

HDP Operations

Cluster Setup Guide

Rev 1.0



Create the Operations Clusters in AWS

Objective:	This is an instruction guide to setup HDP Operations Clusters for Admin1, Admin2 & Security trainings.
Before You Begin:	<ul style="list-style-type: none">• You need to have an AWS account to launch clusters.• You need to have access to the AWS EC2 console.• You need to ask Hortonworks to share the Windows Server AD Image with you (please contact hwuniversity@hortonworks.com).

Step 1: Prepare an AWS CLI Server to Deploy AWS Clusters

1.1. If you already have a server that has AWS CLI installed, you can jump to Step 2.

1.2. Launch an Ubuntu AWS image. This step can also be performed on other OS, although we are only giving Ubuntu as an example.

1.2.1. From your AWS console, choose an Ubuntu AMI in your zone similar to:
Ubuntu/images/hvm-ssd/ubuntu-xenial-16.04-amd64-server-20161020:

The screenshot shows the AWS Lambda console interface. At the top, there are tabs for AWS, Services, and Edit. Below the tabs, a breadcrumb navigation shows: 1. Choose AMI, 2. Choose Instance Type, 3. Configure Instance, 4. Add Storage, 5. Tag Instance, 6. Configure Security Group, and 7. Review. On the right side, there is a user identifier (hwx_admin/wgonzalez@hwx.c...), a location dropdown set to Oregon, and a Support link. The main area is titled "Step 1: Choose an Amazon Machine Image (AMI)". It says: "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." A search bar labeled "Search community AMIs" is present. On the left, there is a sidebar with filters for Operating system (Amazon Linux, Cent OS, Debian, Fedora, Gentoo, OpenSUSE, Other Linux, Red Hat, SUSE Linux, Ubuntu, Windows), Architecture (32-bit, 64-bit), and Root device type (EBS, Instance store). The "Ubuntu" filter is selected. In the main list, the first item is highlighted: "ubuntu/images/hvm-ssd/ubuntu-xenial-16.04-amd64-server-20161020 - ami-a9d276c9". To its right are "Select" and "64-bit" buttons. Below this, several other AMI entries are listed, each with a "Select" and "64-bit" button to their right. The entries include: "ubuntu/images/hvm-ssd/ubuntu-trusty-14.04-amd64-server-20161020 - ami-01f05461", "ubuntu/images-testing/ebss-ssd/ubuntu-zesty-daily-amd64-server-20161103 - ami-019e3f61", "ubuntu-15.04-Snappy-core-edge-15.04-20150922.1552 - ami-01cad331", "ubuntu-rolling-Snappy-core-edge-rolling-20160108.1751 - ami-02263d83", and "ubuntu-rolling-Snappy-core-edge-rolling-20150908.0745 - ami-03445933".

1.2.2. For the instance type, select t2.medium:

The screenshot shows the AWS EC2 instance creation wizard at Step 2. The 't2.medium' instance type is selected. The table lists the following instance types:

	Family	Type	vCPUs	Memory (GiB)	Instance Storage (GiB)	EBS-Optimized Available	Network Performance
<input type="checkbox"/>	General purpose	t2.nano	1	0.5	EBS only	-	Low to Moderate
<input type="checkbox"/>	General purpose	t2.micro	1	1	EBS only	-	Low to Moderate
<input type="checkbox"/>	General purpose	t2.small	1	2	EBS only	-	Low to Moderate
<input checked="" type="checkbox"/>	General purpose	t2.medium	2	4	EBS only	-	Low to Moderate
<input type="checkbox"/>	General purpose	t2.large	2	8	EBS only	-	Low to Moderate
<input type="checkbox"/>	General purpose	m4.large	2	8	EBS only	Yes	Moderate
<input type="checkbox"/>	General purpose	m4.xlarge	4	16	EBS only	Yes	High
<input type="checkbox"/>	General purpose	m4.2xlarge	8	32	EBS only	Yes	High
<input type="checkbox"/>	General purpose	m4.4xlarge	16	64	EBS only	Yes	High
<input type="checkbox"/>	General purpose	m4.10xlarge	40	160	EBS only	Yes	10 Gigabit

1.2.3. On the 'Step 3 - Configure Instance' steps you can take most of the defaults, just make sure you enable 'Auto-assign Public IP'

