

AWS Account Setup and Services Overview

1. Purpose of the Lab

Understand definitions of various Amazon Web Services (AWS) and their use in cloud computing based web applications that are accessible over the Internet through an AWS account.

2. Lab Steps and output collection guidelines



Figure 1: Lab 1 Steps Overview

Figure 1 shows the steps required to successfully create an account credited with funds for using AWS. You will need to understand pricing conditions and services documentation related with 'AWS free usage tier', understand AWS Architecture, create your 'AWS account' and join it to the 4001/7001 Cloud Computing course in order to be granted with \$100 credit. You will launch your first AWS EC2 (Elastic Compute Cloud) instance. Finally, you will use AWS CloudWatch to add a Bill alarm for monitoring and managing your credit.

Let's get started!

3.1 Amazon Web Services

Take your time in order to understand the conditions of free usage that involve free account availability, restrictions in terms of instance types, pay-as-you-go service rates, operating systems that are under the free usage condition, and free usage accumulation, detailed information can be found on <http://aws.amazon.com/free/>.

AWS Free Tier (Per Month):

Elastic Compute Cloud (EC2)

- 750 hours of [Amazon EC2](#) Linux t.2 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 t.2 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](#) plus 15 GB data processing*
- 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*

Simple Storage Service (S3)

- 5 GB of [Amazon S3](#) standard storage, 20,000 Get Requests, and 2,000 Put Requests*

DynamoDB

25 GB of Storage, 25 Units of Read Capacity and 25 Units of Write Capacity – Enough to handle up to 200M requests per month with [Amazon DynamoDB](#)**

Relational Database Service (RDS)

- 750 hours of [Amazon RDS](#) Single-AZ Micro DB Instances, for running MySQL, PostgreSQL, Oracle BYOL or SQL Server (running SQL Server Express Edition) – enough hours to run a DB Instance continuously each month*
- 20 GB of database storage, in any combination of RDS General Purpose (SSD) or Magnetic storage
- 10 million I/Os (for use with RDS Magnetic storage; I/Os on RDS General Purpose (SSD) storage are not separately billed)
- 20 GB of backup storage for your automated database backups and any user-initiated DB Snapshots

Simple Workflow (SWF)

- 1,000 [Amazon SWF](#) workflow executions and a total of 10,000 activity tasks, signals, timers and markers, and 30,000 workflow-days.**

Simple Queue Service (SQS) and Simple Notification Service (SNS)

- 1,000,000 Requests of [Amazon Simple Queue Service](#)**
- 1,000,000 Requests, 100,000 HTTP notifications and 1,000 email notifications for [Amazon Simple Notification Service](#)**

Amazon Elastic Transcoder

- 20 minutes of SD transcoding or 10 minutes of HD transcoding**

CloudWatch

- 10 [Amazon Cloudwatch](#) metrics, 10 alarms, and 1,000,000 API requests**

Data Transfer

- 15 GB of bandwidth out aggregated across all AWS services*

Data Pipeline

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

ElastiCache

- 750 hours of [Amazon ElastiCache](#) - enough hours to run a Cache Node continuously each month.*

Amazon Mobile Analytics

- 100 million free events per month**

Go through the <http://aws.amazon.com/documentation/> to find detailed information of each service that AWS provides. Pay special attention to the service groups: Getting started with AWS, Compute, Storage & Content Delivery and Database.

3.2. AWS Architecture Center

You will need to understand overall <http://aws.amazon.com/architecture/> to help you build your application architecture customized according to your requirements, and for maximizing the AWS services usage. Web application hosting related customization example is shown below in Figure 1.

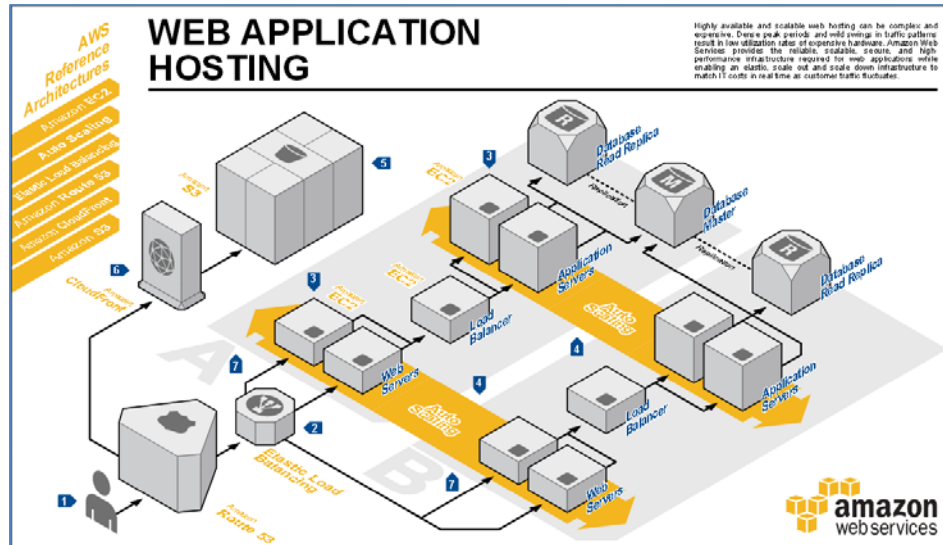
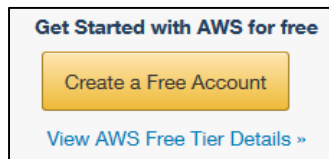


Figure 1: Example application customization of AWS architecture

3.3. AWS Account Creation

Create an (AWS) Amazon Web Service account in <http://aws.amazon.com> by clicking the button ‘Create a Free Account’ and follow the instructions. A credit/debit card and a cellphone/Landline number is required.



