Tutorial:
Using HortonWorks Sandbox 2.3
on Amazon Web Services

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1 Overview

Welcome

Before diving into Cloud Applications, we need to set up the environment for doing tutorials or programming assignments. This course uses an all-in-one virtual machine made by Hortonworks. This tutorial covers the critical skills needed to work with this VM on Amazon Web Service (AWS).

Objectives

Upon completing this tutorial, students will be able to:

- Set up an all-in-one Hadoop installation on AWS
- Start, Stop, and Terminate the Virtual Machine
- Harden the Virtual Machine to prevent unauthorized accesses
- Install “nano” Text Editor
- Connect to the VM through SSH

2 Requirements

AWS Account

You will need to sign up for an AWS Educate account. You’ll get access upon a successful MP1 submission. For more information, visit the following address:

http://aws.amazon.com/education/awseducate/

SSH Client

For command line steps, you need a SSH client:

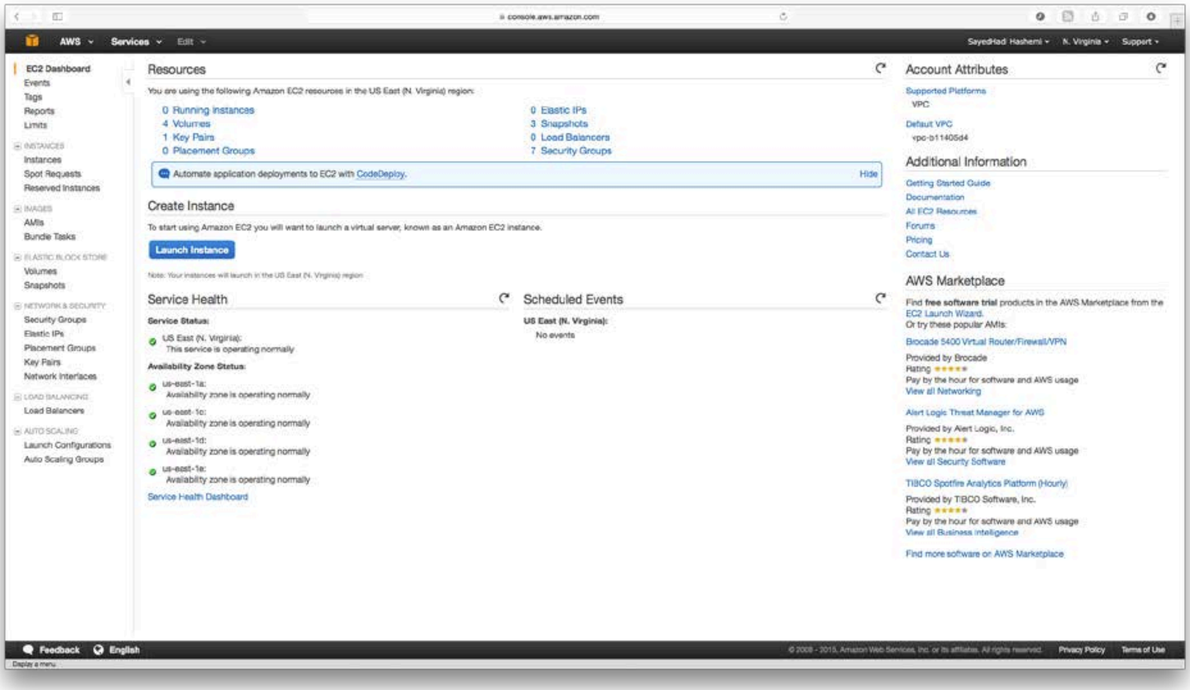
- For Linux and OS X, you should already have it installed.
- For Windows, you can download a free copy of the **Putty** from the following URL.

http://www.chiark.greenend.org.uk/~sgtatham/putty/download.html

3 Setup Hadoop Virtual Machine

Step 1: Log in to the AWS EC2 Management Dashboard using the following link:

https://console.aws.amazon.com/ec2/v2/home?region=us-east-1



Resources

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

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

Automate application deployments to EC2 with CodeDeploy.