1.2.4. Take defaults on 'Step 4 – Add storage'

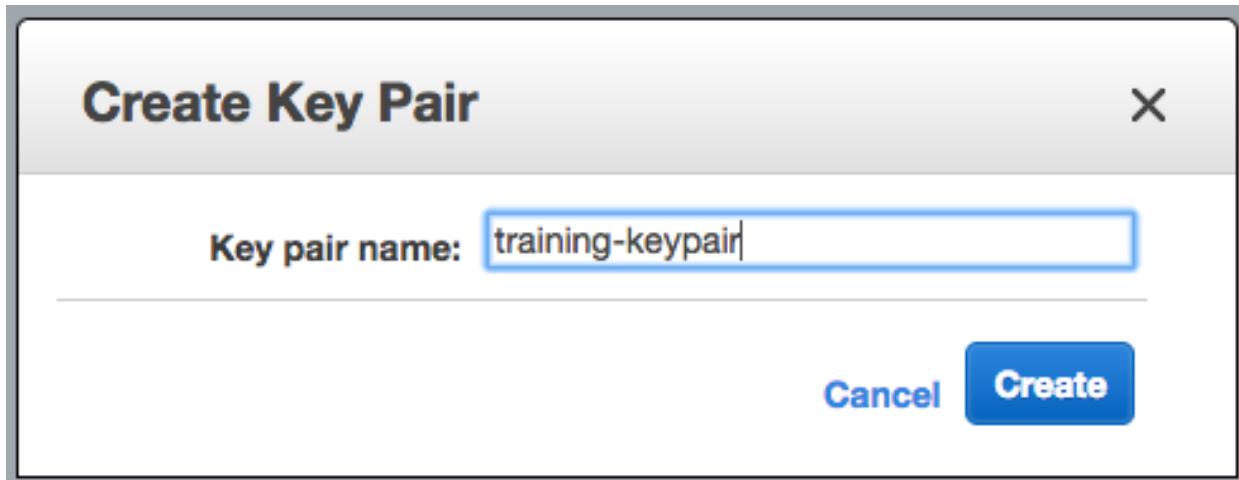
1.2.5. Name your instance appropriately on 'Step 5 – Tag Instance':

The screenshot shows the AWS EC2 instance creation wizard at Step 5. A single tag named 'Name' is added with the value 'AWS CLI Server'.

1.2.6. On 'Step 6 – Configure Security Group' create a new group with SSH access, then review and Launch:

The screenshot shows the AWS EC2 instance creation wizard at Step 6. A new security group 'launch-wizard-3' is created with an SSH rule allowing port 22 from anywhere.

- 1.2.7. Create a NEW key-pair for accessing your server. Name your keypair "training-keypair." The new keypair will be downloaded locally.



1.3. Install AWS CLI on the newly provisioned AWS CLI Server

- 1.3.1. After the instance finishes launching (check 'Instance State' and 'Status check' columns on the EC2 Console), try to ssh to the instance using a terminal window (if connecting from MacOS) or puTTY (if connecting from Windows). For instance, from a MacOSX terminal, type (substitute < ... > for the actual values):

```
$ ssh -i /<directory where key-pair was installed>/training-keypair.pem ubuntu@<instance IP>
```

- 1.3.2. Install the AWS CLI as described here:

<http://docs.aws.amazon.com/cli/latest/userguide/installing.html#install-bundle-other-os>

- 1.3.3. After installing the AWS CLI, make sure the 'aws' command works:

```
$ aws
usage: aws [options] <command> <subcommand> [<subcommand> ...]
[parameters]
To see help text, you can run:

    aws help
    aws <command> help
    aws <command> <subcommand> help
aws: error: the following arguments are required: command
$
```

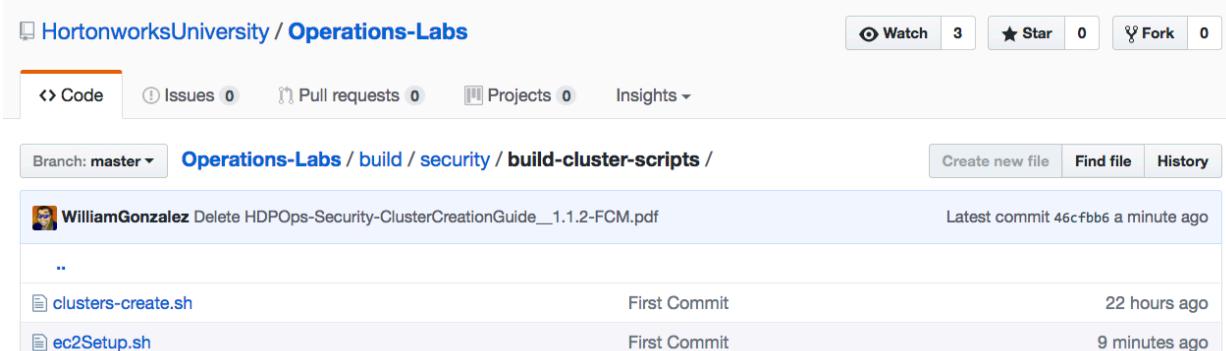
Step 2: Download and Install Operations Cluster Create scripts into AWS CLI Server

2.1. Upload scripts from the relevant GitHub Repo for this guide (see step below).

2.1.1. Operations Clusters (Admin1, Admin2, Security) please see:

<https://github.com/HortonworksUniversity/Operations-Labs/tree/master/build/security/build-cluster-scripts>

There are 2 scripts found in that directory:



The screenshot shows a GitHub repository page for 'Operations-Labs / build / security / build-cluster-scripts'. The repository has 3 stars and 0 forks. It contains two files: 'clusters-create.sh' and 'ec2Setup.sh'. Both files were committed by 'WilliamGonzalez' and are labeled as 'First Commit'. The 'clusters-create.sh' file was committed 22 hours ago, and the 'ec2Setup.sh' file was committed 9 minutes ago. The commit message for 'clusters-create.sh' is 'Delete HDPOps-Security-ClusterCreationGuide_1.1.2-FCM.pdf'.

