

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

The screenshot shows the 'Create security group' page in the AWS Management Console. The breadcrumb navigation is 'EC2 > Security Groups > Create security group'. The page title is 'Create security group' with an 'Info' link. A note states: 'A security group acts as a virtual firewall for your instance to control inbound and outbound traffic. To create a new security group, complete the fields below.'

Basic details

- Security group name:** cassandra-ports (Note: Name cannot be edited after creation.)
- Description:** cassandra security group
- VPC:** vpc-816568fb (default)

Inbound rules

Fields for rule configuration:

- Type:** Custom TCP
- Protocol:** TCP
- Port range:** 1024 - 65500
- Source:** Custom, 172.31.0.0/16
- Description - optional:** (empty)
- Delete:** button

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The screenshot shows the 'Details' page for the security group 'sg-0b709483a1586f5ce - cassandra-ports'. A green banner at the top states: 'Security group (sg-0b709483a1586f5ce | cassandra-ports) was created successfully'. The breadcrumb navigation is 'EC2 > Security Groups > sg-0b709483a1586f5ce - cassandra-ports'. Buttons for 'Delete security group' and 'Copy to new security group' are present.

Details

Security group name cassandra-ports	Security group ID sg-0b709483a1586f5ce	Description cassandra security group	VPC ID vpc-816568fb
Owner 619672015684	Inbound rules count 1 Permission entry	Outbound rules count 1 Permission entry	

Inbound rules

Type	Protocol	Port range	Source	Description - optional
Custom TCP	TCP	1024 - 65500	172.31.0.0/16	-

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EC2 > Security Groups > sg-0b709483a1586f5ce - cassandra-ports > Edit inbound rules

Edit inbound rules

Inbound rules control the incoming traffic that's allowed to reach the instance.

Inbound rules

Type	Protocol	Port range	Source
Custom TCP	TCP	1024 - 65500	Custom
Custom TCP	TCP	22	Custom

Add rule

CIDR blocks

- 0.0.0.0/0
- 0.0.0.0/8
- 0.0.0.0/16
- 0.0.0.0/24
- 0.0.0.0/32
- ::/0
- ::/16
- ::/32
- ::/48
- 0.0.0.0/0

Description - optional

Delete

NOTE: Any edits made on existing rules will result in the edited rule being deleted and a new rule created with the new details. This will cause traffic that depends on that rule to be dropped for a very brief period of time until the new rule can be created.

Cancel Preview changes Save rules

Launch instances

Instance 1 - cassandra-node-1

aws Services Resource Groups

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

Step 1: Choose an Amazon Machine Image (AMI)

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.

Cancel and Exit

Search SKL-Ubuntu-Cassandra

Quick Start (0) My AMIs (0) AWS Marketplace (502) Community AMIs (1)

SKL-Ubuntu-Cassandra - ami-ec1a8593

[Copied ami-7b982103 from us-west-2] SKL-Ubuntu-Cassandra

Root device type: ebs Virtualization type: hvm ENA Enabled: Yes

64-bit (x86)

Select

The following results for "SKL-Ubuntu-Cassandra" were found in other catalogs:

- 502 results in AWS Marketplace

AWS Marketplace provides partnered Software that is pre-configured to run on AWS.

Operating system

- ☐ Amazon Linux
- ☐ Cent OS
- ☐ Debian
- ☐ Fedora
- ☐ Gentoo
- ☐ openSUSE
- ☐ Other Linux
- ☐ Red Hat
- ☐ SUSE Linux

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1. Choose AMI2. Choose Instance Type3. Configure Instance4. Add Storage5. Add Tags6. Configure Security Group7. 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 typesCurrent generationShow/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
<input type="checkbox"/>	General purpose	t2.nano	1	0.5	EBS only	-	Low to Moderate	Yes
<input type="checkbox"/>	General purpose	t2.micro <small>Free tier eligible</small>	1	1	EBS only	-	Low to Moderate	Yes
<input checked="" type="checkbox"/>	General purpose	t2.small	1	2	EBS only	-	Low to Moderate	Yes
<input type="checkbox"/>	General purpose	t2.medium	2	4	EBS only	-	Low to Moderate	Yes
<input type="checkbox"/>	General purpose	t2.large	2	8	EBS only	-	Low to Moderate	Yes
<input type="checkbox"/>	General purpose	t2.xlarge	4	16	EBS only	-	Moderate	Yes
<input type="checkbox"/>	General purpose	t2.2xlarge	8	32	EBS only	-	Moderate	Yes
<input type="checkbox"/>	General purpose	t3a.nano	2	0.5	EBS only	Yes	Up to 5 Gigabit	Yes

CancelPreviousReview and LaunchNext: Configure Instance Details

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1. Choose AMI2. Choose Instance Type3. Configure Instance4. Add Storage5. Add Tags6. Configure Security Group7. 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 instances1Launch into Auto Scaling Group

Purchasing option☐ Request Spot instances

Networkvpc-816568fb | default (default)Create new VPC

Subnetsubnet-51d02137 | Default in us-east-1a4091 IP Addresses availableCreate new subnet

Auto-assign Public IPUse subnet setting (Enable)

Placement group☐ Add instance to placement group

Capacity ReservationOpenCreate new Capacity Reservation

IAM roleNoneCreate new IAM role

Shutdown behaviorStop

Stop - Hibernate behavior☐ Enable hibernation as an additional stop behavior

Enable termination protection☐ Protect against accidental termination

Monitoring☐ Enable CloudWatch detailed monitoringAdditional charges apply

CancelPreviousReview and LaunchNext: Add Storage

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Services

Resource Groups

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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	<input checked="" type="checkbox"/>	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

