Lecture 2: Amazon Web Services Launch into the Cloud

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Disclaimer

Disclaimer:

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

Content

1. Sign-up for AWS Account
2. Setup AWS for EC2
3. Launch EC2
4. Running R

Amazon Web Services

History:

While Amazon standardized its internal infrastructure for all teams, it found the opportunity of open it up to the public and make computing infrastructure available to all people. Amazon thus becomes the new utility company for the Internet age, supplying crucial infrastructure like electricity and water.

We can almost attribute the inventor of “Cloud”, “Cloud services”, “Cloud computing” to Amazon.

Now the “cloud” market has many competitor, with AWS still holds about 33% (Apr 2018)

Sign-up for AWS as a student

1. Sign-up with an AWS account at https://aws.amazon.com
- 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 applying to AWS Educate.
3. (Depends) Because NTU is not (yet) listed as a institutude, you may need to apply credit from AWS Educate separatedly https://aws.amazon.com/education/awseducate/contact-us/
4. Claim credit from AWS according according to the instruction of AWS

AWS Free Tier for New Account

AWS Free Tier (12 Month Introductory Period):

These free tier offers are only available to new AWS customers, and are available for 12 months following your AWS sign-up date. When your 12 month free usage term expires or if your application use exceeds the tiers, you simply pay standard, pay-as-you-go service rates (see each service page for full pricing details). Restrictions apply; see offer terms for more details.

Elastic Compute Cloud (EC2)

- 750 hours of Amazon EC2 Linux t2.micro instance usage (1 GiB of memory and 32-bit and 64-bit platform support) – enough hours to run continuously each month*
- 750 hours of Amazon EC2 Microsoft Windows Server† t2.micro instance usage (1 GiB of memory and 32-bit and 64-bit platform support) – enough hours to run continuously each month*
- 750 hours of an Elastic Load Balancer shared between Classic and Application load balancers, 15 GB data processing for Classic load balancers, and 15 LCUs for Application load balancers*
- 30 GB of Amazon Elastic Block Storage in any combination of General Purpose (SSD) or Magnetic, plus 2 million I/Os (with EBS Magnetic) and 1 GB of snapshot storage*
- 500 MB-month of Amazon EC2 Container Registry storage for new customers*

Amazon Simple Storage Service (S3)

- 5 GB of Amazon S3 standard storage, 20,000 Get Requests, and 2,000 Put Requests*

Data Transfer

- 15 GB of data transfer out and 1GB of regional data transfer aggregated across all AWS services*

Amazon Data Pipeline

- 3 low frequency preconditions running on AWS per month*
- 5 low frequency activities running on AWS per month*

Amazon ElastiCache

- 750 hours of Amazon ElastiCache cache.t2micro Node usage - enough hours to run continuously each month.*

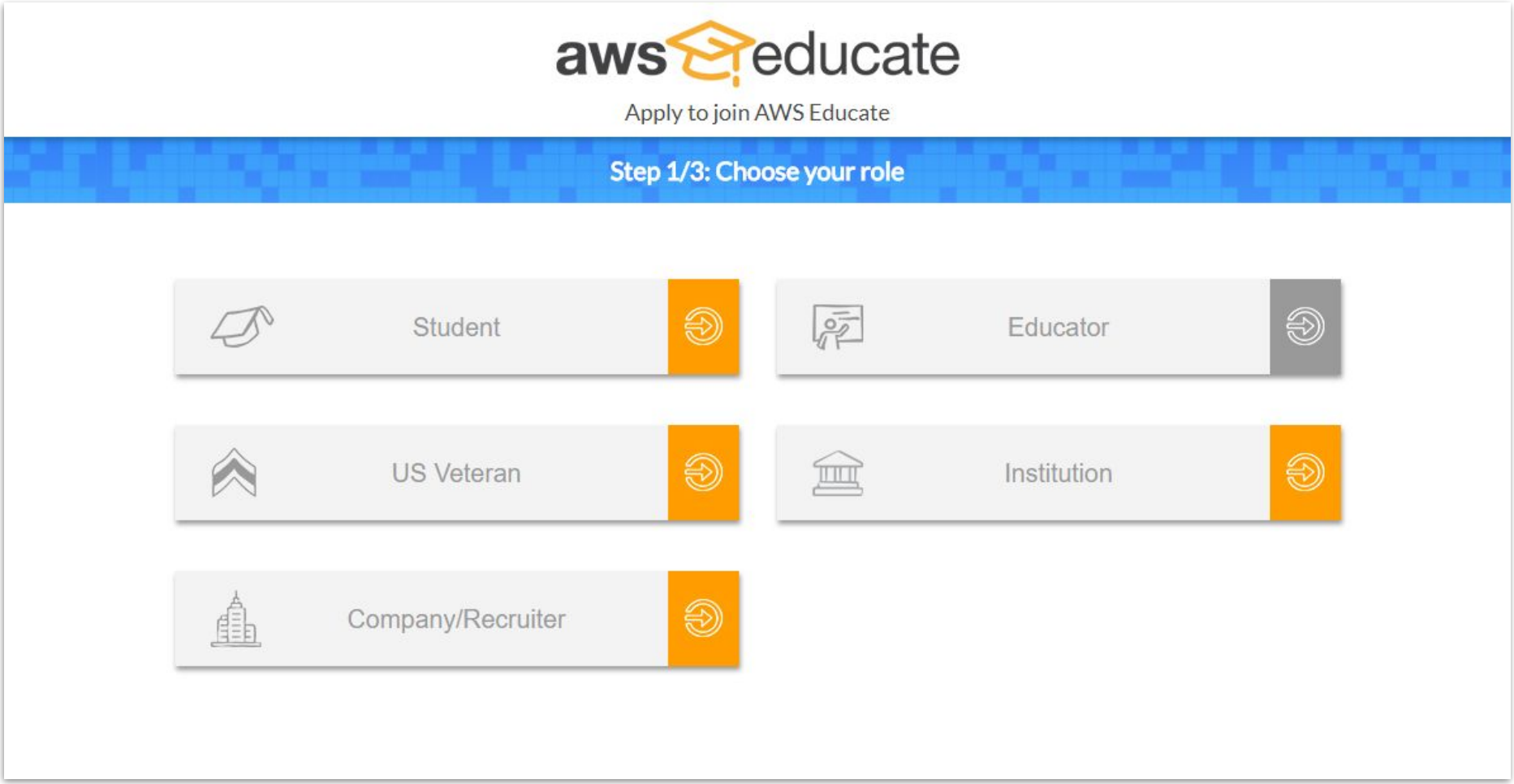
Amazon CloudFront

- 50 GB Data Transfer Out, 2,000,000 HTTP and HTTPS Requests of Amazon CloudFront*

