Lab 01 :

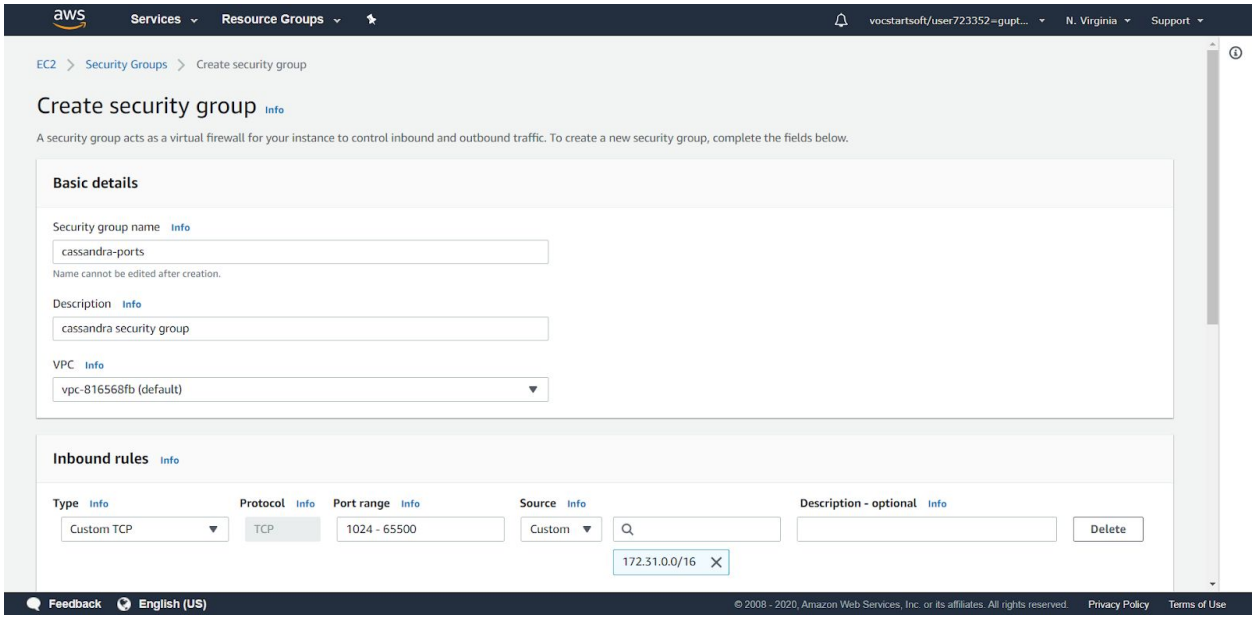
Cassandra Setup | Master-less arch concepts
(Install multi-node Cassandra cluster, induce failure, create a keyspace/table and
access from the client)

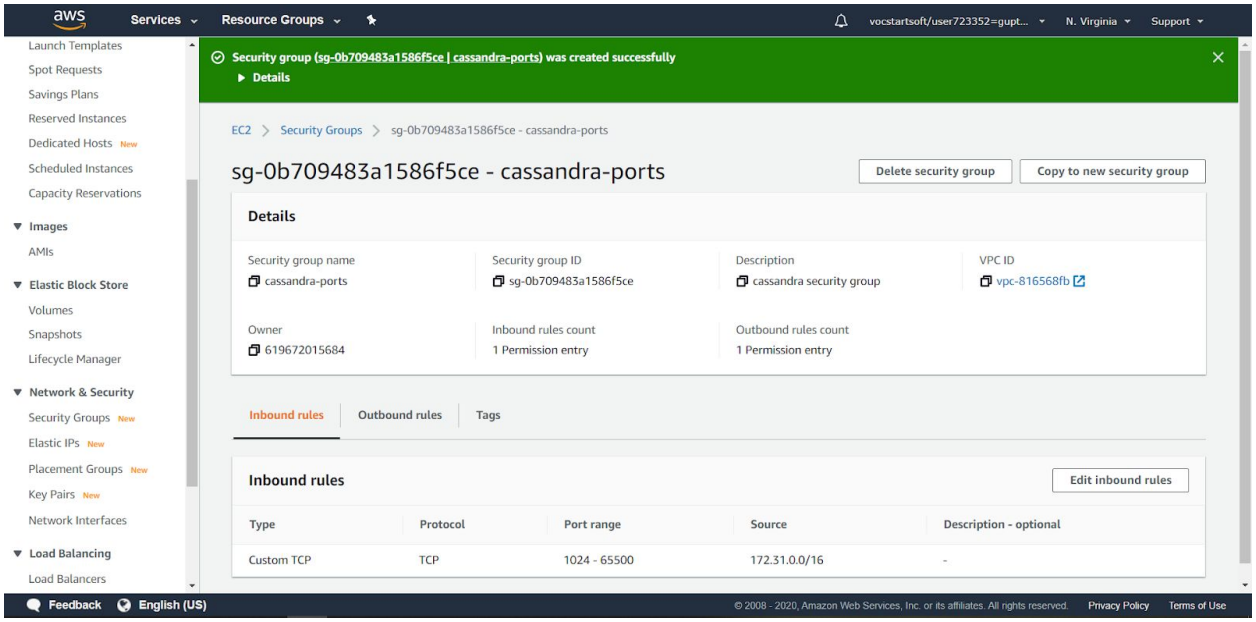
Chapter 1: Lab 1 steps

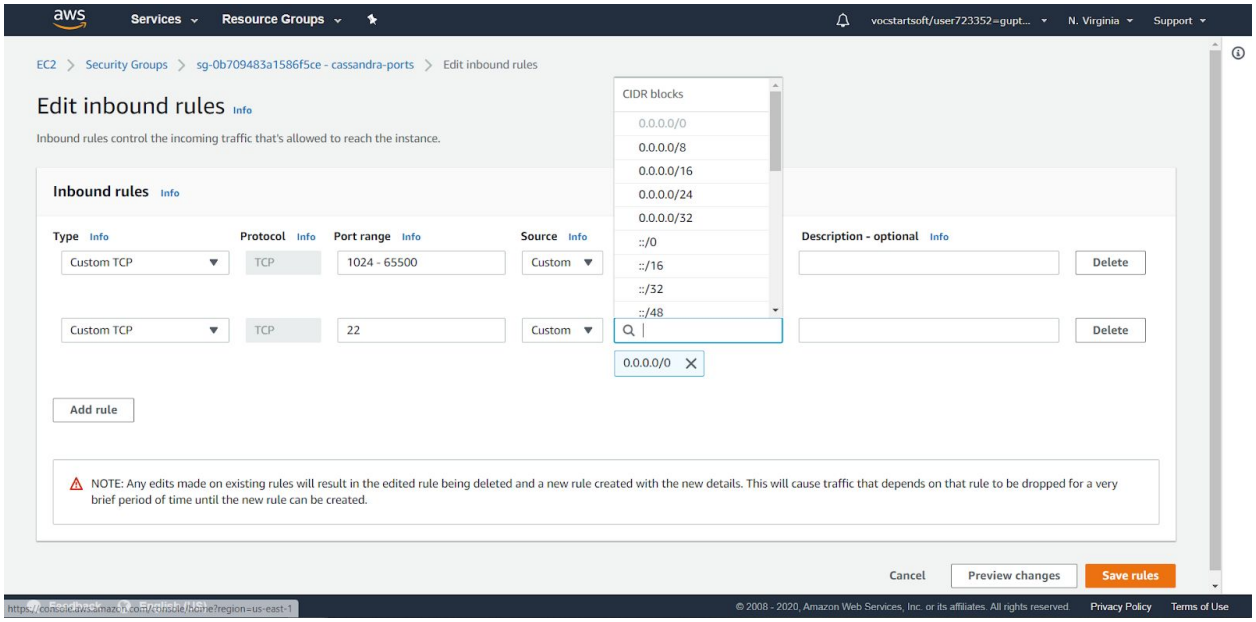
This report contains screenshots and steps followed for configuring cassandra on a 3 node setup.

The below are the steps executed for fulfillment of this exercise.