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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
<input checked="" type="checkbox"/> sg-0b709483a1586f5ce	cassandra-ports	cassandra security group	Copy to new
<input type="checkbox"/> sg-0050b268082184121	database-sg	Created by RDS management console	Copy to new
<input type="checkbox"/> sg-3802a419	default	default VPC security group	Copy to new
<input type="checkbox"/> sg-049bb8cb170dafbde	launch-wizard-1	launch-wizard-1 created 2020-07-27T17:19:21.011+05:30	Copy to new
<input type="checkbox"/> sg-058f9193cc9374877	ssh_80_8080	launch-wizard-1 created 2020-06-14T12:30:31.821+05:30	Copy to new
<input type="checkbox"/> 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

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1. Choose AMI2. Choose Instance Type3. Configure Instance4. Add Storage5. Add Tags6. Configure Security Group7. Review

Step 7: Review Instance Launch

Root Device Type: ebsVirtualization 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

aws

ServicesResource Groups

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Support

1. Choose AMI2. Choose Instance Type3. Configure Instance4. Add Storage5. Add Tags6. Configure Security Group7. 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 for the free usage tier. To launch an instance that's eligible for the free usage tier, you must select a different instance type, AMI, or operating system.

⚠️ Improve your instances' security. Your security groups may be accessible from any IP address. You can also open additional ports in your security groups.

AMI Details

SKL-Ubuntu-Cassandra - ami-ec1a8593

[Copied ami-7b982103 from us-west-2] SKL-Ubuntu-Cassandra

Root Device Type: ebsVirtualization 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

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

aws

Services

Resource Groups

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Support

Launch Status

✓

Your instances are now launching

The following instance launches have been initiated: i-043b9e29531d905b7 [View launch log](#)

ⓘ

Get notified of estimated charges

Create billing alerts to get an email notification when estimated charges on your AWS bill exceed an amount you define (for example, if you exceed the free usage tier).

How to connect to your instances

Your instances are launching, and it may take a few minutes until they are in the **running** state, when they will be ready for you to use. Usage hours on your new instances will start immediately and continue to accrue until you stop or terminate your instances.

Click **View Instances** to monitor your instances' status. Once your instances are in the **running** state, you can **connect** to them from the Instances screen. [Find out](#) how to connect to your instances.

▼ Here are some helpful resources to get you started

[How to connect to your Linux instance](#)

[Amazon EC2: User Guide](#)

[Learn about AWS Free Usage Tier](#)

[Amazon EC2: Discussion Forum](#)

While your instances are launching you can also

[Create status check alarms to be notified when these instances fail status checks. \(Additional charges may apply\)](#)

[Create and attach additional EBS volumes \(Additional charges may apply\)](#)

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Launching 2nd instance - cassandra-node-2

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Services

Resource Groups

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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 for the free usage tier

To launch an instance that's eligible for the free usage tier, check your AMI selection, instance type, configuration options, or storage devices. [Learn more about free usage tier eligibility and usage restrictions.](#)

[Don't show me this again](#)

⚠

Improve your instances' security. Your security group, launch-wizard-1, is open to the world.

Your instances may be accessible from any IP address. We recommend that you update your security group rules to allow access from known IP addresses only. You can also open additional ports in your security group to facilitate access to the application or service you're running, e.g., HTTP (80) for web servers. [Edit security groups](#)

▼ AMI Details [Edit AMI](#)

🔍

SKL-Ubuntu-Cassandra - ami-ec1a8593

[Copied ami-7b982103 from us-west-2] SKL-Ubuntu-Cassandra

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

Cancel

Previous

Launch

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Services

Resource Groups

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Launch Status

Your instances are now launching

The following instance launches have been initiated: i-07d7389cc40cfaea2 [View launch log](#)

Get notified of estimated charges

Create billing alerts to get an email notification when estimated charges on your AWS bill exceed an amount you define (for example, if you exceed the free usage tier).

How to connect to your instances

Your instances are launching, and it may take a few minutes until they are in the **running** state, when they will be ready for you to use. Usage hours on your new instances will start immediately and continue to accrue until you stop or terminate your instances.

Click **View Instances** to monitor your instances' status. Once your instances are in the **running** state, you can **connect** to them from the Instances screen. Find out how to connect to your instances.

Here are some helpful resources to get you started

How to connect to your Linux instance

Learn about AWS Free Usage Tier

Amazon EC2: User Guide

Amazon EC2: Discussion Forum

While your instances are launching you can also

- Create status check alarms to be notified when these instances fail status checks. (Additional charges may apply)
- Create and attach additional EBS volumes (Additional charges may apply)

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Launching 3rd Instance - cassandra-node-3

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Resource Groups

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Support

Launch Status

Your instances are now launching

The following instance launches have been initiated: i-0df912fc83a01ebf9 [View launch log](#)

Get notified of estimated charges

Create billing alerts to get an email notification when estimated charges on your AWS bill exceed an amount you define (for example, if you exceed the free usage tier).

How to connect to your instances

Your instances are launching, and it may take a few minutes until they are in the **running** state, when they will be ready for you to use. Usage hours on your new instances will start immediately and continue to accrue until you stop or terminate your instances.