Amazon API Gateway

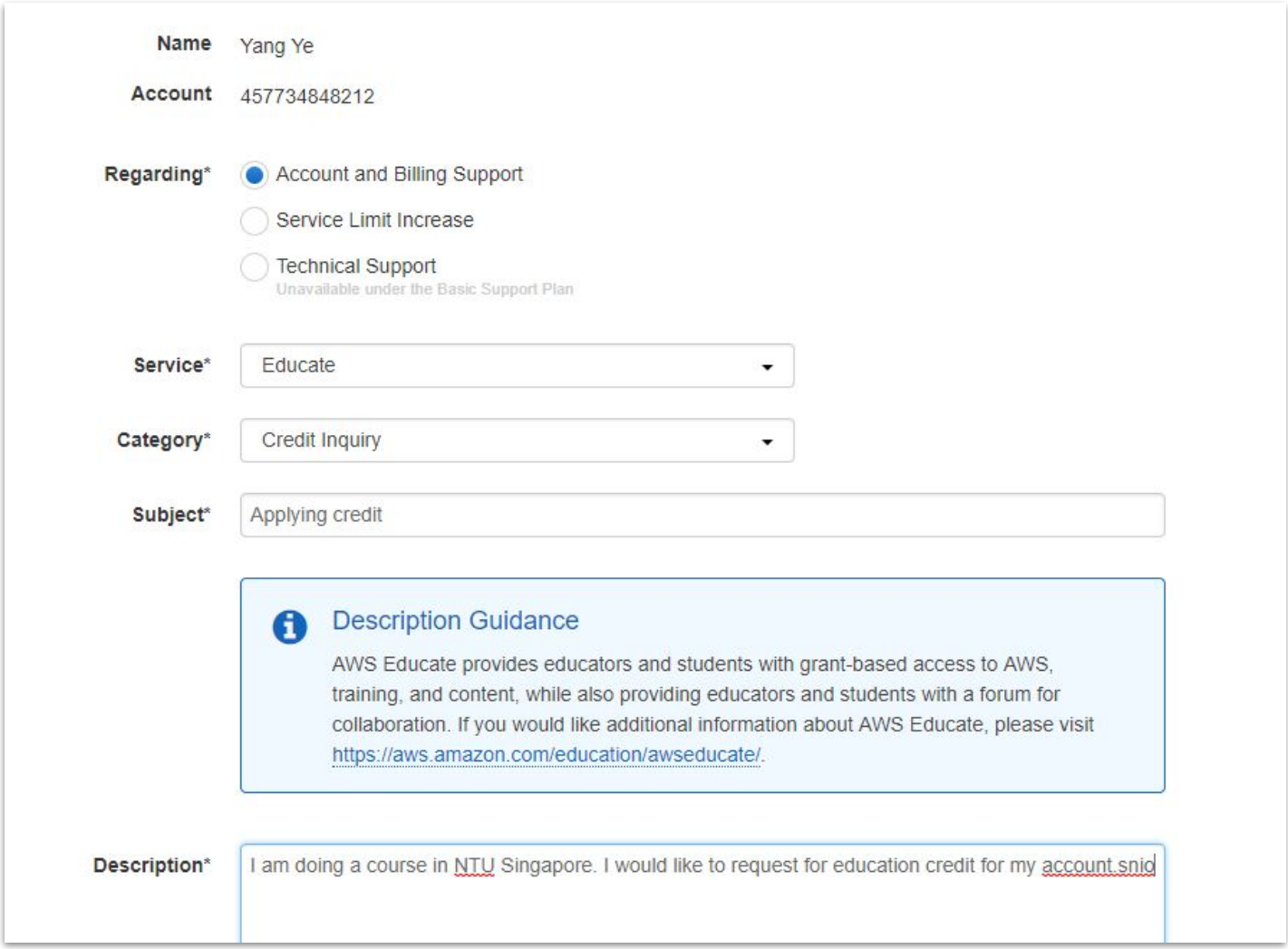
- 1 Million API Calls per month*

Register for AWS Educate account



https://www.awseducate.com/registration

Apply AWS Educate Credit



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

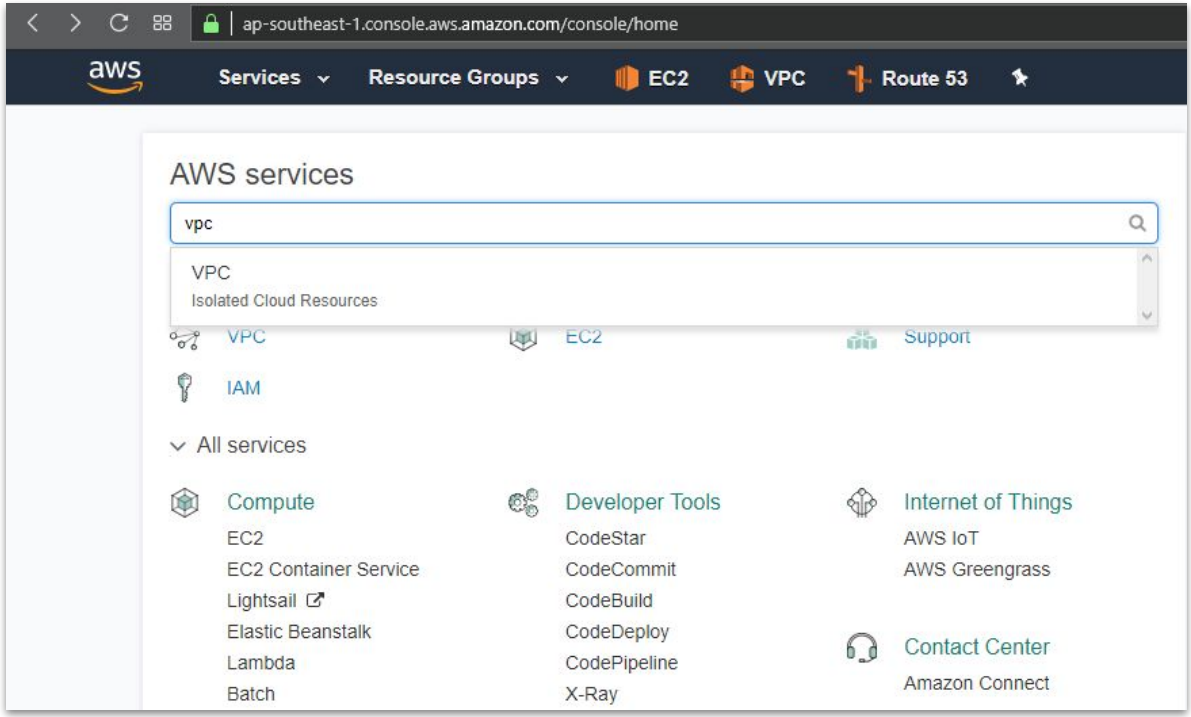
2. Setup AWS

After you login to AWS

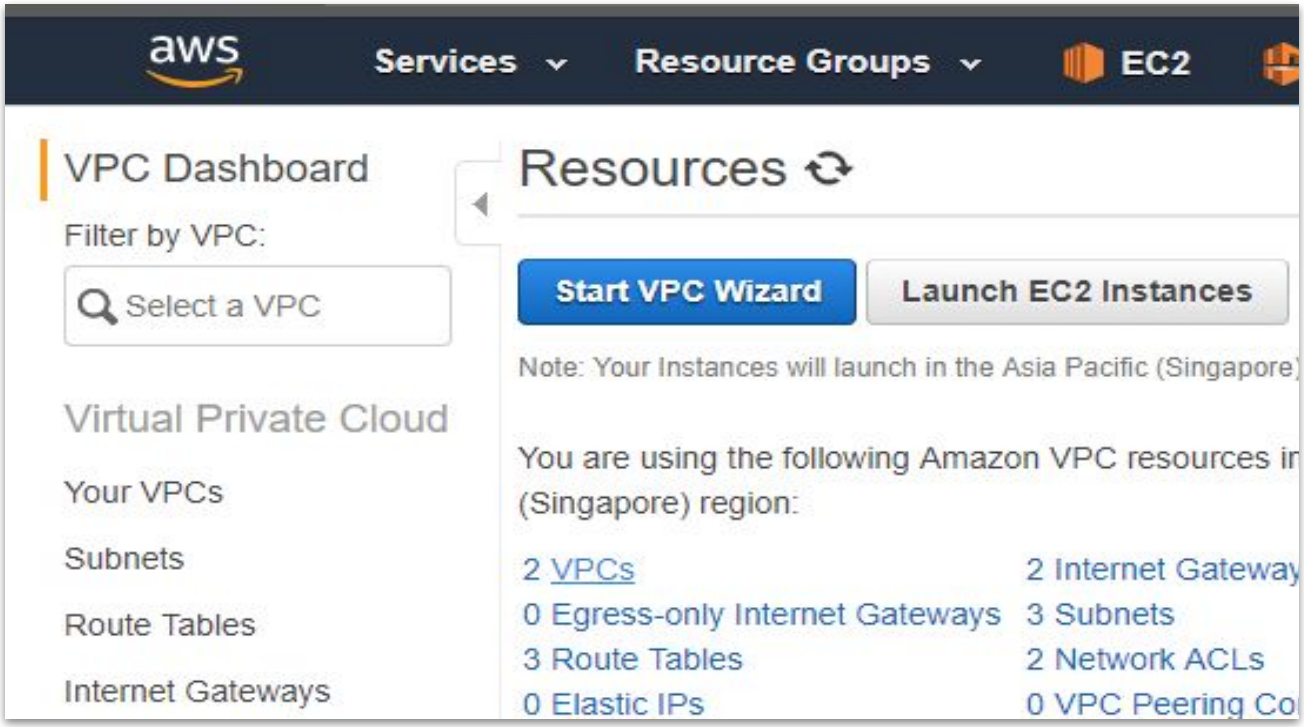
1. Change your region to **Singapore**.
2. Add shortcuts in the navigation bar
   a. **EC2**
   b. **VPC**