Create Instance

To start using Amazon EC2 you will want to launch a virtual server, known as an Amazon EC2 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-1c:
Availability zone is operating normally

us-east-1d:
Availability zone is operating normally

us-east-1e:
Availability zone is operating normally

Service Health Dashboard

Scheduled Events

US East (N. Virginia):
No events

Account Attributes

Supported Platforms
VPC

Default VPC
vpc-b11405d4

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:

Brocade 5400 Virtual Router/Firewall/VPN
Provided by Brocade
Rating ★★★★★
Pay by the hour for software and AWS usage
View all Networking

Alert Logic Threat Manager for AWS
Provided by Alert Logic, Inc.
Rating ★★★★★
Pay by the hour for software and AWS usage
View all Security Software

TIBCO Spotfire Analytics Platform (Hourly)
Provided by TIBCO Software, Inc.
Rating ★★★★★
Pay by the hour for software and AWS usage
View all Business Intelligence

Find more software on AWS Marketplace

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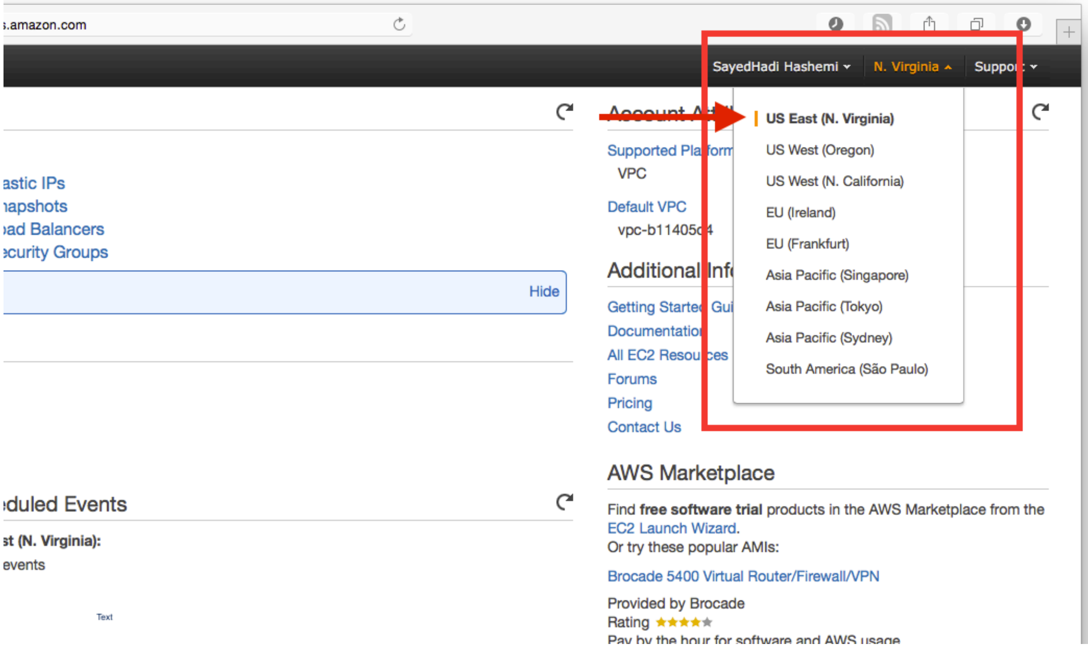
For more information about this AWS, please refer to:

http://docs.aws.amazon.com/AWSEC2/latest/UserGuide/concepts.html

Step 2: Make sure your current region is set to **US East**. This information can be checked in the top navigation menu.

