

# Launch in the cloud: AWS

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MFE FF8828  
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1. Sign-up for AWS Account
2. Setup AWS for EC2
3. Launch EC2
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# Sign-up for AWS











1. Sign-up with an AWS account at <https://aws.amazon.com>
  - Students will need to either create a new AWS account or use one that they've already created. Their AWS account needs to be fully activated by completing phone verification steps and adding a valid credit card.
2. Sign-up AWS Educate account at <https://aws.amazon.com/education/awseducate/>
  - They will need to select the AWS Account option and enter their 12 digit AWS Account ID number when they apply to AWS Educate.
3. (Depends) Because NTU is not (yet) listed as a institutude, you may need to apply credit from AWS Educate separately  
<https://aws.amazon.com/education/awseducate/contact-us/>
4. Claim credit from AWS according to the instruction of AWS

# Register for AWS Educate account




Apply to join AWS Educate

Step 1/3: Choose your role

 Student 	 Educator 
 US Veteran 	 Institution 
 Company/Recruiter 	

<https://www.awseducate.com/registration>

# Apply AWS Educate Credit

Name	Yang Ye
Account	457734848212
Regarding*	<p><input checked="" type="radio"/> Account and Billing Support</p> <p><input type="radio"/> Service Limit Increase</p> <p><input type="radio"/> Technical Support <small>Unavailable under the Basic Support Plan</small></p>
Service*	Educate
Category*	Credit Inquiry
Subject*	Applying credit
<div> <b>Description Guidance</b> AWS Educate provides educators and students with grant-based access to AWS, training, and content, while also providing educators and students with a forum for collaboration. If you would like additional information about AWS Educate, please visit <a href="https://aws.amazon.com/education/awseducate/">https://aws.amazon.com/education/awseducate/</a>.</div>	
Description*	I am doing a course in <u>NTU</u> Singapore. I would like to request for education credit for my <u>account.snid</u>

