

# Introduction to Amazon AWS Development Environment

Robert Chen  
Computational Science & Engineering  
Georgia Institute of Technology





# Intro

- Need a standard environment for development
- Amazon AWS - a popular service
  - web hosting
  - storage

# Getting Started

# Getting Started

- Visit [aws.amazon.com](https://aws.amazon.com)
- make an account
- enter information
- need a credit card
- select the basic(free) tier
  - 750 hours/month of t1.micro instance
  - 5GB of S3 storage
  - 750 hours/month of database RDS

## Payment Information

Please enter your payment information below. You will be able to try a broad set of AWS products for free via the Free Usage Tier. We will only bill your credit card for usage that is not covered by our Free Usage Tier.

<b>AWS Free Usage Tier</b> <i>free for 1 year</i>	<b>Compute</b> <b>Amazon EC2</b> 750hrs/month*	<b>Storage</b> <b>Amazon S3</b> 5GB	<b>Database</b> <b>Amazon RDS</b> 750hrs/month*
--	--	---	---

[\\*View full offer details »](#)

**Credit Card Number**

**Expiration Date**

**Cardholder's Name**

# Getting started

## Support Plan

All customers receive free support. Choosing a paid support plan will allow you to receive one-on-one technical assistance from experienced engineers and access many other support features. Please see below.

Please Select One


- Basic (Free)**  
Contact Customer Service for account and billing questions, receive help for resources that don't pass system health checks, and access the AWS Community Forums.
- Developer (\$49/month)**  
Get started on AWS - ask technical questions and get a response to your web case within 12 hours during local business hours.
- Business (Starting at \$100/month - Pricing Example) - Recommended**  
24/7/365 real-time assistance by phone and chat, a 1 hour response to web cases, and help with 3rd party software. Access Trusted Advisor to increase performance, fault tolerance, security, and potentially save money. [?](#)
- Enterprise Support**  
15 minute response to web cases, an assigned technical account manager (TAM) who is an expert in your use case, and white-glove case handling that notifies your TAM and the service engineering team of a critical issue.

*If you select this option, you will not be charged immediately. We will contact you to discuss your needs and finalize the signup.*

Continue

# Signup confirmation

- you should receive a confirmation email



Welcome to Amazon Web Services,

You can get started by accessing the [AWS Management Console](#), launching [an Amazon EC2 Instance](#), or exploring popular software optimized for Amazon EC2 on [AWS Marketplace](#). For the next 12 months, you will have free access to compute, storage, database, and application services. Learn more by visiting our [Free Tier](#) page.

**Getting Started Resources**

- [Step-by-Step Instructions on How to Deploy Your Application](#)
- [Quick Start Tutorials for Developers](#)
- [Tool Downloads](#)
- [Billing Alerts](#)

**Account Management & Credentials**

If you interact with AWS programmatically using the SDKs, Command Line Interface (CLI), or APIs, you must provide access keys to verify who you are and whether you have permission to access the resources you're requesting. To manage your account's access keys, go to the [Security Credentials](#) page in the AWS Management Console. If you want to allow other users to access resources in your account, use the [Identity and Access Management \(IAM\) console](#) to create credentials and assign permissions to

# Go to EC2 dashboard

[Console Home](#) **Web Services**

---

**Compute & Networking**

- Direct Connect**  
Dedicated Network Connection to AWS
- EC2**  
Virtual Servers in the Cloud
- Route 53**  
Scalable Domain Name System
- VPC**  
Isolated Cloud Resources

**Storage & Content Delivery**

- CloudFront**  
Global Content Delivery Network
- Glacier**  
Archive Storage in the Cloud
- S3**  
Scalable Storage in the Cloud
- Storage Gateway**  
Integrates On-Premises IT Environments with Cloud Storage

**Database**

- DynamoDB**  
Predictable and Scalable NoSQL Data Store
- ElastiCache**  
In-Memory Cache
- RDS**  
Managed Relational Database Service
- Redshift**  
Managed Petabyte-Scale Data Warehouse Service

**Deployment & Management**

- CloudFormation**  
Templated AWS Resource Creation
- CloudTrail**  
User Activity and Change Tracking
- CloudWatch**  
Resource and Application Monitoring
- Elastic Beanstalk**  
AWS Application Container
- IAM**  
Secure AWS Access Control
- OpsWorks**  
DevOps Application Management Service
- Trusted Advisor**  
AWS Cloud Optimization Expert