Click **View Instances** to monitor your instances' status. Once your instances are in the **running** state, you can **connect** to them from the Instances screen. Find out how to connect to your instances.

Here are some helpful resources to get you started

How to connect to your Linux instance

Learn about AWS Free Usage Tier

Amazon EC2: User Guide

Amazon EC2: Discussion Forum

While your instances are launching you can also

- Create status check alarms to be notified when these instances fail status checks. (Additional charges may apply)
- Create and attach additional EBS volumes (Additional charges may apply)

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Launched instances

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Launch Instance Connect Actions

Filter by tags and attributes or search by keyword

Name	Instance ID	Instance Type	Availability Zone	Instance State	Status Checks	Alarm Status	Public DNS (IPv4)	IPv4 Public IP	IPv6 IPs
cassandra-node-1	i-014b4c58501933cd0	t2.small	us-east-1a	running	2/2 checks ...	None	ec2-3-227-9-131 comp...	3.227.9.131	-
cassandra-node-2	i-036f95acbc9ace9c8	t2.small	us-east-1b	running	Initializing	None	ec2-3-83-177-65 comp...	3.83.177.65	-
cassandra-node-3	i-07c558882632e6a02	t2.small	us-east-1a	pending	Initializing	None	ec2-54-89-138-116 co...	54.89.138.116	-

Instance: i-07c558882632e6a02 (cassandra-node-3) Public DNS: ec2-54-89-138-116.compute-1.amazonaws.com

Description Status Checks Monitoring Tags

Instance ID: i-07c558882632e6a02
 Instance state: pending
 Instance type: t2.small
 Finding: You may not have permission to access AWS Compute Optimizer.
 Private DNS: ip-172-31-12-119 ec2.internal
 Private IPs: 172.31.12.119
 Secondary private IPs:
 VPC ID: vpc-816568fb (default)
 Subnet ID: subnet-51d02137

Public DNS (IPv4): ec2-54-89-138-116.compute-1.amazonaws.com
 IPv4 Public IP: 54.89.138.116
 IPv6 IPs: -
 Elastic IPs: -
 Availability zone: us-east-1a
 Security groups: cassandra-ports. view inbound rules. view outbound rules
 Scheduled events: -
 AMI ID: SKL-Ubuntu-Cassandra (ami-ec1a8593)
 Platform details: Linux/UNIX

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

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Launch Instance Connect Actions

Filter by tags and attributes or search by keyword

Name	Instance ID	Instance Type	Availability Zone	Instance State	Status Checks	Alarm Status	Public DNS (IPv4)	IPv4 Public IP	IPv6 IPs
cassandra-node-1	i-014b4c58501933cd0	t2.small	us-east-1a	running	2/2 checks ...	None	ec2-3-227-9-131 comp...	3.227.9.131	-
cassandra-node-2	i-036f95acbc9ace9c8	t2.small	us-east-1b	running	Initializing	None	ec2-3-83-177-65 comp...	3.83.177.65	-
cassandra-node-3	i-07c558882632e6a02	t2.small	us-east-1a	pending	Initializing	None	ec2-54-89-138-116 co...	54.89.138.116	-

Instance: i-036f95acbc9ace9c8 (cassandra-node-2) Public DNS: ec2-3-83-177-65.compute-1.amazonaws.com

Description Status Checks Monitoring Tags

Instance ID: i-036f95acbc9ace9c8
 Instance state: running
 Instance type: t2.small
 Finding: You may not have permission to access AWS Compute Optimizer.
 Private DNS: ip-172-31-83-199 ec2.internal
 Private IPs: 172.31.83.199
 Secondary private IPs:
 VPC ID: vpc-816568fb (default)
 Subnet ID: subnet-3f18e41e

Public DNS (IPv4): ec2-3-83-177-65.compute-1.amazonaws.com
 IPv4 Public IP: 3.83.177.65
 IPv6 IPs: -
 Elastic IPs: -
 Availability zone: us-east-1b
 Security groups: cassandra-ports. view inbound rules. view outbound rules
 Scheduled events: No scheduled events
 AMI ID: SKL-Ubuntu-Cassandra (ami-ec1a8593)
 Platform details: Linux/UNIX

Putty Configuration

Category: Session

Basic options for your PuTTY session

Specify the destination you want to connect to

Host Name (or IP address): 3.227.9.131 Port: 22

Connection type: ☐ Raw ☐ Telnet ☐ Rlogin ☒ SSH ☐ Serial

Load, save or delete a stored session

Saved Sessions: [Empty field]

Default Settings: [Empty field]