New AWS Accounts Include:

12 months of access to the AWS Free Tier

- Amazon EC2: 750 hrs/month of Windows and Linux t2.micro instance usage
- Amazon S3: 5GBs of Storage
- Amazon RDS: 750 hrs/month of Micro DB Instance usage
- Amazon DynamoDB: 25 GB of storage, up to 200 million requests/month

AWS Basic Support Features

- Customer Service: 24x7x365
- Support Forums
- Documentation, White Papers, and Best Practice Guides

Visit aws.amazon.com/free for full offer terms.

- Follow the instruction to create your account. At some point you will also need to enter your credit/debit card information.
- Don't forget to select 'Basic (Free)' Support plan to access to AWS free services.

Select your AWS Support Plan

All customers receive free support. Choosing a paid support plan will allow you to receive one-on-one technical assistance from experienced engineers and access many other support features. [Click here to compare all Support plans.](#)

Basic (Free)
Contact Customer Service for account and billing questions, receive help for resources that don't pass system health checks, and access the AWS Community Forums.

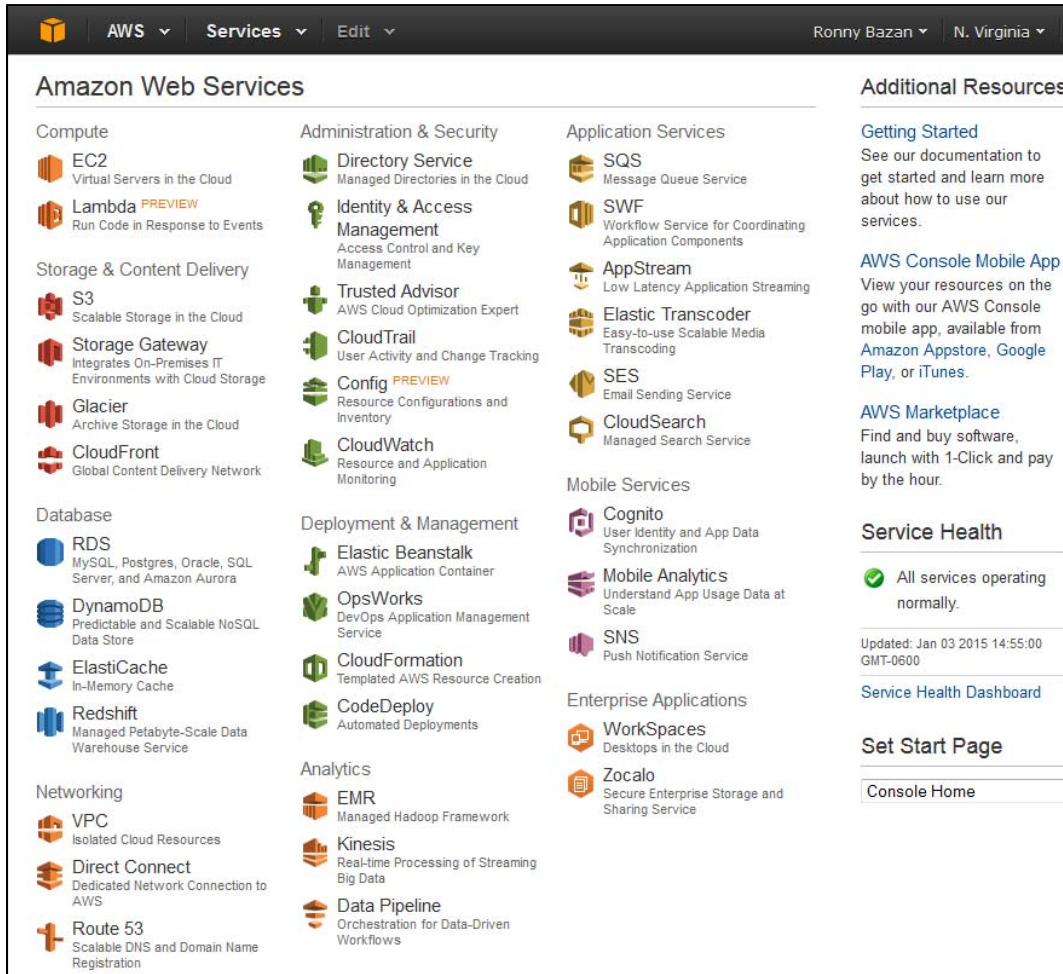
Developer (\$49/month)
Get started on AWS – ask technical questions and get a response to your web case within 12 hours during local business hours.

Business (Starting at \$100/month - Pricing example [↗](#)) - Recommended
24/7/365 real-time assistance by phone and chat, a 1 hour response to web cases, and help with 3rd party software. Access Trusted Advisor to increase performance, fault tolerance, security, and potentially save money. ([What's this \[↗\]\(#\)](#))

Enterprise (Starting at \$15,000/month - Pricing example [↗](#))
15 minute response to web cases, an assigned technical account manager (TAM) who is an expert in your use case, and white-glove case handling that notifies your TAM and the service engineering team of a critical issue.

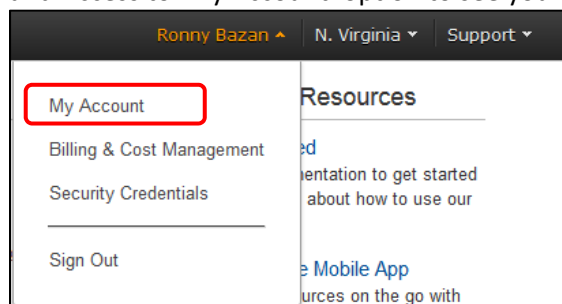
[Continue \[▶\]\(#\)](#)

- Once you create your account you will see all AWS services available for you.



