

Getting Started With Amazon AWS for Server and Database Hosting in Education

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This document contains instructions to set up and connect to a database instance running the MySQL software and a server instance running Linux on Amazon AWS (Amazon Web Services). It uses some of the AWS site documentation, but hopefully offers some additional help to make setup easier. This is for academic/educational purposes; the configuration is grossly insecure for any professional operation or data that is sensitive or private.

This document is only a draft; any problems you encounter should be sent to the author, Joshua Gross, at gross.joshua.b@gmail.com. At the time of writing, AWS offers 12 months of free services, and this document is designed to show how to use those free services, but they could become pay services either through an error on the part of the author or because Amazon changes something. If you encounter any requirement to pay for any of these services, please inform Joshua Gross ASAP.

This document does not describe how to create/activate an AWS account; that is beyond the scope, and must be done before any steps described herein are taken. In other words, go create an AWS account before starting this. This page has an instructional video and a link to create an account https://aws.amazon.com/getting-started/?nc2=h_12_cc.

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Step One: Installing Software and Configuring Access to AWS

1. Go to the AWS IAM (Identity and Access Manager) and select Users
<https://console.aws.amazon.com/iam/home#users>

The screenshot shows the AWS IAM service interface. On the left, a sidebar menu includes options like Dashboard, Details, Groups, Users (which is selected and highlighted in blue), Roles, Policies, Identity Providers, Account Settings, Credential Report, and Encryption Keys. The main content area has tabs for 'Create New Users' and 'User Actions'. A search bar is at the top. Below it is a table with columns: User Name, Groups, Password, Password Last Used, and Access Keys. One row is visible for the user 'glenn', which is currently selected.

2. Create a new user, enter a user name, and select the “Create” button on the bottom right.

The screenshot shows the 'Create User' form. At the top, there's a heading 'Enter User Names:' followed by five input fields labeled 1., 2., 3., 4., and 5. A note below says 'Maximum 64 characters each'. Below the input fields is a checked checkbox for 'Generate an access key for each user'. A note explains that users need access keys for secure requests to AWS services. Another note at the bottom indicates that for AWS Management Console access, a password must be created in the Users panel after completion.

Screenshot of the AWS IAM 'Create User' wizard step 1: Enter User Names.

The form has five input fields for user names, with the first field containing 'jbgrossl'. A note below says 'Maximum 64 characters each'. A checked checkbox 'Generate an access key for each user' has a descriptive tooltip: 'Users need access keys to make secure REST or Query protocol requests to AWS service APIs.' and a note: 'For users who need access to the AWS Management Console, create a password in the Users panel after completing this wizard.'

At the bottom right are 'Cancel' and 'Create' buttons.

3. Download the security credentials for this user by selecting the “Download Credentials” button on the bottom right. Note the name of the file and where it downloads to (it should be called credentials.csv and will download to your preset downloads folder).

Your 1 User(s) have been created successfully.
This is the last time these User security credentials will be available for download.
You can manage and recreate these credentials any time.

► Show User Security Credentials

[Close](#) [Download Credentials](#)

4. Select “Close” once you have downloaded the file.
5. Select “Policies” on the left toolbar:
<https://console.aws.amazon.com/iam/home#policies>

Dashboard

Create Policy Policy Actions

Details Groups Users Roles Policies Identity Providers Account Settings Credential Report Encryption Keys

Filter: Policy Type Search Showing 148 results

	Policy Name	Attached Entities	Creation Time	Edited Time
<input type="checkbox"/>	AdministratorAccess	0	2015-02-06 13:39 EST	2015-02-06 13:39 EST
<input type="checkbox"/>	AmazonAPIGatewayAdministrator	0	2015-07-09 13:34 EDT	2015-07-09 13:34 EDT
<input type="checkbox"/>	AmazonAPIGatewayInvokeFullAccess	0	2015-07-09 13:36 EDT	2015-07-09 13:36 EDT
<input type="checkbox"/>	AmazonAppStreamFullAccess	0	2015-02-06 13:40 EST	2015-02-06 13:40 EST
<input type="checkbox"/>	AmazonAppStreamReadOnlyAccess	0	2015-02-06 13:40 EST	2015-02-06 13:40 EST
<input type="checkbox"/>	AmazonCognitoDeveloperAuthentic...	0	2015-03-24 13:22 EDT	2015-03-24 13:22 EDT
<input type="checkbox"/>	AmazonCognitoPowerUser	0	2015-03-24 13:14 EDT	2015-03-24 13:14 EDT
<input type="checkbox"/>	AmazonCognitoReadOnly	0	2015-03-24 13:06 EDT	2015-03-24 13:06 EDT
<input type="checkbox"/>	AmazonDynamoDBFullAccess	0	2015-02-06 13:40 EST	2015-02-06 13:40 EST
<input type="checkbox"/>	AmazonDynamoDBFullAccesswithD...	0	2015-02-06 13:40 EST	2015-02-06 13:40 EST
<input type="checkbox"/>	AmazonDynamoDBReadOnlyAccess	0	2015-02-06 13:40 EST	2015-02-06 13:40 EST
<input type="checkbox"/>	AmazonEC2ContainerServiceforEC2...	0	2015-03-19 14:45 EDT	2015-03-19 14:45 EDT

6. Select the “Create Policy” button

https://console.aws.amazon.com/iam/home#policies

AWS Services Edit Joshua Gross Global Support

Create Policy

Step 1: Create Policy

Step 2: Set Permissions

Step 3: Review Policy

Create Policy

A policy is a document that formally states one or more permissions. Create a policy by copying an AWS Managed Policy, using the Policy Generator, or typing your own custom policy.

Copy an AWS Managed Policy
Start with an AWS Managed Policy, then customize it to fit your needs. **Select**

Policy Generator
Use the policy generator to select services and actions from a list. The policy generator uses your selections to create a policy. **Select**

Create Your Own Policy
Use the policy editor to type or paste in your own policy. **Select**

7. Select the “Select” button for “Copy an AWS Managed Policy”

https://console.aws.amazon.com/iam/home#policies

Create Policy
Step 1: Create Policy
Step 2: Set Permissions
Step 3: Review Policy

Copy an AWS Managed Policy

Select a policy to copy from the following list.

Search Policies

AdministratorAccess
Provides full access to AWS services and resources. **Select**

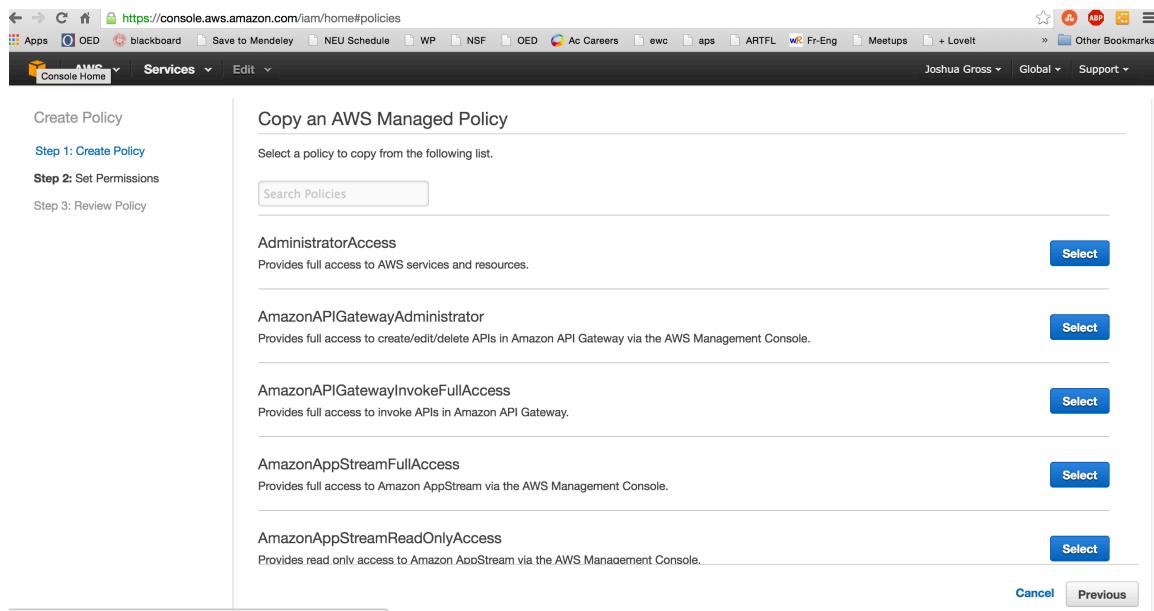
AmazonAPIGatewayAdministrator
Provides full access to create/edit/delete APIs in Amazon API Gateway via the AWS Management Console. **Select**

AmazonAPIGatewayInvokeFullAccess
Provides full access to invoke APIs in Amazon API Gateway. **Select**

AmazonAppStreamFullAccess
Provides full access to Amazon AppStream via the AWS Management Console. **Select**

AmazonAppStreamReadOnlyAccess
Provides read only access to Amazon AppStream via the AWS Management Console. **Select**

Cancel Previous



8. Select the “Select” button for “AdministratorAccess”

https://console.aws.amazon.com/iam/home#policies

Create Policy
Step 1: Create Policy
Step 2: Set Permissions
Step 3: Review Policy

Review Policy

Customize permissions by editing the following policy document. For more information about the access policy language, see [Overview of Policies](#) in the [Using IAM](#) guide. To test the effects of this policy before applying your changes, use the [IAM Policy Simulator](#).

Policy Name
AdministratorAccess-201507181945

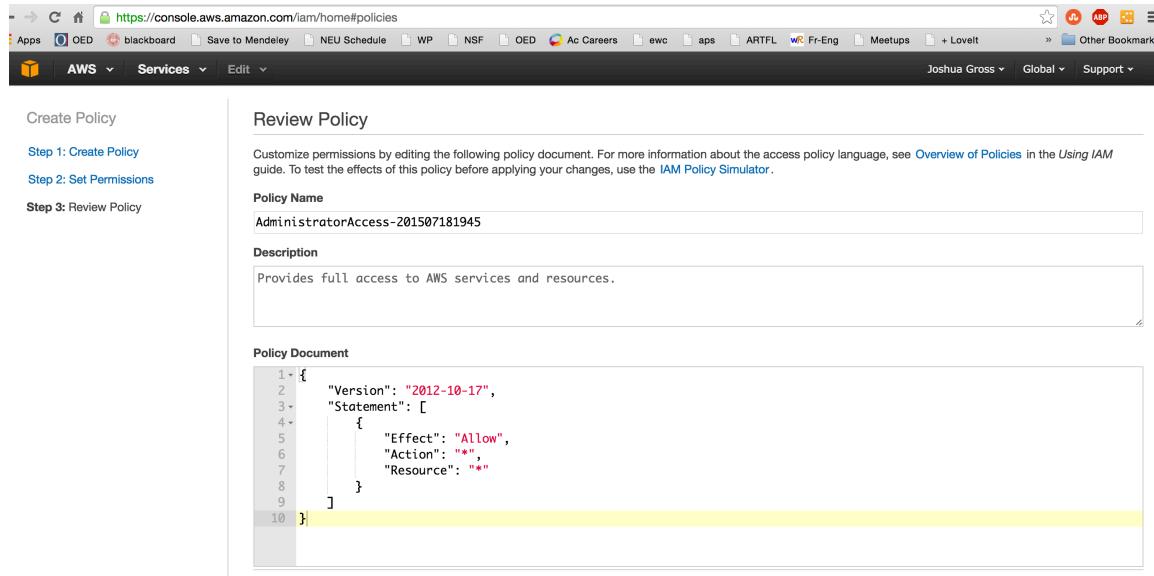
Description
Provides full access to AWS services and resources.

