

# A GUIDE TO USING AMAZON-AWS TO CONDUCT PARALLEL PROCESSING IN R.

PERRY WILLIAMS

Navigate to the Amazon EC2 website



Amazon ec2

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- amazon ec2 **free**
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# Select Amazon EC2 – Amazon AWS:

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## Amazon Elastic Compute Cloud | Virtual Server Hosting

[aws.amazon.com/ec2/](https://aws.amazon.com/ec2/)

Complete Control of Your Servers. Scale Capacity in Minutes. Get Started Today!  
Multiple Instance Types · Easy To Start · Quickly Scale Capacity · Virtual Private Cloud  
Types: Elastic Block Store, EBS-Optimized Instances, Virtual Private Cloud, Elastic Load Balancing

### Instance Types

Our Instance Types are Optimized to Fit Your Use Case. T2, M4 & More.

### Get Started For Free

Free Usage of 40+ AWS Products. EC2, S3, DynamoDB & More.

### Pricing

Pay For What You Use. No Minimum Fee. Estimate Your Monthly Bill Now

### Product Details

Elastic IP Addresses, Auto Scaling, HPC Clusters, & More.

## Amazon EC2 - Amazon AWS

<https://aws.amazon.com/ec2/>

Amazon EC2's simple web service interface allows you to obtain and configure capacity with minimal friction. It provides you with complete control of your computing resources and lets you run on Amazon's proven computing environment. Amazon EC2 reduces the time required to obtain and boot new server instances to ...

### Amazon EC2 Pricing

Learn about the four ways to pay for Amazon EC2 instances: On ...

### Amazon EC2 Product Details

Amazon EC2 presents a true virtual computing environment ...

### Amazon Elastic Compute ...

Amazon Elastic Compute Cloud (Amazon EC2) is a web service ...

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### Amazon EC2 Instance Types

Amazon EC2 provides a wide selection of instance types ...

### Amazon EC2 for Windows ...

The AWS Free Usage Tier includes Amazon EC2 ...

### Amazon EC2 Spot Instances

Amazon EC2 Spot instances are spare compute capacity in the ...

## What Is Amazon EC2? - Amazon Elastic Compute Cloud

<https://docs.aws.amazon.com/AWSEC2/latest/UserGuide/concepts.html>

Amazon Elastic Compute Cloud (Amazon EC2) provides scalable computing capacity in the Amazon Web Services (AWS) cloud. ... Persistent storage volumes for your data using Amazon Elastic Block Store (Amazon EBS), known as Amazon EBS volumes. Multiple physical locations for your resources ...

[Features of Amazon EC2](#) · [How to Get Started with ...](#) · [Accessing Amazon EC2](#)



Amazon EC2 [More images](#)

## Amazon Elastic Compute Cloud

Computer application

Amazon Elastic Compute Cloud forms a central part of Amazon.com's cloud-computing platform. Amazon Web Services, by allowing users to rent virtual computers on which to run their own computer applications. [Wikipedia](#)

**Developed by:** [Amazon.com](#)

**Original author(s):** Amazon.com, Inc

**Initial release:** August 25, 2006; 11 years ago (public beta)

**Operating system:** Linux; Microsoft Windows; FreeBSD

People also search for [View 15+](#)



Linux



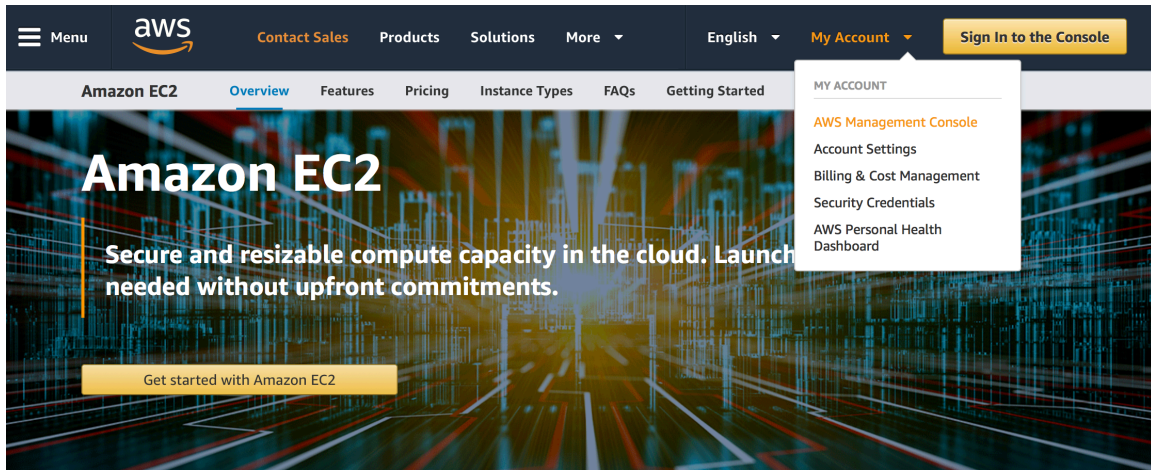
Microsoft Windows



Microsoft Azure

[Feedback](#)

Select “My Account” and “AWS Management Console.” If you haven’t created an account you may need to do so.



Amazon Elastic Compute Cloud (Amazon EC2) is a web service that provides secure, resizable compute capacity in the cloud. It is designed to make web-scale cloud computing easier for developers.

Amazon EC2's simple web service interface allows you to obtain and configure capacity with minimal friction. It provides you with complete control of your computing resources and lets you run on Amazon's proven computing environment. Amazon EC2 reduces the time required to obtain and boot new server instances to minutes, allowing you to quickly scale capacity, both up and down, as your computing requirements change. Amazon EC2 changes the economics of computing by allowing you to pay only for capacity that you actually use. Amazon EC2 provides developers the tools to build failure resilient applications and isolate them from common failure scenarios.

[Try Amazon EC2 for Free](#)

AWS Free Tier includes 750 hours of Linux and Windows t2.micro instances each month for one year. To stay within the Free Tier, use only EC2 Micro instances.

[View AWS Free Tier details >>](#)

# Select EC2:

aws Services Resource Groups

Perry Williams Oregon Support

### AWS services

Find a service by name or feature (for example, EC2, S3 or VM, storage).

Recently visited services

- EC2

All services

- Compute**
  - EC2
  - Lightsail
  - Elastic Container Service
  - Lambda
  - Batch
  - Elastic Beanstalk
- Storage**
  - S3
  - EFS
  - Glacier
  - Storage Gateway
- Database**
  - RDS
  - DynamoDB
  - ElastiCache
  - Amazon Redshift
- Migration**
  - AWS Migration Hub
  - Application Discovery Service
  - Database Migration Service
  - Server Migration Service
  - Snowball
- Networking & Content Delivery**
  - VPC
  - CloudFront
  - Route 53
  - API Gateway
  - Direct Connect
- Management Tools**
  - CloudWatch
  - AWS Auto Scaling
  - CloudFormation
  - CloudTrail
  - Config
  - OpsWorks
  - Service Catalog
  - Systems Manager
  - Trusted Advisor
  - Managed Services
- Media Services**
  - Elastic Transcoder
  - Kinesis Video Streams
  - MediaConvert
  - MediaLive
  - MediaPackage
  - MediaStore
  - MediaTailor
- Machine Learning**
  - Amazon SageMaker
  - Amazon Comprehend
  - AWS DeepLens
  - Amazon Lex
  - Machine Learning
  - Amazon Polly
  - Rekognition
  - Amazon Transcribe
  - Amazon Translate
- Analytics**
  - Athena
  - EMR
  - CloudSearch
- Mobile Services**
  - Mobile Hub
  - AWS AppSync
  - Device Farm
  - Mobile Analytics
- AR & VR**
  - Amazon Sumerian
- Application Integration**
  - Step Functions
  - Amazon MQ
  - Simple Notification Service
  - Simple Queue Service
  - SWF
- Customer Engagement**
  - Amazon Connect
  - Pinpoint
  - Simple Email Service
- Business Productivity**
  - Alexa for Business
  - Amazon Chime
  - WorkDocs
  - WorkMail
- Desktop & App Streaming**
  - WorkSpaces
  - AppStream 2.0
- Internet of Things**
  -


### Helpful tips

- Manage your costs**  
Get real-time billing alerts based on your cost and usage budgets. [Start now](#)
- Create an organization**  
Use AWS Organizations for policy-based management of multiple AWS accounts. [Start now](#)

### Explore AWS

- Amazon Relational Database Service (RDS)**  
RDS manages and scales your database for you. RDS supports Aurora, MySQL, PostgreSQL, MariaDB, Oracle, and SQL Server. [Learn more.](#)
- Real-Time Analytics with Amazon Kinesis**  
Stream and analyze real-time data, so you can get timely insights and react quickly. [Learn more.](#)
- Get Started with Containers on AWS**  
Amazon ECS helps you build and scale containers for any size application. [Learn more.](#)
- AWS Marketplace**  
Discover, procure, and deploy popular software products that run on AWS. [Learn more.](#)
- Have feedback?**  
[Submit feedback](#) to tell us about your experience with the AWS Management Console.