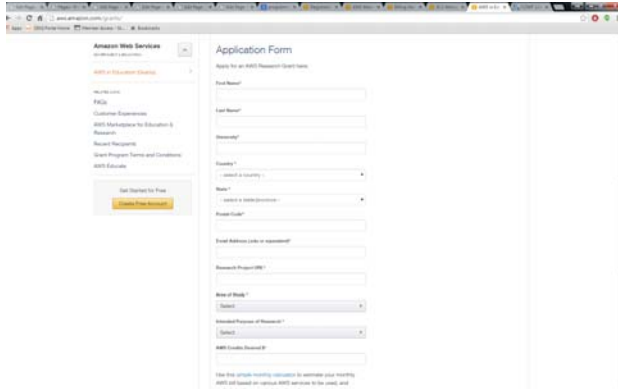
3.4. Add AWS Education Credit for \$100 to your Account.

- Click on your user name and Access to 'My Account' option to see your AWS Account Id.



- As an instructor, you will have to apply for AWS education credits for your course. Goto: <http://aws.amazon.com/grants/>

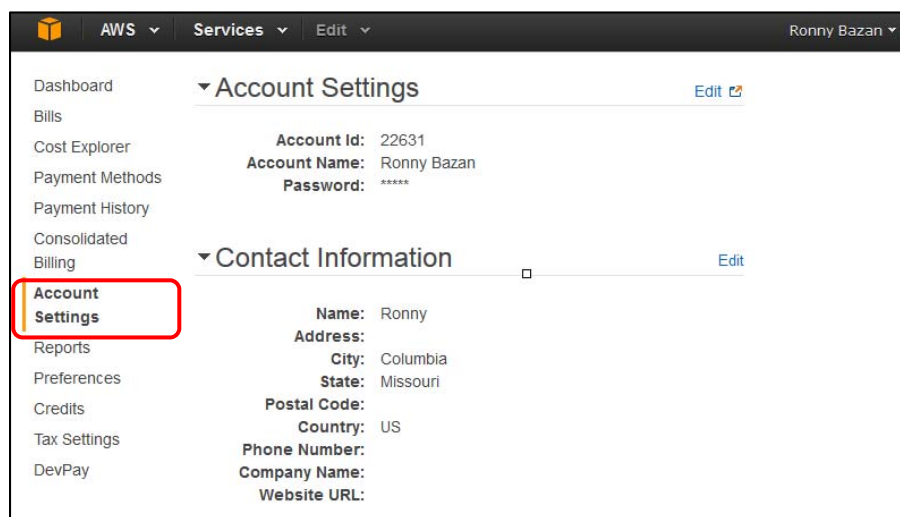
- The application process is simple and quick



You will receive an email within several minutes. You could have the credits set up for your AWS account and or you to manage access for students, or you could have your students set up their own AWS accounts separately. If you choose to have students set up separate accounts, you will receive individual credit codes for each user.

If you choose to manage **centrally** in your account, you can use the AWS **Identity and Access Management** feature: <http://aws.amazon.com/iam>.

- You can then assign each student their \$100 credit for the course.



- When your student receives their Promo Code from you, they select 'Credits' in the menu located in the left side, enter your code and press 'Redeem' button, they will see the message with \$100 credit confirmed.
- They will be able to see their detailed usage and Credits Balance by accessing 'Bills' option in the menu.

Dashboard Bills ?

Cost Explorer Date: January 2015 Download CSV Print

Payment Methods

Payment History

Consolidated

Billing

Account Settings

Reports

Preferences

Credits

Tax Settings

DevPay

Summary	Amount
AWS Service Charges	\$0.00
<i>There are no invoices for the selected month.</i>	

+ Expand All

Details	Total
AWS Service Charges	\$0.00
▶ SimpleDB	\$0.00
▶ CT to be collected	\$0.00
▶ GST to be collected	\$0.00
▶ US Sales Tax to be collected	\$0.00
▶ VAT to be collected	\$0.00

- Another useful option is to enable 'Receive PDF Invoice my Email' as well 'Receive Billing Alerts' to keep track of the usage.

Dashboard Preferences ?

Bills Receive PDF Invoice By Email

Cost Explorer

Payment Methods

Payment History

Consolidated

Billing

Account Settings

Reports

Preferences

Credits

Tax Settings

DevPay

Receive Billing Alerts
Turn on this feature to monitor your AWS usage charges and recurring fees automatically, making it easier to track and manage your spending on AWS. You can set up billing alerts to receive email notifications when your charges reach a specified threshold. Once enabled, this preference cannot be disabled. [Manage Billing Alerts](#)

Receive Billing Reports
Turn on this feature to receive ongoing reports of your AWS charges once or more daily. AWS delivers these reports to the Amazon S3 bucket that you specify where indicated below. For consolidated billing customers, AWS generates reports only for paying accounts. Linked accounts cannot sign up for billing reports.