Policy Document

```
1 - {  
2 -   "Version": "2012-10-17",  
3 -   "Statement": [  
4 -     {  
5 -       "Effect": "Allow",  
6 -       "Action": "*",  
7 -       "Resource": "*"  
8 -     }  
9 -   ]  
10 }
```

Use autoformatting for policy editing

Cancel Validate Policy Previous Create Policy



9. Select “Create Policy”

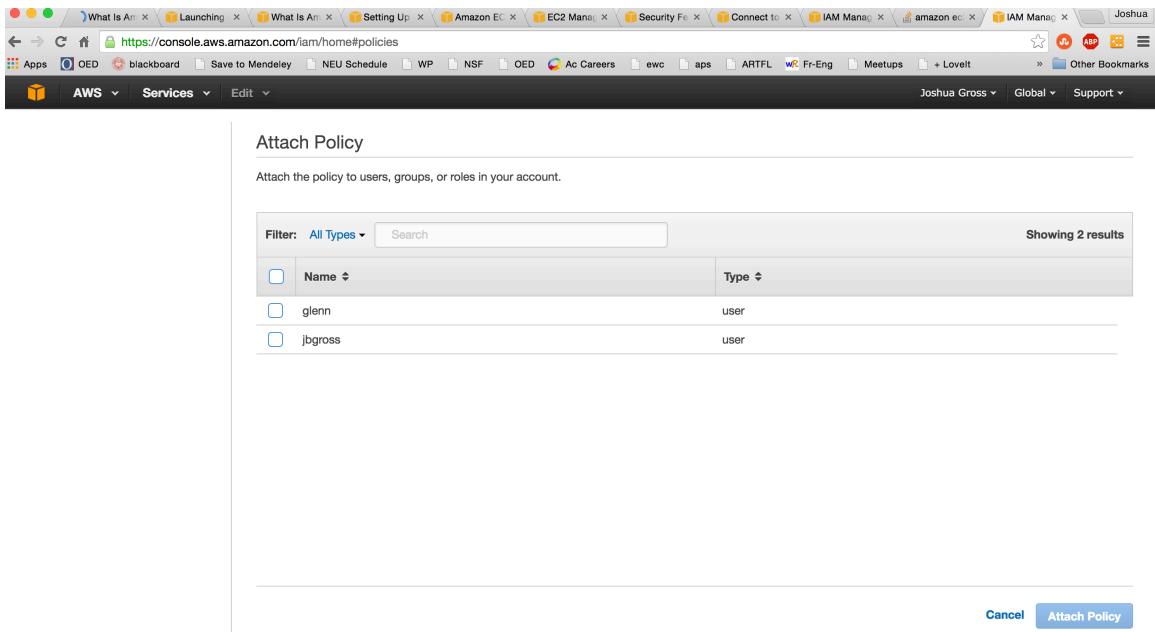
AdministratorAccess-201507181945 has been created.
Now you are ready to attach your policy to users, groups, and roles.

	Policy Name	Attached Entities	Creation Time	Edited Time
<input type="checkbox"/>	AdministratorAccess	0	2015-02-06 13:39 EST	2015-02-06 13:39 EST
<input type="checkbox"/>	AdministratorAccess-201507181945	0	2015-07-18 19:45 EDT	2015-07-18 19:45 EDT
<input type="checkbox"/>	AmazonAPIGatewayAdministrator	0	2015-07-09 13:34 EDT	2015-07-09 13:34 EDT
<input type="checkbox"/>	AmazonAPIGatewayInvokeFullAccess	0	2015-07-09 13:36 EDT	2015-07-09 13:36 EDT
<input type="checkbox"/>	AmazonAppStreamFullAccess	0	2015-02-06 13:40 EST	2015-02-06 13:40 EST
<input type="checkbox"/>	AmazonAppStreamReadOnlyAccess	0	2015-02-06 13:40 EST	2015-02-06 13:40 EST
<input type="checkbox"/>	AmazonCognitoDeveloperAuthentic...	0	2015-03-24 13:22 EDT	2015-03-24 13:22 EDT
<input type="checkbox"/>	AmazonCognitoPowerUser	0	2015-03-24 13:14 EDT	2015-03-24 13:14 EDT
<input type="checkbox"/>	AmazonCognitoReadOnly	0	2015-03-24 13:06 EDT	2015-03-24 13:06 EDT
<input type="checkbox"/>	AmazonDynamoDBFullAccess	0	2015-02-06 13:40 EST	2015-02-06 13:40 EST

10. Check the box next to your new policy

	Policy Name	Attached Entities	Creation Time	Edited Time
<input type="checkbox"/>	AdministratorAccess	0	2015-02-06 13:39 EST	2015-02-06 13:39 EST
<input checked="" type="checkbox"/>	AdministratorAccess-201507181945	0	2015-07-18 19:45 EDT	2015-07-18 19:45 EDT
<input type="checkbox"/>	AmazonAPIGatewayAdministrator	0	2015-07-09 13:34 EDT	2015-07-09 13:34 EDT
<input type="checkbox"/>	AmazonAPIGatewayInvokeFullAccess	0	2015-07-09 13:36 EDT	2015-07-09 13:36 EDT
<input type="checkbox"/>	AmazonAppStreamFullAccess	0	2015-02-06 13:40 EST	2015-02-06 13:40 EST
<input type="checkbox"/>	AmazonAppStreamReadOnlyAccess	0	2015-02-06 13:40 EST	2015-02-06 13:40 EST
<input type="checkbox"/>	AmazonCognitoDeveloperAuthentic...	0	2015-03-24 13:22 EDT	2015-03-24 13:22 EDT
<input type="checkbox"/>	AmazonCognitoPowerUser	0	2015-03-24 13:14 EDT	2015-03-24 13:14 EDT
<input type="checkbox"/>	AmazonCognitoReadOnly	0	2015-03-24 13:06 EDT	2015-03-24 13:06 EDT
<input type="checkbox"/>	AmazonDynamoDBFullAccess	0	2015-02-06 13:40 EST	2015-02-06 13:40 EST
<input type="checkbox"/>	AmazonDynamoDBFullAccesswithD...	0	2015-02-06 13:40 EST	2015-02-06 13:40 EST
<input type="checkbox"/>	AmazonDynamoDBReadOnlyAccess	0	2015-02-06 13:40 EST	2015-02-06 13:40 EST
<input type="checkbox"/>	AmazonFC2ContainerServiceforFC2	0	2015-03-19 14:45 FNT	2015-03-19 14:45 FNT

11. Select the “Policy Actions” button and select “Attach”

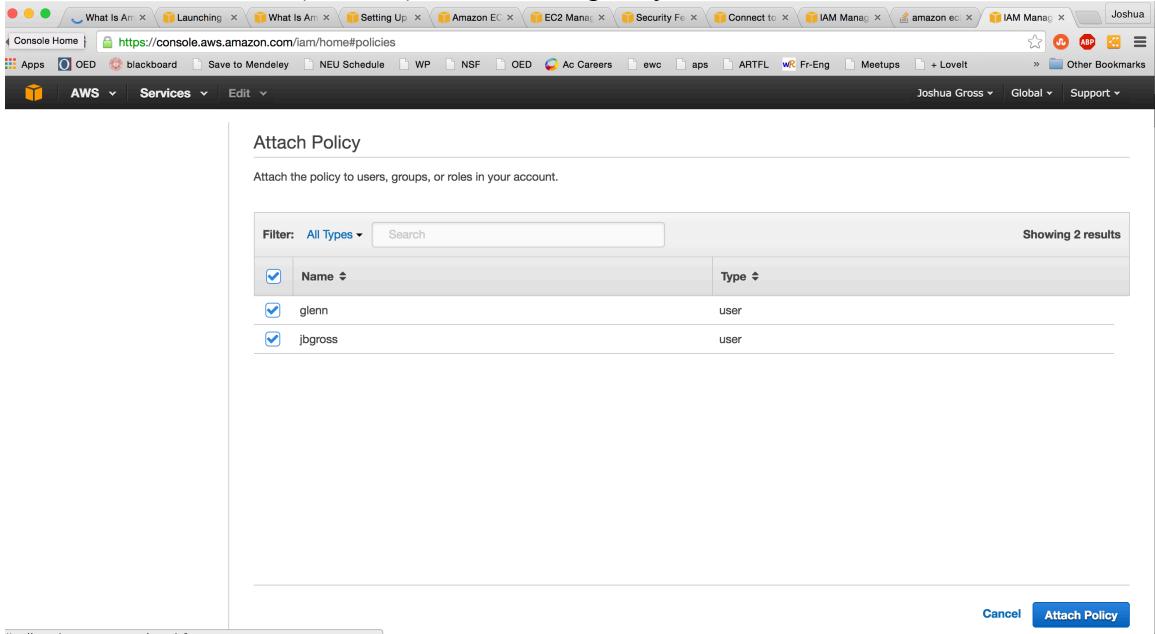


The screenshot shows the AWS IAM Attach Policy interface. At the top, there are tabs for 'All Types' and a search bar. Below that is a table with two rows, each containing a checkbox, a name ('glenn' and 'jbgross'), and a 'user' type indicator. At the bottom right of the table are 'Cancel' and 'Attach Policy' buttons.

	Name	Type
<input type="checkbox"/>	glenn	user
<input type="checkbox"/>	jbgross	user

Attach Policy
Attach the policy to users, groups, or roles in your account.
Filter: All Types Search Showing 2 results
Cancel Attach Policy

12. Select the user (or users) to attach the policy to



The screenshot shows the same AWS IAM Attach Policy interface as the previous one, but with both users ('glenn' and 'jbgross') now having their checkboxes checked. The rest of the interface is identical, including the table and the 'Attach Policy' button at the bottom right.

	Name	Type
<input checked="" type="checkbox"/>	glenn	user
<input checked="" type="checkbox"/>	jbgross	user

Attach Policy
Attach the policy to users, groups, or roles in your account.
Filter: All Types Search Showing 2 results
Cancel Attach Policy

13. Select the “Attach Policy” button in the bottom right. NOTE: This is not the most secure security strategy. If we were going to use this for any real data, we would create more users, restrict administrator access to a few, and create limited access groups/policies for other users.

The screenshot shows the AWS IAM Policies page. On the left, a sidebar lists navigation options: Dashboard, Details, Groups, Users, Roles, Policies (which is selected), Identity Providers, Account Settings, and Credential Report. Below these are sections for Encryption Keys and AWS Lambda. The main content area displays a table titled "Attached Entities to the AdministratorAccess-201507181945 policy". The table has columns: Policy Name, Attached Entities, Creation Time, and Edited Time. There are 149 results. One row is selected, showing "AdministratorAccess-201507181945" with 2 entities attached, created on 2015-07-18 at 19:45 EDT and last edited on the same date at 19:45 EDT.