# Launch Instance:

 Services ▾ Resource Groups ▾ 🔍 🔔 Perry Williams

**EC2 Dashboard**

- Events
- Tags
- Reports
- Limits
- INSTANCES
  - Instances
  - Launch Templates
  - Spot Requests
  - Reserved Instances
  - Dedicated Hosts
  - Scheduled Instances
- IMAGES
  - AMIs
  - Bundle Tasks
- ELASTIC BLOCK STORE
  - Volumes
  - Snapshots
- NETWORK & SECURITY
  - Security Groups
  - Elastic IPs
  - Placement Groups
  - Key Pairs
  - Network Interfaces
- LOAD BALANCING
  - Load Balancers
  - Target Groups
- AUTO SCALING
  - Launch Configurations

## Resources

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

1 Running Instances	0 Elastic IPs
0 Dedicated Hosts	0 Snapshots
4 Volumes	0 Load Balancers
3 Key Pairs	11 Security Groups
0 Placement Groups	

Learn more about the latest in AWS Compute from AWS re:Invent 2017 by viewing the [EC2 Videos](#).

## 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

Using a Mac, I select Ubuntu Server 16.04 LTS (HVM), SSD Volume Type.

**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** 1 to 36 of 36 AMIs

Category	AMI Name	Description	Root Device Type	Virtualization Type	ENA Enabled	Architecture	Action
My AMIs	<b>Amazon Linux AMI 2017.09.1 (HVM), SSD Volume Type</b> - ami-d874e0a0	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.	ebs	hvm	Yes	64-bit	Select
AWS Marketplace	<b>Amazon Linux 2 LTS Candidate 2 AMI (HVM), SSD Volume Type</b> - ami-07eb707f	Amazon Linux 2 LTS Candidate 2 provides an updated version of the Linux Kernel (4.14) tuned for EC2, systemd support, a newer compiler (gcc 7.3), an updated C runtime (glibc 2.26), newer tooling (binutils 2.29.1), and the latest software packages through the extras mechanisms.	ebs	hvm	Yes	64-bit	Select
Community AMIs	<b>SUSE Linux Enterprise Server 12 SP3 (HVM), SSD Volume Type</b> - ami-6bc56f13	SUSE Linux Enterprise Server 12 Service Pack 3 (HVM), EBS General Purpose (SSD) Volume Type. Public Cloud, Advanced Systems Management, Web and Scripting, and Legacy modules enabled.	ebs	hvm	Yes	64-bit	Select
	<b>Red Hat Enterprise Linux 7.4 (HVM), SSD Volume Type</b> - ami-223f945a	Red Hat Enterprise Linux version 7.4 (HVM), EBS General Purpose (SSD) Volume Type	ebs	hvm	Yes	64-bit	Select
	<b>Ubuntu Server 16.04 LTS (HVM), SSD Volume Type</b> - ami-4e79ed36	Ubuntu Server 16.04 LTS (HVM), EBS General Purpose (SSD) Volume Type. Support available from Canonical ( <a href="http://www.ubuntu.com/cloud/services">http://www.ubuntu.com/cloud/services</a> ).	ebs	hvm	Yes	64-bit	Select
	<b>Microsoft Windows Server 2016 Base</b> - ami-f3dcbc8b						Select

**Are you launching a database instance? Try Amazon RDS.** Hide

Amazon Relational Database Service (RDS) makes it easy to set up, operate, and scale your database on AWS by automating time-consuming database management tasks. With RDS, you can easily deploy **Amazon Aurora, MariaDB, MySQL, Oracle, PostgreSQL, and SQL Server** databases on AWS. **Aurora** is a MySQL- and PostgreSQL-compatible, enterprise-class database at 1/10th the cost of commercial databases. [Learn more about RDS](#)

[Launch a database using RDS](#)

# The m5.24xlarge Type has 96 cores that can be used. It costs: \$4.608 per hour (as of 19 April 2018)

- 1. Choose AMI
- 2. Choose Instance Type
- 3. Configure Instance
- 4. Add Storage
- 5. Add Tags
- 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: All instance types Current generation Show/Hide Columns

Currently selected: m5.24xlarge (345 ECUs, 96 vCPUs, 2.5 GHz, Intel Xeon Platinum 8175, 384 GiB memory, EBS only)

	Family	Type	vCPUs	Memory (GiB)	Instance Storage (GB)	EBS-Optimized Available	Network Performance	IPv6 Support
<input type="checkbox"/>	General purpose	t2.nano	1	0.5	EBS only	-	Low to Moderate	Yes
<input type="checkbox"/>	General purpose	t2.micro Free tier eligible	1	1	EBS only	-	Low to Moderate	Yes
<input type="checkbox"/>	General purpose	t2.small	1	2	EBS only	-	Low to Moderate	Yes
<input type="checkbox"/>	General purpose	t2.medium	2	4	EBS only	-	Low to Moderate	Yes
<input type="checkbox"/>	General purpose	t2.large	2	8	EBS only	-	Low to Moderate	Yes
<input type="checkbox"/>	General purpose	t2.xlarge	4	16	EBS only	-	Moderate	Yes
<input type="checkbox"/>	General purpose	t2.2xlarge	8	32	EBS only	-	Moderate	Yes
<input type="checkbox"/>	General purpose	m5.large	2	8	EBS only	Yes	Up to 10 Gigabit	Yes
<input type="checkbox"/>	General purpose	m5.xlarge	4	16	EBS only	Yes	Up to 10 Gigabit	Yes
<input type="checkbox"/>	General purpose	m5.2xlarge	8	32	EBS only	Yes	Up to 10 Gigabit	Yes
<input type="checkbox"/>	General purpose	m5.4xlarge	16	64	EBS only	Yes	Up to 10 Gigabit	Yes
<input type="checkbox"/>	General purpose	m5.12xlarge	48	192	EBS only	Yes	10 Gigabit	Yes
<input checked="" type="checkbox"/>	General purpose	m5.24xlarge	96	384	EBS only	Yes	25 Gigabit	Yes
<input type="checkbox"/>	General purpose	m4.large	2	8	EBS only	Yes	Moderate	Yes
<input type="checkbox"/>	General purpose	m4.xlarge	4	16	EBS only	Yes	High	Yes
<input type="checkbox"/>	General purpose	m4.2xlarge	8	32	EBS only	Yes	High	Yes
<input type="checkbox"/>	General purpose	m4.4xlarge	16	64	EBS only	Yes	High	Yes

Cancel Previous Review and Launch Next: Configure Instance Details

# Select "Launch"

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

## Step 7: Review Instance Launch

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

### AMI Details

[Edit AMI](#)

**Free tier eligible** **Ubuntu Server 16.04 LTS (HVM), SSD Volume Type - ami-4e79ed36**  
Ubuntu Server 16.04 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-11  
**Description** launch-wizard-11 created 2018-04-19T10:21:55.049-06:00

Type	Protocol	Port Range	Source	Description
------	----------	------------	--------	-------------

*This security group has no rules*

### Instance Details

[Edit instance details](#)

### Storage

[Edit storage](#)

### Tags

[Edit tags](#)

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



Create a KeyPair for security. When I originally created this document the keypair I created was called “PerryDemKeyPail”. I have since updated the keypair to “PerryKeyPailApril2018”, and use these interchangeably throughout this document.

aws Services Resource Groups Perry Williams Oregon Support

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

### Step 7: Review Instance Launch

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

AMI Details [Edit AMI](#)

Ubuntu Server 16.04 LTS (HVM), SSD Volume Type - ami-4e79ed36

Free tier eligible Ubuntu Server 16.04 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	1	1	1	8	Yes	Low to Moderate

Security Groups [Edit security groups](#)

Security group name  
Description

Type ⓘ

Instance Details [Edit instance details](#)

Storage [Edit storage](#)

Tags [Edit tags](#)

#### 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](#).

Create a new key pair

Key pair name  
PerryDemoKeyPail

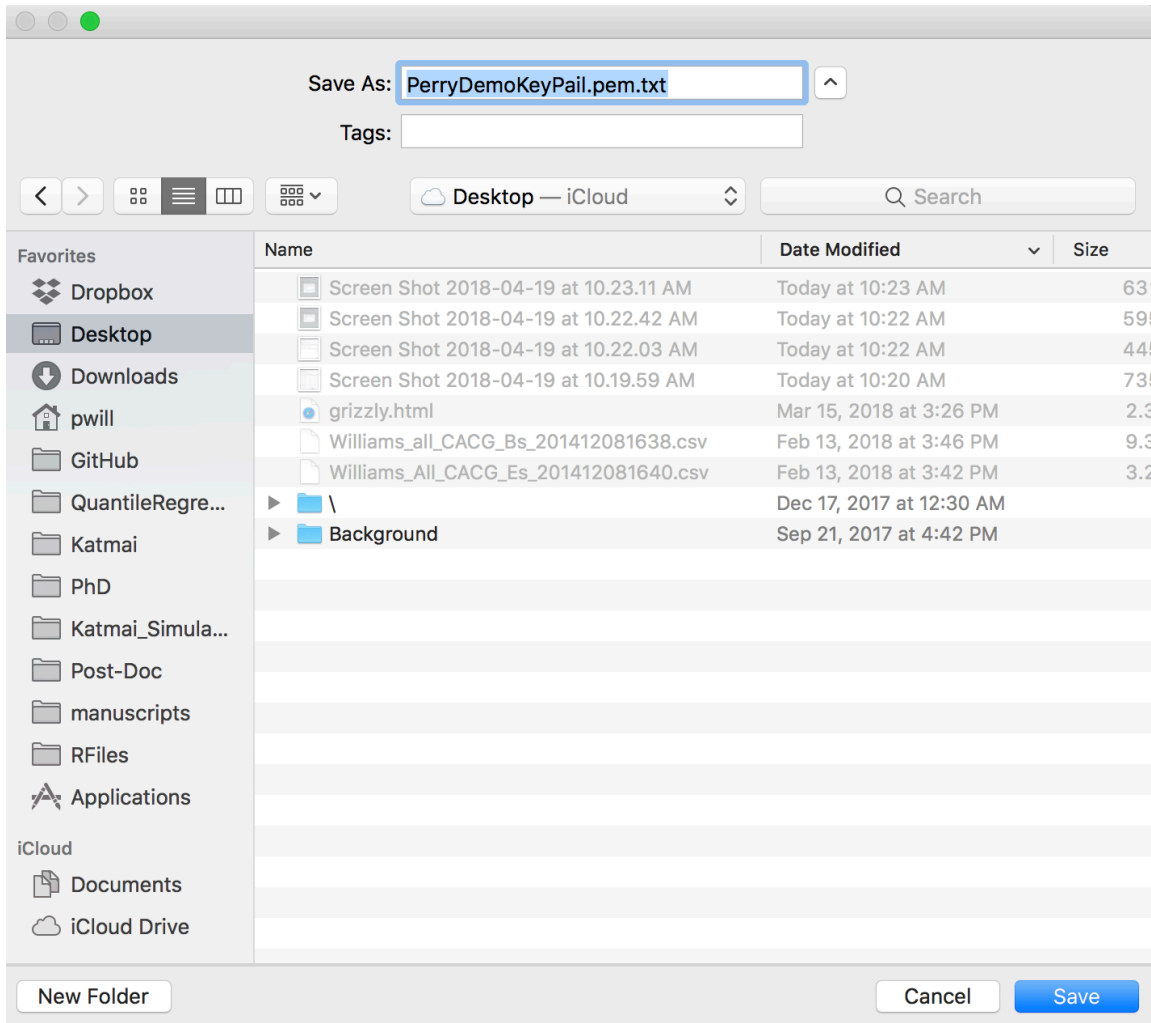
[Download Key Pair](#)