2. Create VPC Network

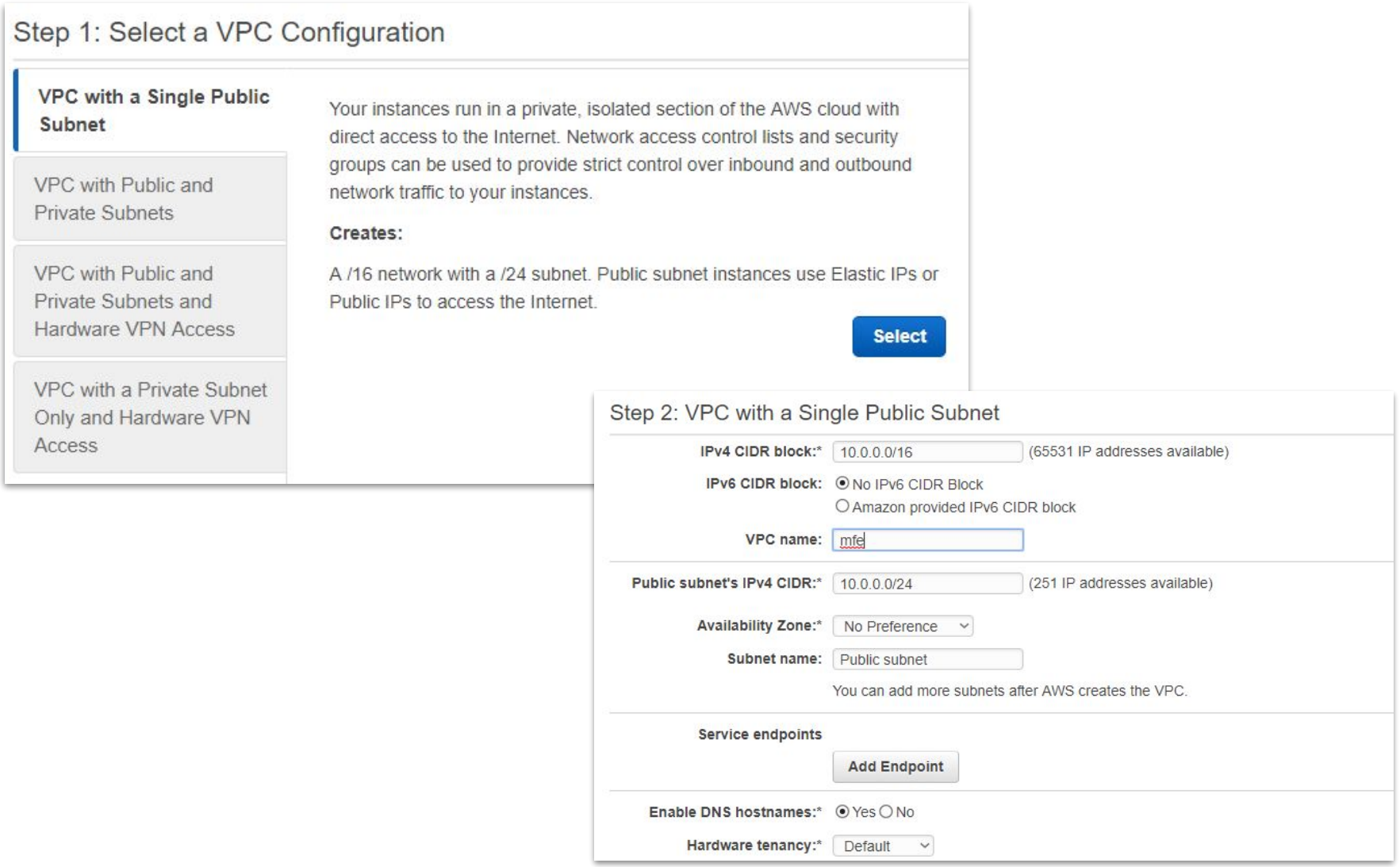
Search for VPC



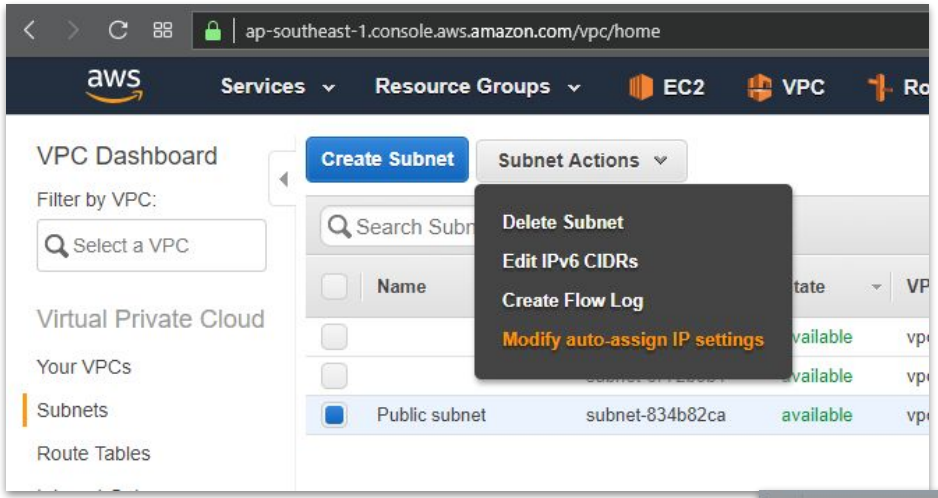
2.1 VPC: Click “Start VPC Wizard”

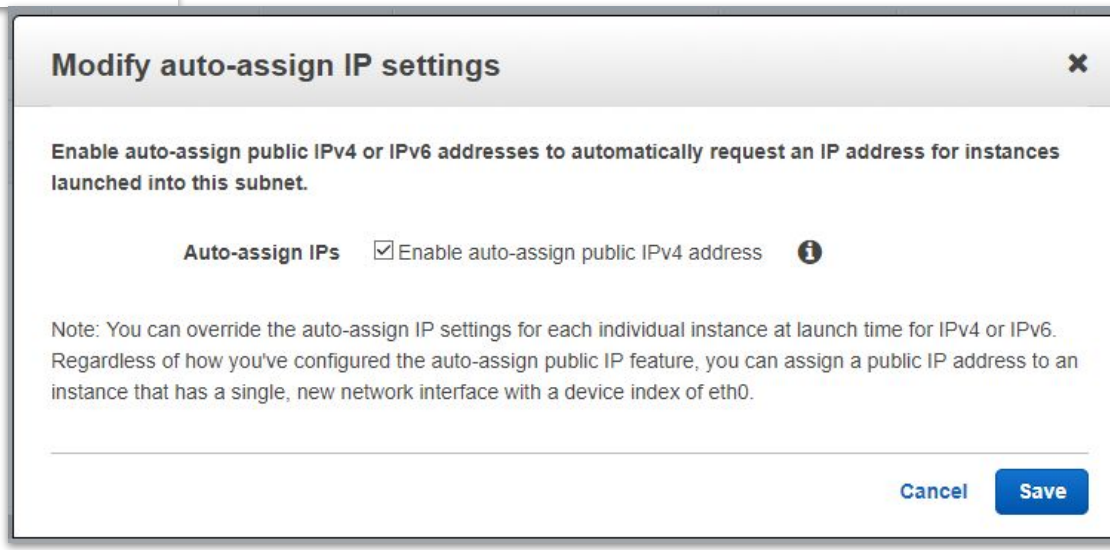


2.2 VPC two steps - follow defaults, add a name



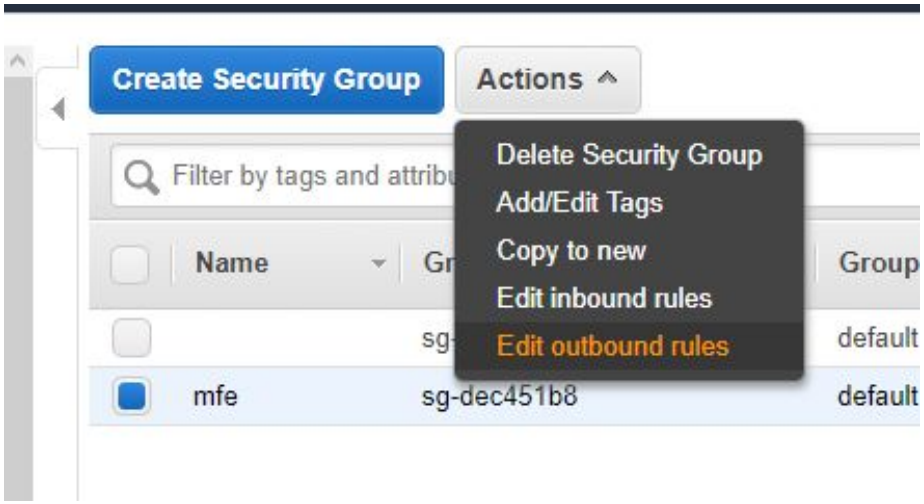
2.3 Subnet: Change settings. Tick auto-assign public IP4 address





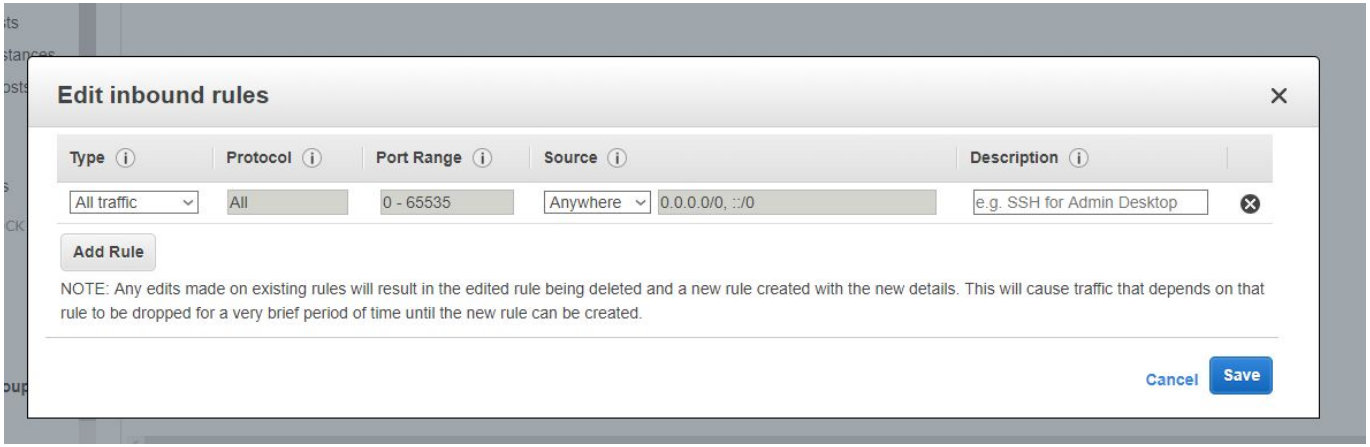
2.4 In VPC wizard, it created new security group.

