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# labibi Documentation

*Release 1.0*

C. Titus Brown

Jun 05, 2017



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This is the documentation for a workshop on Amazon Web Services, offered at UC Davis (and broadcast online) on March 7, 2016. [The workshop page is here.](#)



## CHAPTER 1

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Start here: Start an Amazon Web Services computer:

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**[Click here to go to the workshop etherpad](#)**





## CHAPTER 2

Full table of contents:

### Start an Amazon Web Services computer:

This page shows you how to create a new “AWS instance”, or a running computer.

Start at the Amazon Web Services console (<http://aws.amazon.com/> and sign in to the console).

#### 0. Select “EC2 - virtual servers in the cloud”

Amazon Web Services

Compute

EC2

Virtual Servers in the Cloud

EC2 Container Service

Run and Manage Docker Containers

Elastic Beanstalk

Run and Manage Web Apps

Lambda

Run Code in Response to Events

Storage & Content Delivery

S3

Scalable Storage in the Cloud

CloudFront

Global Content Delivery Network

Elastic File System

Fully Managed File System for EC2

Glacier

Archive Storage in the Cloud

Import/Export Snowball

Large Scale Data Transport

Storage Gateway

Hybrid Storage Integration

Database

RDS

Managed Relational Database Service

DynamoDB

Managed NoSQL Database

ElastiCache

In-Memory Cache

Redshift

Fast, Simple, Cost-Effective Data Warehousing

Developer Tools

CodeCommit

Store Code in Private Git Repositories

CodeDeploy

Automate Code Deployments

CodePipeline

Release Software using Continuous Delivery

Management Tools

CloudWatch

Monitor Resources and Applications

CloudFormation

Create and Manage Resources with Templates

CloudTrail

Track User Activity and API Usage

Config

Track Resource Inventory and Changes

OpsWorks

Automate Operations with Chef

Service Catalog

Create and Use Standardized Products

Trusted Advisor

Optimize Performance and Security

Security & Identity

Identity & Access Management

Manage User Access and Encryption Keys

Directory Service

Host and Manage Active Directory

Inspector

Analyze Application Security

WAF

Filter Malicious Web Traffic

Internet of Things

AWS IoT

Connect Devices to the Cloud

Game Development

Gamelift

Deploy and Scale Session-based Multiplayer Games

Mobile Services

Mobile Hub

Build, Test, and Monitor Mobile Apps

Cognito

User Identity and App Data Synchronization

Device Farm

Test Android, FireOS, and iOS Apps on Real Devices in the Cloud

Mobile Analytics

Collect, View and Export App Analytics

SNS

Push Notification Service

Application Services

API Gateway

Build, Deploy and Manage APIs

AppStream

Low Latency Application Streaming

CloudSearch

Managed Search Service

Elastic Transcoder

Easy-to-Use Scalable Media Transcoding

SES

Email Sending and Receiving Service

SQS

Resource Groups

Learn more

A resource group is a collection of resources that share one or more tags. Create a group for each project, application, or environment in your account.

Create a Group

Tag Editor

Additional Resources

Getting Started

Read our documentation or view our training to learn more about AWS.

AWS Console Mobile App

View your resources on the go with our AWS Console mobile app, available from Amazon Appstore, Google Play, or iTunes.

AWS Marketplace

Find and buy software, launch with 1-Click and pay by the hour.

AWS re:Invent Announcements

Explore the next generation of AWS cloud capabilities. See what's new

Service Health

All services operating normally.

## 1. Switch to zone US West (N California)

The screenshot shows the AWS Management Console interface. At the top, the 'N. California' region is selected. The left sidebar contains navigation links for EC2 Dashboard, INSTANCES, IMAGES, ELASTIC BLOCK STORE, and NETWORK & SECURITY. The main content area is titled 'Resources' and lists various EC2 resources: 0 Running Instances, 0 Elastic IPs, 0 Dedicated Hosts, 0 Snapshots, 0 Volumes, 0 Load Balancers, 0 Key Pairs, 1 Security Groups, and 0 Placement Groups. A 'Launch Instance' button is highlighted with a red box. Below it, a 'Create Instance' section provides instructions on how to launch an Amazon EC2 instance. The 'Service Health' section shows that the US West (N. California) service is operating normally. The 'Account Attributes' sidebar on the right lists supported platforms, resource ID length management, and additional information links.

## 2. Click on “Launch instance.”

## 3. Select “Community AMIs.”

The screenshot shows the 'Step 1: Choose an Amazon Machine Image (AMI)' page in the AWS Management Console. The 'Community AMIs' tab is selected in the left sidebar. The main content area displays a list of AMIs. The first AMI, 'Amazon Linux AMI 2015.09.2 (HVM), SSD Volume Type - ami-d1f482b1', is highlighted. It is a 64-bit AMI with an EBS root device and HVM virtualization type. The 'Select' button next to it is highlighted. The 'Free tier eligible' badge is also visible. The 'Red Hat Enterprise Linux 7.2 (HVM), SSD Volume Type' and 'SUSE Linux Enterprise Server 12 SP 1 (HVM), SSD Volume Type' AMIs are also listed below it.

## 4. Search for ami-05384865 (ubuntu-wily-15.10-amd64-server)

Use ami-05384865.

The screenshot shows the AWS Management Console interface for Step 1: Choose an Amazon Machine Image (AMI). The top navigation bar includes the AWS logo, 'Services', 'Edit', and user information (Titus Brown, N. California, Support). The progress bar shows steps 1 through 7, with step 1 highlighted. The main heading is 'Step 1: Choose an Amazon Machine Image (AMI)' with a 'Cancel and Exit' link. Below the heading is a description of an AMI. The search bar contains 'ami-05384865'. The results show 'ubuntu/images/hvm/ubuntu-wily-15.10-amd64-server-20160222 - ami-05384865' with a 'Select' button highlighted. The left sidebar shows 'Community AMIs' and 'Operating system' filters. The bottom footer includes 'Feedback', 'English', and copyright information.

## 5. Click on “Select.”

## 6. Choose m4.large.

The screenshot shows the AWS Management Console interface for Step 2: Choose an Instance Type. The top navigation bar and progress bar are the same as in the previous screenshot. The main heading is 'Step 2: Choose an Instance Type'. Below the heading is a table of instance types. The 'm4.large' instance type is selected, and the 'Review and Launch' button is highlighted. The bottom footer is the same as in the previous screenshot.

	Family	Type	vCPUs	Memory (GiB)	Instance Storage (GB)	EBS-Optimized Available	Network Performance
<input type="checkbox"/>	General purpose	t2.nano	1	0.5	EBS only	-	Low to Moderate
<input type="checkbox"/>	General purpose	t2.micro Free tier eligible	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	t2.large	2	8	EBS only	-	Low to Moderate
<input checked="" type="checkbox"/>	General purpose	m4.large	2	8	EBS only	Yes	Moderate
<input type="checkbox"/>	General purpose	m4.xlarge	4	16	EBS only	Yes	High
<input type="checkbox"/>	General purpose	m4.2xlarge	8	32	EBS only	Yes	High
<input type="checkbox"/>	General purpose	m4.4xlarge	16	64	EBS only	Yes	High

## 7. Click “Review and Launch.”

## 8. Click “Launch.”

**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, launch-wizard-1, 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](#)

**Your instance configuration is not eligible for the free usage tier**  
 To launch an instance that's eligible for the free usage tier, check your AMI selection, instance type, configuration options, or storage devices. Learn more about [free usage tier](#) eligibility and usage restrictions. [Don't show me this again](#)

**AMI Details** [Edit AMI](#)

ubuntu/images/hvm/ubuntu-wily-15.10-amd64-server-20160222 - ami-05384865  
 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