Load Save Delete

Close window on exit: ☐ Always ☐ Never ☒ Only on clean exit

About Help Open Cancel

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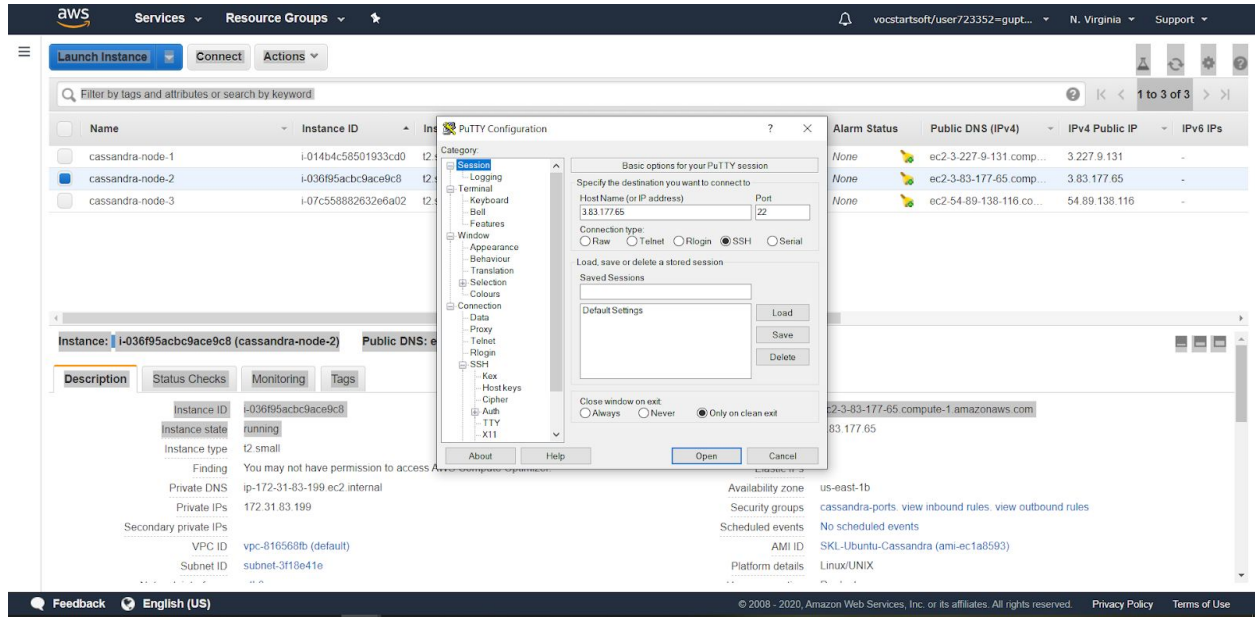
```
INFO [main] 2020-07-28 19:35:193; [org.apache.cassandra.3.11/bin
INFO MigrationStage=1] 2020-07-28 08:12:34,615 ViewManager.java:137 - Not submitting build tasks for views in keyspace system distributed as storage service is not initialized
INFO [MigrationStage=1] 2020-07-28 08:12:34,171 ColumnFamilyStore.java:408 - 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 08:12:34,221 StorageService.java:1441 - JOINING
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={}), tables=[org.apache.cassandra.config.CFMetadata@c3664bf[cfId=5Bc52802-d5e2-35ed-a818-eeceeb990,kName=syste
em,auth,cName=roles,flags=[COMPOUND],params=TableParams(comment=role definitions, read_repair_chance=0.0, local_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')],compression_opts=[org.apache.cassandra.compression.Parameters@7cd362e9, extensions=[]],cdc=false},comparator=comparator(org.apache.cassandra.db.marsha
l.UTF8Type),partitionColumns=[()]}],(can_login=is_superuser,salted_hash_member_of={},partiti
onKeyColumns=[role]),clusteringColumns=[(),keyValidator=org.apache.cassandra.db.marshall.UTF8Type,columnMetadata={salted hash, member_of, role, can_login, is_superuser},droppedColumns={}
,indexes=[],org.apache.cassandra.config.CFMetadata@87ef440d[cfId=0ecdaad8-7f8b-3e60-88d1-74fb36fed50c,kName=system,auth,cName=role_members,flags=[COMPOUND],params=TableParams(comm
ent=role members lookup table, read_repair_chance=0.0, local_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=
SimpleCompactionStrategy([min_threshold=4, max_threshold=32]),compression_opts=[org.apache.cassandra.schema.CompressionParameters@7cd362e9, extensions=[]],cdc=false},comparator=comparato
r(org.apache.cassandra.db.marshall.UTF8Type),partitionColumns=[()]}],(partitionKeyColumns=[role]),clusteringColumns=[member],keyVa
lidator=org.apache.cassandra.db.marshall.UTF8Type,columnMetadata={role, member},droppedColumns=[],triggers=[],indexes=[],org.apache.cassandra.config.CFMetadata@866dc7bd[cfId=3afbe79f-2194-31
7d-ad77-f5ab9db8ec5c,kName=system,auth,cName=role_permissions,flags=[COMPOUND],params=TableParams(comment=permissions granted to db roles, read_repair_chance=0.0, local_read_repair_cha
nce=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': 'NONE'),compression_opts=[org.apache.cassandra.schema.CompressionParameters@7cd362e9, extensions=[]],cdc=false},comparator=comparato
r(org.apache.cassandra.db.marshall.UTF8Type),partitionColumns=[()]}],(permissions),partitionKeyColumns=[resource]),clusteringColumns=[resource],keyValidator=org.apache.cassandra.db.marsh
al.UTF8Type,columnMetadata={rol
e, resource, permissions},droppedColumns=[],triggers=[],indexes=[],org.apache.cassandra.config.CFMetadata@4d7b486f[cfId=5f2fbad-91fi-3946-bd25-d5da3a5c35ce,kName=system,auth,cName=reso
urce_role_permissions,index,flags=[COMPOUND],params=TableParams(comment=index of db roles with permissions granted on a resource, read_repair_chance=0.0, local_read_repair_chance=0.0, bloo
n_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, specu
lative_retry=99PERCENTILE, caching='keys': 'NONE'),compression_opts=[org.apache.cassandra.schema.CompressionParameters@7cd362e9, extensions=[]],cdc=false},comparator=comparator(org.apac
he.cassandra.db.marshall.UTF8Type),partitionColumns=[()]}],(none),columnKeyColumns=[resource]),clusteringColumns=[resource],keyValidator=org.apache.cassandra.db.marshall.UTF8Type,columnMeta
data={resource, none},droppedColumns=[],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.role_permissions 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 08:12:34,625 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 GossipJmx.java:1655 - Waiting for gossip to settle...
INFO [main] 2020-07-28 08:12:42,673 GossipJmx.java:1666 - No gossip backlog; proceeding
```

```
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