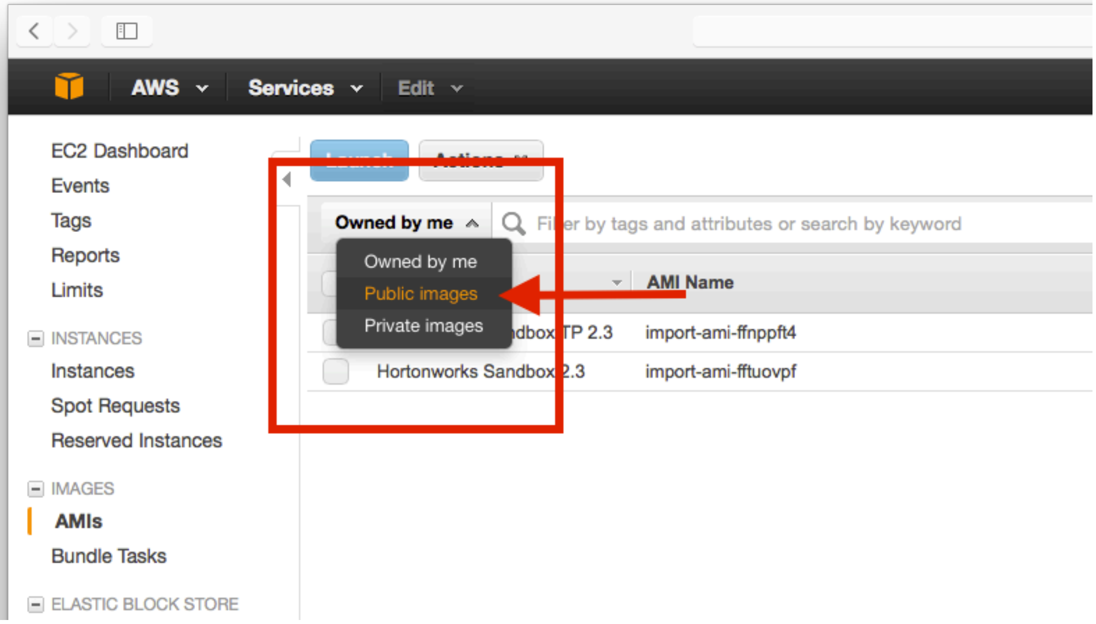


Find **free software trial** products in the AWS Marketplace from the EC2 Launch Wizard.
Or try these popular AMIs:

Brocade 5400 Virtual Router/Firewall/VPN

Provided by Brocade
Rating ★★★★★
Pay by the hour for software and AWS usage

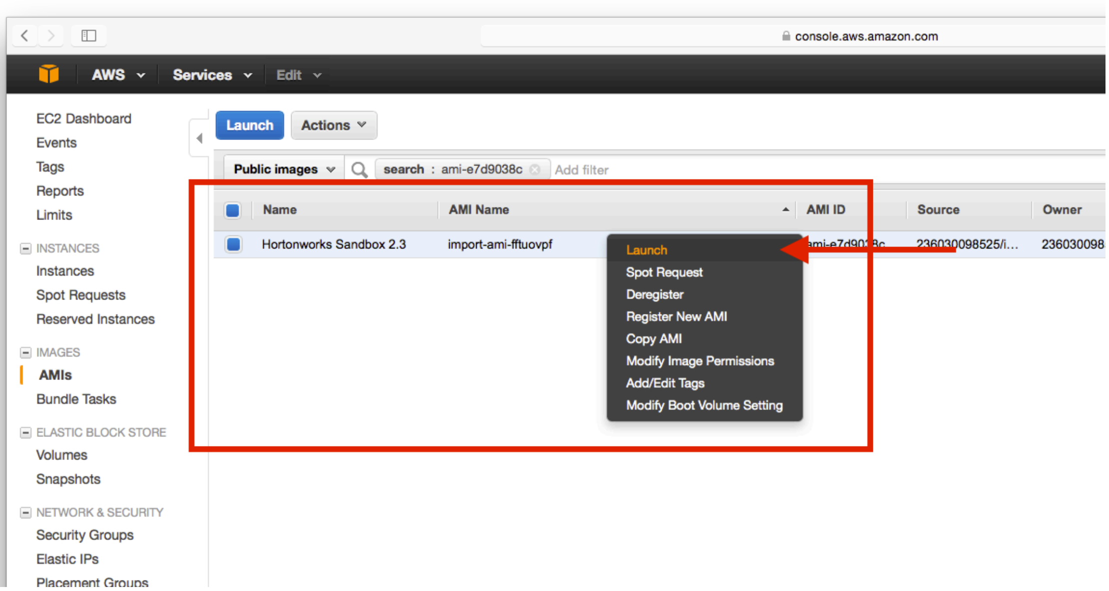
Step 3: Open **AMIs** from the left panel; then select **Public images**.



	AMI Name
Hortonworks Sandbox TP 2.3	import-ami-ffnppft4
Hortonworks Sandbox 2.3	import-ami-fftuovpf

Step 4: Search for the following image. Then right click on the image and select **Launch.**

```
ami-e7d9038c
```



Name	AMI Name	AMI ID	Source	Owner
Hortonworks Sandbox 2.3	import-ami-fftuovpf	ami-e7d9038c	236030098525/i...	236030098

Step 5: Select **c3.xlarge** for Instance Type, and then click on **Review and Launch**.