Creation of Security group

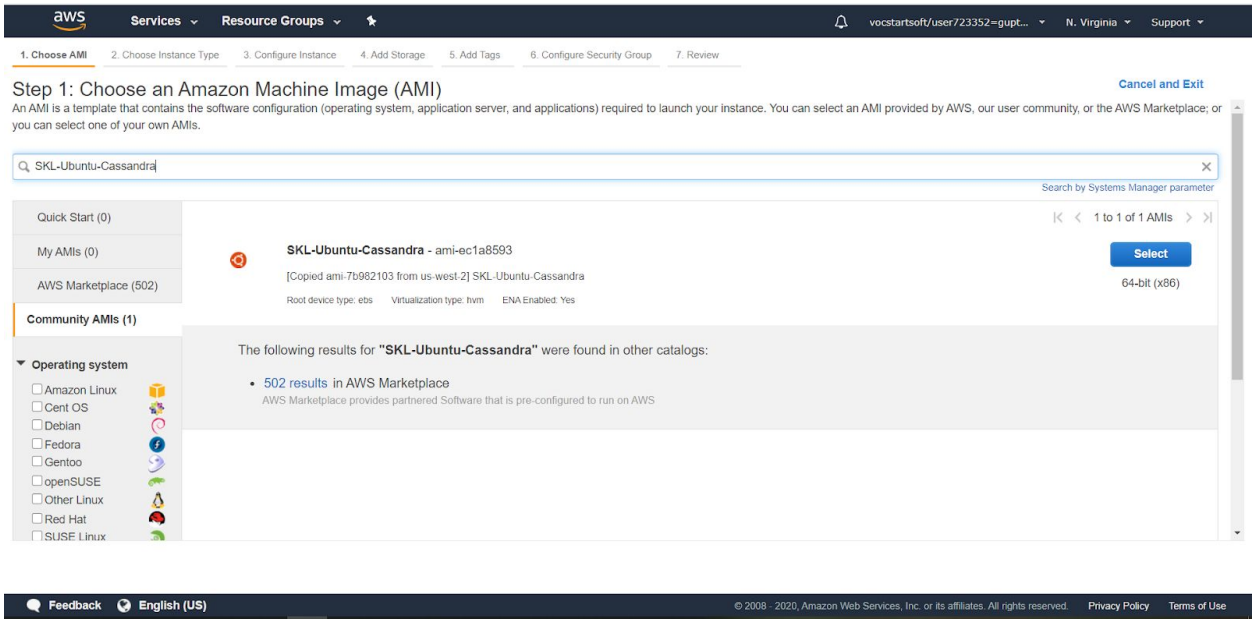


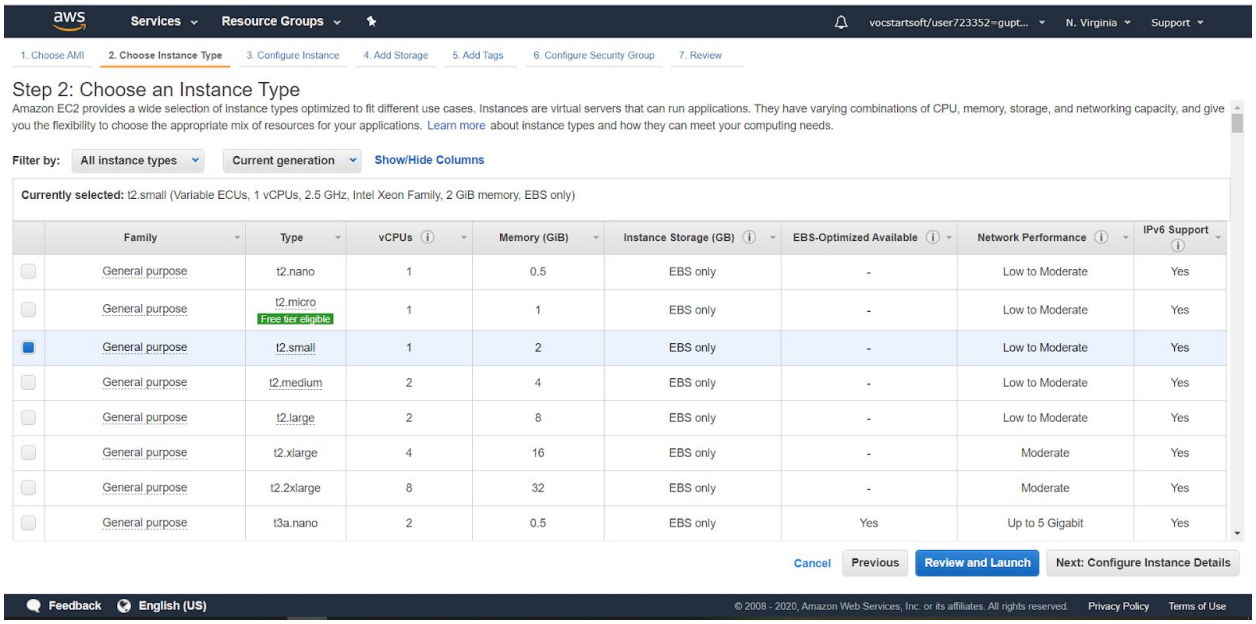




Launch instances

Instance 1 - cassandra-node-1




aws
Services
Resource Groups
vocstartsoft/user723352=gupt...
N. Virginia
Support
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.small (Variable ECUs, 1 vCPUs, 2.5 GHz, Intel Xeon Family, 2 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
t3a.nano
2
0.5
EBS only
Yes
Up to 5 Gigabit
Yes
Cancel
Previous
Review and Launch
Next: Configure Instance Details
Feedback
English (US)
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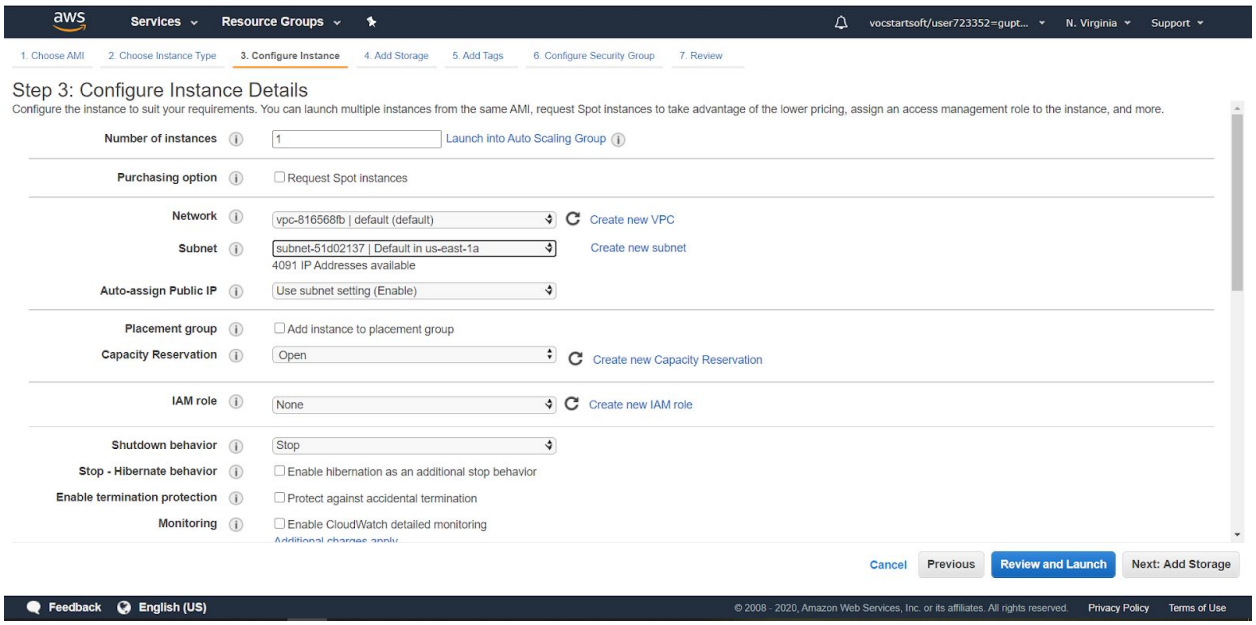
aws
Services
Resource Groups
vocstartsoft/user723352=gupt...
N. Virginia
Support
1. Choose AMI
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3. Configure Instance
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5. Add Tags
6. Configure Security Group
7. Review
Step 3: Configure Instance Details
Configure the instance to suit your requirements. You can launch multiple instances from the same AMI, request Spot instances to take advantage of the lower pricing, assign an access management role to the instance, and more.
Number of instances
1
Launch into Auto Scaling Group
Purchasing option
Request Spot instances
Network
vpc-816568fb | default (default)
Create new VPC
Subnet
subnet-51d02137 | Default in us-east-1a
Create new subnet
4091 IP Addresses available
Auto-assign Public IP
Use subnet setting (Enable)
Placement group
Add instance to placement group
Capacity Reservation
Open
Create new Capacity Reservation
IAM role
None
Create new IAM role
Shutdown behavior
Stop
Stop - Hibernate behavior
Enable hibernation as an additional stop behavior
Enable termination protection
Protect against accidental termination
Monitoring
Enable CloudWatch detailed monitoring
Additional charges apply.
Cancel
Previous
Review and Launch
Next: Add Storage
Feedback
English (US)
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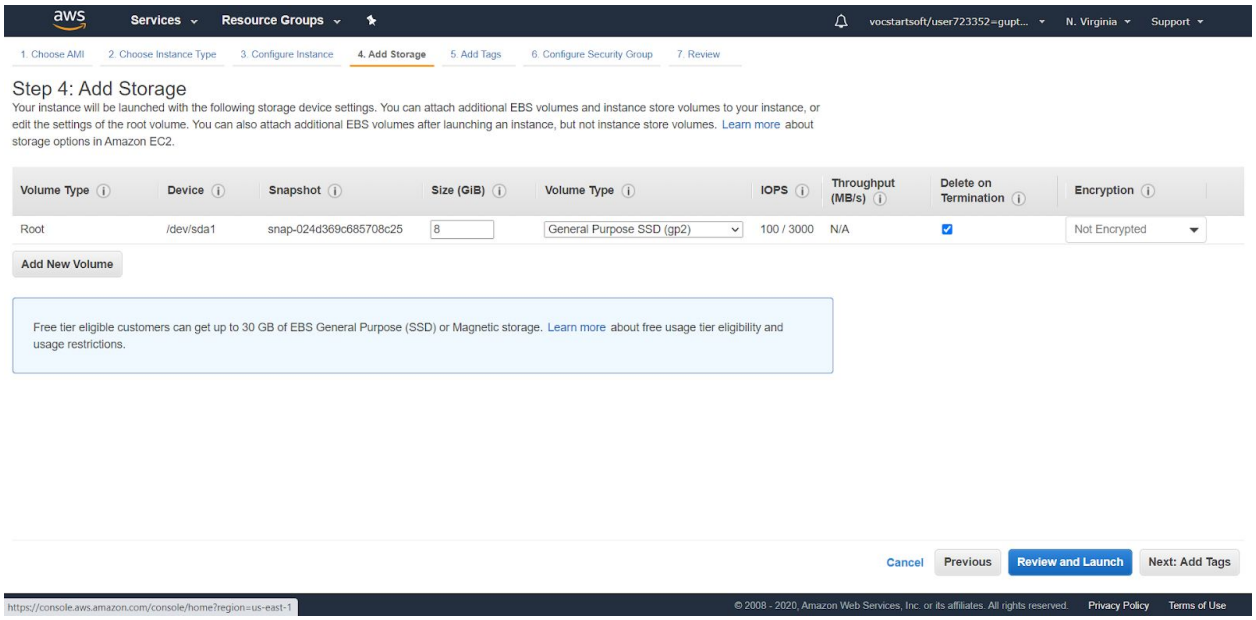
aws
Services
Resource Groups
vocstartsoft/user723352=gupt...
N. Virginia
Support
1. Choose AMI
2. Choose Instance Type
3. Configure Instance
4. Add Storage
5. Add Tags
6. Configure Security Group
7. Review
Step 4: Add Storage
