

CSCI E-63, Week 1, 09-02-2017

Learning Objectives ...

1

Overview of the course, Homework Tips,
Piazza

2

R & R Studio Installation Info

3

Using Amazon Web Services, login, EC2 and
S3



Harvard
University

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Lab: Sept 2, 2017

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- How can you reach us?

1. Message via Canvas Inbox
2. Private or Public Message via Piazza

E-63 Big Data Analytics is...

- **Weekly Lectures cover Big Data Analytics *latest* technologies**
 - Professor briefs from slides and shows practical steps.
 - We will use Amazon Web Services and Install/Config Software
- **Optional Saturday Labs (held by Professor or TA)**

Review last week's homework, upcoming homework tips
- **Weekly homeworks: 11 or 12**
- **Final project (2-3 weeks):**

This is a hands-on programming course:
Install / Config SET UP Technology
and Code: Java, Python, Scala

Harvard Resources

Online Library reference books through Harvard

<http://library.harvard.edu/>

Everything HOLLIS Articles

Apache Spark

Advanced Search New Search Browse HOLLIS by...

Limit to: Any resource type keywords any field

Show only

Peer-reviewed articles (1,316)
Online (7,649)
In library or storage (42)
In library (40)

Refine My Results

Date

From To Refine
1800 2017

Resource Type

Newspaper Articles (3,257)
Articles (2,146)

Results 1 - 30 of 9,481 for All locations (Everything) Sorted by: relevance

Show only Peer-reviewed articles (1,316) | Online (7,649) | In library or storage (42) | In library (40)

1  **Mastering Apache Spark : gain expertise in processing and storing data by using advanced techniques with Apache Spark**
Frampton, Mike [author]
Birmingham, UK : Packt Publishing, 2015. (Community experience distilled.)

[View Online](#)  Locations & Availability Details

2  **Apache Spark 2.x cookbook : Cloud-ready recipes to do analytics and data science on Apache Spark**
Yadav, Rishi [author]
Birmingham, UK : Packt Publishing, 2017.

[View Online](#)  Locations & Availability Details

Contact library on how to access collection.

Homework

1

Homework

- Submissions should include:
 - Use word document Zoran provides. Please keep the problem statement.
 - Upload: Word document OR PDF and code files. We don't ask for executables.
 - zips will not be allowed as a file type for your uploads.
- Points deducted: if source code missing; if steps and results are missing.
- Homework is due in one week on Saturdays at 12:00 pm EST. No late days. No exceptions. 0 grade if no submission.
- Give reference to code or technical documentation you use from the web.
- Put snaps/diagrams/plots/graphs in your homework doc! Do not put them in separate files.
- Use grading comment box for your grades. Grading comments will be addressed by your TA first and/or myself. Please do not pester Professor about your grades. You need to work it out with your TA grader.

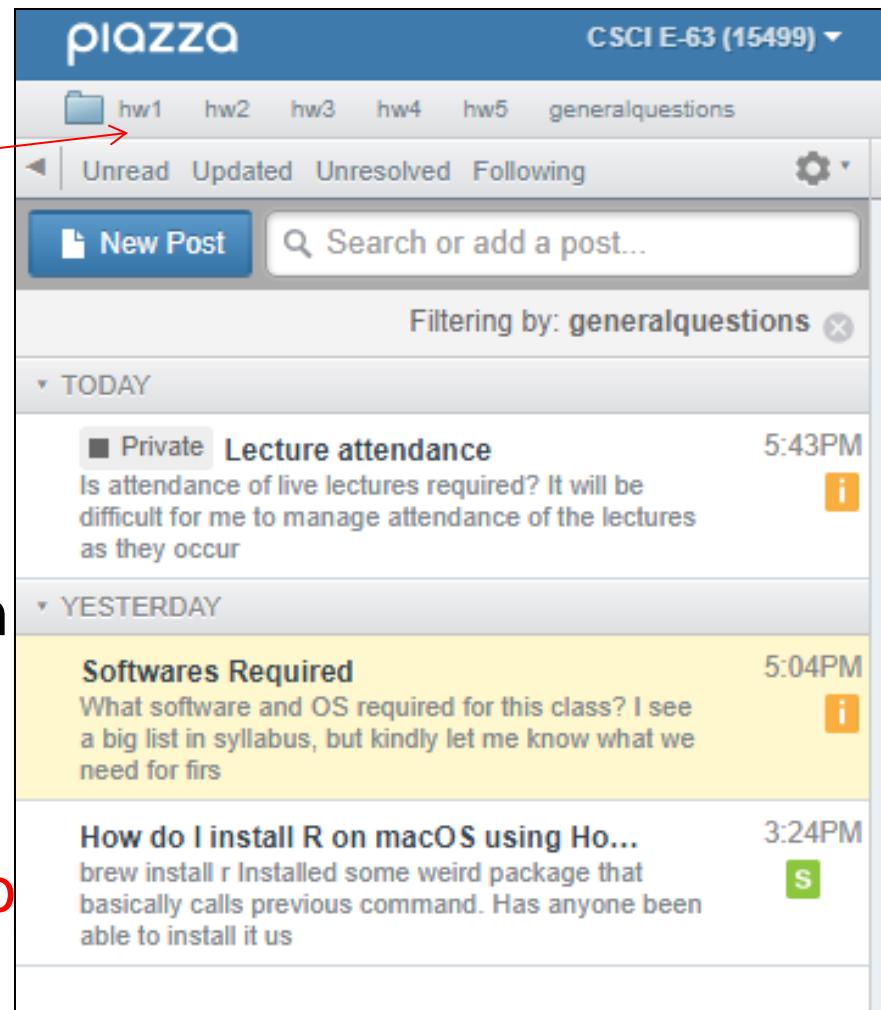
Tips

- Most HW help can be found in course materials:
Lecture videos, slide decks, weekly demos!
- Document steps to prove your work.
- Participate in class Forum. Search Piazza first for Q&As. Try to avoid asking same question already answered.

- **Be cautious: cut and paste from Professor's slides. Carries bad characters from Windows to Linux.**
- Don't interpret homework tools as strict guidance. Use common sense. Solve the intent of the problem. The homework is for you to learn.
- Don't include your error messages or long log files in your solutions.

Piazza

- Use folders for weekly homework questions: issues/bugs.
- Piazza is student - student help. TAs may provide some assistance.
- Please do not put your code in your post. **It will be deleted** and a penalty may be applied.
- Note: if you use Anonymous to post in Piazza instructors can see your name but it appears as Anonymous to your colleagues.



The screenshot shows the Piazza interface for the course CSCI E-63 (15499). The top navigation bar includes the Piazza logo, course name, and a dropdown menu. Below the navigation is a toolbar with icons for hw1 through hw5, generalquestions, Unread, Updated, Unresolved, Following, and settings. A red arrow points from the hw1 icon towards the generalquestions search bar. The main area displays posts filtered by 'generalquestions'. Posts are listed by date: TODAY and YESTERDAY. Each post includes a title, a snippet of the message, and a timestamp. The first post is a private message about lecture attendance. The second post is about software requirements. The third post is about installing R on macOS.

Date	Title	Timestamp	Type
TODAY	Private Lecture attendance	5:43PM	i
TODAY	Is attendance of live lectures required? It will be difficult for me to manage attendance of the lectures as they occur	5:43PM	i
YESTERDAY	Softwares Required	5:04PM	i
YESTERDAY	What software and OS required for this class? I see a big list in syllabus, but kindly let me know what we need for firs	5:04PM	i
YESTERDAY	How do I install R on macOS using Ho...	3:24PM	s
YESTERDAY	brew install r Installed some weird package that basically calls previous command. Has anyone been able to install it us	3:24PM	s

Homework 1

- **Show all your R code**
- **Show all your plots/graphs**
- **Save your code in .R file and include it in your submission.**
- **Use your homework .doc and add your solution below each problem.**
- **Note: You do not have to show your installation.**

Some Useful Functions for Homework 1

Function name ()	Task performed
sum(x)	Sums the elements in x
prod(x)	Product of the elements in x
max(x)	Maximum element in x
min(x)	Minimum element in x
length(x)	Number of elements in x
range(x)	Range (min to max) of elements in x
mean(x)	Mean (average value) of elements in x
median(x)	Median (middle value) of elements in x
var(x)	Variance of elements in x
sd(x)	Standard deviation of element in x
cor(x,y)	Correlation between x and y
quantile(x,p)	The p th quantile of x
cov(x,y)	Covariance between x and y
abline()	Add Straight Lines to a Plot
subset()	Subsetting Vectors, Matrices and Data Frames

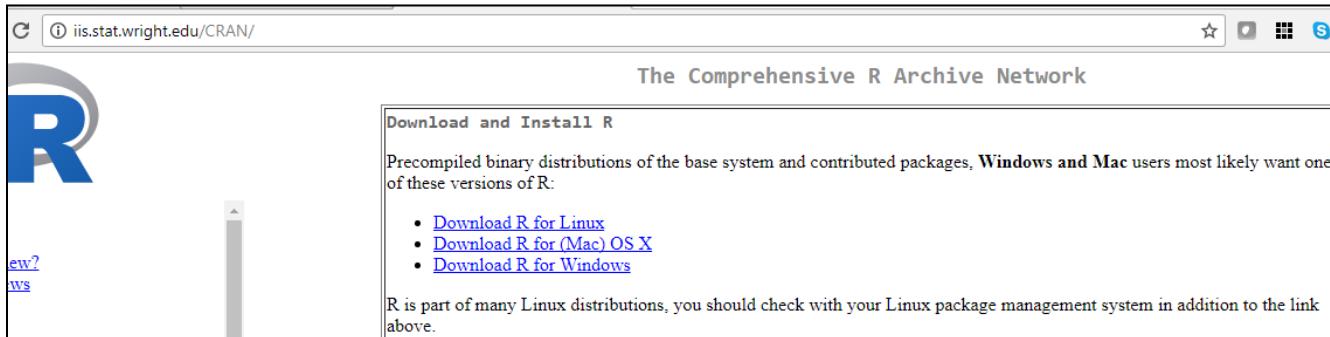
What's the difference between `sort()` and `order()`? Function `order()` returns the indices in sorted order, which, when applied to the unsorted dataset as row indices, will return a sorted dataset

Homework 1: R Install

- Two options:

1. R (Command Line Interface):

<https://www.r-project.org/>



2. R Studio (for IDE) (need to install R first):

<https://www.rstudio.com/>



Download R

This example is for Windows.

The screenshot shows the 'Download and Install R' section of the CRAN website. It includes a list of download links for Linux, Mac OS X, and Windows. A red arrow points from the 'Windows' link to the second screenshot.

Download and Install R
Precompiled binary distributions of the base system and contributed packages. Windows and Mac users most likely want one of these versions of R.
• Download R for Linux
• Download R for (Mac)OS X
• Download R for Windows

R is part of many Linux distributions, you should check with your Linux package management system in addition to the link above.

Source Code for all Platforms
Windows and Mac users most likely want to download the precompiled binaries listed in the upper box, not the source code. The sources have to be compiled before you can use them. If you do not know what this means, you probably do not want to do it!
• The latest release (Friday 2017-06-30, Single Candle) [R-3.4.1.tar.gz](#), read [what's new](#) in the latest version.
• Sources of [R alpha and beta releases](#) (daily snapshots, created only in time periods before a planned release).
• Daily snapshots of current patched and development versions are [available here](#). Please read about [new features and bug fixes](#) before filing corresponding feature requests or bug reports.
• Source code of older versions of R is [available here](#).
• Contributed extension [packages](#)

The screenshot shows the 'R for Windows' page. It lists several subdirectories: 'base', 'contrib', 'old contrib', and 'Rtools'. A red arrow points from the 'base' link to the third screenshot. Below the links, there is a note about not submitting binaries to CRAN and links to FAQs.

Subdirectories:
base
contrib
old contrib
Rtools

Binaries for base distribution (managed by Duncan Murdoch). This is what you want to [install R for the first time](#).
Binaries of contributed CRAN packages (for R >= 2.11.x; managed by Uwe Ligges). There is also information on [third party software](#) available for CRAN Windows services and corresponding environment and make variables.
Binaries of contributed CRAN packages for outdated versions of R (for R < 2.11.x; managed by Uwe Ligges).
Tools to build R and R packages (managed by Duncan Murdoch). This is what you want to build your own packages on Windows, or to build R itself.

Please do not submit binaries to CRAN. Package developers might want to contact Duncan Murdoch or Uwe Ligges directly in case of questions / suggestions related to Windows binaries.

You may also want to read the [R FAQ](#) and [R for Windows FAQ](#).

The screenshot shows the download page for R-3.4.1 for Windows. It features a large download button labeled 'Download R 3.4.1 for Windows (62 megabytes, 32/64 bit)' and a preview image of the executable file 'R-3.4.1-win.exe'. A blue arrow points from the 'Download' button to the third screenshot.

Download R 3.4.1 for Windows (62 megabytes, 32/64 bit)
Installation and other instructions
New features in this version

If you want to double-check that the package you have downloaded matches the package distributed by CRAN, you can compare the [md5sum](#) of the exe to the [fingerprint](#) on the master server. You will need a version of md5sum for windows: both [graphical](#) and [command line versions](#) are available.

Frequently asked questions

- Does R run under my version of Windows?
- How do I update packages in my previous version of R?
- Should I run 32-bit or 64-bit R?

Please see the [R FAQ](#) for general information about R and the [R Windows FAQ](#) for Windows-specific information.

Other builds

- Patches to this release are incorporated in the [r-patched snapshot build](#)
- A build of the development version (which will eventually become the next major release of R) is available in the [r-devel snapshot build](#).
- [Previous releases](#)

Note to webmasters: A stable link which will redirect to the current Windows binary release is [CRAN MIRROR>/bin/windows/base/release.htm](#).