Save to S3 Bucket: Verify

3.5 Launching your first AWS Instance

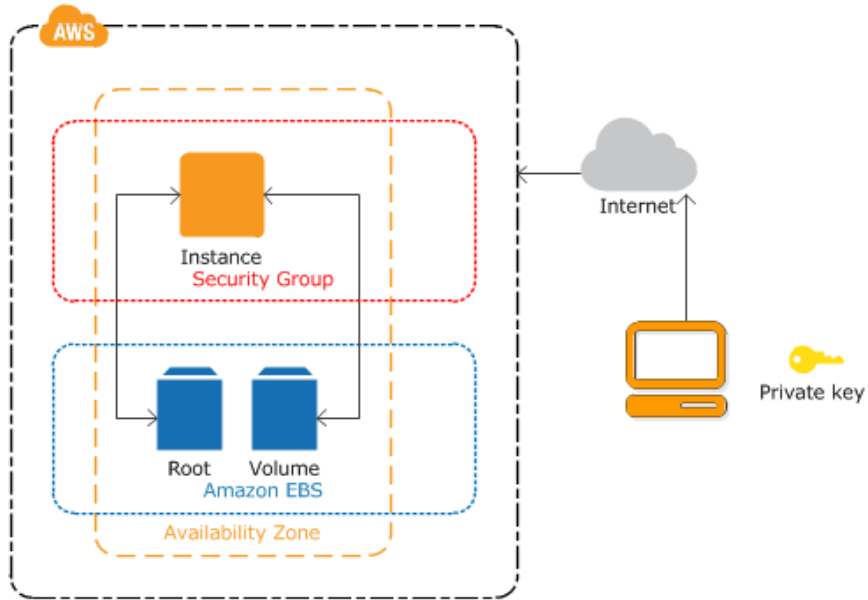


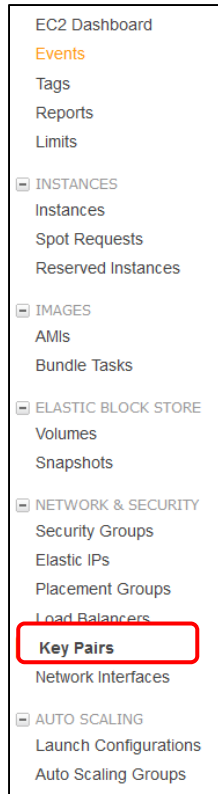
Figure 3: Overview of an AWS Instance

Figure 3 shows the instance architecture to be configured in this Lab. Using your AWS account, you will launch a virtual instance created in a new 'Volume' from an Amazon EBS-backed instance snapshot (called 'Root'), in order to access your reserved infrastructure resources over the Internet; you will need to create key pairs and secure it through a security group; all the infrastructure will be created in a specific zone.

- 3.5.1 Click 'Console Home', make sure to select the US East (N. Virginia) region in the top-right part of your screen and select AWS EC2 service (Elastic Compute Cloud).



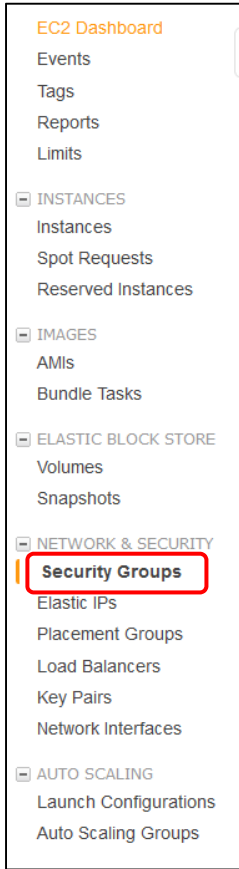
- 3.5.2 In left menu select "Key Pairs".



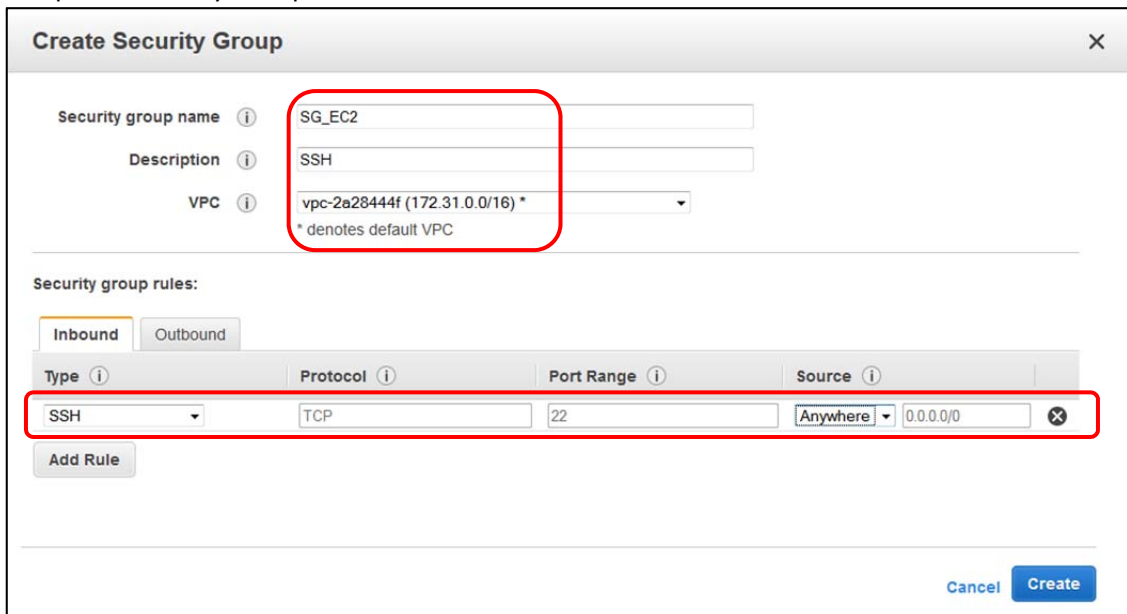
- Create a KeyPair called 'key-ec2' and store it in a safe location, you will need this key for the future labs.