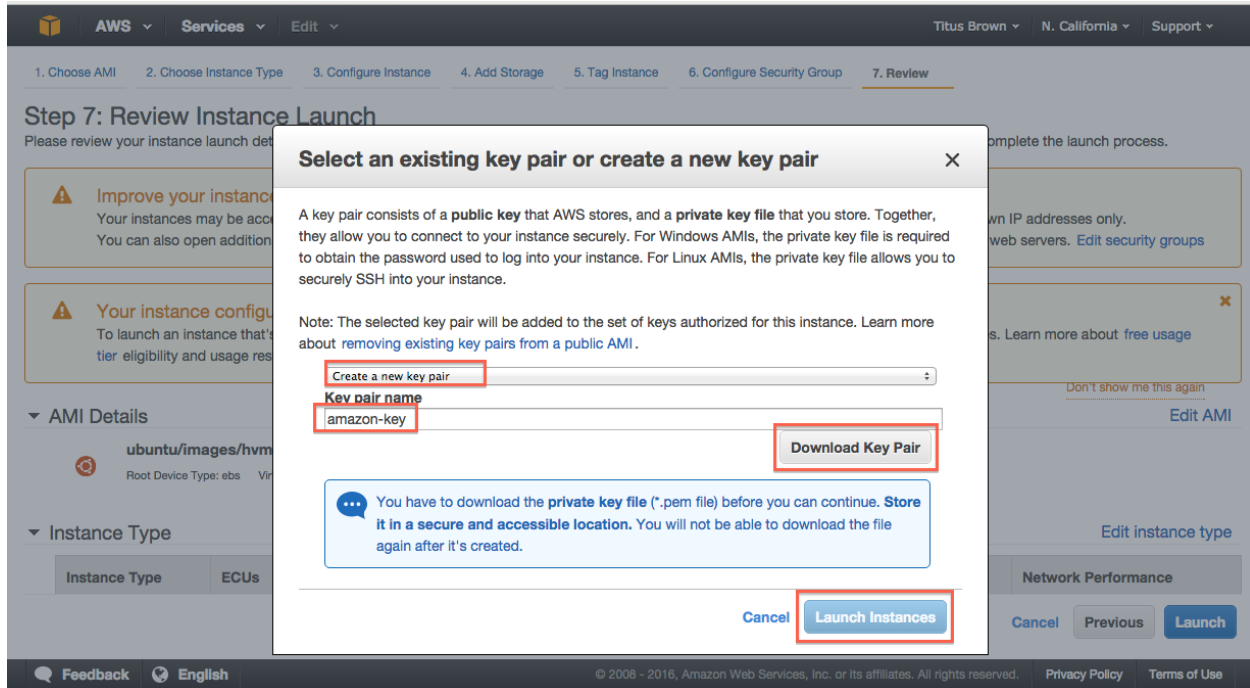
[Cancel](#) [Previous](#) [Launch](#)

[Feedback](#) [English](#) © 2008 - 2016, Amazon Web Services, Inc. or its affiliates. All rights reserved. [Privacy Policy](#) [Terms of Use](#)

## 9. Select “Create a new key pair.”

Note: you only need to do this the first time you create an instance. If you know where your amazon-key.pem file is, you can select ‘Use an existing key pair’ here. But you can always create a new key pair if you want, too.

If you have an existing key pair, go to step 12, “Launch instance.”

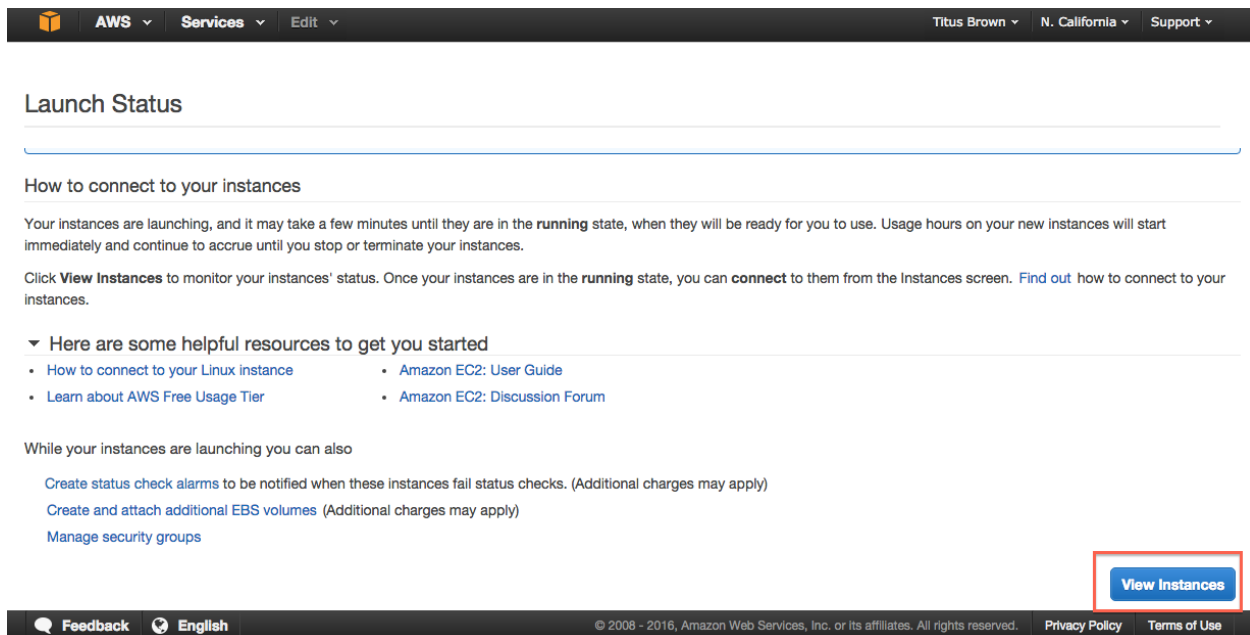


10. Enter name 'amazon-key'.

11. Click "Download key pair."

12. Click "Launch instance."

13. Select View instances (lower right)



## 14. Bask in the glory of your running instance

Note that for your instance name you can use either “Public IP” or “Public DNS”. Here, the machine only has a public IP.

The screenshot shows the AWS Management Console interface. On the left is a navigation menu with categories like INSTANCES, IMAGES, ELASTIC BLOCK STORE, and NETWORK & SECURITY. The main panel displays a list of EC2 instances. One instance, 'i-0b8237c8', is highlighted with a red box. Below the list, the details for this instance are shown, including its state (running), type (m4.large), and availability zone (us-west-1b). A red box highlights the 'Public IP: 54.183.148.114' in the instance details section.

Name	Instance ID	Instance Type	Availability Zone	Instance State	Status Checks	Alarm Status	Public DN
	i-0b8237c8	m4.large	us-west-1b	running	Initializing	None	

Instance: i-0b8237c8		Public IP: 54.183.148.114
<b>Description</b>	Instance ID: i-0b8237c8	Public DNS: -
Instance state: running	Instance type: m4.large	Public IP: 54.183.148.114
Private DNS: ip-172-30-1-108.us-west-1.compute.internal	Availability zone: us-west-1b	Elastic IP: -
Private IPs: 172.30.1.108	Security groups: launch-wizard-1. view rules	Scheduled events: No scheduled events
Secondary private IPs: -	AMI ID: ubuntu-wily-15.10-amd64-server-	
VPC ID: vpc-287f154d		

You can now *Log into your instance with the UNIX shell* or *Configure your instance firewall*.

## Log into your instance with the UNIX shell

You will need the `amazon-key.pem` file that was downloaded in step 11 of booting up your new instance (see *Start an Amazon Web Services computer*:).

Then, you can either *Log into your instance from a Mac or Linux machine* or *Log into your instance from a Windows machine*.