**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](#)

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

Save key pair in a place you'll be able to find it, but delete the ".txt" part listed below



## Select "Launch Instances"

The screenshot shows the AWS Management Console interface during the 'Review Instance Launch' step. The navigation bar at the top includes the AWS logo, 'Services', 'Resource Groups', and user information (Perry Williams, Oregon, Support). The progress bar indicates seven steps, with '7. Review' being the current step.

**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](#)  
**Ubuntu Server 16.04 LTS (HVM), SSD Volume Type - ami-4e79ed36**  
Free tier eligible  
Ubuntu Server 16.04 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](#)  
Table with columns: Instance Type, ECUs, vCPUs, Memory (GiB), Instance Storage (GB), EBS-Optimized Available, Network Performance.  
Row 1: t2.micro, Va, Low to Moderate

**Security Groups** [Edit security groups](#)  
Security group name: Description  
Type ⓘ

**Instance Details** [Edit instance details](#)  
**Storage** [Edit storage](#)  
**Tags** [Edit tags](#)

**Modal: 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](#).  
Create a new key pair ⓘ  
**Key pair name**  
PerryDemoKeyPair  
[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](#)

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

## Select “View Instances”

### Launch Status

✔ **Your instances are now launching**  
The following instance launches have been initiated: [i-0eb2f2292be56602c](#) [View launch log](#)

ℹ **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](#)
- [Amazon EC2: User Guide](#)
- [Learn about AWS Free Usage Tier](#)
- [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](#)

## Push "Connect" to get details of how to connect to instance via ssh

The screenshot shows the AWS Management Console interface for the EC2 service. The top navigation bar includes the AWS logo, 'Services', 'Resource Groups', and user information for 'Perry Williams' in the 'Oregon' region. The left sidebar contains navigation options: EC2 Dashboard, Events, Tags, Reports, Limits, INSTANCES (expanded), Instances (selected), Launch Templates, Spot Requests, Reserved Instances, Dedicated Hosts, and Scheduled Instances.

The main content area displays the 'Instances' page with a search bar and a table of instances. The table has columns for Name, Instance ID, Instance Type, Availability Zone, Instance State, Status Checks, and Alarm Status. One instance is in a 'running' state, while others are 'terminated'.

Name	Instance ID	Instance Type	Availability Zone	Instance State	Status Checks	Alarm Status
	i-03d6ceb5760bd9170	m4.16xlarge	us-west-2c	terminated		None
	i-067ee0a605a3ac871	m4.16xlarge	us-west-2a	terminated		None
	i-0c2ff5b08a7f069a1	m5.24xlarge	us-west-2c	running	2/2 checks ...	None
	i-0c408dc445d0c76a2	t2.micro	us-west-2a	terminated		None
	i-0ece359b5b33e98e6	m5.24xlarge	us-west-2c	terminated		None

**Connect To Your Instance**

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

**To access your instance:**

1. Open an SSH client. (find out how to [connect using PuTTY](#))
2. Locate your private key file (PerryKeyPailApril2018.pem). The wizard automatically detects the key you used to launch the instance.
3. Your key must not be publicly viewable for SSH to work. Use this command if needed:  

```
chmod 400 PerryKeyPailApril2018.pem
```
4. Connect to your instance using its Public DNS:  

```
ec2-34-217-111-216.us-west-2.compute.amazonaws.com
```

**Example:**

```
ssh -i "PerryKeyPailApril2018.pem" ubuntu@ec2-34-217-111-216.us-west-2.compute.amazonaws.com
```

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

If you need any assistance connecting to your instance, please see our [connection documentation](#).

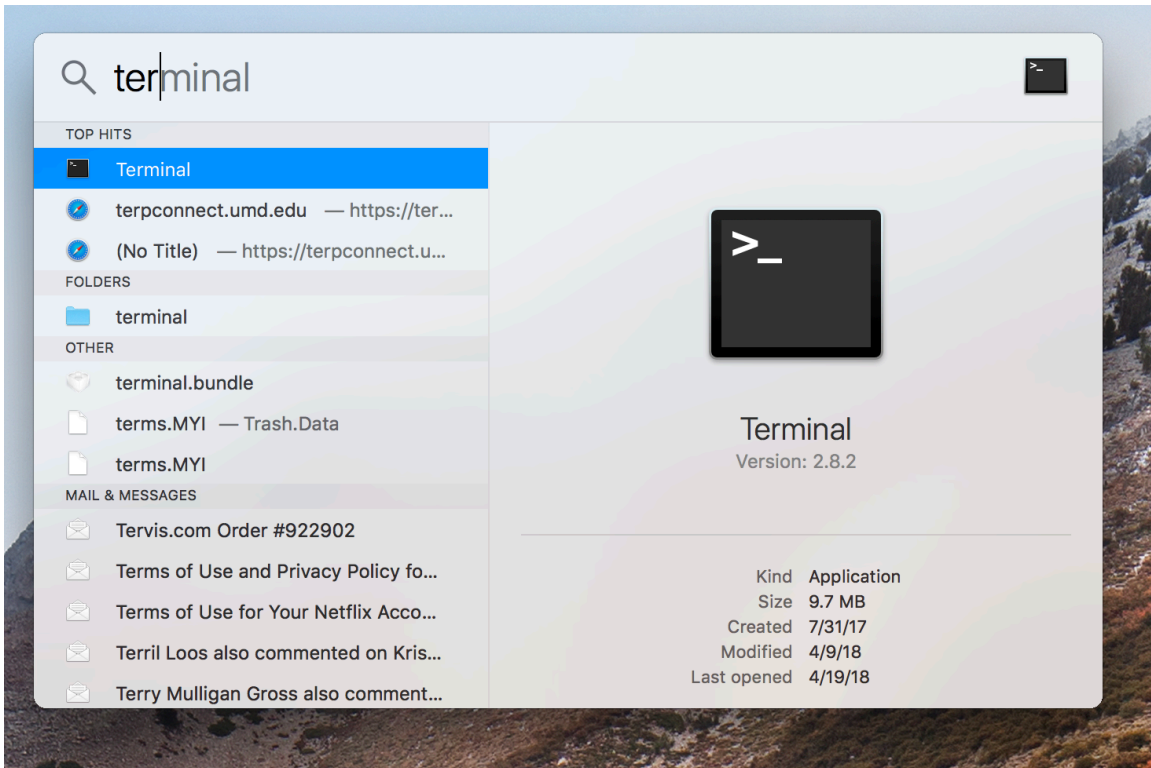
[Close](#)

Name	Instance ID	Instance Type	Availability Zone	Instance State	Status Checks	Alarm Status
	i-03d6ceb5760bd9170	m4.16xlarge	us-west-2c	terminated		None
	i-067ee0a605a3ac871	m4.16xlarge	us-west-2a	terminated		None
	i-0c2ff5b08a7f069a1	m5.24xlarge	us-west-2c	running	2/2 checks ...	None
	i-0c408dc445d0c76a2	t2.micro	us-west-2a	terminated		None

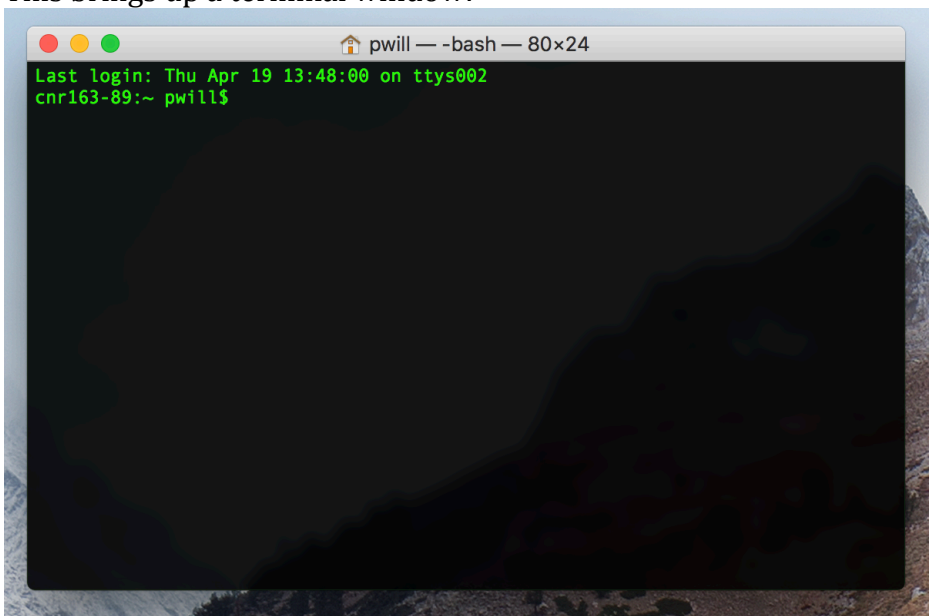
Follow the 4 steps to connect to instance:

1. Open a new terminal/ssh client.

On a Mac, Command>Space to open Finder, then “ter” followed by Return.