Useful R & Stats documentation

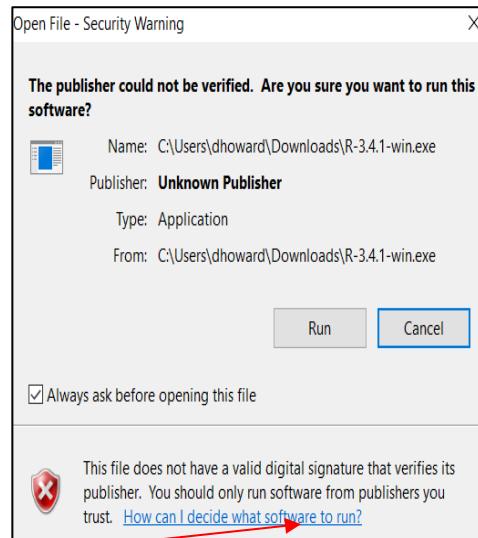
- I will post these reference materials to the Week 1 folder:

- [Kaplan R Sheet \(2012\).pdf](#)
- [OpenIntroStatistics3rdEdition.pdf](#)
- [os3.pdf](#)
- [Paradis-rdebut_en.pdf](#)
- [Short-refcard.pdf](#)
- [StudentGuideToR.pdf](#)

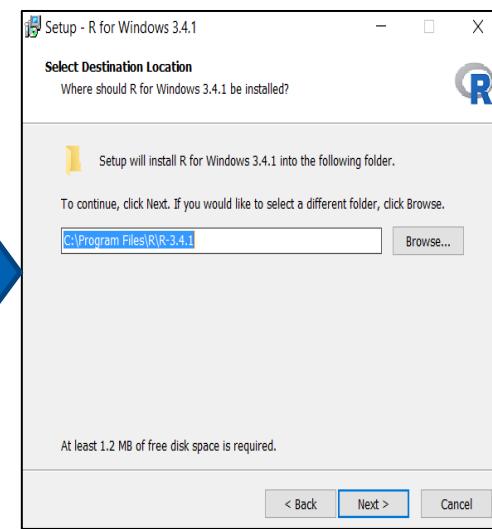
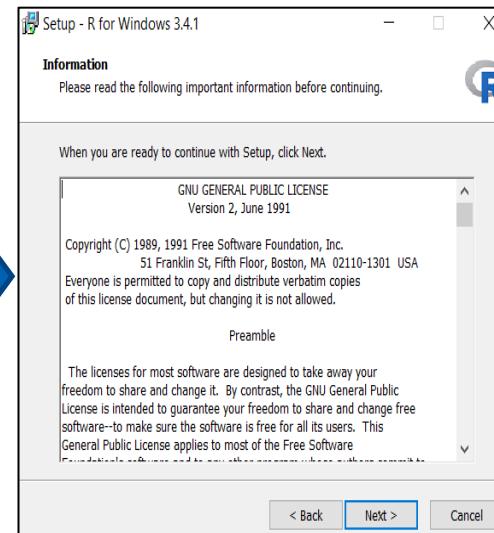
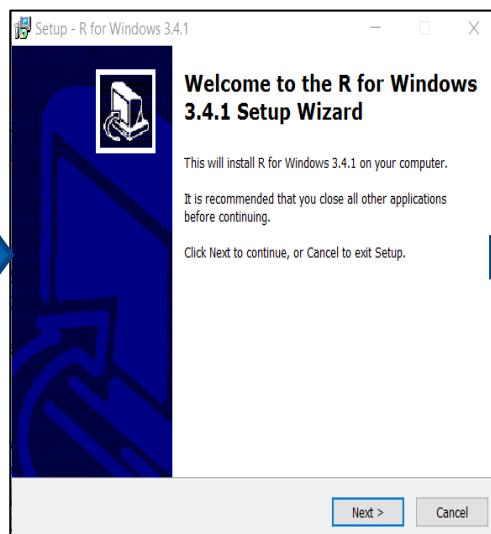
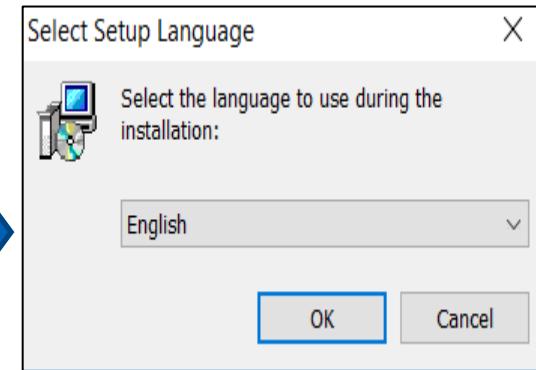
Useful URL:

http://www.sr.bham.ac.uk/~ajrs/R/r-function_list.html

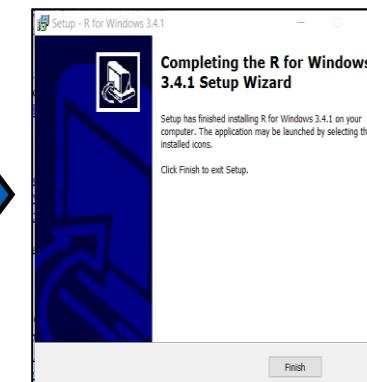
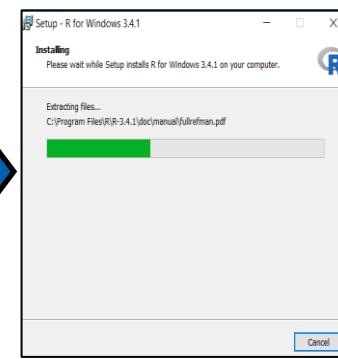
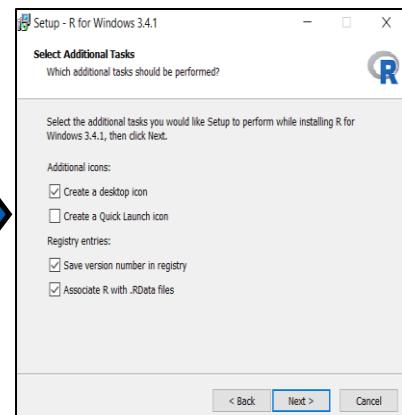
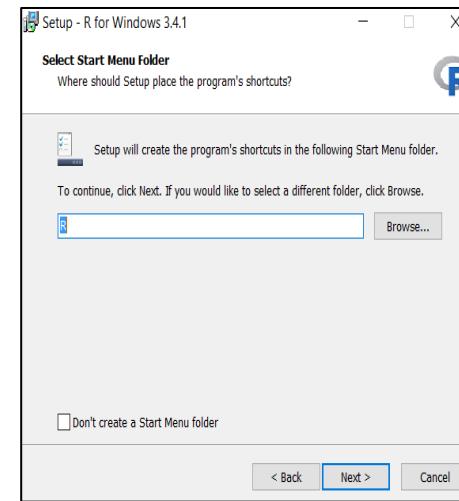
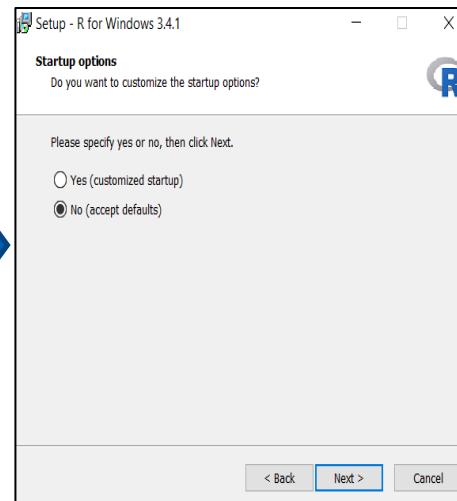
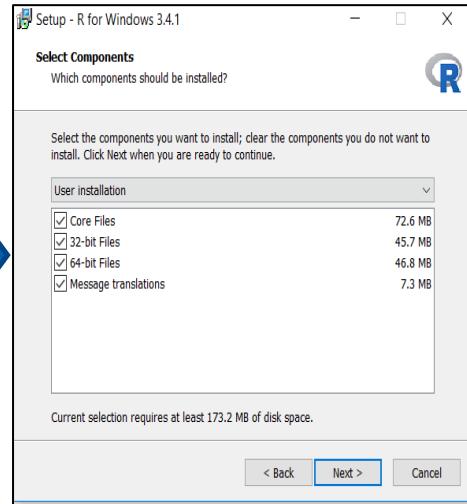
R Install Steps



Allow Admin Access



R Install Steps



R Command Line Interface

RGui (64-bit)

File Edit View Misc Packages Windows Help

R Console

```
R version 3.4.1 (2017-06-30) -- "Single Candle"
Copyright (C) 2017 The R Foundation for Statistical Computing
Platform: x86_64-w64-mingw32/x64 (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.
```

> |

R Console

```
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.

> getwd()
[1] "C:/Users/dhoward/Documents"
> setwd("c:\\users\\dhoward\\documents\\R")
> getwd()
[1] "c:/users/dhoward/documents/R"
> a<-2
> b<-3
> print(a+b)
[1] 5
> Square <- function(x) {
+   return(x^2)
+ }
> print(Square(4))
[1] 16
> sqrt(10)
[1] 3.162278
> save.image()
[1]
```

Function ←

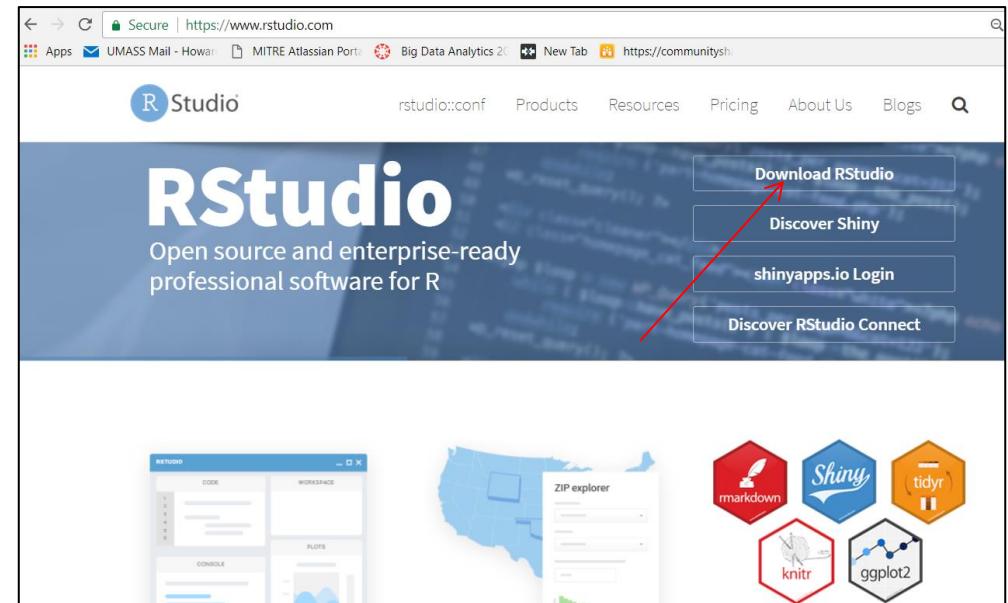
Note: You don't have to use print.
Use: Square(4) for same results

R Studio

- Now install R Studio after R install
- <https://www.rstudio.com/>

What is R Studio?

- ‘a free and open-source integrated development environment for R’
- ‘a programming language for statistical computing and graphics’



R Studio Download

Download:

<https://www.rstudio.com/products/rstudio/download2/>

- **Use free version**
- **Open Source**
- **Use Desktop Version**
- **This is an Interactive Editor**

The screenshot shows the RStudio download page. At the top, there's a brief description of what RStudio is: "RStudio is a set of integrated tools designed to help you be more productive with R; it includes a code editor, syntax-highlighting editor that supports direct code execution, and a variety of robust tools for plotting, viewing history, debugging and managing your workspace. Learn More about RStudio features." Below this is a pricing matrix comparing five different RStudio products based on various features.

	RStudio Desktop Open Source License	RStudio Desktop Commercial License	RStudio Server Open Source License	RStudio Server Pro Commercial License	RStudio Server Pro + RStudio Connect Commercial License
Price	FREE	\$995 per year	FREE	\$9,995 per year	\$29,995 per year
Integrated Tools for R	●	●	●	●	●
Priority Support		●		●	●
Access via Web Browser			●	●	●
Enterprise Security				●	●
Project Sharing			●	●	●
Manage Multiple R Sessions & Versions				●	●
Admin Dashboard			●	●	●
Load Balancing			●	●	
Push-Button Publishing				●	
Dev-Managed Content				●	
Scheduled Updates & Distribution				●	
License	APL	Commercial	APL	Commercial	Commercial
Price	FREE	\$995/yr	FREE	\$9,995/yr	\$29,995/yr

At the bottom, there are four green "DOWNLOAD" buttons corresponding to the first four rows of the matrix, each with a "Learn More" link below it. To the right of these buttons is a "CONTACT SALES" button with a "Learn More" link. A red arrow points from the word "FREE" in the first row of the matrix to the first "DOWNLOAD" button. Another red arrow points from the "CONTACT SALES" button to a download progress bar in the bottom right corner.

RStudio-1.0.153.exe
13.9/81.9 MB, 43 secs left

R Studio Installation

I used this.

RStudio Desktop 1.0.153 — Release Notes

RStudio requires R 2.11.1+. If you don't already have R, download it [here](#).

