (HVM) - ami-4b6f650e
The Amazon Linux AMI is an EBS backed image. It includes the 3.14 kernel, Ruby 2.1, PHP 5.5, PostgreSQL 9.3, Docker 1.2, the AWS command line tools, and repository access to many other packages.
Root Device Type: ebs Virtualization type: hvm

Instance Type [Edit instance type](#)

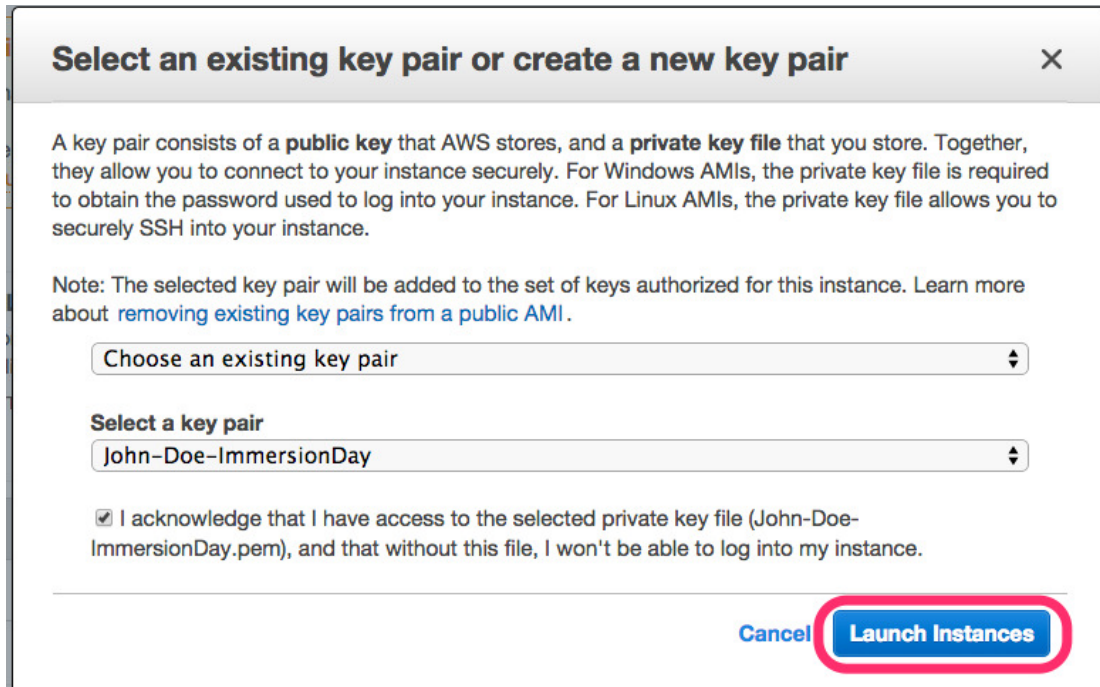
Instance Type	ECUs	vCPUs	Memory (GiB)	Instance Storage (GB)	EBS-Optimized Available	Network Performance
t2.micro	Variable	1	1	EBS only	-	Low to Moderate

Security Groups [Edit security groups](#)
Security group name: John-Doe-WebTier

[Cancel](#)
[Previous](#)
[Launch](#)

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15. Select the *[YourName]-ImmersionDay* key pair that you created in the beginning of this lab from the drop and check the "I acknowledge" checkbox. Then click the **Launch Instances** button.



Select an existing key pair or create a new key pair ✕

A key pair consists of a **public key** that AWS stores, and a **private key file** that you store. Together, they allow you to connect to your instance securely. For Windows AMIs, the private key file is required to obtain the password used to log into your instance. For Linux AMIs, the private key file allows you to securely SSH into your instance.

Note: The selected key pair will be added to the set of keys authorized for this instance. Learn more about [removing existing key pairs from a public AMI](#).

Choose an existing key pair

Select a key pair

John-Doe-ImmersionDay

☒ I acknowledge that I have access to the selected private key file (John-Doe-ImmersionDay.pem), and that without this file, I won't be able to log into my instance.

Cancel **Launch Instances**

16. Click the **View Instances** button to view the list of EC2 instances. Once your instance has launched, you will see your "Manual Web Server," as well as the Availability Zone the instance is in and the publicly routable DNS name.

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The screenshot shows the AWS Management Console interface. On the left is a navigation menu with categories like INSTANCES, IMAGES, ELASTIC BLOCK STORE, NETWORK & SECURITY, and AUTO SCALING. The 'INSTANCES' section is expanded, showing 'Instances', 'Spot Requests', and 'Reserved Instances'. The main content area displays a table of EC2 instances. One instance, 'John Doe Web Server', is highlighted with a red circle. Below the table, a detailed view of the selected instance is shown, also with a red circle highlighting the instance name and public DNS information.