### Log into your instance via the UNIX shell (Mac/Linux)

See: *Log into your instance from a Mac or Linux machine*

### Log into your instance via MobaXTerm (Windows)

See: *Log into your instance from a Windows machine*

Logging in is the starting point for most of the follow-on tutorials. For example, you can now install and run software on your EC2 instance.

Go back to the top page to continue: *2016 February AWS tutorial main page*

## Log into your instance from a Mac or Linux machine

You'll need to do two things: first, set the permissions on `amazon-key.pem`:

```
chmod og-rwx ~/Downloads/amazon-key.pem
```

Then, ssh into your new machine using your key:

```
ssh -i ~/Downloads/amazon-key.pem -l ubuntu MACHINE_NAME
```

where you should replace `MACHINE_NAME` with the public IP or hostname of your EC2 instance, which is located at the top of the host information box (see screenshot below). It should be something like `54.183.148.114` or `ec2-XXX-YYY.amazonaws.com`.

Here are some screenshots!

### Change permissions and execute ssh

```
% chmod og-rwx ~/Downloads/amazon-key.pem
% ssh -i ~/Downloads/amazon-key.pem ubuntu@54.183.148.114
The authenticity of host '54.183.148.114 (54.183.148.114)' can't be established.
RSA key fingerprint is b6:de:2f:fb:e7:12:e5:1e:5d:66:37:ef:40:bb:b7:c8.
Are you sure you want to continue connecting (yes/no)? yes
Warning: Permanently added '54.183.148.114' (RSA) to the list of known hosts.
█
```

### Successful login

```
Are you sure you want to continue connecting (yes/no)? yes
Warning: Permanently added '54.183.148.114' (RSA) to the list of known hosts.
Welcome to Ubuntu 15.10 (GNU/Linux 4.2.0-30-generic x86_64)

 * Documentation:  https://help.ubuntu.com/

Get cloud support with Ubuntu Advantage Cloud Guest:
  http://www.ubuntu.com/business/services/cloud

0 packages can be updated.
0 updates are security updates.

The programs included with the Ubuntu system are free software;
the exact distribution terms for each program are described in the
individual files in /usr/share/doc/*/copyright.

Ubuntu comes with ABSOLUTELY NO WARRANTY, to the extent permitted by
applicable law.

To run a command as administrator (user "root"), use "sudo <command>".
See "man sudo_root" for details.

ubuntu@ip-172-30-1-108:~$ █
```

## Host information box - MACHINE\_NAME location

The screenshot shows the AWS Management Console interface. On the left, there is a navigation menu with categories like INSTANCES, IMAGES, ELASTIC BLOCK STORE, and NETWORK & SECURITY. The main area displays a list of EC2 instances. One instance, named 'i-0b8237c8', is highlighted with a red box. Below this, the details for this instance are shown, including its state (running), type (m4.large), and various DNS and IP addresses. The 'Public IP' is specifically highlighted with a red box and shows the value '54.183.148.114'.

Name	Instance ID	Instance Type	Availability Zone	Instance State	Status Checks	Alarm Status	Public DN
	i-0b8237c8	m4.large	us-west-1b	running	Initializing	None	

Instance: i-0b8237c8		Public IP: 54.183.148.114
<b>Description</b>	<b>Status Checks</b>	<b>Monitoring</b>
Instance ID	i-0b8237c8	Public DNS
Instance state	running	Public IP
Instance type	m4.large	Elastic IP
Private DNS	ip-172-30-1-108.us-west-1.compute.internal	Availability zone
Private IPs	172.30.1.108	Security groups
Secondary private IPs		Scheduled events
VPC ID	vpc-287f154d	AMI ID

Logging in is the starting point for most of the follow-on tutorials. For example, you can now install and run software on your EC2 instance.

Go back to the top page to continue: [2016 February AWS tutorial main page](#)

## Log into your instance from a Windows machine

Go follow the instructions this URL:

<https://angus.readthedocs.org/en/2015/amazon/log-in-with-mobaxterm-win.html>

Logging in is the starting point for most of the follow-on tutorials. For example, you can now install and run software on your EC2 instance.

Go back to the top page to continue: [2016 February AWS tutorial main page](#)

## Configure your instance firewall

Normally, Amazon computers only allow shell logins via ssh (port 22 access). If we want to run a Web service or something else, we need to give the outside world access to other network locations on the computer.

Below, we will open ports 8000-9000, which will let us run things like RStudio Server. If you want to run other things, like a Web server, you'll need to find the port(s) associated with those services and open those instead of 8000-9000. (Tip: Web servers run on port 80.)



## 1. Select ‘Security Groups’

Find “Security Groups” in the lower pane of your instance’s information page, and click on “launch-wizard-N”.

The screenshot shows the AWS Management Console interface. On the left, the navigation pane is visible with categories like INSTANCES, IMAGES, ELASTIC BLOCK STORE, and NETWORK & SECURITY. The 'Security Groups' link under NETWORK & SECURITY is highlighted. The main content area shows the details for an EC2 instance named 'i-0b8237c8'. The 'Security groups' field is highlighted with a red box, displaying 'launch-wizard-1' and a 'view rules' link. Other instance details like Public IP, Private DNS, and VPC ID are also visible.

## 2. Select ‘Inbound’

The screenshot shows the AWS Management Console interface for a Security Group. The left navigation pane shows 'Security Groups' under the 'NETWORK & SECURITY' category. The main content area displays the details for a Security Group named 'sg-1e6d817a'. The 'Inbound' tab is highlighted with a red box. The 'Group name' is 'launch-wizard-1' and the 'Group ID' is 'sg-1e6d817a'. The 'VPC ID' is 'vpc-287f154d'. The 'Group description' is 'launch-wizard-1 created 2016-03-06T15:03:06T15:20:28.001-08:00'.

### 3. Select 'Edit'

The screenshot shows the AWS Management Console interface. On the left sidebar, under 'NETWORK & SECURITY', the 'Security Groups' link is highlighted. The main content area shows the 'Create Security Group' page for a security group named 'sg-1e6d817a'. Below the 'Inbound' tab, there is a table of rules. The first rule is for SSH (Type), TCP (Protocol), Port Range 22, and Source 0.0.0.0/0. Below this table, there is an 'Edit' button, which is highlighted with a red box.

### 4. Select 'Add Rule'

The screenshot shows the 'Edit inbound rules' dialog box. It contains a table with two rows of rules. The first row is for SSH (Type), TCP (Protocol), Port Range 22, and Source 0.0.0.0/0. The second row is for 'Custom TCP Rule' (Type), TCP (Protocol), Port Range 8000-9000, and Source 0.0.0.0/0. The 'Add Rule' button is highlighted with a red box. The 'Cancel' and 'Save' buttons are also visible at the bottom right.

### 5. Enter rule information

Add a new rule: Custom TCP, 8000-9000, Source Anywhere.

## 6. Select 'Save'.

## 7. Return to the Instances page.

The screenshot shows the AWS Management Console interface for creating a security group. The left sidebar contains a navigation menu with categories like INSTANCES, IMAGES, ELASTIC BLOCK STORE, and NETWORK & SECURITY. The 'Instances' link is highlighted. The main content area shows the 'Create Security Group' wizard for the security group 'sg-1e6d817a'. The 'Inbound' tab is active, displaying a table of inbound rules.

Type	Protocol	Port Range	Source
SSH	TCP	22	0.0.0.0/0
Custom TCP Rule	TCP	8000 - 9000	0.0.0.0/0

You're done!

Go back to the index: [2016 February AWS tutorial main page](#)

## Running RStudio Server in the cloud

In this section, we will run RStudio Server on a remote Amazon machine. This will require starting up an instance, configuring its network firewall, and installing and running some software.

Reference documentation for running RStudio Server on Ubuntu:

<https://www.rstudio.com/products/rstudio/download-server/>

### 1. Start up an Amazon instance

Start an ami-05384865 on an m4.xlarge machine, as per the instructions here:

*Start an Amazon Web Services computer:.*

### 2. Configure your network firewall

Normally, Amazon computers only allow shell logins via ssh. Since we want to run a Web service, we need to give the outside world access to other network locations on the computer.