	Policy Name	Attached Entities	Creation Time	Edited Time
<input type="checkbox"/>	AdministratorAccess	0	2015-02-06 13:39 EST	2015-02-06 13:39 EST
<input checked="" type="checkbox"/>	AdministratorAccess-201507181945	2	2015-07-18 19:45 EDT	2015-07-18 19:45 EDT
<input type="checkbox"/>	AmazonAPIGatewayAdministrator	0	2015-07-09 13:34 EDT	2015-07-09 13:34 EDT
<input type="checkbox"/>	AmazonAPIGatewayInvokeFullAccess	0	2015-07-09 13:36 EDT	2015-07-09 13:36 EDT
<input type="checkbox"/>	AmazonAppStreamFullAccess	0	2015-02-06 13:40 EST	2015-02-06 13:40 EST
<input type="checkbox"/>	AmazonAppStreamReadOnlyAccess	0	2015-02-06 13:40 EST	2015-02-06 13:40 EST
<input type="checkbox"/>	AmazonCognitoDeveloperAuthentic...	0	2015-03-24 13:22 EDT	2015-03-24 13:22 EDT
<input type="checkbox"/>	AmazonCognitoPowerUser	0	2015-03-24 13:14 EDT	2015-03-24 13:14 EDT
<input type="checkbox"/>	AmazonCognitoReadOnly	0	2015-03-24 13:06 EDT	2015-03-24 13:06 EDT
<input type="checkbox"/>	AmazonDynamoDBFullAccess	0	2015-02-06 13:40 EST	2015-02-06 13:40 EST
<input type="checkbox"/>	AmazonDynamoDBFullAccessWithD...	0	2015-02-06 13:40 EST	2015-02-06 13:40 EST

14. Install the CLI tools – these instructions are pretty good, but they’re different for Linux, Windows, and MacOS. During this process, you’ll need the two keys in the credentials file you downloaded earlier.

<http://docs.aws.amazon.com/AWSEC2/latest/CommandLineReference/set-up-ec2-cli-linux.html>

15. If you’ve installed everything properly and set up your environment properly, you should be able to execute the command “ec2-describe-regions”

The screenshot shows a terminal window with the title "csumb — ec2-user@ip-172-31-31-95:~ — bash — 80x24". The command "ec2-describe-regions" was run, and the output listed all available AWS regions:

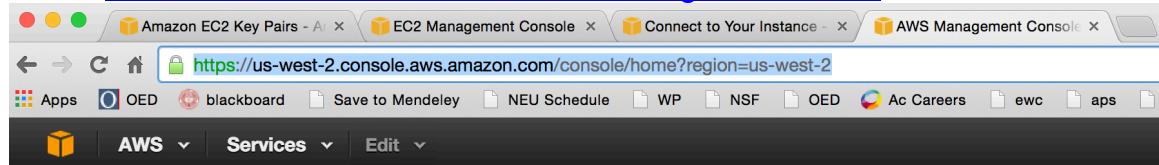
```

Joshua's-MacBook-Pro:csumb jbgross2$ ec2-describe-regions
REGION eu-central-1      ec2.eu-central-1.amazonaws.com
REGION sa-east-1        ec2.sa-east-1.amazonaws.com
REGION ap-northeast-1    ec2.ap-northeast-1.amazonaws.com
REGION eu-west-1         ec2.eu-west-1.amazonaws.com
REGION us-east-1         ec2.us-east-1.amazonaws.com
REGION us-west-1         ec2.us-west-1.amazonaws.com
REGION us-west-2         ec2.us-west-2.amazonaws.com
REGION ap-southeast-2    ec2.ap-southeast-2.amazonaws.com
REGION ap-southeast-1    ec2.ap-southeast-1.amazonaws.com
Joshua's-MacBook-Pro:csumb jbgross2$ █

```

Step Two: Creating a Linux Server and Gaining Access

1. Go to the AWS main console: <https://us-west-2.console.aws.amazon.com/console/home?region=us-west-2>



Amazon Web Services

Compute
EC2
Virtual Servers in the Cloud
Lambda
Run Code in Response to Events
EC2 Container Service
Run and Manage Docker Containers

Storage & Content Delivery
S3
Scalable Storage in the Cloud
Elastic File System PREVIEW
Fully Managed File System for EC2
Storage Gateway
Integrates On-Premises IT Environments with Cloud Storage
Glacier
Archive Storage in the Cloud

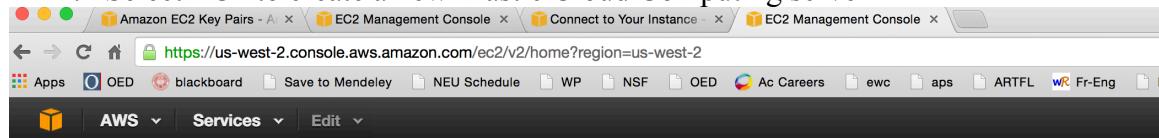
Administration & Security
Directory Service
Managed Directories in the Cloud
Identity & Access Management
Access Control and Key Management
Trusted Advisor
AWS Cloud Optimization Expert
CloudTrail
User Activity and Change Tracking
Config
Resource Configurations and Inventory
CloudWatch
Resource and Application Monitoring
Service Catalog
Personalized Catalog of AWS Resources

Deployment & Management
Elastic Beanstalk

Application Services
SQS
Message Queue Service
SWF
Workflow Service for Coordinating Applications
AppStream
Low Latency Application Streaming
Elastic Transcoder
Easy-to-use Scalable Media Transcoding Service
SES
Email Sending Service
CloudSearch
Managed Search Service
API Gateway
Build, Deploy and Manage APIs

Mobile Services

2. Select EC2 to create a new Elastic Cloud Computing server



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

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	4 Security Groups

Automate application deployments to EC2 with [CodeDeploy](#).

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

Scheduled Events

US West (Oregon):

No events

3. Select the "Launch Instance" button

Step 1: Choose an Amazon Machine Image (AMI)

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.

AMI Name	Description	Type	Root device type	Virtualization type	Action	Architecture
Amazon Linux AMI 2015.03 (HVM), SSD Volume Type - ami-e7527ed7	The Amazon Linux AMI is an EBS-backed, AWS-supported image. The default image includes AWS command line tools, Python, Ruby, Perl, and Java. The repositories include Docker, PHP, MySQL, PostgreSQL, and other packages.	Amazon Linux	ebs	hvm	Select	64-bit
Red Hat Enterprise Linux 7.1 (HVM), SSD Volume Type - ami-4dbf9e7d	Red Hat Enterprise Linux version 7.1 (HVM), EBS General Purpose (SSD) Volume Type	Red Hat	ebs	hvm	Select	64-bit
SUSE Linux Enterprise Server 12 (HVM), SSD Volume Type - ami-d7450be7	SUSE Linux Enterprise Server 12 (HVM), EBS General Purpose (SSD) Volume Type. Public Cloud, Advanced Systems Management, Web and Scripting, and Legacy modules enabled.	SUSE Linux	ebs	hvm	Select	64-bit
Ubuntu Server 14.04 LTS (HVM), SSD Volume Type - ami-5189a661	Ubuntu Server 14.04 LTS (HVM), EBS General Purpose (SSD) Volume Type. Support available from Canonical	Ubuntu	ebs	hvm	Select	64-bit

4. Select the Amazon Linux “Select” button.

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.

Family	Type	vCPUs	Memory (GiB)	Instance Storage (GB)	EBS-Optimized Available	Network Performance
General purpose	t2.micro Free tier eligible	1	1	EBS only	-	Low to Moderate
General purpose	t2.small	1	2	EBS only	-	Low to Moderate
General purpose	t2.medium	2	4	EBS only	-	Low to Moderate
General purpose	t2.large	2	8	EBS only	-	Low to Moderate
General purpose	m4.large	2	8	EBS only	Yes	Moderate
General purpose	m4.xlarge	4	16	EBS only	Yes	High

5. Select the “t2.micro” Instance Type and then select the “Review and Launch” button

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.

Family	Type	vCPUs	Memory (GiB)	Instance Storage (GB)	EBS-Optimized Available	Network Performance
General purpose	t2.micro <small>Free tier eligible</small>	1	1	EBS only	-	Low to Moderate
General purpose	t2.small	1	2	EBS only	-	Low to Moderate
General purpose	t2.medium	2	4	EBS only	-	Low to Moderate
General purpose	t2.large	2	8	EBS only	-	Low to Moderate
General purpose	m4.large	2	8	EBS only	Yes	Moderate
General purpose	m4.xlarge	4	16	EBS only	Yes	High
General purpose	m4.2xlarge	8	32	EBS only	Yes	High

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

6. Review your instance to make sure you understand what you are starting up. You can have up to 30GB free EBS (Elastic Block Storage), the built-in storage, but we don't need that much, so we'll leave it at the default of 8GB. Note that EBS is not the same as S3, which is a different, shared storage system, of which you are limited to 5GB, but we're not even going to set that up now. Once you are ready, select the "Launch" button. NOTE: As above, we could increase the security here; we're going to allow ssh connections from anywhere.

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.

AMI Details [Edit AMI](#)

Amazon Linux AMI 2015.03 (HVM), SSD Volume Type - ami-e7527ed7
Free tier eligible
 The Amazon Linux AMI is an EBS-backed, AWS-supported image. The default image includes AWS command line tools, Python, Ruby, Perl, and Java. The repositories include Docker, PHP, MySQL, PostgreSQL, and 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: launch-wizard-3
 Description: launch-wizard-3 created 2015-07-18T22:12:38.394-04:00

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

7. Select "Create a new key pair" on the dialog box and give it the Key pair name of your user (it doesn't have to be your user, but we'll use that name for convenience).

Select an existing key pair or create a new key pair

X

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](#).

Create a new key pair

Key pair name

jbgross|

Download Key Pair



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.

Cancel

Launch Instances

8. Select the “Download Key Pair” button. As the dialog notes, you won’t be able to download this again. You’ll need to remember where you downloaded the file; its name will be <username>.pem
9. Select the “Launch Instances” button.

The screenshot shows the AWS Lambda console with the URL <https://us-west-2.console.aws.amazon.com/lambda/home?region=us-west-2#LaunchInstanceWizard>. The page is titled "Launch Status". A green checkmark icon indicates that instances are launching. The message "Your instances are now launching" is displayed. Below this, there is a note about estimated charges: "Get notified of estimated charges" and "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)".

Launch Status

✓ Your instances are now launching

The following instance launches have been initiated: i-82b35474 [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 instances

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

Click [View Instances](#) to monitor your instances’ status. Once your instances are in the **running** state, you can [connect](#) to them from the Instances screen. [Find out](#) how to connect to your instances.

▼ 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](#)

The screenshot shows the bottom navigation bar of the AWS Lambda console. It includes links for "Feedback", "English", "Privacy Policy", and "Terms of Use".