Launch Instance **Connect** **Actions**

Filter by tags and attributes or search by keyword

Name	aws:autoscaling:groupName	Instance ID	Instance Type	Availability Zone
John Doe Web Server		i-664070ae	t2.micro	us-west-1c

Instance: i-664070ae (John Doe Web Server) **Public DNS:** ec2-54-183-155-199.us-west-1.compute.amazonaws.com

Description **Status Checks** **Monitoring** **Tags**

Property	Value
Instance ID	i-664070ae
Instance state	running
Instance type	t2.micro
Private DNS	ip-172-31-16-33.us-west-1.compute.internal
Public DNS	ec2-54-183-155-199.us-west-1.compute.amazonaws.com
Public IP	54.183.155.199
Elastic IP	-
Availability zone	us-west-1c

Browse the Web Server

1. Wait for the instance to pass the Status Checks to finish loading.

<input type="checkbox"/>	Name	Instance ID	Instance Type	Availability Zone	Instance State	Status Checks
<input type="checkbox"/>	John Doe Web Server	i-664070ae	t2.micro	us-west-1c	● running	Initializing

Finished initializing

<input type="checkbox"/>	Name	Instance ID	Instance Type	Availability Zone	Instance State	Status Checks
<input type="checkbox"/>	John Doe Web Server	i-664070ae	t2.micro	us-west-1c	● running	✔ 2/2 checks passed

2. Open a new browser tab and browse the Web Server by entering the EC2 instance's Public DNS name into the browser. The EC2 instance's Public DNS name can be found in the console by reviewing the "Public DNS" name line highlighted above.

You should see a website that looks like the following:



LOAD TEST

RDS

Meta-Data	Value
InstanceId	<i>i-664070ae</i>
Availability Zone	<i>us-west-1c</i>

Current CPU Load: **0%**

Great Job: You have manually built your first web server!

Appendix – Additional EC2 Concepts

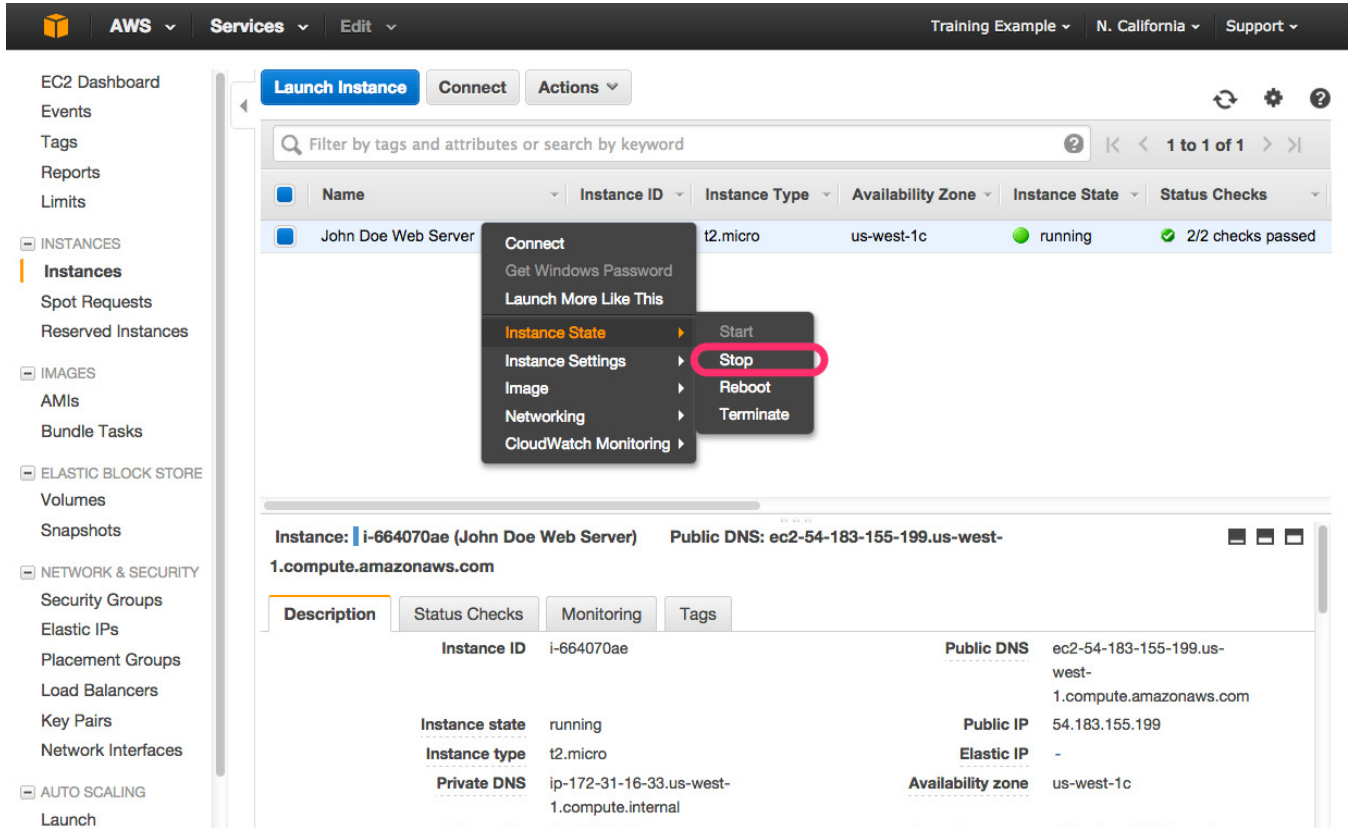
Change the Instance Type

Did you know that you can change the instance type that an AML is running on? This only works with EBS-backed instances (what we're running here). There is no particular reason to change the instance type in this lab, but the following steps outline how easy it is to do in AWS.

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In the AWS Console, select your lab instance, then right-click on it and hover over “Instance State” and select “Stop” (NOT “Terminate”!). Confirm you would like to stop the instance by selecting “Yes, Stop”.