Step 6: Select **Edit security groups** and add the following three additional rules. Then click on **Review and Launch**:

Type	Protocol	Port Range	Source
Custom TCP Rule	TCP	8080	Anywhere
HTTP	TCP	80	Anywhere
HTTPS	TCP	443	Anywhere

Step 5: Click on **Launch.** When prompted, select **"Proceed without a key pair"** and continue until you see the confirmation.

4 Start HDP Virtual Machine

Step 1: From the main windows of **AWS EC2,** open **Instances** from the left panel. Alternatively, use the following link:

https://console.aws.amazon.com/ec2/v2/home?region=us-east-1#Instances

Step 2: Make sure your current region is set to **US East**. This information can be checked in the top navigation menu.

Step 3: Right click on the instance and select **Instance State > Start.**

Step 4: Wait for a few moments until you see that you have passed all the **Status Checks**. Note the value under **Public IP**.

5 Connect to the Virtual Machine Using SSH

Step 1 (OS X, Linux): Open the terminal on your local machine, and log in to the virtual machine via SSH protocol. Use the **Public IP** Address you noted earlier from AWS EC2 Dashboard. The default password is **hadoop**.

```
# ssh root@<Public IP>
```

Step 1 (Windows): Open **Putty** on your machine, and log in to the virtual machine via SSH protocol using the following information:

Server	<Public IP>
Port	2222
Username	root
Password	hadoop

Step 2: After successfully logging in, you should see a prompt similar to the following:

```
[root@sandbox ~]#
```

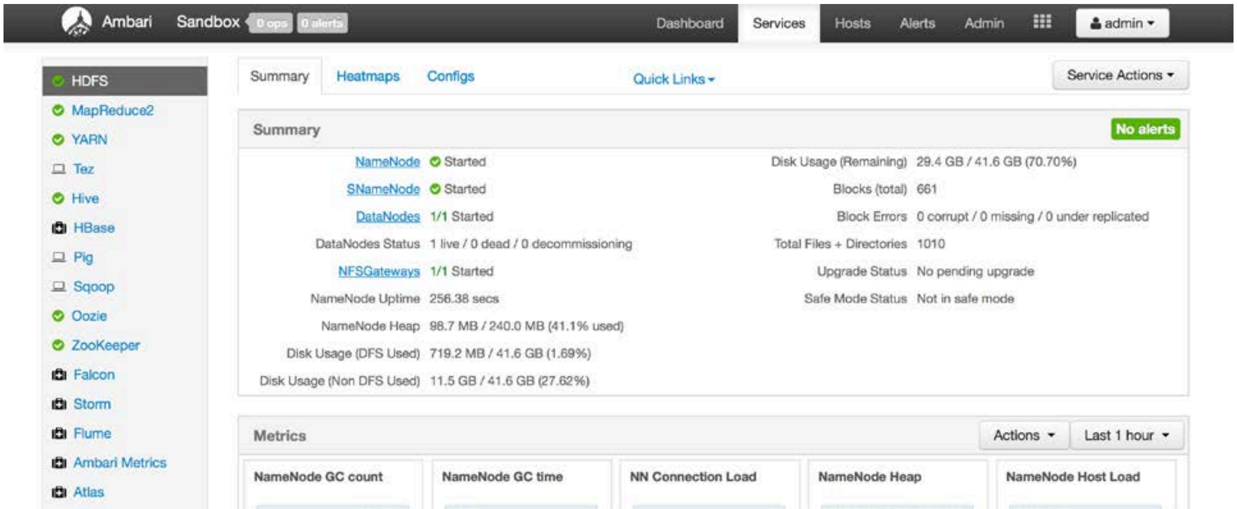
Ignore the leading # in the commands.
It is simply an indicator that the command has to run in a terminal.