**Analytics**

- Data Pipeline**  
Orchestration for Data-Driven Workflows
- Elastic MapReduce**  
Managed Hadoop Framework
- Kinesis**  
Real-time Processing of Streaming Big Data

**Mobile Services**

- Cognito**  
User Identity and App Data Synchronization
- Mobile Analytics**  
Understand App Usage Data at Scale
- SNS**  
Push Notification Service

**App Services**

- AppStream**  
Low Latency Application Streaming
- CloudSearch**  
Managed Search Service
- Elastic Transcoder**  
Easy-to-use Scalable Media Transcoding
- SES**  
Email Sending Service
- SQS**  
Message Queue Service
- SWF**  
Workflow Service for Coordinating Application Components

**Applications**

- WorkSpaces**  
Desktops in the Cloud
- Zocalo**  
Secure Enterprise Storage and Sharing Service

**Additional Resources**

[Getting Started](#)  
See our documentation to get started and learn more about how to use our services.

[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.

**Service Health**

All services operating normally.

Updated: Aug 18 2014 01:10:00 GMT-0400

[Service Health Dashboard](#)

**Set Start Page**

[Console Home](#)



# Launch Instance

The screenshot shows the AWS Management Console interface for the EC2 Dashboard in the US West (Oregon) region. The left-hand navigation pane includes sections for EC2 Dashboard, INSTANCES, IMAGES, ELASTIC BLOCK STORE, NETWORK & SECURITY, and AUTO SCALING. The main content area is divided into several panels: Resources, Create Instance, Service Health, and Scheduled Events. The Resources panel shows 0 Running Instances, 0 Elastic IPs, 0 Volumes, 0 Snapshots, 0 Key Pairs, 0 Load Balancers, 0 Placement Groups, and 1 Security Group. A blue button labeled "Launch Instance" is highlighted with a red box, and a red arrow points to it from the right. Below the button, a note states: "Note: Your instances will launch in the US West (Oregon) region." The Service Health panel shows the service status for US West (Oregon) as "operating normally" and lists three availability zones (us-west-2a, us-west-2b, us-west-2c) as "operating normally". The Scheduled Events panel shows "No events" for the US West (Oregon) region. On the right side, the Account Attributes panel displays supported platforms (VPC), default VPC (vpc-eadf1a8f), and additional information links. The AWS Marketplace panel lists various software products available for purchase.

**EC2 Dashboard**

- 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
- AUTO SCALING
  - Launch Configurations
  - Auto Scaling Groups

**Resources**

You are using the following Amazon EC2 resources in the US West (Oregon) region:

0 Running Instances	0 Elastic IPs
0 Volumes	0 Snapshots
0 Key Pairs	0 Load Balancers
0 Placement Groups	1 Security Group

[View AWS Trusted Advisor](#) to optimize EC2. [Hide](#)

**Create Instance**

To start using Amazon EC2 you will want to launch a virtual server, known as an Amazon EC2 instance.

[Launch Instance](#)

Note: Your instances will launch in the US West (Oregon) region

**Service Health**

**Service Status:**

- US West (Oregon): This service is operating normally

**Availability Zone Status:**

- us-west-2a: Availability zone is operating normally
- us-west-2b: Availability zone is operating normally
- us-west-2c: Availability zone is operating normally

[Service Health Dashboard](#)

**Scheduled Events**

**US West (Oregon):** No events

**Account Attributes**

**Supported Platforms**

- VPC

**Default VPC**

- vpc-eadf1a8f

**Additional Information**

- [Getting Started Guide](#)
- [Documentation](#)
- [All EC2 Resources](#)
- [Forums](#)
- [Pricing](#)
- [Contact Us](#)

**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 Software](#)
- [Alert Logic Threat Manager for AWS](#)  
Provided by Alert Logic  
Rating ★★★★★  
Pay by the hour for software and AWS usage  
[View all Security Software](#)
- [Adobe ColdFusion](#)  
Provided by Orbitera  
Rating ★★★★★

# Load the Image for the class

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**

Operating system

- Amazon Linux
- Cent OS
- Debian
- Fedora
- Gentoo
- OpenSUSE
- Other Linux
- Red Hat
- SUSE Linux
- Ubuntu
- Windows