A screenshot of the 'Create Key Pair' dialog box in the AWS Management Console. The dialog has a title bar with 'Create Key Pair' and a close button (X). Below the title bar, there is a text input field labeled 'Key pair name:' with the value 'key-ec2' entered. At the bottom right of the dialog, there are two buttons: 'Cancel' and 'Create'.

- 3.5.3 Select “Security Groups” from the left menu, name a Security Group ‘SG_EC2’, add description and a SSH rule with ‘anywhere’ option selected in source field.

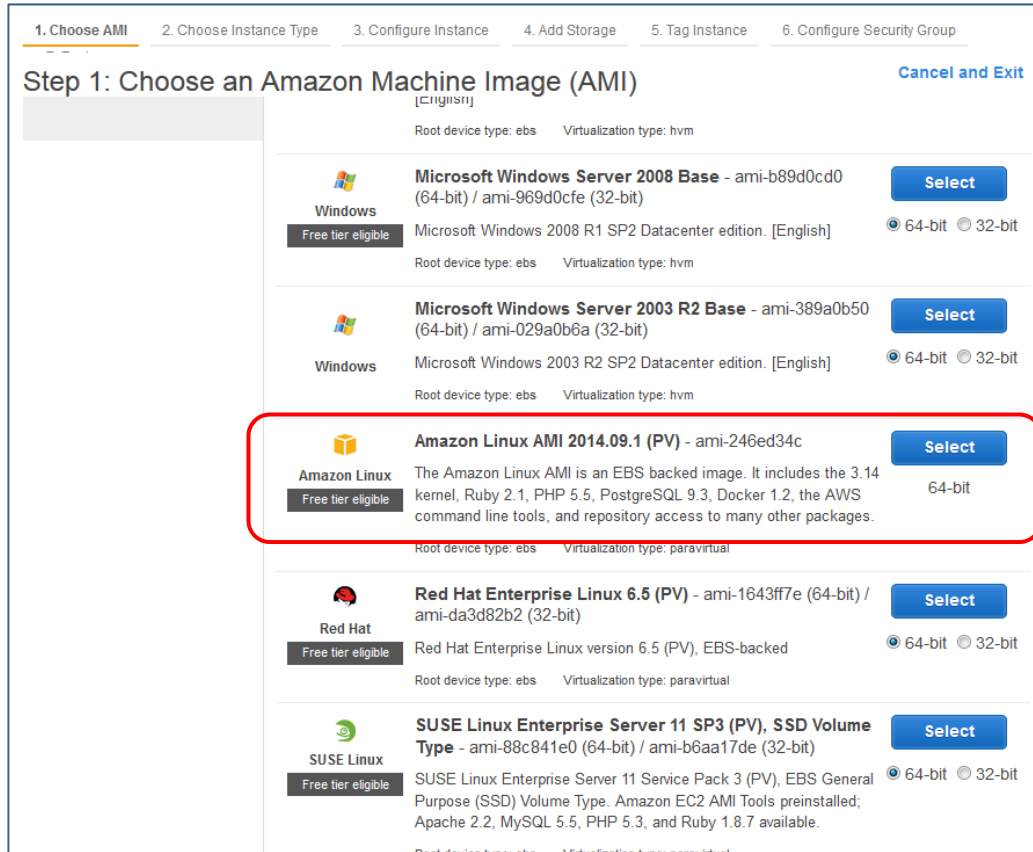


- Example of Security Group creation.

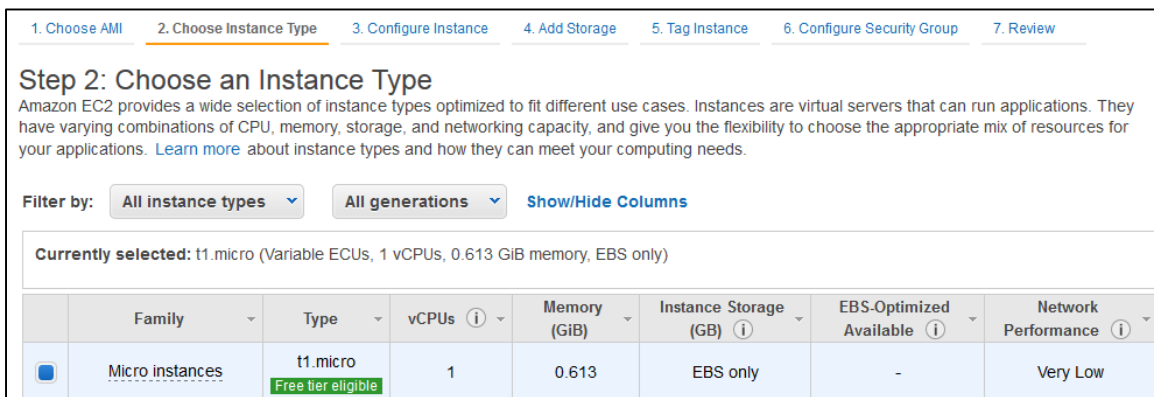


3.5.4 Launch your Instance

- In left menu, launch a new instance in the 'Instances' option Click on the 'Launch Instance' button and select the first 'Amazon Linux AMI 2014.09.1 (PV)' on the list (This AMI is not the first in the list).



- Select the first instance that is 'Free'.



- Configure the instance similar to the following diagram

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

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

Purchasing option ⓘ Request Spot Instances

Network ⓘ vpc-2a28444f (172.31.0.0/16) (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

Shutdown behavior ⓘ Stop

Enable termination protection ⓘ Protect against accidental termination

Monitoring ⓘ Enable CloudWatch detailed monitoring
Additional charges apply.

Tenancy ⓘ Shared tenancy (multi-tenant hardware)
Additional charges will apply for dedicated tenancy.