10. Select the “View Instances” button.

The screenshot shows the AWS Management Console with the EC2 service selected. The left sidebar shows navigation options like EC2 Dashboard, Events, Tags, Reports, Limits, Instances, Images, AMIs, and more. The main content area displays a table of instances. One instance, with ID i-82b35474, is highlighted. Its details are shown in a modal window: Instance ID i-82b35474, Public DNS ec2-52-26-5-162.us-west-2.compute.amazonaws.com, Instance state running, Instance type m4.xlarge, Private DNS ip-172-31-18-89.us-west-2.compute.internal, Public IP 52.26.5.162, and Availability zone us-west-2a. Status Checks show 1 to 1 of 1, with one check labeled "Initializing".

11. Wait for your server instance to complete booting. During the booting process, the Instance State will be “running” and the Status Checks will be “Initializing”. It will take a few minutes to complete booting. If you ever decide to cycle it (shut it down and reboot it), subsequent boots will be faster, but there’s no real need to cycle your instance or your database. Your free resources will allow you to have a server and a database running constantly. When the class is over, you may want to shut everything down. When the Status Checks reads “2/2 checks passed”, your server is up and running.

The screenshot shows the same AWS Management Console interface as the previous one, but the status check for the instance has now completed successfully. The modal window shows the status check count as 2/2 checks passed. The rest of the instance details remain the same: Instance ID i-82b35474, Public DNS ec2-52-26-5-162.us-west-2.compute.amazonaws.com, Instance state running, Instance type m4.xlarge, Private DNS ip-172-31-18-89.us-west-2.compute.internal, Public IP 52.26.5.162, and Availability zone us-west-2a.

12. Now we will allow incoming traffic to your server instance. Select “Security Groups” on the bottom left with your server selected (the checkbox checked).

Screenshot of the AWS EC2 Security Groups list page. The left sidebar shows navigation links for EC2, Instances, Images, and Network & Security (Security Groups). The main content area displays a table of security groups with columns: Name, Group ID, Group Name, VPC ID, and Description. A search bar at the top allows filtering by tags and attributes or keyword.

Name	Group ID	Group Name	VPC ID	Description
sg-3c38f958	vpc-5720bd32	launch-wizard-1		launch-wizard-1 created 2015-07-12T21:09:29.391-04:00
sg-4a72be2e	vpc-5720bd32	launch-wizard-2		launch-wizard-2 created 2015-07-18T20:13:25.253-04:00
sg-62f13106	vpc-5720bd32	rds-launch-wizard-1		Created from the RDS Management Console
sg-69ff050d	vpc-5720bd32	default		default VPC security group
sg-c375b0a7	vpc-5720bd32	rds-launch-wizard		Created from the RDS Management Console

Select a security group above

13. Select the checkbox for the “launch-wizard-1” group.

Screenshot of the AWS EC2 Security Groups list page, showing the same interface as the previous screenshot but with a checked checkbox next to the "launch-wizard-1" group. This indicates it has been selected.

Name	Group ID	Group Name	VPC ID	Description
sg-3c38f958	vpc-5720bd32	launch-wizard-1		launch-wizard-1 created 2015-07-12T21:09:29.391-04:00
sg-4a72be2e	vpc-5720bd32	launch-wizard-2		launch-wizard-2 created 2015-07-18T20:13:25.253-04:00
sg-62f13106	vpc-5720bd32	rds-launch-wizard-1		Created from the RDS Management Console
sg-69ff050d	vpc-5720bd32	default		default VPC security group
sg-c375b0a7	vpc-5720bd32	rds-launch-wizard		Created from the RDS Management Console

Security Group: sg-3c38f958

Description Inbound Outbound Tags

Group name: launch-wizard-1 Group description: launch-wizard-1 created 2015-07-12T21:09:29.391-04:00
 Group ID: sg-3c38f958 VPC ID: vpc-5720bd32

14. Select the “Inbound” tab on the bottom. You may need to scroll down a bit to see the rule(s).

The screenshot shows the AWS Management Console with the URL <https://us-west-2.console.aws.amazon.com/ec2/v2/home?region=us-west-2#SecurityGroups:sort=groupID>. The left sidebar is collapsed. The main content area displays a table of security groups:

Name	Group ID	Group Name	VPC ID	Description
sg-3c38f958		launch-wizard-1	vpc-5720bd32	launch-wizard-1 created 2015-07-12T21:09:29.391-04:00
sg-4a72be2e		launch-wizard-2	vpc-5720bd32	launch-wizard-2 created 2015-07-18T20:13:25.253-04:00
sg-62f13106		rds-launch-wizard-1	vpc-5720bd32	Created from the RDS Management Console
sg-69ff050d		default	vpc-5720bd32	default VPC security group
sg-c375b0a7		rds-launch-wizard	vpc-5720bd32	Created from the RDS Management Console

Below the table, there are tabs for Description, Inbound, Outbound, and Tags. The Inbound tab is selected, showing a single rule:

Type	Protocol	Port Range	Source
SSH	TCP	22	0.0.0.0/0

15. If you have the rule you see above, you're done. This is the rule we were warned about earlier, and it allows ssh access for any user from anywhere in the world.

This screenshot is identical to the one above, showing the AWS EC2 Security Groups page with the same list of security groups and the same inbound rule for port 22.

16. If you don't have this rule, select the "Edit" button. The dialog box will open; set the Type to SSH, the Protocol to TCP, the Port Range to 22, the Source to Anywhere (in the dropdown) and 0.0.0.0/0 (in the text box). Then press the "Save" button. This says that any ssh connection is allowed, although it will be restricted to the user(s) you've created, and you'll need the .pem file. EC2 Windows instances use passwords, as do MySQL databases, but Linux instances use keys.

Edit inbound rules

Type	Protocol	Port Range	Source
SSH	TCP	22	Anywhere

Add Rule **Cancel** **Save**

17. Select “EC2 Dashboard” on the top left.

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

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

Automate application deployments to EC2 with [CodeDeploy](#).

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

Scheduled Events
US West (Oregon): No events

Account Attributes
Supported Platforms: VPC
Default VPC: vpc-5720bd32

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:
Brocade 5400 Virtual Router/Firewall/VPN
Provided by Brocade, Rating ★★★★☆, Pay by the hour for software and AWS usage, View all Networking

Alert Logic Threat Manager for AWS
Provided by Alert Logic, Inc., Rating ★★★★☆

18. Select “1 Running Instances”.

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

Filter by tags and attributes or search by keyword

Name	Instance ID	Instance Type	Available	Status Checks	Alarm	Public DNS	Pub
i-82b35474	m4.xlarge	us...	running	2/2 checks passed	...	ec2-52-26-5-162.us-west-2.compute.amazonaws.com	52.2

Instance: i-82b35474 Public DNS: ec2-52-26-5-162.us-west-2.compute.amazonaws.com

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

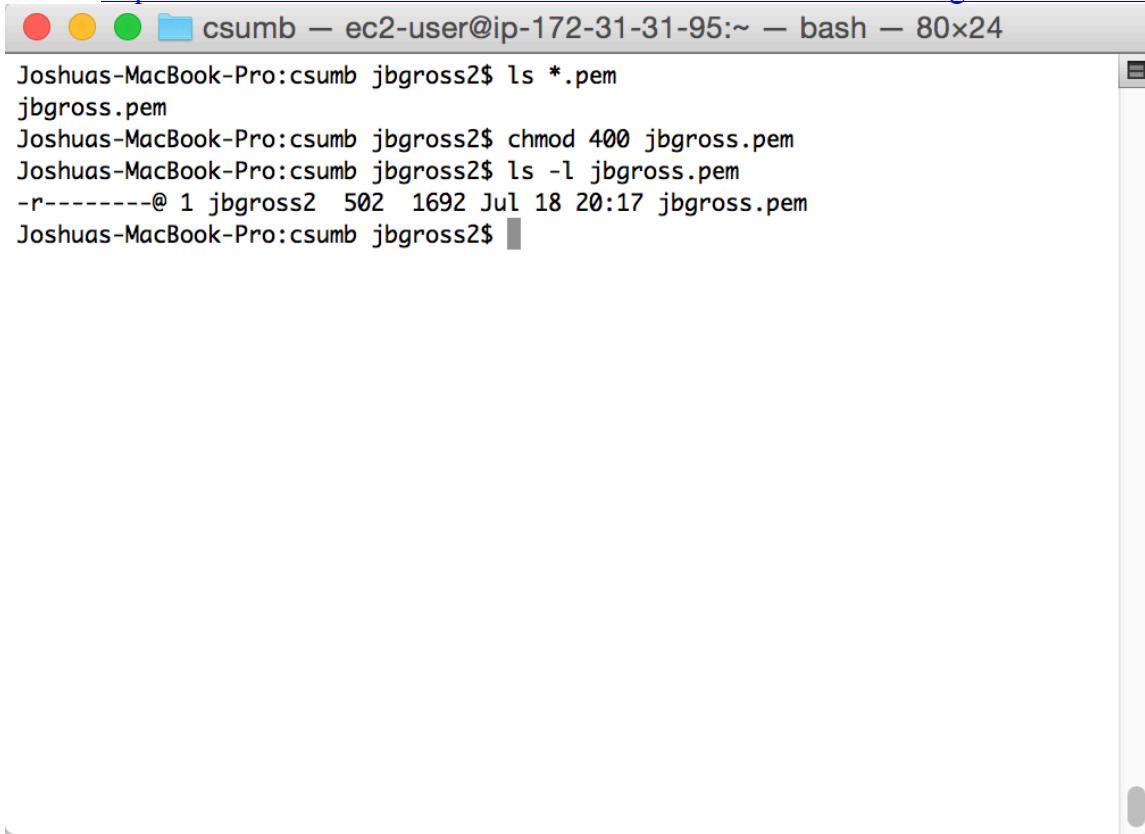
Instance ID	i-82b35474	Public DNS	ec2-52-26-5-162.us-west-2.compute.amazonaws.com
Instance state	running	Public IP	52.26.5.162
Instance type	m4.xlarge	Elastic IP	-
Private DNS	ip-172-31-18-89.us-west-2.compute.internal	Availability zone	us-west-2a

<https://us-west-2.console.aws.amazon.com/ec2/v2/home?region=us-west-2#Instances>

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19. Notice that your server has a Public DNS; this is the address of the instance that you will use to log in via ssh. You'll also need to locate the .pem file you downloaded earlier. These instances public/private key pairs to log in via ssh.
20. Follow the instructions for getting an ssh client (if you are on Windows; if you're on MacOS or Linux, you already have one). The Linux instructions apply to MacOS. You will need to change the permissions of the .pem file with the command "chmod 400 <username>.pem" for Linx or MacOS. As you can see below, the file is now readable only by the owner.