```
ubuntu@ip-172-31-83-199:/opt/apache-cassandra-3.11.1/conf$
ubuntu@ip-172-31-83-199:/opt/apache-cassandra-3.11.1/conf$ sed -i 's=MOD_CLUSTER_NAME=GL-Cluster=g' cassandra.yaml
sed -i 's=MOD_RACK=r2=g' cassandra-rackdc.propertiesubuntu@ip-172-31-83-199:/opt/apache-cassandra-3.11.1/conf$ sed -i 's=MOD_IP_ADDRESS=172.31.83.199=g' cassandra.yaml
ubuntu@ip-172-31-83-199:/opt/apache-cassandra-3.11.1/conf$ sed -i 's=MOD_SEED_LIST=172.31.2.193=g' cassandra.yaml
ubuntu@ip-172-31-83-199:/opt/apache-cassandra-3.11.1/conf$ sed -i 's=MOD_DATACENTER=dc1=g' cassandra-rackdc.properties
ubuntu@ip-172-31-83-199:/opt/apache-cassandra-3.11.1/conf$ sed -i 's=MOD_RACK=r2=g' cassandra-rackdc.properties
ubuntu@ip-172-31-83-199:/opt/apache-cassandra-3.11.1/conf$ vi cassandra.yaml
ubuntu@ip-172-31-83-199:/opt/apache-cassandra-3.11.1/conf$
ubuntu@ip-172-31-83-199:/opt/apache-cassandra-3.11.1/conf$
ubuntu@ip-172-31-83-199:/opt/apache-cassandra-3.11.1/conf$
```

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