2.1.2. You can use wget from your AWS CLI Server to get those 2 files:

```
$ wget https://raw.githubusercontent.com/HortonworksUniversity/Operations-Labs/master/build/security/build-cluster-scripts/clusters-create.sh  
$ wget https://raw.githubusercontent.com/HortonworksUniversity/Operations-Labs/master/build/security/build-cluster-scripts/ec2Setup.sh
```

2.1.3 Copy or Move the training-keypair.pem to the same directory in AWS CI Server where the other 2 files from GitHub were saved.

```
If you are using a Windows machine to connect to the AWS instance: $ c:>"c:\Program Files (x86)\PuTTY\pscp.exe" -l ubuntu scp c:\Users\myUserName\Documents\*.* <IP>:
```

2.1.4 If you are using a MacOS machine to connect to the AWS instance:

```
$ scp -i ./NEW-AWS-CLI-Server-keypair.pem <directory where you downloaded github script files>//* ubuntu@<IP>:~
```

2.2 Login to the AWS CLI Server again and ensure the 3 files got copied to AWS CLI Server appropriately (this includes the keypair not shown in screenshot below):

```
$ ls -al /home/ubuntu/
total 44
drwxr-xr-x 4 ubuntu ubuntu 4096 Nov  7 20:59 .
drwxr-xr-x 3 root  root 4096 Nov  7 19:34 ..
-rw----- 1 ubuntu ubuntu    34 Nov  7 20:57 .bash_history
-rw-r--r-- 1 ubuntu ubuntu  220 Aug 31 2015 .bash_logout
-rw-r--r-- 1 ubuntu ubuntu 3771 Aug 31 2015 .bashrc
drwx----- 2 ubuntu ubuntu 4096 Nov  7 20:00 .cache
-rwx----- 1 ubuntu ubuntu 1527 Nov  7 20:59 clusters-create.sh
-rwx----- 1 ubuntu ubuntu 4958 Nov  7 20:59 ec2Setup.sh
-rw-r--r-- 1 ubuntu ubuntu   655 Jun 24 15:44 .profile
drwx----- 2 ubuntu ubuntu 4096 Nov  7 19:34 .ssh
```

2.3 Make the scripts executable:

```
$ chmod 755 /home/ubuntu/*.sh
```

2.4 Add the JSON template to the current directory

2.4.2 Into the same directory in AWS CLIServer above, wget the file found in

```
$ wget https://github.com/HortonworksUniversity/Operations-Labs/blob/master/build/security/cloudformation.json
```

2.4.3 To clarify: there should now be 4 files in your folder in the AWS CLI Server: clusters-create.sh, ec2Setup.sh, cloudformation.json and the training-keypair that was downloaded from an earlier step.

2.4.4 The json file defines, among other things the AWS AMIs that will be used as base images for the nodes.

```
{
  "CENTOS7": {
    "ap-northeast-1": {
      "AMI": "ami-b80b6db8"
    },
    "ap-northeast-2": {
      "AMI": "ami-c74789a9"
    },
    "ap-southeast-1": {
      "AMI": "ami-2a7b6b78"
    },
    "ap-southeast-2": {
      "AMI": "ami-d38dc6e9"
    },
    "eu-central-1": {
      "AMI": "ami-e68f82fb"
    },
    "eu-west-1": {
      "AMI": "ami-7abd0209"
    },
    "sa-east-1": {
      "AMI": "ami-fd0197e0"
    },
    "us-east-1": {
      "AMI": "ami-61bbf104"
    },
    "us-west-1": {
      "AMI": "ami-f77fbeb3"
    },
    "us-west-2": {
      "AMI": "ami-d440a6e7"
    }
  }
},
```

- 2.4.5 These AMIs listed in the screenshot are HWX Private images and cannot be shared. You need to change these AMIs into free “AWS Marketplace” AMIs, one for each region that you want to launch a cluster in. The subsequent steps describe how to obtain and customize these AMIs.
- 2.4.6 For this example, we will use Ireland AWS Region. You need to replicate these steps for each region that you want to launch clusters in. In Ireland region EC2 dashboard, select “Launch Instances”

The screenshot shows the AWS EC2 Dashboard with the "Launch Instances" page selected. The left sidebar includes links for EC2 Dashboard, Events, Tags, Reports, Limits, Instances, Spot Requests, Reserved Instances, Scheduled Instances, Dedicated Hosts, Images, AMIs, and Bundle Tasks. The main content area shows service health for EU West (Ireland) and scheduled events. A prominent blue button labeled "Launch Instance" is visible. On the right, there's a section for "Account Attributes" and another for "AWS Marketplace" featuring Cisco Cloud Services Router (CSR) 1000V - Direct Connect Multi-Gig.