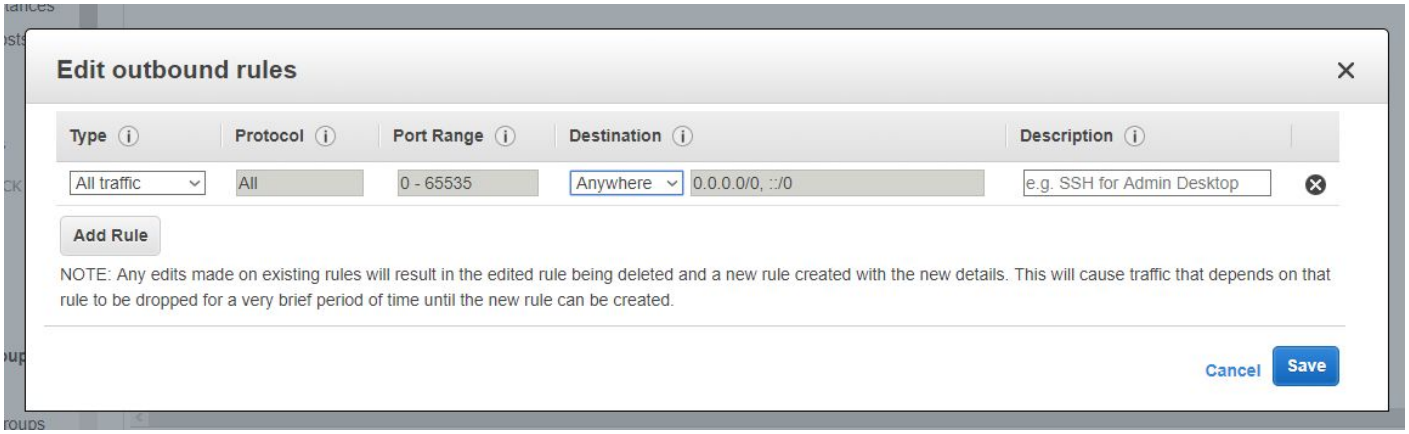
Selected the newly created security group.
Edit Inbound rules and edit outbound rules.



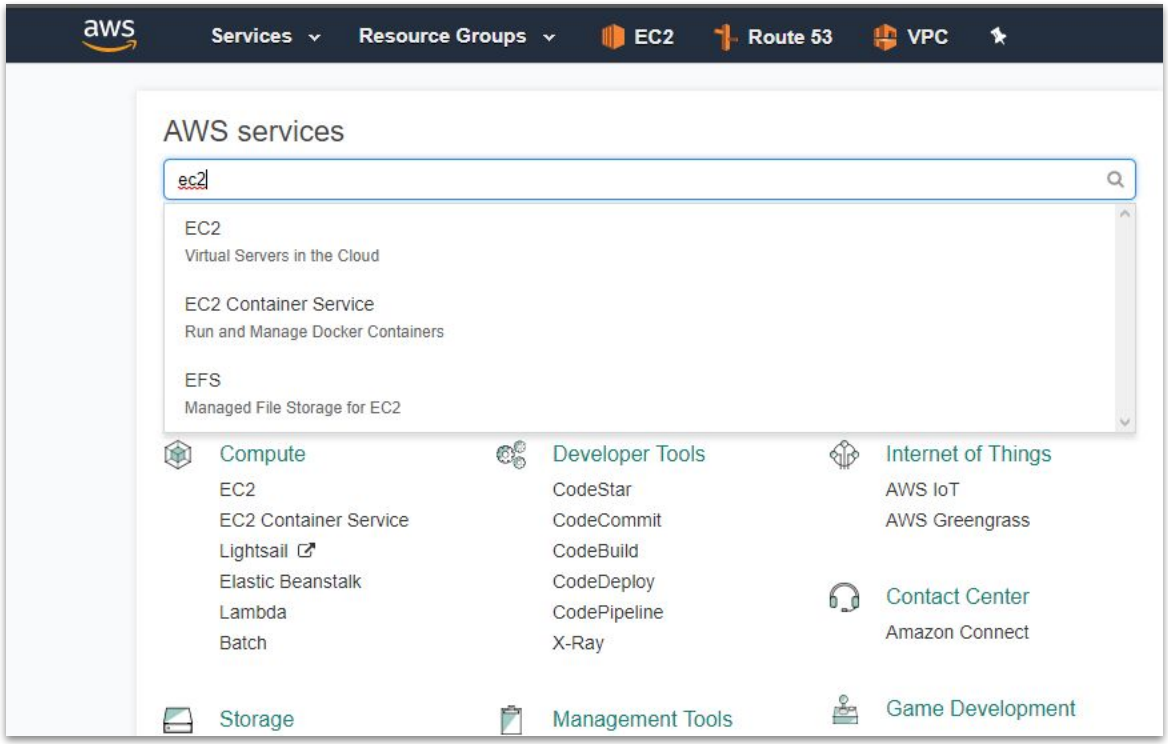
2.4 Inbound/Outbound: choose All traffic/Anywhere

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.

