Common Data Layer

Feature Summary and Revision History

Summary Data

Table 1: Summary Data

Applicable Product(s) or Functional Area	AMF
Applicable Platform(s)	SMI
Feature Default Setting	Enabled - Always-on
Related Documentation	Not Applicable

Revision History

Table 2: Revision History

Revision Details	Release
First introduced.	2021.04.0

Feature Description

Common Data Layer (CDL) can be deployed separately as a common datastore for AMF.

The following are the two different deployment possibilities for CDL pods:

• CDL created locally in the same namespace as that of AMF namespace

• CDL created in a different namespace
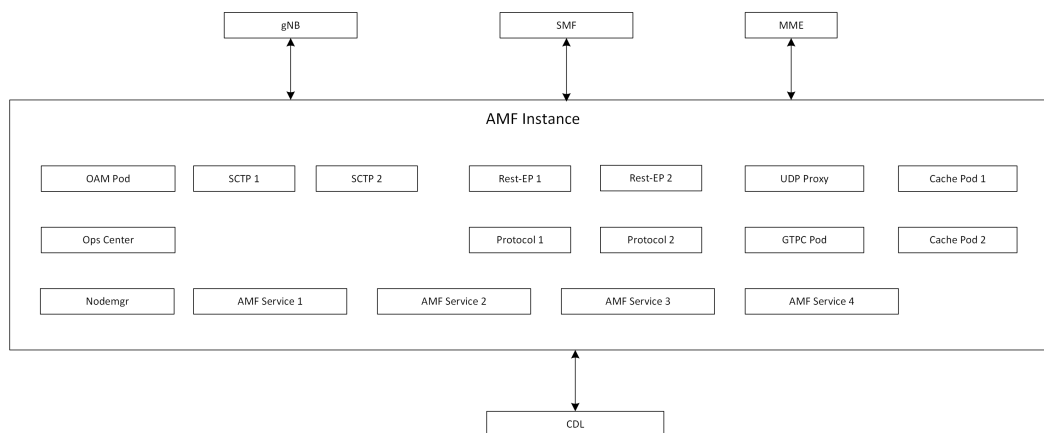
Architecture

AMF consists of the following layers as part of the cloud native architecture:

- Protocol Layer—NGAP/NAS over SCTP transport and SBA over REST/HTTP transport

  Example: AMF-protocol and AMF REST-EP

- Service Layer—Business logic of AMF functionality

  Example: AMF-service pod

- Datastore Layer—Supports session storage

  Example: CDL

The management entities Etcd, Cache pod, and NodeMgr provide services to the Protocol Layer, Service Layer, and Datastore Layer functionalities.

The following figure explains the architecture of AMF instance with separate namespace of CDL.

Figure 1: AMF Instance Architecture

The CDL is deployed as an independent entity which acts as a session store for AMF. The AMF instance performs the following:

The CDL can be configured with slice name as AMF to store the AMF sessions. The AMF instance performs the following:

- Provides instance ID by enhancing the existing session gRPC APIs of CDL or using session-related CDL gRPC APIs.

- Uses the slice name as AMF for session store with CDL.

The CDL exposes the gRPC API to register or deregister notification URI. The AMF instance uses gRPC API to provide the notification URI details to CDL.

The CDL searches for the notification URI in session lookup with instance ID. If the notification URI fails, the CDL picks another URI from the list in round robin.

Feature Configuration

Configuring this feature involves the following steps:

- CDL configuration in same namespace as AMF—This configuration provides the commands to configure CDL locally per AMF in the same namespace. For more information, refer to Configuring the CDL in same namespace as AMF, on page 3.

- CDL configuration in different namespace as AMF—To deploy CDL in different namespace, install CDL Ops Center in a separate namespace. This configuration provides the commands to configure CDL in separate namespace. For more information, refer to Configuring the CDL in different namespace as AMF, on page 5.

Configuring the CDL in same namespace as AMF

The CDL in same namespace as AMF configuration must be done in AMF Ops Center.

To configure CDL in same namespace as AMF, use the following example configuration:

```
cdl label-config session
  endpoint key key_value
  endpoint value endpoint_value
  slot map  no_of_slot_maps
    key key_value
    value value
  end
  index map map_number
    key key_value
    value value
  end
cdl logging default-log-level log_level
cdl datastore session
  cluster-id cluster_id
  label-config session
    slice-names cdl_slice_name
    endpoint replica replica_number
    index replica replica_number
    index map map_number
      index write-factor write_factor
    end
    slot replica replica_number
    slot map map_number
      slot write-factor write_factor
    end
  end
```

```
end
cdl kafka replica replica_number
cdl kafka storage storage_value
```

NOTES:

- **endpoint key** *key_value*—Specify the key for the endpoint configuration.

- **endpoint value** *endpoint_value*—Specify the value associated with the endpoint key.