Architecture

- 32-bit
- 64-bit

Root device type

Search community AMIs

1 to 50 of 16,647 AMIs

	<b>amzn-ami-hvm-2014.03.2.x86_64-ebs</b> - ami-d13845e1 Amazon Linux AMI x86_64 HVM EBS Root device type: ebs   Virtualization type: hvm	<a href="#">Select</a> 64-bit
	<b>RHEL-7.0_GA_HVM-x86_64-3-Hourly2</b> - ami-77d7a747 Provided by Red Hat, Inc. Root device type: ebs   Virtualization type: hvm	<a href="#">Select</a> 64-bit
	<b>suse-sles-11-sp3-hvm-blid485-v1.0.0.x86_64_ssd</b> - ami-7fd3ae4f SUSE Linux Enterprise Server 11 Service Pack 3 for x86_64 HVM (SSD-backed) Root device type: ebs   Virtualization type: hvm	<a href="#">Select</a> 64-bit
	<b>ubuntu/images/hvm-ssd/ubuntu-trusty-14.04-amd64-server-20140607.1</b> - ami-e7b8c0d7 Root device type: ebs   Virtualization type: hvm	<a href="#">Select</a> 64-bit
	<b>Windows_Server-2012-R2_RTM-English-64Bit-Base-2014.07.10</b> - ami-57e29c67 Microsoft Windows Server 2012 R2 RTM 64-bit Locale English AMI provided by Amazon Root device type: ebs   Virtualization type: hvm	<a href="#">Select</a> 64-bit
	<b>Windows_Server-2012-R2_RTM-English-64Bit-SQL_2014_RTM_Express-2014.07.10</b> - ami-5be59b6b	<a href="#">Select</a>

2

Enter the AMI image ID: ami-7d2e6a4d

# Select the t2.micro, click Review and Launch

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

## 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:   [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 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	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
<input type="checkbox"/>	Compute optimized	c3.large	2	3.75	2 x 16 (SSD)	-	Moderate
<input type="checkbox"/>	Compute optimized	c3.xlarge	4	7.5	2 x 40 (SSD)	Yes	Moderate
<input type="checkbox"/>	Compute optimized	c3.2xlarge	8	15	2 x 80 (SSD)	Yes	High

Cancel

Previous

Review and Launch

Next: Configure Instance Details

# Add Storage

## 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 ⓘ	En
Root	/dev/sda1	snap-5ebe82aa	<input type="text" value="8"/>	General Purpose (SSD) ▾	24 / 3000	<input checked="" type="checkbox"/>	No

Add New Volume



Free tier eligible customers can get up to 30 GB of EBS General Purpose (SSD) and usage restrictions.

Increase the size to  
15GiB.  
(max 30 GiB)

Cancel

Previous

Review and Launch

Next: Tag Instance

# Modify the Security Group

## 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, 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 <sup>i</sup>	Protocol <sup>i</sup>	Port Range <sup>i</sup>	
SSH	TCP	22	
HTTP	TCP	80	
MYSQL	TCP	3306	
Custom TCP Rule	TCP	5432	Anywhere
Custom TCP Rule	TCP	27017	Anywhere

Open the following 4 TCP ports

PostgreSQL

MongoDB

Cancel Previous **Review and Launch**

# 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 instance's security. Your security group, launch-wizard-1, is open to the world.**

Your instance 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](#)



#### Ubuntu Server 14.04 LTS (HVM), SSD Volume Type - ami-e7b8c0d7

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

### 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

launch-wizard-1

Description

launch-wizard-1 created 2014-08-19T01:13:50.194-04:00

Type <i>i</i>	Protocol <i>i</i>	Port Range <i>i</i>	Source <i>i</i>
SSH	TCP	22	0.0.0.0/0

### Instance Details

[Edit instance details](#)

Cancel

Previous

**Launch**

Create a NEW public + private key pair; name the key pair; download the key pair and save it; then press Launch Instances

Instance Launch

View 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.

**Instance's security. Your security group, launch-wizard-1, is open to the world.**

Your instance 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 add 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](#)

### 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](#)

1  Choose an existing key pair

Create a new key pair

Proceed without a key pair

Key pair name

2

You have to download the **private key file** (\*.pem file) before you can continue. **Store it in a secure and accessible location.** You will not be able to download the file again after it's created.

3

EC2s	Virtualization type
Variable	1

launch-wizard-1  
launch-wizard-1 cre

Network Pe  
Low to Mod

# click View Instances

## Launch Status

### ✓ Your instance is now launching

The following instance launch has been initiated: [i-b32568be](#) [View launch log](#)

### 💬 Get notified of estimated charges

[Create billing alerts](#) to get an email notification when estimated charges on your AWS bill exceed an amount you define (for example, if you exceed the free usage tier).