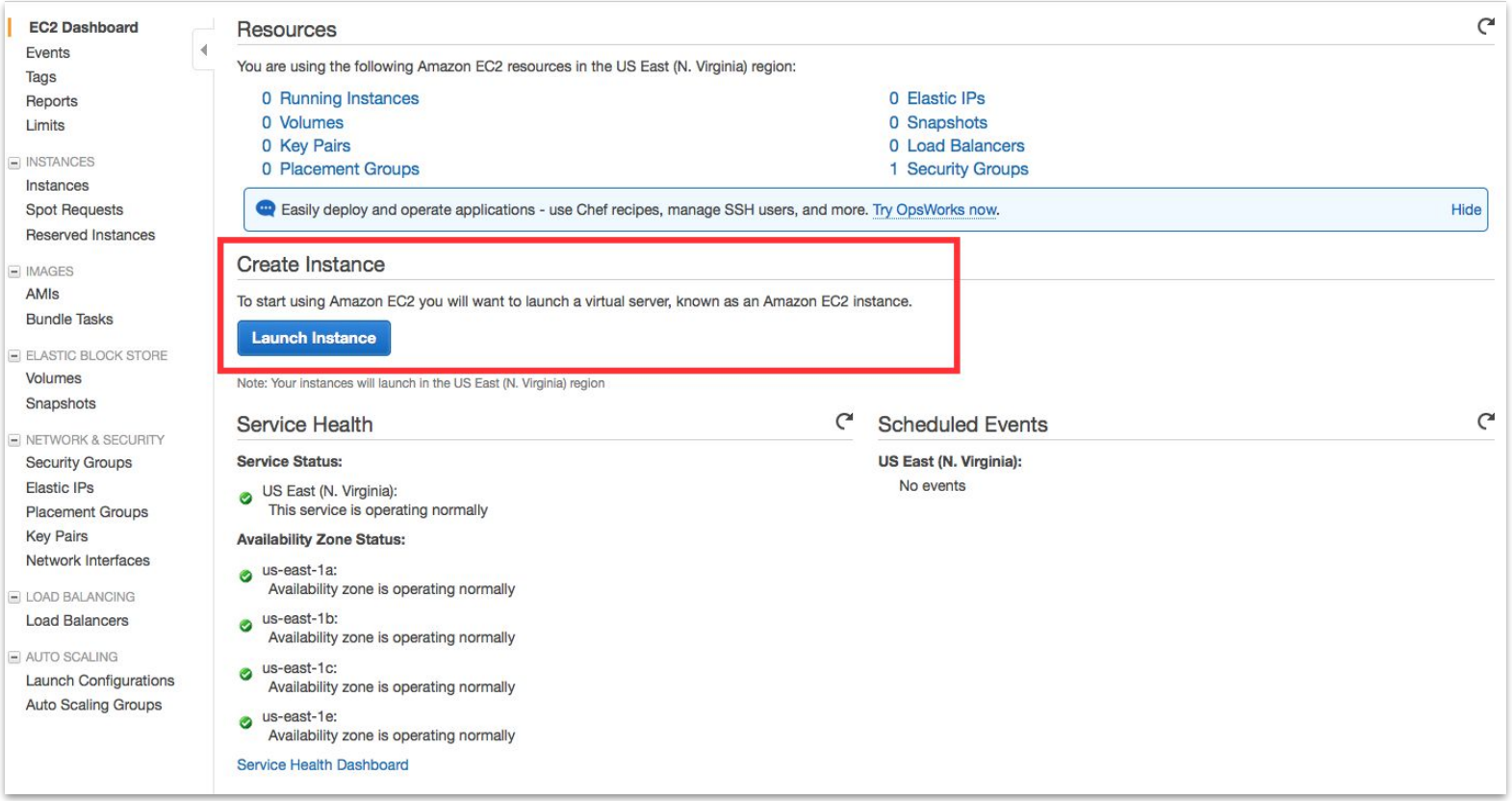




3. Go to EC2

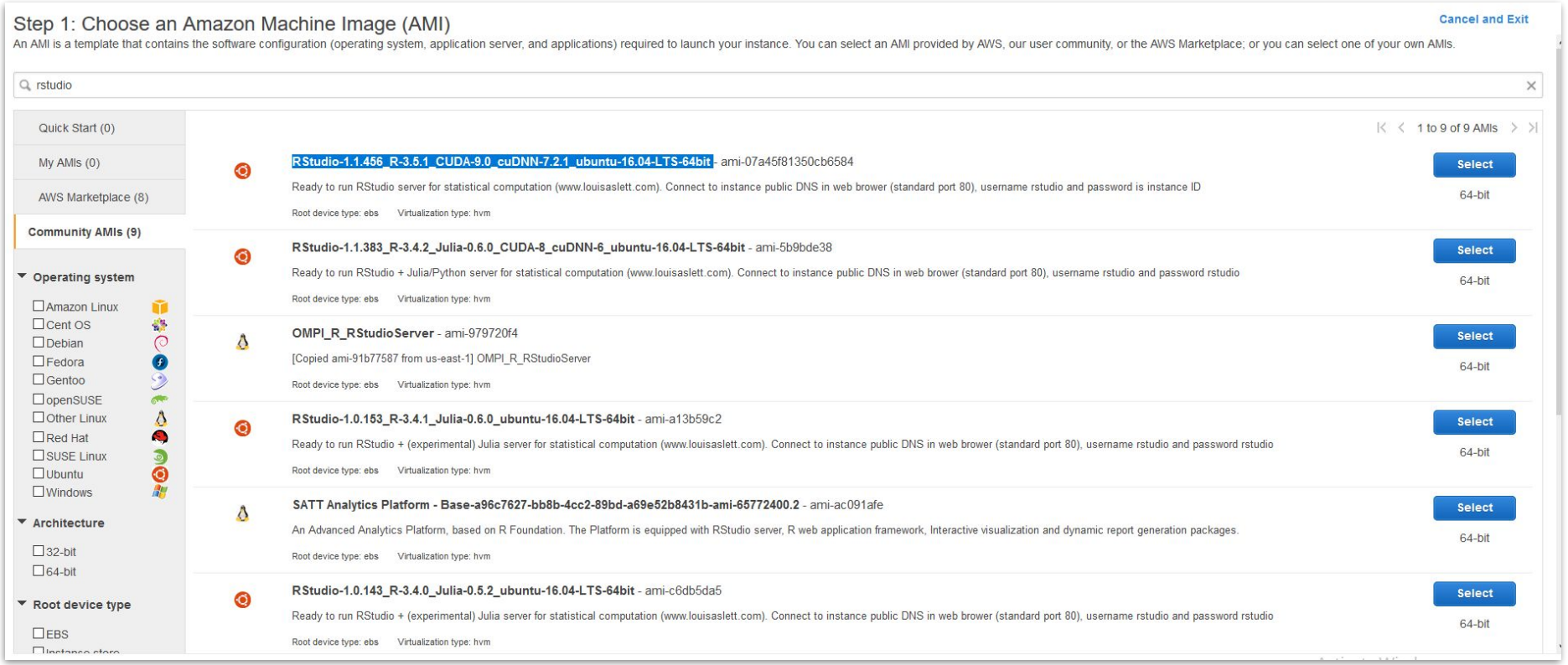

aws
Services
Resource Groups
EC2
Route 53
VPC
AWS services
ec2
EC2
Virtual Servers in the Cloud
EC2 Container Service
Run and Manage Docker Containers
EFS
Managed File Storage for EC2
Compute
EC2
EC2 Container Service
Lightsail
Elastic Beanstalk
Lambda
Batch
Developer Tools
CodeStar
CodeCommit
CodeBuild
CodeDeploy
CodePipeline
X-Ray
Internet of Things
AWS IoT
AWS Greengrass
Contact Center
Amazon Connect
Storage
Management Tools
Game Development

3.1 Ready to Launch



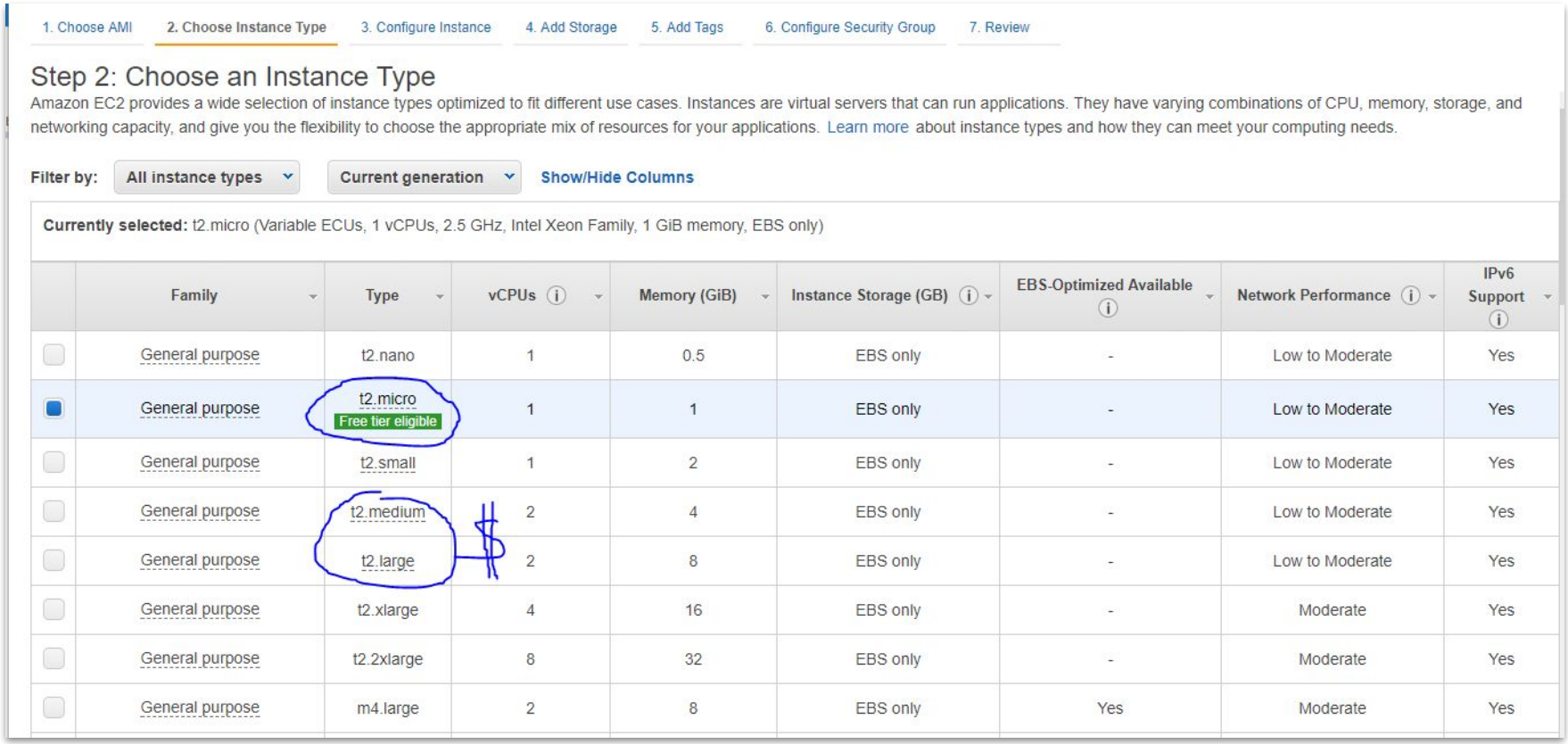
EC2 Step 1: Community AMI: search for “RStudio”

RStudio-1.1.456_R-3.5.1_CUDA-9.0_cuDNN-7.2.1_ubuntu-16.04-LTS-64bit
Id: ami-07a45f81350cb6584 in Singapore region
created by http://www.louisaslett.com/RStudio_AMI/
Newer than below