```

ubuntu@ip-172-31-83-199:/opt/apache-cassandra-3.11.1/bin$
INFO [MentableFlushWriter:1] 2020-07-28 08:21:16,053 CacheService.java:112 - Initializing key cache with capacity of 49 MBs.
INFO [MentableFlushWriter:1] 2020-07-28 08:21:16,069 CacheService.java:134 - Initializing row cache with capacity of 0 MBs
INFO [MentableFlushWriter:1] 2020-07-28 08:21:16,070 CacheService.java:163 - Initializing counter cache with capacity of 24 MBs
INFO [MentableFlushWriter:1] 2020-07-28 08:21:16,075 CacheService.java:174 - Scheduling counter cache save to every 7200 seconds (going to save all keys).
INFO [main] 2020-07-28 08:21:16,338 StorageService.java:599 - Populating token metadata from system tables
INFO [CompactionExecutor:2] 2020-07-28 08:21:16,365 BufferPool.java:230 - Global buffer pool is enabled, when pool is exhausted (max is 247.000MiB) it will allocate on heap
INFO [main] 2020-07-28 08:21:16,466 StorageService.java:606 - Token metadata:
INFO [pool-4-thread-1] 2020-07-28 08:21:16,526 AutoSavingCache.java:173 - Completed loading (2 ms; 8 keys) KeyCache cache
INFO [main] 2020-07-28 08:21:16,562 CommitLog.java:152 - No commitlog files found; skipping replay
INFO [main] 2020-07-28 08:21:16,567 StorageService.java:599 - Populating token metadata from system tables
INFO [main] 2020-07-28 08:21:16,669 QueryProcessor.java:163 - Preloaded 0 prepared statements
INFO [main] 2020-07-28 08:21:16,882 StorageService.java:617 - Cassandra version: 3.11.1
INFO [main] 2020-07-28 08:21:16,882 StorageService.java:618 - Thrift API version: 20.1.0
INFO [main] 2020-07-28 08:21:16,883 StorageService.java:619 - CQL supported versions: 3.4.4 (default: 3.4.4)
INFO [main] 2020-07-28 08:21:16,884 StorageService.java:621 - Native protocol supported versions: 3/v3, 4/v4, 5/v5-beta (default: 4/v4)
INFO [main] 2020-07-28 08:21:16,950 IndexSummaryManager.java:85 - Initializing index summary manager with a memory pool size of 49 MB and a resize interval of 60 minutes
INFO [main] 2020-07-28 08:21:16,972 MessagingService.java:753 - Starting Messaging Service on /172.31.83.199:7000 (eth0)
WARN [main] 2020-07-28 08:21:16,980 SystemKeyspace.java:1089 - No host ID found, created 52d67e8b-8731-4453-85cb-26a4068ad0e6 (Note: This should happen exactly once per node).
INFO [main] 2020-07-28 08:21:17,043 OutboundTcpConnection.java:108 - OutboundTcpConnection using coalescing strategy DISABLED
INFO [HANDSHAKE-/172.31.2.193] 2020-07-28 08:21:17,075 OutboundTcpConnection.java:560 - Handshaking version with /172.31.2.193
INFO [ScheduledTasks:1] 2020-07-28 08:21:17,256 TokenMetadata.java:490 - Updating topology for all endpoints that have changed
INFO [main] 2020-07-28 08:21:18,104 StorageService.java:706 - Loading persisted ring state
INFO [main] 2020-07-28 08:21:18,113 StorageService.java:819 - Starting up server gossip
INFO [main] 2020-07-28 08:21:18,277 StorageService.java:1442 - JOINING: waiting for ring information
INFO [HANDSHAKE-/172.31.2.193] 2020-07-28 08:21:19,174 OutboundTcpConnection.java:560 - Handshaking version with /172.31.2.193
INFO [GossipStage:1] 2020-07-28 08:21:19,622 Gossiper.java:1067 - Node /172.31.2.193 is now part of the cluster
INFO [RequestResponseStage:1] 2020-07-28 08:21:19,644 Gossiper.java:1031 - InetAddress /172.31.2.193 is now UP
INFO [GossipStage:1] 2020-07-28 08:21:19,750 TokenMetadata.java:479 - Updating topology for /172.31.2.193
INFO [GossipStage:1] 2020-07-28 08:21:19,751 TokenMetadata.java:479 - Updating topology for /172.31.2.193
INFO [InternalResponseStage:1] 2020-07-28 08:21:20,278 ViewManager.java:137 - Not submitting build tasks for views in keyspace system_traces as storage service is not initialized
INFO [InternalResponseStage:1] 2020-07-28 08:21:20,288 ColumnFamilyStore.java:408 - Initializing system_traces.events
INFO [InternalResponseStage:1] 2020-07-28 08:21:20,300 ColumnFamilyStore.java:408 - Initializing system_traces.sessions
INFO [InternalResponseStage:1] 2020-07-28 08:21:20,309 ViewManager.java:137 - Not submitting build tasks for views in keyspace system distributed as storage service is not initialized
INFO [InternalResponseStage:1] 2020-07-28 08:21:20,321 ColumnFamilyStore.java:408 - Initializing system distributed.parent_repair_history
INFO [InternalResponseStage:1] 2020-07-28 08:21:20,329 ColumnFamilyStore.java:408 - Initializing system distributed.repair_history
INFO [InternalResponseStage:1] 2020-07-28 08:21:20,341 ColumnFamilyStore.java:408 - Initializing system distributed.view_build_status
INFO [InternalResponseStage:1] 2020-07-28 08:21:20,348 ViewManager.java:137 - Not submitting build tasks for views in keyspace system_auth as storage service is not initialized
INFO [InternalResponseStage:1] 2020-07-28 08:21:20,353 ColumnFamilyStore.java:408 - Initializing system_auth.resource_role_permissions_index
INFO [InternalResponseStage:1] 2020-07-28 08:21:20,358 ColumnFamilyStore.java:408 - Initializing system_auth.role_members
INFO [InternalResponseStage:1] 2020-07-28 08:21:20,365 ColumnFamilyStore.java:408 - Initializing system_auth.role_permissions
INFO [InternalResponseStage:1] 2020-07-28 08:21:20,376 ColumnFamilyStore.java:408 - Initializing system_auth.roles
INFO [main] 2020-07-28 08:21:21,278 StorageService.java:1442 - JOINING: waiting for schema information to complete
INFO [main] 2020-07-28 08:21:21,279 StorageService.java:1442 - JOINING: schema complete, ready to bootstrap
INFO [main] 2020-07-28 08:21:21,279 StorageService.java:1442 - JOINING: waiting for pending range calculation
INFO [main] 2020-07-28 08:21:21,279 StorageService.java:1442 - JOINING: calculation complete, ready to bootstrap
INFO [main] 2020-07-28 08:21:21,279 StorageService.java:1442 - JOINING: getting bootstrap token
INFO [main] 2020-07-28 08:21:21,335 StorageService.java:1442 - JOINING: sleeping 30000 ms for pending range setup
ubuntu@ip-172-31-83-199:/opt/apache-cassandra-3.11.1/bin$

```

Command: cassandra

```

ubuntu@ip-172-31-83-199:/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 172.31.83.199  108.4 KiB  256        100.0%            52d67e8b-8731-4453-85cb-26a4068ad0e6  r1
UN 172.31.2.193  108.79 KiB  256        100.0%            0a17d131-f69d-4975-92c8-ee7367e33cb3  r1
ubuntu@ip-172-31-83-199:/opt/apache-cassandra-3.11.1/bin$

```

Command: ./nodetool status

Instance 3 - cassandra-node-3

The screenshot displays the AWS Management Console interface. On the left, a list of instances is shown, with 'cassandra-node-3' selected. The main panel shows the details for this instance, including its ID (i-07c55882632e6a02), state (running), and various network and security settings. A PuTTY configuration window is overlaid on the console, showing the connection details for the instance, including the host name (ip-172-31-12-119.ec2.internal) and port (22). The PuTTY window also shows the connection type (SSH) and the session name (Default Settings).

Name	Instance ID	State	Private DNS	Private IPs	Secondary private IPs	VPC ID	Subnet ID
cassandra-node-1	i-014b4c58501933cd0	running	ip-172-31-12-119.ec2.internal	172.31.12.119		vpc-816568fb (default)	subnet-51d02137
cassandra-node-2	i-030f95abc9ace9c8	running	ip-172-31-12-119.ec2.internal	172.31.12.119		vpc-816568fb (default)	subnet-51d02137
cassandra-node-3	i-07c55882632e6a02	running	ip-172-31-12-119.ec2.internal	172.31.12.119		vpc-816568fb (default)	subnet-51d02137