Installers for Supported Platforms

Installers

	Size	Date	MD5
RStudio 1.0.153 - Windows Vista/7/8/10	81.9 MB	2017-07-20	b3b4bbc82865ab105c21cb70b17271b3
RStudio 1.0.153 - Mac OS X 10.6+ (64-bit)	71.2 MB	2017-07-20	8773610566b74ec3e1a88b2fdb10c8b5
RStudio 1.0.153 - Ubuntu 12.04-15.10/Debian 8 (32-bit)	85.5 MB	2017-07-20	981be44f91fc07e5f69f52330da32659
RStudio 1.0.153 - Ubuntu 12.04-15.10/Debian 8 (64-bit)	91.7 MB	2017-07-20	2d0769bea2bf6041511d6901a1cf69c3
RStudio 1.0.153 - Ubuntu 16.04+/Debian 9+ (64-bit)	61.9 MB	2017-07-20	d584cbab01041777a15d62cbef69a976
RStudio 1.0.153 - Fedora 19+/RedHat 7+/openSUSE 13.1+ (32-bit)	84.7 MB	2017-07-20	8dfee96059b05a063c49b705eca0ceb4
RStudio 1.0.153 - Fedora 19+/RedHat 7+/openSUSE 13.1+ (64-bit)	85.7 MB	2017-07-20	16c2c8334f961c65d9bfa8fb813ad7e7

Zip/Tarballs

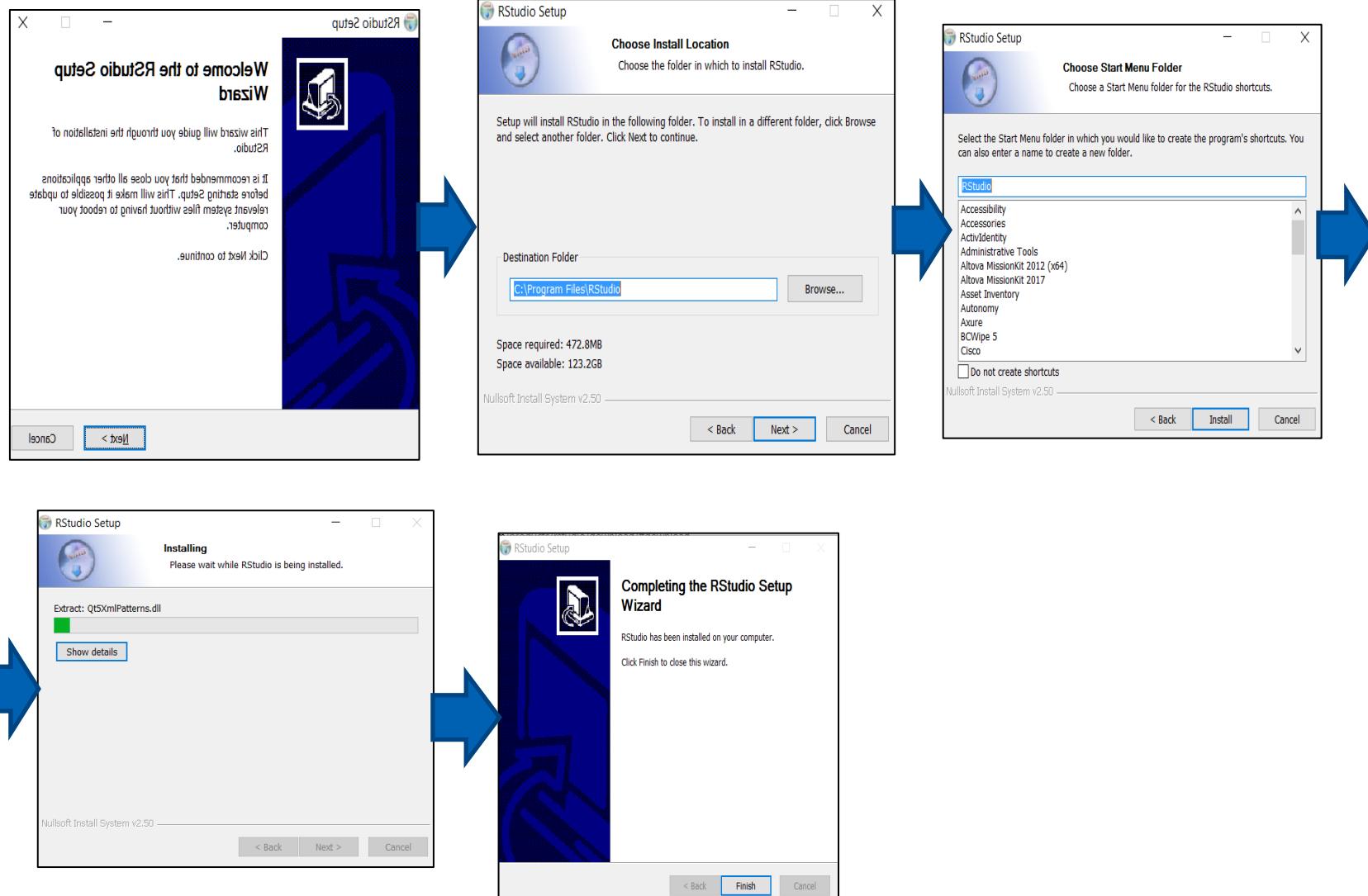
Zip/tar archives

	Size	Date	MD5
RStudio 1.0.153 - Windows Vista/7/8/10	117.6 MB	2017-07-20	024b5714fa6ef337fe0c6f5e2894cfc
RStudio 1.0.153 - Ubuntu 12.04-15.10/Debian 8 (32-bit)	86.2 MB	2017-07-20	f8e0ffa7ec62665524f9e2477facd346
RStudio 1.0.153 - Ubuntu 12.04-15.10/Debian 8 (64-bit)	92.7 MB	2017-07-20	2077c181311d1aad6fb8d435f8f1f45f
RStudio 1.0.153 - Fedora 19+/RedHat 7+/openSUSE 13.1+ (32-bit)	85.4 MB	2017-07-20	92e1a22d14952273ec389e5a55be614f
RStudio 1.0.153 - Fedora 19+/RedHat 7+/openSUSE 13.1+ (64-bit)	86.6 MB	2017-07-20	0b71c5a7fc53c84b3fe67242240b3531

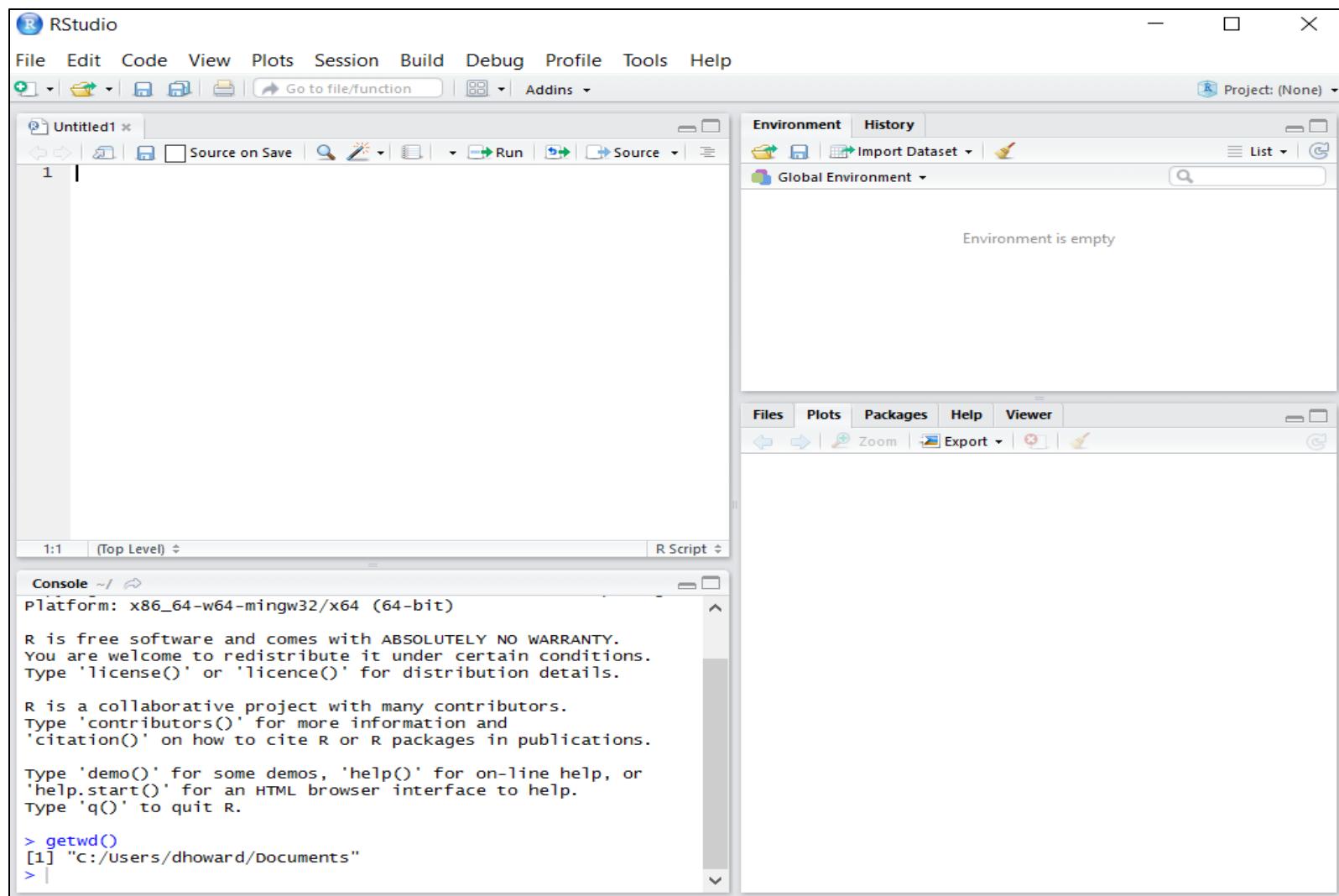
Source Code

A tarball containing source code for RStudio v1.0.153 can be downloaded from [here](#)

R Studio Install



R Studio



R Advice from Colleagues

- Recommendation from last evening:

<https://www.udemy.com/data-science-and-machine-learning-bootcamp-with-r/learn/v4/overview>

The screenshot shows the Udemy website with a course page for 'Data Science and Machine Learning Bootcamp with R'. At the top, there's a purple banner with a new student discount offer: 'New student discount—6 hours only! Change your life through learning. Over 40,000 courses are \$10 each for a limited time.' The discount ends in 05h 57m. The main header is 'Data Science and Machine Learning Bootcamp with R'. Below it, a description reads: 'Learn how to use the R programming language for data science and machine learning and data visualization!' The course has a rating of 4.6 (2,226 ratings) and 16,331 students enrolled. It was created by Jose Portilla and last updated on 3/2017. The price is \$10, down from \$495, with a 95% discount. A preview video thumbnail shows a play button, an R logo, a lightbulb, and gears. A 'Preview This Course' button is visible.

- And more advice:

and your learning style is more visual, then why not? My preference is to study/run code from pdf/R tutorial @ my own pace instead of watching 17.5 hours of Udemy's videos. By again, it all depends on what your learning style is and how deep you'd like to get into R...

for those new to R, the ggplot2 package is great for creating better looking graphs than base R

Getting Started with Amazon Web Services

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

AWS Free Tier

The AWS Free Tier enables you to gain free, hands-on experience with the AWS platform, products, and services.

Create a Free Account

- Signing up is easy
 - Credit card required but no charge for signing up
- 4 important pieces of information that you will need post sign up
 - Account Id
 - Access Id
 - Secret key
 - Private key and certificate files

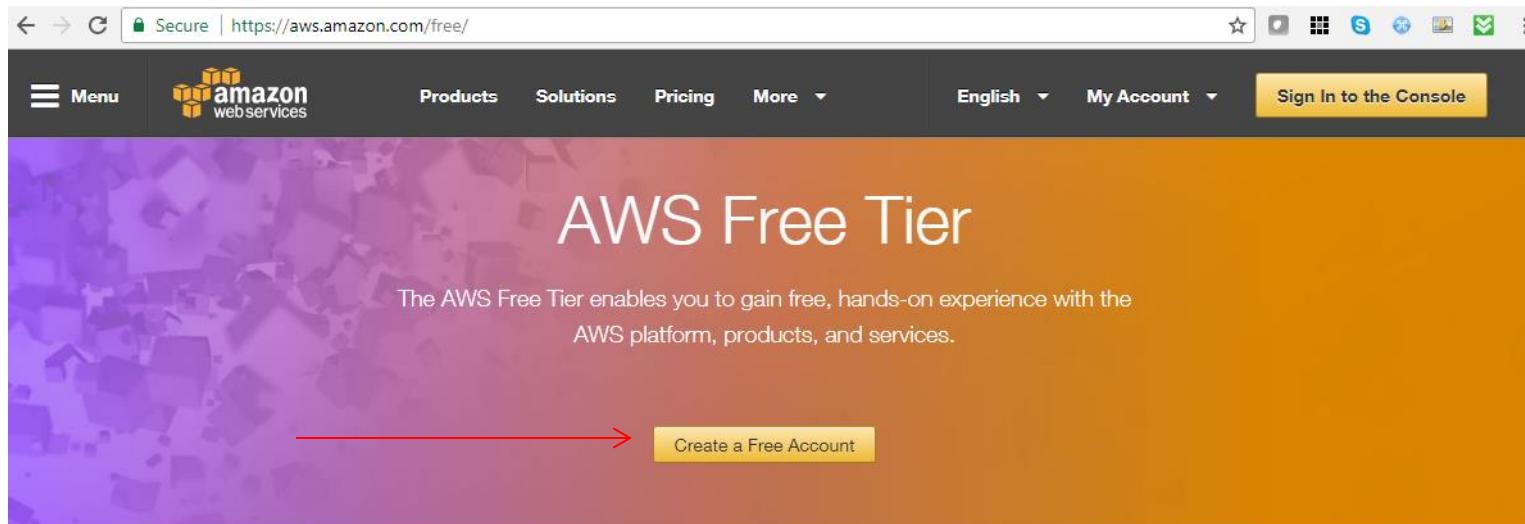


Information that you need after signing up

- **Various combinations of the information generated during sign up are needed for Amazon's EC2 API and Tools**
 1. Account Number
 - Currently a 12 digit number
 2. Access Id and Secret key
 - Long Character strings
 3. Private key and certificate
 - Long character strings that need to be downloaded and stored as files
- **This information should be closely guarded. Do not share it in your homeworks please!**

Amazon Web Services Free Tier Registration

- Sign up for a Free Account: aws.amazon.com/free



- Use your Harvard Email Address (or another email address is fine)

Sign in ⓘ

Email address of your AWS account
To sign in as an IAM user, enter your [account ID](#) or [account alias](#) instead.

Next

New to AWS?

Create a new AWS account

A red arrow points from the bottom-left towards the "Create a new AWS account" button.

Register for an Amazon Account

Sign In or Create an AWS Account

What is your email (phone for mobile accounts)?

E-mail or mobile number:

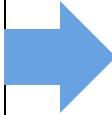
yournamehere@g.harvard.edu 

I am a new user.

I am a returning user
and my password is:

Sign in using our secure server 

[Forgot your password?](#)



Or try!

To try the new AWS sign-in experience, [sign in here](#).

Login Credentials

Use the form below to create login credentials that can be used for AWS as well as Amazon.com.

My name is:

My e-mail address is:

Type it again: 

note: this is the e-mail address that we will use to contact you about your account

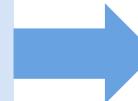
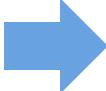
Enter a new password:

Type it again:

 Create account

Next enter:

- Your Contact Info for a Personal account:
Your Name, Address, Phone to create your Account
- Your Credit Card info.



Verify
via
Phone
Call from
Amazon & finish up

Register for a Plan



Support Plan

AWS Support offers a selection of plans to meet your needs. All plans provide 24x7 access to customer service, AWS documentation, whitepapers, and support forums. For access to technical support and additional resources to help you plan, deploy, and optimize your AWS environment, we recommend selecting a support plan that best aligns with your AWS usage.

Please Select One

Basic

Description: Customer Service for account and billing questions and access to the AWS Community Forums.

Price: Included

Developer

Use case: Experimenting with AWS

Description: One primary contact may ask technical questions through Support Center and get a response within 12–24 hours during local business hours.

Price: Starts at \$29/month (scales based on usage)

Business

Use case: Production use of AWS

Description: 24x7 support by phone and chat, 1-hour response to urgent support cases, and help with common third-party software. Full access to AWS Trusted Advisor for optimizing your AWS infrastructure, and access to the AWS Support API for automating your support cases and retrieving Trusted Advisor results.