## How to connect to your instance

Your instance is launching, and it may take a few minutes until it is in the **running** state, when it will be ready for you to use. Usage hours on your new instance will start immediately and continue to accrue until you stop or terminate your instance.

Click **View Instances** to monitor your instance's status. Once your instance is in the **running** state, you can **connect** to it from the Instances screen. [Find out](#) how to connect to your instance.

### ▼ Here are some helpful resources to get you started

- [How to connect to your Linux instance](#)
- [Learn about AWS Free Usage Tier](#)
- [Amazon EC2: User Guide](#)
- [Amazon EC2: Discussion Forum](#)

While your instances are launching you can also

[Create status check alarms](#) to be notified when these instances fail status checks. (Additional charges may apply)

[Create and attach additional EBS volumes](#) (Additional charges may apply)

[Manage security groups](#)

[View Instances](#)



← → ↻ <https://console.aws.amazon.com/ec2/home?region=us-east-1#s=Instances> ☆ ☰

Services ▾ Edit ▾ AWS ▾ N. Virginia ▾ Help ▾

EC2 Dashboard  
Events

INSTANCES  
Instances  
Spot Requests  
Reserved Instances

IMAGES  
AMIs  
Bundle Tasks

ELASTIC BLOCK STORE  
Volumes  
Snapshots

NETWORK & SECURITY

Launch Instance Actions ▾

Viewing: All Instances ▾ All Instance Types ▾ Search

1 to 2 of 2 Instances

	Name	Instance	AMI ID	Root Device	Type	State	Status Checks	A
<input type="checkbox"/>	empty	i-7dcfd602	ami-3d4ff254	ebs	t1.micro	terminated		n
<input type="checkbox"/>	empty	i-4b4cf83a	ami-3d4ff254	ebs	t1.micro	running	initializing...	n

When done initializing, you can connect to the EC2 instance.



EC2 Dashboard

Events

Tags

▢ INSTANCES

Instances

Spot Requests

Reserved Instances

▢ IMAGES

AMIs

Bundle Tasks

▢ ELASTIC BLOCK STORE

Volumes

Snapshots

Launch Instance Actions ▾

Viewing: All Instances ▾ All Instance Types ▾ Search

<input type="checkbox"/>	Name ↕	Instance	AMI ID	Root Device	Type	State	Status
<input type="checkbox"/>	<i>empty</i>	i-6ec3cd5b	ami-70f96e40	ebs	t1.micro	running	2/

**You can confirm that you are only using t1.micro instances in the instances dashboard**

**Go to [console.aws.amazon.com/ec2](https://console.aws.amazon.com/ec2)**

**And click "Instances" on the left**

# Software preloaded into the instance

1. Databases (MongoDB, PostgreSQL, MySQL)
2. Python (numpy, scipy, MySQLdb, pymongo)
3. PHP
4. Git/Mercurial
5. Text editors (vi and emacs)
6. Apache web server
7. DB example connection script for MySQL and MongoDB (/var/www/html)

How to connect to your  
EC2 instance (Mac OS  
terminal)

# find the public DNS

The screenshot shows the AWS Management Console interface for an EC2 instance. The instance is named 'i-b32568be' and is in a 'running' state. The public DNS is highlighted with a red box and is 'ec2-54-213-48-146.us-west-2.compute.amazonaws.com'. The console also displays various instance details such as Instance ID, Instance state, Instance type, Private DNS, Private IPs, Secondary private IPs, VPC ID, Subnet ID, Network interfaces, Source/dest. check, EBS-optimized, Root device type, Public DNS, Public IP, Elastic IP, Availability zone, Security groups, Scheduled events, AMI ID, Platform, IAM role, Key pair name, Owner, Launch time, and Termination protection.