```
ubuntu@ip-172-31-12-119:/opt/apache-cassandra-3.11.1/conf$  
ubuntu@ip-172-31-12-119:/opt/apache-cassandra-3.11.1/conf$ sed -i 's=MOD_CLUSTER_NAME=GL-Cluster=g' cassandra.yaml  
ubuntu@ip-172-31-12-119:/opt/apache-cassandra-3.11.1/conf$ sed -i 's=MOD_IP_ADDRESS=172.31.12.119=g' cassandra.yaml  
ubuntu@ip-172-31-12-119:/opt/apache-cassandra-3.11.1/conf$ sed -i 's=MOD_SEED_LIST=172.31.2.193=g' cassandra.yaml  
ubuntu@ip-172-31-12-119:/opt/apache-cassandra-3.11.1/conf$ sed -i 's=MOD_DATACENTER=dc1=g' cassandra-rackdc.properties  
ubuntu@ip-172-31-12-119:/opt/apache-cassandra-3.11.1/conf$ sed -i 's=MOD_RACK=r3=g' cassandra-rackdc.properties  
ubuntu@ip-172-31-12-119:/opt/apache-cassandra-3.11.1/conf$
```

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

```
ubuntu@ip-172-31-12-119:/opt/apache-cassandra-3.11.1/bin$  
INFO [StreamConnectionEstablisher:1] 2020-07-28 08:27:12,616 StreamCoordinator.java:264 - [Stream #22844eb0-d0ac-11ea-8e8a-11280f56a2b0, ID#0] Beginning stream session with /172.31.2.193  
INFO [STREAM-IN-/172.31.2.193:7000] 2020-07-28 08:27:12,643 StreamResultFuture.java:187 - [Stream #22844eb0-d0ac-11ea-8e8a-11280f56a2b0] Session with /172.31.2.193 is complete  
INFO [STREAM-IN-/172.31.2.193:7000] 2020-07-28 08:27:12,652 StreamResultFuture.java:219 - [Stream #22844eb0-d0ac-11ea-8e8a-11280f56a2b0] All sessions completed  
INFO [STREAM-IN-/172.31.2.193:7000] 2020-07-28 08:27:12,663 StorageService.java:1498 - Bootstrap completed! for the tokens [704650348397226211, 4024697723735659755, 8033320988737603049, -  
1486112950745187347, -672030404583937540, -3629682629676247504, -5233271411059011396, 728273376723786303, -5520431720726326102, -3996355753360338270, -3969656233614082483, 84426141308510547  
92, 3027112370005827055, -3446697930109894719, -568871355919212027, -2482174092623044372, -8425735817379054828, -3987094383702724308, -263311598527213585, -4188060604035753201, -7562850457  
053986512, -1150790698000546389, -3526179842801021200, 6752560465136403523, -4840167458632601344, -8076834435645810218, 5188322569267030271, 8142899615481153334, 6636299987411476340, -23879  
89501137742358, 12284960245560796370, 1752814826296750515, 2796951639632846464, -8965440650978733726, 8567751009224515150, 4782738931590973279, -2747579678310413458, 2646427228847919158, -48  
80375971774512696, -5572026902207046974, 34561435345424743, -48424753187965948231, -6377164106988708840, 4997115049590860292, -6550304485002089601, 4459550487001322745, -2621263782394083238  
, -8550561021267554775, -6825027937080336028, 8740046645306092411, -79059277883161800197, 1417610940681433460, 432789858556102601, 6944788972211784803, 3768985461859135942, 292619913131575842  
78, 930447534221151251, -3585812730259390152, -9036445276247071759, 681622209423573420, -467366235056371249, 3933146335086481, 4998909875240679987, 3810602667240136064, 6408415795552948  
15, -831484510743961114, 4559290266691786124, 3108031277685919498, -7367523425324074979, 8988953260932605710, 8502718498110603532, 4074173908331716291, 5034001765132038641, -51065376788720  
02522, 939308239391245813, -3258369418839455434, -4191647764616155239, 6327285448366941078, 5134851305782011506, -2542478996098337184, 4742352263789793237, -7148091872192904273, 19736766094  
46075449, -6310764810249206828, 4887132114623069989, -743344228124369024, -7409897854407717171, -4820216243497300295, 4370901665376923912, -6743840064379055803, 1623250217533244132, -24208  
91758241799246, -728266190655709148, -6665448420004176197, 8757845032042671778, -73439001139682715, -5334582281790706979, 7762900447827744631, -6684366726343806009, 4734138251236513887,  
-251915558658763265, -4363113888821419373, -4919214002895325490, 2384504428599463395, 4703179333607819673, 7690389693242118343, 640188774274061723, -347244228567921513, -8872914921437731  
952, 1213420355017835387, 5236501071197946119, -4567905556148312993, 7259952462680392811, 1715595834498595091, -2332794514441592256, -2304856377499058846, 7474444749983442110, 3405131865202  
140276, 8156743495587532101, -808165856982750213, -1270864614234853607, -688410407686974365, 8327301779237485906, 3674653112240466016, -4389804900434435066, -8592445619037330583, 68349197  
12719890845, -1254603452700327567, -1873424771763815048, -400337668655971869, 6351364091159310944, -794626262693538494, -4666158452484721571, 419184787559297335, 5350849689311611348, -362  
33955270522052, -3863685987695235420, -413804500264899828, 6909187493139796147, -8463228401724963027, -2010530788920618100, -685928325893726457, -616939204227958105, -56011654009399854,  
2499897375594021361, -730780015413456411, 5808092370939721788, -1704944108832917494, -5184160442235834557, 8671207998351115250, 1210530408299629458, -6400264779693378282, 46453440898482289  
52, -662198011545878408, 5425307704670950113, 402714687663245433, -5896095779870698466, 5101258572176764505, -449599838442571474, -1415680235660872997, -6933123107824618055, 27064432963258  
03864, 8564673176648610417, 6071531818233199426, 1505110331401555584, -5553865755940557356, -5126870854069304721, 5260172496264179629, 2367838438546888202, -1065259882712694576, 51321724198  
16713938, -3301201226674669953, -7255926520648129737, -353046340344999410, 7069784694649166334, -1939128600292519101, 8051271625087546755, 1034838169657231034, -2892511126158550394, -716121  
8337058383649, -113961653039104624, 5835408343137403752, -3208058272172476534, 7255784994636772764, 4051277927580078418, -25748482932403609, -7204996186257701547, 1767591817708180054, -1  
55853999002675283, -385497677605859020, 1051447797355355876, 7724261741964480559, 278950296427795198, 2147872887394553493, -1287205007180904546, -7515788034291960217, -870416019278740835  
8, -1837489084060738179, -6542288744655416973, 7765951592490839080, 3502462407450031918, -3264575611421900252, 6253816914799212256, -3516025190770214964, 7053550633806095763, -2430493531571  
585234, 3699270970605502320, -5612119176533515410, -4745695151303583575, -612906690401983552, -4214997613510116947, -7270584846451287332, -2376138005467064462, 3590456800477841616, 7562710  
028255362693, -1231842725345848730, -7969359518757888928, 785842246237563572, 12592977341309417, 8622453585483873986, -5456285047139573335, 1155107508669836342, -5193335508160698332, 2548  
393592820384443, -7827457389336474511, 4091529091206166155, 784560038679166596, 9032603306078022538, -5046277239778897538, 774158139589608634, 3792994367101661962, 1209638987254571421, 679  
04992240620373294, 2410240362496919448, -6699016381497340775, 8919127073585500518, -173771820297499648, -6115876808593574422, 710328650341381574, -29656677089022700, 4545424579471030254, 97  
4538850072500691, 6407871589203025585, -592510580375206279, 5773235729855095841, -9048890562102930927, 21879800965974221, 409550025917745795, -7908489548831230623, 6734235465284036586, -7  
019769353618846730, -723663617186900103, -915539334419896480, -2682045176703203797, -7362194900689285202, 8300437573182520552]  
INFO [main] 2020-07-28 08:27:12,664 StorageService.java:1442 - JOINING: Finish joining ring  
INFO [main] 2020-07-28 08:27:12,790 AuthCache.java:172 - (Re)initializing CredentialsCache (validity period/update interval/max entries) (2000/2000/1000)  
INFO [main] 2020-07-28 08:27:12,795 Gossipiper.java:1655 - Waiting for gossip to begin...  
INFO [main] 2020-07-28 08:27:20,801 Gossipiper.java:1686 - No gossip backlog proceeding
```

Command: cassandra