Your instance will be launched with the following storage device settings. You can attach additional EBS volumes and instance store volumes to your instance, or edit the settings of the root volume. You can also attach additional EBS volumes after launching an instance, but not instance store volumes. Learn more about storage options in Amazon EC2.
Volume Type
Device
Snapshot
Size (GiB)
Volume Type
IOPS
Throughput (MB/s)
Delete on Termination
Encryption
Root
/dev/sda1
snap-024d369c685708c25
8
General Purpose SSD (gp2)
100 / 3000
N/A
Not Encrypted
Add New Volume
Free tier eligible customers can get up to 30 GB of EBS General Purpose (SSD) or Magnetic storage. Learn more about free usage tier eligibility and usage restrictions.
Cancel
Previous
Review and Launch
Next: Add Tags
https://console.aws.amazon.com/console/home?region=us-east-1
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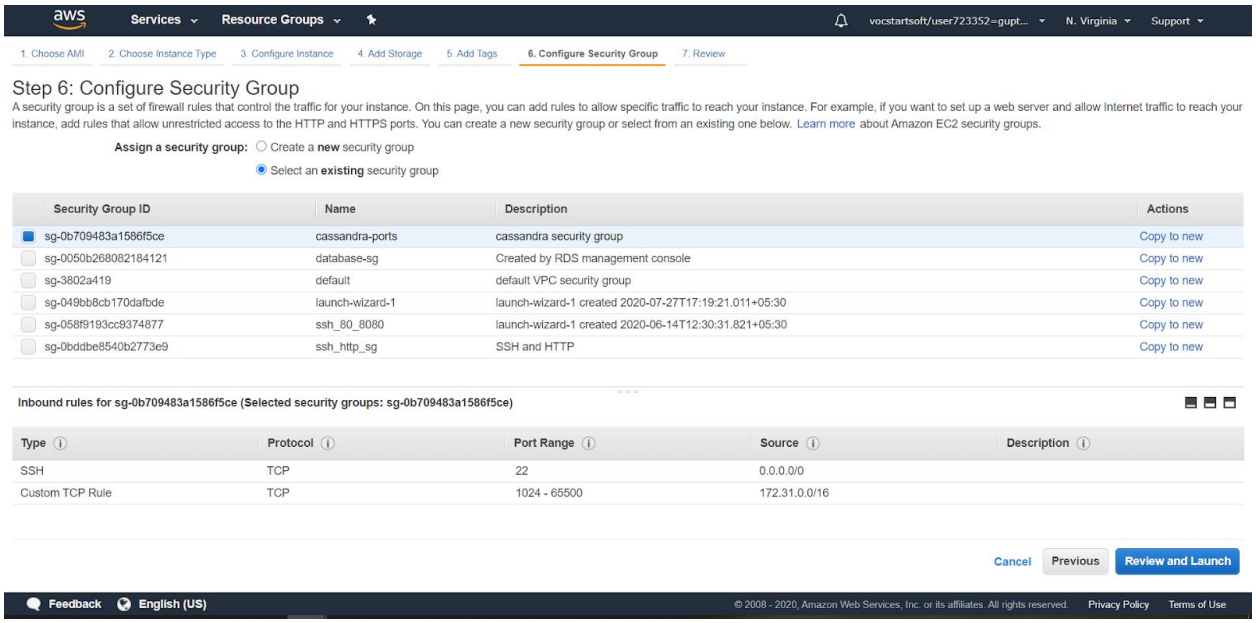
aws
Services
Resource Groups
vocstartsoft/user723352=gupt...
N. Virginia
Support
1. Choose AMI
2. Choose Instance Type
3. Configure Instance
4. Add Storage
5. Add Tags
6. Configure Security Group
7. Review
Step 6: Configure Security Group
A security group is a set of firewall rules that control the traffic 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
sg-0b709483a1586f5ce
cassandra-ports
cassandra security group
Copy to new
sg-0050b268082184121
database-sg
Created by RDS management console
Copy to new
sg-3802a419
default
default VPC security group
Copy to new
sg-049bb8cb170dafbde
launch-wizard-1
launch-wizard-1 created 2020-07-27T17:19:21.011+05:30
Copy to new
sg-058f9193cc9374877
ssh_80_8080
launch-wizard-1 created 2020-06-14T12:30:31.821+05:30
Copy to new
sg-0bddbe8540b2773e9
ssh_http_sg
SSH and HTTP
Copy to new
Inbound rules for sg-0b709483a1586f5ce (Selected security groups: sg-0b709483a1586f5ce)
Type
Protocol
Port Range
Source
Description
SSH
TCP
22
0.0.0.0/0
Custom TCP Rule
TCP
1024 - 65500
172.31.0.0/16
Cancel
Previous
Review and Launch
Feedback
English (US)
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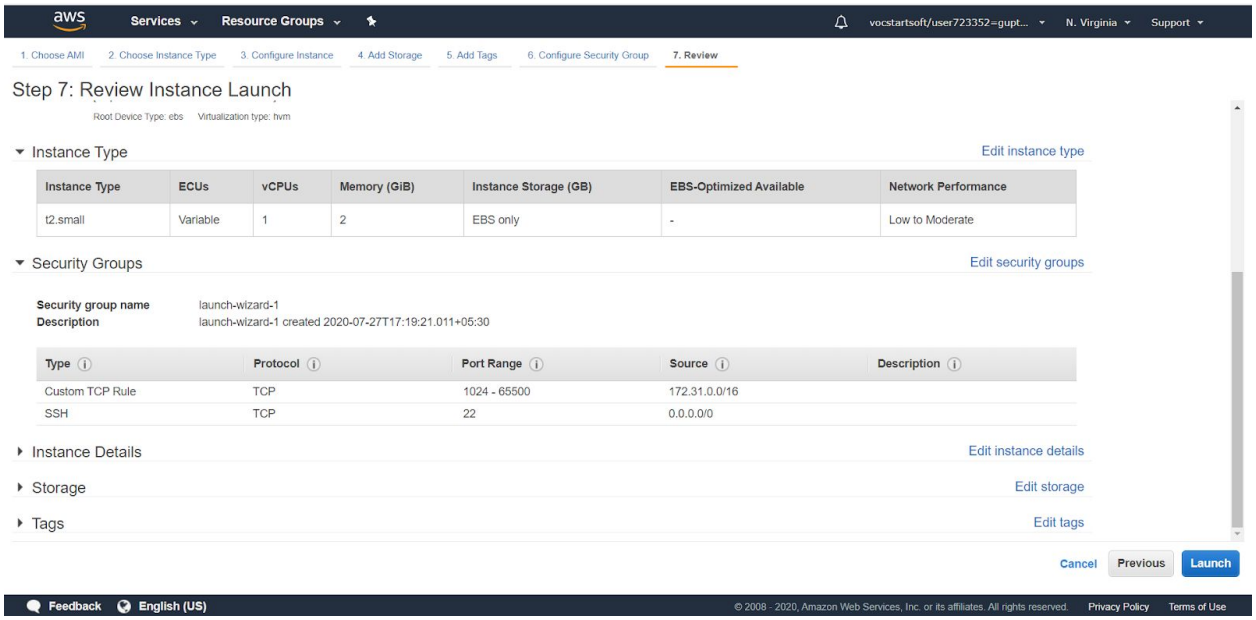
Services
Resource Groups
vocstartsoft/user723352=gupt...
N. Virginia
Support
1. Choose AMI
2. Choose Instance Type
3. Configure Instance
4. Add Storage
5. Add Tags
6. Configure Security Group