<https://aws.amazon.com/education/awseducate/contact-us/>

## 2. Setup AWS

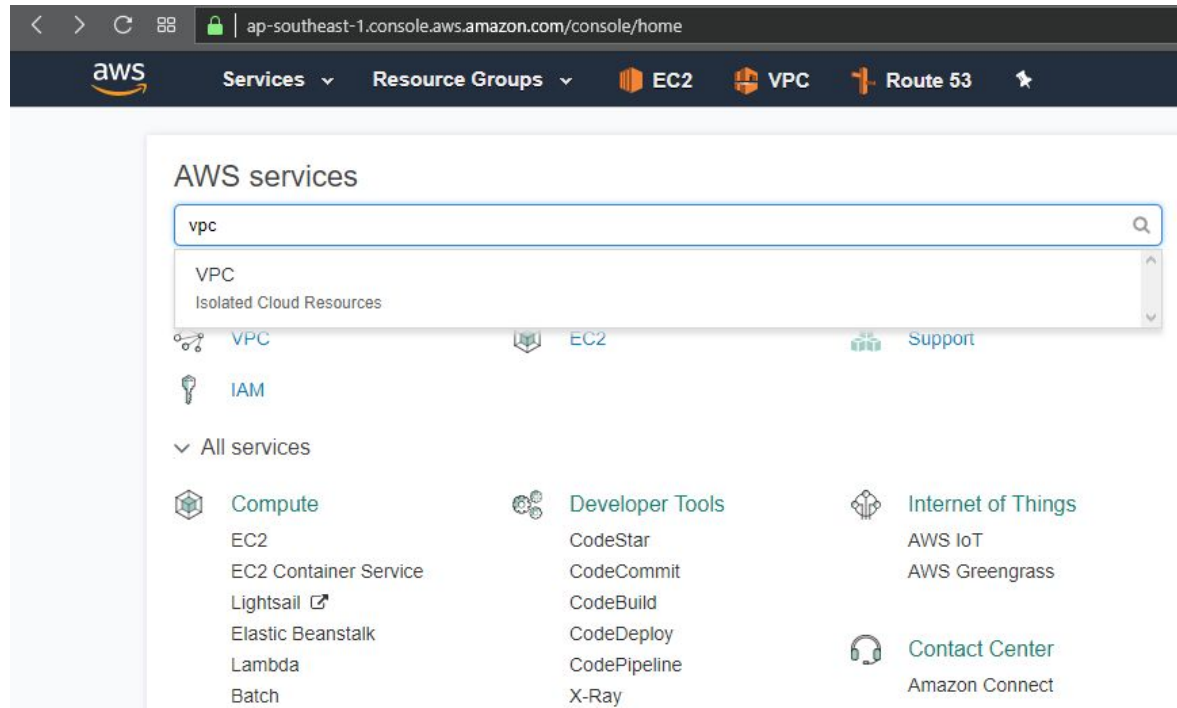
After you login to AWS

1. Change your region to Singapore.
2. Add shortcuts in the navigation bar
  - a. EC2
  - b. VPC

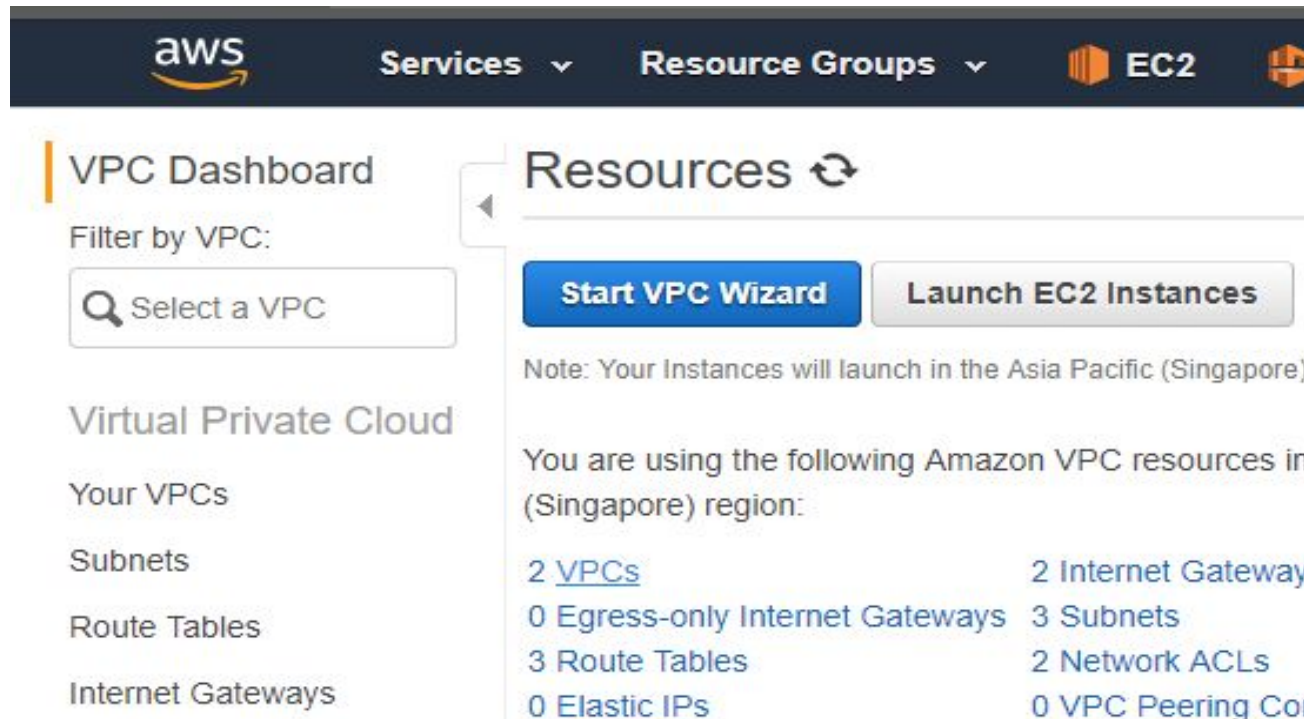


## 2. Create VPC Network

Search for VPC



## 2.1 VPC: Click “Start VPC Wizard”



The screenshot shows the AWS VPC Dashboard. The top navigation bar includes the AWS logo, 'Services' with a dropdown arrow, 'Resource Groups' with a dropdown arrow, and 'EC2' with a dropdown arrow. The left sidebar contains the 'VPC Dashboard' header, a 'Filter by VPC:' section with a search box labeled 'Select a VPC', and a list of VPC resources: 'Your VPCs', 'Subnets', 'Route Tables', and 'Internet Gateways'. The main content area is titled 'Resources' with a refresh icon. It features two buttons: 'Start VPC Wizard' (highlighted in blue) and 'Launch EC2 Instances' (grey). Below the buttons, a note states: 'Note: Your Instances will launch in the Asia Pacific (Singapore) region.' Further down, it says 'You are using the following Amazon VPC resources in (Singapore) region:' followed by a list of resources in two columns: 2 VPCs, 0 Egress-only Internet Gateways, 3 Route Tables, 0 Elastic IPs, 2 Internet Gateway, 3 Subnets, 2 Network ACLs, and 0 VPC Peering Connections.

**aws** Services ▾ Resource Groups ▾ EC2

**VPC Dashboard**

Filter by VPC:

Q Select a VPC

**Virtual Private Cloud**

Your VPCs

Subnets

Route Tables

Internet Gateways

**Resources** ↻

**Start VPC Wizard** **Launch EC2 Instances**

Note: Your Instances will launch in the Asia Pacific (Singapore) region.

You are using the following Amazon VPC resources in (Singapore) region:

2 <a href="#">VPCs</a>	2 <a href="#">Internet Gateway</a>
0 <a href="#">Egress-only Internet Gateways</a>	3 <a href="#">Subnets</a>
3 <a href="#">Route Tables</a>	2 <a href="#">Network ACLs</a>
0 <a href="#">Elastic IPs</a>	0 <a href="#">VPC Peering Connections</a>



## 2.2 VPC two steps - follow defaults, add a name

### Step 1: Select a VPC Configuration

#### VPC with a Single Public Subnet

VPC with Public and Private Subnets

VPC with Public and Private Subnets and Hardware VPN Access

VPC with a Private Subnet Only and Hardware VPN Access

Your instances run in a private, isolated section of the AWS cloud with direct access to the Internet. Network access control lists and security groups can be used to provide strict control over inbound and outbound network traffic to your instances.