<http://docs.aws.amazon.com/AWSEC2/latest/UserGuide/AccessingInstances.html>

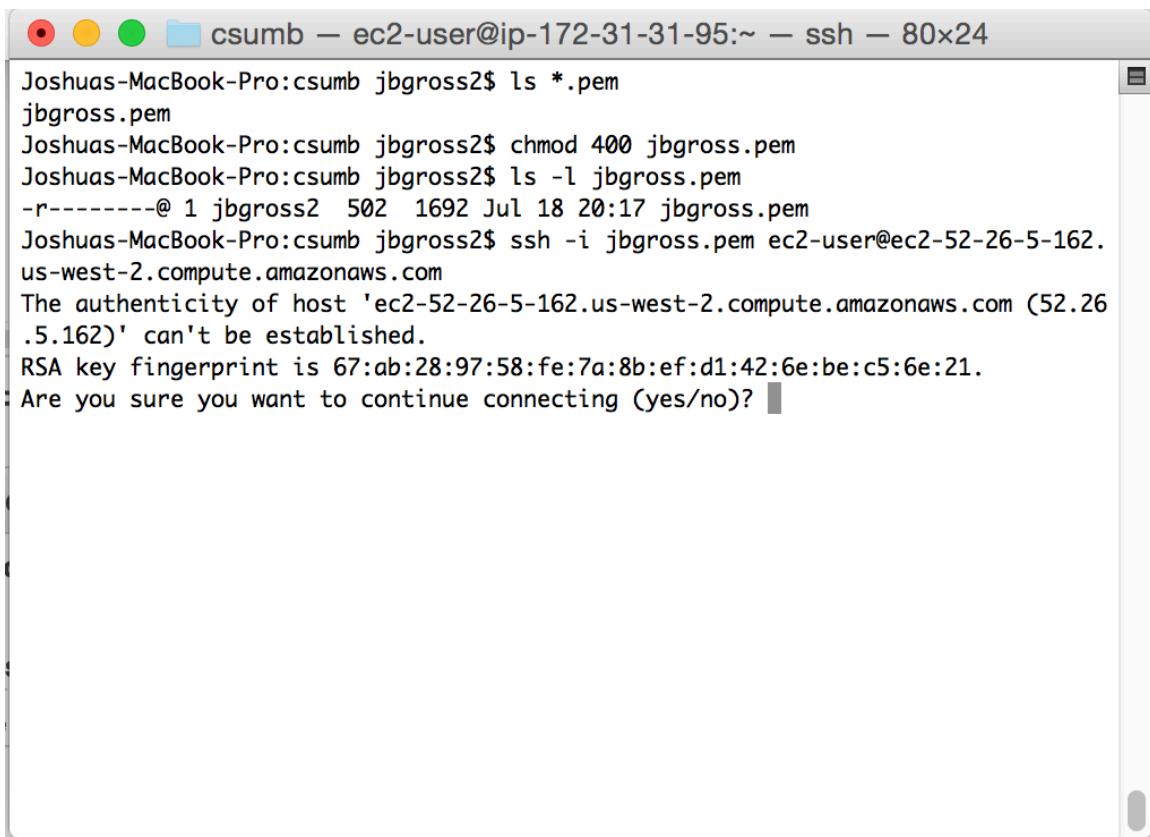


A screenshot of a macOS terminal window titled "csumb – ec2-user@ip-172-31-31-95:~ – bash – 80x24". The window shows the following command-line session:

```
Joshua's-MacBook-Pro:csumb jbgross2$ ls *.pem
jbgross.pem
Joshua's-MacBook-Pro:csumb jbgross2$ chmod 400 jbgross.pem
Joshua's-MacBook-Pro:csumb jbgross2$ ls -l jbgross.pem
-r-----@ 1 jbgross2 502 1692 Jul 18 20:17 jbgross.pem
Joshua's-MacBook-Pro:csumb jbgross2$
```

21. Connect to your server instance with ssh using the command below, substituting your username and DNS name

`ssh -i <username>.pem ec2-user@<dnsname>.compute.amazonaws.com`

A screenshot of a Mac OS X terminal window titled "csumb". The window shows a command-line session where a user named "jbgross" is connected via SSH to an Amazon EC2 instance. The session starts with listing files, changing permissions, and displaying file details. It then attempts to log in using the private key "jbgross.pem" to the host "ec2-52-26-5-162.us-west-2.compute.amazonaws.com". A warning message about host authenticity is displayed, followed by a prompt asking if the user wants to continue connecting.

```
Joshua-MacBook-Pro:csumb jbgross2$ ls *.pem
jbgross.pem
Joshua-MacBook-Pro:csumb jbgross2$ chmod 400 jbgross.pem
Joshua-MacBook-Pro:csumb jbgross2$ ls -l jbgross.pem
-r-----@ 1 jbgross2  502  1692 Jul 18 20:17 jbgross.pem
Joshua-MacBook-Pro:csumb jbgross2$ ssh -i jbgross.pem ec2-user@ec2-52-26-5-162.us-west-2.compute.amazonaws.com
The authenticity of host 'ec2-52-26-5-162.us-west-2.compute.amazonaws.com (52.26.5.162)' can't be established.
RSA key fingerprint is 67:ab:28:97:58:fe:7a:8b:ef:d1:42:6e:be:c5:6e:21.
Are you sure you want to continue connecting (yes/no)?
```

22. Type “yes” (not “y”) to accept the key. You only need to do this the first time you log into a server.

```
Joshua's-MacBook-Pro:csumb jbgross2$ ls *.pem
jbgross.pem
Joshua's-MacBook-Pro:csumb jbgross2$ chmod 400 jbgross.pem
Joshua's-MacBook-Pro:csumb jbgross2$ ls -l jbgross.pem
-r-----@ 1 jbgross2  502  1692 Jul 18 20:17 jbgross.pem
Joshua's-MacBook-Pro:csumb jbgross2$ ssh -i jbgross.pem ec2-user@ec2-52-26-5-162.us-west-2.compute.amazonaws.com
The authenticity of host 'ec2-52-26-5-162.us-west-2.compute.amazonaws.com (52.26.5.162)' can't be established.
RSA key fingerprint is 67:ab:28:97:58:fe:7a:8b:ef:d1:42:6e:be:c5:6e:21.
Are you sure you want to continue connecting (yes/no)? yes
Warning: Permanently added 'ec2-52-26-5-162.us-west-2.compute.amazonaws.com,52.26.5.162' (RSA) to the list of known hosts.

      _\   __|_
     _\  (    /  Amazon Linux AMI
     ___\_\__|__|_
```

<https://aws.amazon.com/amazon-linux-ami/2015.03-release-notes/>
24 package(s) needed for security, out of 53 available
Run "sudo yum update" to apply all updates.
[ec2-user@ip-172-31-18-89 ~]\$

23. The server will tell you that you need to update some of the installed software; this is normal. Just follow the directions and type “sudo yum update”. The command means this: “sudo” runs commands as root, the system administrator, “yum” is the package updater, kind of like Windows Update or Software Update on the Mac, and “update” just tells yum to update all out-of-date packages. Once you start the update, you’ll have to accept the update size (this time you can just type “y”).

```
Joshua's-MacBook-Pro:csumb jbgross2$ ls *.pem
jbgross.pem
Joshua's-MacBook-Pro:csumb jbgross2$ chmod 400 jbgross.pem
Joshua's-MacBook-Pro:csumb jbgross2$ ls -l jbgross.pem
-r-----@ 1 jbgross2  502  1692 Jul 18 20:17 jbgross.pem
Joshua's-MacBook-Pro:csumb jbgross2$ ssh -i jbgross.pem ec2-user@ec2-52-26-5-162.us-west-2.compute.amazonaws.com
The authenticity of host 'ec2-52-26-5-162.us-west-2.compute.amazonaws.com (52.26.5.162)' can't be established.
RSA key fingerprint is 67:ab:28:97:58:fe:7a:8b:ef:d1:42:6e:be:c5:6e:21.
Are you sure you want to continue connecting (yes/no)? yes
Warning: Permanently added 'ec2-52-26-5-162.us-west-2.compute.amazonaws.com,52.26.5.162' (RSA) to the list of known hosts.

      _\   __|_
      -|  (   /  Amazon Linux AMI
      ___\_\__|__|
```

<https://aws.amazon.com/amazon-linux-ami/2015.03-release-notes/>
24 package(s) needed for security, out of 53 available
Run "sudo yum update" to apply all updates.
[ec2-user@ip-172-31-18-89 ~]\$

```
Joshua's-MacBook-Pro:csumb jbgross2$ ssh -i jbgross.pem ec2-user@ec2-52-26-5-162.us-west-2.compute.amazonaws.com
The authenticity of host 'ec2-52-26-5-162.us-west-2.compute.amazonaws.com (52.26.5.162)' can't be established.
RSA key fingerprint is 67:ab:28:97:58:fe:7a:8b:ef:d1:42:6e:be:c5:6e:21.
Are you sure you want to continue connecting (yes/no)? yes
Warning: Permanently added 'ec2-52-26-5-162.us-west-2.compute.amazonaws.com,52.26.5.162' (RSA) to the list of known hosts.

      _\   __|_
      -|  (   /  Amazon Linux AMI
      ___\_\__|__|
```