6 Connect to the Virtual Machine Using HTTP

Step 1: Open a web browser on your local machine and browse to the following URL. Replace the **<Public IP>** with the **Public IP** Address you noted earlier from AWS EC2 Dashboard. The default username/password is **admin/admin**.

```
http://<Public IP>:8080/
```

Step 2: After successfully logging in, you should see a screen similar to the following:



NameNode Started
SNameNode Started
DataNodes 1/1 Started
DataNodes Status 1 live / 0 dead / 0 decommissioning
NFSGateways 1/1 Started
NameNode Uptime 256.38 secs
NameNode Heap 98.7 MB / 240.0 MB (41.1% used)
Disk Usage (DFS Used) 719.2 MB / 41.6 GB (1.69%)
Disk Usage (Non DFS Used) 11.5 GB / 41.6 GB (27.62%)

Disk Usage (Remaining) 29.4 GB / 41.6 GB (70.70%)
Blocks (total) 661
Block Errors 0 corrupt / 0 missing / 0 under replicated
Total Files + Directories 1010
Upgrade Status No pending upgrade
Safe Mode Status Not in safe mode

7 Install “nano” Text Editor

If you are new to Linux, you might find it challenging to use the default text editor in the terminal. Therefore, it is recommended for you to use **nano.** Unfortunately, nano is not installed by default in the HDP Sandbox. Fortunately, it is relatively easy to install.

Step 1: Run this command and follow the installation instructions:

```
# yum install nano
```

Step 2: After the installation is finished, check the installation:

```
# nano
```

Step 3: Quit **nano**.

8 Stop HDP Virtual Machine

Step 1: Run the following command from the SSH Terminal:

```
# poweroff
```

Step 1 (Alternative): From the main windows of **AWS EC2** open **Instances** from the left panel. Make sure your current region is set to **US East**. This information can be checked in the top navigation menu. Right click on the instance, and select **Instance State > Stop.**

Step 2: Wait for a few moments until the VM has fully shut down.

You are billed hourly on AWS. Always stop the instance as soon as you are finished. Otherwise, you might ran out of credit to use the instances.

9 Stop HDP Virtual Machine

When you are completely finished, you can fully remove the instance from your AWS account. After that, you will not be able to access to instance data or recover it.

Step 1: From the main windows of **AWS EC2** open **Instances** from the left panel. Make sure your current region is set to **US East**. This information can be checked in the top navigation menu. Right click on the instance, and select **Instance State > Terminate.**

Step 2: Wait for a few moments until the VM has been fully removed.

10 Make Virtual Machine Safer and More Secure

Since the VM will be accessible to the Internet, additional **essential** steps are needed to ensure the security and safety of VM.

10.1 Change Default Passwords

Step 1: Start the virtual machine, and then connect to it through the SSH.

Step 2: Change the default **root** password using the following command:

```
# passwd root
```

Don't forget this password. If you do, you might need to initiate a new instance.

Step 3: Change the default Hadoop password using the following command:

```
# passwd Hadoop
```

Step 4: Open a web browser on your local machine and browse to the following URL. Replace the **<Public IP>** with the **Public IP** Address you noted earlier from AWS EC2 Dashboard. The default username/password is **admin/admin**.

```
http://<Public IP>:8080/views/ADMIN_VIEW/2.1.0/INSTANCE/#/
```

Step 5: From the right panel select “**Users**”. Then click on “**admin**” user in the main panel. After that, use “**Change Password”** to change the admin password.

Step 6: Stop the Virtual Machine.

10.2 Alarms

Step 1: From the main windows of **AWS EC2,** open **Instances** from the left panel. Alternatively use the following link:

https://console.aws.amazon.com/ec2/v2/home?region=us-east-1#Instances

Step 2: Make sure your current region is set to **US East**. This information can be checked in the top navigation menu.

Step 3: Right click on the instance, and select **CloudWatch Monitoring > Add/Edit Alarms.** Then, click on **Create Alarm.**

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Step 4 (IDLE Protection): Enter the following values, and then click **Create Alarm.**

Send Notification to	Select your email address, or add yours by clicking on **create topic**.
Take Action	Stop this instance
Whenever	**Sum** of **CPU Utilization**
Is	>= 0 percent
For at least	**6** consecutive period(s) of **1 hour**
Name of alarm	IDLE Protection

This alarm will turn off your virtual machine every 6 hours to protect your credits from being wasted on an idle virtual machine. If 6 hours is too little for you, feel free change it to a more convenient value.