This brings up a terminal window:



2. Locate your private key file.

I stored the private key file on the Desktop so type:  
"cd Desktop" in the terminal:

```
pwill$ cd Desktop
```

The screenshot shows the AWS Management Console interface. A dialog box titled "Connect To Your Instance" is open, providing instructions on how to access the instance. The dialog includes two radio button options: "A standalone SSH client" (selected) and "A Java SSH Client directly from my browser (Java required)". Below these options, a list of steps is provided:

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

```
chmod 400 PerryDemoKeyPair.pem
```
4. Connect to your instance using its Public DNS:  

```
ec2-54-191-252-18.us-west-2.compute.amazonaws.com
```

An "Example:" section shows the command: 

```
ssh -i "PerryDemoKeyPair.pem" ubuntu@ec2-54-191-252-18.us-west-2.compute.amazonaws.com
```

Below the example, it states: "Please note that in most cases the username above will be ubuntu. For more information, see the instructions to ensure that the AMI owner has not changed the default user." It also includes a link: "If you need any assistance connecting to your instance, please see [this page](#)."

In the background, a terminal window is open, showing the command `cd Desktop` being executed. The terminal output shows the last login time and the current directory: 

```
Last login: Thu Apr 19 10:28:37 on ttys003  
cnr163-89:~ pwill$ cd Desktop
```



Look at files on the desktop and notice .pem file is there.

Desktop pwill\$ ls

The screenshot shows the AWS Management Console interface for connecting to an EC2 instance. The main window is titled "Connect To Your Instance" and contains the following text:

**I would like to connect with**

- A standalone SSH client
- A Java SSH Client directly from my browser (Java required)

**To access your instance:**

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

```
chmod 400 PerryDemoKeyPail.pem
```
4. Connect to your instance using its Public DNS:

**Example:**

```
ssh -i "PerryDemoKeyPail.pem" ec2-54-191-254-111.compute-1.amazonaws.com
```

Please note that in order to connect to your instance, you must have the instructions to ensure that your key file is properly configured.

If you need any assistance connecting to your instance, see [Getting started with SSH](#).

Overlaid on this is a terminal window titled "Desktop -- -bash -- 80x24" showing the following output:

```
Last login: Thu Apr 19 10:29:31 on ttys002
[cnr163-89:~ pwill$ cd Desktop
[cnr163-89:Desktop pwill$ ls
Background
EC2 Instructions.docx
PerryDemoKeyPail.pem
Screen Shot 2018-04-19 at 10.28.57 AM.png
Screen Shot 2018-04-19 at 10.29.40 AM.png
Williams_All_CACG_Es_201412081640.csv
Williams_all_CACG_Bs_201412081638.csv
\
grizzly.html
[cnr163-89:Desktop pwill$
```

At the bottom of the console, the instance state is shown as "running" and the IPv4 Public IP is "54.191.254.111".

3. Run `chmod 400 PerryKeyPailApril2018.pem` in terminal (or whatever the keypair is).

```
Desktop pwill$ chmod 400 PerryKeyPailApril2018.pem
```

**Connect To Your Instance**

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

To access your instance:

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

```
chmod 400 PerryDemoKeyPail.pem
```
4. Connect to your instance using its Public DNS:

**Example:**

```
ssh -i "PerryDemoKeyPail.pem" ec2-54-191-251-100.compute-1.amazonaws.com
```

Please note that in the terminal output, the IP address is replaced by the instance's Public DNS. Instructions to ensure the key file permissions are correct are provided.

If you need any assistance connecting to your instance, see [Connect to your Amazon EC2 instance](#).

Instance ID	ec2-54-191-251-100
Instance state	running
Instance type	t2.micro
Elastic IPs	-
Private DNS	ip-172-31-31-100.compute-1.amazonaws.com

#### 4. Connect to your instance using its Public DNS:

```
Desktop pwill$ ssh -i "PerryKeyPailApril2018.pem" ubuntu@ec2-34-217-111-216.us-west-2.compute.amazonaws.com
```

**Connect To Your Instance**

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

To access your instance:

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

```
chmod 400 PerryDemoKeyPail.pem
```
4. Connect to your instance using its Public DNS:  

```
ec2-54-191-252-18.us-west-2.compute.amazonaws.com
```

**Example:**

```
ssh -i "PerryDemoKeyPail.pem" ubuntu@ec2-54-191-252-18.us-west-2.compute.amazonaws.com
```

Please note that if you need any assistance

```
Last login: Thu Apr 19 10:29:31 on ttys002
[cr163-89:~ pwill$ cd Desktop
[cr163-89:Desktop pwill$ ls
Background
EC2 Instructions.docx
PerryDemoKeyPail.pem
Screen Shot 2018-04-19 at 10.28.57 AM.png
Screen Shot 2018-04-19 at 10.29.40 AM.png
Williams_All_CACG_Es_201412081640.csv
Williams_all_CACG_Bs_201412081638.csv
\
grizzly.html
[cr163-89:Desktop pwill$ chmod 400 PerryDemoKeyPail.pem
[cr163-89:Desktop pwill$ ssh -i "PerryDemoKeyPail.pem" ubuntu@ec2-54-191-252-18.us-west-2.compute.amazonaws.com
```

Type in "yes" and push return

Desktop pwill \$yes

**Connect To Your Instance**

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

**To access your instance:**

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

```
chmod 400 PerryDemoKeyPair.pem
```
4. Connect to your instance using its Public DNS:  

```
ec2-54-191-252-18.us-west-2.compute.amazonaws.com
```

**Example:**

```
ssh -i "PerryDemoKeyPair.pem" ubuntu@ec2-54-191-252-18.us-west-2.compute.amazonaws.com
```

Please note that it is your responsibility to ensure you have the correct permissions and instructions to connect to your instance.

If you need any assistance, please refer to the [EC2 Instance Connect User Guide](#).

**Close**

```
Desktop — ssh -i PerryDemoKeyPair.pem ubuntu@ec2-54-191-252-18.us-west-2.compute.amazonaws.com
Last login: Thu Apr 19 10:29:31 on ttys002
cnr163-89:~ pwill$ cd Desktop
cnr163-89:Desktop pwill$ ls
Background
EC2_Instructions.docx
PerryDemoKeyPair.pem
Screen Shot 2018-04-19 at 10.28.57 AM.png
Screen Shot 2018-04-19 at 10.29.40 AM.png
Williams_All_CACG_Es_201412081640.csv
Williams_all_CACG_Bs_201412081638.csv
\
grizzly.html
cnr163-89:Desktop pwill$ chmod 400 PerryDemoKeyPair.pem
cnr163-89:Desktop pwill$ ssh -i "PerryDemoKeyPair.pem" ubuntu@ec2-54-191-252-18.us-west-2.compute.amazonaws.com
The authenticity of host 'ec2-54-191-252-18.us-west-2.compute.amazonaws.com (54.191.252.18)' can't be established.
ECDSA key fingerprint is SHA256:FQprjsUQ5D1/q8DIR30a8ZonDhRYKsRqa66CNTeV2gU.
Are you sure you want to continue connecting (yes/no)? yes
```

Our terminal is now connected to the instance (keep this terminal open for later use).

```
Desktop — ubuntu@ip-172-31-31-26: ~ — ssh -i PerryDemoKeyPair.pem ubun...

* Documentation: https://help.ubuntu.com
* Management:    https://landscape.canonical.com
* Support:       https://ubuntu.com/advantage

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

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

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

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

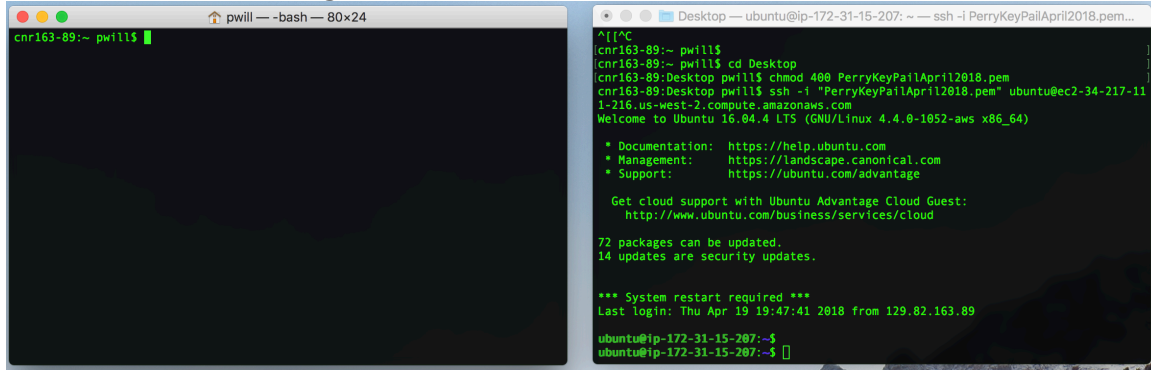
To run a command as administrator (user "root"), use "sudo <command>".
See "man sudo_root" for details.

ubuntu@ip-172-31-31-26:~$
```

