Edge Capacity Expansion

Add and remove Cassandra

Google Cloud

Agenda

- Background information
- Cassandra ring expansion process
- Add Cassandra
- Remove Cassandra

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Background Information

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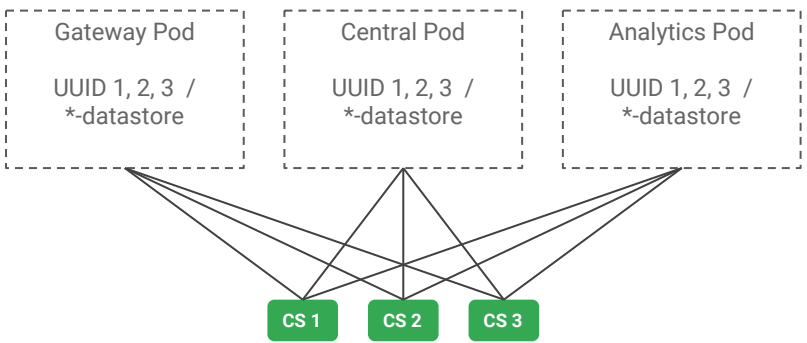
Cassandra server registration

On Edge, most components are registered as server references (via UUID) in their corresponding Pods. Cassandra is the noticeable exception to this rule. In the case of Cassandra, the servers and references to specific keyspaces are actually register to each Pod. All Pods, Gateway, Central and Analytics have relevant references to Cassandra.

```
{
"internalIP" : "xxx.xxx.xxx.xxx",
"isUp" : true,
"pod" : "gateway",
"reachable" : true,
"region" : "dc-1",
"tags" : {
"property" : [ ]
},
       "type" : [ "dc-datastore", "cache-datastore",
 "keyvaluemap-datastore", "kms-datastore", "counter-datastore"
                              ],
"uUID" : "c6d1c0d2-ffa5-4ffe-b950-9b06b75e41eb"
}
```



You can list server registration by Pod and Region by executing the following API call:

```
curl -v -u <adminEmail>:<adminPassword> http://<ms_IP>:8080/v1/servers?region=<region>&pod=<pod>
```

Cassandra node configuration

In addition to the logical server registration performed during Edge installation, Cassandra components use local configuration file which describe the topology. As part of the addition and removal of nodes, these files must be updated.

`/opt/apigee/apigee-cassandra/conf/cassandra-topology.properties`

`/opt/apigee/apigee-cassandra/conf/cassandra.yaml`

The upgrade corresponding to the files above is managed by Edge setup.sh.

No manual changes to these files is required.

Cassandra Ring Expansion Process

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Cassandra ring expansion process

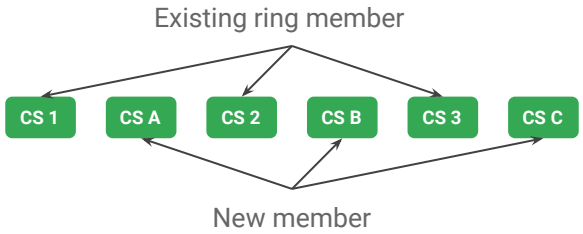
Cassandra embraces horizontal scalability. When expanding an existing Cassandra ring, often the size of the ring is doubled or increased by an increment of the replication factor used by the client applications.
In the case of Edge this means, that expanding a 3 Cassandra nodes ring will require adding 3 additional Cassandra nodes or any increment of 3. Edge replication factor is configured, by default, as 3.

On the illustration below, nodes 1, 2 and 3 correspond to the existing member of the ring. A, B and C to the new nodes being added.

As part of the addition of the new nodes, they are placed in between existing nodes with the goal being split ranges and shared data ownership between existing and newly added nodes.

Ring expansion steps:

1. Reconfigure the existing Cassandra nodes
2. Install Cassandra on the new nodes
3. Rebuild the new Cassandra nodes from existing nodes
4. Reconfigure the Management Server
5. Free memory on the existing Cassandra nodes



Adding Cassandra Nodes

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Add Cassandra Nodes - 1/5

1. Reconfigure the existing Cassandra nodes

1.1. Update your existing response file to include the new Cassandra nodes. On the example below, nodes 10, 11 and 12 correspond to the new Cassandra nodes. Copy response file to all existing Cassandra nodes and new Cassandra nodes.

```
IP1=<node 1>
IP2=<node 2>
IP3=<node 3>
IP10=<node 10>
IP11=<node 11>
IP12=<node 12>

HOSTIP="$(hostname -i)"
...
CASS_HOSTS="$IP1:1,1 $IP10:1,1 $IP2:1,1 $IP11:1,1 $IP3:1,1 $IP12:1,1"
...
BIND_ON_ALL_INTERFACES="y"
```