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

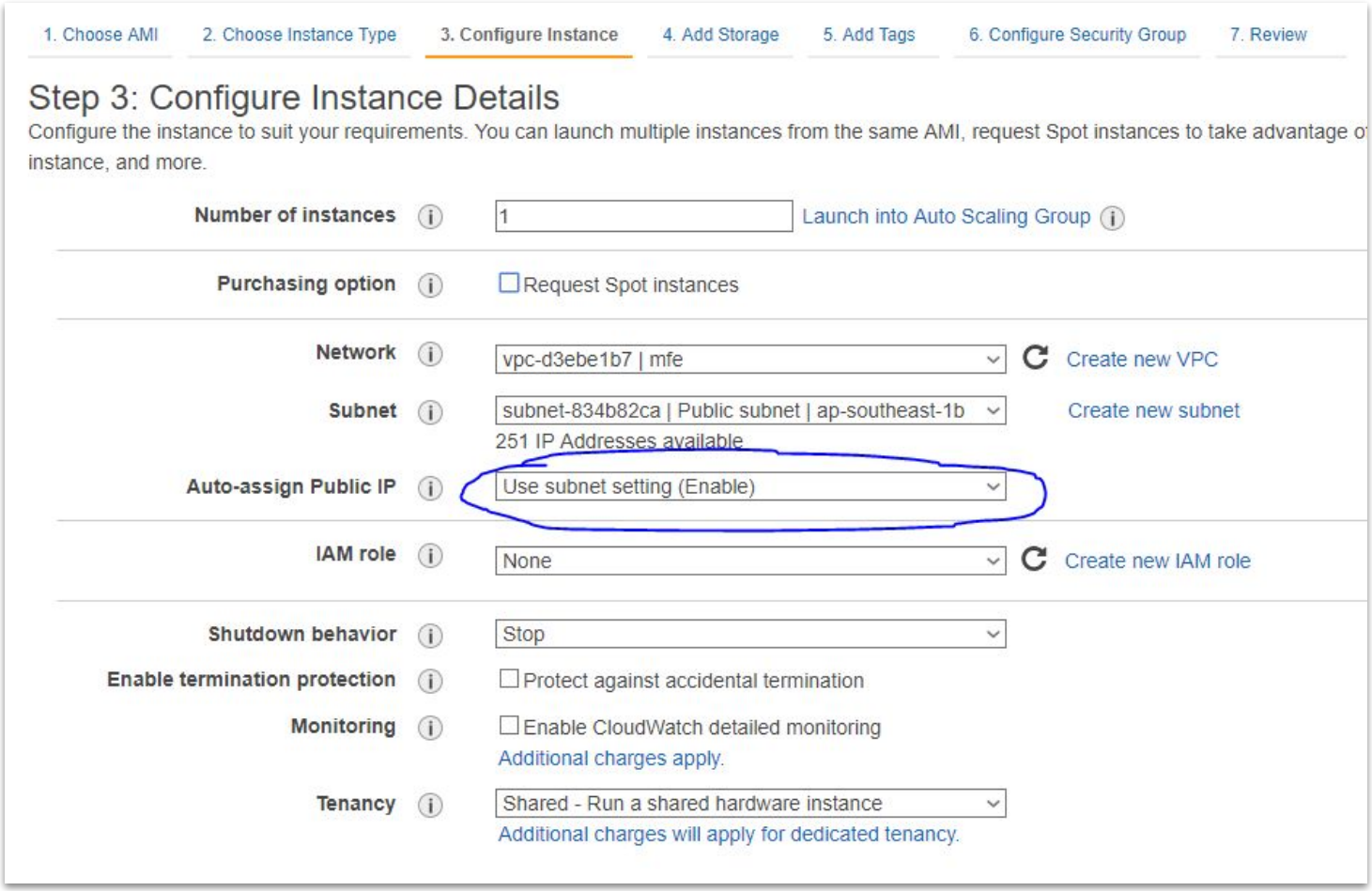
Amazon EC2 provides a wide selection of instance types optimized to fit different use cases. Instances are virtual servers that can run applications. They have varying combinations of CPU, memory, storage, and networking capacity, and give you the flexibility to choose the appropriate mix of resources 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
☐	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
☐	General purpose	t2.large	2	8	EBS only	-	Low to Moderate	Yes
☐	General purpose	t2.xlarge	4	16	EBS only	-	Moderate	Yes
☐	General purpose	t2.2xlarge	8	32	EBS only	-	Moderate	Yes
☐	General purpose	m4.large	2	8	EBS only	Yes	Moderate	Yes

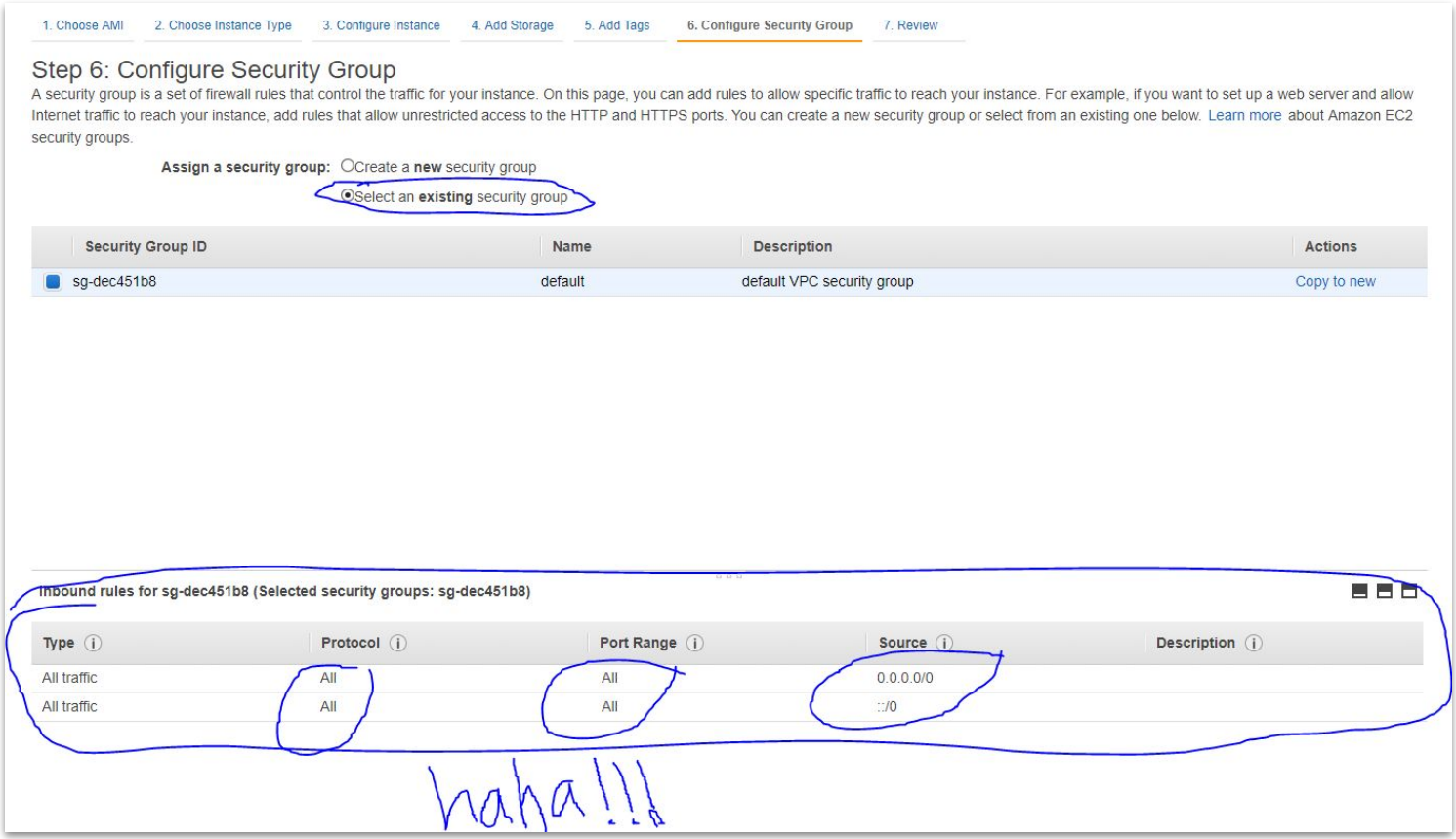
EC2 Step 3: Make sure Auto-assign Public IP is ticked. Click “Next”.



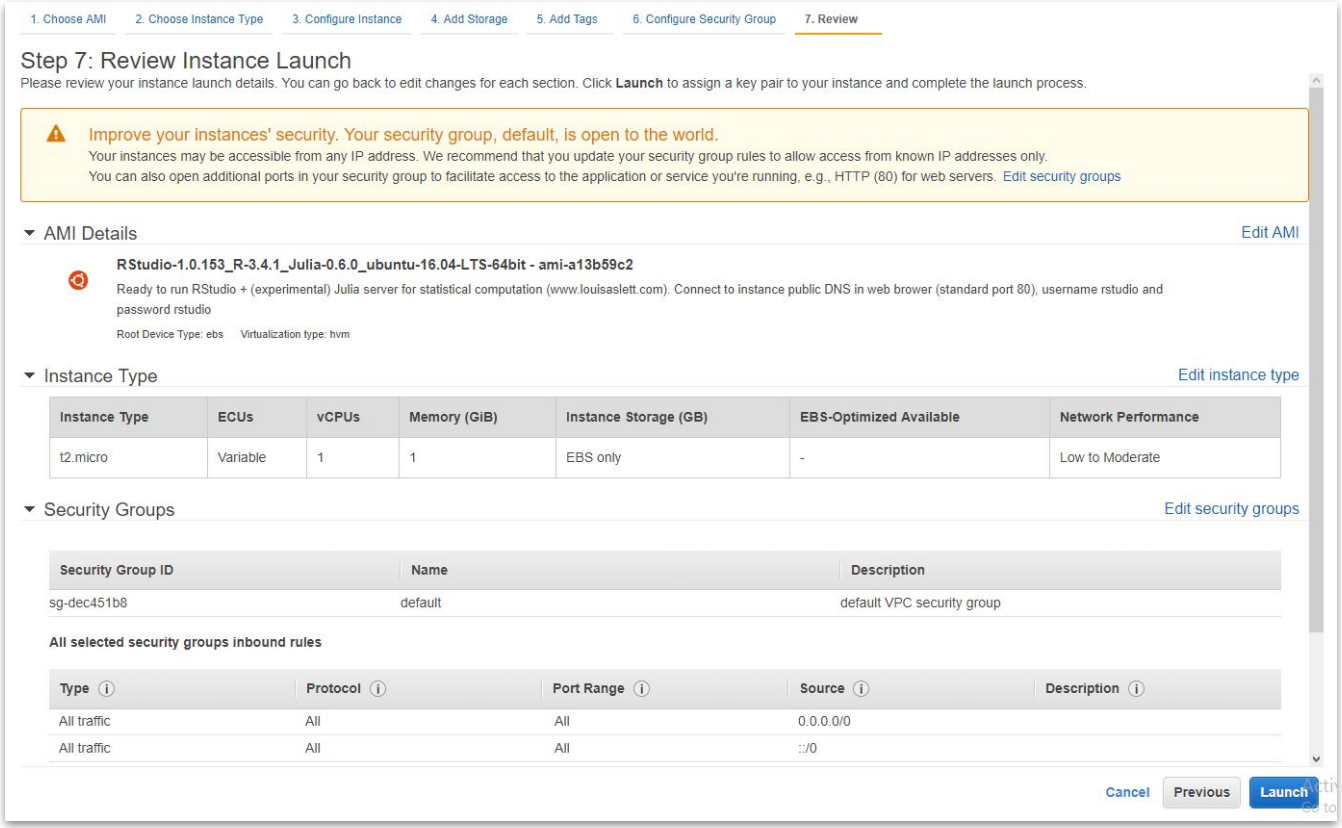
EC 2 Step 4: Add Storage, use the default setting.