- **slot map** *no_of_slot_maps*—Specify the number of partitions to be created for slot. Must be an integer in the range of 1–1024.

- **key** *key_value*—Specify the key for the slot map.

- **value** *value*—Specify the value associated with the slot map key.

- **index map** *map_number*—Specify the number of partitions to be created for index. Must be an integer in the range of 1–1024.

- **key** *key_value*—Specify the key for the index map.

- **value** *value*—Specify the value associated with the index map key.

- **cdl logging default-log-level** *log_level*—Specify the default logging level for the system.

- **cluster-id** *cluster_id*—Specify the the cluster ID for the datastore session.

- **slice-names** *cdl_slice_name*—Specify the CDL slice names. cdl_slice_name must be an alphanumeric string from 1 to 16 characters in length.

- **endpoint replica** *replica_number*—Specify the number of replicas to be created. The default value is 1. Must be an integer in the range of 1–16.

- **index replica** *no_of_replicas_per_map*—Specify the number of replicas to be created. The default value is 2. num_replica must be an integer in the range of 1–16.

- **index write-factor** *write_factor*—Specifythe number of copies to be written before successful response. The default value is 1. write_factor must be an integer in the range of 0–16.

- **slot replica** *replica_number*—Specify the number of replicas to be created. The default value is 1. num_replica must be an integer in the range of 1–16.

- **slot map** *map_number*—Specify the number of partitions in a slot. The default value is 1. num_map/shards must be an integer in the range of 1–1024.

- **slot write-factor** *write_factor*—Specify the number of copies to be written before successful response. The default value is 1. *write_factor* must be an integer in the range of 0–16. Make sure that the value is lower than or equal to the number of replicas..

Configuration Example

Use the `show running-config cdl` command to verify the configuration. The following is an example configuration in CDL Ops Center.

```
cdl label-config session
 endpoint key smi.cisco.com/node-type-4
 endpoint value cdl
 slot map 1
```

```
   key   smi.cisco.com/node-type-4
  value cdl
 exit
 slot map 2
  key   smi.cisco.com/node-type-4
  value cdl
 exit
 index map 1
  key   smi.cisco.com/node-type-4
  value cdl
 exit
exit
cdl logging default-log-level error
cdl datastore session
 cluster-id   1
 label-config session
 slice-names  [ 1 ]
 endpoint replica 2
 index replica 2
 index map     1
 index write-factor 1
 slot replica 2
 slot map     2
 slot write-factor 1
 slot notification dynamic-provisioning true
exit
cdl kafka replica 3
cdl kafka storage 1
```

Configuring the CDL in different namespace as AMF

To configure CDL in a different namespace as AMF, use the following configuration:

```
cdl label-config session
  endpoint key key_value
  endpoint value endpoint_value
  slot map  no_of_slot_maps
    key key_value
    value value
  end
  index map map_number
    key key_value
    value value
  end
cdl logging default-log-level log_level
cdl datastore session
  cluster-id cluster_id
  label-config session
    slice-names cdl_slice_name
    endpoint replica replica_number
    index replica replica_number
    index map map_number
      index write-factor write_factor
    end
    slot replica replica_number
    slot map map_number
      slot write-factor write_factor
```

```
         slot notification dynamic-provisioning true
       end
    end
end
cdl kafka replica replica_number
cdl kafka storage storage_value
```

NOTES:

- **endpoint key** *key_value*—Specify the key for the endpoint configuration.

- **endpoint value** *endpoint_value*—Specify the value associated with the endpoint key.

- **slot map** *no_of_slot_maps*—Specify the number of partitions to be created for slot. Must be an integer in the range of 1–1024.

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- **value** *value*—Specify the value associated with the slot map key.

- **index map** *map_number*—Specify the number of partitions to be created for index. Must be an integer in the range of 1–1024.

- **key** *key_value*—Specify the key for the index map.

- **value** *value*—Specify the value associated with the index map key.

- **cdl logging default-log-level** *log_level*—Specify the default logging level for the system.

- **cluster-id** *cluster_id*—Specify the the cluster ID for the datastore session.

- **slice-names** *cdl_slice_name*—Specify the CDL slice names. cdl_slice_name must be an alphanumeric string from 1 to 16 characters in length.

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 endpoint value cdl
 slot map 1
  key    smi.cisco.com/node-type-4
  value cdl
 exit
 slot map 2
  key    smi.cisco.com/node-type-4
  value cdl
 exit
 index map 1
  key    smi.cisco.com/node-type-4
  value cdl
 exit
exit
cdl logging default-log-level error
cdl datastore session
 cluster-id   1
 label-config session
 slice-names  [ 1 ]
 endpoint replica 2
 index replica 2
 index map     1
 index write-factor 1
 slot replica 2
 slot map      2
 slot write-factor 1
 slot notification dynamic-provisioning true
exit
cdl kafka replica 3
cdl kafka storage 1
```