The screenshot shows the AWS Management Console interface. On the left, the navigation pane lists various services under categories like INSTANCES, IMAGES, ELASTIC BLOCK STORE, NETWORK & SECURITY, and AUTO SCALING. The main content area displays a table of EC2 instances. The first instance, 'John Doe Web Server', is selected. A context menu is open over this instance, showing options like 'Connect', 'Get Windows Password', 'Launch More Like This', 'Instance State', 'Instance Settings', 'Image', 'Networking', and 'CloudWatch Monitoring'. The 'Instance State' sub-menu is open, and the 'Stop' option is highlighted with a red circle. Below the table, the details for the selected instance are shown, including its ID, state (running), type (t2.micro), and DNS information.

Name	Instance ID	Instance Type	Availability Zone	Instance State	Status Checks
John Doe Web Server	i-664070ae	t2.micro	us-west-1c	running	2/2 checks passed

Instance: **i-664070ae (John Doe Web Server)** Public DNS: **ec2-54-183-155-199.us-west-1.compute.amazonaws.com**

Description		Status Checks		Monitoring		Tags	
Instance ID	i-664070ae	Public DNS	ec2-54-183-155-199.us-west-1.compute.amazonaws.com	Public IP	54.183.155.199	Elastic IP	-
Instance state	running	Private IP	172.31.16.33	Availability zone	us-west-1c		
Instance type	t2.micro						
Private DNS	ip-172-31-16-33.us-west-1.compute.internal						

After it has stopped, right-click on it again and hover over “Instance Settings” and select “Change Instance Type”.

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The screenshot shows the AWS Management Console interface for EC2 instances. On the left, a navigation sidebar lists various services like EC2 Dashboard, Events, Tags, Reports, Limits, INSTANCES, IMAGES, ELASTIC BLOCK STORE, NETWORK & SECURITY, and AUTO SCALING. The main panel displays a table of instances. The first instance, 'John Doe Web Server' (ID: i-664070ae), is in a 'stopped' state. A context menu is open for this instance, with 'Change Instance Type' highlighted. Below the table, the 'Description' tab for the instance is visible, showing details like Instance ID, Instance state, Instance type, Private DNS, Private IPs, Public DNS, Public IP, Elastic IP, Availability zone, Security groups, and Scheduled events.

Name	Instance ID	Instance Type	Availability Zone	Instance State	Status Checks
John Doe Web Server	i-664070ae	t2.micro	us-west-1c	stopped	

Instance: **i-664070ae (John Doe Web Server)** Private IP: 172.31.16.33

Description | Status Checks | Monitoring | Tags

Property	Value
Instance ID	i-664070ae
Instance state	stopped
Instance type	t2.micro
Private DNS	ip-172-31-16-33.us-west-1.compute.internal
Private IPs	172.31.16.33
Public DNS	-
Public IP	-
Elastic IP	-
Availability zone	us-west-1c
Security groups	John-Doe-WebTier . view rules
Scheduled events	-

After going through the options and selecting your new instance type, right-click your lab instance and start it again.

Elastic IPs

How do you set up practical DNS names for your web server? Using an address such as <http://ec2-75-101-197-112.compute-1.amazonaws.com/> is not likely to win the day with your customers. Setting up a DNS record that points to <http://www.yourdomain.com> is easy enough – until you reboot the server and the underlying DNS name and IP address both change.

AWS offers Elastic IP Addresses, which are actually NAT addresses that operate at a regional level. That is, an Elastic IP Address works across Availability Zones, within a single region.

Assign one to your application as follows:

- Click on the Elastic IPs link in the AWS Console
- Allocate a new address
- Associate the address with a running instance. If you change instances, it's as simple as allocating the address to the new instance.
- Create a DNS "A" record in your own DNS server that points tt.mydomain.com to 75.101.162.40.

Two Important Notes:



1. As long as an Elastic IP address is associated with a running instance, there is no charge for it. However an address that is not associated with a running instance costs \$0.01/hour. This prevents address hoarding; however it also means that you need to delete any addresses you create, or you will incur an ongoing charge.
2. Load balancing (covered in the next section) requires CNAME records instead of "A" records. So Elastic IP is not required for load-balanced applications.

Black Belt Booting

There are a number of advanced techniques that offer additional power and flexibility when booting Linux instances. For example, some organizations maintain a series of generic instances, and customize the images upon launch.

Common techniques include:

- Automatically check for updates upon each boot.
- Look in a well-known location, such as in a S3 bucket, for data or a script to tell the instance which packages to load.
- Pass **user data** to the instance to accomplish each of the above, or possibly instead of the other approaches.

How to Pass User Data

The general format looks like this from the command line:

```
aws ec2 run-instances --image-id [ami id] --user-data "user data up  
to 2048 bytes" ...other params...
```

You can also paste user data into a text field via the AWS Console; however this is usually a form of automation – thus the command line example.

Security Concerns

All of the methods except the final one require that your AMIs have security keys embedded in the image (unless you are using IAM Roles for EC2 instances). That is a serious security concern, and we do not recommend storing the keys on your instance.

By passing user data, the keys can be stored locally on a master control server. There is some risk that the keys will be compromised; however it's a much lower risk than storing keys on the AMI. It is still a risk, though! That's because User Data can't be encrypted – although it does arrive at the control plane via https.

Even our Solutions Architects at AWS are not in complete agreement about risk vs. benefit of user data. We suggest that you start a class conversation on this subject, if there has not been one by the time that you read this section.

Appendix B – SSH to EC2 instances using MindTerm

In this example, we will connect to an EC2 instance that has been configured for the lab. These instructions require Java to launch the MindTerm SSH client through the console.