<https://aws.amazon.com/amazon-linux-ami/2015.03-release-notes/>
24 package(s) needed for security, out of 53 available
Run "sudo yum update" to apply all updates.
[ec2-user@ip-172-31-18-89 ~]\$ sudo yum update
Loaded plugins: priorities, update-motd, upgrade-helper
amzn-main/latest | 2.1 kB 00:00
amzn-updates/latest | 2.3 kB 00:00
Resolving Dependencies
--> Running transaction check
---> Package at.x86_64 0:3.1.10-44.12.amzn1 will be updated
---> Package at.x86_64 0:3.1.10-44.13.amzn1 will be an update

```
csumb ~ ec2-user@ip-172-31-18-89:~ ssh 80x24
rpm x86_64 4.11.2-2.64.amzn1 amzn-updates 1.4 M
rpm-build-libs x86_64 4.11.2-2.64.amzn1 amzn-updates 107 k
rpm-libs x86_64 4.11.2-2.64.amzn1 amzn-updates 291 k
rpm-python27 x86_64 4.11.2-2.64.amzn1 amzn-updates 82 k
ruby20 x86_64 2.0.0.645-1.27.amzn1 amzn-updates 69 k
ruby20-irb noarch 2.0.0.645-1.27.amzn1 amzn-updates 89 k
ruby20-libs x86_64 2.0.0.645-1.27.amzn1 amzn-updates 3.7 M
rubygem20-bigdecimal x86_64 1.2.0-1.27.amzn1 amzn-updates 79 k
rubygem20-psych x86_64 2.0.0-1.27.amzn1 amzn-updates 76 k
rubygems20 noarch 2.0.14-1.27.amzn1 amzn-updates 224 k
time x86_64 1.7-38.9.amzn1 amzn-updates 27 k
tzdata noarch 2015b-1.33.amzn1 amzn-updates 760 k
tzdata-java noarch 2015b-1.33.amzn1 amzn-updates 215 k
unzip x86_64 6.0-2.9.amzn1 amzn-updates 196 k
yum noarch 3.4.3-137.57.amzn1 amzn-updates 1.7 M
yum-metadata-parser x86_64 1.1.4-8.12.amzn1 amzn-updates 29 k

Transaction Summary
=====
Install 1 Package
Upgrade 52 Packages

Total download size: 84 M
Is this ok [y/d/N]: y
```

```
csumb ~ ec2-user@ip-172-31-18-89:~ ssh 80x24
python27-jmespath.noarch 0:0.7.1-1.9.amzn1
python27-libs.x86_64 0:2.7.9-4.115.amzn1
python27-pip.noarch 0:6.1.1-1.20.amzn1
python27-setuptools.noarch 0:12.2-1.30.amzn1
rpm.x86_64 0:4.11.2-2.64.amzn1
rpm-build-libs.x86_64 0:4.11.2-2.64.amzn1
rpm-libs.x86_64 0:4.11.2-2.64.amzn1
rpm-python27.x86_64 0:4.11.2-2.64.amzn1
ruby20.x86_64 0:2.0.0.645-1.27.amzn1
ruby20-irb.noarch 0:2.0.0.645-1.27.amzn1
ruby20-libs.x86_64 0:2.0.0.645-1.27.amzn1
rubygem20-bigdecimal.x86_64 0:1.2.0-1.27.amzn1
rubygem20-psych.x86_64 0:2.0.0-1.27.amzn1
rubygems20.noarch 0:2.0.14-1.27.amzn1
time.x86_64 0:1.7-38.9.amzn1
tzdata.noarch 0:2015b-1.33.amzn1
tzdata-java.noarch 0:2015b-1.33.amzn1
unzip.x86_64 0:6.0-2.9.amzn1
yum.noarch 0:3.4.3-137.57.amzn1
yum-metadata-parser.x86_64 0:1.1.4-8.12.amzn1

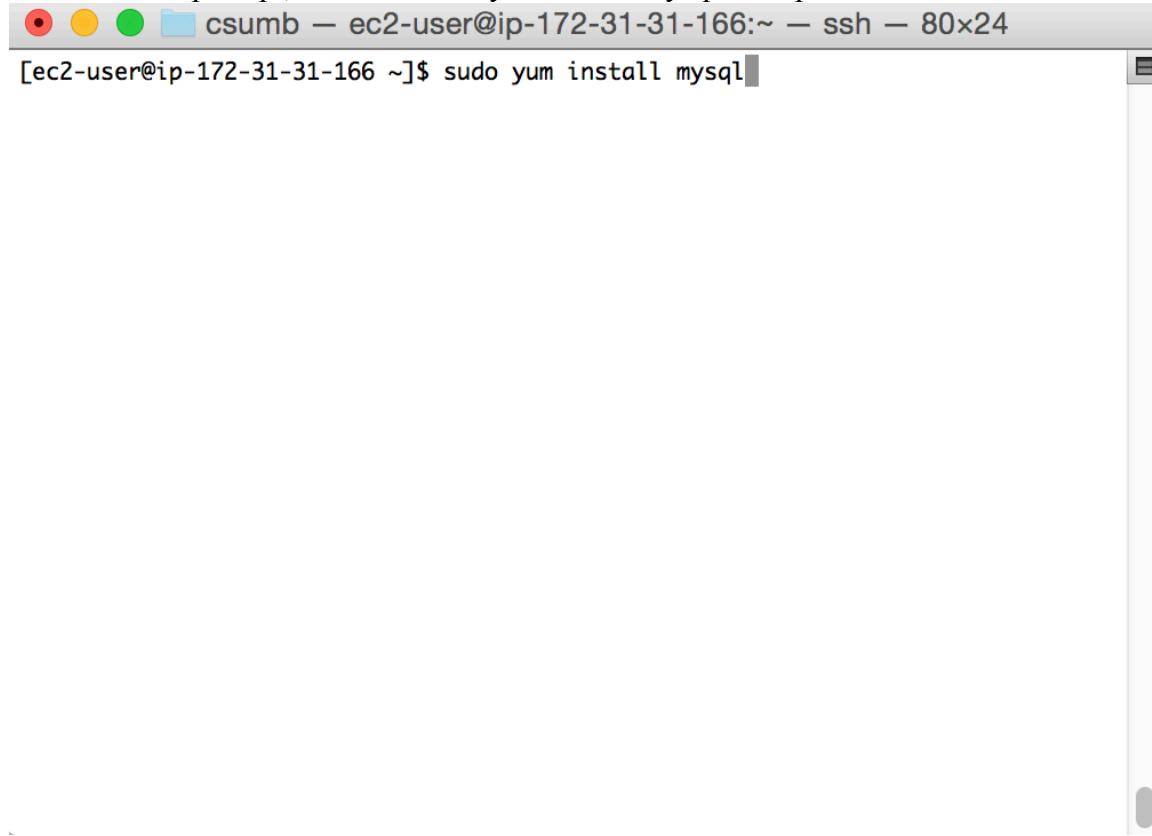
Complete!
[ec2-user@ip-172-31-18-89 ~]$ 
[ec2-user@ip-172-31-18-89 ~]$ 
```

24. Now your server is up, running, and ready. In the future, you can run the same ssh command to log in. Again, there is no reason to shut down your server instance or your database instance, although if you do, you can restart them using the EC2 Console.

Step Three: Installing MySQL on Your Server Instance

Now we need to install the MySQL software on the server instance you just created. To do this, you'll start at the command prompt.

1. At the prompt, enter the text “`yum install mysql`” and press enter.



A screenshot of a terminal window titled "csumb — ec2-user@ip-172-31-31-166:~ — ssh — 80x24". The window shows a command line interface with the following text:

```
[ec2-user@ip-172-31-31-166 ~]$ sudo yum install mysql
```

2. You will be asked to confirm the download and install; enter “y” to confirm.

```
csumb ~ ssh - 80x24
--> Running transaction check
---> Package mysql55-common.x86_64 0:5.5.42-1.4.amzn1 will be installed
---> Package mysql55-libs.x86_64 0:5.5.42-1.4.amzn1 will be installed
--> Finished Dependency Resolution

Dependencies Resolved

=====
Package          Arch      Version       Repository   Size
=====
Installing:
mysql            noarch    5.5-1.6.amzn1   amzn-main   2.7 k
Installing for dependencies:
mysql55          x86_64   5.5.42-1.4.amzn1   amzn-main   7.5 M
mysql55-common   x86_64   5.5.42-1.4.amzn1   amzn-main   48 k
mysql55-libs     x86_64   5.5.42-1.4.amzn1   amzn-main   813 k

Transaction Summary
=====
Install 1 Package (+3 Dependent packages)

Total download size: 8.3 M
Installed size: 31 M
Is this ok [y/d/N]:
```

We aren't actually going to run MySQL here; it's much easier to use Amazon's prebuilt database instance. What we need MySQL installed here for is the client (`mysql`) and the administration client (`mysqladmin`). We will be using this software in Step Six.

Step Four: Creating a Database Instance and Gaining Access

1. On your EC2 console, select the “Services” tab on the top left. Your history will NOT be populated like mine until you do a bit more.

The screenshot shows the AWS Services dashboard with the URL <https://us-west-2.console.aws.amazon.com/rds/home?region=us-west-2#launch-dbinstance:ct=dbinstances>. The dashboard features a navigation bar with links like History, RDS, EC2, Console Home, and IAM. Below the navigation is a grid of AWS services categorized under All AWS Services. The grid includes: API Gateway, DynamoDB, RDS; AppStream, EC2, Redshift; CloudFormation, CloudFront, ElastiCache, Route 53; CloudSearch, CloudTrail, Elastic Beanstalk, S3; CloudWatch, CodeCommit, Elastic Transcoder, Service Catalog; CodeDeploy, CodePipeline, EMR, SES; Cognito, Config, Lambda, SNS; Device Farm, Data Pipeline, Glacier, SQS; Direct Connect, Directory Service, IAM, Storage Gateway; and OpsWorks, WorkSpaces, Trusted Advisor, SWF.

2. Select RDS (Relational Database Service) from All AWS Services; note that the list is in alphabetical order. This will bring you to the RDS Dashboard, where you will select “Instances” on the left list.

The screenshot shows the RDS Dashboard with the URL <https://us-west-2.console.aws.amazon.com/rds/home?region=us-west-2#dbinstances:sf=all>. The dashboard has a sidebar with links for RDS Dashboard, Instances, Reserved Purchases, Snapshots, Security Groups, Parameter Groups, Option Groups, Subnet Groups, Events, Event Subscriptions, and Notifications. The main area features a search bar with "All Instances" selected and a "Launch DB Instance" button. A message states "No DB Instances" and provides instructions to click the "Launch DB Instance" button to get started. A note at the bottom says "Note: Your DB Instances will launch in the US West (Oregon) region."

3. You will have no instances running. Select the “Launch DB Instance” button.

Step 1: Select Engine

Step 2: Production?

Step 3: Specify DB Details

Step 4: Configure Advanced Settings

Do you plan to use this database for production purposes?

For databases used in production or pre-production we recommend:

- Multi-AZ Deployment for high availability (99.95% monthly up time SLA)
- Provisioned IOPS Storage for fast, consistent performance

Billing is based upon the [RDS pricing table](#). An instance which uses these features is not eligible for the [RDS Free Usage Tier](#).

Yes, use Multi-AZ Deployment and Provisioned IOPS Storage as defaults while creating this instance

No, this instance is intended for use outside of production or under the [RDS Free Usage Tier](#)

[Cancel](#) [Previous](#) [Next Step](#)

- This is very important: to keep this database safely under free usage, you MUST select the option “No, this instance is intended for use outside of production or under the RDS Free Usage Tier”. Basically, your telling Amazon you don’t want to pay for high availability and really, really fast I/O, but don’t worry; this is how your database instance would be set up if you were building it yourself. Select the “Next Step” button once you’ve selected this radio button.

Step 1: Select Engine

Step 2: Production?

Step 3: Specify DB Details

Step 4: Configure Advanced Settings

Instance Specifications

DB Engine mysql

License Model general-public-license

DB Engine Version 5.6.23

Review the [Known Issues/Limitations](#) to learn about potential compatibility issues with specific database versions.

DB Instance Class - Select One -

Multi-AZ Deployment - Select One -

Storage Type - Select One -

Allocated Storage* 5 GB

Provisioning less than 100 GB of General Purpose (SSD) storage for high throughput workloads could result in higher latencies upon exhaustion of the initial General Purpose (SSD) IO credit balance. [Click here](#) for more details.

Settings

DB Instance Identifier*

- We need to configure the database instance. The License Model should be set to “general-public-license” (which is the only option for MySQL; they have a “bring

your own license” system for Oracle’s commercial database (Oracle owns MySQL, too)). The DB Engine Version should be set to whatever the most current option is; when these instructions were written, that was 5.6.23. This is not the same version of MySQL you installed on your server instance, but they are compatible. The DB Instance Class should be set to “db.t2.micro – 1 CPU, 1 GiB RAM” (this is the free tier). Multi-AZ Deployment should be set to “No” (it’s not free and we don’t need it; it’s a neat system, though, that keeps a hot copy of your database instance in another region, so if your home region goes down your database will automatically fail over). Don’t hit “Next Step” just yet.

The screenshot shows the AWS RDS 'Specify DB Details' step. On the left, a sidebar lists steps: Step 1: Select Engine, Step 2: Production?, Step 3: Specify DB Details (highlighted in blue), and Step 4: Configure Advanced Settings. A note says 'Your current selection is eligible for the free tier.' Below it is a 'Learn More' link. The main panel is titled 'Specify DB Details' under 'Instance Specifications'. It shows the following settings:

- DB Engine:** mysql
- License Model:** general-public-license
- DB Engine Version:** 5.6.23
- DB Instance Class:** db.t2.micro – 1 vCPU, 1 GiB RAM
- Multi-AZ Deployment:** No
- Storage Type:** General Purpose (SSD)
- Allocated Storage***: 5 GB

A callout box for 'Allocated Storage*' contains a warning: 'Provisioning less than 100 GB of General Purpose (SSD) storage for high throughput workloads could result in higher latencies upon exhaustion of the initial General Purpose (SSD) IO credit balance. Click here for more details.' To the right of the storage type dropdown, there's a list of storage types with descriptions:

- General Purpose (SSD): storage is suitable for a broad range of database workloads. Provides baseline of 3 IOPS/GB and ability to burst to 3,000 IOPS.
- Provisioned IOPS (SSD): storage is suitable for I/O-intensive database workloads. Provides flexibility to provision I/C ranging from 1,000 to 30,000 IOPS.
- Magnetic storage: may be used for small databases.