Follow these instructions:

## 2.6. Running RStudio Server in the cloud

*Configure your instance firewall*

(You can do this while the computer is booting.)

### 3. Log in via the shell

Follow these instructions to log in via the shell:

*Log into your instance with the UNIX shell.*

### 4. Set a password for the ‘ubuntu’ account

Amazon Web Services computers normally require a key (the .pem file) instead of a login password, but RStudio Server will need us to log in with a password. So we need to configure a password for the account we’re going to use (which is ‘ubuntu’)

Create a password like so:

```
sudo passwd ubuntu
```

and set it to something you’ll remember.

### 5. Install R and the gdebi tool

Update the software catalog and install a few things:

```
sudo apt-get update && sudo apt-get -y install gdebi-core r-base
```

This will take a few minutes.

### 6. Download & install RStudio Server

```
wget https://download2.rstudio.org/rstudio-server-0.99.891-amd64.deb
sudo gdebi -n rstudio-server-0.99.891-amd64.deb
```

Upon success, you should see:

```
Mar 07 15:20:18 ip-172-31-6-68 systemd[1]: Starting RStudio Server...
Mar 07 15:20:18 ip-172-31-6-68 systemd[1]: Started RStudio Server.
```

### 7. Open your RStudio Server instance

Finally, go to ‘<http://>’ + your hostname + ‘:8787’ in a browser, eg.

```
http://ec2-XX-YY-33-165.us-west-1.compute.amazonaws.com:8787/
```

and log into RStudio with username ‘ubuntu’ and the password you set it to above.

Voila!

---

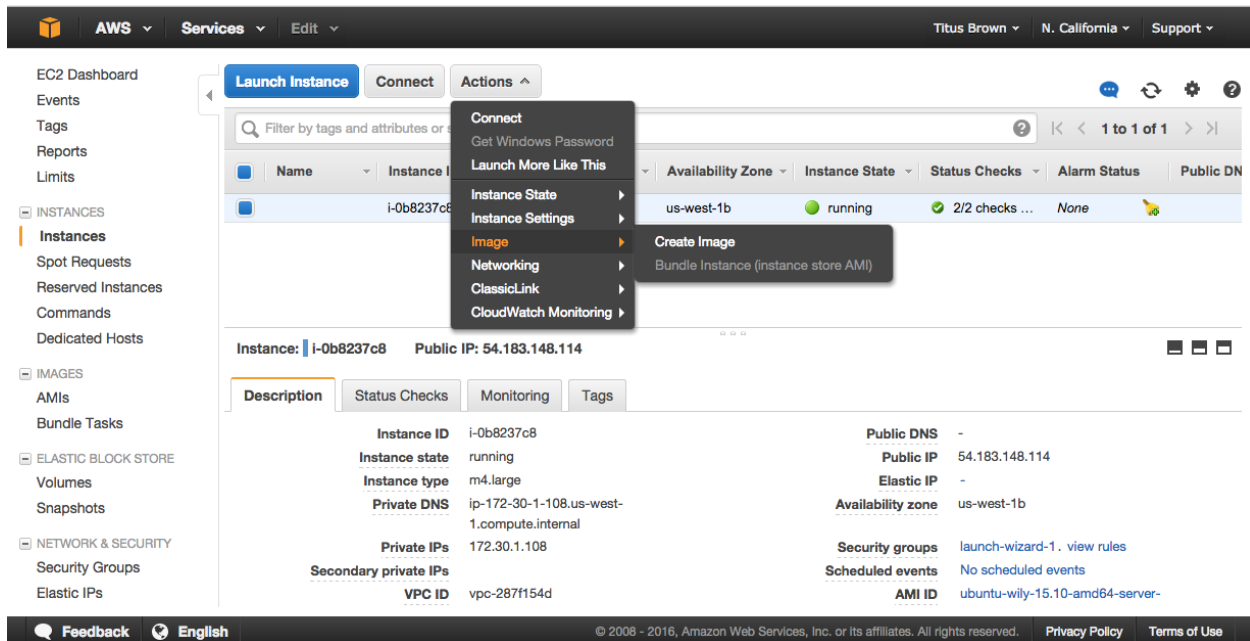
You can now just go ahead and use this, or you can “stop” it, or you can freeze into an AMI for later use.

Note that on reboot, RStudio Server will start up again and all your files will be there.

Go back to the index: [2016 February AWS tutorial main page](#).

## Creating your own Amazon Machine Image

### 1. Actions, Create image



The screenshot shows the AWS Management Console interface. On the left, the navigation menu includes EC2 Dashboard, Events, Tags, Reports, Limits, INSTANCES, IMAGES, ELASTIC BLOCK STORE, and NETWORK & SECURITY. The main content area displays a table of EC2 instances. The instance 'i-0b8237c8' is selected, and the 'Actions' menu is open, showing options like Connect, Launch More Like This, Instance State, Instance Settings, Image (highlighted), Networking, ClassicLink, and CloudWatch Monitoring. The 'Create Image' option is further expanded, showing 'Bundle Instance (instance store AMI)'. Below the table, the details for instance 'i-0b8237c8' are shown, including its public IP (54.183.148.114) and various configuration details.

Name	Instance ID	Availability Zone	Instance State	Status Checks	Alarm Status	Public DNS
	i-0b8237c8	us-west-1b	running	2/2 checks ...	None	

Instance: i-0b8237c8 Public IP: 54.183.148.114

Description		Status Checks		Monitoring		Tags	
Instance ID	i-0b8237c8	Public DNS	-				
Instance state	running	Public IP	54.183.148.114				
Instance type	m4.large	Elastic IP	-				
Private DNS	ip-172-30-1-108.us-west-1.compute.internal	Availability zone	us-west-1b				
Private IPs	172.30.1.108	Security groups	launch-wizard-1 . view rules				
Secondary private IPs		Scheduled events	No scheduled events				
VPC ID	vpc-287f154d	AMI ID	ubuntu-wily-15.10-amd64-server-				

## 2. Fill out name and description

Create Image

Instance ID

i-0b8237c8

Image name

titus-blast-install

Image description

for demonstration purposes

No reboot

☐

Instance Volumes

Volume Type	Device	Snapshot	Size (GiB)	Volume Type	IOPS	Delete on Termination	Encrypted
Root	/dev/sda1	snap-f7961dcf	8	General Purpose SSD (GP2)	24 / 3000	<input checked="" type="checkbox"/>	Not Encrypted

Add New Volume

Total size of EBS Volumes: 8 GiB  
When you create an EBS image, an EBS snapshot will also be created for each of the above volumes.

Cancel

Create Image

## 3. Wait for it to become available

AWS

Services

Edit

Titus Brown

N. California

Support

EC2 Dashboard

Events

Tags

Reports

Limits

INSTANCES

Instances

Spot Requests

Reserved Instances

Commands

Dedicated Hosts

IMAGES

AMIs

Bundle Tasks

ELASTIC BLOCK STORE

Volumes

Snapshots

NETWORK & SECURITY

Security Groups

Elastic IPs

Launch

Actions

Owned by me

Filter by tags and attributes or search by keyword

Name	AMI Name	AMI ID	Source	Owner	Visibility	Status	Creation Date
	titus-blast-install	ami-240f7c44	817232153141/ti...	817232153141	Private	pending	March 6, 2016 at 4:42

Image: ami-240f7c44

Details

Permissions

Tags

AMI ID

ami-240f7c44

AMI Name

titus-blast-install

Edit

Feedback

English

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Go back to the index: [2016 February AWS tutorial main page](#)

## Working with persistent storage: volumes and snapshots

Volumes are basically UNIX disks (“block devices”) that will persist after you terminate your instance. They are tied to a zone within a region and can only be mounted on instances within that zone.