- 2.4.7 Select AWS Marketplace and search for this string “CentOS Linux 7 x86_64 HVM EBS 1602”

The screenshot shows the AWS Marketplace search results for the query "CentOS Linux 7 x86_64 HVM EBS 1602". The search bar at the top has the query entered. Below the search bar, there are four search results, each with a "Select" button. The results are:

- CentOS 7 (x86_64) - with Updates HVM
- CentOS 6 (x86_64) - with Updates HVM
- CentOS 6.5 (x86_64) - Release Media
- CentOS 6 (x86_64) - with Updates

- 2.4.8 Unfortunately, the AMI-ID id of the CentOS instance is not provided in this screen. To get the AMI ID, you need to go thru each step of launching, and you can obtain the AMI-Id in the last step (7), see the step below for an example (but do not actually “launch” the instance as it is not needed, we only want to obtain the Base CentOS AMI-ID – see next step).

2.4.9 You will notice that the launch procedure has 7 steps. Keep hitting next and taking all defaults until the 7th step:

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 vCPU, 2.5 GHz, Intel Xeon Family, 1 GB memory, EBS only)

Family	Type	vCPUs	Memory (GB)	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 <small>Free tier eligible</small>	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
General purpose	m4.xlarge	4	16	EBS only	Yes	High	Yes
General purpose	m4.2xlarge	8	32	EBS only	Yes	High	Yes
General purpose	m4.4xlarge	16	64	EBS only	Yes	High	Yes
General purpose	m4.10xlarge	40	160	EBS only	Yes	10 Gigabit	Yes

Cancel Previous Review and Launch Next: Configure Instance Details

2.4.10 In the last step 7-Review you will see the ami-id. Since we are not interested in launching it from here, only to obtain the ami-id, take note of the ami-id and cancel the launch.

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

CentOS Linux 6 x86_64 HVM EBS 1602-74e73035-3435-48d6-88e0-89cc02ad83ee-ami-21e6d54b.3 **ami-1c221e76**

CentOS Linux 6 x86_64 HVM EBS 1602
Root Device Type: ebs Virtualization type: hvm

Instance Type Edit instance type

Instance Type	ECUs	vCPUs	Memory (GB)	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 name: launch-wizard-11
Description: launch-wizard-11 created 2017-10-24T08:55:45.742-04:00

Type	Protocol	Port Range	Source	Description
SSH	TCP	22	0.0.0.0/0	

Instance Details Edit instance details

Storage Edit storage

Cancel Previous Launch

- 2.5 Now that you know the base CentOS ami-id to use in your clusters, go back and edit the cloudformation.json file obtained from github earlier and enter the correct AMI id for your region as obtained from the step above:

```
        },
        "CENTOS7": {
            "ap-northeast-1": {
                "AMI": "ami-b80b6db8"
            },
            "ap-northeast-2": {
                "AMI": "ami-c74789a9"
            },
            "ap-southeast-1": {
                "AMI": "ami-2a7b6b78"
            },
            "ap-southeast-2": {
                "AMI": "ami-d38dc6e9"
            },
            "eu-central-1": {
                "AMI": "ami-e68f82fb"
            },
            "eu-west-1": {
                "AMI": "ami-7abd0209"
            },
            "sa-east-1": {
                "AMI": "ami-fd0197e0"
            },
            "us-east-1": {
                "AMI": "ami-61bbf104"
            },
            "us-west-1": {
                "AMI": "ami-f77fbef3"
            },
            "us-west-2": {
                "AMI": "ami-d440a6e7"
            }
        }
    },
```

2.6 Update the clusters-create.sh script to your parameters

2.6.2 Make a backup copy of the clusters-create.sh script first

2.6.3 There is a line that points to the github copy of the json file that needs to be changed to point to the local json file updated in the last step:

Change from:

```
--template-body  
https://raw.githubusercontent.com/HortonworksUniversity/Operatio  
ns-Labs/master/build/security/cloudformation.json \
```

to:

```
--template-body file:///home//ubuntu//cloudformation.json \
```

2.6.4 In this example, my json file is in “/home/ubuntu/cloudformation.json” Notice the double slash syntax for directories.

2.6.5 Now you need to configure your clusters-create.sh to your settings. The next steps show you how.

Step 3: Launch Operations Cluster(s)