#### Creates:

A /16 network with a /24 subnet. Public subnet instances use Elastic IPs or Public IPs to access the Internet.

Select

### Step 2: VPC with a Single Public Subnet

IPv4 CIDR block:\* 10.0.0.0/16 (65531 IP addresses available)

IPv6 CIDR block: ☒ No IPv6 CIDR Block  
☐ Amazon provided IPv6 CIDR block

VPC name: mfe

Public subnet's IPv4 CIDR:\* 10.0.0.0/24 (251 IP addresses available)

Availability Zone:\* No Preference

Subnet name: Public subnet

You can add more subnets after AWS creates the VPC.

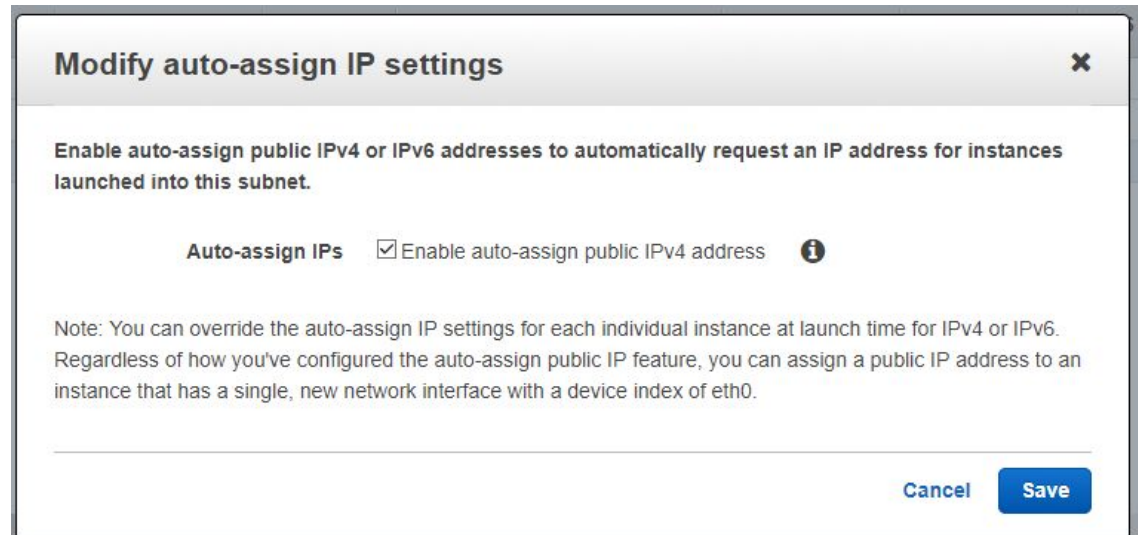
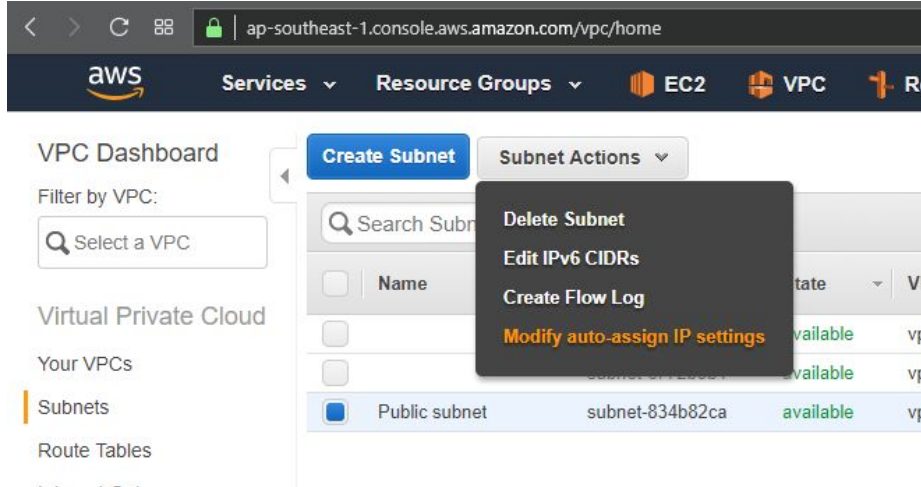
#### Service endpoints