- 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.

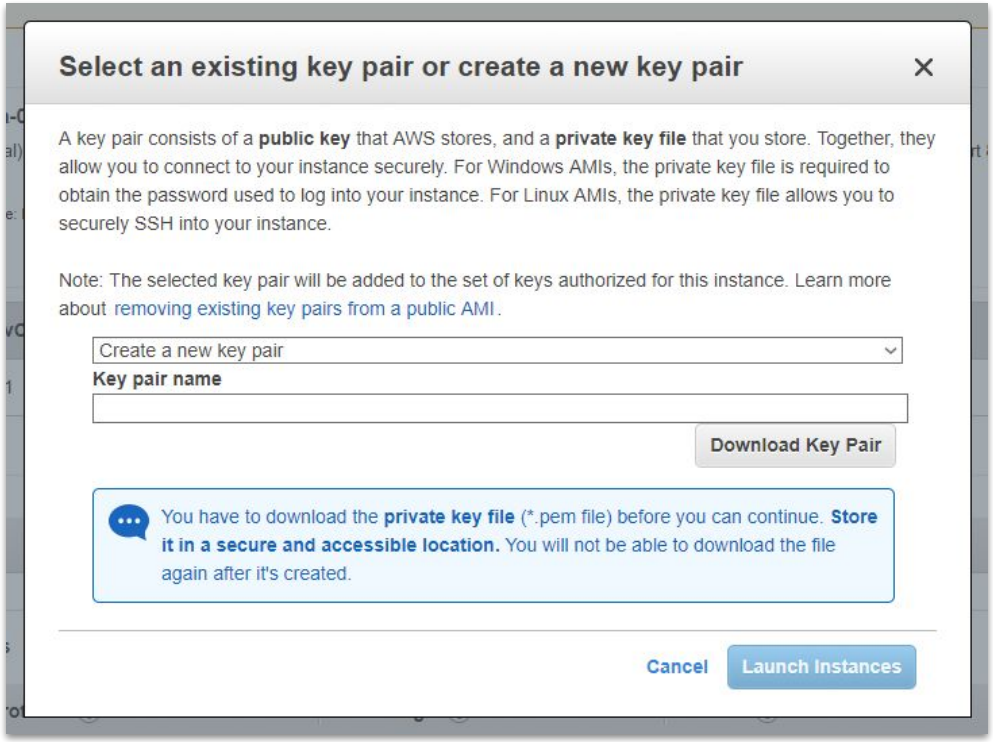
EC Step 6: Click “6. Configure Security Group” Select an existing security group. Your previous changes are loaded.



EC 2 Step 7: Review and Launch
Click the blue button.



One last thing: Key pair
Create if you didn't have an existing one or lost the previous download.



If you know SSH

You can connect to the server by

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

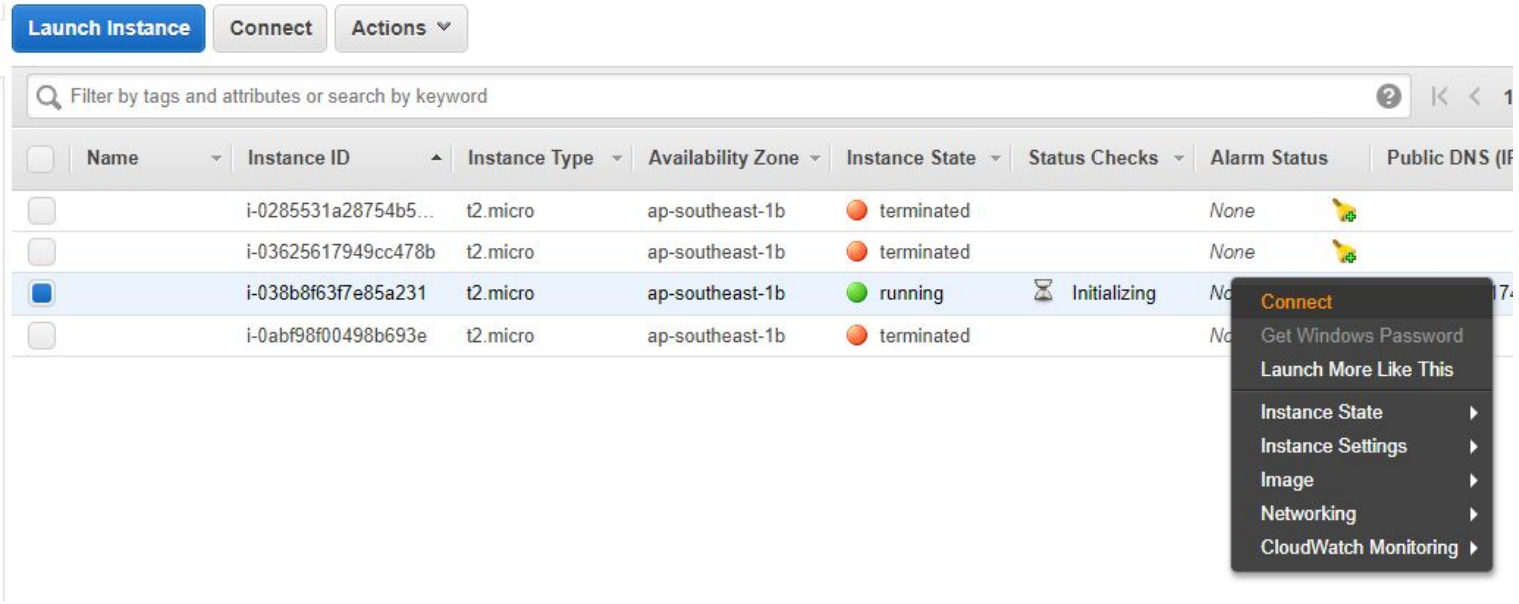
ssh -i 'c:\Users\yourusername\Downloads\MyKeyPair.pem' ubuntu@{IP_Address}

- Mac: skip download Git. Go straight

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

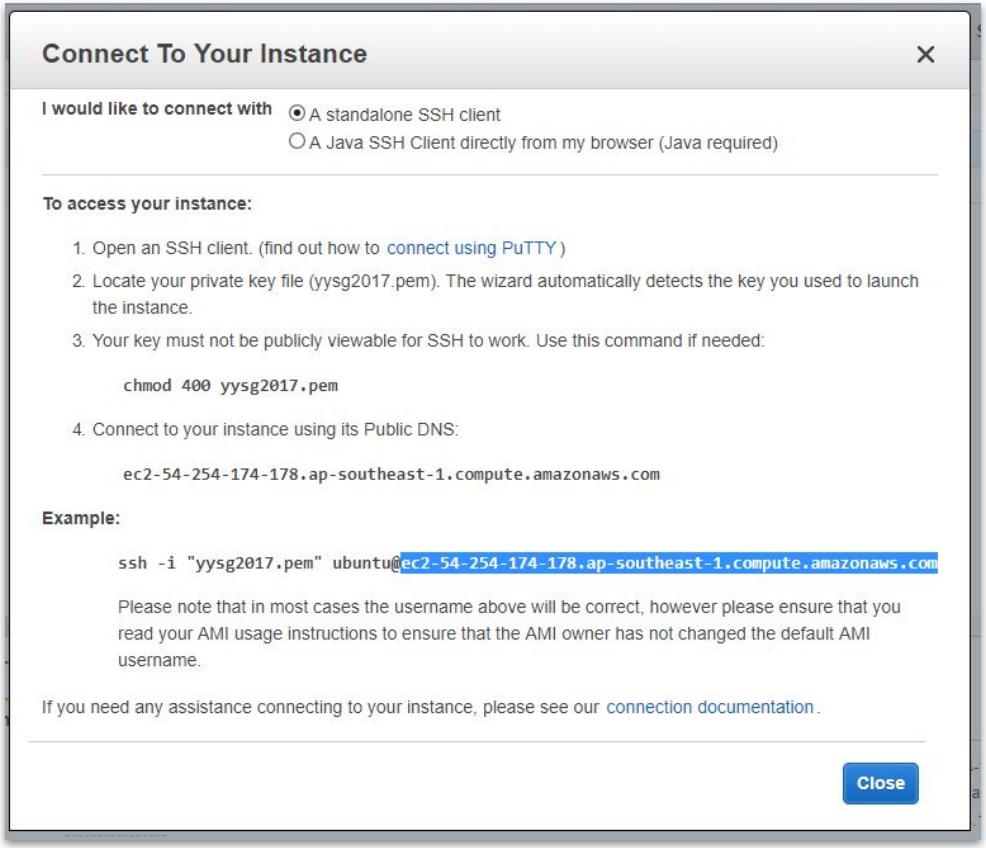
Control the instance.