7. Review
Step 7: Review Instance Launch
Root Device Type: ebs
Virtualization type: hvm
Instance Type
Edit instance type
Instance Type | ECUs | vCPUs | Memory (GiB) | Instance Storage (GB) | EBS-Optimized Available | Network Performance
t2.small | Variable | 1 | 2 | EBS only | - | Low to Moderate
Security Groups
Edit security groups
Security group name launch-wizard-1
Description launch-wizard-1 created 2020-07-27T17:19:21.011+05:30
Type | Protocol | Port Range | Source | Description
Custom TCP Rule | TCP | 1024 - 65500 | 172.31.0.0/16
SSH | TCP | 22 | 0.0.0.0/0
Instance Details
Edit instance details
Storage
Edit storage
Tags
Edit tags
Cancel
Previous
Launch
Feedback
English (US)
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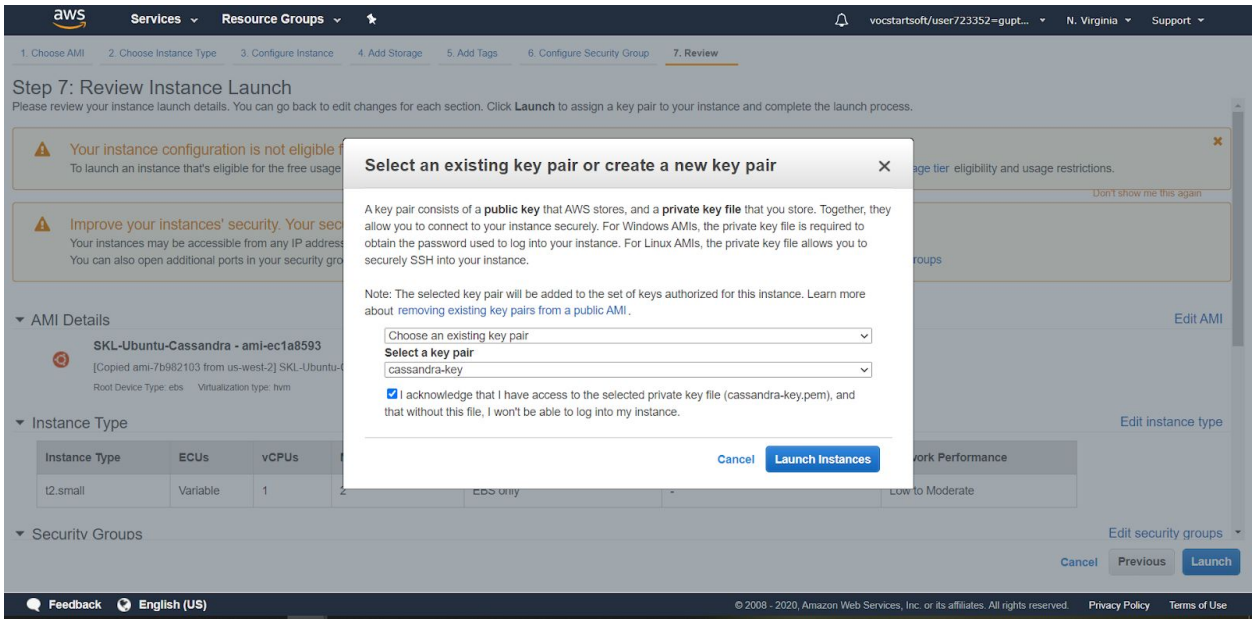
Services
Resource Groups
vocstartsoft/user723352=gupt...
N. Virginia
Support
1. Choose AMI
2. Choose Instance Type
3. Configure Instance
4. Add Storage
5. Add Tags
6. Configure Security Group
7. Review
Step 7: Review Instance Launch
Please review your instance launch details. You can go back to edit changes for each section. Click Launch to assign a key pair to your instance and complete the launch process.
Your instance configuration is not eligible
To launch an instance that's eligible for the free usage
Improve your instances' security. Your sec
Your instances may be accessible from any IP addres
You can also open additional ports in your security gro
AMI Details
Edit AMI
SKL-Ubuntu-Cassandra - ami-ec1a8593
[Copied ami-7b982103 from us-west-2] SKL-Ubuntu-
Root Device Type: ebs
Virtualization type: hvm
Instance Type
Edit instance type
Instance Type | ECUs | vCPUs
t2.small | Variable | 1
Low to Moderate
Security Groups
Edit security groups
Cancel
Previous
Launch
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.
Choose an existing key pair
Select a key pair
cassandra-key
I acknowledge that I have access to the selected private key file (cassandra-key.pem), and that without this file, I won't be able to log into my instance.
Cancel
Launch Instances
Feedback
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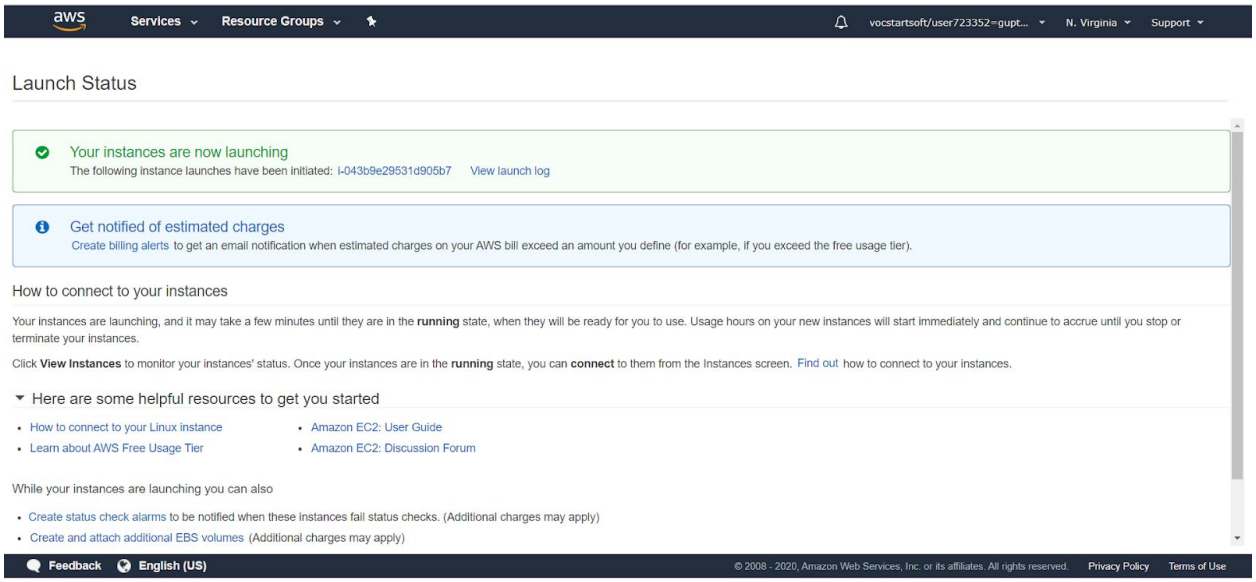
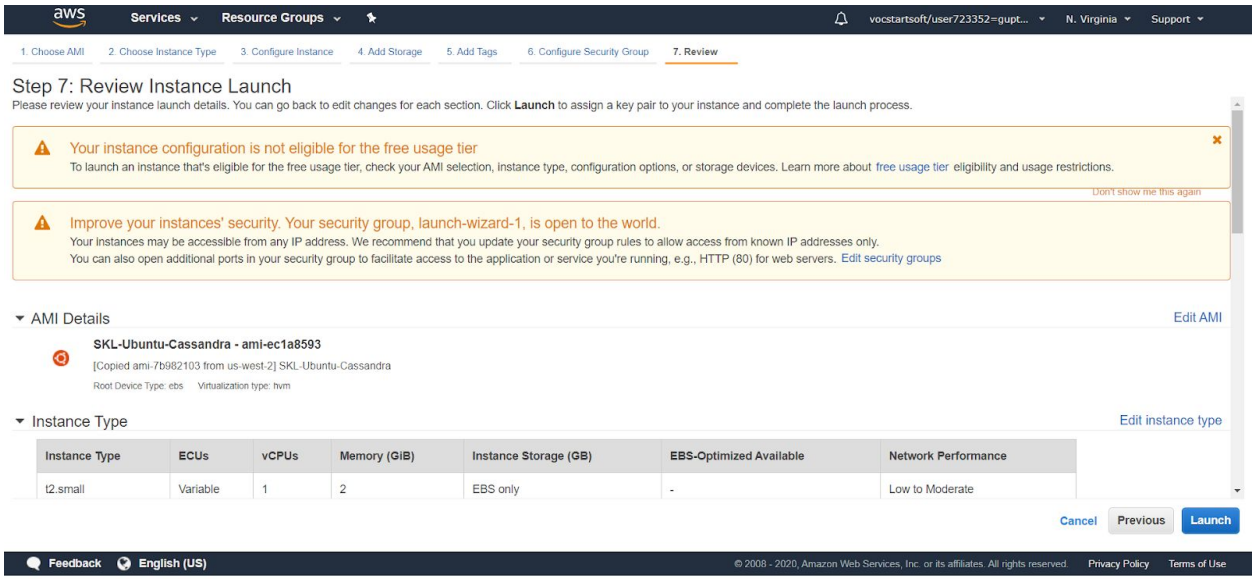
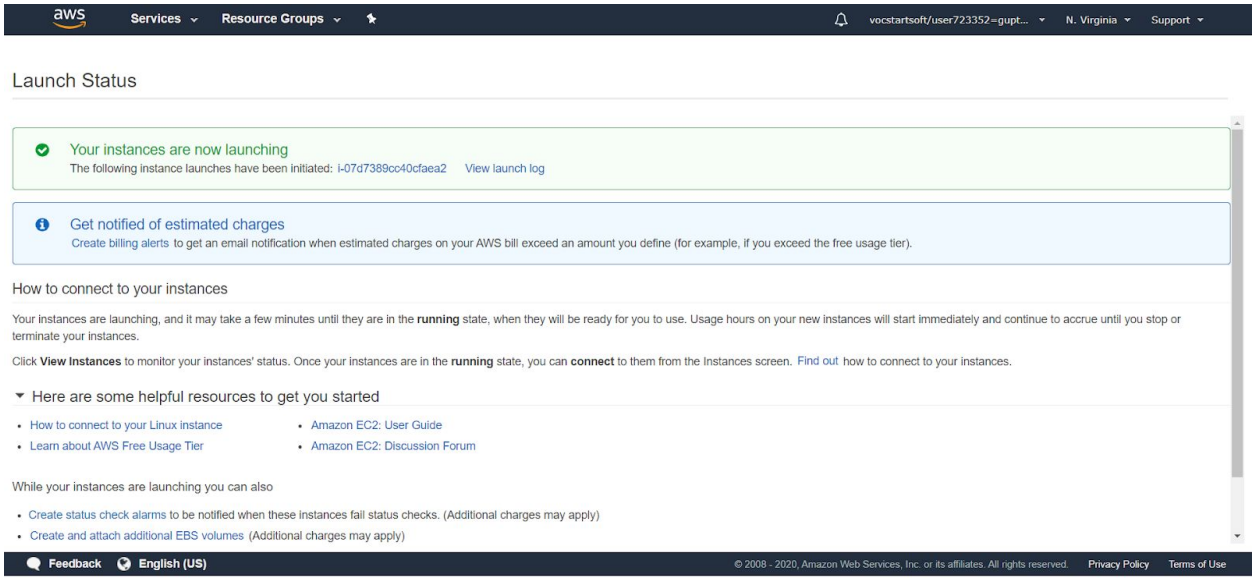
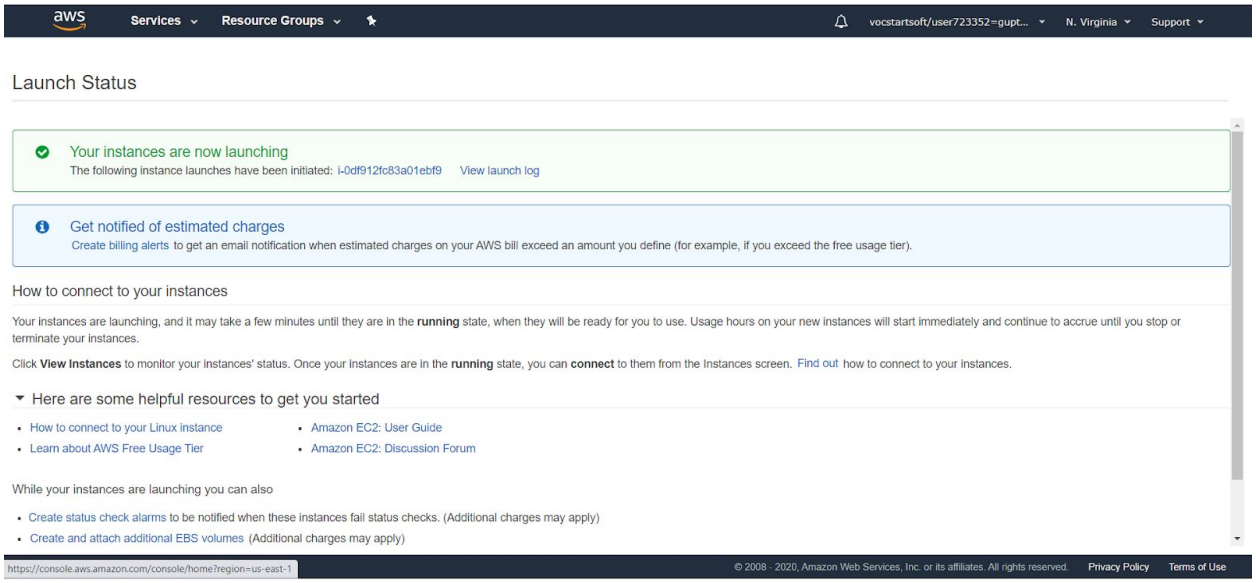