Instance ID	Instance state	Instance type	Private DNS	Private IPs	Secondary private IPs	VPC ID	Subnet ID	Network interfaces	Source/dest. check	EBS-optimized	Root device type	Public DNS	Public IP	Elastic IP	Availability zone	Security groups	Scheduled events	AMI ID	Platform	IAM role	Key pair name	Owner	Launch time	Termination protection
i-b32568be	running	t2.micro	ip-172-31-25-113.us-west-2.compute.internal	172.31.25.113		vpc-eadf1a8f	subnet-e991669e	eth0	True	False	ebs	ec2-54-213-48-146.us-west-2.compute.amazonaws.com	54.213.48.146	-	us-west-2a	launch-wizard-1 . view rules	No scheduled events	ubuntu-trusty-14.04-amd64-server-20140607.1 (ami-e7b8c0d7)	-	-	vipclass	097967135938	August 19, 2014 1:23:17 AM UTC-4 (less than one hour)	False

# Open up terminal, change permissions for public key, and use it to SSH into the EC2 instance

```
[localadmin@Administrators-MacBook-Pro:~]$cd ~/Downloads
[localadmin@Administrators-MacBook-Pro:~/Downloads]$chmod 400 vipclass.pem
[localadmin@Administrators-MacBook-Pro:~/Downloads]$ssh -i vipclass.pem ubuntu@ec2-54-213-48-146.us-west-2.compute.amazonaws.com
Welcome to Ubuntu 14.04 LTS (GNU/Linux 3.13.0-29-generic x86_64)

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

System information as of Tue Aug 19 05:32:06 UTC 2014

System load:  0.0                Processes:            98
Usage of /:   9.7% of 7.74GB      Users logged in:     0
Memory usage: 6%                IP address for eth0: 172.31.25.113
Swap usage:  0%

Graph this data and manage this system at:
  https://landscape.canonical.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.

Last login: Tue Aug 19 05:32:10 2014 from c-67-191-153-35.hsd1.ga.comcast.net
ubuntu@ip-172-31-25-113:~$ █
```

# (optional) setup SSH config

```
[localadmin@Administrators-MacBook-Pro:~]$mkdir -p ~/.ssh
[localadmin@Administrators-MacBook-Pro:~]$cp ~/Downloads/vipclass.pem ~/.ssh/
[localadmin@Administrators-MacBook-Pro:~]$chmod 400 ~/.ssh/vipclass.pem
[localadmin@Administrators-MacBook-Pro:~]$chmod 700 ~/.ssh/
[localadmin@Administrators-MacBook-Pro:~]$nano ~/.ssh/config # edit the file as shown below
[localadmin@Administrators-MacBook-Pro:~]$cat ~/.ssh/config
Host aws_vipclass
HostName ec2-54-213-48-146.us-west-2.compute.amazonaws.com
User ubuntu
IdentityFile "~/.ssh/vipclass.pem"
[localadmin@Administrators-MacBook-Pro:~]$
```

# Setting up Git / Bitbucket



# Bitbucket

- Code is hosted in repositories at [bitbucket.org](https://bitbucket.org). There will be one repository for each of the 3 projects in the class.
- At this point, make sure you have a bitbucket account.
- If not, signup for bitbucket ASAP, and email the TAs your username.

# Git

- Git is a version control system.
- We use Git to push code to the Bitbucket repository.
- You will connect your Bitbucket username to Git
- You will track your progress in the class (and you will be evaluated) based upon your commits to the Bitbucket project repositories

# Git setup - username/email for your EC2

```
ubuntu@ip-172-31-26-86:~$ git config --global user.name "Robert Chen"  
ubuntu@ip-172-31-26-86:~$ git config --global user.email [REDACTED]@gmail.com  
ubuntu@ip-172-31-26-86:~$ git config user.name  
Robert Chen  
ubuntu@ip-172-31-26-86:~$ git config user.email  
[REDACTED]@gmail.com  
ubuntu@ip-172-31-26-86:~$ █
```

# Git setup - SSH key

- Now, we will generate an ssh-key pair **on the EC2 machine**
- Do the following, from your HOME directory (~/)

```
ubuntu@ip-172-31-26-86:~$ ssh-keygen -t rsa -C "[REDACTED]@gmail.com"
Generating public/private rsa key pair.
Enter file in which to save the key (/home/ubuntu/.ssh/id_rsa):
Enter passphrase (empty for no passphrase):
Enter same passphrase again:
Your identification has been saved in /home/ubuntu/.ssh/id_rsa.
Your public key has been saved in /home/ubuntu/.ssh/id_rsa.pub.
The key fingerprint is:
91:0d:[REDACTED] 06:e7:[REDACTED]@gmail.com
The key's randomart image is:
[REDACTED]
ubuntu@ip-172-31-26-86:~$
```