Snapshots are an Amazon-specific thing that let you communicate data on volumes between accounts. They are “read-only” backups that are created from volumes; they can be used to create new volumes in turn, and can also be shared with specific people (or made public). Snapshots are tied to a region but not a zone.

## Creating persistent volumes to store data

### 0. Locate your instance zone

The screenshot shows the AWS Management Console interface for an EC2 instance. The left sidebar contains navigation links for EC2 Dashboard, Events, Tags, Reports, Limits, INSTANCES, IMAGES, ELASTIC BLOCK STORE, and NETWORK & SECURITY. The main content area displays the instance details for i-27d61392. The instance is in the 'running' state, located in the 'us-west-1c' availability zone. The 'Availability zone' is highlighted with a red box. The instance has a public IP of 54.215.186.13 and a public DNS of ec2-54-215-186-13.us-west-1.compute.amazonaws.com. The instance type is m4.large and the VPC ID is vpc-4b6ea223.

Name	Instance ID	Instance Type	Availability Zone	Instance State	Status Checks	Alarm Status	Public DNS	Public IP
	i-27d61392	m4.large	us-west-1c	running	2/2 checks ...	None	ec2-54-215-186-13.us-...	54.215.186.13

Instance: i-27d61392		Public DNS: ec2-54-215-186-13.us-west-1.compute.amazonaws.com	
<div> <div>Description</div> <div>Status Checks</div> <div>Monitoring</div> <div>Tags</div> </div>			
Instance ID	i-27d61392	Public DNS	ec2-54-215-186-13.us-west-1.compute.amazonaws.com
Instance state	running	Public IP	54.215.186.13
Instance type	m4.large	Elastic IP	-
Private DNS	ip-172-31-6-68.us-west-1.compute.internal	Availability zone	us-west-1c
Private IPs	172.31.6.68	Security groups	launch-wizard-4, view rules
Secondary private IPs		Scheduled events	No scheduled events
VPC ID	vpc-4b6ea223	AMI ID	ubuntu-wily-15.10-amd64-server-20160222

## 1. Click on the volumes tab

The screenshot shows the AWS Management Console interface. In the left sidebar, under 'ELASTIC BLOCK STORE', the 'Volumes' tab is highlighted with a red box. The main content area displays details for the EC2 instance 'i-0b8237c8'. The instance is in a 'running' state. Below the instance summary, the 'Description' tab is selected, showing various attributes of the instance.

Name	Instance ID	Instance Type	Availability Zone	Instance State	Status Checks	Alarm Status	Public DN
	i-0b8237c8	m4.large	us-west-1b	running	2/2 checks ...	None	

Instance: **i-0b8237c8** Public IP: 54.183.148.114

Attribute	Value
Instance ID	i-0b8237c8
Instance state	running
Instance type	m4.large
Private DNS	ip-172-30-1-108.us-west-1.compute.internal
Private IPs	172.30.1.108
Secondary private IPs	
VPC ID	vpc-287f154d
Public DNS	-
Public IP	54.183.148.114
Elastic IP	-
Availability zone	us-west-1b
Security groups	launch-wizard-1. <a href="#">view rules</a>
Scheduled events	No scheduled events
AMI ID	ubuntu-wily-15.10-amd64-server-

## 2. 'Create Volume'

The screenshot shows the AWS Management Console interface. In the left sidebar, under 'ELASTIC BLOCK STORE', the 'Create Volume' button is highlighted with a red box. The main content area displays a table of existing volumes. The volume 'vol-2075f29d' is highlighted.

Name	Volume ID	Size	Volume Type	IOPS	Snapshot	Created	Availability Zone	State	Alarm
	vol-2075f29d	8 GiB	gp2	24 / 3000	snap-f7961dcf	March 7, 2016 at 7:03:33 AM UTC-8	us-west-1c	in-use	None

Volumes: **vol-2075f29d**

Attribute	Value
Volume ID	vol-2075f29d
Size	8 GiB
Created	March 7, 2016 at 7:03:33 AM UTC-8
Alarm status	None
Snapshot	snap-f7961dcf
Availability Zone	us-west-1c



### 3. Configure your volume to have the same zone as your instance

## Create Volume

**Volume Type** ⓘ
 

General Purpose SSD (GP2)

**Size (GiB)** ⓘ
 

100

 (Min: 1 GiB, Max: 16384 GiB)

**IOPS** ⓘ
 

300 / 3000

 (Baseline of 3 IOPS per GiB)

**Availability Zone** ⓘ
 

us-west-1c

**Snapshot ID** ⓘ
 

Search (case-insensitive)

**Encryption** ⓘ
 

☐ Encrypt this volume

Cancel

Create

### 4. Wait for your volume to be available

AWS

Services

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Titus Brown

N. California

Support

EC2 Dashboard

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Limits

INSTANCES

Instances

Spot Requests

Reserved Instances

Commands

Dedicated Hosts

IMAGES

AMIs

Bundle Tasks

ELASTIC BLOCK STORE

Volumes

Snapshots

NETWORK & SECURITY

Security Groups

Elastic IPs

Create Volume

Actions

Filter by tags and attributes or search by keyword

1 to 2 of 2

	Name	Volume ID	Size	Volume Type	IOPS	Snapshot	Created	Availability Zone	Status
<input type="checkbox"/>		vol-21e1a98e	100 GiB	gp2	300 / 3000		March 6, 2016 at 4:...	us-west-1b	<span></span>
<input checked="" type="checkbox"/>		vol-89dd9526	8 GiB	gp2	24 / 3000	snap-f7961dcf	March 6, 2016 at 3:...	us-west-1b	<span></span>