Price: Starts at \$100/month (scales based on usage)

Enterprise

Sign in to the Amazon Console

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

Use your new login and password

A screenshot of the AWS homepage. At the top, there's a navigation bar with links for Menu, Products, Solutions, Pricing, Getting Started, Documentation, Software, Support, More, English, My Account, and a prominent yellow "Sign In to the Console" button. A red arrow points from the text "Use your new login and password" down to the "Sign In to the Console" button. Below the navigation bar is a large image of a young boy wearing a hard hat labeled "THINKER" and safety glasses, smiling. To the left of the image, the word "Welcome" is displayed, followed by a paragraph about AWS customers and a "Get Started" button. At the bottom left, there's a link to "Learn more about our customers".

After signing in you are at the AWS Management Console

- Here's the AWS Services:

The screenshot shows the AWS Management Console homepage. At the top, there is a navigation bar with 'Services' and 'Resource Groups' dropdowns, a search bar, and user information for Diane Howard in the Ohio region. The main area is divided into several sections:

- AWS services:** A sidebar with a search bar and a red arrow pointing to the 'All services' link.
- Recently visited services:** EC2, Billing, Simple Notification Service, VPC, CloudWatch.
- Build a solution:** Cards for Launch a virtual machine, Build a web app, Host a static website, Connect an IoT device, Start a development project, and Register a domain.
- Learn to build:** Buttons for Websites, DevOps, and Backup.
- Helpful tips:** Manage your costs, Create an organization.
- Explore AWS:** Cards for Apache MXNet, Regions, Availability zone, and Specify availability zone when launching instances.
- Regions:** A callout box highlighting the 14 regions: US East (N. Virginia), US East (Ohio), US West (N. California), US West (Oregon), Canada (Central), EU (Ireland), EU (Frankfurt), EU (London), Asia Pacific (Singapore), Asia Pacific (Sydney), Asia Pacific (Seoul), Asia Pacific (Tokyo), Asia Pacific (Mumbai), and South America (São Paulo).

Regions:
Geographically dispersed
Currently there are 14 regions

Availability zone:
Part of a region
Engineered to be insulated from failure in other zones

Specify availability zone when launching instances:
Place all machines in the same zone for faster data transfer.
Place machines in different zones for reliability and higher-availability

@DianeHoward

Here's some of the Amazon Services

All services

Compute

- EC2
- EC2 Container Service
- Lightsail
- Elastic Beanstalk
- Lambda
- Batch

Storage

- S3
- EFS
- Glacier
- Storage Gateway

Database

- RDS
- DynamoDB
- ElastiCache
- Amazon Redshift

Networking & Content Delivery

- VPC
- CloudFront
- Direct Connect
- Route 53

Migration

- AWS Migration Hub
- Application Discovery Service

Developer Tools

- CodeStar
- CodeCommit
- CodeBuild
- CodeDeploy
- CodePipeline
- X-Ray

Management Tools

- CloudWatch
- CloudFormation
- CloudTrail
- Config
- OpsWorks
- Service Catalog
- Trusted Advisor
- Managed Services

Security, Identity & Compliance

- IAM
- Inspector
- Certificate Manager
- Directory Service
- WAF & Shield
- Artifact
- Amazon Macie
- CloudHSM

Analytics

- Athena

Internet of Things

- AWS IoT
- AWS Greengrass

Contact Center

- Amazon Connect

Game Development

- Amazon GameLift

Mobile Services

- Mobile Hub
- Cognito
- Device Farm
- Mobile Analytics
- Pinpoint

Application Services

- Step Functions
- SWF
- API Gateway
- Elastic Transcoder

Messaging

- Simple Queue Service
- Simple Notification Service
- Simple Email Service

Business Productivity

management of multiple AWS accounts. [Start now](#)

Explore AWS

Apache MXNet

Get started with the most scalable framework for deep learning in the cloud. [Learn more.](#)

Build Applications with AWS Lambda

Run and scale code for Python, Node.js, Java, or C# without provisioning or managing servers. [Learn more.](#)

Amazon DynamoDB

Fast and flexible NoSQL database service for any scale. [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.

Click on Services in Upper Left

AWS Management Console

The AWS Management Console services menu. A red arrow points to the 'Services' button in the top left corner. The menu includes a search bar, user information, and navigation links for History, Console Home, and AWS Organizations. The main area displays services categorized into groups:

- Compute**: EC2, EC2 Container Service, Lightsail, Elastic Beanstalk, Lambda, Batch.
- Developer Tools**: CodeStar, CodeCommit, CodeBuild, CodeDeploy, CodePipeline, X-Ray.
- Analytics**: Athena, EMR, CloudSearch, Elasticsearch Service, Kinesis, Data Pipeline, QuickSight, AWS Glue.
- Application Services**: Step Functions, SWF, API Gateway, Elastic Transcoder.
- Storage**: S3, EFS, Glacier, Storage Gateway.
- Management Tools**: CloudWatch, CloudFormation, CloudTrail, Config, OpsWorks, Service Catalog, Trusted Advisor, Managed Services.
- Artificial Intelligence**: Lex, Amazon Polly, Rekognition, Machine Learning.
- Messaging**: Simple Queue Service, Simple Notification Service, Simple Email Service.
- Database**: RDS, DynamoDB, ElastiCache, Amazon Redshift.
- Internet Of Things**: AWS IoT, AWS Greengrass.
- Business Productivity**: WorkDocs, WorkMail, Amazon Chime.
- Networking & Content Delivery**: VPC, CloudFront, Direct Connect, Route 53.
- Security, Identity & Compliance**: IAM, Inspector, Certificate Manager, Directory Service, WAF & Shield, Artifact, Amazon Macie, CloudHSM.
- Contact Center**: Amazon Connect.
- Game Development**: Amazon GameLift.
- Desktop & App Streaming**: WorkSpaces, AppStream 2.0.

AWS Services – older page

Amazon Web Services

Compute

-  EC2
Virtual Servers in the Cloud
-  EC2 Container Service
Run and Manage Docker Containers
-  Elastic Beanstalk
Run and Manage Web Apps
-  Lambda
Run Code in Response to Events

Storage & Content Delivery

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

Database

-  RDS
MySQL, Postgres, Oracle, SQL Server, and Amazon Aurora
-  DynamoDB
Predictable and Scalable NoSQL Data Store
-  ElastiCache
In-Memory Cache
-  Redshift
Managed Petabyte-Scale Data Warehouse Service

Networking

-  VPC
Isolated Cloud Resources
-  Direct Connect
Dedicated Network Connection to AWS
-  Route 53
Scalable DNS and Domain Name Registration

Developer Tools

-  CodeCommit
Store Code in Private Git Repositories
-  CodeDeploy
Automate Code Deployments
-  CodePipeline
Release Software using Continuous Delivery

Management Tools

-  CloudWatch
Monitor Resources and Applications
-  CloudFormation
Create and Manage Resources with Templates
-  CloudTrail
Track User Activity and API Usage
-  Config
Track Resource Inventory and Changes
-  OpsWorks
Automate Operations with Chef
-  Service Catalog
Create and Use Standardized Products

Security & Identity

-  Identity & Access Management
Manage User Access and Encryption Keys
-  Directory Service
Host and Manage Active Directory
-  Trusted Advisor
Optimize Performance and Security

Analytics

-  EMR
Managed Hadoop Framework
-  Data Pipeline
Orchestration for Data-Driven Workflows
-  Kinesis
Real-time Processing of Streaming Big Data
-  Machine Learning
Build Smart Applications Quickly and Easily

Mobile Services

-  Cognito
User Identity and App Data Synchronization
-  Device Farm
Test Android, Fire OS, and iOS apps on real devices in the Cloud
-  Mobile Analytics
Collect, View and Export App Analytics
-  SNS
Push Notification Service

Application Services

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

Enterprise Applications

-  WorkSpaces
Desktops in the Cloud
-  WorkDocs
Secure Enterprise Storage and Sharing Service
-  WorkMail PREVIEW
Secure Email and Calendaring Service

Set up your Security Credentials

- Under My Account/Console
Select Security Credentials

The screenshot shows the AWS IAM console. On the left, there's a navigation sidebar with links like Search IAM, Dashboard, Groups, Users, Roles, Policies, Identity providers, Account settings, Credential report, and Encryption keys. The main content area is titled "AWS services" and shows Recently visited services: IAM, S3, Billing, and EC2. Below this is a list of security options: Multi-Factor Authentication (MFA), Access Keys (Access Key ID and Secret Access Key), CloudFront Key Pairs, X.509 Certificates, and Account Identifiers. A modal window is open at the bottom, providing instructions about security credentials and best practices, with buttons to "Continue to Security Credentials" and "Get Started with IAM Users". On the right, there's a "Helpful tips" sidebar with links to My Account, My Organization, My Billing Dashboard, My Security Credentials (which is highlighted with a red arrow), and Sign Out. There's also a "Create an organization" section.

Security Credentials: Access Keys & X.509 Certs

The screenshot shows the AWS IAM 'Your Security Credentials' page. On the left, a vertical navigation bar lists: Dashboard, Groups, Users, Roles, Policies, Identity providers, Account settings, Credential report, and Encryption keys. A blue curved arrow points from the 'Encryption keys' link towards the 'Access Keys' section. A green curved arrow points from the 'Encryption keys' link towards the 'Multi-Factor Authentication (MFA)' section. The main content area has a heading 'Your Security Credentials' and a sub-instruction: 'Use this page to manage the credentials for your AWS account. To manage credentials for AWS Identity and Access Management (IAM) users, use the [IAM Console](#). To learn more about the types of AWS credentials and how they're used, see [AWS Security Credentials](#) in AWS General Reference.' Below this, a list of credential types is shown with plus signs: Password, Multi-Factor Authentication (MFA), Access Keys (Access Key ID and Secret Access Key) (which is highlighted with a red box), CloudFront Key Pairs (which is highlighted with a red box), X.509 Certificates (which is highlighted with a red box), and Account Identifiers.

Use this page to manage the credentials for your AWS account. To manage credentials for AWS Identity and Access Management (IAM) users, use the [IAM Console](#). To learn more about the types of AWS credentials and how they're used, see [AWS Security Credentials](#) in AWS General Reference.

- + Password
- + Multi-Factor Authentication (MFA)
- + Access Keys (Access Key ID and Secret Access Key)
- + CloudFront Key Pairs
- + X.509 Certificates
- + Account Identifiers

You use access keys to sign programmatic requests to AWS services. To learn how to sign requests using your access keys, see the [signing documentation](#). For your protection, store your access keys securely and do not share them. In addition, AWS recommends that you rotate your access keys every 90 days.

Note: You can have a maximum of two access keys (active or inactive) at a time.

Created	Deleted	Access Key ID	Last Used	Last Used Region	Last Used Service	Status	Actions
Create New Access Key							

- Multi-Factor Authentication (MFA)

You use AWS MFA to increase the security of your AWS environments when you sign in AWS websites. When AWS MFA is enabled, you must provide not only a user name and password but also an authentication code from an AWS MFA device.

[Activate MFA](#)

Select X.509 Certificate

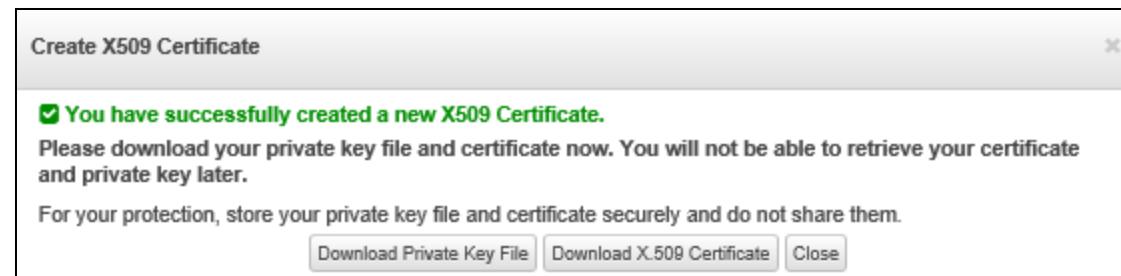
- X.509 Certificates

You use X.509 certificates to make secure SOAP-protocol requests to some AWS services. Note: You use your access keys to make SOAP requests to Amazon S3 and Amazon Mechanical Turk. For your protection, store your private certificate keys securely and do not share them. In addition, AWS recommends that you rotate your certificates periodically.

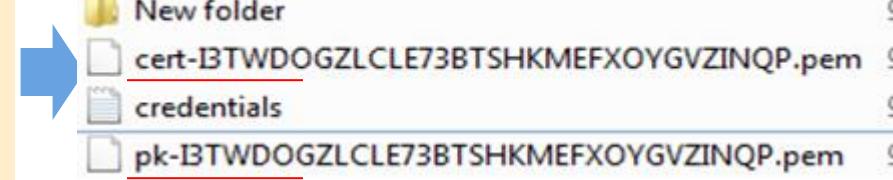
Note: You can have a maximum of two X.509 certificates (active or inactive) at a time.

Created	Deleted	Thumbprint	Status	Actions
Feb 21st 2014	Sep 2nd 2016	IN7ZXRFGQMM42WOVNWREH6DXYNLPHNG6	Deleted	

[Create New Certificate](#) [Upload Your Own Certificate](#)



- Download and save both the Private Key and X.509 Certificate as separate files.
Store them in a standard directory
- Certificate is public key. Can show it to anyone. **Private key is very secret.**
- **Never show your private key to anyone.**

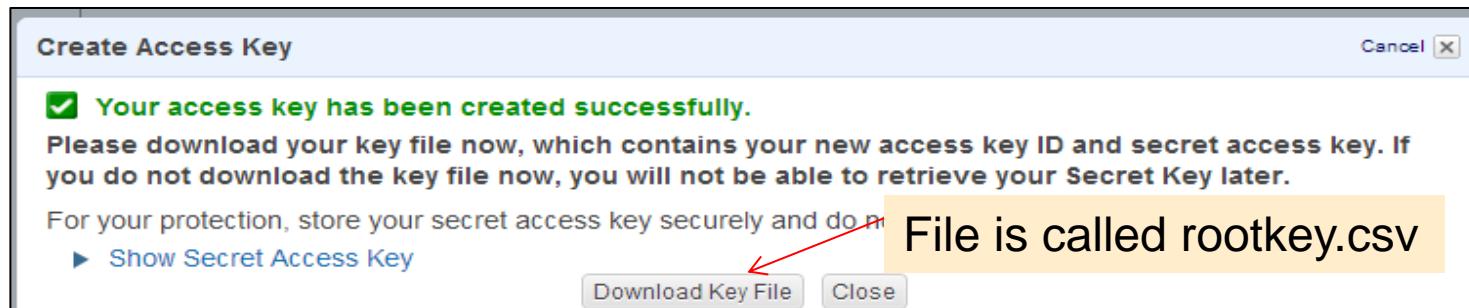


Create Access Key and Secret Access Key

- Go back to Security Credentials screen and Create New Access Key

The screenshot shows the 'Your Security Credentials' page in the AWS IAM console. On the left, there's a sidebar with links like Dashboard, Groups, Users, Roles, Policies, Identity providers, Account settings, Credential report, and Encryption keys. The main area has a heading 'Your Security Credentials' and a note about managing credentials for AWS accounts. It lists three types of credentials: Password, Multi-Factor Authentication (MFA), and Access Keys (Access Key ID and Secret Access Key). Below this is a note about access keys and a table with columns: Created, Deleted, Access Key ID, Last Used, Last Used Region, Last Used Service, Status, and Actions. At the bottom of the page is a blue 'Create New Access Key' button.