Launching 2nd instance - cassandra-node-2

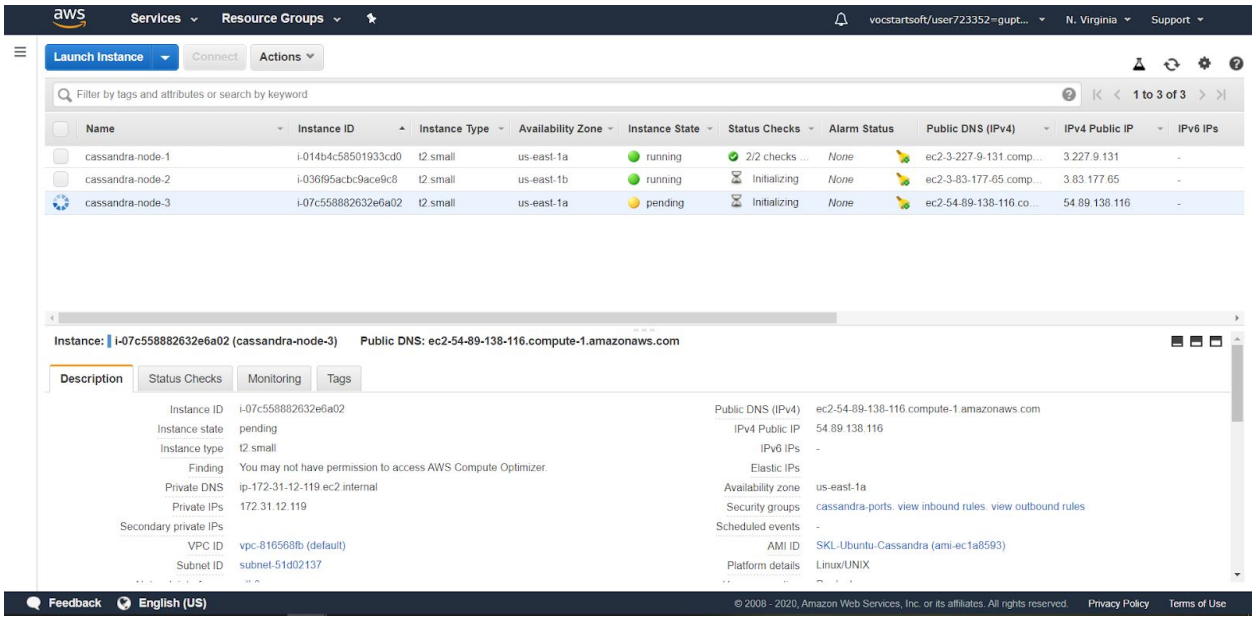




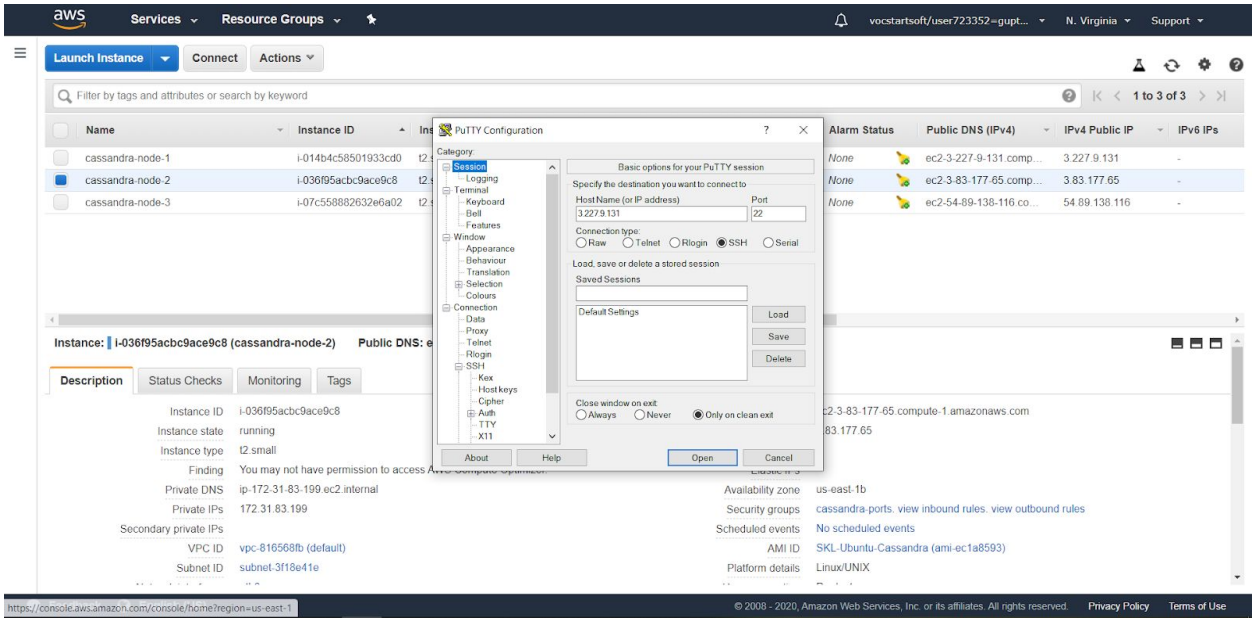
Launching 3rd Instance - cassandra-node-3