Add Endpoint

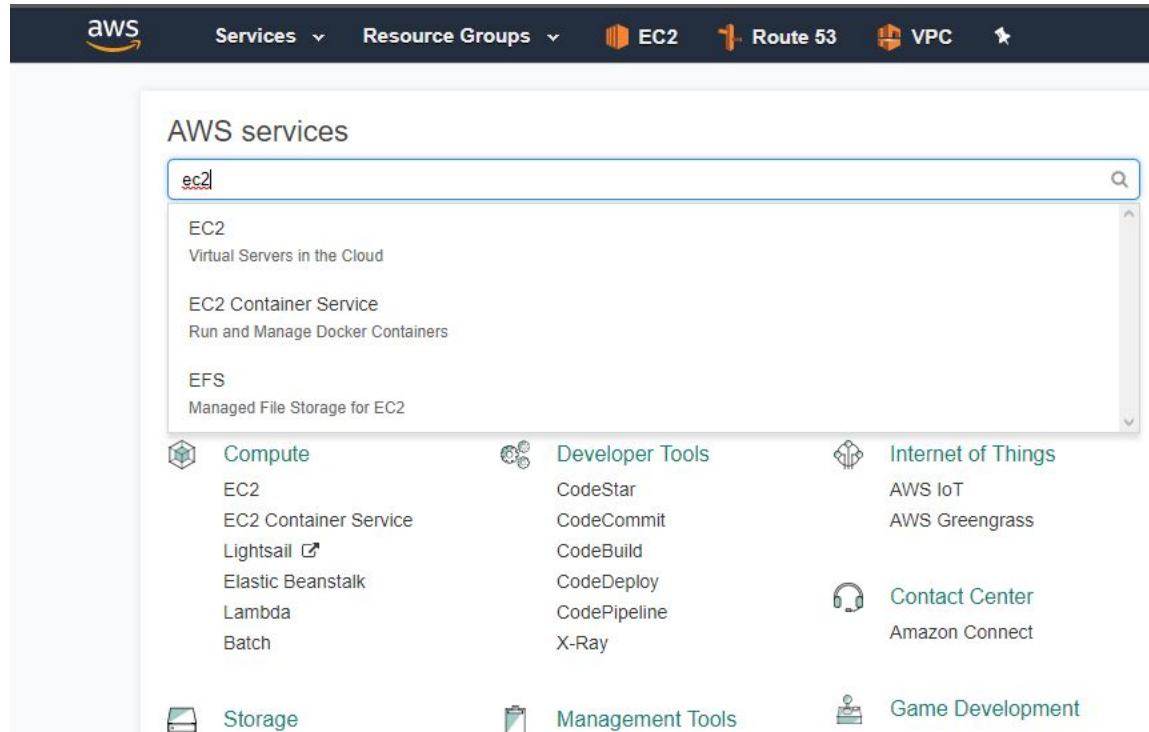
Enable DNS hostnames:\* ☒ Yes ☐ No

Hardware tenancy:\* Default

## 2.3 Subnet: Change settings. Tick auto-assign public IP4 address

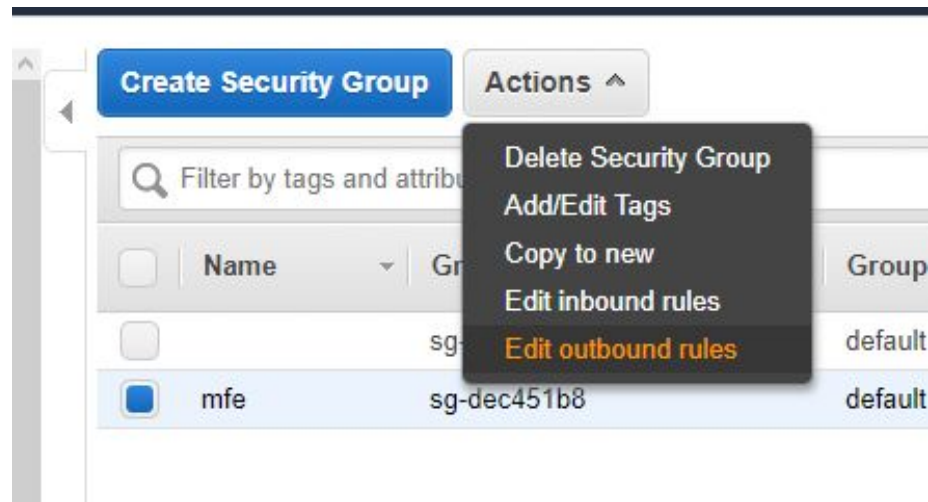


### 3. Go to EC2



3.1 In VPC wizard, it created new security group.

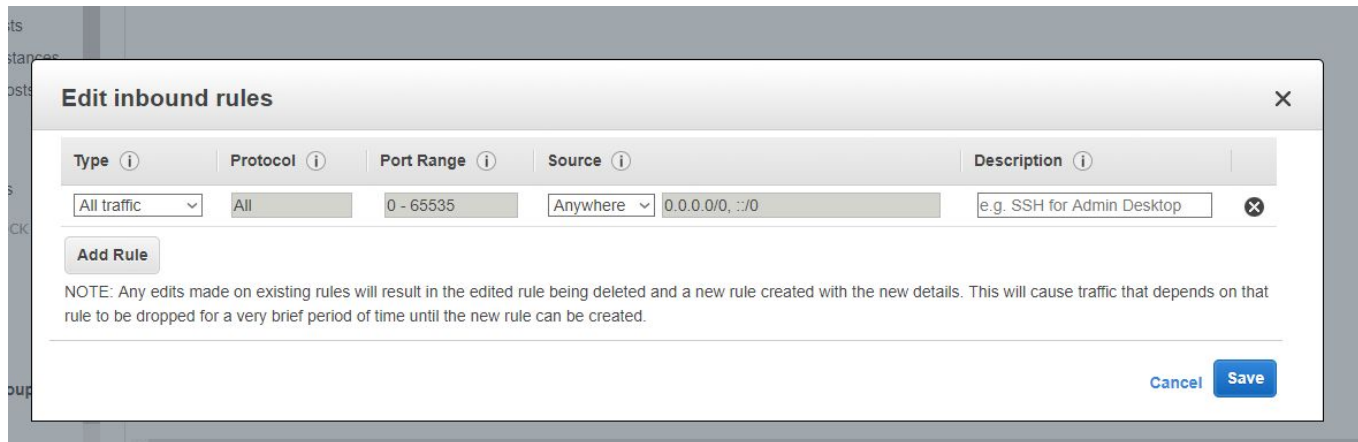
Selected the newly created security group.  
Edit Inbound rules and edit outbound rules.