3.1 Please review and update ec2Setup.sh. The next several steps describe how.

3.1.1 Edit lines 9-29 in the ec2Setup.sh script

```
$ vi /home/ubuntu/ec2Setup.sh
```

Here is a screenshot of the first few lines of the script:

```
1  #!/bin/bash
2
3  #####
4  # CREATE OPERATIONS CLUSTERS #
5  #####
6
7  # 1. DEFINE VARIABLES
8  # 1.1 global vars
9  export AWS_CLI_HOME=/usr/local/aws
10 PATH=$PATH:$AWS_CLI_HOME/bin
11 export AWS_ACCESS_KEY_ID=<your aws key id>
12 export AWS_SECRET_ACCESS_KEY=<your aws secret access key>
13
14 # 1.2 job specific variables -- change these as required
15 export AWS_DEFAULT_REGION=us-west-2
16 export EC2_URL=https://ec2.us-west-2.amazonaws.com
17 export SEC_GROUP=<your aws sec group>
18 export AMI=ami-0e3fde6e
19 export AMI2=ami-b35346ca
20 export AMI3=ami-f8574281
21 export SUBNET=<your aws subnet id>
22 export TRAINING_NAME=BASE-NAME-FOR-YOUR-CLUSTERS
23 export FIRST_CLUSTER_LABEL=100
24 export NO_OF_VMs=1
25 export NO_OF_ADDTL_NODES=3
26 export INSTANCE_TYPE="m4.large"
27 export ADD_AD_SERVER=true
28 export ADD_XR_SERVER=true
29 export DEPLOY_CLUSTER=false
```

- 3.1.2 Lines 9-12 are normally not need to change, but verify that the aws command is at /usr/local/aws.
- 3.1.3 Change lines 11-12 to reflect your AWS account key id and secret key
- 3.1.4 Change lines 15-16 to reflect the AWS region where you want the clusters to be created.
- 3.1.5 Line 17 represents a AWS Security group that you need to create that exposes ports (or IPs) for the cluster. This Sec-Group will be used for all cluster nodes as well as any AD/KDC servers (if required). To setup the AWS Sec Group ports, please see table in step 3.1.15 or 3.1.16.

- 3.1.6 Lines 18- 19 are the AMI IDs for the Windows AD Server, and the Cross-realm servers. These images will need to be shared with your AWS account in order for you to use them. These images live in the us-west-2 (Oregon) region. If you do not have these AMIs shared with you, or you need them on another AWS region, please contact hwuniversity@hortonworks.com.
- 3.1.7 Line 21 is an AWS VPC subnet that needs to be created in your AWS region. For info on how to create a VPC Subnet, please refer to:
http://docs.aws.amazon.com/AmazonVPC/latest/UserGuide/VPC_Subnets.html
- 3.1.8 Line 22 is the Basic Name of the clusters (one for each training class). Since this setup creates a multi-node clusters, this line represents the cluster PREFIX. Normally clusters will be appended a NUMBER for each student after this basic name, for instance: My-Cluster-100, My-Cluster-101, etc., where the postfix 100 & 101 refer to a separate clusters per student. For instance there will be several instances named “My-Cluster-100” that all refer to a single student’s cluster.
- 3.1.9 Line 23 is the numeric POSTFIX that will be appended to the Cluster Name Prefix described in the previous step. In the screenshot, the postfix for the first cluster, for instance, is “100” and will be incremented by 1 for each cluster, thus you can end up with clusters each named “My-Cluster-100,” “My-Cluster-101,” “My-Cluster-102” etc.
- 3.1.10 Line 24 is the number of Clusters (one per student) to be created. Each cluster can have 2 or more nodes (one Ambari + x additional nodes).
- 3.1.11 Line 25 is the number of “additional” nodes (besides Ambari) to be created per cluster. For the Operations training, this is either 2 or 3. As per screenshot, this default is “3” and this will create an Ambari node + 3 Additional nodes (total 4 nodes) per student/cluster.
- 3.1.12 Line 26 is the AWS instance type. We have found that “m4.large” is acceptable for this class.
- 3.1.13 Line 27 is the flag whether to create an AD Server or not. For the Security Training this is required; for Admin trainings, this may be optional. Leave as “true.” Please note that only 1 AD server is created/needed per class. Similarly, line 28 is used in case that Kerberos cross-realm authentication is desired. This will create 2 servers: one MIT-KDC and one Win-AD for x-realm auth. Normally you will only need to set to true either line 27 or 28.
- 3.1.14 After making the appropriate changes, save the ec2Setup.sh script.

3.1.15 AWS Security Group Port list

These are the ports and protocols needed for Operations trainings.

Type	Protocol	Port	Source
SSH	TCP	22	0.0.0.0/0
HTTP	TCP	80	0.0.0.0/0
LDAP	TCP	389	0.0.0.0/0
HTTPS	TCP	443	0.0.0.0/0
Custom TCP Rule	TCP	3000	0.0.0.0/0
Custom TCP Rule	TCP	3359	0.0.0.0/0
RDP	TCP	3389	0.0.0.0/0
Custom TCP Rule	TCP	4000	0.0.0.0/0
Custom TCP Rule	TCP	6080	0.0.0.0/0
Custom TCP Rule	TCP	6083	0.0.0.0/0
Custom TCP Rule	TCP	8080	0.0.0.0/0
Custom TCP Rule	TCP	8081	0.0.0.0/0
Custom TCP Rule	TCP	8088	0.0.0.0/0
Custom TCP Rule	TCP	8443	0.0.0.0/0
Custom TCP Rule	TCP	8444	0.0.0.0/0
Custom TCP Rule	TCP	8983	0.0.0.0/0
Custom TCP Rule	TCP	9995	0.0.0.0/0
Custom TCP Rule	TCP	11000	0.0.0.0/0
Custom TCP Rule	TCP	15000	0.0.0.0/0
Custom TCP Rule	TCP	19888	0.0.0.0/0
Custom TCP Rule	TCP	50070	0.0.0.0/0
Custom TCP Rule	TCP	50075	0.0.0.0/0
Custom TCP Rule	TCP	59100	0.0.0.0/0
Custom TCP Rule	TCP	61888	0.0.0.0/0
All traffic	All	All	sg-xxxxxxxx (THIS security group)
All ICMP - IPv4	All	N/A	0.0.0.0/0