Step 3: Right click on the instance, and select **CloudWatch Monitoring > Add/Edit Alarms.** Then click on **Create Alarm.**

Step 4 (Zombie Protection): Enter the following values, and then click **Create Alarm.**

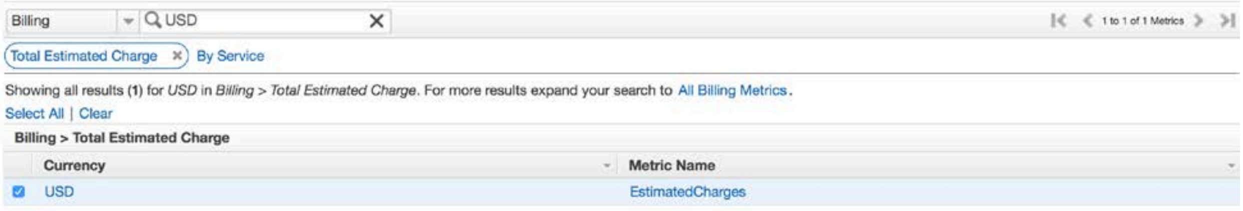
Send Notification to	Select your email address, or add yours by clicking on **create topic**.
Take Action	Stop this instance
Whenever	**Sum** of **Network Out**
Is	>= 1000000000 bytes
For at least	**1** consecutive period(s) of **1 hour**
Name of alarm	Zombie Protection

This alarm will turn off your virtual machine if the transmitted data from the VM exceeds 1GB in an hour.

Step 3: From the top panel select **Services > CloudWatch.** Then click on **Create Alarm**.

Step 4 (Billing Warning): Select **Total Estimated Charge**, then check the **USD.** In the bottom panel, enter the following values. Finally, click on **Create Alarm.**

Time Range	Relative
From	365 Days ago
To	0 minutes ago



Billing | USD ✕

1 to 1 of 1 Metrics

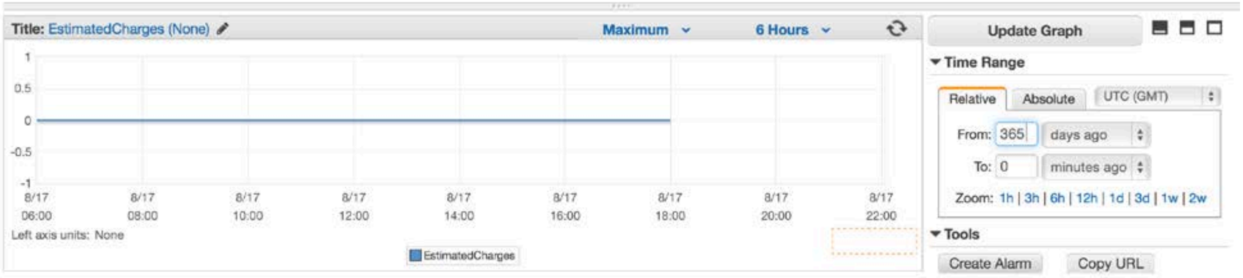
Total Estimated Charge ✕ | By Service

Showing all results (1) for *USD* in *Billing* > *Total Estimated Charge*. For more results expand your search to All Billing Metrics.

Select All | Clear

Billing > Total Estimated Charge

	Currency	Metric Name
☑	USD	EstimatedCharges



Title: EstimatedCharges (None)

Maximum | 6 Hours

Time Range

Relative | Absolute | UTC (GMT)

From: 365 days ago

To: 0 minutes ago

Zoom: 1h | 3h | 6h | 12h | 1d | 3d | 1w | 2w

Tools

Create Alarm | Copy URL

Step 5: In the next screen, enter the following values**, and** then click on **Create Alarm**.

Exceed	40 USD

send a notification to	Select your email address, or add yours by clicking on **create topic.**

This alarm will only notify you when your bill is about to exceed your AWS credit. It is still your responsibility to release AWS resources before your credit completely runs out.

11 Best Practices

In addition to the essential steps described in the previous section, there are a few more recommended steps to increase the security level of the AWS and VM.

11.1 AWS Authentication

To reduce the risk of someone taking control of your AWS account, it is recommended that you enable Multi Factor Authentication on your account.

Refer to the following URL for more information:
https://aws.amazon.com/iam/details/mfa/

11.2 Public Key Authentication

There are many ways to improve the security of the SSH service on your VM. Disable password login and Public Key Authentication are some of the well-know mechanisms.

Refer to the following URL for more information:
http://wiki.centos.org/HowTos/Network/SecuringSSH

11.3 Patch Management

It is highly recommended that you keep the VM Operating System and applications updated.

Refer to the following URL for more information:
https://www.centos.org/docs/5/html/yum/sn-updating-your-system.html