## 3.2 Inbound/Outbound: choose All traffic/Anywhere

An inbound firewall protects the network against incoming traffic from the internet or other network segments, namely disallowed connection from outside.

Outbound rules determines what application can connect to the outside.



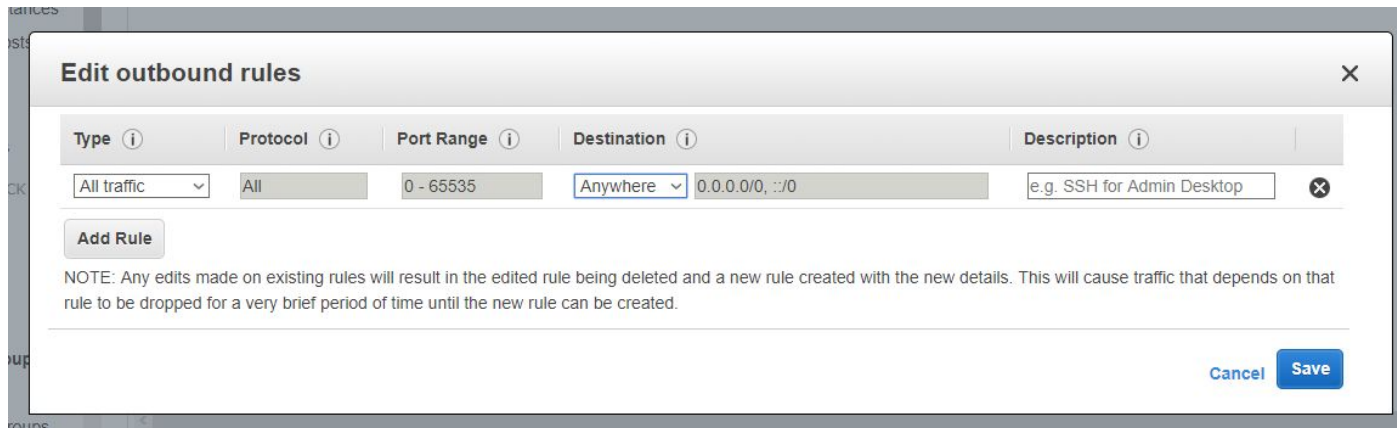
The screenshot shows a dialog box titled "Edit inbound rules" with a close button (X) in the top right corner. The dialog contains a table with five columns: "Type", "Protocol", "Port Range", "Source", and "Description". Each column has an information icon (i) to its right. The "Type" column has a dropdown menu showing "All traffic". The "Protocol" column has a dropdown menu showing "All". The "Port Range" column has a text input field showing "0 - 65535". The "Source" column has a dropdown menu showing "Anywhere" and a text input field showing "0.0.0.0/0, ::/0". The "Description" column has a text input field showing "e.g. SSH for Admin Desktop" and a close button (X) to its right. Below the table is an "Add Rule" button. A note below the button states: "NOTE: Any edits made on existing rules will result in the edited rule being deleted and a new rule created with the new details. This will cause traffic that depends on that rule to be dropped for a very brief period of time until the new rule can be created." At the bottom right are "Cancel" and "Save" buttons.

Type <i>i</i>	Protocol <i>i</i>	Port Range <i>i</i>	Source <i>i</i>	Description <i>i</i>	
All traffic	All	0 - 65535	Anywhere	0.0.0.0/0, ::/0	e.g. SSH for Admin Desktop

**Add Rule**

NOTE: Any edits made on existing rules will result in the edited rule being deleted and a new rule created with the new details. This will cause traffic that depends on that rule to be dropped for a very brief period of time until the new rule can be created.

**Cancel Save**



The screenshot shows a dialog box titled "Edit outbound rules" with a close button (X) in the top right corner. The dialog contains a table with five columns: "Type", "Protocol", "Port Range", "Destination", and "Description". Each column has an information icon (i) to its right. The "Type" column has a dropdown menu showing "All traffic". The "Protocol" column has a dropdown menu showing "All". The "Port Range" column has a text input field showing "0 - 65535". The "Destination" column has a dropdown menu showing "Anywhere" and a text input field showing "0.0.0.0/0, ::/0". The "Description" column has a text input field showing "e.g. SSH for Admin Desktop" and a close button (X) to its right. Below the table is an "Add Rule" button. A note below the button states: "NOTE: Any edits made on existing rules will result in the edited rule being deleted and a new rule created with the new details. This will cause traffic that depends on that rule to be dropped for a very brief period of time until the new rule can be created." At the bottom right are "Cancel" and "Save" buttons.