3.1.16 If you prefer, you can also assign all ports to be opened to only your IP (or student IP), this may work better since it opens all ports but only to a single IP. For example, if your external IP is 127.1.33.5, then you can configure the aws security group as:

Type	Protocol	Port Range	Source	Description
All TCP	TCP	0 - 65535	127.1.33.5	My-External IP
All UDP	UDP	0 - 65535	127.1.33.5	My-External IP
All ICMP - IPv4	All	N/A	127.1.33.5	My-External IP

3.2 Run the ec2Setup.sh script:

```
$ /home/ubuntu/ec2Setup.sh
```

3.3 This will launch an AWS CloudFormation job that takes several minutes, please be patient (it may take up to 5 minutes per cluster to be build). You will eventually see an output similar to this:

```
[root@ip-10-0-0-11]# ./ec2Setup.sh
1. Creating new clusters in region us-west-2...
    This may take several minutes, please wait.

    Creating Win-AD Instance

    Creating Cross-real auth MIT-KDC Server

    Creating Cross-real auth AD Server

2. List of newly created Instances:
i-00d5682ef38d7a0da i-099b25bb38df537f2

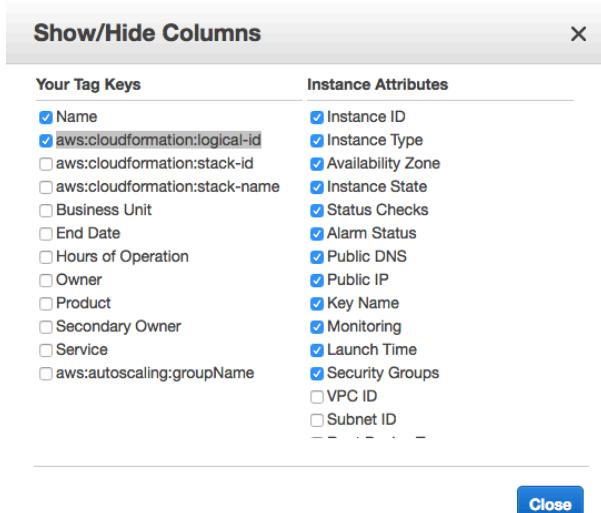
3. Final List of Hosts:

HDP-ADMIN-I-100 : AdditionalNodes : 34.210.203.38/172.30.0.234
HDP-ADMIN-I-100 : AdditionalNodes : 52.38.208.114/172.30.0.227
HDP-ADMIN-I-100 : AdditionalNodes : 34.215.132.78/172.30.0.10
HDP-ADMIN-I-100 : AmbariNode---- : 34.212.144.101/172.30.0.15
HDP-ADMIN-I     : WIN AD SERVER   : 35.161.59.176/172.30.0.25
HDP-ADMIN-I     : MIT-KDC-XREALM  : 52.38.67.78/172.30.0.88
HDP-ADMIN-I     : AD-XREALM       : 34.215.78.230/172.30.0.172
```

3.4 In this example, I created 1 cluster named “HDP-ADMIN-I” with an Ambari server, plus 3 additional nodes + Win AD server + 2 cross-realm servers. In this output, each node has external/internal IPs. The Ambari node, for instance, has an external IP: 34.212.144.101 and an internal IP: 172.30.0.15. Newer versions of this script may print DNS names instead of IPs (which is preferable for the labs).

3.5 You can also see all IPs, DNS and instance information in the EC2 Console:

3.5.1 In the EC2 console add a column for aws:cloudformation:logical-id:



3.5.2 Search for your cluster name and you will see the created nodes:

The screenshot shows the AWS CloudFormation console. At the top, there are buttons for 'Launch Instance', 'Connect', and 'Actions'. Below is a search bar with the query 'HDP-ADMIN-I-Willie-Test4-bash'. A table lists resources with columns: Name, aws:cloudformation:logical-id, Instance State, IPv4 Public IP, Launch Time, and Private IP Addr. The table contains the following data:

Name	aws:cloudformation:logical-id	Instance State	IPv4 Public IP	Launch Time	Private IP Addr
HDP-ADMIN-I-Willie-Test4-bash-100	AmbariNode	running	34.212.144.101	October 4, 2017 at 11:50:34 ...	172.30.0.15
HDP-ADMIN-I-Willie-Test4-bash-100	AdditionalNodes	running	34.210.203.38	October 4, 2017 at 11:51:45 ...	172.30.0.234
HDP-ADMIN-I-Willie-Test4-bash-100	AdditionalNodes	running	52.38.208.114	October 4, 2017 at 11:51:45 ...	172.30.0.227
HDP-ADMIN-I-Willie-Test4-bash-100	AdditionalNodes	running	34.215.132.78	October 4, 2017 at 11:51:45 ...	172.30.0.10
HDP-ADMIN-I-Willie-Test4-bash-AD-SERVER		running	35.161.59.176	October 4, 2017 at 11:50:31 ...	172.30.0.25
HDP-ADMIN-I-Willie-Test4-bash-MIT-KDC-XREALM		running	52.38.67.78	October 4, 2017 at 11:50:35 ...	172.30.0.88
HDP-ADMIN-I-Willie-Test4-bash-AD-XREALM		running	34.215.78.230	October 4, 2017 at 11:50:38 ...	172.30.0.172

Below the table, it says 'Instance: i-0e3085dcdf5b032ed (HDP-ADMIN-I-Willie-Test4-bash-AD-XREALM)' and 'Public DNS: ec2-34-215-78-230.us-west-2.compute.amazonaws.com'.

The detailed view for the selected instance (i-0e3085dcdf5b032ed) shows the following details:

Description	Value
Instance ID	i-0e3085dcdf5b032ed
Instance state	running
Instance type	m3.xlarge
Elastic IPs	
Availability zone	us-west-2a
Security groups	hdp-training, view inbound rules
Scheduled events	No scheduled events
AMI ID	Active Directory for Training Course v3 (ami-f8574281)
Platform	windows
IAM role	-
Key pair name	training-keypair
Owner	736220674405
Launch time	October 4, 2017 at 11:50:38 AM UTC-4 (2 hours)
Termination protection	False
Lifecycle	normal

On the right side, there is a large table of network and system details:

	Value
Public DNS (IPv4)	ec2-34-215-78-230.us-west-2.compute.amazonaws.com
IPv4 Public IP	34.215.78.230
IPv6 IPs	-
Private DNS	ip-172-30-0-172.us-west-2.compute.internal
Private IPs	172.30.0.172
Secondary private IPs	
VPC ID	vpc-442e5f21
Subnet ID	subnet-02edac67
Network interfaces	eth0
Source/dest. check	True
ClassicLink	-
EBS-optimized	False
Root device type	ebs
Root device	/dev/sda1
Block devices	/dev/sda1

3.5.3 In this screenshot, you can see One cluster, HDP-ADMIN-I-Willie-Test4-bash-100 (for one student), that has 1 Ambari node + 3 Additional Nodes + 1 AD Server + 2 cross realm servers.

3.6 Also, you can check the additional CloudFormation Administration console:

The screenshot shows the AWS CloudFormation Administration console. The top navigation bar includes 'AWS', 'Services', and 'Edit'. The main content area is titled 'Amazon Web Services' and shows the CloudFormation service page. The page features a grid of service icons and names. The 'CloudFormation' icon is highlighted with a red box, indicating it is the active service. Other visible services include EC2, Lambda, S3, CloudFront, CloudWatch, CloudFormation, CloudTrail, Config, OpsWorks, Service Catalog, Trusted Advisor, Identity & Access Management, Directory Service, Inspector, WAF, Certificate Manager, EMR, Data Pipeline, Elasticsearch Service, Kinesis, WorkSpaces, WorkDocs, and WorkMail.

The screenshot shows the AWS CloudFormation console interface. At the top, there's a navigation bar with 'CloudFormation' and 'Stacks'. Below it is a toolbar with 'Create Stack', 'Actions', and 'Design template'. A filter dropdown is set to 'Active' with the search term 'HDP-ADMIN-I-Willie-Test4-bash-100'. The main area displays a table of stacks:

Stack Name	Created Time	Status	Description
HDP-ADMIN-I-Willie-Test4-bash-100	2017-10-04 11:50:24 UTC-0400	CREATE_COMPLETE	CloudFormation template to Deploy Hortonworks Data Platform on VPC with a public subnet

Below this, a secondary panel titled 'Overview' is visible, containing detailed information about the stack:

- Stack name:** HDP-ADMIN-I-Willie-Test4-bash-100
- Stack ID:** arn:aws:cloudformation:us-west-2:736220674405:stack/HDP-ADMIN-I-Willie-Test4-bash-100/bc7980a0-a91b-11e7-87a1-500c32c86c29
- Status:** CREATE_COMPLETE
- Status reason:**
- Termination protection:** Disabled
- IAM Role:**
- Description:** CloudFormation template to Deploy Hortonworks Data Platform on VPC with a public subnet

3.7 from the ec2Script.sh output. You are now ready to start the labs.

3.8 After your clusters have been successfully created, you can Stop (but not terminate) the AWS CLI Server to limit your AWS costs.

3.9 Do not stop/terminate the actual cluster nodes since they have a feature to auto-relaunch on stop/termination. To properly terminate the clusters, please see Step5.