Transfer files to instance—I want to transfer my files to process on the remote instance. I’m going to use “scp” (secure-copy-paste)

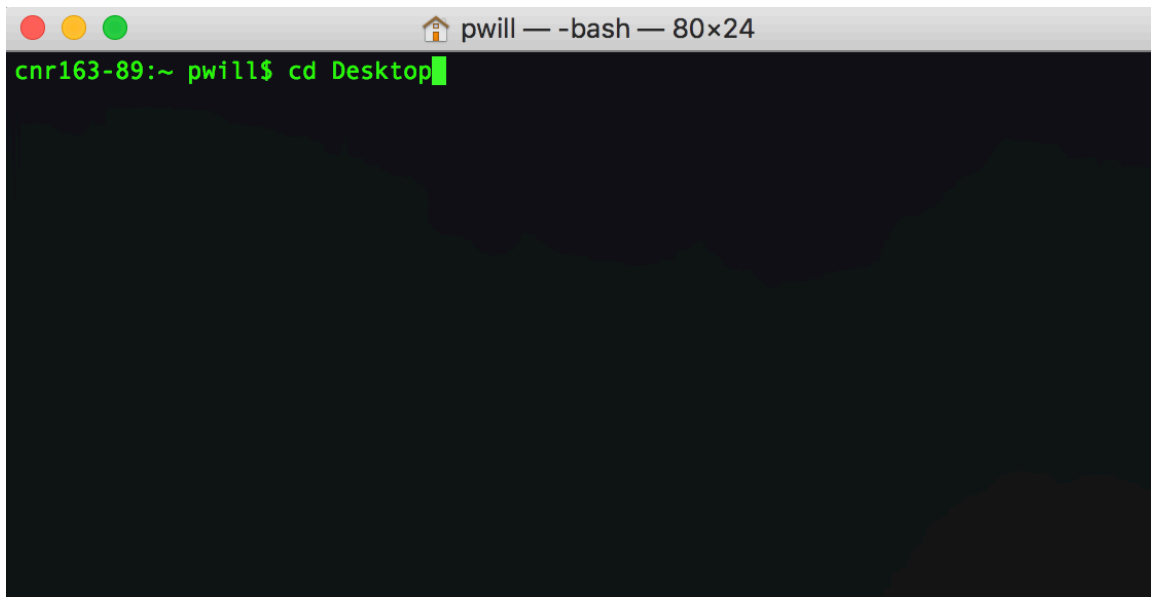
First open new terminal (we’ll put this side-by-side with the previous terminal connected to the remote instance):

Left: **Local Terminal**. Right: **Remote terminal**



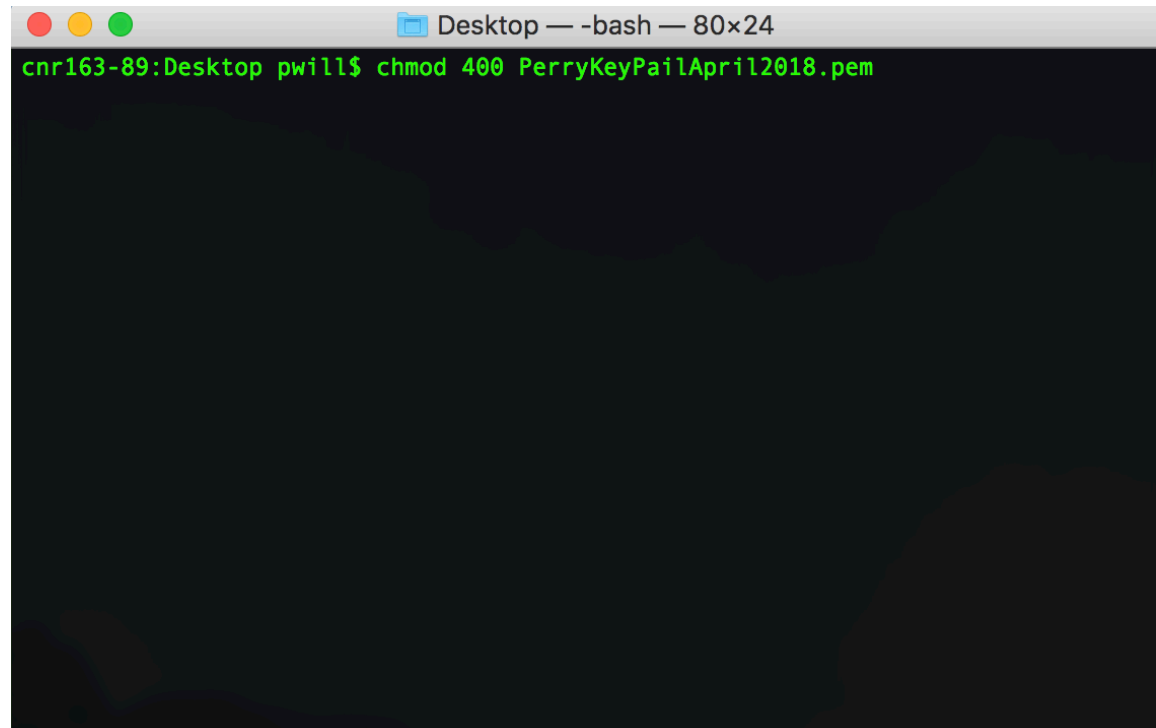
```
cnr163-89:~ pwill$  
^[[C  
[cnr163-89:~ pwill$  
[cnr163-89:~ pwill$ cd Desktop  
[cnr163-89:Desktop pwill$ chmod 400 PerryKeyPairApril2018.pem  
[cnr163-89:Desktop pwill$ ssh -i "PerryKeyPairApril2018.pem" ubuntu@ec2-34-217-11  
1-216.us-west-2.compute.amazonaws.com  
Welcome to Ubuntu 16.04.4 LTS (GNU/Linux 4.4.0-1052-aws x86_64)  
  
* Documentation:  https://help.ubuntu.com  
* Management:    https://landscape.canonical.com  
* Support:        https://ubuntu.com/advantage  
  
Get cloud support with Ubuntu Advantage Cloud Guest:  
http://www.ubuntu.com/business/services/cloud  
  
72 packages can be updated,  
14 updates are security updates.  
  
*** System restart required ***  
Last login: Thu Apr 19 19:47:41 2018 from 129.82.163.89  
ubuntu@ip-172-31-15-207:~$  
ubuntu@ip-172-31-15-207:~$
```

Next, on the **Local Terminal**, navigate to where key pair is stored:



```
cnr163-89:~ pwill$ cd Desktop
```

Make sure it is secure.

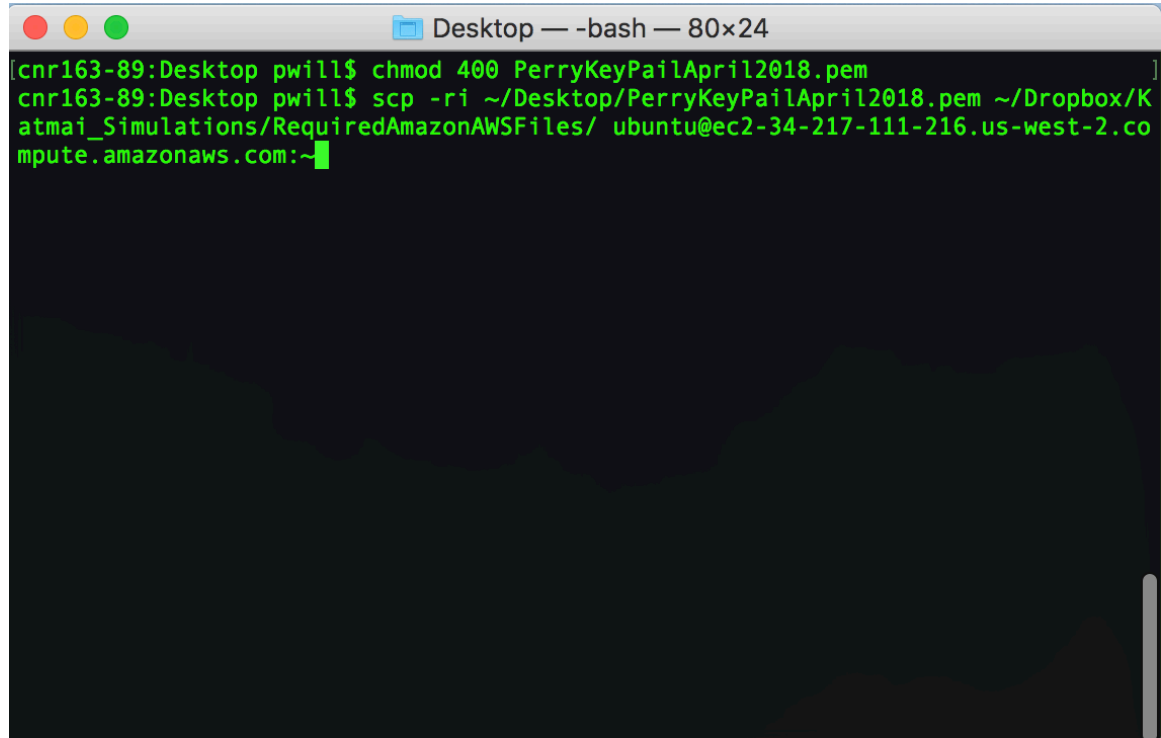
A terminal window with a grey title bar containing three colored window control buttons (red, yellow, green) on the left and the text "Desktop — -bash — 80x24" on the right. The terminal area has a black background with green text. The text shows the prompt "cnr163-89:Desktop pwill\$" followed by the command "chmod 400 PerryKeyPairApril2018.pem".

```
cnr163-89:Desktop pwill$ chmod 400 PerryKeyPairApril2018.pem
```