```
ubuntu@ip-172-31-12-119:/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 172.31.83.199 108.4 KiB 256 65.7% 52d67e8b-8731-4453-85cb-26a4068ad0e6 r2  
UN 172.31.12.119 84.26 KiB 256 65.6% 669dbdc0-c5d2-409f-9358-b84c066c2864 r3  
UN 172.31.2.193 108.79 KiB 256 68.7% 0a1d131f-f69d-4975-92c8-ee73b7633cb3 r1
```

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:

```
ubuntu@ip-172-31-2-193:/opt/apache-cassandra-3.11.1/bin$ ./cqlsh 172.31.2.193 -u cassandra -p cassandra
Connected to db-cluster at 172.31.2.193:9042.
[cqlsh 5.0.1 | Cassandra 3.11.1 | CQL spec 3.4.4 | Native protocol v4]
Use HELP for help.
cassandra@cqlsh>
cassandra@cqlsh>
cassandra@cqlsh>
cassandra@cqlsh>
```

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

Step 2:

```
cassandra@cqlsh> ALTER KEYSPACE "system_auth" WITH REPLICATION = {'class':'NetworkTopologyStrategy', 'dc1':3}
...
...
...
Statements are terminated with a ';'. You can press CTRL-C to cancel an incomplete statement.
...
cassandra@cqlsh> ALTER KEYSPACE "system_auth" WITH REPLICATION = {'class':'NetworkTopologyStrategy', 'dc1':3};
cassandra@cqlsh>
cassandra@cqlsh>
cassandra@cqlsh>
```

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

Step 3:

```
cassandra@cqlsh>
cassandra@cqlsh> CREATE KEYSPACE IF NOT EXISTS starfleet WITH replication = {'class':'NetworkTopologyStrategy', 'dc1':3};
cassandra@cqlsh>
```

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

Step 4,5:

```
cassandra@cqlsh> 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>
cassandra@cqlsh>
cassandra@cqlsh>
```

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>
cassandra@cqlsh> INSERT INTO starfleet.user (user_id,location,display_name,first_name,last_name) VALUES ('u1','earth1','Kirk','William','Shatner');
cassandra@cqlsh> INSERT INTO starfleet.user (user_id,location,display_name,first_name,last_name) VALUES ('u2','vulcan','Spock','Leonard','Nimoy');
cassandra@cqlsh>
cassandra@cqlsh>
```

```
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 5.203618 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