1. Navigate to the EC2 section of the AWS Console by clicking on the **EC2** shortcut.

The screenshot shows the AWS Management Console interface. At the top, the navigation bar includes the AWS logo, a dropdown menu, and the 'Services' dropdown, which is currently expanded to show 'EC2' as the selected option. Below the navigation bar, the main content area is divided into two columns. The left column, titled 'Amazon Web Services', lists various services grouped by category: Compute (EC2, Lambda), Storage & Content Delivery (S3, Storage Gateway, Glacier, CloudFront), Database (RDS, DynamoDB, ElastiCache, Redshift), Networking (VPC, Direct Connect, Route 53), Administration & Security (Directory Service, IAM, Trusted Advisor, CloudTrail, Config, CloudWatch), Deployment & Management (Elastic Beanstalk, OpsWorks, CloudFormation, CodeDeploy), Analytics (EMR, Kinesis, Data Pipeline), Application Services (SQS, SWF, AppStream, Elastic Transcoder, SES, CloudSearch), Mobile Services (Cognito, Mobile Analytics, SNS), and Enterprise Applications (WorkSpaces, Zocalo). The right column, titled 'Additional Resources', contains links to 'Getting Started', 'AWS Console Mobile App', 'AWS Marketplace', 'Service Health', and 'Set Start Page'. The 'Service Health' section shows a green checkmark indicating that all services are operating normally.

2. Click on **Instances** in the left menu.

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The screenshot shows the AWS Management Console for the EC2 service. In the left-hand navigation pane, the 'Instances' link is highlighted with a red circle. The main content area displays the 'Resources' section for the US West (N. California) region, listing counts for Running Instances, Volumes, Key Pairs, Placement Groups, Elastic IPs, Snapshots, Load Balancers, and Security Groups. Below this is the 'Create Instance' section with a 'Launch Instance' button. To the right, there are sections for 'Account Attributes' and 'AWS Marketplace'.

3. Verify that the Instance is running and **click** on the instance and select **Connect** on the toolbar.

The screenshot shows the EC2 Instance list in the AWS Management Console. The 'Connect' button in the toolbar is circled in red. The instance list table shows one instance named 'John Doe Web Server' with an Instance ID of 'i-664070ae', Instance Type of 't2.micro', Availability Zone of 'us-west-1c', and a status of 'running'. The 'Status Checks' column shows '2/2 checks passed'.

4. Make sure the User name is **ec2-user**, provide the location to your private key (confirm the Private Key Path value in your Workshop Configuration Details sheet), and **check** the option to **save the key location** (not the key itself) in browser cache so you will not have to retype this location in every time you connect to EC2 instances. Then click on **Launch SSH Client**.

Connect To Your Instance ×

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

Enter the required information in the fields below to connect to your instance. AWS automatically detects the key pair name, and Public IP for your instance. You need to enter the location and name of the .pem file containing your private key.

Public IP	54.67.104.170
User name	<input type="text" value="ec2-user"/>
Key name	John-Doe-ImmersionDay.pem
Private key path	<input type="text" value="/Users/jdoe/John-Doe-ImmersionDa"/>
Save key location	<input type="checkbox"/> Store in browser cache

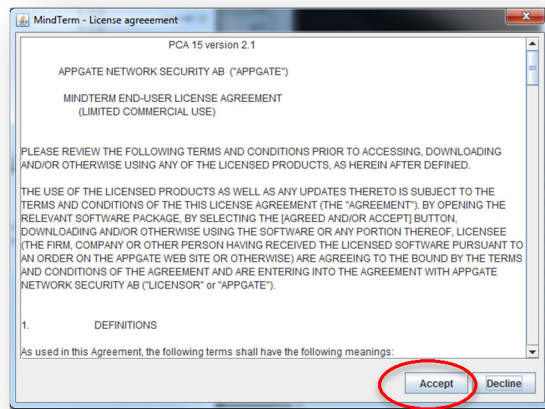
Launch SSH Client

Close

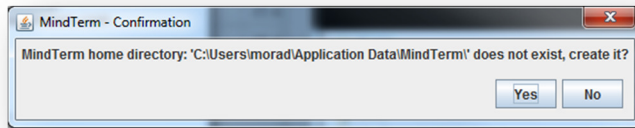
It can take some time for the MindTerm applet to download and run. If you do not have Java installed on your computer, or cannot launch the Java applet from your browser, please see **Appendix B** for instructions on using a 3rd party SSH client to connect to your EC2 instance.

If this is the first time you have used MindTerm, you will be prompted to accept the MindTerm EULA. **Click Accept:**

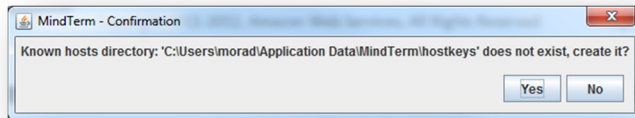
Getting Started with Linux on Amazon EC2



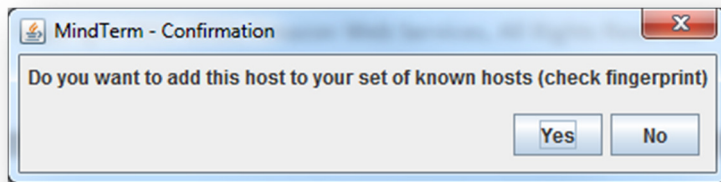
You will be asked to create a directory for MindTerm. Click Yes:



Next you will be asked to create a directory for MindTerm to use to store host keys. Click Yes:



And finally you will be asked if you want to store the host key for your Instance. At this point you have the option to verify the host key MindTerm is seeing with the host key provided by the AWS console to verify that you are connecting directly to your EC2 instance and not some third-party in the middle. Click Yes:



You should be logged into your Instance:

Getting Started with Linux on Amazon EC2

```
ec2-user@ip-10-185-29-45:~ [80x24]
File Edit Settings Plugins Tunnels Help

MindTerm home: C:\Users\baz\Application Data\MindTerm\
Initializing random generator, please wait...done
Connected to server running SSH-2.0-OpenSSH_6.1

Server's hostkey (ssh-rsa) fingerprint:
openssh md5: 55:87:14:8a:f8:99:1a:13:25:a4:35:78:69:12:92:17
bubblebabble: xodiv-hokun-zysup-lumul-hidif-mymep-zavud-racen-hosur-nihok-nexex

  _| _|_ )
  _| ( _/  Amazon Linux AMI
  _|\_|_!

https://aws.amazon.com/amazon-linux-ami/2013.03-release-notes/
[ec2-user@ip-10-185-29-45 ~]$
```

5. Launch the AWS CLI help manual from the terminal command line
Type the following AWS CLI command:

```
$ aws help
```

Continue to press the **SPACE** key to scroll through the manual until you reach the end.
Press the **Q** key to return back to the command line.

```
ec2-user@ip-172-31-24-127:~ [80x24]
File Edit Settings Plugins Tunnels Help

MindTerm home: C:\Users\baz\Application Data\MindTerm\
Initializing random generator, please wait...done
Connected to server running SSH-2.0-OpenSSH_6.1

Server's hostkey (ssh-rsa) fingerprint:
openssh md5: 60:2e:68:67:66:d2:60:76:51:b3:46:0a:29:3b:63:16
bubblebabble: xofen-siman-bokeh-kemor-kocof-gerib-cetap-kyhil-kykem-vitoh-puxax

Last login: Sat Sep 28 14:08:34 2013 from 87-238-80-64.amazon.com

  _| _|_ )
  _| ( _/  Amazon Linux AMI
  _|\_|_!

https://aws.amazon.com/amazon-linux-ami/2013.03-release-notes/
[ec2-user@ip-172-31-24-127 ~]$ aws help
```

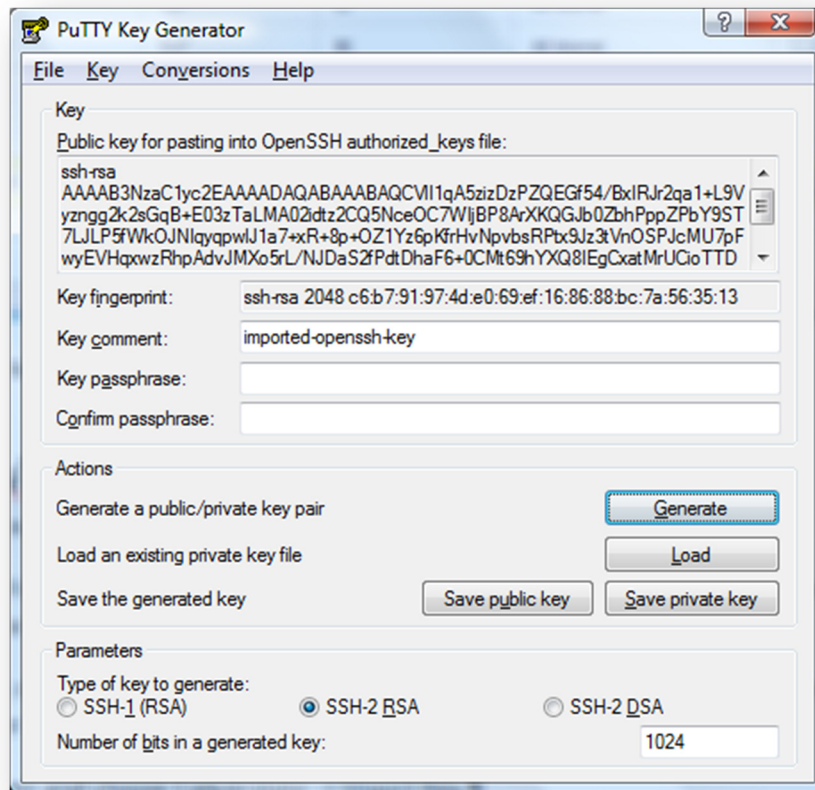

Appendix C – Using a 3rd Party SSH Client

Windows (PuTTY)

This is a Windows-only step, because other operating systems have SSH built in. Download and install Putty. The single word “putty” in Google will return a list of download sites. Be certain that you install both Putty and PuttyGen

Launch PuttyGen and choose Conversions -> Import Key.

Browse for **Bootcamp.pem** and import the key. The result will look similar to this:

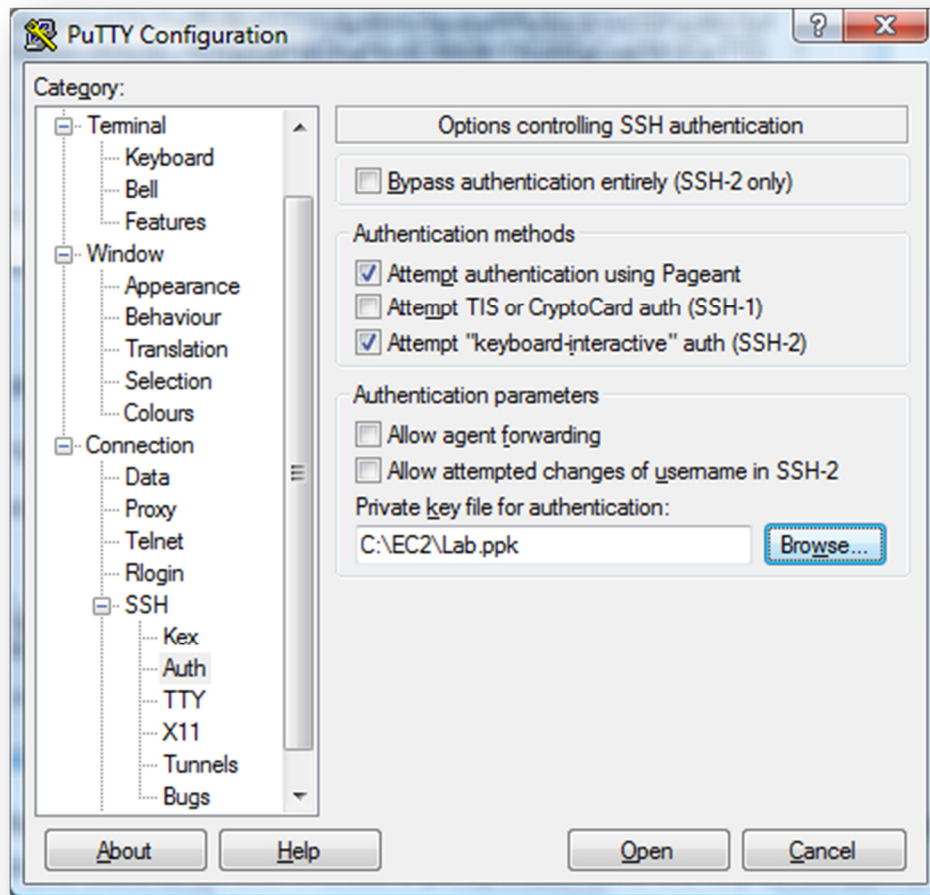


Save the key as the same file name with a .ppk extension (for the rest of these instructions, we will use the name Lab.ppk). Click on File -> Save as Private Key. Ignore the dialog that asks if you want to do this without a passphrase. Save the key as Lab.ppk.

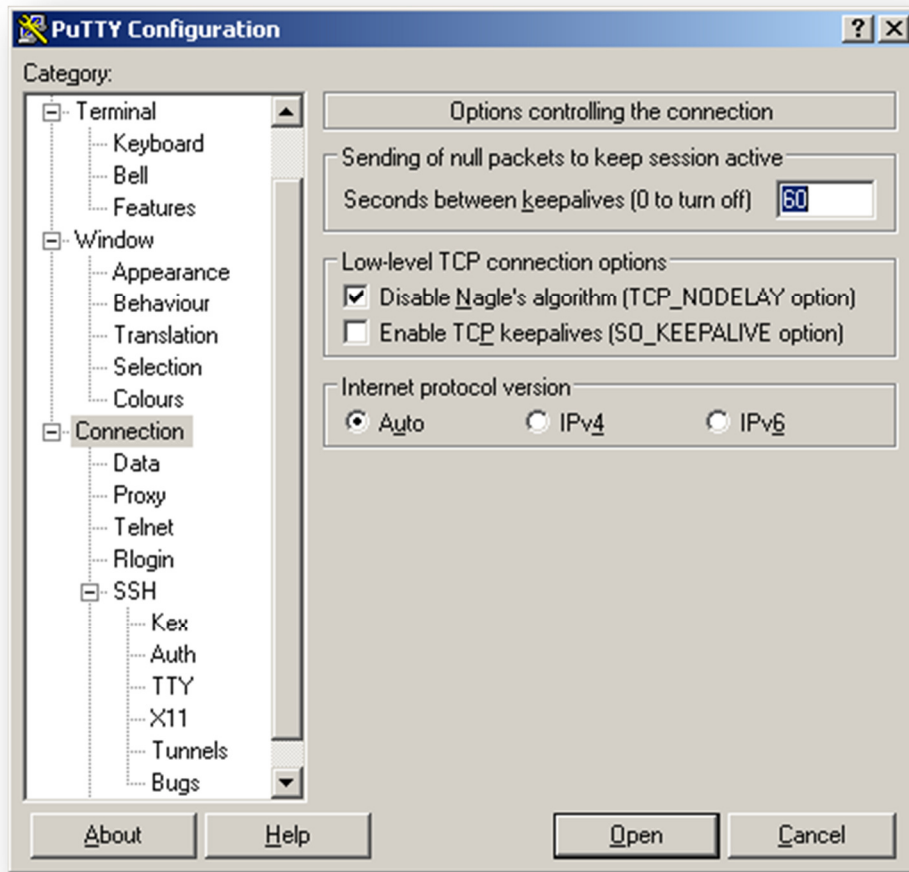
Close PuttyGen.