- Keep default values in the next configuration windows and continue.
- In Tag Instance option, add 'Key' and 'Value' and shown in figure below and click on 'Next: Configure Security Group'.

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

Step 5: Tag Instance

A tag consists of a case-sensitive key-value pair. For example, you could define a tag with key = Name and value = Webserver. [Learn more](#) about tagging your Amazon EC2 resources.

Key (127 characters maximum) **Value** (255 characters maximum)

Server Name Web Server

Create Tag (Up to 10 tags maximum)

- Select the Security Group created previously and click on 'Review and Launch'.

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

Step 6: Configure Security Group

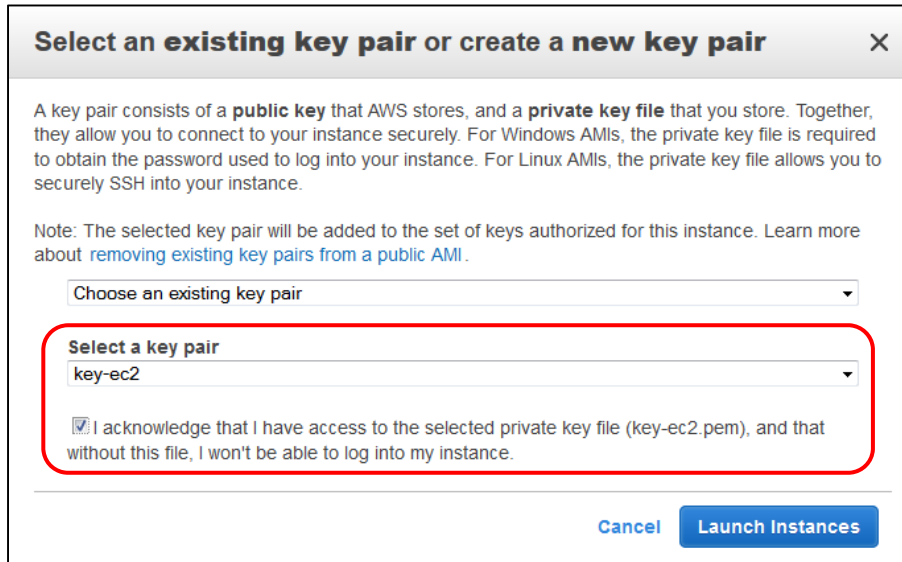
A security group is a set of firewall rules that control the traffic for your instance. On this page, you can add rules to allow specific traffic to reach your instance. For example, if you want to set up a web server and allow Internet traffic to reach your instance, add rules that allow unrestricted 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

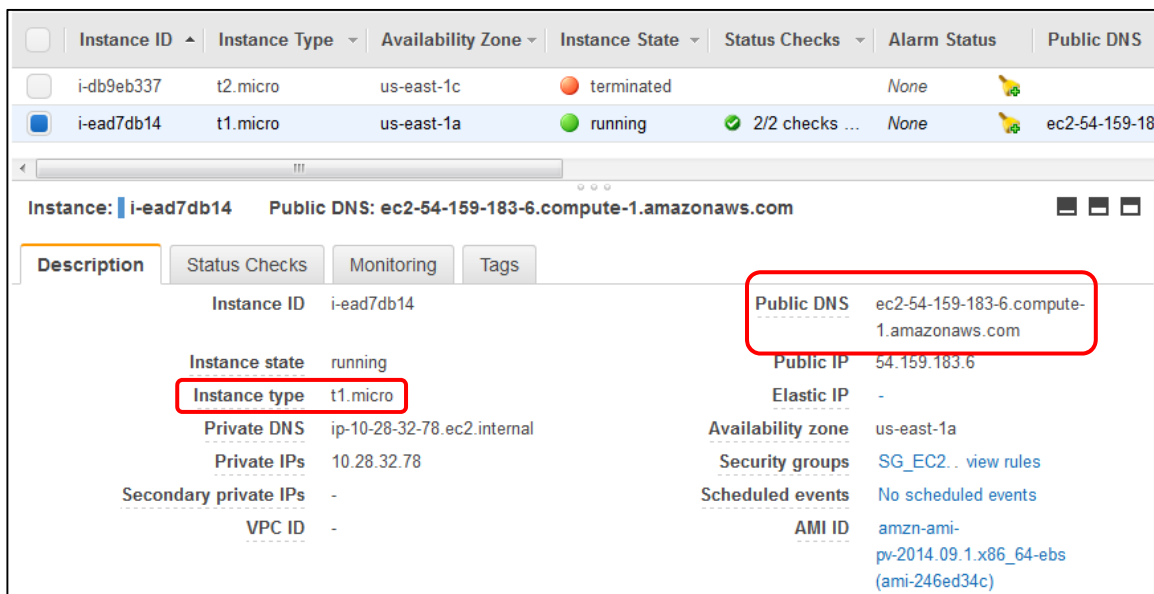
Filter: VPC security groups

Security Group ID	Name	Description	Actions
<input type="checkbox"/> sg-84dd79eb	default	default VPC security group	Copy to new
<input checked="" type="checkbox"/> sg-0dccc0c69	SG_EC2	SSH	Copy to new

- Once you click 'launch' you will be prompted to choose the key pair 'key-ec2' created previously.

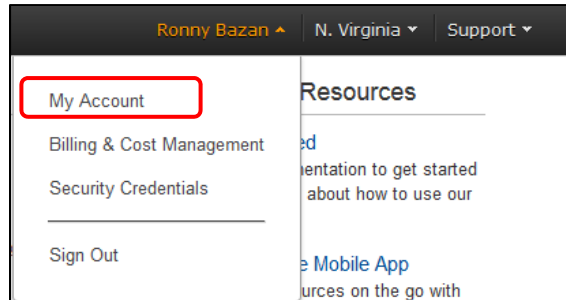


- In a short time your new instance will be deployed and ready to be used.