1.2. Update configuration of existing Cassandra nodes:

```
/opt/apigee/apigee-setup/bin/setup.sh -p c -f updatedConfigFile
```

Add Cassandra Nodes - 2/5

2. Install new Cassandra nodes

Installing the new nodes is as simple as following the same steps used during the installation process and performing a setup with profile c (Cassandra).

```
curl https://software.apigee.com/bootstrap_<version>.sh -o /tmp/edge/bootstrap_<version>.sh

bash /tmp/edge/bootstrap_<version>.sh apigeeuser=uName apigeepassword=pWord

/opt/apigee/apigee-service/bin/apigee-service apigee-setup install

/opt/apigee/apigee-setup/bin/setup.sh -p c -f updatedConfigFile
```

Note: On this chapter we focus on adding just Cassandra nodes. A typical Edge installation may add both Cassandra and Zookeeper processes on the same node. If you are installing both new Zookeeper and Cassandra you can use profile ds (Datastore).

Add Cassandra Nodes - 3/5

3. Rebuild the new Cassandra nodes from existing nodes

Rebuild the three new Cassandra nodes, specifying the region name set in the config file (response file) by the REGION property. In this example, it is "dc-1":

On the first node, run:

```
/opt/apigee/apigee-cassandra/bin/nodetool -h nodeIP rebuild dc-1
```

Where nodeIP is the IP address of the Cassandra node.

Repeat this step on the remaining new Cassandra nodes.

Add Cassandra Nodes - 4/5

4. Reconfigure the Management Server

On a Management-Server node, execute setup.sh to update the Management Server for the newly added Cassandra nodes:

```
/opt/apigee/apigee-setup/bin/setup.sh -p ms -f updatedConfigFile
```

Add Cassandra Nodes - 5/5

5. Free memory on the existing Cassandra nodes

On the existing Cassandra nodes, run the nodetool cleanup command to free up memory:

```
/opt/apigee/apigee-cassandra/bin/nodetool -h cassandraIP cleanup
```

e.g.

```
/opt/apigee/apigee-cassandra/bin/nodetool -h 10.152.0.2 cleanup
```

Removing Cassandra Nodes

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Remove Cassandra Nodes - 1/5

1. Remove Cassandra references from Pods

1.1. Update your existing response file to exclude nodes to be removed.

Current response file:

```
IP1=<node 1>
IP2=<node 2>
IP3=<node 3>
IP10=<node 10>
IP11=<node 11>
IP12=<node 12>

HOSTIP="$(hostname -i)"
...
CASS_HOSTS="$IP1:1,1 $IP10:1,1 $IP2:1,1 $IP11:1,1
$IP3:1,1 $IP12:1,1"
...
BIND_ON_ALL_INTERFACES="y"
```

Updated response file:

```
IP1=<node 1>
IP2=<node 2>
IP3=<node 3>

HOSTIP="$(hostname -i)"
...
CASS_HOSTS="$IP1:1,1 $IP2:1,1 $IP3:1,1"
...
BIND_ON_ALL_INTERFACES="y"
```

1.2. Update configuration of existing Management Server nodes:

```
/opt/apigee/apigee-setup/bin/setup.sh -p ms -f updatedConfigFile
```

Remove Cassandra Nodes - 2/5

2. Restart components

Perform a rolling restart of all Edge components (R, MP, QS, PS):

```
/opt/apigee/apigee-service/bin/apigee-all restart
```

The restart will force components to read latest Pod wiring information and remove references to existing Cassandra nodes.

Remove Cassandra Nodes - 3/5

3. Decommission Cassandra nodes

For each Cassandra node to remove, one node at the time, execute decommission command:

```
/opt/apigee/apigee-cassandra/bin/nodetool <options> decommission

Options:

( -h | --host ) <host name> | <ip address>
( -p | --port ) <port number>
( -pw | --password ) <password >
( -u | --username ) <user name>
```

Decommission command deactivates a node by streaming its data to another node.

Remove Cassandra Nodes - 4/5

4. Update local configuration on remaining Cassandra nodes

```
/opt/apigee/apigee-setup/bin/setup.sh -p c -f updatedConfigFile
```

5. Uninstall Cassandra

If required, uninstall component as described at Uninstalling Edge:

```
http://docs.apigee.com/private-cloud/latest/uninstalling-edge
```

Thank You

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