**Hit enter when prompted for file in which to save the key (will default to ~/.ssh/id\_rsa)**

**Hit enter twice when prompted for passphrase**

# In Bitbucket, add SSH key

The screenshot shows the Bitbucket user interface for account management. The top navigation bar includes 'Bitbucket', 'Dashboard', 'Teams', 'Repositories', and 'Create'. The user is logged in as 'owner/repository'. The main content area is titled 'Manage' and shows the user 'Robert Chen'. A dropdown menu is open, with 'Manage account' highlighted. The left sidebar contains categories: 'GENERAL' (Account settings, Email addresses, Notifications, Custom domain, Change username, Delete account), 'PLANS AND BILLING' (Plan details), 'ACCESS MANAGEMENT' (User groups, OAuth), and 'SECURITY' (Change password, SSH keys, Connected accounts, Sessions, Audit log). The 'SSH keys' option is highlighted. The main content area shows the 'SSH keys' section with a description and an 'Add key' button. A table below the button is empty, with columns 'Key' and 'Added'. The text 'There are no keys configured' is displayed in the table. Red boxes and numbers 1, 2, and 3 highlight the 'Manage account' button, the 'SSH keys' menu item, and the 'Add key' button respectively.

owner/repository

Manage Robert Chen

1 Manage account

GENERAL

- Account settings
- Email addresses
- Notifications
- Custom domain
- Change username
- Delete account

PLANS AND BILLING

- Plan details

ACCESS MANAGEMENT

- User groups
- OAuth

SECURITY

- Change password
- 2 SSH keys
- Connected accounts
- Sessions
- Audit log

## SSH keys

Use SSH to avoid password prompts when you push code to Bitbucket. Learn how to [generate a SSH key](#).