Volumes: vol-89dd9526

Description

Status Checks

Monitoring

Tags

Volume ID

Size

Created

vol-89dd9526

8 GiB

March 6, 2016 at 3:21:16 PM

Alarm status

Snapshot

Availability Zone

None

snap-f7961dcf

us-west-1b

Feedback

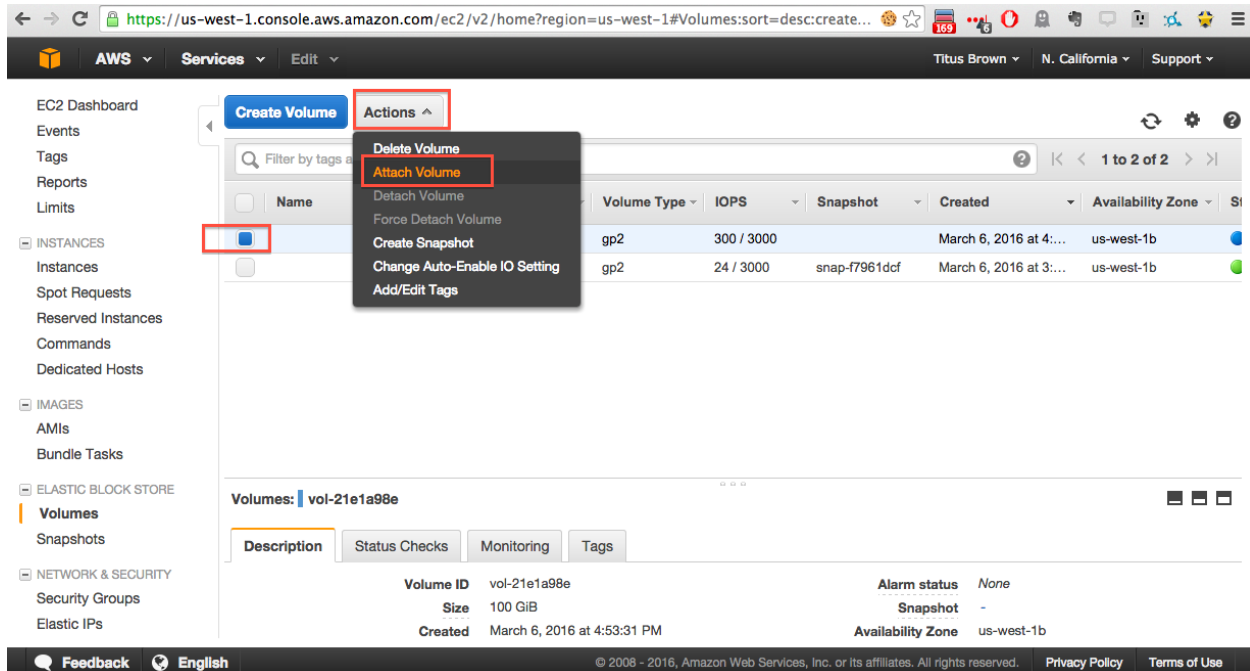
English

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Privacy Policy

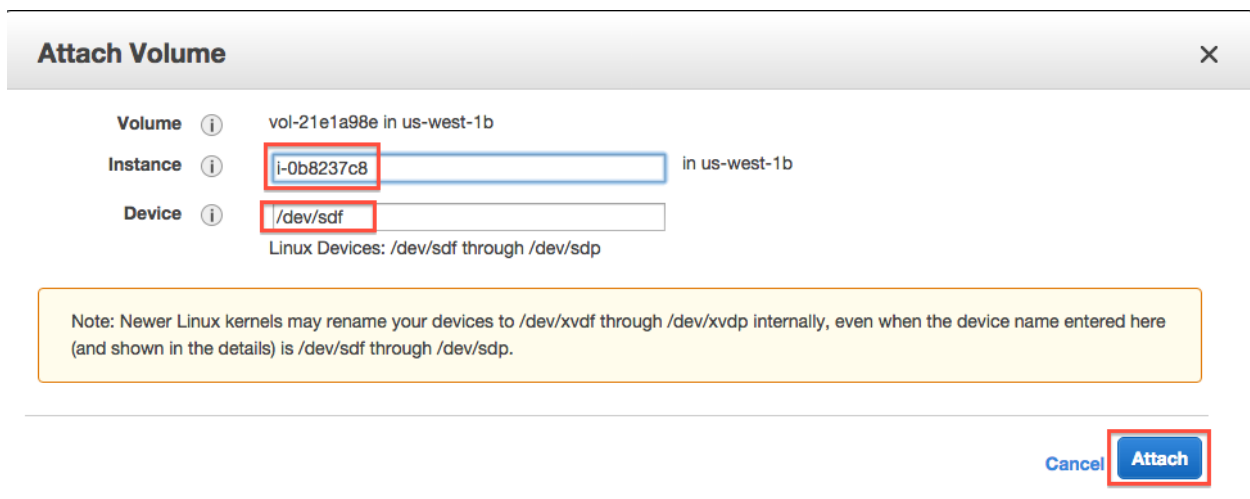
Terms of Use

## 5. Select volume, Actions, Attach volume



## 6. Select instance, attachment point, and Attach

Here, your attachment point will be `/dev/sdf` and your block device will be named `/dev/xvdf`.



## 7. On your instance, list block devices

Type:

```
lsblk
```

You should see something like this:

NAME	MAJ:MIN	RM	SIZE	RO	TYPE	MOUNTPOINT
xvda	202:0	0	8G	0	disk	
└─xvda1	202:1	0	8G	0	part	/
xvdf	202:80	0	100G	0	disk	

Now format the disk (ONLY ON EMPTY DISKS - THIS WILL ERASE ANY DATA ON THE DISK):

```
sudo mkfs -t ext4 /dev/xvdf
```

and mount the disk:

```
sudo mkdir /disk
sudo mount /dev/xvdf /disk
sudo chmod a+rwxt /disk
```

and voila, anything you put on /disk will be on the volume that you allocated!

The command 'df -h' will show you what disks are actually mounted & where.

## Detaching volumes

### 1. Unmount it from the instance

Change out of the directory, stop any running programs using it, and then:

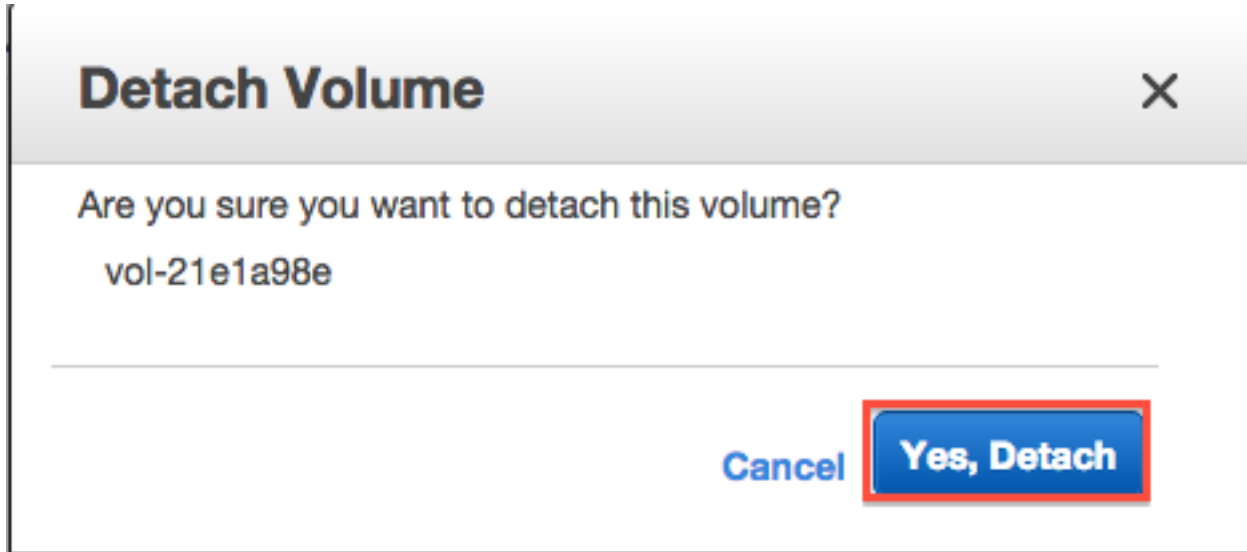
```
sudo umount /disk
```

### 2. Detach

On the 'volumes' tab in your EC2 console, go to Actions, Detach.

The screenshot shows the AWS Management Console interface. On the left, the navigation pane is visible with categories like INSTANCES, IMAGES, ELASTIC BLOCK STORE, and NETWORK & SECURITY. The 'Volumes' tab is selected under ELASTIC BLOCK STORE. The main content area shows a table of volumes. The 'Actions' dropdown menu is open for the selected volume, and 'Detach Volume' is highlighted. Below the table, the details for the selected volume 'vol-21e1a98e' are displayed, including its ID, size (100 GiB), creation time (March 6, 2016 at 4:53:31 PM), and availability zone (us-west-1b).