- 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



Access it

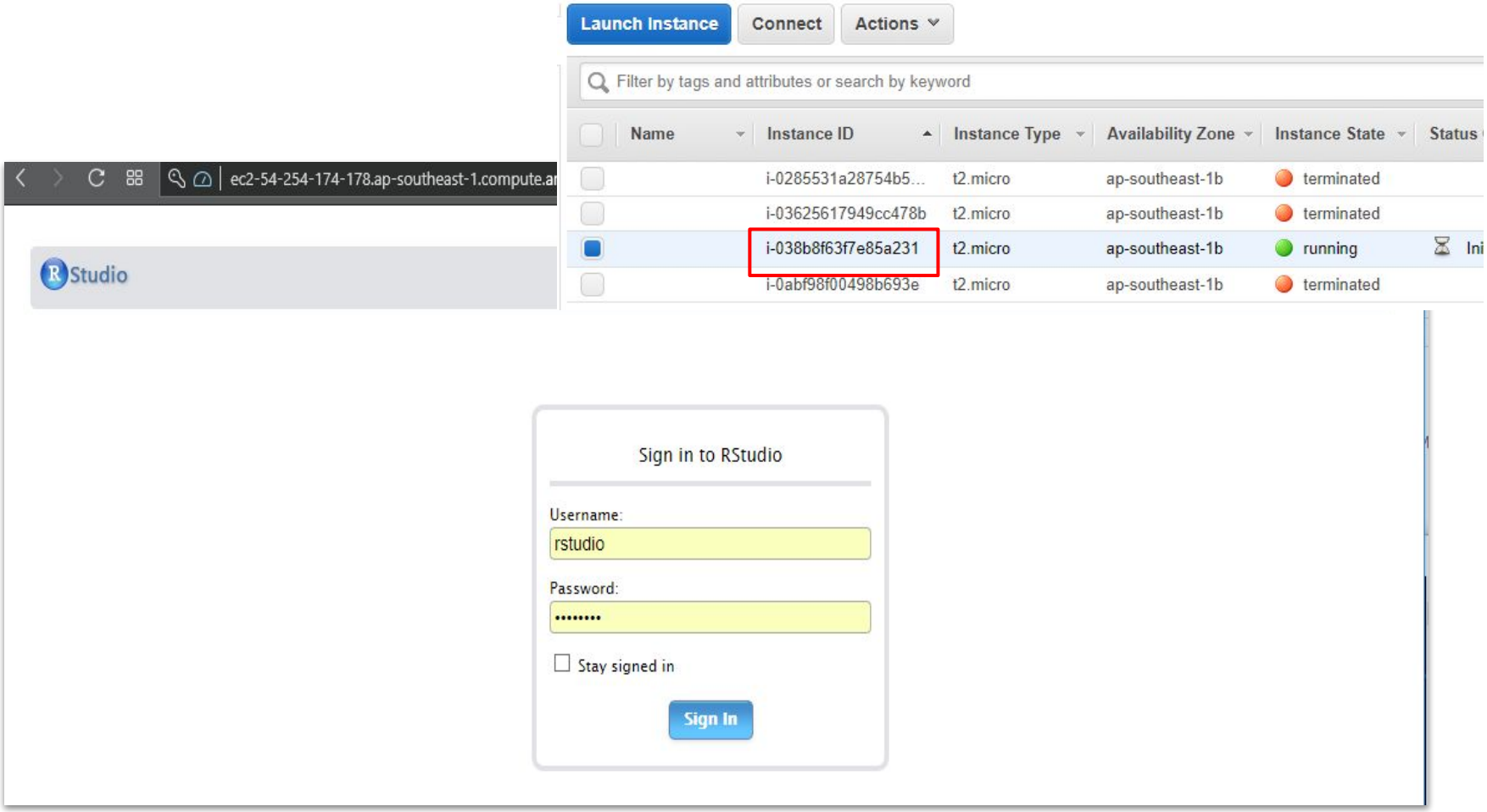
- Copy this address



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

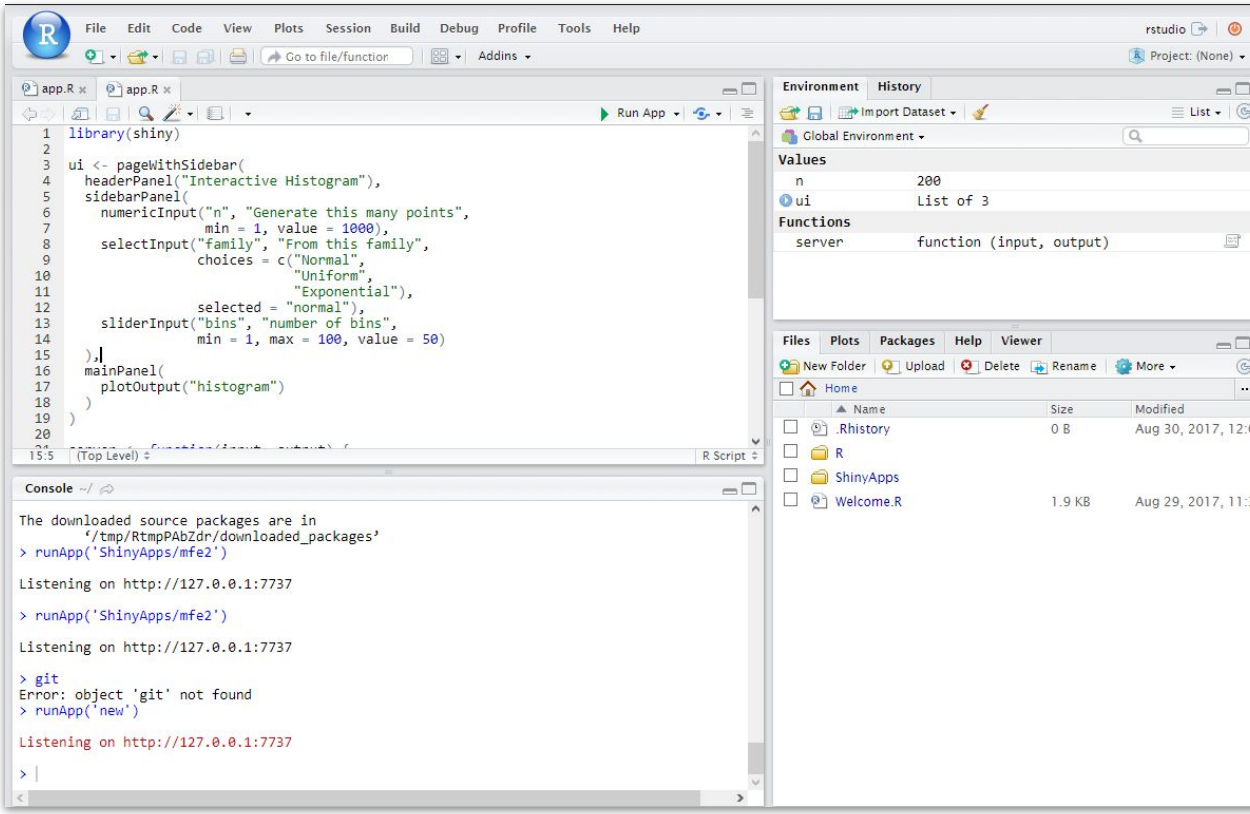
This would change every time when you launch it.

Initial password: rstudio/Instance ID.

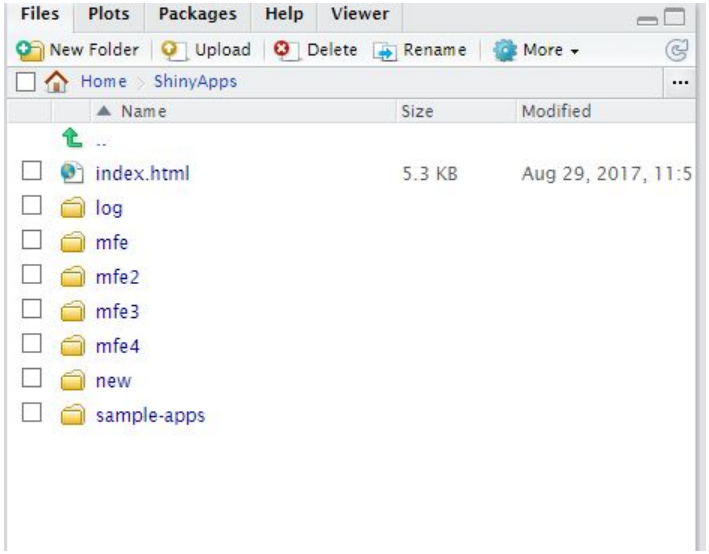


RStudio Setup

- 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://ec2-13-229-181-28.ap-southeast-1.compute.amazonaws.com/shiny/rstudio/sample-apps/hello/

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.
- It’s cool to have something running in the cloud. You can show people to impress.

- AWS setup is optional in this course.
- You can run R Studio and application on your laptop
- If you finishing working on it, leave the instance as Stopped. Be aware of how much you spend on AWS.