Launched instances



Configuring Cassandra to instance 1 -- cassandra-node-1



```
ubuntu@ip-172-31-2-193:/opt/apache-cassandra-3.11.1/conf
ubuntu@ip-172-31-2-193:/opt/apache-cassandra-3.11.1/conf$ sed -i 's=MOD_CLUSTER_NAME=GL-Cluster=g' cassandra.yaml
ubuntu@ip-172-31-2-193:/opt/apache-cassandra-3.11.1/conf$ sed -i 's=MOD_IP_ADDRESS=172.31.2.193=g' cassandra.yaml
ubuntu@ip-172-31-2-193:/opt/apache-cassandra-3.11.1/conf$ sed -i 's=MOD_SEED_LIST=172.31.2.193=g' cassandra.yaml
ubuntu@ip-172-31-2-193:/opt/apache-cassandra-3.11.1/conf$ sed -i 's=MOD_DATACENTER=dc1=g' cassandra-rackdc.properties
ubuntu@ip-172-31-2-193:/opt/apache-cassandra-3.11.1/conf$ sed -i 's=MOD_RACK=r1=g' cassandra-rackdc.properties
ubuntu@ip-172-31-2-193:/opt/apache-cassandra-3.11.1/conf$
```

Command: sed commands for making changes in cassandra.yaml and cassandra.rackdc.properties

```
ubuntu@ip-172-31-2-193:/opt/apache-cassandra-3.11.1/bin
ion=CompactionParams{class=org.apache.cassandra.db.compaction.SizeTieredCompactionStrategy, options={min_threshold=4, max_threshold=32}}, compression=org.apache.cassandra.schema.Compression
Params@7cd362e9, extensions={}, cdc=false},comparator=comparator(),partitionColumns=[[] | [exception_message exception_stacktrace finished_at keyspace_name started_at columnfamily_names opt
ions requested_ranges successful_ranges]],partitionKeyColumns=[parent_id],clusteringColumns=[],keyValidator=org.apache.cassandra.db.marshal.TimeUUIDType,columnMetadata=[requested_ranges, ex
ception_message, keyspace_name, successful_ranges, started_at, finished_at, options, exception_stacktrace, parent_id, columnfamily_names],droppedColumns={},triggers=[],indexes=[]], org.apac
he.cassandra.config.CFMetaData@527731af[cfId=5582b59f-8e4e-35e1-b913-3acada51eb04,ksName=system_distributed,cfName=view_build_status,flags=[COMPOUND],params=TableParams{comment=Materialized
 View build status, read_repair_chance=0.0, dclocal_read_repair_chance=0.0, bloom_filter_fp_chance=0.01, crc_check_chance=1.0, gc_grace_seconds=864000, default_time_to_live=0, memtable_flus
h_period_in_ms=3600000, min_index_interval=128, max_index_interval=2048, speculative_retry=99PERCENTILE, caching={'keys' : 'ALL', 'rows_per_partition' : 'NONE'}, compaction=CompactionParams
{class=org.apache.cassandra.db.compaction.SizeTieredCompactionStrategy, options={min_threshold=4, max_threshold=32}}, compression=org.apache.cassandra.schema.CompressionParams@7cd362e9, ext
ensions={}, cdc=false},comparator=comparator(org.apache.cassandra.db.marshal.UUIDType),partitionColumns=[[] | [status]],partitionKeyColumns=[keyspace_name, view_name],clusteringColumns=[hos
t_id],keyValidator=org.apache.cassandra.db.marshal.CompositeType(org.apache.cassandra.db.marshal.UTF8Type,org.apache.cassandra.db.marshal.UTF8Type),columnMetadata=[view_name, status, keyspa
ce_name, host_id],droppedColumns={},triggers=[],indexes=[]]], views=[], functions=[], types=[]}
INFO  [MigrationStage:1] 2020-07-28 08:12:34,165 ViewManager.java:137 - Not submitting build tasks for views in keyspace system_distributed as storage service is not initialized
INFO  [MigrationStage:1] 2020-07-28 08:12:34,171 ColumnFamilyStore.java:408 - Initializing system_distributed.parent_repair_history
INFO  [MigrationStage:1] 2020-07-28 08:12:34,179 ColumnFamilyStore.java:408 - Initializing system_distributed.repair_history
INFO  [MigrationStage:1] 2020-07-28 08:12:34,190 ColumnFamilyStore.java:408 - Initializing system_distributed.view_build_status
INFO  [main] 2020-07-28 08:12:34,220 StorageService.java:1442 - JOINING: Finish joining ring
INFO  [main] 2020-07-28 08:12:34,416 MigrationManager.java:310 - Create new Keyspace: KeyspaceMetadata{name=system_auth, params=KeyspaceParams{durable_writes=true, replication=ReplicationPa
rams{class=org.apache.cassandra.locator.SimpleStrategy, replication_factor=1}}, tables=[org.apache.cassandra.config.CFMetaData@3c664fbc[cfId=5bc52802-de25-35ed-aeab-188eecebb090,ksName=syst
em_auth,cfName=roles,flags=[COMPOUND],params=TableParams{comment=role definitions, read_repair_chance=0.0, dclocal_read_repair_chance=0.0, bloom_filter_fp_chance=0.01, crc_check_chance=1.0,
 gc_grace_seconds=7776000, default_time_to_live=0, memtable_flush_period_in_ms=3600000, min_index_interval=128, max_index_interval=2048, speculative_retry=99PERCENTILE, caching={'keys' : 'A
LL', 'rows_per_partition' : 'NONE'}, compaction=CompactionParams{class=org.apache.cassandra.db.compaction.SizeTieredCompactionStrategy, options={min_threshold=4, max_threshold=32}}, compres
sion=org.apache.cassandra.schema.CompressionParams@7cd362e9, extensions={}, cdc=false},comparator=comparator(),partitionColumns=[[] | [can_login is_superuser salted_hash member_of]],partiti
onKeyColumns=[role],clusteringColumns=[],keyValidator=org.apache.cassandra.db.marshal.UTF8Type,columnMetadata=[salted_hash, member_of, role, can_login, is_superuser],droppedColumns={},trigg
ers=[],indexes=[]], org.apache.cassandra.config.CFMetaData@7ef4a4d0[cfId=0ecdaa87-f8fb-3e60-88d1-74fb36fe5c0d,ksName=system_auth,cfName=role_members,flags=[COMPOUND],params=TableParams{comm
ent=role memberships lookup table, read_repair_chance=0.0, dclocal_read_repair_chance=0.0, bloom_filter_fp_chance=0.01, crc_check_chance=1.0, gc_grace_seconds=7776000, default_time_to_live=
0, memtable_flush_period_in_ms=3600000, min_index_interval=128, max_index_interval=2048, speculative_retry=99PERCENTILE, caching={'keys' : 'ALL', 'rows_per_partition' : 'NONE'}, compaction=
CompactionParams{class=org.apache.cassandra.db.compaction.SizeTieredCompactionStrategy, options={min_threshold=4, max_threshold=32}}, compression=org.apache.cassandra.schema.CompressionPara
ms@7cd362e9, extensions={}, cdc=false},comparator=comparator(org.apache.cassandra.db.marshal.UTF8Type),partitionColumns=[[] | []],partitionKeyColumns=[role],clusteringColumns=[member],keyVa
lidator=org.apache.cassandra.db.marshal.UTF8Type,columnMetadata=[role, member],droppedColumns={},triggers=[],indexes=[]], org.apache.cassandra.config.CFMetaData@606dc7bd[cfId=3afbe79f-2194-
31a7-add7-f5ab90d8ec9c,ksName=system_auth,cfName=role_permissions,flags=[COMPOUND],params=TableParams{comment=permissions granted to db roles, read_repair_chance=0.0, dclocal_read_repair_ch
ance=0.0, bloom_filter_fp_chance=0.01, crc_check_chance=1.0, gc_grace_seconds=7776000, default_time_to_live=0, memtable_flush_period_in_ms=3600000, min_index_interval=128, max_index_interva
l=2048, speculative_retry=99PERCENTILE, caching={'keys' : 'ALL', 'rows_per_partition' : 'NONE'}, compaction=CompactionParams{class=org.apache.cassandra.db.compaction.SizeTieredCompactionStr
ategy, options={min_threshold=4, max_threshold=32}}, compression=org.apache.cassandra.schema.CompressionParams@7cd362e9, extensions={}, cdc=false},comparator=comparator(org.apache.cassandra
.db.marshal.UTF8Type),partitionColumns=[[] | [permissions]],partitionKeyColumns=[role],clusteringColumns=[resource],keyValidator=org.apache.cassandra.db.marshal.UTF8Type,columnMetadata=[rol
e, resource, permissions],droppedColumns={},triggers=[],indexes=[]], org.apache.cassandra.config.CFMetaData@4d7b486f[cfId=5f2fbdad-91f1-3946-bd25-d5da3a5c35ec,ksName=system_auth,cfName=reso
urce_role_permissons_index,flags=[COMPOUND],params=TableParams{comment=index of db roles with permissions granted on a resource, read_repair_chance=0.0, dclocal_read_repair_chance=0.0, bloo
m_filter_fp_chance=0.01, crc_check_chance=1.0, gc_grace_seconds=7776000, default_time_to_live=0, memtable_flush_period_in_ms=3600000, min_index_interval=128, max_index_interval=2048, specul
ative_retry=99PERCENTILE, caching={'keys' : 'ALL', 'rows_per_partition' : 'NONE'}, compaction=CompactionParams{class=org.apache.cassandra.db.compaction.SizeTieredCompactionStrategy, options
={min_threshold=4, max_threshold=32}}, compression=org.apache.cassandra.schema.CompressionParams@7cd362e9, extensions={}, cdc=false},comparator=comparator(org.apache.cassandra.db.marshal.UT
F8Type),partitionColumns=[[] | []],partitionKeyColumns=[resource],clusteringColumns=[role],keyValidator=org.apache.cassandra.db.marshal.UTF8Type,columnMetadata=[resource, role],droppedColum
ns={},triggers=[],indexes=[]]], views=[], functions=[], types=[]}
INFO  [MigrationStage:1] 2020-07-28 08:12:34,538 ViewManager.java:137 - Not submitting build tasks for views in keyspace system_auth as storage service is not initialized
INFO  [MigrationStage:1] 2020-07-28 08:12:34,547 ColumnFamilyStore.java:408 - Initializing system_auth.resource_role_permissons_index
INFO  [MigrationStage:1] 2020-07-28 08:12:34,555 ColumnFamilyStore.java:408 - Initializing system_auth.role_members
INFO  [MigrationStage:1] 2020-07-28 08:12:34,563 ColumnFamilyStore.java:408 - Initializing system_auth.role_permissions
INFO  [MigrationStage:1] 2020-07-28 08:12:34,625 ColumnFamilyStore.java:408 - Initializing system_auth.roles
INFO  [main] 2020-07-28 08:12:34,661 AuthCache.java:172 - (Re)initializing CredentialsCache (validity period/update interval/max entries) (2000/2000/1000)
INFO  [main] 2020-07-28 08:12:34,666 Gossiper.java:1655 - Waiting for gossip to settle...
INFO  [main] 2020-07-28 08:12:42,673 Gossiper.java:1686 - No gossip backlog; proceeding
```