Next use 'scp' to move the files we will need from local directory to remote instance:

```
Desktop pwill$ scp -ri ~/Desktop/PerryKeyPailApril2018.pem  
~/Dropbox/Katmai_Simulations/RequiredAmazonAWSFiles/  
ubuntu@ec2-34-217-111-216.us-west-2.compute.amazonaws.com:~
```

#### Local Terminal



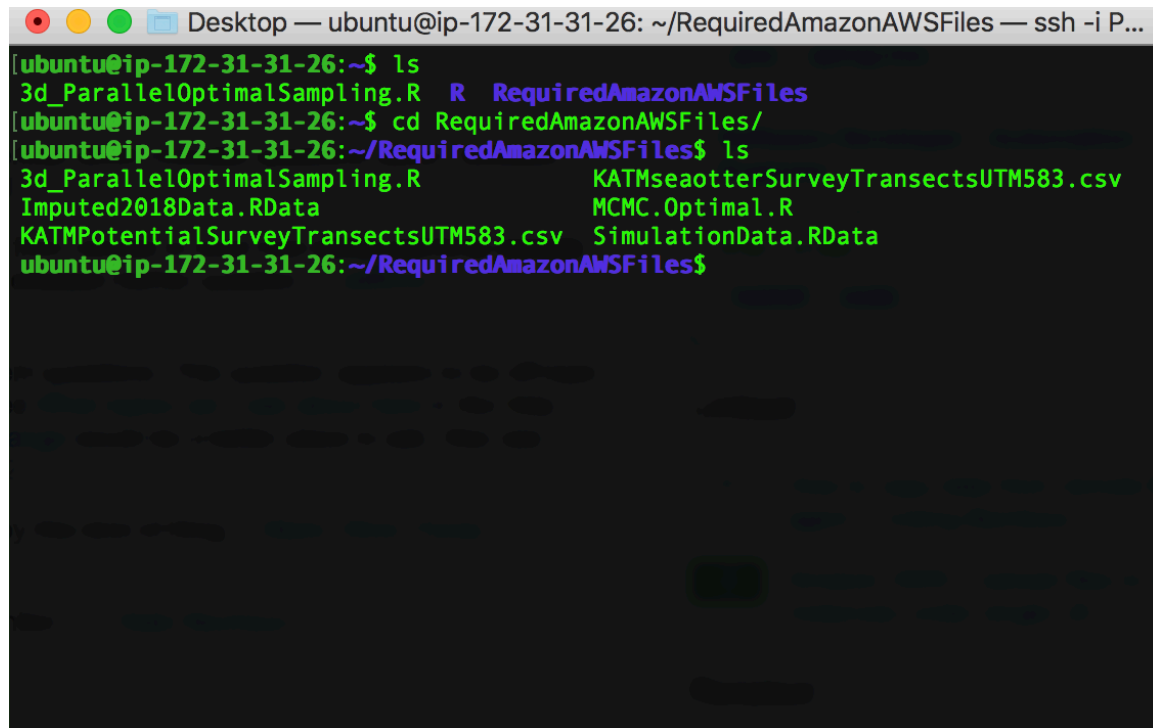
```
Desktop — -bash — 80x24  
[cnr163-89:Desktop pwill$ chmod 400 PerryKeyPailApril2018.pem  
cnr163-89:Desktop pwill$ scp -ri ~/Desktop/PerryKeyPailApril2018.pem ~/Dropbox/K  
atmai_Simulations/RequiredAmazonAWSFiles/ ubuntu@ec2-34-217-111-216.us-west-2.co  
mpute.amazonaws.com:~
```



Go back to the other terminal that we kept open to make sure the file transfer worked. Type “ls” and make sure the file is stored on the remote instance. The files in “RequiredAmazonAWSFiles” are now located in the remote instance.

```
ubuntu@ip-172-31-15-207:~$ ls
R RequiredAmazonAWSFiles
ubuntu@ip-172-31-15-207:~$ cd RequiredAmazonAWSFiles/
ubuntu@ip-172-31-15-207:~/RequiredAmazonAWSFiles$ ls
3d_ParallelOptimalSampling.R
KATMseaotterSurveyTransectsUTM583.csv
Imputed2018Data.RData
KATMPotentialSurveyTransectsUTM583.csv
MCMC.Optimal.R
SimulationData.RData
```

### Remote terminal



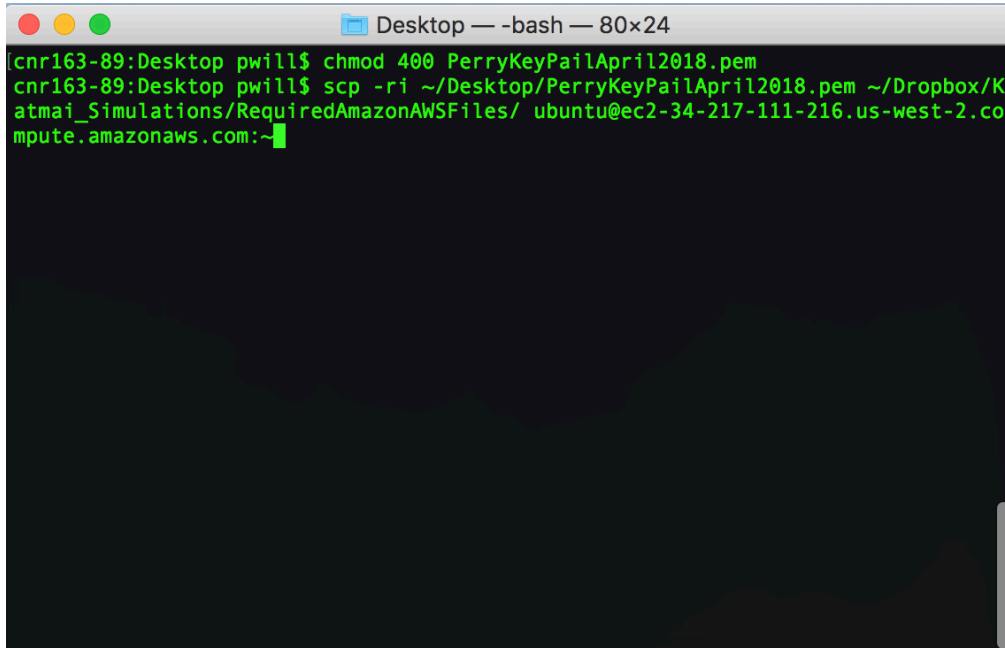
The screenshot shows a terminal window titled "Desktop — ubuntu@ip-172-31-31-26: ~/RequiredAmazonAWSFiles — ssh -i P...". The terminal output is as follows:

```
[ubuntu@ip-172-31-31-26:~$ ls
3d_ParallelOptimalSampling.R R RequiredAmazonAWSFiles
[ubuntu@ip-172-31-31-26:~$ cd RequiredAmazonAWSFiles/
[ubuntu@ip-172-31-31-26:~/RequiredAmazonAWSFiles$ ls
3d_ParallelOptimalSampling.R          KATMseaotterSurveyTransectsUTM583.csv
Imputed2018Data.RData                 MCMC.Optimal.R
KATMPotentialSurveyTransectsUTM583.csv SimulationData.RData
ubuntu@ip-172-31-31-26:~/RequiredAmazonAWSFiles$
```

Now we need to install R on the remote instance.

Type in the **Remote** terminal:

```
sudo apt-key adv --keyserver keyserver.ubuntu.com --recv-keys E298A3A825C0D65DFD57CBB651716619E084DAB9
```

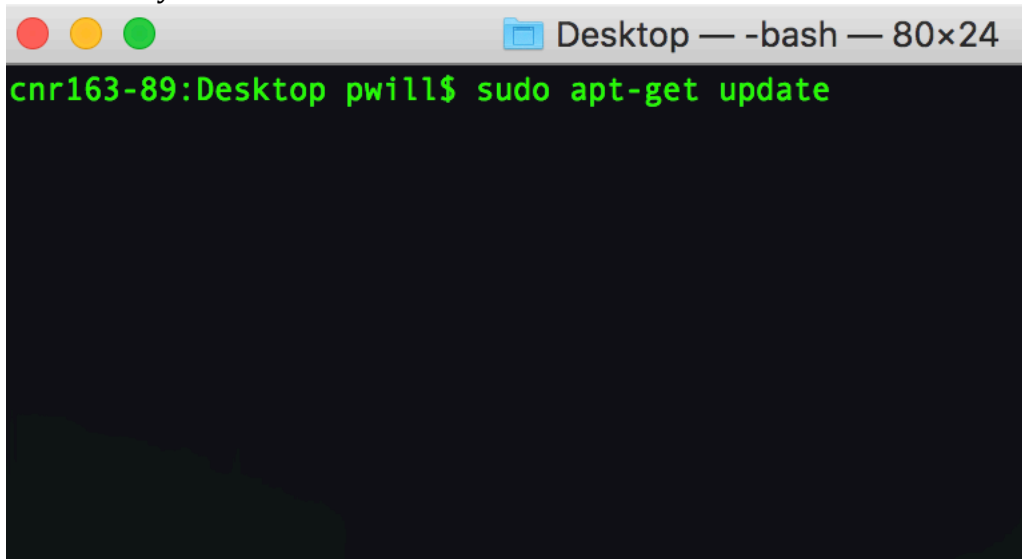


```
Desktop — -bash — 80x24
cnr163-89:Desktop pwill$ chmod 400 PerryKeyPailApril2018.pem
cnr163-89:Desktop pwill$ scp -ri ~/Desktop/PerryKeyPailApril2018.pem ~/Dropbox/K
atmai_Simulations/RequiredAmazonAWSFiles/ ubuntu@ec2-34-217-111-216.us-west-2.co
mpute.amazonaws.com:~
```