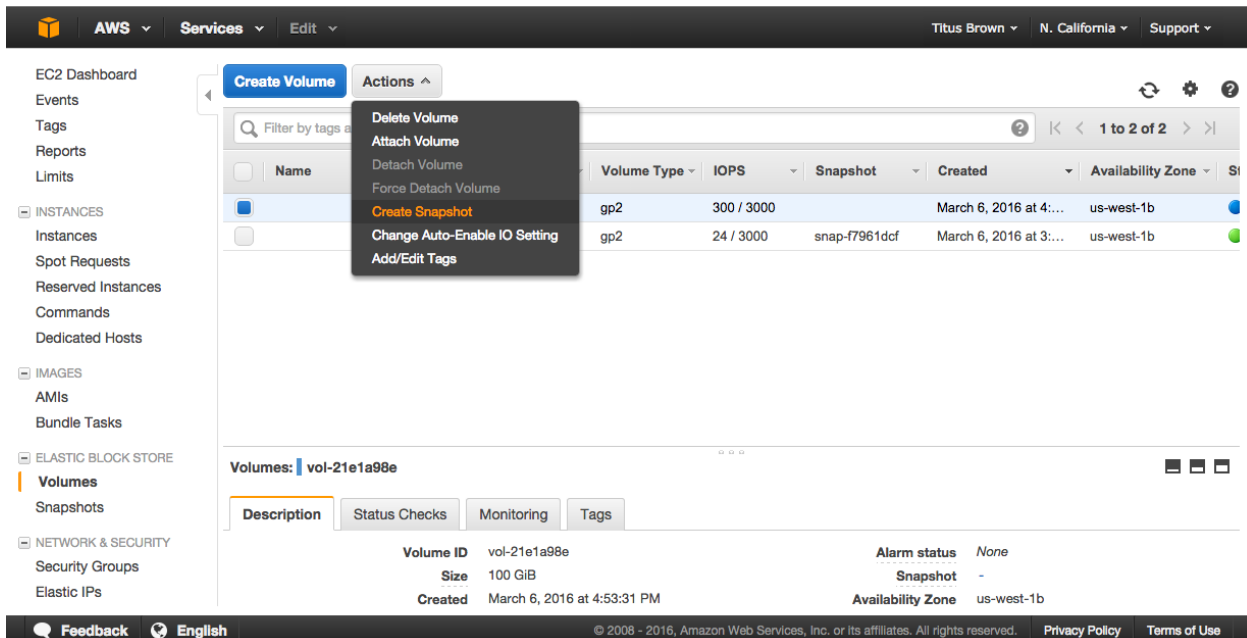
### 3. Yes, detach.



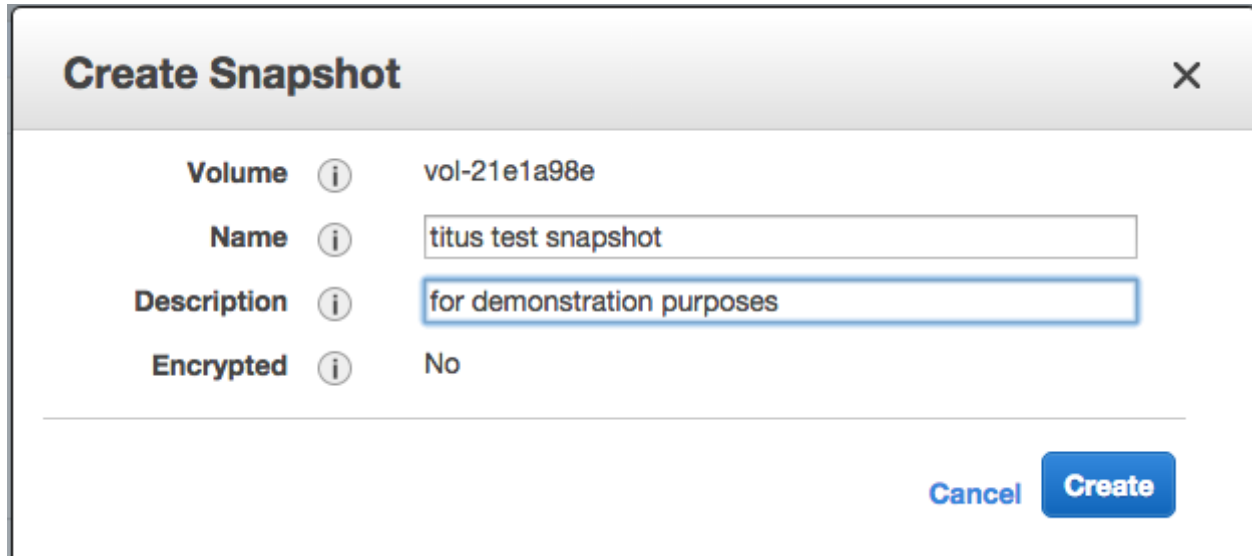
Note, volumes remain attached when you reboot or stop an instance, but are (of course) detached when you terminate an instance.

## Creating snapshots of volumes

### 1. Actions, Create snapshot



## 2. Fill out name and description

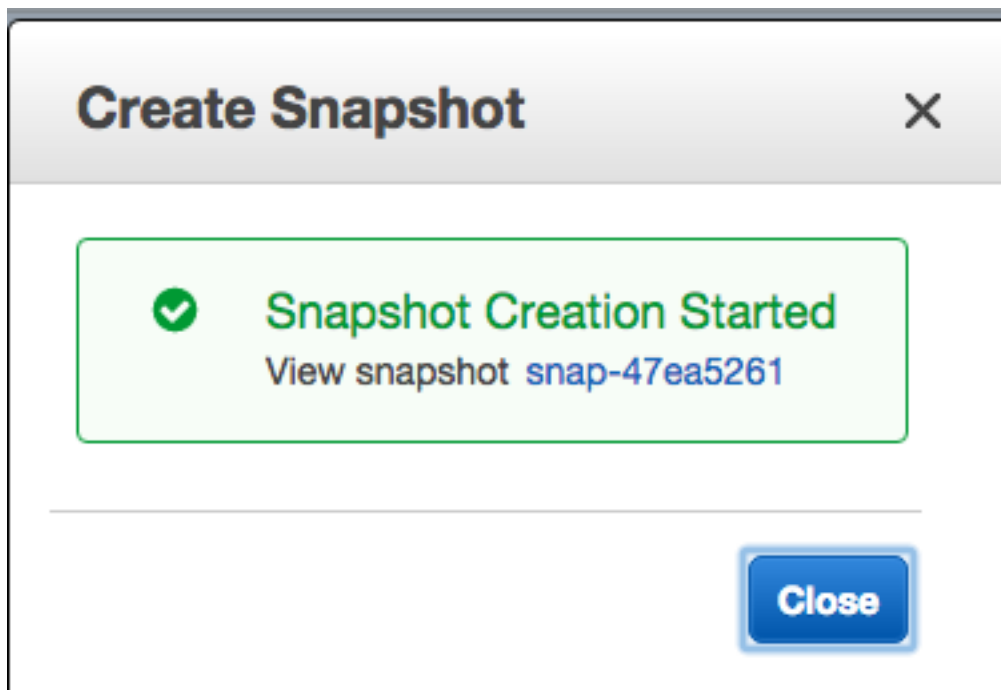


The 'Create Snapshot' dialog box is shown. It has a title bar with 'Create Snapshot' and a close button (X). The dialog contains four fields: 'Volume' with value 'vol-21e1a98e', 'Name' with value 'titus test snapshot', 'Description' with value 'for demonstration purposes', and 'Encrypted' with value 'No'. Each field has an information icon (i) to its right. At the bottom right, there are 'Cancel' and 'Create' buttons.

Volume	i	vol-21e1a98e
Name	i	titus test snapshot
Description	i	for demonstration purposes
Encrypted	i	No

Cancel Create

## 3. Click 'Close' & wait.



The 'Create Snapshot' dialog box is shown in a success state. It has a title bar with 'Create Snapshot' and a close button (X). The main content area has a green border and contains a green checkmark icon, the text 'Snapshot Creation Started', and a link 'View snapshot snap-47ea5261'. At the bottom right, there is a 'Close' button.