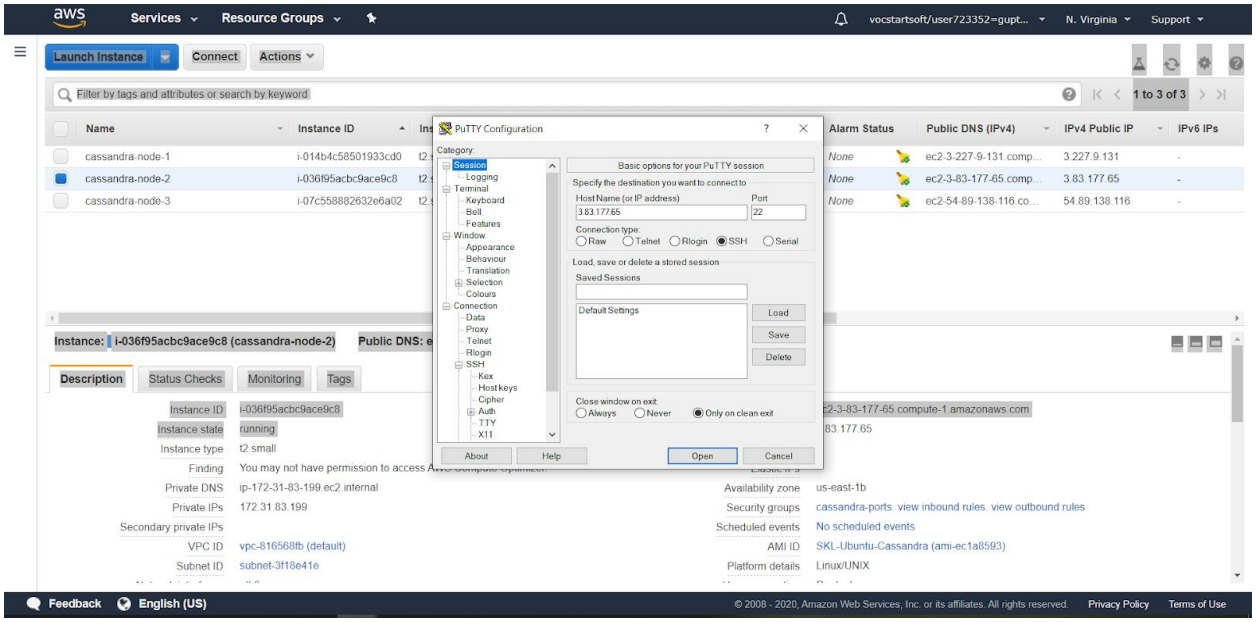
Command: cassandra

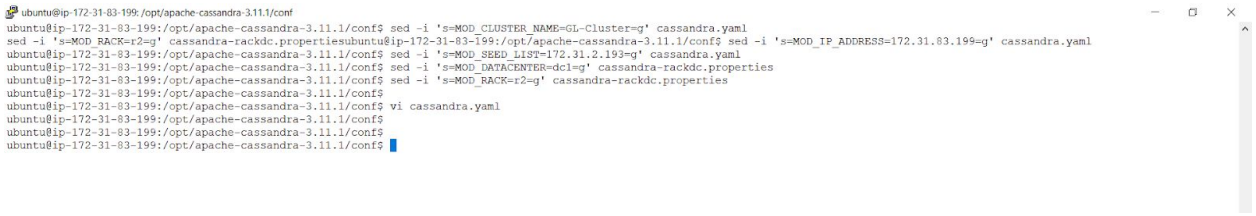
```
ubuntu@ip-172-31-2-193:/opt/apache-cassandra-3.11.1/bin$ ./nodetool status
Datacenter: dc1
===============
Status=Up/Down
|/ State=Normal/Leaving/Joining/Moving
--  Address       Load       Tokens       Owns (effective)  Host ID                               Rack
UN  172.31.2.193  103.84 KiB  256          100.0%            0a17d131-f69d-4975-92c8-ee7367e33cb3  r1

ubuntu@ip-172-31-2-193:/opt/apache-cassandra-3.11.1/bin$
```

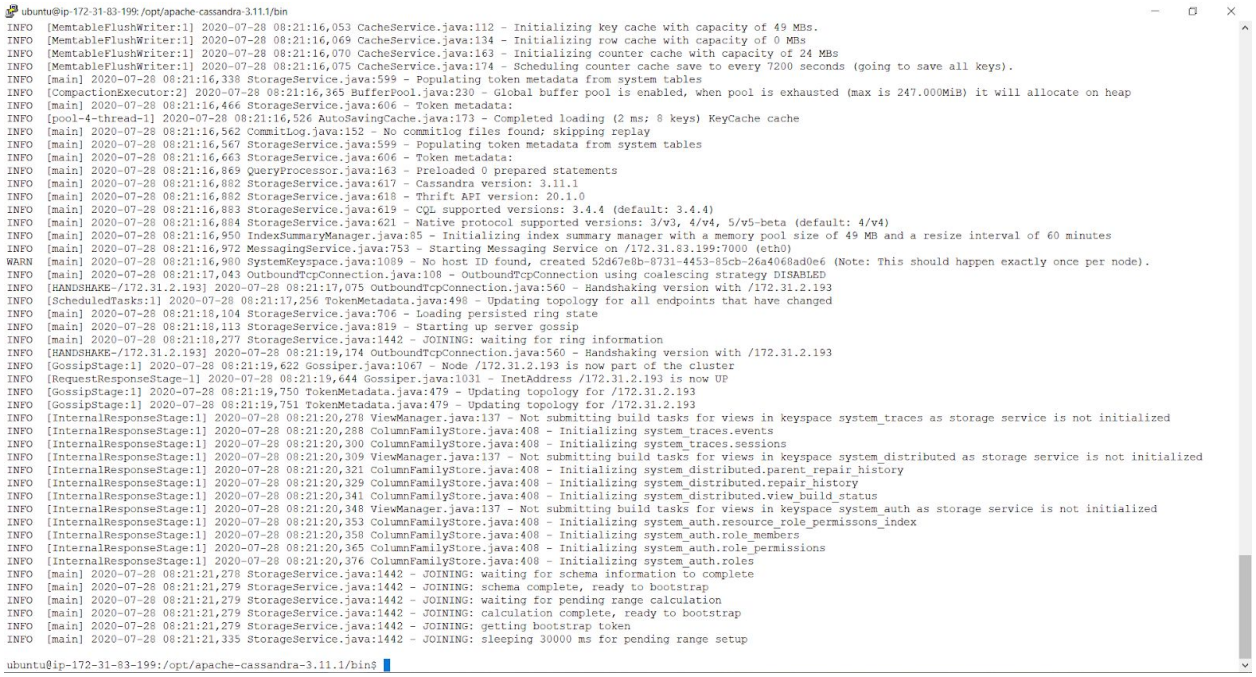
Command: ./nodetool status

Instance 2 - cassandra-node-2

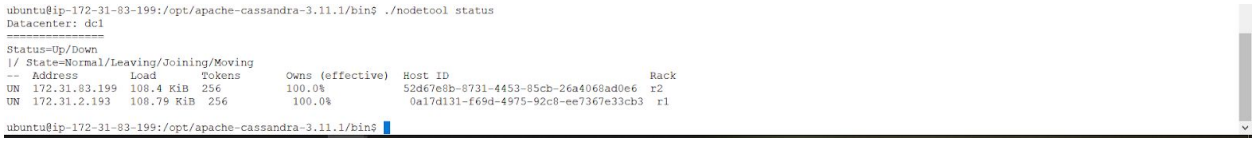




Command: sed commands for making changes in cassandra.yaml and cassandra.rackdc.properties