Type <i>i</i>	Protocol <i>i</i>	Port Range <i>i</i>	Destination <i>i</i>	Description <i>i</i>	
All traffic	All	0 - 65535	Anywhere	0.0.0.0/0, ::/0	e.g. SSH for Admin Desktop

**Add Rule**

NOTE: Any edits made on existing rules will result in the edited rule being deleted and a new rule created with the new details. This will cause traffic that depends on that rule to be dropped for a very brief period of time until the new rule can be created.

**Cancel Save**

# Ready to Launch

The screenshot displays the AWS Management Console's EC2 Dashboard. On the left is a navigation sidebar with categories like EC2 Dashboard, INSTANCES, IMAGES, ELASTIC BLOCK STORE, NETWORK & SECURITY, LOAD BALANCING, and AUTO SCALING. The main content area is titled 'Resources' and shows a summary of EC2 resources in the US East (N. Virginia) region: 0 Running Instances, 0 Elastic IPs, 0 Volumes, 0 Snapshots, 0 Key Pairs, 0 Load Balancers, 0 Placement Groups, and 1 Security Groups. Below this is a 'Create Instance' section with a 'Launch Instance' button highlighted by a red rectangle. To the right, the 'Service Health' section shows that the US East (N. Virginia) service is operating normally across all four availability zones (us-east-1a, us-east-1b, us-east-1c, us-east-1e). A 'Scheduled Events' section on the far right indicates no events are currently scheduled.

**EC2 Dashboard**

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

## Resources

You are using the following Amazon EC2 resources in the US East (N. Virginia) region:

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

Easily deploy and operate applications - use Chef recipes, manage SSH users, and more. [Try OpsWorks now.](#) [Hide](#)

### Create Instance

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

[Launch Instance](#)

Note: Your instances will launch in the US East (N. Virginia) region

## Service Health

**Service Status:**

- US East (N. Virginia): This service is operating normally

**Availability Zone Status:**

- us-east-1a: Availability zone is operating normally
- us-east-1b: Availability zone is operating normally
- us-east-1c: Availability zone is operating normally
- us-east-1e: Availability zone is operating normally

[Service Health Dashboard](#)

## Scheduled Events

**US East (N. Virginia):**

No events

# EC2 Step 1: Community AMI: search for “RStudio”

ami-a13b59c2

This is created by [http://www.louisaslett.com/RStudio\\_AMI/](http://www.louisaslett.com/RStudio_AMI/)

## Step 1: Choose an Amazon Machine Image (AMI)

[Cancel and Exit](#)

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

Quick Start

My AMIs

AWS Marketplace

Community AMIs

Operating system

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

Architecture

- ☐ 32-bit
- ☐ 64-bit

Root device type

Search: rstudio

6 results for "rstudio" on AWS Marketplace

Partner software pre-configured to run on AWS

AMI ID	Description	Architecture	Root device type	Virtualization type	Action
RStudio-0.99.896_R-3.3.0_Julia-0.4.5_ubuntu-16.04-LTS-64bit - ami-3f9a4c5c	Ready to run RStudio + (experimental) Julia server for statistical computation (www.louisaslett.com). Connect to instance public DNS in web browser (standard port 80), username rstudio and password rstudio	64-bit	ebs	hvm	Select
OMPI_R_RStudioServer - ami-979720f4	[Copied ami-91b77587 from us-east-1] OMPI_R_RStudioServer	64-bit	ebs	hvm	Select
RStudio-1.0.153_R-3.4.1_Julia-0.6.0_ubuntu-16.04-LTS-64bit - <b>ami-a13b59c2</b>	Ready to run RStudio + (experimental) Julia server for statistical computation (www.louisaslett.com). Connect to instance public DNS in web browser (standard port 80), username rstudio and password rstudio	64-bit	ebs	hvm	Select
SATT Analytics Platform - Base-a96c7627-bb8b-4cc2-89bd-a69e52b8431b-ami-65772400.2 - ami-ac091afe	An Advanced Analytics Platform, based on R Foundation. The Platform is equipped with RStudio server, R web application framework, Interactive visualization and dynamic report generation packages.	64-bit	ebs	hvm	Select



EC2 Step 2: Choose instance type. You can enjoy having one instance of t2.micro during 12-month free-tier.

- Upgrade to higher instance type when you have received your AWS educate credit.
- T2.medium/t2.large should be good enough. There are more expensive ones.

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: 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
<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
<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	m4.large	2	8	EBS only	Yes	Moderate	Yes



# EC2 Step 3: Make sure Auto-assign Public IP is ticked. Click “Next”.

1. Choose AMI   2. Choose Instance Type   **3. Configure Instance**   4. Add Storage   5. Add Tags   6. Configure Security Group   7. 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 instance, and more.

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

Purchasing option ⓘ ☐ Request Spot instances

Network ⓘ  [Create new VPC](#)

Subnet ⓘ  [Create new subnet](#)  
251 IP Addresses available

Auto-assign Public IP ⓘ

IAM role ⓘ  [Create new IAM role](#)

Shutdown behavior ⓘ

Enable termination protection ⓘ ☐ Protect against accidental termination

Monitoring ⓘ ☐ Enable CloudWatch detailed monitoring  
[Additional charges apply.](#)

Tenancy ⓘ   
[Additional charges will apply for dedicated tenancy.](#)

## EC 2 Step 4: Add Storage, use the default setting.

- One AMI image can be launched into many instances so its content is static.
- The author of AMI image configures a persistent storage so it saves any changes we did.
- Most importantly, we don't need to do anything now.