Followed by:

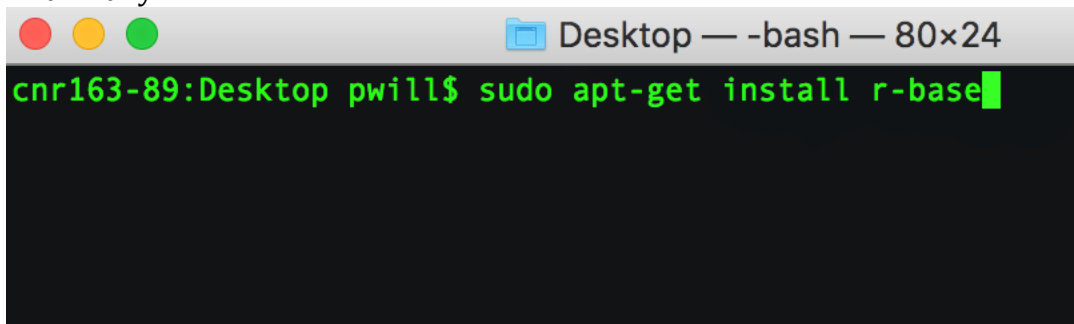
```
sudo add-apt-repository 'deb [arch=amd64,i386]
https://cran.rstudio.com/bin/linux/ubuntu xenial/'
Desktop — ubuntu@ip-172-31-15-207: ~ — ssh -i PerryKeyPailApril2018.pem...
ubuntu@ip-172-31-15-207:~$ sudo add-apt-repository 'deb [arch=amd64,i386] https:
//cran.rstudio.com/bin/linux/ubuntu xenial/'
```

Followed by:



```
Desktop — -bash — 80x24
cnr163-89:Desktop pwill$ sudo apt-get update
```

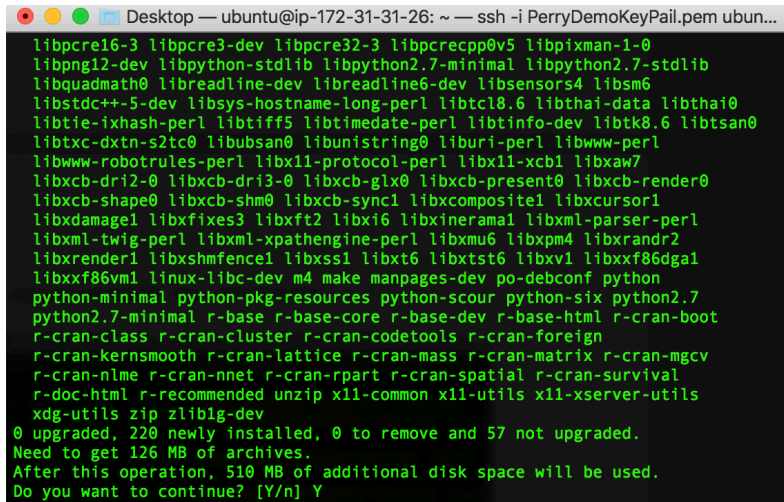
And finally:



```
Desktop — -bash — 80x24
cnr163-89:Desktop pwill$ sudo apt-get install r-base
```

Yes, you want to continue:

### Remote Terminal



```
Desktop — ubuntu@ip-172-31-31-26: ~ — ssh -i PerryDemoKeyPail.pem ubun...
libpcre16-3 libpcre3-dev libpcre32-3 libpcrecpp0v5 libpixmap-1-0
libpng12-dev libpython-stdlib libpython2.7-minimal libpython2.7-stdlib
libquadmath0 libreadline-dev libreadline6-dev libsensors4 libsm6
libstdc++-5-dev libsys-hostname-long-perl libtcl8.6 libthai-data libthai0
libtie-ixhash-perl libtiff5 libtimedate-perl libtinfo-dev libtk8.6 libtsan0
libtxc-dxtn-s2tc0 libubsan0 libunistring0 liburi-perl libwww-perl
libwww-robotrules-perl libx11-protocol-perl libx11-xcb1 libxaw7
libxcb-dri2-0 libxcb-dri3-0 libxcb-glx0 libxcb-present0 libxcb-render0
libxcb-shape0 libxcb-shm0 libxcb-sync1 libxcomposite1 libxcursor1
libxdamage1 libxf86vm3 libxft2 libx16 libxinerama1 libxml-parser-perl
libxml-twig-perl libxml-xpathengine-perl libxmu6 libxpm4 libxrandr2
libxrender1 libxshmfence1 libxss1 libxt6 libxtst6 libxv1 libxxf86dgal
libxxf86vm1 linux-libc-dev m4 make manpages-dev po-debconf python
python-minimal python-pkg-resources python-scour python-six python2.7
python2.7-minimal r-base r-base-core r-base-dev r-base-html r-cran-boot
r-cran-class r-cran-cluster r-cran-codetools r-cran-foreign
r-cran-kernsmooth r-cran-lattice r-cran-mass r-cran-matrix r-cran-mgcv
r-cran-nlme r-cran-nnet r-cran-rpart r-cran-spatial r-cran-survival
r-doc-html r-recommended unzip x11-common x11-utils x11-xserver-utils
xdg-utils zip zlib1g-dev
0 upgraded, 220 newly installed, 0 to remove and 57 not upgraded.
Need to get 126 MB of archives.
After this operation, 510 MB of additional disk space will be used.
Do you want to continue? [Y/n] Y
```

Check if R is installed correctly by opening it:

### Remote Terminal

```
Desktop — ubuntu@ip-172-31-31-26: ~ — ssh -i PerryDemoKeyPair.pem ubun...
Setting up r-cran-codetools (0.2-14-1) ...
Setting up r-recommended (3.2.3-4) ...
Setting up r-base (3.2.3-4) ...
Setting up liblzma-dev:amd64 (5.1.1alpha+20120614-2ubuntu2) ...
Setting up r-doc-html (3.2.3-4) ...
Setting up x11-utils (7.7+3) ...
Setting up x11-xserver-utils (7.7+7) ...
Setting up libauthen-sasl-perl (2.1600-1) ...
Setting up r-base-html (3.2.3-4) ...
Setting up libwww-perl (6.15-1) ...
Setting up libxml-parser-perl (2.44-1build1) ...
Setting up intltool (0.51.0-2ubuntu1.16.04.1) ...
Setting up libxml-twig-perl (1:3.48-1) ...
Setting up libnet-dbus-perl (1.1.0-3build1) ...
Setting up dh-strip-nondeterminism (0.015-1) ...
Setting up debhelper (9.20160115ubuntu3) ...
Setting up liblwp-protocol-https-perl (6.06-2) ...
Setting up dh-translations (129) ...
Setting up cdb (0.4.130ubuntu2) ...
Setting up r-base-dev (3.2.3-4) ...
Processing triggers for libc-bin (2.23-0ubuntu10) ...
Processing triggers for systemd (229-4ubuntu21.1) ...
Processing triggers for ureadahead (0.100.0-19) ...
ubuntu@ip-172-31-31-26:~$ R
```