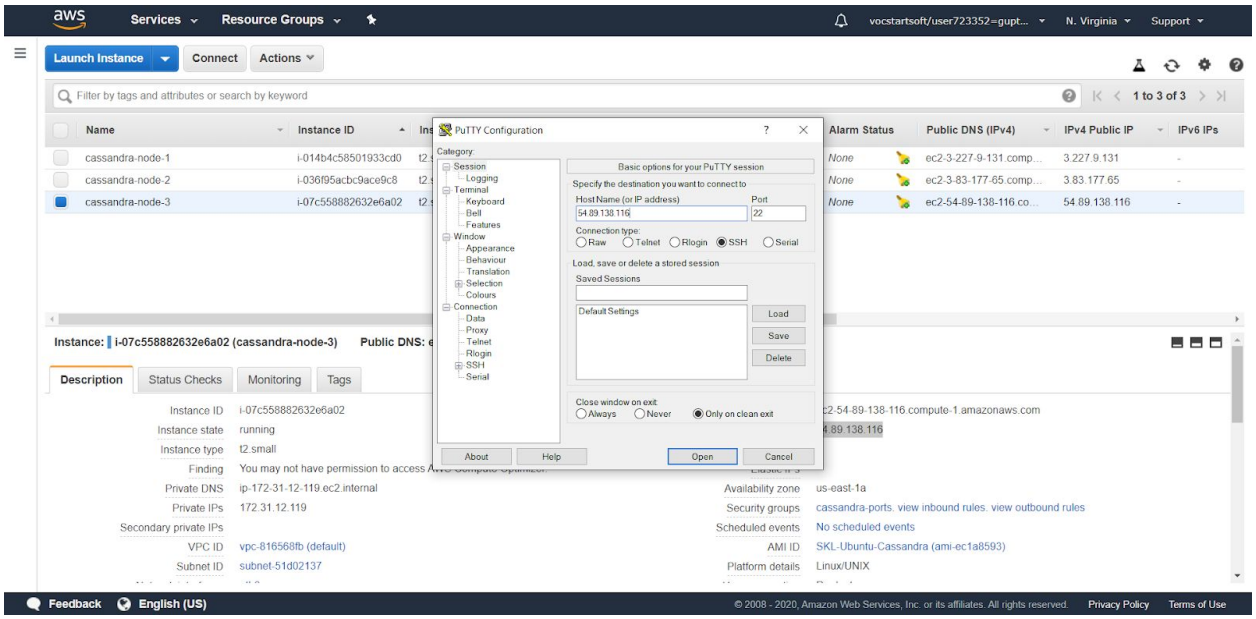


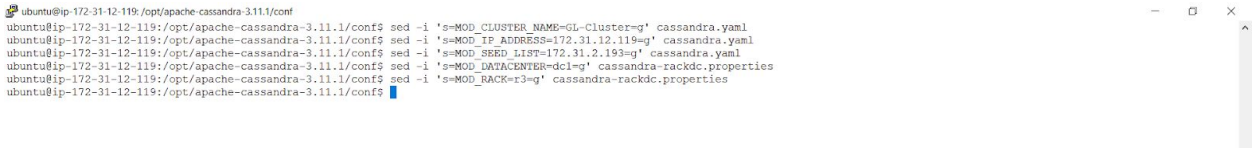
Command: cassandra



Command: ./nodetool status

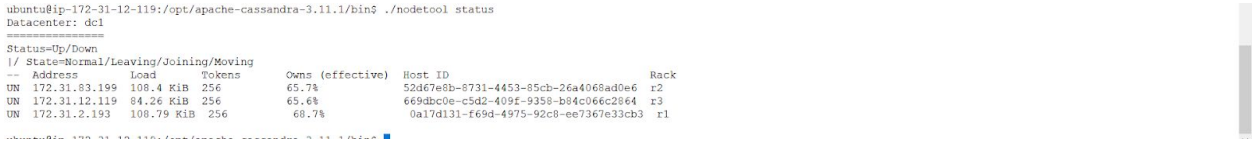
Instance 3 - cassandra-node-3





Command: sed commands for making changes in cassandra.yaml and cassandra.rackdc.properties

Command: cassandra

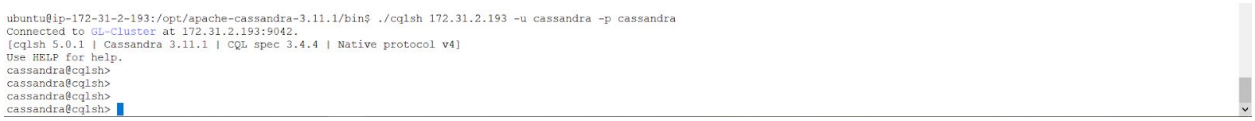


Command: ./nodetool status

Now, all the nodes are in the cluster and which could be validated by running ./nodetool status in all the nodes.

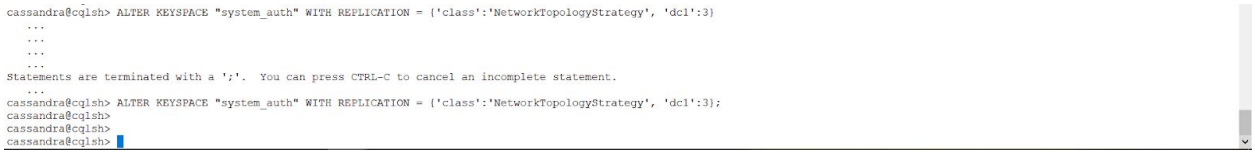
How to do it ? -1 Working with Cassandra

Step 1:



Command: ./cqlsh [EC2 private IP] -u cassandra -p cassandra

Step 2:

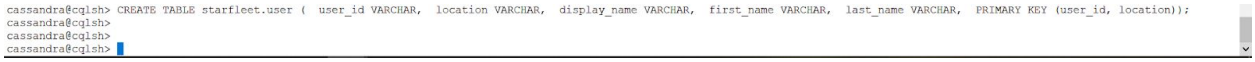


Command: ALTER KEYSPACE "system_auth" WITH REPLICATION = {'class':'NetworkTopologyStrategy', 'dc1':3}

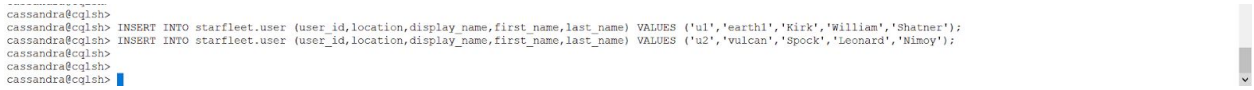
Step 3:

Command: CREATE KEYSPACE IF NOT EXISTS starfleet WITH replication = {'class':'NetworkTopologyStrategy', 'dc1':3};

Step 4,5:



Command: CREATE TABLE starfleet.user (
user_id VARCHAR,
location VARCHAR,
display_name VARCHAR,
first_name VARCHAR,
last_name VARCHAR,
PRIMARY KEY (user_id, location)
);



```
cassandra@cqlsh> select * from starfleet.user;

 user_id | location | display_name | first_name | last_name
---------+----------+--------------+------------+-----------
      u2 |   vulcan |        Spock |    Leonard |     Nimoy
      u1 |   earth1 |         Kirk |    William |   Shatner

(2 rows)
```

Command: select * from starfleet.user;

Step 6:

```
cassandra@cqlsh> consistency
Current consistency level is ONE.
cassandra@cqlsh>
```

Command: consistency

Step 7:

```
cassandra@cqlsh> consistency ALL
Consistency level set to ALL.
cassandra@cqlsh>
```

Command: consistency ALL

Step 8: Select * from starfleet.user where user_id = 'u2';

```
cassandra@cqlsh> Select * from starfleet.user where user_id = 'u2';

 user_id | location | display_name | first_name | last_name
---------+----------+--------------+------------+-----------
      u2 |   vulcan |        Spock |    Leonard |     Nimoy

(1 rows)
cassandra@cqlsh>
```

Step 9: ./nodetool stopdaemon

```
ubuntu@ip-172-31-12-119:/opt/apache-cassandra-3.11.1/bin$ ./nodetool stopdaemon
WARN  09:10:43,855 Small commitlog volume detected at /opt/cassandra-data/commitlog; setting commitlog_total_space_in_mb to 1969.  You can override this in cassandra.yaml
WARN  09:10:43,859 Small cdc volume detected at /opt/cassandra-data/cdc_raw; setting cdc_total_space_in_mb to 984.  You can override this in cassandra.yaml
WARN  09:10:43,860 Only 5.203GiB free across all data volumes. Consider adding more capacity to your cluster or removing obsolete snapshots
Cassandra has shutdown.
ubuntu@ip-172-31-12-119:/opt/apache-cassandra-3.11.1/bin$
```

Step 10: Select * from starfleet.user where user_id = 'u2';

```
cassandra@cqlsh> Select * from starfleet.user where user_id = 'u2';
NoHostAvailable:
cassandra@cqlsh>
```

Step 11: After shutting down the node-3, and setting consistency level to ALL, reading data was not possible.

Step 12: consistency QUORUM

Step 13: Select * from starfleet.user where user_id = 'u2';

```
cassandra@cqlsh> Select * from starfleet.user where user_id = 'u2';

 user_id | location | display_name | first_name | last_name
---------+----------+--------------+------------+-----------
      u2 |   vulcan |        Spock |    Leonard |     Nimoy

(1 rows)
```

Step 14: On changing the consistency level to QUORUM, reading data is possible