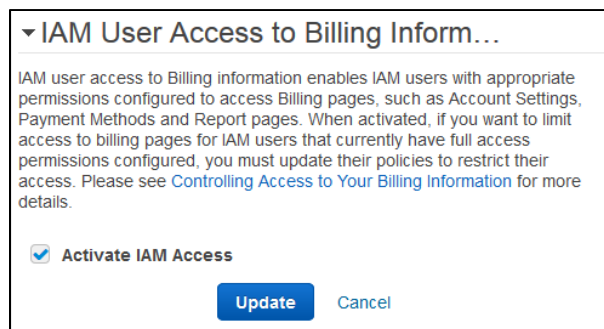


3.6 Add a Bill Alarm

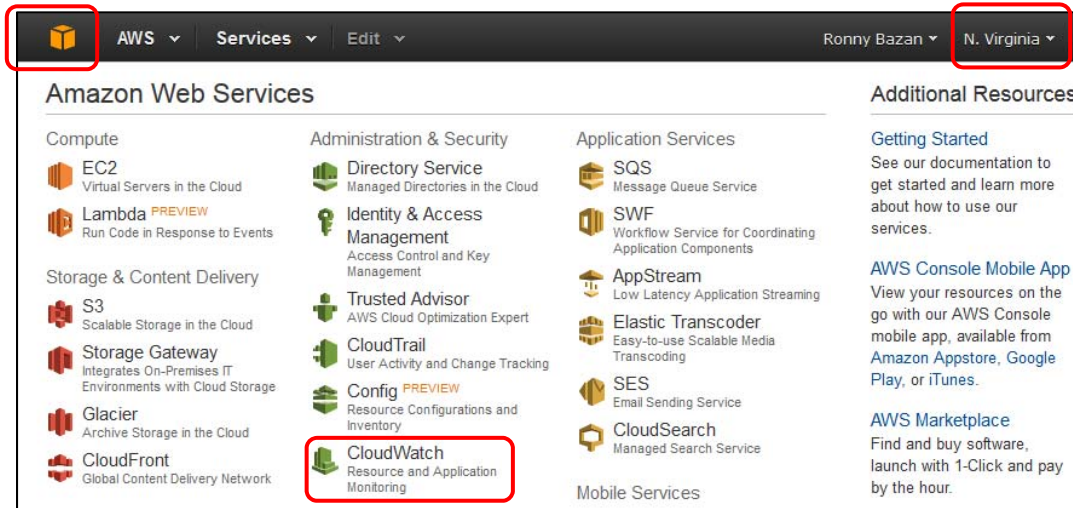
- Click on 'My Account' located in the top right corner of your screen.



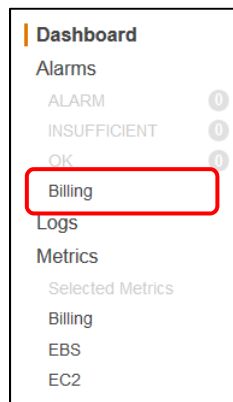
- In 'Account Settings' find 'IAM User Access to Billing inform', Activate IAM Access and click on update button.



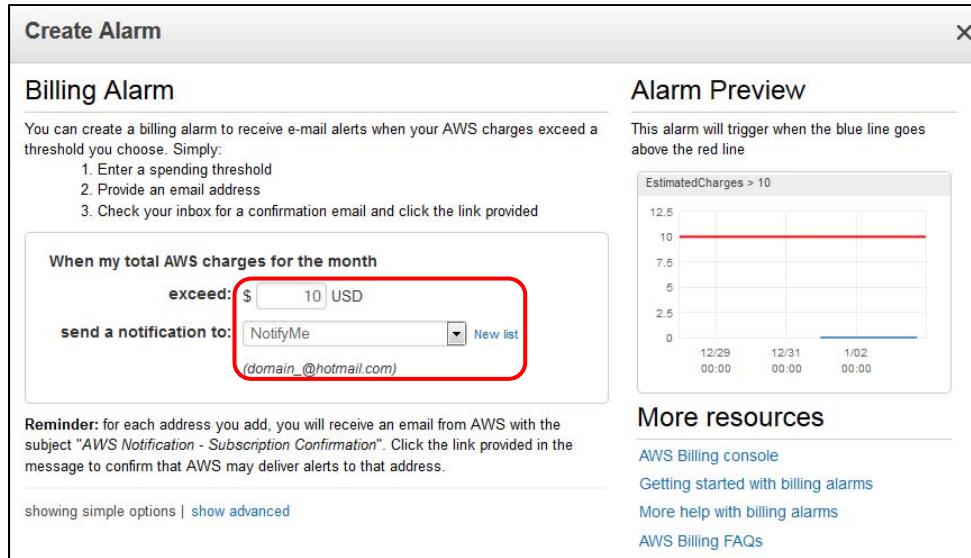
- In Console Home, select 'CloudWatch' service and make sure that 'N.Virginia' zone is selected.



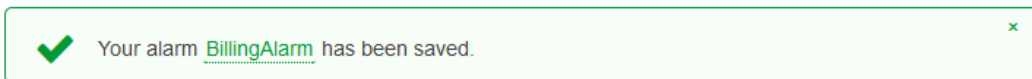
- You will find a panel in the left side of your screen, click on 'Billing Alarms'



- After clicking on 'Create Alarm', input \$10 in exceed field and select your e-mail address. Take a screenshot with your name and e-mail address visible for grading purpose.