- For the free tier, you’re allowed 20 GB of Allocated Storage (again, this is separate from the EBS storage on the server instance, and from the S3 shared storage, which we’re not using). It’s unlikely we’ll need this much space, but it’s hard to add it later, so we’ll change it now.

https://us-west-2.console.aws.amazon.com/rds/home?region=us-west-2#launch-dbinstance:ct=dbinstances

Console Home Step 1: Select Engine
Step 2: Production?
Step 3: Specify DB Details
Step 4: Configure Advanced Settings

Your current selection is eligible for the free tier.
[Learn More.](#)

Specify DB Details

Instance Specifications

DB Engine mysql
License Model general-public-license
DB Engine Version 5.6.23

Review the Known Issues/Limitations to learn about potential compatibility issues with specific database versions.

DB Instance Class db.t2.micro — 1 vCPU, 1 GiB RAM
Multi-AZ Deployment No
Storage Type General Purpose (SSD)
Allocated Storage* 20 GB

(Minimum: 5 GB, Maximum: 6144 GB) Higher allocated storage may improve I/O performance.

Provisioning less than 100 GB of General Purpose (SSD) storage for high throughput workloads could result in higher latencies upon exhaustion of the initial General Purpose (SSD) IO credit balance.
[Click here](#) for more details.

Settings

DB Instance Identifier*

7. Now we need to set the access control for the database. There are four fields to fill in. The first is the DB Instance Identifier (do not confuse this with the name of the database, which yeah, that's confusing, but that's why I'm making this point, the DB Instance Identifier is not the same as the name of the database); this can be anything, but I would make it your name plus the initials "db". Next is the database Master Username; in a production database, for security reasons you would almost never use this account, but we're going to use it for convenience, so set it to your username. Set the password something you'll remember. We can always add more accounts later. However, if you forget your Master Username and/or Password, the database is permanently inaccessible and unrecoverable. There's no special access that your instructors have. Fill out the fields and select the "Next Step" button.

Click here for more details.

Settings

DB Instance Identifier* jbgrossdb
Master Username* jbgross
Master Password*
Confirm Password*

Retype the value you specified for Master Password.

* Required Cancel Previous **Next Step**

8. In the Advanced Options, we just need to select the VPC (Virtual Private Cloud) Security Group of “launch-wizard-1 (VPC)”. This is the security group we created earlier. Then select the Launch DB Instance button.

The screenshot shows the 'Configure Advanced Settings' step of the AWS RDS wizard. On the left, a sidebar lists steps: Step 1: Select Engine, Step 2: Production?, Step 3: Specify DB Details, and Step 4: Configure Advanced Settings. The main area is titled 'Configure Advanced Settings' and contains two sections: 'Network & Security' and 'Database Options'. In the 'Network & Security' section, there is a note about using a new certificate bundle. The 'VPC*' dropdown is set to 'Default VPC (vpc-5720bd32)'. The 'Subnet Group' dropdown is set to 'default'. The 'Publicly Accessible' dropdown is set to 'Yes'. The 'Availability Zone' dropdown is set to 'No Preference'. The 'VPC Security Group(s)' dropdown shows three options: 'Create new Security Group default (VPC)', 'launch-wizard-1 (VPC)', and 'launch-wizard-2 (VPC)'. The 'launch-wizard-1 (VPC)' option is highlighted with a gray background. To the right of the form, a tooltip explains that selecting a VPC defines the networking environment for the DB instance.

9. Select the View Your DB Instances button.

This screenshot is identical to the previous one, showing the 'Configure Advanced Settings' step of the AWS RDS wizard. The sidebar and main form layout are the same, but the 'VPC Security Group(s)' dropdown now shows 'launch-wizard-1 (VPC)' selected instead of 'Default VPC (vpc-5720bd32)'. The rest of the configuration remains the same, including the note about the new certificate bundle and the other VPC options.

10. As with the server instance, this will take a few minutes. Select the “Show DB Instances” button. Once your database instance is available, you will note that the console is telling you that you have no access path to the database.

11. Hover your cursor over the red alert triangle next to the words “No Inbound Permissions”. You will see that the security policy for this VPC has no rules to allow inbound traffic. Select the “Edit Security Group” button.

12. This will open a new tab; don’t worry, you can have multiple tabs open to different or the same parts of the console simultaneously. You will see the security group we created earlier, “launch-wizard-1”. Select its checkbox if it’s not, select the Inbound tab near the bottom, and select the Edit button.

The screenshot shows the AWS EC2 Dashboard with the 'Services' menu selected. Under 'NETWORK & SECURITY', 'Security Groups' is expanded. A search bar at the top right contains 'sg-3c38f958'. The main table lists one security group:

Name	Group ID	VPC ID	Description
sg-3c38f958	launch-wizard-1	vpc-5720bd32	launch-wizard-1 created 2015-07-12T21:09:29.391-04:00

The 'Inbound' tab is active, showing the following rule:

Type	Protocol	Port Range	Source
SSH	TCP	22	0.0.0.0/0

13. Select the Add Rule button, and select the type as MySQL/Aurora, the Protocol as TCP, the Port Range as 3306, the Source as Anywhere with an address of 0.0.0.0/0. Then select the Save button. Your database is now accessible from anywhere in the world; again, this is not a real-world security strategy.

The dialog box has the following fields:

Type	Protocol	Port Range	Source
SSH	TCP	22	Anywhere 0.0.0.0/0
MYSQL/Aurora	TCP	3306	Anywhere 0.0.0.0/0

Buttons: Add Rule, Cancel, Save

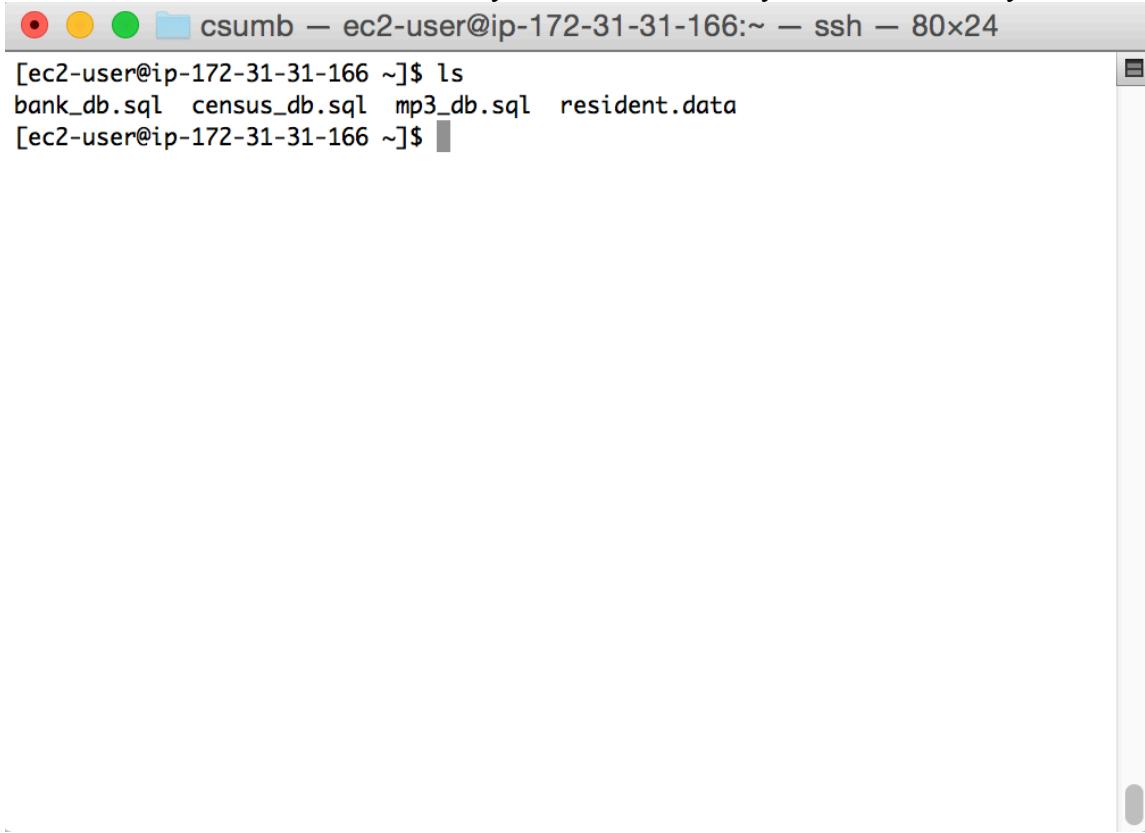
Step Five: Connecting to Your Server and Building the Databases

In order to build the databases you will be using in the course and load them with data, you will need to upload several files to your Linux server.

1. Download the database files from the course website to your personal computer
 bank_db.sql
 census_db.sql
 resident.data
 mp3_db.sql
2. Copy each of the files to your Linux server using scp (Linux/MacOS) following the instructions at
<http://docs.aws.amazon.com/AWSEC2/latest/UserGuide/AccessingInstancesLinux.html> or PuttySCP (Windows command line) or WinSCP (Windows GUI tool),

following the instructions at
<http://docs.aws.amazon.com/AWSEC2/latest/UserGuide/putty.html>.