3.10 If you need to “stop but not terminate” clusters because you anticipate some downtime, there is a separate procedure not explained in this guide. Please write to hwuniversity@hortonworks.com for a walk-thru of this.

Step 4: Test cluster connectivity

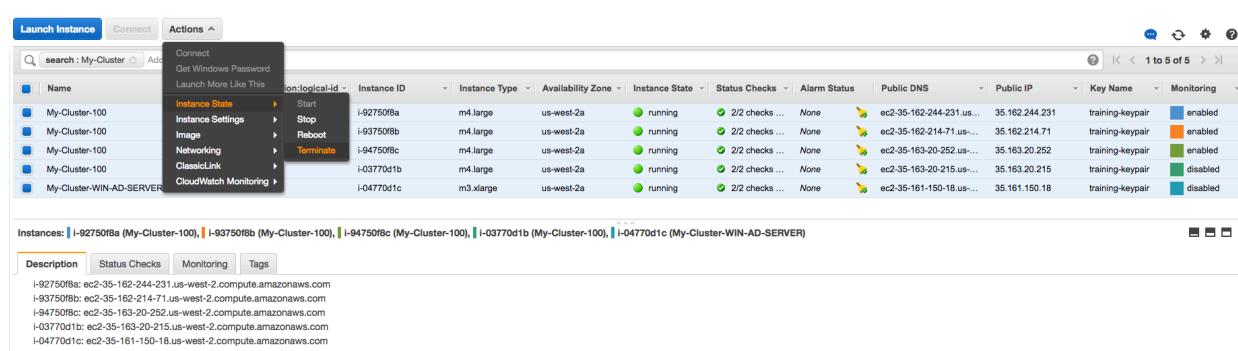
- 4.1 ssh to each cluster node via Terminal window (if MacOS) or puTTY (if Windows) using the previously downloaded training-keypair. Make sure that you can ssh and that nodes are responding to ping between each other.
- 4.2 To access the WIN-AD server or the Cross-real Win AD box, you will need the Remote Desktop application (Windows) or Microsoft Remote Desktop.app (Mac OS). The credentials for the server are user/password = Administrator/pqysjWG9V(F).
- 4.3 To access the Cross-realm MIT-KDC box, use the training-keypair to ssh to it as described in 4.1 above.

Shut Down Clusters after class completion

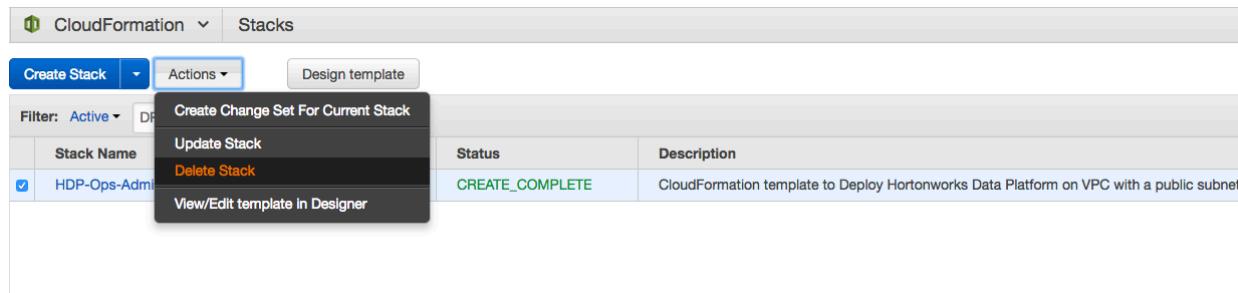
Step 5: How to shut down the clusters on the last day after the end of class.

5.1 Normally you should terminate instances via the EC2 console and selecting “Terminate.” However, these clusters were created with AWS CloudFormation, which has a feature to “RELAUNCH” terminated/stopped instances. To avoid the automatic re-launching of instances you should perform the following steps.

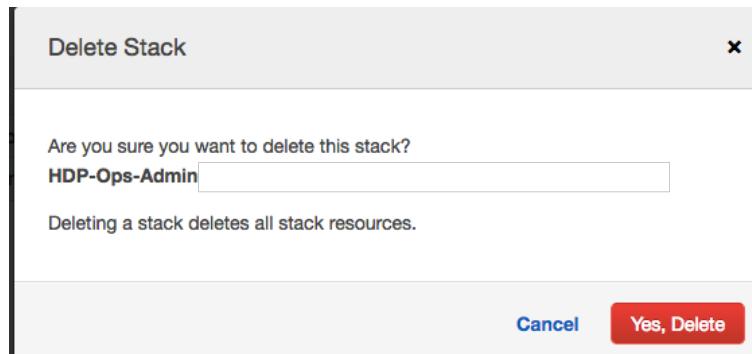
5.2 In the EC2 Console select all the nodes from all the class clusters to be deleted and “Terminate” them:



5.3 In addition to the above, go to the CloudFormation Console and select the clusters to be deleted:



5.4 Confirm delete. After a few minutes the Clusters will be gone from both AWS and CloudFormation Consoles.



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