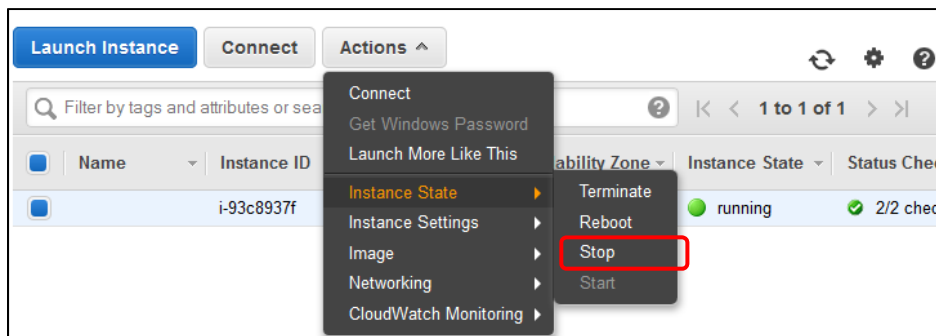
- A message will be displayed after you have successfully setup your alarm.



Note: You should turn off any instances after each session – otherwise this can deplete the credits and start charging your credit card

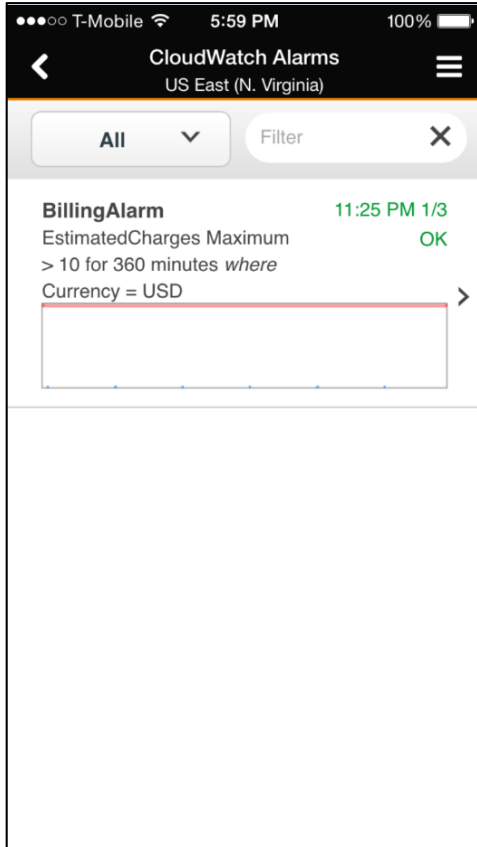
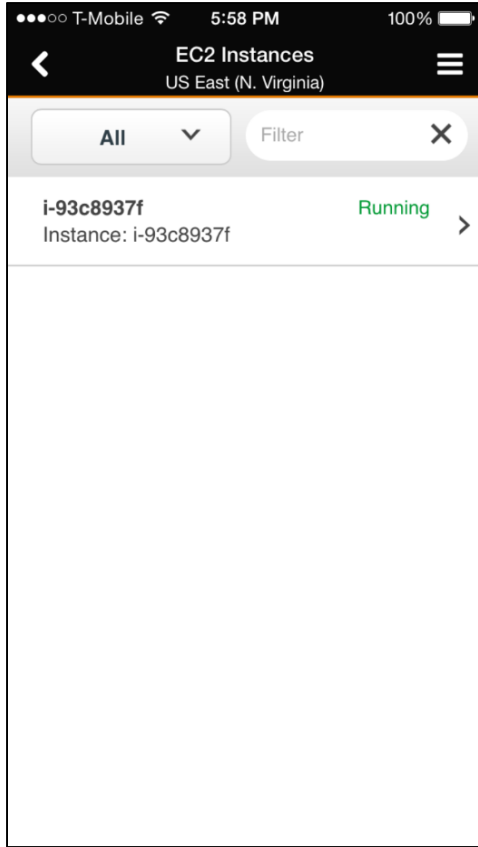
Stop your instance.

In your AWS EC2 service select 'Instances' under 'INSTANCES' option, select your running instance, click on 'Actions' button and 'Stop' option.



3.7 Manage AWS resources from your mobile device

Through a free Amazon application for smartphones (AWS Console App) you can manage your services and instances and check your billing alarms.



What to turn in for Grading?

(Report with answers to below questions should be turned in at the beginning of the class on the due date; don't forget to write your name and title (e.g., Lab X) on the reports)

Note: See first part of Step 3.4 (email screenshot of account setup to [TA's email](#)). Once you get e-mail from the TA, with your \$100 AWS promotion code, please add that to your account and send acknowledgement back to TA.

1. Provide screenshot of your billing alarm setup as described in Step 3.6.
2. List the 4 AWS services for each of the following categories: Database, Storage & CDN, Cross-Service, Analytics, Compute & Networking, Deployment & Management and App services.
3. Explain the objective of any 8 AWS services.
4. List the specification for the free instance used in this lab (Family, vCPUs, Memory, Storage and Network Performance)
5. Which other storage options are available besides 'Magnetic'?
6. According to 'Amazon Content and Media Service Architecture' why do IT enterprises need to use AWS to handle 'spiky' hour demands?
7. Some AWS services have been built with fault tolerance and high availability in mind. Referring to the AWS Architecture documentation, list the services that are inherently fault tolerant and provide high availability. What other services do not inherently provide these benefits, and how does one add these capabilities within those services?
8. Describe the necessity of 'Amazon Machine Image (AMI)' and 'security group' customization in 'Web Application Hosting' as described in the AWS Architecture documentation.