### Remote Terminal

```
Desktop — ubuntu@ip-172-31-15-207: ~/RequiredAmazonAWSFiles — ssh -i P...
ubuntu@ip-172-31-15-207:~/RequiredAmazonAWSFiles$ R

R version 3.4.4 (2018-03-15) -- "Someone to Lean On"
Copyright (C) 2018 The R Foundation for Statistical Computing
Platform: x86_64-pc-linux-gnu (64-bit)

R is free software and comes with ABSOLUTELY NO WARRANTY.
You are welcome to redistribute it under certain conditions.
Type 'license()' or 'licence()' for distribution details.

Natural language support but running in an English locale

R is a collaborative project with many contributors.
Type 'contributors()' for more information and
'citation()' on how to cite R or R packages in publications.

Type 'demo()' for some demos, 'help()' for on-line help, or
'help.start()' for an HTML browser interface to help.
Type 'q()' to quit R.

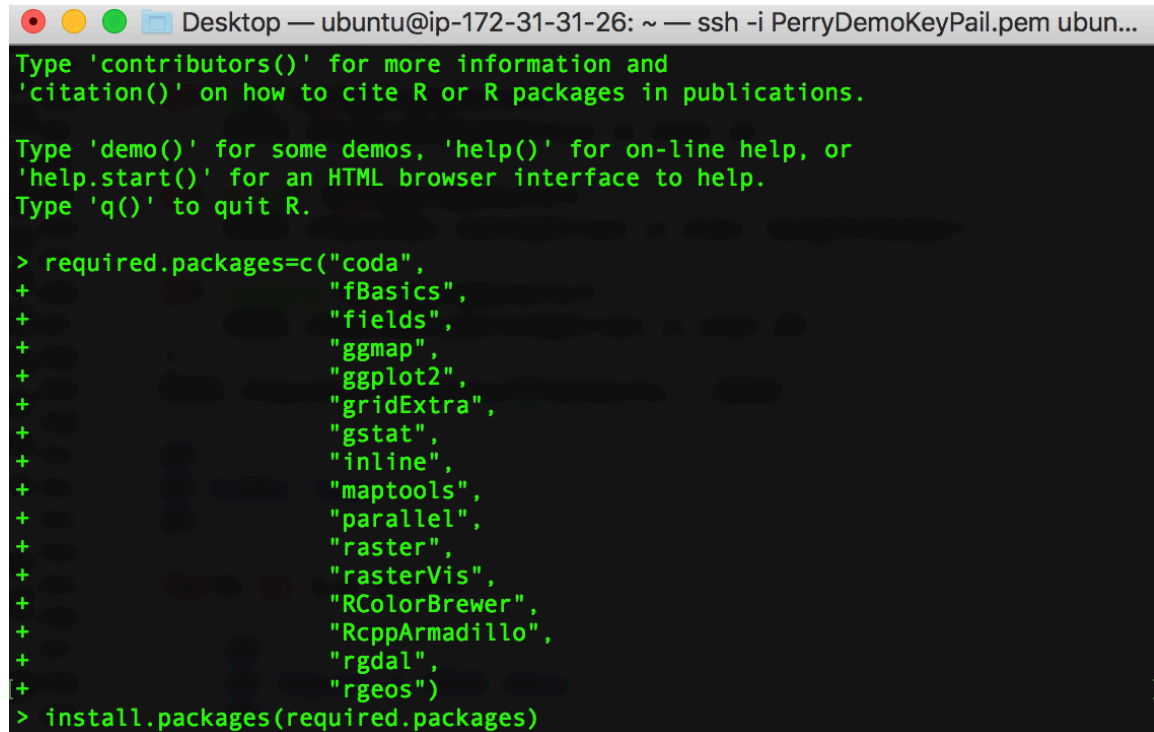
>
```

While we have R open, lets install the required packages for our specific analysis:

```
> required.packages=c("coda",  
  "fBasics",  
  "fields",  
  "gmap",  
  "ggplot2",  
  "gridExtra",  
  "gstat",  
  "inline",  
  "maptools",  
  "parallel",  
  "raster",  
  "rasterVis",  
  "RColorBrewer",  
  "RcppArmadillo",  
  "rgdal",  
  "rgeos")
```

```
> install.packages(required.packages)
```

### Remote Terminal



The screenshot shows a terminal window titled "Desktop — ubuntu@ip-172-31-31-26: ~ — ssh -i PerryDemoKeyPail.pem ubun...". The terminal displays the following text:

```
Type 'contributors()' for more information and  
'citation()' on how to cite R or R packages in publications.  
  
Type 'demo()' for some demos, 'help()' for on-line help, or  
'help.start()' for an HTML browser interface to help.  
Type 'q()' to quit R.  
  
> required.packages=c("coda",  
+   "fBasics",  
+   "fields",  
+   "gmap",  
+   "ggplot2",  
+   "gridExtra",  
+   "gstat",  
+   "inline",  
+   "maptools",  
+   "parallel",  
+   "raster",  
+   "rasterVis",  
+   "RColorBrewer",  
+   "RcppArmadillo",  
+   "rgdal",  
+   "rgeos")  
> install.packages(required.packages)
```

Hit “y” twice, and select a CRAN mirror. This will take a minute.

## Remote Terminal

```
Desktop — ubuntu@ip-172-31-31-26: ~ — ssh -i PerryDemoKeyPail.pem ubun...
Type 'q()' to quit R.

> required.packages=c("coda",
+                     "fBasics",
+                     "fields",
+                     "ggmap",
+                     "ggplot2",
+                     "gridExtra",
+                     "gstat",
+                     "inline",
+                     "maptools",
+                     "parallel",
+                     "raster",
+                     "rasterVis",
+                     "RColorBrewer",
+                     "RcppArmadillo",
+                     "rgdal",
+                     "rgeos")
[> install.packages(required.packages)
Installing packages into '/usr/local/lib/R/site-library'
(as 'lib' is unspecified)
Warning in install.packages(required.packages) :
  'lib = "/usr/local/lib/R/site-library"' is not writable
Would you like to use a personal library instead? (y/n) y
```

After the packages are installed try:

```
> detectCores()
```

to see how many cores we now have available for parallel processing.

## Remote Terminal

```
+         return(this.chain)
+     },
+     mc.cores=min(length(data$Transects.2018.1),
+                 detectCores())
+ )
+
+     ## Save the initial random seed as the name of the chain
+     names(chain.list)=data$seed
+     return(chain.list)
+ }
>
> #####
> ### Load workspace containing simulated data and imputed Y values
> #####
>
> load("/home/ubuntu/RequiredAmazonAWSFiles/SimulationData.RData")
> load(paste0("/home/ubuntu/RequiredAmazonAWSFiles/",
+             "Imputed2018Data.RData")) # includes Y.2018.save
>
> detectCores()
Error: unexpected ')' in "detectCores()"
> detectCores()
[1] 96
>
```

Quit R (we're going to use BATCH scripts to run R).

```
Desktop — ubuntu@ip-172-31-31-26: ~ — ssh -i PerryDemoKeyPail.pem ubun...
Processing triggers for libc-bin (2.23-0ubuntu10) ...
Processing triggers for systemd (229-4ubuntu21.1) ...
Processing triggers for ureadahead (0.100.0-19) ...
[ubuntu@ip-172-31-31-26:~$ R

R version 3.2.3 (2015-12-10) -- "Wooden Christmas-Tree"
Copyright (C) 2015 The R Foundation for Statistical Computing
Platform: x86_64-pc-linux-gnu (64-bit)

R is free software and comes with ABSOLUTELY NO WARRANTY.
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R is a collaborative project with many contributors.
Type 'contributors()' for more information and
'citation()' on how to cite R or R packages in publications.

Type 'demo()' for some demos, 'help()' for on-line help, or
'help.start()' for an HTML browser interface to help.
Type 'q()' to quit R.

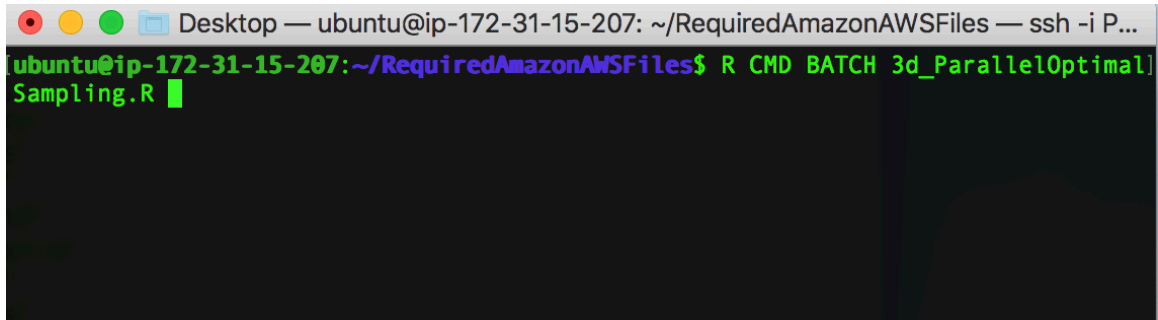
> q()
```

The final step is to run the script for parallel processing. Our script is entitled: "3d\_ParrallelOptimalSampling.R"

On the **Remote** terminal, after exiting R, navigate to where the file is stored:

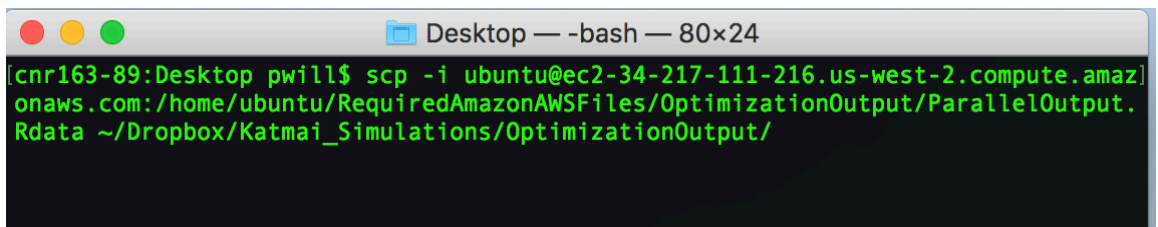
```
Desktop — ubuntu@ip-172-31-15-207: ~ — ssh -i PerryKeyPa
[ubuntu@ip-172-31-15-207:~$ ls
R RequiredAmazonAWSFiles
[ubuntu@ip-172-31-15-207:~$ cd RequiredAmazonAWSFiles/
```

Run R CMD BATCH script to run the entire script, which saves the output.



```
Desktop — ubuntu@ip-172-31-15-207: ~/RequiredAmazonAWSFiles — ssh -i P...
ubuntu@ip-172-31-15-207:~/RequiredAmazonAWSFiles$ R CMD BATCH 3d_ParallelOptimal
Sampling.R █
```

Last, we need to transfer the results to our local drive (The output will be huge):



```
Desktop — -bash — 80x24
[cnr163-89:Desktop pwill$ scp -i ubuntu@ec2-34-217-111-216.us-west-2.compute.amaz
onaws.com:/home/ubuntu/RequiredAmazonAWSFiles/OptimizationOutput/ParallelOutput.
Rdata ~/Dropbox/Katmai_Simulations/OptimizationOutput/
```