- On the widget that pops up, select Download Key File



AWSAccessKeyId=AKIAJ3QV5GTRSHIPG9TQ

AWSSecretKey=f4TaRsd0c0EQaLguEAk6BOWL2-eAih4si29somFv

- Safeguard downloaded Key File: rootkey.csv

Record your Account Identifiers

Your Security Credentials

Use this page to manage the credentials for your AWS account. To manage credentials for AWS Identity and Management (IAM) users, use the [IAM Console](#).

To learn more about the types of AWS credentials and how they're used, see [AWS Security Credentials](#) in Reference.

- + Password
- + Multi-Factor Authentication (MFA)
- + Access Keys (Access Key ID and Secret Access Key)
- + CloudFront Key Pairs
- + X.509 Certificates
- + Account Identifiers

Click the + sign next to Account Identifiers and record

AWS Account ID: **9534-1513-9294** (this number is usually used without dashes)

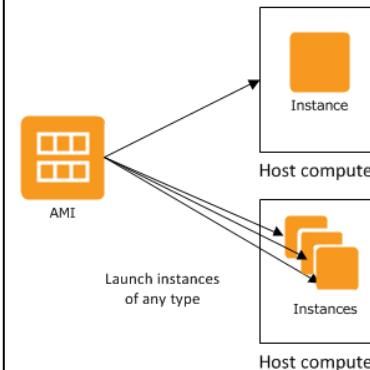
Canonical User ID:

ba6fde63312f068caa5411ceedaa8ff67a7178a8119a5ae

What exactly is an Amazon Machine Instance (AMI) ?

- A XEN image, pre-configured and available on demand from AWS
- Stock AMI image has no permanent storage
 - Users can customize AMIs and then store them for reuse.
 - Users can allocate storage and mount as needed
 - Storage can be mounted by different AMI's

An *Amazon Machine Image (AMI)* is a template that contains a software configuration (for example, an operating system, an application server, and applications). From an AMI, you launch an *instance*, which is a copy of the AMI running as a virtual server in the cloud. You can launch multiple instances of an AMI, as shown in the following figure.



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.

Cancel and Exit

Quick Start	AMIs	Actions
<input checked="" type="checkbox"/> My AMIs	Amazon Linux AMI 2017.03.1 (HVM), SSD Volume Type - ami-ea87a78f	<input type="button" value="Select"/>
<input type="checkbox"/> AWS Marketplace	Amazon Linux Free tier eligible	64-bit
<input type="checkbox"/> Community AMIs	SUSE Linux Enterprise Server 12 SP2 (HVM), SSD Volume Type - ami-f990b69c	<input type="button" value="Select"/>
<input type="checkbox"/> Free tier only ⓘ	SUSE Linux Free tier eligible	64-bit
	Red Hat Enterprise Linux 7.4 (HVM), SSD Volume Type - ami-cfdafaaa	<input type="button" value="Select"/>
	Red Hat Free tier eligible	64-bit
	Ubuntu Server 16.04 LTS (HVM), SSD Volume Type - ami-10547475	<input type="button" value="Select"/>
	Ubuntu Server 16.04 LTS (HVM) EBS General Purpose (SSD) Volume Type. Support available from Canonical (http://aws.amazon.com/cloud/comparison/)	

<http://docs.aws.amazon.com/AWSEC2/latest/UserGuide/ec2-instances-and-amis.html>

Examples of EC2 Instance types

Amazon EC2 provides a wide selection of instance types optimized to fit different use cases. Instance types comprise varying combinations of CPU, memory, storage, and networking capacity and give you the flexibility to choose the appropriate mix of resources for your applications. Each instance type includes one or more instance sizes, allowing you to scale your resources to the requirements of your target workload.

Type	CPU*	Memory	Storage	Platform
Small (default)	1 EC2 Compute Unit	1.7 GB	160 GB	32-bit
Large	4 EC2 Compute Units	7.5 GB	850 GB	64-bit
Extra large	8 EC2 Compute Units	15 GB	1690 GB	64-bit
High CPU Medium	5 EC2 Compute Units	1.7 GB	350 GB	32-bit
High CPU Extra large	20 EC2 Compute Units	7 GB	1690 GB	64-bit

Sample EC2 Instances

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

Family	Type	vCPUs	Memory (GiB)	Instance Storage (GB)	EBS-Optimized Available	Network Performance	IPv6 Support
General purpose	t2.nano	1	0.5	EBS only	-	Low to Moderate	Yes
General purpose	t2.micro Free tier eligible	1	1	EBS only	-	Low to Moderate	Yes
General purpose	t2.small	1	2	EBS only	-	Low to Moderate	Yes
General purpose	t2.medium	2	4	EBS only	-	Low to Moderate	Yes

Dual IPs and Security Groups

- **All AMIs come with public IP addresses**
 - Security groups *allow you to configure which ports to open up for external inbound access*
 - Each entry in a Security Group has a protocol, port number and optionally a subnet mask to restrict access by IP address
 - A Security Group must be allocated to an AMI before it is started
 - You can add/delete entries to a security group allocated to one or several AMI-s without having to restart the AMI. Modifications to the security group affect running AMI-s
- **AMIs could have a Private IP address that can be used for public access or optimized AMI-AMI network traffic**

Elastic Block Storage

- <https://aws.amazon.com/ebs/>

Amazon EC2 instances in the AWS Cloud. Each Amazon EBS volume is automatically replicated within its Availability Zone to protect you from component failure, offering high availability and durability. Amazon EBS volumes offer the consistent and low-latency performance needed to run your workloads. With Amazon EBS, you can scale your usage up or down within minutes – all while paying a low price for only what you provision.

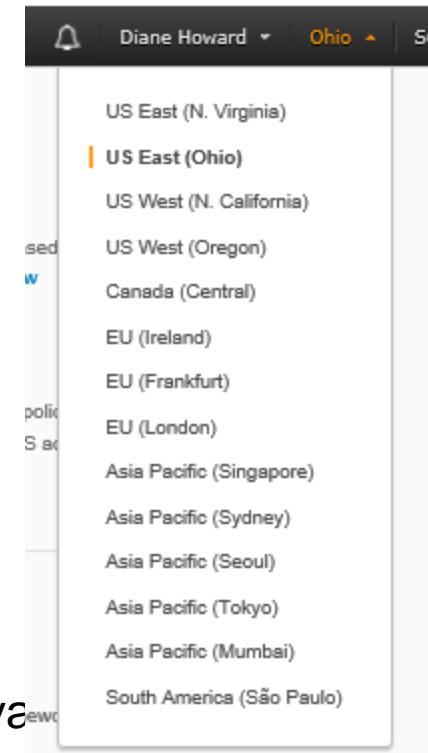
Amazon EBS is designed for application workloads that benefit from fine tuning for performance, cost and capacity. Typical use cases include Big Data analytics engines (like the Hadoop/HDFS ecosystem and Amazon EMR clusters), relational and NoSQL databases (like Microsoft SQL Server and MySQL or Cassandra and MongoDB), stream and log processing applications (like Kafka and Splunk), and data warehousing applications (like Vertica and Teradata).

- **EBS - Elastic Block Store**

- Mountable storage volumes
- “SAN on demand”
- From 1Gb to 1Tb
- Significantly faster than AMI volatile storage
- Mounts on a single AMI only
 - Can mount several on a single AMI
- Cost
 - \$0.10/Gb per month (based on size of volume not amount used)
 - \$0.10/1 million I/O requests

Regions and Availability Zones

- In a failover DB server configuration your standby server could run on the same physical machine
- **Regions:**
 - Geographically dispersed locations
 - Currently there are 14 regions
- **Availability zone:**
 - Part of a region
 - Engineered to be insulated from failure in other zones
- **Specify availability zone when launching instances:**
 - Place all machines in the same zone for faster data transfer.
 - Place machines in different zones for reliability and higher-availability



Elastic Compute Dashboard

Services ▾ Resource Groups ▾ 🔍

Diane Howard ▾ Ohio ▾ Support ▾

EC2 Dashboard

- Events
- Tags
- Reports
- Limits
- INSTANCES**
- Instances**
- Spot Requests
- Reserved Instances
- Dedicated Hosts

IMAGES

- AMIs
- Bundle Tasks

ELASTIC BLOCK STORE

- Volumes
- Snapshots

NETWORK & SECURITY

- Security Groups
- Elastic IPs
- Placement Groups
- Key Pairs
- Network Interfaces

LOAD BALANCING

Resources

You are using the following Amazon EC2 resources in the US East (Ohio) region:

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

Just need a simple virtual private server? Get everything you need to jumpstart your project - compute, storage, and networking – for a low, predictable price. [Try Amazon Lightsail for free.](#)

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 East (Ohio) region

Service Health

Service Status:

- US East (Ohio):
This service is operating normally

Availability Zone Status:

- us-east-2a:
Availability zone is operating normally

Scheduled Events

US East (Ohio):
No events

Account Attributes

Supported Platforms

- VPC
- Default VPC
- vpc-cb4460a2

Resource ID length management

Additional Information

- Getting Started Guide
- Documentation
- All EC2 Resources
- Forums
- Pricing
- Contact Us

AWS Marketplace

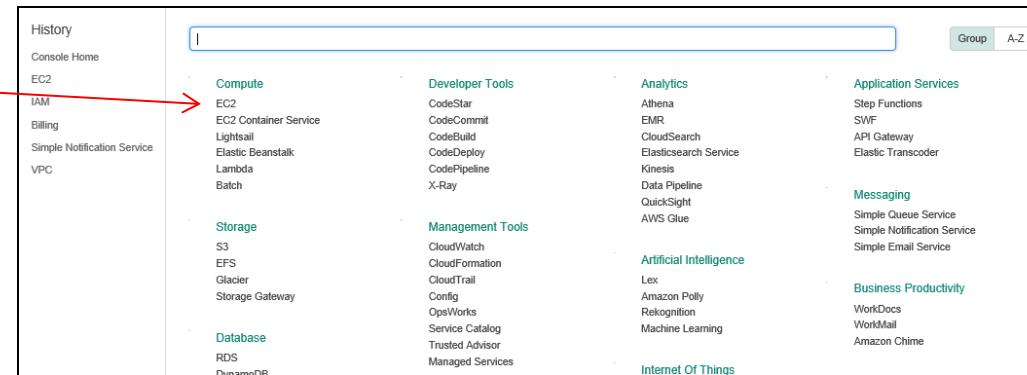
Find free software trial products in the AWS Marketplace from the [EC2 Launch Wizard](#). Or try these popular AMIs:

- Barracuda NextGen Firewall F-Series - PAYG

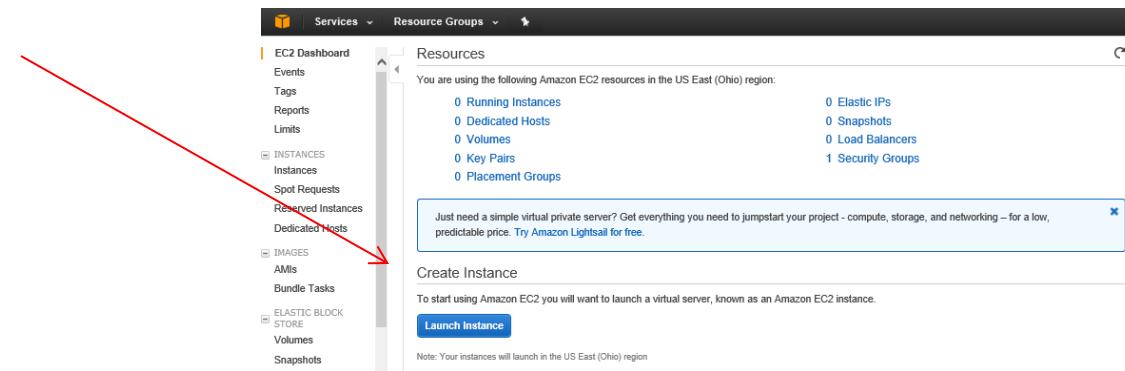
Provided by Barracuda Networks, Inc.
Rating ★★★★☆
Starting from \$0.60/hr or from \$4,599/yr (12% savings)
for software + AWS usage fees
[View all Network Infrastructure](#)

Launch an Instance

- Go to EC2 Service in your Management Console



- Select Launch Instance



Select “Community AMIs” tab in Left Panel

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

Step 1: Choose an Amazon Machine Image (AMI)

[Cancel and Exit](#)

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

Quick Start

My AMIs

AWS Marketplace

Community AMIs

Operating system

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

Architecture

Search community AMIs

1 to 50 of 88,260 AMIs

AMI Name	Description	Root device type	Virtualization type	Action
amzn-ami-hvm-2017.03.1.20170812-x86_64-gp2 - ami-4fffc834	Amazon Linux AMI 2017.03.1.20170812 x86_64 HVM GP2	ebs	hvm	Select (64-bit)
suse-sles-12-sp2-v20170620-hvm-ssd-x86_64 - ami-8fac8399	SUSE Linux Enterprise Server 12 SP2 (HVM, 64-bit, SSD-Backed)	ebs	hvm	Select (64-bit)
RHEL-7.4_HVM_GA-20170808-x86_64-2-Hourly2-GP2 - ami-c998b6b2	Provided by Red Hat, Inc.	ebs	hvm	Select (64-bit)
ubuntu/images/hvm-ssd/ubuntu-xenial-16.04-amd64-server-20170721 - ami-cd0f5cb6	Canonical, Ubuntu, 16.04 LTS, amd64 xenial image build on 2017-07-21	ebs	hvm	Select (64-bit)
Windows_Server-2016-English-Full-Base-2017.08.09 - ami-27a58d5c				Select

Enter bitnami-tomcat in Search Criteria

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

[Cancel and Exit](#)

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.