Using Putty, login in via SSH as follows:

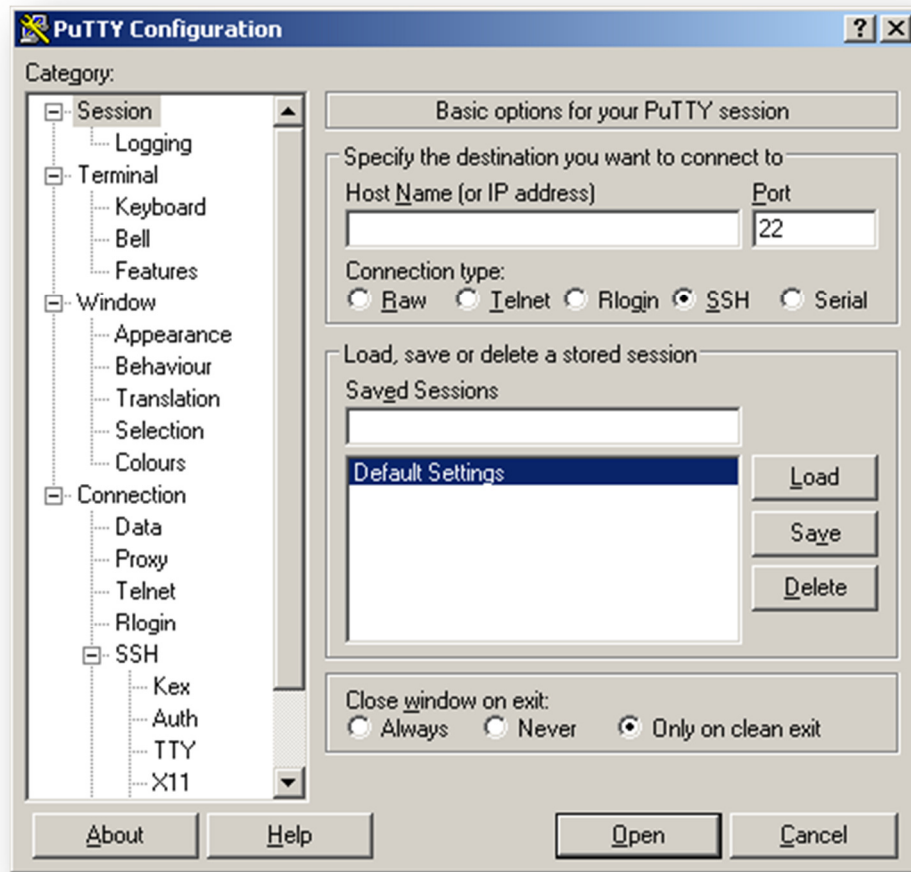
Launch Putty, then expand the SSH node and select the Auth sub-node. Enter Lab.ppk as the key name (shown below).



Make certain that *keepalive* has a value greater than zero. Otherwise your session will time out, which is annoying.



At this point (before entering the host address in the next step), it's a good time to save the settings. You can either highlight *Default* and update the settings, or pick a new name such as *Lab*.



Immersion Day

Getting Started with Linux on Amazon EC2

If you are not certain how to find the DNS name of the server, click on the running instance and look at the lower pane.

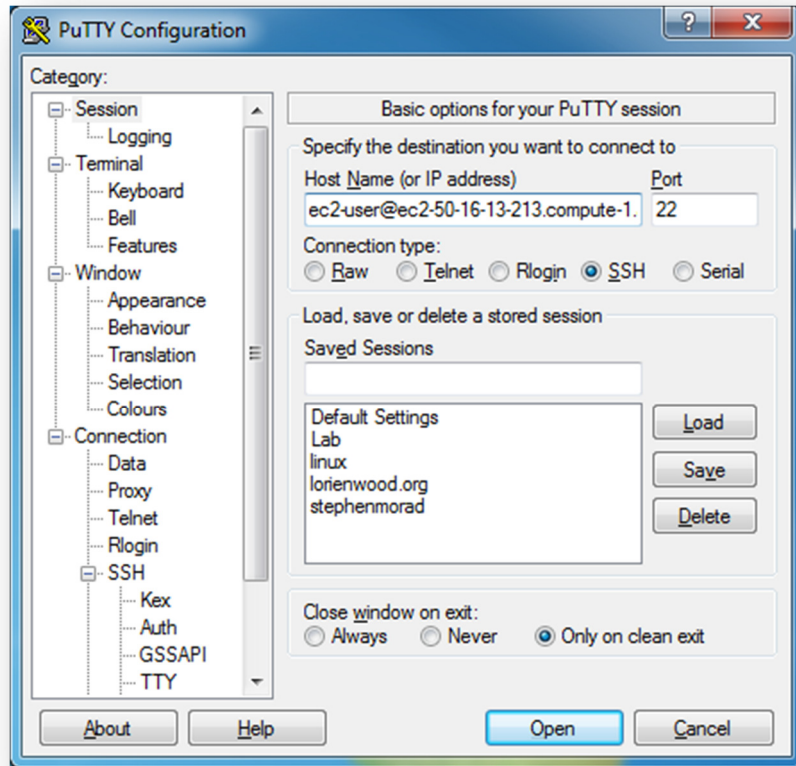
The screenshot displays the AWS Management Console for the EC2 service. The left-hand navigation pane shows the 'INSTANCES' section, with 'Instances' highlighted. The main content area shows a list of instances. One instance, 'John Doe Web Server' (ID: i-664070ae), is in the 'running' state. Below the list, the instance details pane is open for 'i-664070ae (John Doe Web Server)'. The 'Public DNS' field is highlighted, showing the value 'ec2-54-67-104-170.us-west-1.compute.amazonaws.com'.