# EC Step 6: Click “6. Configure Security Group”

## Select an existing security group. Your previous changes are loaded.

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
<input checked="" type="checkbox"/> sg-dec451b8	default	default VPC security group	<a href="#">Copy to new</a>

Inbound rules for sg-dec451b8 (Selected security groups: sg-dec451b8)

Type ⓘ	Protocol ⓘ	Port Range ⓘ	Source ⓘ	Description ⓘ
All traffic	All	All	0.0.0.0/0	
All traffic	All	All	:::0	

haha!!!


# EC 2 Step 7: Review and Launch

## Click the blue button.

1. Choose AMI2. Choose Instance Type3. Configure Instance4. Add Storage5. Add Tags6. Configure Security Group7. 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.



**Improve your instances' security. Your security group, default, is open to the world.**  
Your instances may be accessible from any IP address. We recommend that you update your security group rules to allow access from known IP addresses only.  
You can also open additional ports in your security group to facilitate access to the application or service you're running, e.g., HTTP (80) for web servers. [Edit security groups](#)

▼ AMI Details



**RStudio-1.0.153\_R-3.4.1\_Julia-0.6.0\_ubuntu-16.04-LTS-64bit - ami-a13b59c2**  
Ready to run RStudio + (experimental) Julia server for statistical computation (www.louisaslett.com). Connect to instance public DNS in web browser (standard port 80), username rstudio and password rstudio  
Root Device Type: ebs    Virtualization type: hvm

[Edit AMI](#)

▼ 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

[Edit instance type](#)

▼ Security Groups

Security Group ID	Name	Description
sg-dec451b8	default	default VPC security group

All selected security groups inbound rules

Type ⓘ	Protocol ⓘ	Port Range ⓘ	Source ⓘ	Description ⓘ
All traffic	All	All	0.0.0.0/0	
All traffic	All	All	:::0	

[Edit security groups](#)

CancelPrevious**Launch**

Go to

# One last thing: Key pair

Create if you didn't have an existing one or lost the previous download.

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

# If you know SSH

You can connect to the server by

- Windows: Download Git for Windows from <https://git-scm.com/download/>.

```
ssh -i 'c:\Users\yourusername\Downloads\MyKeyPair.pem' ubuntu@{IP_Address}
```

- Mac: skip download Git. Go straight

```
ssh -i ~/Downloads/MyKeyPair.pem ubuntu@{IP_Address}
```

# Control the instance.

- Connect gives information.
- Stop but not to terminate, which deletes all data from EBS.
- A running instance charges.
- A stopped instance will charge a small fee for the storage. Our configured size is 10G, within the free-tier for new account within 12-month.
- Use AWS calculator

Launch Instance Connect Actions

Filter by tags and attributes or search by keyword

	Name	Instance ID	Instance Type	Availability Zone	Instance State	Status Checks	Alarm Status	Public DNS (IP)
<input type="checkbox"/>		i-0285531a28754b5...	t2.micro	ap-southeast-1b	terminated		None	
<input type="checkbox"/>		i-03625617949cc478b	t2.micro	ap-southeast-1b	terminated		None	
<input checked="" type="checkbox"/>		i-038b8f63f7e85a231	t2.micro	ap-southeast-1b	running	Initializing	No	7.
<input type="checkbox"/>		i-0abf98f00498b693e	t2.micro	ap-southeast-1b	terminated		No	

Connect

Get Windows Password

Launch More Like This

Instance State

Instance Settings

Image

Networking

CloudWatch Monitoring

# Access it

- Copy this address

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 (yysg2017.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 yyg2017.pem
```

4. Connect to your instance using its Public DNS:  

```
ec2-54-254-174-178.ap-southeast-1.compute.amazonaws.com
```

Example:

```
ssh -i "yyg2017.pem" ubuntu@ec2-54-254-174-178.ap-southeast-1.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



http://ec2-54-254-174-178.ap-southeast-1.compute.amazonaws.com/

Initial password: rstudio/rstudio.



### Sign in to RStudio

---

Username:

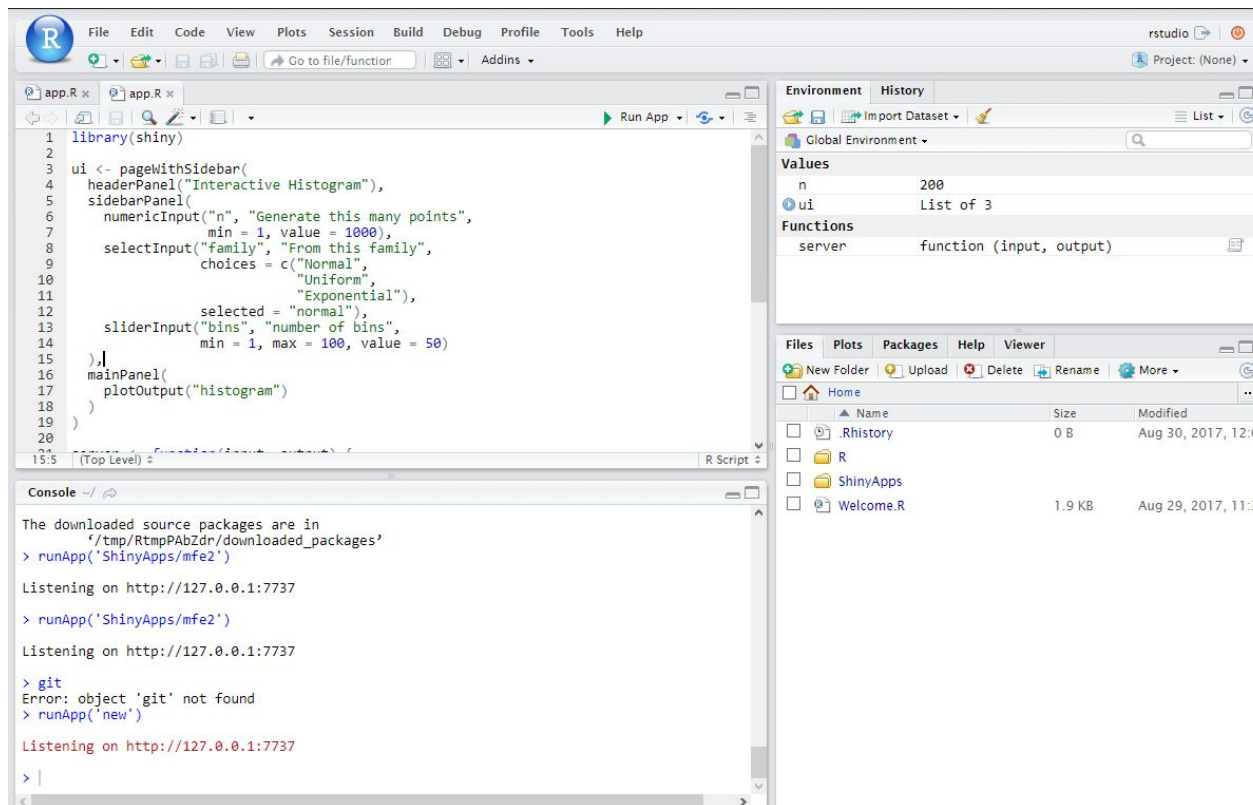
Password:

☐ Stay signed in

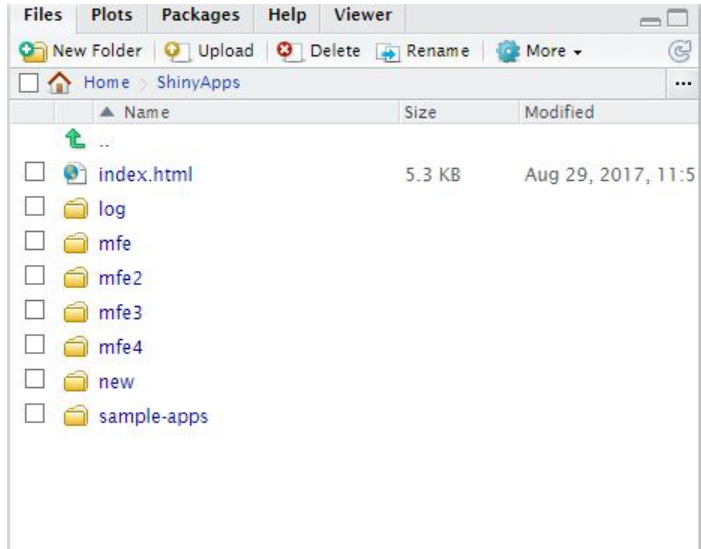
[Sign In](#)

# RStudio Setup

- Install packages
  - tidyverse
  - tidyquant
  - install.packages
- Tools -> Shell
  - passwd
- Shiny
  - Directory ShinyApps
  - Create sub-directories
- Files
  - Manage upload



# Shiny Server



/home/**rstudio**/ShinyApps/new/

/ShinyApps/new/

[http://ec2-54-254-174-178.ap-southeast-1.compute.amazonaws.com/shiny/\*\*rstudio\*\*/new/](http://ec2-54-254-174-178.ap-southeast-1.compute.amazonaws.com/shiny/rstudio/new/)

# AWS Recap

- AWS (Amazon Web Services) is an utility company for the internet like electricity/water.
- We can launch many computing/storage resources as we need.
  - We use Spot instance which is expensive.
  - AWS provides other pricing plan for long-term usage.
- Cool! We got something in the cloud.

## Disclaimer:

- 1.
2. I am not working for Amazon and I don't get paid by this.
3. I am not owning Amazon shares directly and indirectly.
4. I don't plan to long AMZN during the course of this course.

# For this course

- AWS setup is optional in this course.
- If you finishing working on it, leave the instance as Stopped. Be aware of how much you spend on AWS.
- It's cool to have something running in the cloud. You can show people to impress.
- You can run R Studio and application on your laptop
- You can submit your assignment with me by Dropbox/Google drive.
- Please organize your assignments into different directories.