The screenshot shows the AWS Lambda Step Functions interface for creating a new state machine. The top navigation bar includes 'Create New State Machine', 'My State Machines', 'AWS Marketplace', and 'Community AMIs'. The main area has tabs for 'Quick Start', 'My AMIs', and 'Community AMIs', with 'Community AMIs' currently selected. A search bar at the top right says 'Search community AMIs'. Below the search bar is a table of AMI results:

AMIs	Description	Root device type	Virtualization type	Action
amzn-ami-hvm-2017.03.1.20170812-x86_64-gp2 - ami-4fffc834	Amazon Linux AMI 2017.03.1.20170812 x86_64 HVM GP2	ebs	hvm	Select 64-bit
suse-sles-12-sp2-v20170620-hvm-ssd-x86_64 - ami-8fac8399	SUSE Linux Enterprise Server 12 SP2 (HVM, 64-bit, SSD-Backed)	ebs	hvm	Select 64-bit
RHEL-7.4_HVM_GA-20170808-x86_64-2-Hourly2-GP2 - ami-c998b6b2	Provided by Red Hat, Inc.	ebs	hvm	Select 64-bit
ubuntu/images/hvm-ssd/ubuntu-xenial-16.04-amd64-server-20170721 - ami-cd0f5cb6	Canonical, Ubuntu, 16.04 LTS, amd64 xenial image build on 2017-07-21	ebs	hvm	Select 64-bit
Windows_Server-2016-English-Full-Base-2017.08.09 - ami-27a58d5c				Select

Do not choose an AMI with aws-marketplace prefix. Those need an additional authorization and some additional payments.. Select for example ami-008db468

Choose Micro Instance Type

- Leave No Preference for Availability Zone

The screenshot shows the AWS EC2 instance creation wizard at Step 2: Choose an Instance Type. The t2.micro instance is selected, indicated by a blue border around its row. The table displays various instance types with their details:

	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 checked="" 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

Next screens:

- Configure Instance Details Screen: take the defaults and select Continue.
- Add Storage Screen: leave defaults and select Continue.
- Tag Instance Screen: provide some/any name in the Value field,
e.g. My Tomcat server. Select Continue.

Configure Instance Details Screen

The screenshot shows the 'Configure Instance Details' screen in the AWS Lambda console. The top navigation bar includes 'Services', 'Resource Groups', and user information for Diane Howard in the N. Virginia region. Below the navigation is a progress bar with steps 1 through 7: Choose AMI, Choose Instance Type, Configure Instance (which is highlighted), Add Storage, Add Tags, Configure Security Group, and Review.

Step 3: Configure Instance Details

Configure the instance to suit your requirements. You can launch multiple instances from the same AMI, request Spot instances to take advantage of the lower pricing, assign an access management role to the instance, and more.

Number of instances: 1 [Launch into Auto Scaling Group](#)

Purchasing option: Request Spot instances

Network: vpc-2f261b56 (default) [Create new VPC](#)

Subnet: No preference (default subnet in any Availability Zone) [Create new subnet](#)

Auto-assign Public IP: Use subnet setting (Enable)

IAM role: None [Create new IAM role](#)

Shutdown behavior: Stop

Enable termination protection: Protect against accidental termination

Monitoring: Enable CloudWatch detailed monitoring
Additional charges apply.

Tenancy: Shared - Run a shared hardware instance
Additional charges will apply for dedicated tenancy.

[Advanced Details](#)

At the bottom right, there are buttons for 'Cancel', 'Previous', 'Review and Launch' (which is highlighted in blue), and 'Next: Add Storage' (which is enclosed in a red box).

Add Storage Screen

The screenshot shows the 'Add Storage' step of an AWS EC2 instance creation wizard. The top navigation bar includes 'Services', 'Resource Groups', and user information for Diane Howard in the N. Virginia region. The breadcrumb navigation shows steps 1 through 7: Choose AMI, Choose Instance Type, Configure Instance, Add Storage (highlighted in orange), Add Tags, Configure Security Group, and Review.

Step 4: Add Storage

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

Volume Type	Device	Snapshot	Size (GiB)	Volume Type	IOPS	Throughput (MB/s)	Delete on Termination	Encrypted
Root	/dev/xvda	snap-083016866ac6b06eb	8	General Purpose SSD (GP2)	100 / 3000	N/A	<input checked="" type="checkbox"/>	Not Encrypted

Add New Volume

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

Buttons at the bottom include 'Cancel', 'Previous', 'Review and Launch' (highlighted in blue), and 'Next: Add Tags'.

Add Tag for the Instance (labeling purposes in Console)

Services ▾ Resource Groups ▾ Diane Howard ▾ N. Virginia ▾ Support ▾

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

Step 5: Add Tags

A tag consists of a case-sensitive key-value pair. For example, you could define a tag with key = Name and value = Webserver.

A copy of a tag can be applied to volumes, instances or both.

Tags will be applied to all instances and volumes. [Learn more](#) about tagging your Amazon EC2 resources.

Key	(127 characters maximum)	Value	(255 characters maximum)	Instances	Volumes
BitNami-TopCat	x			<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

Add another tag (Up to 50 tags maximum)

Cancel Previous **Review and Launch** Next: Configure Security Group

Select Security Group

- This is default but we will create a new Security Group for Linux. See next slide.

Services ▾ Resource Groups ▾ Diane Howard ▾ N. Virginia ▾ Support ▾

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

Step 6: Configure Security Group

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

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

Security Group ID	Name	Description	Actions
sg-a65773d6	default	default VPC security group	Copy to new

Inbound rules for sg-a65773d6 (Selected security groups: sg-a65773d6)

Type	Protocol	Port Range	Source	Description
All traffic	All	All	sg-a65773d6 (default)	

Cancel Previous **Review and Launch**

Security Group for Linux (allow SSH remote login)

Services | Resource Groups | Diane Howard | N. Virginia | Support

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

Step 6: Configure Security Group

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

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

Security group name: x

Description:

Type	Protocol	Port Range	Source	Description
SSH	TCP	22	Custom <input type="button" value="▼"/> 0.0.0.0/0	SSH for Linux
HTTP	TCP	80	Custom <input type="button" value="▼"/> 0.0.0.0/0, ::/0	http
HTTPS	TCP	443	Custom <input type="button" value="▼"/> 0.0.0.0/0, ::/0	https

[Add Rule](#)

Warning

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

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

Review Instance Description & Launch – 1 of 2

Services ▾ Resource Groups ▾ Diane Howard ▾ N. Virginia ▾ 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](#)

 Amazon Linux AMI 2017.03.1 (HVM), SSD Volume Type - ami-4fffc834
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 ID	Name	Description
sg-a65773d6	default	default VPC security group

All selected security groups inbound rules

Type <small>i</small>	Protocol <small>i</small>	Port Range <small>i</small>	Source <small>i</small>	Description <small>i</small>
All traffic	All	All	sg-a65773d6 (default)	

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

More details of our Instance

Step 7: Review Instance Launch

Number of instances 1
Purchasing option On demand

Network vpc-2f261b56
Subnet No preference (default subnet in any Availability Zone)

EBS-optimized No
Monitoring No

Termination protection No
Shutdown behavior Stop
IAM role None
Tenancy default
Host ID
Affinity Off
Kernel ID Use default
RAM disk ID Use default
User data
Assign Public IP Use subnet setting (Enable)
Assign IPv6 IP Use subnet setting (Enable)

Network interfaces

▼ Storage

[Edit storage](#)

Volume Type ⓘ	Device ⓘ	Snapshot ⓘ	Size (GiB) ⓘ	Volume Type ⓘ	IOPS ⓘ	Throughput (MB/s) ⓘ	Delete on Termination ⓘ	Encrypted ⓘ
Root	/dev/xvda	snap-083018866ac6b06eb	8	gp2	100 / 3000	N/A	Yes	Not Encrypted

Tags

[Edit tags](#)

Key	Value	Instances ⓘ	Volumes ⓘ

Before launching you will need to create a new Key Pair

Services ▾ Resource Groups ▾ 🔍

Diane Howard ▾ N. Virginia ▾ 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

Number of instances 1
Network vpc-2f261b56
Subnet No preference (default subnet)
EBS-optimized No
Monitoring No
Termination protection No
Shutdown behavior Stop
IAM role None
Tenancy default
Host ID
Affinity Off
Kernel ID Use default
RAM disk ID Use default
User data
Assign Public IP Use subnet setting (Enable)
Assign IPv6 IP Use subnet setting (Enable)

Network interfaces

▼ Storage

Volume Type ⓘ Device ⓘ Snapshot ⓘ

Root	/dev/xvda	snap-083018866ac6b06eb	8
------	-----------	------------------------	---

Tags

Key	Value	Instances ⓘ	Volumes ⓘ
-----	-------	-------------	-----------

Purchasing option On demand

Select an existing key pair or create a new key pair

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

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

Choose an existing key pair
Select a key pair
No key pairs found

No key pairs found
You don't have any key pairs. Please create a new key pair by selecting the Create a new key pair option above to continue.

Cancel Launch Instances

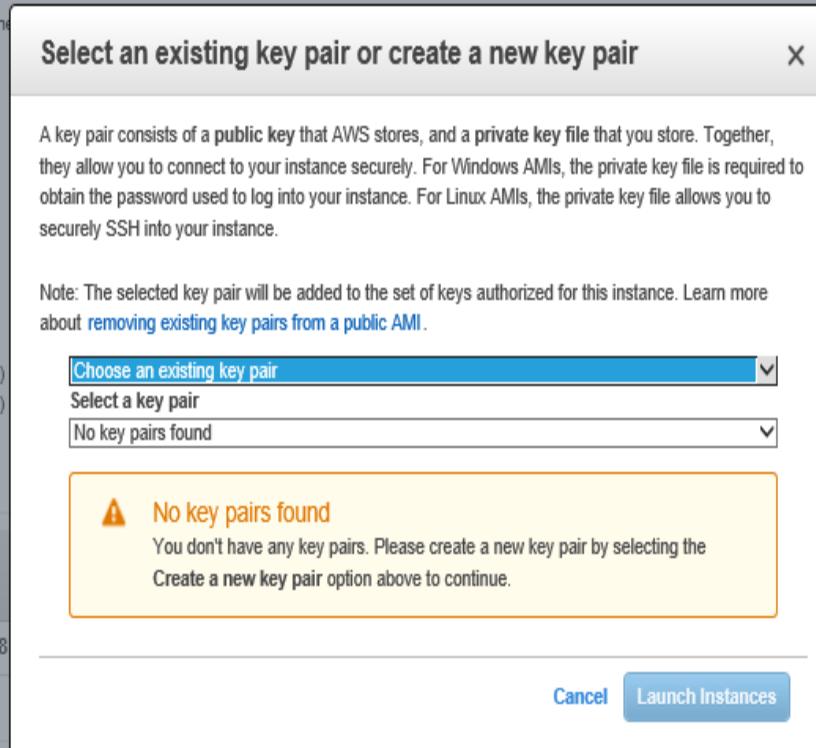
Edit storage

Encrypted ⓘ

Uncrypted

Edit tags

Cancel Previous Launch



Create your new Key Pair

- Select from pull down: Create a new Key Pair
- Enter your name for your key pair
- Don't forget to **download your file to your folder where you keep your keys**

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
 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

dianes-sept-2017-kp - Notepad

```
File Edit Format View Help
-----BEGIN RSA PRIVATE KEY-----
MIIEowIBAAKCAQEAmosJuPfg7I66fEd1sJLS0zLmfKTGVjFw03gAFxhbK5P/92DG78nh7EK8Kw0+
KdzbvDcU815GByS+HwnpIKsfv4RGBMhrB2EF/zv2IUDbanqTAZjTSNoquBoSTkNwbbAf+tosicnL
gx1ctVcbC0er9GK621cGHItf4ipFsVBWUUsrXUjJT06vAd33PXY9xxwSwABNt2m/wG200sJ51q
KRIf54WMvGx14FGztn41MiD5qfL0ocNIrkRaA/k8o7YulN4+Xx1lVYYCr+1KFoPOHycs5wShv
/Y0eCGMZP1T8tmkxv1QhZe14JpVVGfze/MH+BctTAzi9qgAtgErcJwIDAQABAoIBAG4ioiYkF0/e
k7YX57eDmsFHKAzKHPK2puasqXXMDMuSyre3fprZE9Ma+83tzUAKY+prYq+QXe7zqYuGtKlwVo
ncGsNQPjIOE7h+5FNOffU00kzExF8yrSmn98Ynpn9B31tWIpFvnxMnsLcnQWzaS874S/TDu7uwMF
cINndgNPq4SNreTS91IUbwNGradBMFPkBF6mIqbImcd4MxxPJ11BFLZ15Sq1t7PiuwZA41mrxCX
L6W46RVa8FQmkBe0F2YRE0tRnTi0FDPoEUzeAbnc/PICyxpCZsa8LB1C+W7cSh7oH7vqwROZAnU
zVyydw9Cjs1bn1i3H1wmim13kCgYEAlju640SwMAR+N2C8PjVwCYeF0+kLj1eP1AaPwTgv/74X
Z9jwKbXrF0BRRA1AhGpR/D0Yrgyn21pDDQzDc1AAx4y9UBC+HR30+gsBOTNHKi3n1vjCp7NFHuF
on8ucD1bWNY2o5T6Pk/lz1gRQxT/d3yHV4KyQEGe60TSh/W4g50CgYEauLHORCyir2Vu8BTvsmdo
McTM471F1wHhpduJhj491w18xrpbkHc0mwVP+tMD0rtnwFBZkOnCukLa7tFkXRPObyVH7hv7IaF
MdmlHfqpjuf39Mof12DkDf09V2qNm4IoBigbj5VCN9NjGb7wbXObdu//o7NhNWPN9sAdZYcgznZMC
gyA10YQjtGwTN1YFFrZvSS8z194tQ4AUzz3z/sQ11/QOs+RxpkArDDNQyztkjwIe5089TPR0pBqha
WuDrxpy9Q1vnqymYBDhvZmzA6ncQbccQP3eLRY5t7Pp7gUMPH4E/6aa7D4aMUVbIfew20DagYROMH
fj7sIVtJPepW85xhoIIKGQKBgQCGrmdcQjeSotc259vhZrGuS+KTOEDK/Rop9Nf/XZdOKvs8DkjW
S1Spw2m90uwk3RP05WhXcuYM01r6efKarmyRBCeJ0hNCAMywnqkCjbBpPJZvVxZiPhXd2RSbNJ
g+rZQGQ1ahf3fazk755j9nRg00tRcAMxmPpbkeou1+01wKBgA/R9J9xTcGeTTJv5icrB5Xzmuh
7OYuW7JmI5t1TN24N1FXGXty/rVe7T2ZFrLrqtiMmd81F6LhcqRK0MTjAGIEL6VsUCbkdV06um
VALPnqKRsX8QKZURRbkTsChCYta9BHBLu1bFmCb+eimGF1rMRZ5wN1JEqrng8TDWbYva
-----END RSA PRIVATE KEY-----
```

dianes-sept-2017-kp.pem

Downloaded *.pem file is **very important!**

Instance will now Launch

Services | Resource Groups | Diane Howard | N. Virginia | Support

Launch Status

Your instances are now launching
The following instance launches have been initiated: [i-0e5a64185f1e343b6](#) [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](#)
- [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](#)

View Your Running Instance/s in your EC2 Console

Screenshot of the AWS EC2 Instances console showing a single running instance.