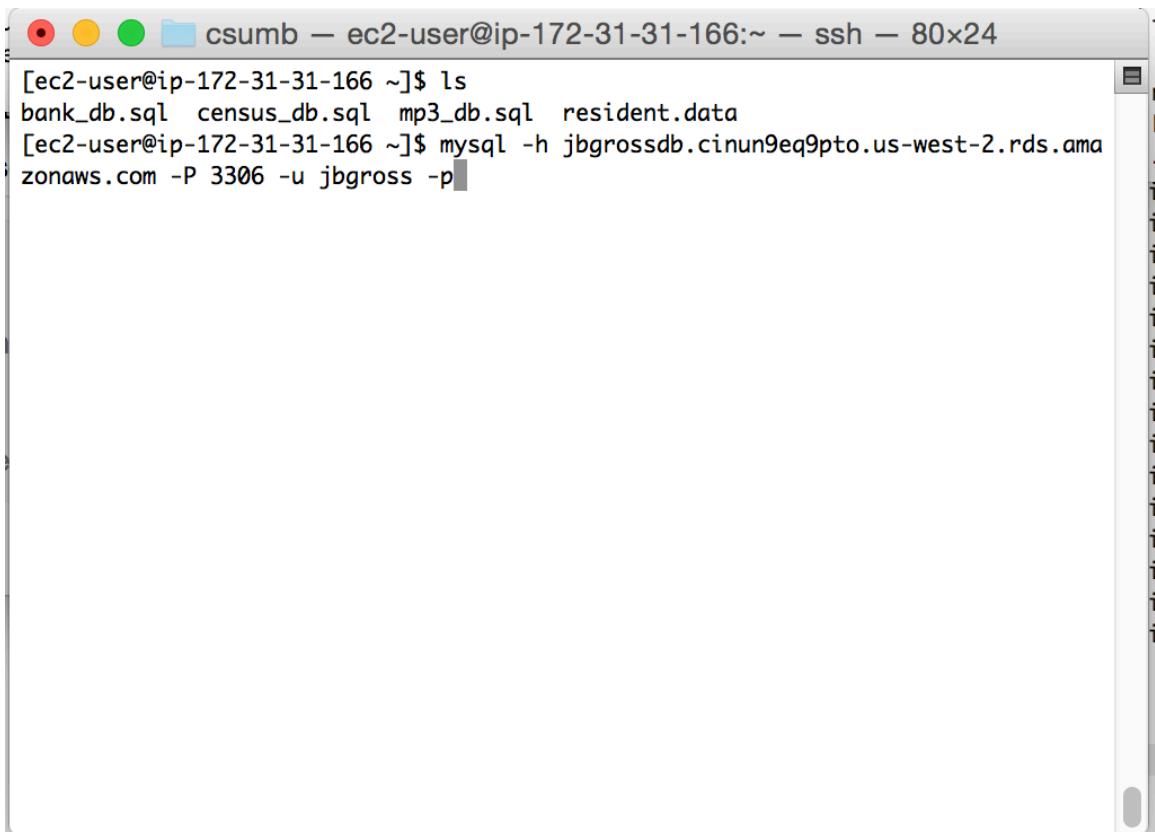
3. Log on to your server instance using ssh (Linux/MacOS) or Putty (Windows).
Use the command “ls” to verify that the files are in your home directory.



A screenshot of a terminal window titled "csumb - ec2-user@ip-172-31-31-166:~ - ssh - 80x24". The window shows the command "ls" being run, and it lists four files: "bank_db.sql", "census_db.sql", "mp3_db.sql", and "resident.data". The terminal has a standard OS X-style title bar with red, yellow, and green buttons.

```
[ec2-user@ip-172-31-31-166 ~]$ ls
bank_db.sql  census_db.sql  mp3_db.sql  resident.data
[ec2-user@ip-172-31-31-166 ~]$
```

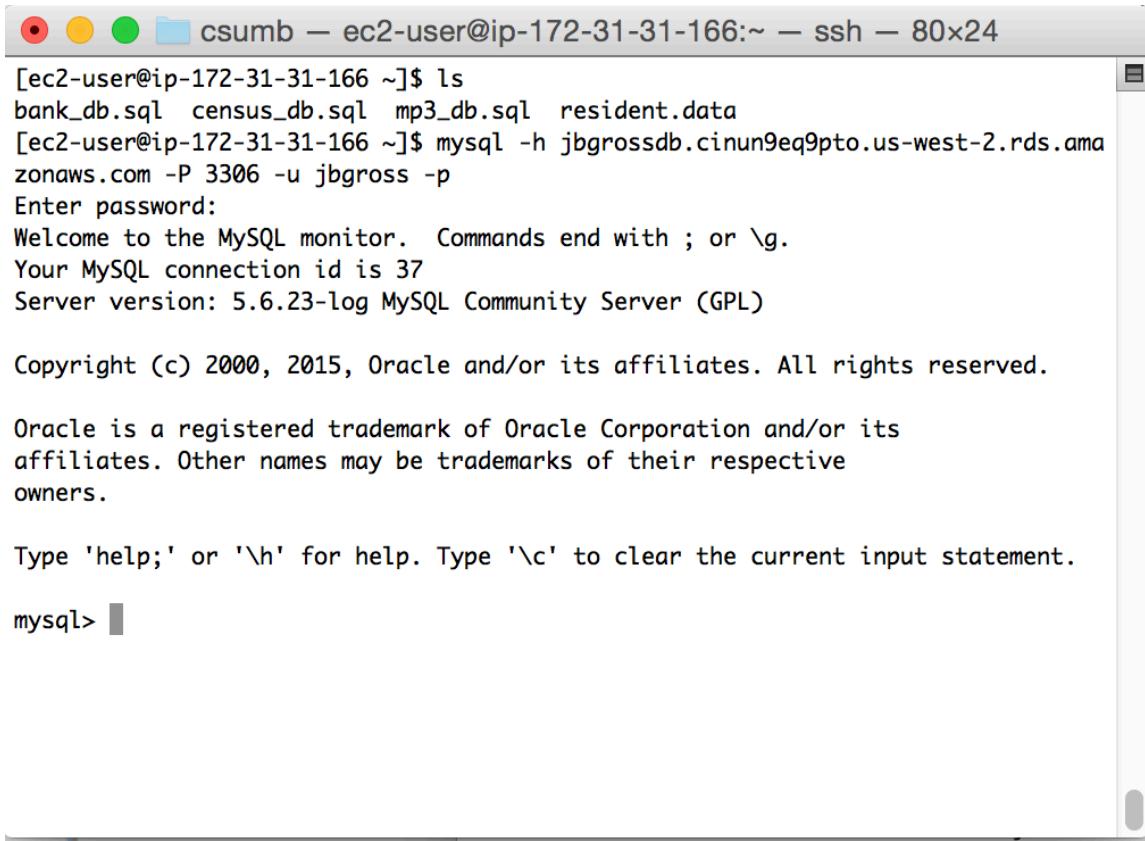
4. Connect to the database from your Linux command prompt using the command
`mysql -h <dns-name>.rds.amazonaws.com -P 3306 -u <your username> -p`
The name of the client software is mysql (mysqld is the server software). The -h option tells the client the hostname (DNS address) of the database instance. The -P option tells the client which port to use. The -u option lets you specify a username, and the -p option (lowercase p this time) tells the client to prompt you for a password when logging you in.

A screenshot of a terminal window titled "csumb — ec2-user@ip-172-31-31-166:~ — ssh — 80x24". The window shows a command-line interface with the following text:

```
[ec2-user@ip-172-31-31-166 ~]$ ls  
bank_db.sql  census_db.sql  mp3_db.sql  resident.data  
[ec2-user@ip-172-31-31-166 ~]$ mysql -h jbgrossdb.cinun9eq9pto.us-west-2.rds.amazonaws.com -P 3306 -u jbgross -p
```

The cursor is visible at the end of the password prompt.

5. This will log you in to the database. From here you can access any data, as well as control security. We're going to build the database from here.



The screenshot shows a terminal window titled "csumb — ec2-user@ip-172-31-31-166:~ — ssh — 80x24". The window contains the following MySQL session:

```
[ec2-user@ip-172-31-31-166 ~]$ ls  
bank_db.sql  census_db.sql  mp3_db.sql  resident.data  
[ec2-user@ip-172-31-31-166 ~]$ mysql -h jbgrossdb.cinun9eq9pto.us-west-2.rds.amazonaws.com -P 3306 -u jbgross -p  
Enter password:  
Welcome to the MySQL monitor. Commands end with ; or \g.  
Your MySQL connection id is 37  
Server version: 5.6.23-log MySQL Community Server (GPL)  
  
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affiliates. Other names may be trademarks of their respective  
owners.  
  
Type 'help;' or '\h' for help. Type '\c' to clear the current input statement.  
mysql> 
```

-
6. To build the database, enter “`\. census_db.sql`”. This tells MySQL to execute a local file named “`census_db.sql`” located in the same directory that you were in when you started the `mysql` client. Note that you cannot use a semicolon at the end. Press enter to build the database; it should take roughly a minute. You may get some beeps or warnings; this is because the script tears down the database and then rebuilds, but if there’s not database to tear down, it reports errors.

```
[ec2-user@ip-172-31-31-166 ~]$ mysql -h jbgrossdb.cinun9eq9pto.us-west-2.rds.amazonaws.com -P 3306 -u jbgross -p
Enter password:
Welcome to the MySQL monitor.  Commands end with ; or \g.
Your MySQL connection id is 42
Server version: 5.6.23-log MySQL Community Server (GPL)

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owners.

Type 'help;' or '\h' for help. Type '\c' to clear the current input statement.

mysql> \. census_db.sql
```

```
Query OK, 1 row affected (0.00 sec)

Query OK, 1 row affected (0.01 sec)

Query OK, 1 row affected (0.01 sec)

Query OK, 1 row affected (0.00 sec)

Query OK, 1 row affected (0.01 sec)

Query OK, 1 row affected (0.00 sec)

Query OK, 1 row affected (0.01 sec)

Query OK, 1 row affected (0.00 sec)

Query OK, 0 rows affected (0.03 sec)

Query OK, 32561 rows affected (0.52 sec)
Records: 32561  Deleted: 0  Skipped: 0  Warnings: 0

Query OK, 0 rows affected (0.01 sec)

mysql>
```

7. To verify that the database built properly, we're going to run a select statement on a view that joins all of the tables. To select the census database, enter "use census" and press enter. Then use the following command to see the age, educational level, and occupation for each person from Yugoslavia. Don't worry that you don't understand the syntax of SQL yet. Note that here you *must* use a semicolon at the end of your statement.

```
select age, education_name, occupation_name from  
resident_data where native_country_name = 'Yugoslavia';
```

```
[ec2-user@ip-172-31-31-166 ~]$ mysql -h jbgrossdb.cinun9eq9pto.us-west-2.rds.amazonaws.com -P 3306 -u jbgross -p  
Enter password:  
Welcome to the MySQL monitor. Commands end with ; or \g.  
Your MySQL connection id is 48  
Server version: 5.6.23-log MySQL Community Server (GPL)  
  
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```

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Type 'help;' or '\h' for help. Type '\c' to clear the current input statement.

```
mysql> use census  
Reading table information for completion of table and column names  
You can turn off this feature to get a quicker startup with -A  
  
Database changed  
mysql> select age, education_name, occupation_name from resident_data where native_country_name = 'Yugoslavia';
```

```
csumb ~ ssh 80x24
ve_country_name = 'Yugoslavia';
+-----+
| age | education_name | occupation_name |
+-----+
| 56 | HS-grad         | Other-service   |
| 25 | Some-college    | Exec-managerial |
| 20 | Some-college    | Adm-clerical   |
| 35 | HS-grad         | Other-service   |
| 40 | 9th             | Other-service   |
| 31 | Bachelors       | Other-service   |
| 66 | Assoc-acdm     | Machine-op-inspct |
| 41 | Bachelors       | Exec-managerial |
| 35 | Bachelors       | Farming-fishing |
| 56 | 7th-8th         | Machine-op-inspct |
| 41 | Assoc-voc       | Craft-repair    |
| 36 | Some-college    | Exec-managerial |
| 45 | Assoc-acdm     | Craft-repair    |
| 43 | 10th            | Transport-moving |
| 22 | HS-grad         | Exec-managerial |
| 29 | Bachelors       | Exec-managerial |
+-----+
16 rows in set (0.01 sec)

mysql> 
```

8. We will cover the rest of the databases later. To leave the database, enter “exit”.
To log off from the ssh connection to your Linux instance, use “exit”.