3 Add key

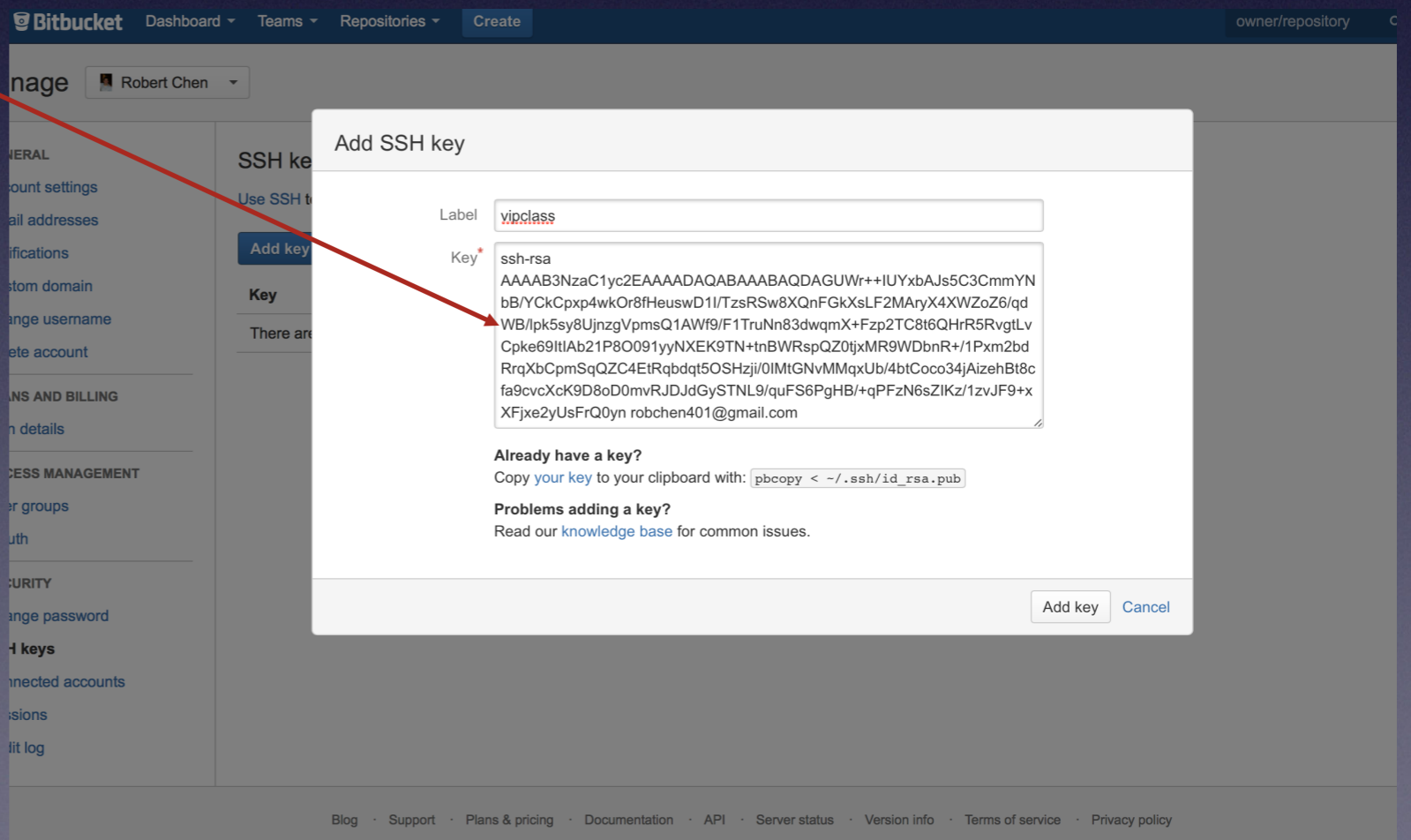
Key	Added
There are no keys configured	

Blog · Support · Plans & pricing · Documentation · API · Server status · Version info · Terms of service · Privacy policy

# Copy your SSH key into the input box

```
ubuntu@ip-172-31-26-86:~$ cd ~/.ssh
ubuntu@ip-172-31-26-86:~/.ssh$ cat id_rsa.pub
ssh-rsa AAAAB3NzaC1yc2EAAAADAQABAAQDAQAGUWr++IUYxBAJs5C3CmmYNbB/YCKCpxp4wk0r8tH
euswD1I/TzsRSw8XQnFGkXsLF2MAryX4XWZoZ6/qdWB/lpk5sy8UjnzgVpmsQ1AWf9/F1TruNn83dwqm
X+Fzp2TC8t6QHR5RvgtLvCpke69ItIAb21P8O091yyNXEK9TN+tnBWRspQZ0tjxMR9WDbnR+/1Pxm2b
dRrQXbCpmSqQZC4EtRqbdqt5OSHzi/0IMtGNvMMqxUb/4btCoco34jAizehBt8cfa9cvcXcK9D8oD0m
vRJDJdGySTNL9/quFS6PgHB/+qPFzN6sZIKz/1zvJF9+xxFjxe2yUsFrQ0yn robchen401@gmail.co
m
ubuntu@ip-172-31-26-86:~/.ssh$
```

**COPY INTO THE "Key" box!**



The screenshot shows the Bitbucket 'Add SSH key' dialog box. The 'Label' field contains 'vipclass'. The 'Key' field contains the SSH public key from the terminal output above. Below the key field, there is a section 'Already have a key?' with a command to copy the key to the clipboard: `pbcopy < ~/.ssh/id_rsa.pub`. There are also links for 'Problems adding a key?' and 'Read our knowledge base for common issues.' At the bottom right, there are 'Add key' and 'Cancel' buttons. A red arrow points from the 'COPY INTO THE "Key" box!' text to the 'Key' input field.

# First Checkpoint —

check code to your project's repository

# Clone the repository for your project

The screenshot shows the Bitbucket interface for a repository named 'solarsys VIP - Phenotyping App'. The left sidebar contains 'ACTIONS' and 'NAVIGATION' sections. In the 'ACTIONS' section, the 'Clone' button is highlighted with a red box and a red arrow labeled '1'. In the 'NAVIGATION' section, the 'Overview' button is highlighted with a red box and a red arrow. The main content area shows the 'Overview' page with the SSH clone URL 'git clone git@bitbucket.org:solarsys' highlighted with a red box and a red arrow labeled '2'. Below the URL, there is a 'Clone in SourceTree' button and a 'README' section. A large red arrow points from the 'Clone in SourceTree' button towards the 'Copy into clipboard' text. The 'README' section contains a title 'Phenotyping Web Services using EHR data' and a list of bullet points. The right sidebar shows 'Recent activity' with several commit entries.

**1**

**2**

**Copy into clipboard**

Bitbucket Dashboard Teams Repositories Create owner/repository

solarsys VIP - Phenotyping App

ACTIONS

- Clone
- Create branch
- Create pull request
- Compare
- Fork

NAVIGATION

- Overview
- Source
- Commits
- Branches
- Pull requests
- Issues 1
- Wiki
- Downloads
- Settings

Overview

SSH `git clone git@bitbucket.org:solarsys`

Need help cloning? Visit [Bitbucket 101](#).