The top navigation bar includes:

- Services
- Resource Groups
- Diane Howard (User)
- N. Virginia (Region)
- Support

The main interface shows a table of instances with the following columns:

Name	Instance ID	Instance Type	Availability Zone	Instance State	Status Checks	Alarm Status	Public DNS (IPv4)	IPv4 Public IP	IP
	i-0e5a64185f1e343b6	t2.micro	us-east-1a	running	2/2 checks...	None	ec2-34-228-255-112.co...	34.228.255.112	-

The instance details page for **i-0e5a64185f1e343b6** shows the following information:

Description	Value
Instance ID	i-0e5a64185f1e343b6
Instance state	running
Instance type	t2.micro
Elastic IPs	-
Availability zone	us-east-1a
Security groups	Linux-sg , view inbound rules
Scheduled events	No scheduled events
AMI ID	amzn-ami-hvm-2017.03.1.20170812-x86_64-gp2 (ami-4fffc834)
Platform	-
IAM role	-
Key pair name	dianes-sept-2017-kp
Owner	367410677513
Launch time	September 2, 2017 at 8:27:53 AM UTC-4 (less than one hour)
Termination protection	False
Lifecycle	normal
Monitoring	basic
Alarm status	None
Kernel ID	-
DAM Kernel ID	-

The Public DNS (IPv4) value, **ec2-34-228-255-112.compute-1.amazonaws.com**, is highlighted with a red box and a blue arrow points to it from the text "Public (DNS) name of new instance".

Public (DNS) name
of new instance

Tools to Connect With

- To connect to an instance you need a **SSH (Secure Shell) tool**.
- **Putty** is one of Windows tools emulating SSH protocol. When you are downloading Putty, from the same site, please, download WinSCP as well. WinSCP provides secure copy functionality on Windows.
- **CygWin** on Windows provides a complete set of Linux (Unix) utilities, including SSH.
- Linux and Unix boxes, including Apple machines, **by rule have a ssh tool**.
- **OpenSSH** project provides a free implementation of the full suite of SSH tools and is part of CygWin download.
- ***OpenSSH project is under Net group of projects. When downloading Cygwin, make sure you check (select) OpenSSH.***

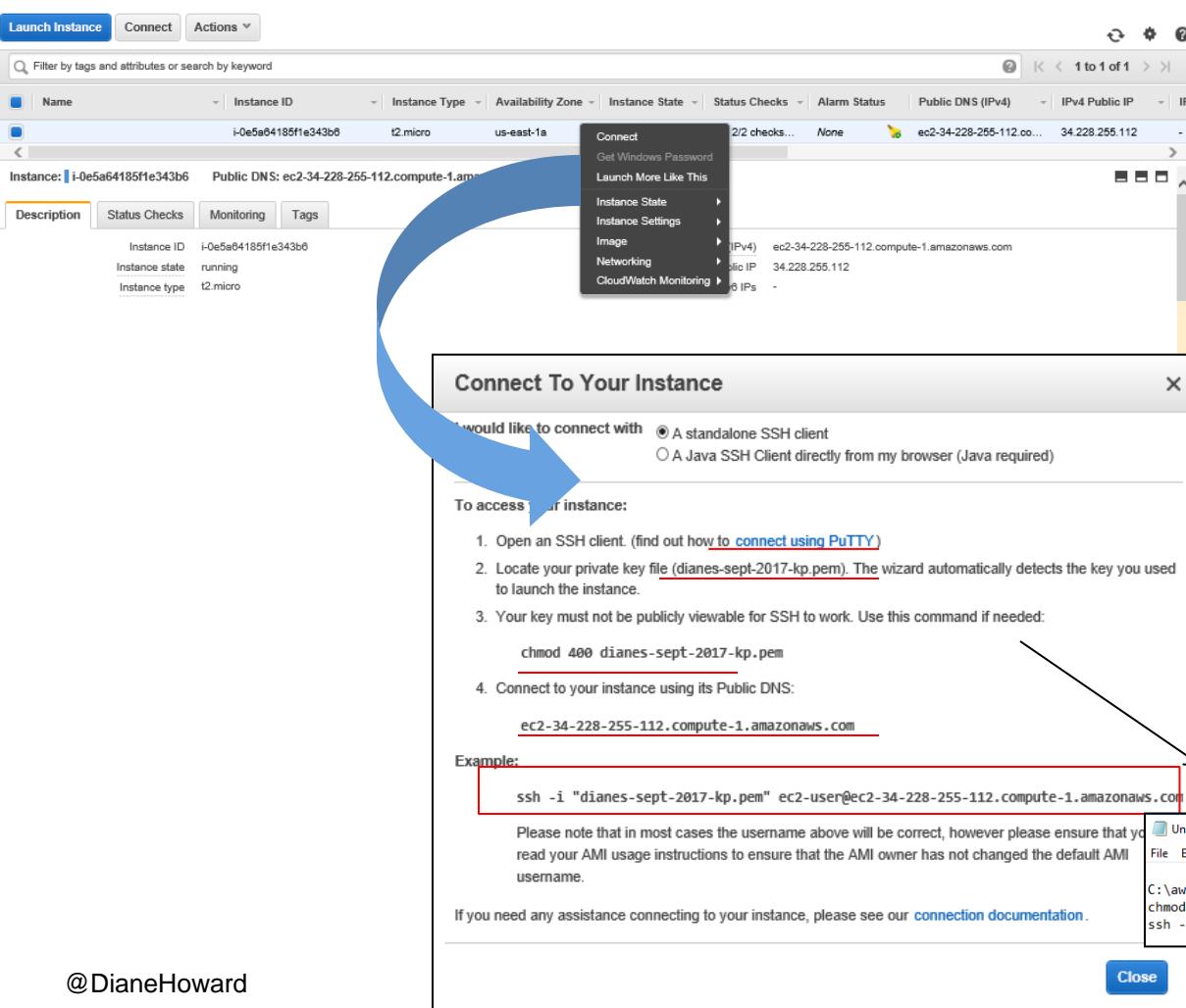
Download Cygwin

- I have slides on Cygwin and Putty Install



How to Connect to your Instance

- You need to obtain connection details of your instance
- Right click on your instance in your EC2 Console



- Select Connect next to Launch Instances button.
- New widget appears.
- Public DNS is the name of your host.
- Please note the user name, `ec2-user` in our case. We need that user name in order to connect with ssh or Putty. Sometimes User name is somewhat unreliable. Be ready to try: `root`, `ec2-user`, `bitnami`, `others`.

Save cmd's in a notepad file.

A screenshot of a Windows Notepad window titled 'Untitled - Notepad'. The content of the window is:

```
File Edit Format View Help
```

```
C:\aws\2017key\Fall2017Keys
chmod 400 dianes-sept-2017-kp.pem
ssh -i "dianes-sept-2017-kp.pem" ec2-user@ec2-34-228-255-112.compute-1.amazonaws.com
```

Note: The location of your PEM for your Instance

- You will need this path as that is the location you will need to be in to connect to your Instance!

C:\aws\2017key\Fall2017Keys

File: dianes-sept-2017-ky.pem

Name	Date modified	Type	Size
AccessKeyInfo	9/2/2017 1:51 AM	JPG File	31 KB
AccountDinfo	9/2/2017 2:02 AM	JPG File	22 KB
cert-XW4BPR3BJYVMBIUT7GYVIM4X7JO6...	9/2/2017 1:41 AM	PEM File	2 KB
dianes-sept-2017-ky	9/2/2017 8:25 AM	PEM File	2 KB
pk-XW4BPR3BJYVMBIUT7GYVIM4X7JO6...	9/2/2017 1:39 AM	PEM File	2 KB
rootkey	9/2/2017 1:56 AM	Microsoft Excel C...	1 KB

Untitled - Notepad

```
C:\aws\2017key\Fall2017Keys
chmod 400 dianes-sept-2017-ky.pem
ssh -i "dianes-sept-2017-ky.pem" ec2-user@ec2-34-228-255-112.compute-1.amazonaws.com
```

Connect with SSH

- In Cygwin's command line shell, change directory to the location of the key pair file that you created when you launched the instance.
- Use the chmod command to make sure your key pair file isn't publicly viewable.
- For example, my file is named dianes-sept-2017-kp.pem. I do this first (use Linux tool cygwin for Windows)

```
$ chmod 400 dianes-sept-2017-kp.pem
```

- Connect to your instance using the instance's public DNS name (which you should have recorded or copied earlier). For example, if the key file is dianes-sept-2017-kp.pem, user name ec2-user and the instance's DNS name:

```
ec2-user@ec2-34-228-255-112.compute-1.amazonaws.com
```

we use the following command (all on one line)

```
$ ssh -i "dianes-sept-2017-kp.pem" ec2-user@ec2-34-228-255-112.compute-1.amazonaws.com
```

Note: ec2-user is the user name or the Linux account. That user usually has sudo privileges, i.e. it could execute commands as if root.

Changing Permissions in Linux tool cygwin

- Use cygwin if you are in Windows to run Linux commands

```
dhoward@dhoward-PC ~
$ pwd
/home/dhoward

dhoward@dhoward-PC ~
$ cd c:/

dhoward@dhoward-PC /cygdrive/c
$ cd aws/2017key/Fall2017keys

dhoward@dhoward-PC /cygdrive/c/aws/2017key/Fall2017keys
$ ls
AccessKeyInfo.JPG
AccountIDinfo.JPG
cert-XW4BPR3BJYVMBIUT7GYVIM4X7J06U5J7.pem
dianes-sept-2017-kp.pem
pk-XW4BPR3BJYVMBIUT7GYVIM4X7J06U5J7.pem
rootkey.csv

dhoward@dhoward-PC /cygdrive/c/aws/2017key/Fall2017keys
$ ls -l
total 69
----rwx---+ 1 dhoward None 30726 Sep  2 01:51 AccessKeyInfo.JPG
----rwx---+ 1 dhoward None 22167 Sep  2 02:02 AccountIDinfo.JPG
----rwx---+ 1 dhoward None 1302 Sep  2 01:41 cert-XW4BPR3BJYVMBIUT7GYVIM4X7J06U
5J7.pem
----rwx---+ 1 dhoward None 1692 Sep  2 08:25 dianes-sept-2017-kp.pem
----rwx---+ 1 dhoward None 1732 Sep  2 01:39 pk-XW4BPR3BJYVMBIUT7GYVIM4X7J06U5J
7.pem
----rwx---+ 1 dhoward None      90 Sep  2 01:56 rootkey.csv

dhoward@dhoward-PC /cygdrive/c/aws/2017key/Fall2017keys
$ |
```

Change permission of your key pair file!

```
dhoward@dhoward-PC /cygdrive/c/aws/2017key/Fall2017keys
$ chmod 400 dianes-sept-2017-kp.pem

dhoward@dhoward-PC /cygdrive/c/aws/2017key/Fall2017keys
$ ls -l dianes-sept-2017-kp.pem
-r-----+ 1 dhoward None 1692 Sep  2 08:25 dianes-sept-2017-kp.pem

dhoward@dhoward-PC /cygdrive/c/aws/2017key/Fall2017keys
$ |
```

Connect to your instance

- You must remain in the directory where your key pair is located to ssh to your instance!
- Successful LOGIN below:

This is a common mistake

```
dhoward@dhoward-PC /cygdrive/c/aws/2017key/Fall2017keys
$ ssh -i "dianes-sept-2017-kp.pem" awecdc2-user@ec2-34-228-255-112.compute-1.amazonaws.com
Permission denied (publickey).

dhoward@dhoward-PC /cygdrive/c/aws/2017key/Fall2017keys
$ ssh -i "dianes-sept-2017-kp.pem" ec2-user@ec2-34-228-255-112.compute-1.amazonaws.com

[ec2-user@ip-172-31-25-245 ~]$ |
```

Amazon Linux AMI

```
https://aws.amazon.com/amazon-linux-ami/2017.03-release-notes/
8 package(s) needed for security, out of 8 available
Run "sudo yum update" to apply all updates.
```

WE ARE REMOTELY LOGGED INTO OUR AMAZON INSTANCE!

Issue with Remote Login to your Instance

- Here's an example of not being able to login

```
$ ssh -i ec2hu.pem ubuntu@ec2-54-158-173-168.compute-  
1.amazonaws.com  
The authenticity of host 'ec2-54-158-173-168.compute-  
1.amazonaws.com (54.242.17.195)' can't be established.  
ECDSA key fingerprint is  
f8:bc:f7:b2:52:8e:a6:ac:a2:9f:92:7d:dd:76:3c:f9.  
Are you sure you want to continue connecting (yes/no)? yes  
Warning: Permanently added 'ec2-54-158-173-168.compute-  
1.amazonaws.com,54.242.17.195' (ECDSA) to the list of known hosts.  
Permission denied (publickey).
```

- Remote host (AWS box) might reject your login.
- The issue might be in the user name. Try bitnami or ec2-user

Another example of logging into a different Instance

- Success! Notice this user is bitnami!

```
$ ssh -i ec2hu.pem bitnami@ec2-54-158-173-168.compute-  
1.amazonaws.com  
Welcome to Ubuntu 12.04.2 LTS (GNU/Linux 3.2.0-49-virtual i686)  
  
[...]  
  
*** Welcome to the BitNami Tomcat 7.0.42-0 ***  
*** BitNami Wiki: http://wiki.bitnami.com/ ***  
*** BitNami Forums: http://answers.bitnami.com/ ***  
To run a command as administrator (user "root"), use "sudo  
<command>".  
See "man sudo_root" for details.  
  
bitnami@ip-10-196-125-57:~$
```

- This time, we are in, as user `bitnami`.
- The note about `sudo` command is very important. In most cases, if you do not login into the instance as `root`, you login as a user with `sudo` (super user doer??) privilege.