✓ Snapshot Creation Started  
View snapshot [snap-47ea5261](#)

Close

## Terminating your instance

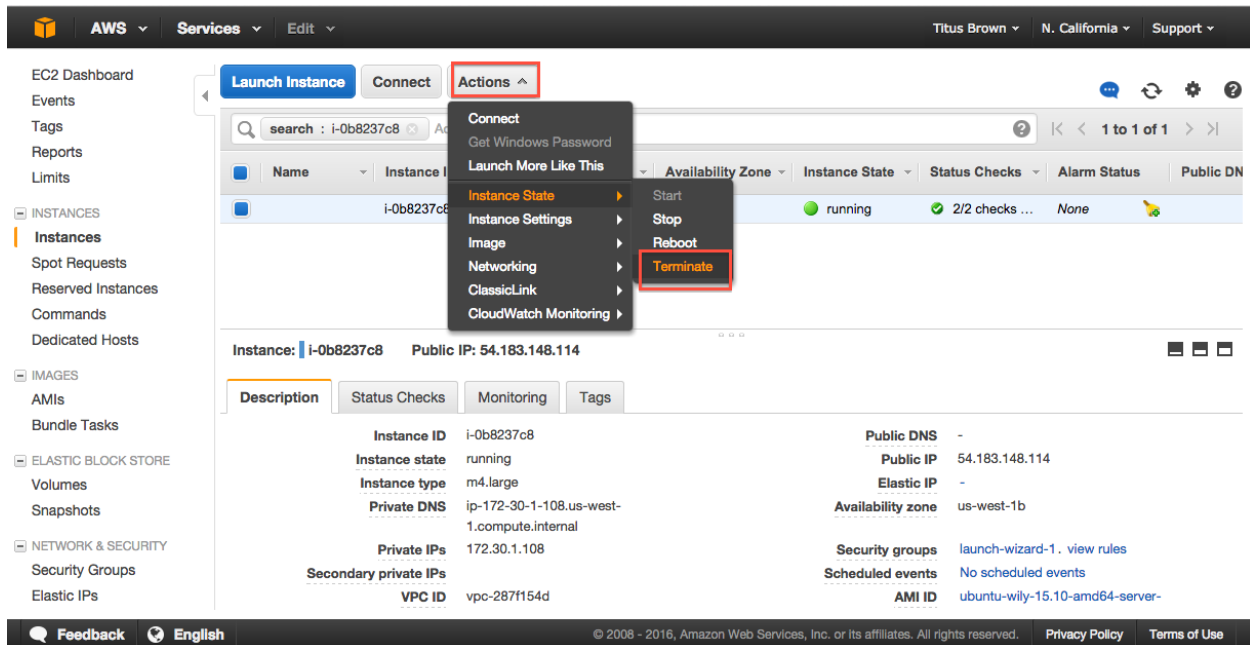
Amazon will happily charge you for running instances and/or associated ephemeral storage until the cows come home - it's your responsibility to turn things off. The Right Way to do this for running instances is to terminate.

The caveat here is that *everything ephemeral* will be deleted (excluding volumes that you created/attached). So you want to make sure you transfer off anything you care about.

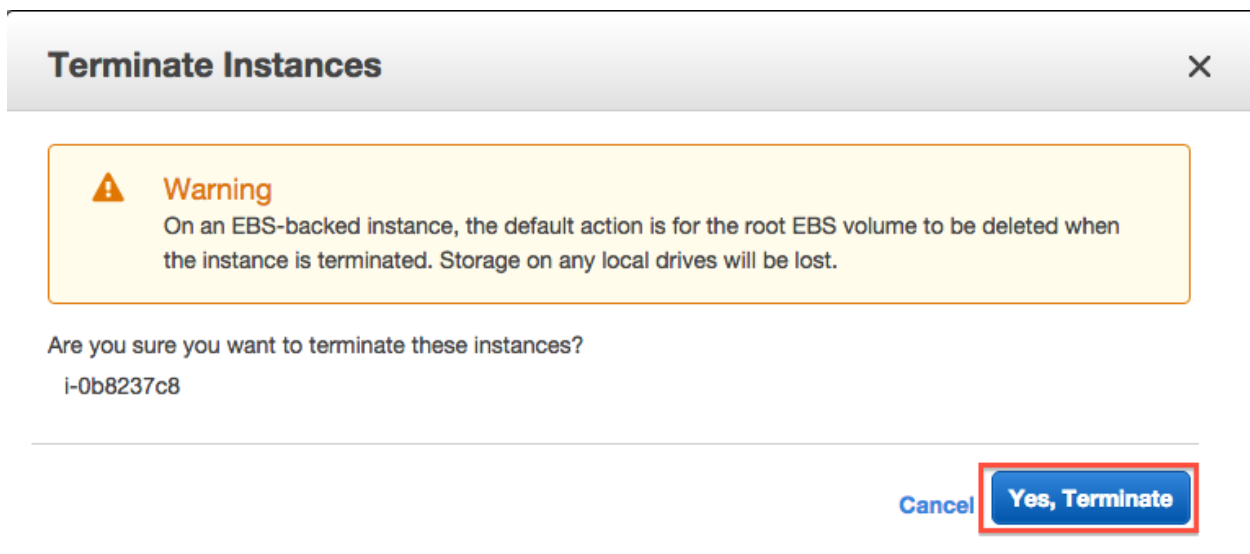
To terminate:

## 1. Select Actions, Instance State, Terminate

In the ‘Instances’ tab, select your instance and then go to the Actions menu.



## 2. Agree to terminate.



### 3. Verify status on your instance page.

Instance state should be either “shutting down” or “terminated”.

The screenshot shows the AWS Management Console interface for the EC2 service. The left sidebar contains navigation links for EC2 Dashboard, Events, Tags, Reports, Limits, INSTANCES, INSTANCES (selected), Spot Requests, Reserved Instances, Commands, Dedicated Hosts, IMAGES, AMIs, Bundle Tasks, ELASTIC BLOCK STORE, Volumes, Snapshots, NETWORK & SECURITY, Security Groups, and Elastic IPs. The main content area displays a table of instances. The first instance, 'i-0b8237c8', is in the 'shutting-down' state, and the second instance, 'i-b472c777', is in the 'terminated' state. Below the table, the details for instance 'i-0b8237c8' are shown, including its Public DNS, Instance ID, Instance state, Instance type, Private DNS, Private IPs, Secondary private IPs, VPC ID, Public IP, Elastic IP, Availability zone, Security groups, Scheduled events, and AMI ID.

Name	Instance ID	Instance Type	Availability Zone	Instance State	Status Checks	Alarm Status	Public DN
	i-0b8237c8	m4.large	us-west-1b	shutting-do...		None	
	i-b472c777	t2.micro	us-west-1b	terminated		None	

Instance: i-0b8237c8 Public DNS: -

Description	Status Checks	Monitoring	Tags
Instance ID	i-0b8237c8		
Instance state	shutting-down		
Instance type	m4.large		
Private DNS	-		
Private IPs	-		
Secondary private IPs	-		
VPC ID	-		
Public DNS	-		
Public IP	-		
Elastic IP	-		
Availability zone	us-west-1b		
Security groups	-		
Scheduled events	-		
AMI ID	ubuntu-wily-15.10-amd64-server-20160222 (ami-05384865)		

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## Things to mention and discuss

### When do disks go away?

- never on reboot;
- ephemeral disks go away on stop;
- AMI-attached volumes go away on terminate;
- attached volumes never go away on terminate and have to be explicitly deleted;
- snapshots only go away when you explicitly delete them.

### What are you charged for?

- you are charged for a running instance at the @@instance price rates;
- ephemeral storage/instance-specific storage is included within that.
- when you stop an instance, you are charged at disk-space rates for the stopped disk;
- when you create a volume, you are charged for that volume until you delete it;
- when you create a snapshot, you are charged for that snapshot until you delete it.

To make sure you're not getting charged, go to your Instance view and clear all search filters; anything that is "running" or "stopped" is costing you. Also check your volumes and your snapshots - they should be empty.

---

## **Regions vs zones:**

- AMIs and Snapshots (and keys and security groups) are per region;
- Volumes and instances are per zone;



## CHAPTER 3

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### Indices and tables

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- `genindex`
- `modindex`
- `search`