Name	Instance ID	Instance Type	Availability Zone	Instance State	Status Checks
John Doe Web Server	i-664070ae	t2.micro	us-west-1c	running	2/2 checks passed

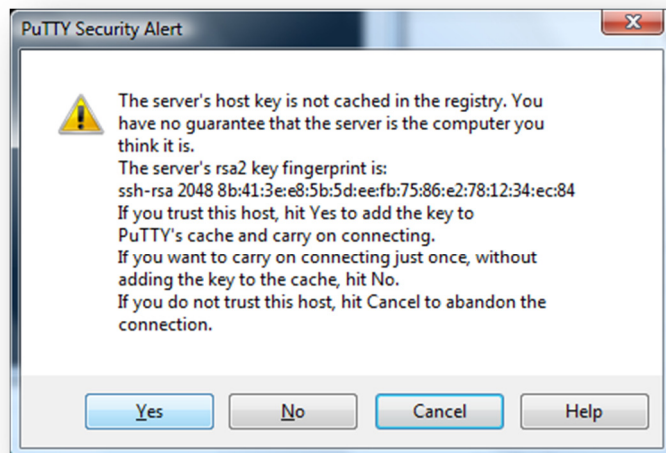
Instance: i-664070ae (John Doe Web Server)	
Public DNS:	ec2-54-67-104-170.us-west-1.compute.amazonaws.com

Description	
Instance ID	i-664070ae
Instance state	running
Instance type	t2.micro
Private DNS	ip-172-31-16-33.us-west-1.compute.internal
Private IPs	172.31.16.33
Public DNS	ec2-54-67-104-170.us-west-1.compute.amazonaws.com
Public IP	54.67.104.170
Elastic IP	-
Availability zone	us-west-1c
Security groups	John-Doe-WebTier . view

Find the Session node (top one in the list) and enter `ec2-user@` followed by the DNS name of the running instance (you must initially login as “**ec2-user**” to Amazon Linux instances). Then click “Open” to connect. For example: `ec2-user@ec2-50-16-13-213.compute-1.amazonaws.com`

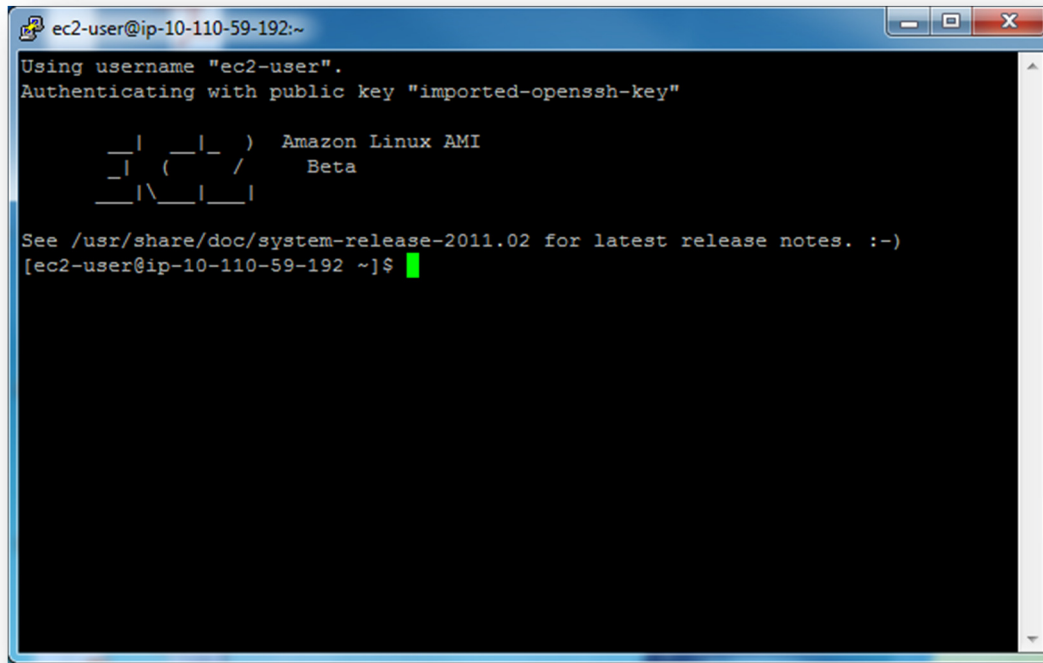


Click “Yes” to confirm that the fingerprint is OK.



Security Tip: The SSH fingerprint will eventually show up in the System Log and you can take that and compare it to protect against a Man in the middle attack.

You used the username “ec2-user”. The file Lab.ppk contains your password, so there is no need to enter one.



```
ec2-user@ip-10-110-59-192:~  
Using username "ec2-user".  
Authenticating with public key "imported-openssh-key"  
  
  _ | _ | _ ) Amazon Linux AMI  
  _ | ( _ /   Beta  
  _ | \ _ | _ |  
  
See /usr/share/doc/system-release-2011.02 for latest release notes. :~)  
[ec2-user@ip-10-110-59-192 ~]$
```

Mac OS X or Linux (OpenSSH)

By default, both Mac OS X and Linux operating systems ship with an SSH client that you can use to connect to your EC2 Linux instances. To use the SSH client with the key you created, a few steps are required.

1. Ideally, put the private key you downloaded while launching your EC2 instance (generic-qwiklab.pem) into the .ssh directory in your home directory. For example:

```
Prompt> mv qwiklab-l14-701.pem ~/.ssh
```

2. Make sure your private key is only readable and writable by you (this assumes your private key was copied into your .ssh directory as described above):

```
Prompt> chmod 600 ~/.ssh/qwiklab-l14-701.pem
```

3. Use your private key when connecting to the instance. The format of the ssh client is as follows: `ssh -i <private_key> <user name>@<host name>`

Therefore connecting to your Amazon Linux instance will require a command similar to the following:

```
Prompt> ssh -i qwiklab-l14-701.pem ec2-user@<EC2 Host  
Name or EIP>
```