Bitnami/stacks Information

Sent Console x BitNami Stacks x g x

bitnami.com/stacks

E-185 Big Data Logout VMware Store Ansambl Svilen Kon... Ebook library Booko... Blackboard Collabor... E-90 Cloud

BitNami

APPS CLOUD HOSTING SUPPORT LOGIN

All
Popular
Recently Updated
Infrastructure
Cloud Tools
Accounting
Analytics
Binary Repository
Blog
Bug Tracking
Bundles
Business Intelligence
CMS
Code Review
Collaboration
Continuous Integration
CRM
Developer Tools
e-Commerce

Applications

BitNami is an app store for server software. Install your favorite applications in your own servers or run them in the cloud. Select one app to get started or [learn more](#) about what makes BitNami special.



 Redmine Bug Tracking	 WordPress Blog	 WAMP Stack Infrastructure	 Joomla! CMS	 PrestaShop e-Commerce	 Ruby Stack Infrastructure
 Drush	 Laravel	 Django	 Moodle	 OpenCart	 Node.js

Amazon's Simple Storage Service

S3

S3 Mgmt Console

Services Resource Groups Diane Howard Global Support

Click here to learn how to store and access objects in S3 via NFS [Click here »](#)

Amazon S3

[+ Create bucket](#) [Delete bucket](#) [Empty bucket](#)

[Discover the new console](#) [Quick tips](#)

- Buckets - Regions

You do not have any buckets. Here is how to get started with Amazon S3.

 Create a new bucket

 Upload your data

 Set up your permissions

Buckets are globally unique containers for everything that you store in Amazon S3.

After you create a bucket, you can upload your objects (for example, your photo or video files).

By default, the permissions on an object are private, but you can set up access control policies to grant permissions to others.

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[Get started](#)

What is Amazon S3?

<https://aws.amazon.com/documentation/s3/>

Amazon Simple Storage Service Documentation

Amazon Simple Storage Service (Amazon S3) is storage for the Internet. You can use Amazon S3 to store and retrieve any amount of data at any time, from anywhere on the web. You can accomplish these tasks using the simple and intuitive web interface of the AWS Management Console.

Getting Started Guide

Introduces you to Amazon S3, helps you set up an account, and walks you through a simple example to use Amazon S3 for the first time. Also provides tips and links to advanced product features and resources.

[HTML](#) | [PDF](#) | [Kindle](#)

Developer Guide

Provides a conceptual overview of Amazon S3 and includes detailed instructions for using the various features.

[HTML](#) | [PDF](#) | [Kindle](#)

Console User Guide

Provides information to help you use Amazon S3 with the AWS Management Console.

[HTML](#) | [PDF](#)

API Reference

Describes all the Amazon S3 API operations in detail. Also provides sample requests, responses, and errors for the supported web services protocols.

[HTML](#) | [PDF](#)

What could be stored in S3?

Users of S3 commonly store images, video, and other content for their websites on Amazon S3. You can host an entire static website from an Amazon S3 buckets.

Amazon's documentation is excellent however we have come across a few bugs with their tutorials.

Essential Concepts

Buckets

- You upload objects into buckets.
- There is no limit to the number of objects that you can store in a bucket.
- The bucket provides a unique namespace for the management of objects contained in the bucket.
- Each developer can own up to 100 buckets at a time, without a special agreement with AWS.
- You own each bucket you create. AWS charges you for storing objects in your buckets and for transferring objects in and out of your buckets.

Bucket Namespaces

- Every object stored in Amazon S3 is contained in a Bucket.
- Buckets partition the namespace of objects stored in Amazon S3 at the top level. Within a bucket, you can use any names for your objects, but bucket names must be unique across all of Amazon S3.
- Buckets are similar to **Internet domain names**.
- Only one person or organization can own a bucket within Amazon S3.
- The similarities between buckets and domain names is not a coincidence—there is a direct mapping between Amazon S3 buckets and subdomains of s3.amazonaws.com.
- Objects stored in Amazon S3 are addressable using the REST API under the domain s3.amazonaws.com/bucketName.
- For example, if the object homepage.html is stored in the Amazon S3 bucket mybucket its Internet address would be

`http://s3.amazonaws.com/mybucket/homepage.html`

Essential Concepts

Keys

- A key is the unique identifier for an object within a bucket.
- The key is the object's name and can not be longer than 1028 bytes.
- Every object has exactly one key. Together, a bucket name and a key uniquely identify an object in Amazon S3.
- You can access every object in Amazon S3 by a combination of the service endpoint, bucket name, and key.
- For example, in

`http://s3.amazonaws.com/bucketName/photos/myPicture.jpg`

- `bucketName` is the bucket name and ,
- `/photos/myPicture.jpg` is the key.

Let's try S3! Select S3 Service, Create Bucket

Services Resource Groups

Click here to learn how to store and access objects in S3 via NFS Click here

Amazon S3

+ Create bucket Delete bucket Empty bucket

You do



Create a new bucket

Buckets are globally unique containers for everything that you store in Amazon S3.

Learn more

Create bucket

① Name and region ② Set properties

Name and region

Bucket name

Region

Copy settings from an existing bucket

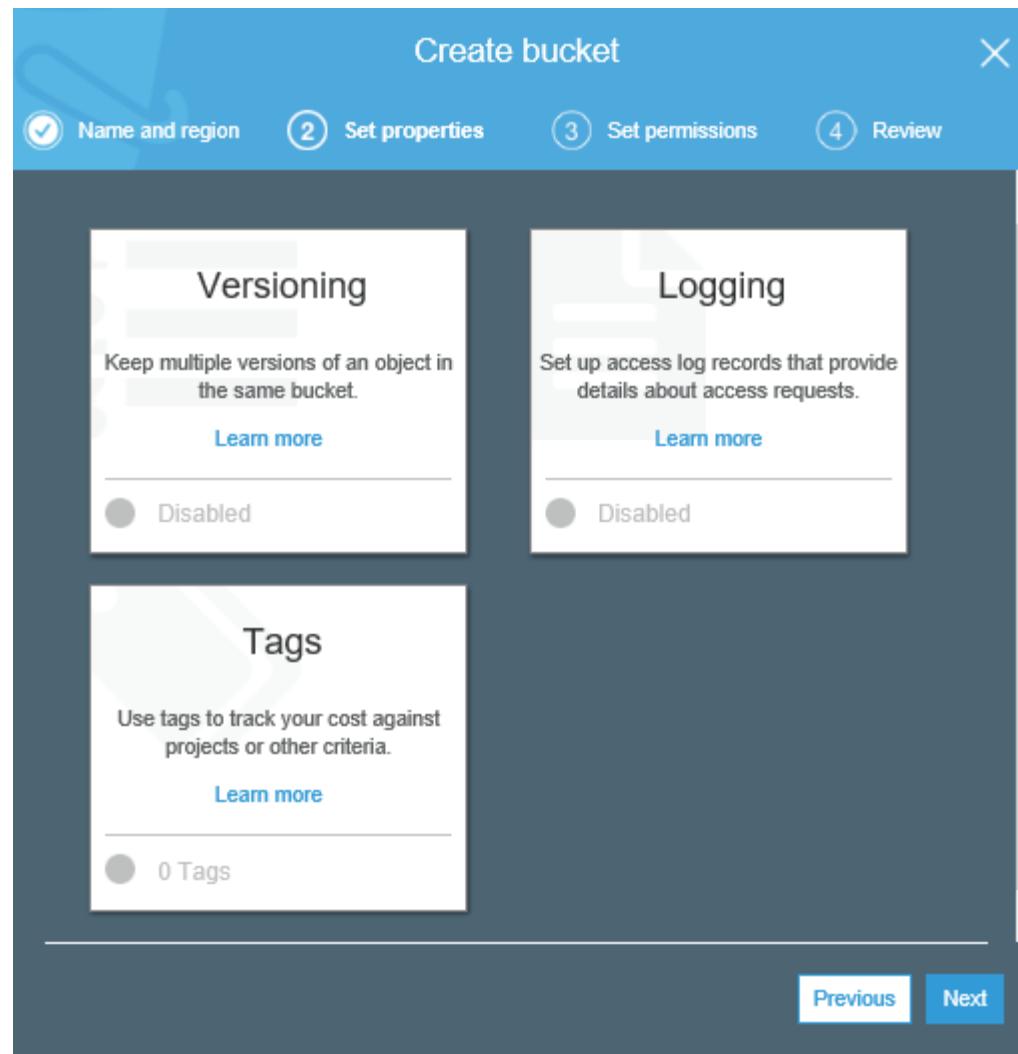
You have no buckets 0 Buckets

Create Cancel Next

Naming Buckets:

- Use 3 to 63 characters.
- Use only lower case letters (at least one), numbers, '-' and '_'. Don't start or end the bucket name with '-' and don't follow or precede a '-' with a '-'.
- Keys can be named with any properly encoded UTF-8 character. Literal '+' characters should always be URL encoded.
- Must be a unique name.

Other options to consider for setting up a S3 Bucket



And more options

Create bucket

X

1 Name and region 2 Set properties 3 Set permissions 4 Review

Manage users

User ID	Objects	Object permissions
howardfamily123(Owner)	<input checked="" type="checkbox"/> Read <input checked="" type="checkbox"/> Write	<input checked="" type="checkbox"/> Read <input checked="" type="checkbox"/> Write

Manage public permissions

Do not grant public read access to this bucket (Recommended)

Manage system permissions

Do not grant Amazon S3 Log Delivery group write access to this bucket

Previous Next

- To access Amazon S3 buckets and objects that were created using `CreateBucketConfiguration`, you must use the path style request. For example:

`http://s3.amazonaws.com/yourbucket/yourobj`

Create Bucket - continued

Create bucket X

✓ Name and region ✓ Set properties ✓ Set permissions 4 Review

Name and region Edit

Bucket name dianeslab1bucket Region US East (N. Virginia)

Properties Edit

Versioning	Disabled
Logging	Disabled
Tagging	0 Tags

Permissions Edit

Users	1
Public permissions	Disabled
System permissions	Disabled

Previous Create bucket

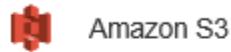
My First Bucket

The screenshot shows the Amazon S3 service page. At the top, there's a navigation bar with 'Services', 'Resource Groups', and user information for Diane Howard. Below the bar, a banner suggests learning about NFS storage. On the left, the 'Amazon S3' logo is visible. In the center, there's a search bar labeled 'Search for buckets'. Below the search bar are three buttons: '+ Create bucket', 'Delete bucket', and 'Empty bucket'. To the right, it displays '1 Buckets' and '1 Regions'. A summary table follows, showing one bucket entry:

Bucket name	Region	Date created
dianeslab1bucket	US East (N. Virginia)	Sep 2, 2017 10:27:04 AM

Current Permissions on My Bucket

Click here to learn how to store and access objects in S3 via NFS [Click here »](#)



Amazon S3

Search for buckets

Create bucket

Delete bucket

Empty bucket

Bucket name

dianeslab1bucket

Permissions are extremely important
For granting access to view images,
files from a browser for outside
Access.

dianeslab1bucket

Copy Bucket ARN

Properties	
Events	0 Active notifications
Versioning	-
MFA delete	-
Logging	Disabled
Static web hosting	Disabled
Tags	0 Tags
Requester pays	Disabled
Transfer acceleration	Disabled

Permissions	
Owner	howardfamily123
Bucket policy	No
Access control list	1 Grantees
CORS configuration	No

Management	
Lifecycle	Disabled
Cross-region replication	Disabled
Analytics	Disabled
Inventory	Disabled
Metrics	Disabled

Upload a File (Any type, JPG, HTML, PDF file)

Amazon S3 > dianeslab1bucket

Overview Properties Permissions Management

Type a prefix and press Enter to search. Press ESC to clear.

Upload Create folder More ▾

US East (N. Virginia)

Viewing 1 to 1

Name	Last modified	Size	Storage class
InstallingPuTTY_Cygwin.pdf	Sep 2, 2017 10:55:17 AM	1.7 MB	Standard

Files are objects.

Essential Concepts

Objects

Objects are the fundamental entities stored in Amazon S3.

Objects consist of object data and metadata and can range in size from 1 byte to 5 terabytes.

The data portion is opaque to Amazon S3.

The key is the handle that you assign to an object that allows you retrieve it later.

The metadata

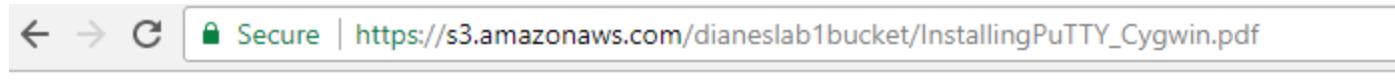
The metadata is a set of name-value pairs that describe the object.

The developer can specify custom metadata and standard HTTP metadata, such as Content-Type.

Accessing Files from Browser

- Our file should be reachable at:

https://s3.amazonaws.com/dianeslab1bucket/InstallingPuTTY_Cygwin.pdf



```
<Error>
  <Code>AccessDenied</Code>
  <Message>Access Denied</Message>
  <RequestId>D6A9B27197945603</RequestId>
  <HostId>
    xeJGS0khf77NPcQ0M0csI+zH9f5d5zPaIAElaYkCr8hQKmPTDrMDJqP6kLNA3ybZkLc1CKGdG84=
  </HostId>
</Error>
```

The issue is in permissions, most probably.

- To change permissions on the specific object in your bucket, highlight the object, select **Properties** in the top menu, then expand **Permissions**, and select **Add more permissions**.

Change Permissions on the File

InstallingPuTTY_Cygwin.pdf Latest version ▾

Overview Properties Permissions

Owner access

Account	Read object	Read object permissions
howardfamily123	Yes	Yes

Access for other AWS accounts

+ Add account Delete

Account	Read object	Read object permissions

Public access

Group	Read object	Read object permissions
Everyone	-	-

Everyone

This object will have public access
Everyone will have access to one or all of the following: read this object, read and write permissions.

Access to the object

Read object

Access to this object's ACL

Read object permissions

Write object permissions

Cancel Save

Reload the Page

- Everyone should be able to view this PDF.

- Try it:

https://s3.amazonaws.com/dianeslab1bucket/InstallingPuTTY_Cygwin.pdf

Installation Steps for:
PuTTY
& Cygwin
(Windows Installation)
Plus URL for simple Linux Commands

Harvard University

Diane Howard
February 2017

Happy Trails!

You will learn a lot as there is a new technology weekly.

Keep up with the weekly new challenges and you will do fine.

Hope you enjoy this course!

Thank you