Clone in SourceTree

Atlassian SourceTree is a free Git and Mercurial client for Mac.

1 Branch 0 Tags

0 Forks 1 Watcher

Edit README

Invite users to this repository

Send invitation

Recent activity

- 1 commit Pushed to solarsys | bda0165 README Robert Chen · 4 minutes ago
- 1 commit Pushed to solarsys | 5b662f6 first commit Robert Chen · 8 minutes ago
- Home Wiki page updated Phenotyping App Robert Chen · 2014-08-08
- Home Wiki page updated Phenotyping App Robert Chen · 2014-08-08
- testing Issue #1 updated in Phenotyping App Robert Chen · 2014-08-08
- testing Issue #1 created in Phenotyping App Robert Chen · 2014-08-08

**Phenotyping Web Services using EHR data**

- Code for the VIP class Phenotyping Web Services application
- Version 1
- [Learn Markdown](#)

**How do I get set up?**

- This repository is where the main production code lives for the phenotyping web service project
- We will use this repository to track all students progress
- Your grades will be based upon the code you push to the repository
- Commit code often, to avoid losing progress

**Contribution guidelines**

- Writing tests
- Code review
- Other guidelines

**Who do I talk to?**



# Clone repository - into home directory of your EC2 instance

```
ubuntu@ip-172-31-26-86:~$ cd
ubuntu@ip-172-31-26-86:~$ git clone git@bitbucket.org:solarsys/vip-phenotyping-app.git
Cloning into 'vip-phenotyping-app'...
Warning: Permanently added the RSA host key for IP address '131.103.20.168' to the list of known hosts.
remote: Counting objects: 10, done.
remote: Compressing objects: 100% (7/7), done.
remote: Total 10 (delta 1), reused 0 (delta 0)
Receiving objects: 100% (10/10), done.
Resolving deltas: 100% (1/1), done.
Checking connectivity... done.
ubuntu@ip-172-31-26-86:~$ █
```

# Go to the team\_members/ folder, make a file with your name and contact info.

```
ubuntu@ip-172-31-26-86:~$  
ubuntu@ip-172-31-26-86:~$ cd vip-phenotyping-app/  
ubuntu@ip-172-31-26-86:~/vip-phenotyping-app$ cd team_members/  
ubuntu@ip-172-31-26-86:~/vip-phenotyping-app/team_members$ nano rchen.txt #create a file named <first initial><lastname>.txt, with format shown below  
ubuntu@ip-172-31-26-86:~/vip-phenotyping-app/team_members$ cat rchen.txt  
Robert Chen  
PhD student - CS  
rchen87@gatech.edu  
ubuntu@ip-172-31-26-86:~/vip-phenotyping-app/team_members$
```

Then, do:

```
git add <files>  
git commit -m "<description>"  
git push <
```

# Git Add, Commit, Push

```
ubuntu@ip-172-31-26-86:~/vip-phenotyping-app/team_members$ git add rchen.txt
ubuntu@ip-172-31-26-86:~/vip-phenotyping-app/team_members$ git commit -m "adding rchen.txt file"
[master 1db9203] adding rchen.txt file
 1 file changed, 1 insertion(+), 1 deletion(-)
ubuntu@ip-172-31-26-86:~/vip-phenotyping-app/team_members$ git push origin master
Counting objects: 10, done.
Compressing objects: 100% (6/6), done.
Writing objects: 100% (8/8), 808 bytes | 0 bytes/s, done.
Total 8 (delta 0), reused 0 (delta 0)
To git@bitbucket.org:solarsys/vip-phenotyping-app.git
 235ad55..1db9203  master -> master
ubuntu@ip-172-31-26-86:~/vip-phenotyping-app/team_members$
```

**add the file** (points to `git add rchen.txt`)

**write a message describing the commit** (points to `git commit -m "adding rchen.txt file"`)

**push code changes from the "master" (your machine) to the "origin" (the repository on bitbucket)** (points to `git push origin master`)

## Changes shown on Bitbucket

The screenshot shows the Bitbucket Source page for the repository 'VIP - Phenotyping App' in the 'team\_members' directory. The file 'rchen.txt' is listed with a size of 49 B, added 4 minutes ago, with the commit message 'adding rchen.txt file'. A red box highlights the file name, and a red arrow points to it with the text 'file that was added'.

File Name	Size	Time	Commit Message
rchen.txt	49 B	4 minutes ago	adding rchen.txt file