Deploying and Configuring AMF through Ops Center

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

AMF deployment and configuration procedure involves deploying AMF through the Subscriber Microservices Infrastructure (SMI) Cluster Deployer and configuring the settings or customizations through the AMF Ops Center which is based on the Confd CLI.

The AMF configuration includes the NRF profile data configuration and the externally visible IP addresses and ports.

AMF Ops Center

The Ops Center is a system-level infrastructure that provides the following user interface to:

- Trigger the deployment of microservices by providing variable helm chart parameters. These chart parameters control the scale and properties of Kubernetes objects (deployment, pod, services, and so on) associated with the deployment.

- Push application specific configuration to one or more micro-services through Kubernetes configuration maps.

- Issue application-specific execution commands (such as show commands and clear). These commands:

  - Invoke APIs in application-specific pods

  - Display the information returned by the application on the user interface

To view the sample of the web-based CLI, use the following `show` command.

```
show running-config amf-services
amf-services am1
 amf-name              AMF
 validate-Tais         false
 relative-amf-capacity 127
 locality              LOC1
 operator-policy-name  local
 guamis mcc 123 mnc 456 region-id 1 set-id 14 pointer 3
 tai-groups test1
exit
slices name s1
 sst 11
 sdt 111111
exit
slices name s2
 sst 2
 sdt 000003
exit
slices name s3
 sst 3
 sdt 000004
 exit
exit
```

Prerequisites

Before deploying AMF on the SMI layer:

- Ensure that all the virtual network functions (VNFs) are deployed.

• Run the SMI synchronization operation for the AMF Ops Center and Cloud Native Common Execution Environment (CN-CEE).

AMF Sysctl Tuning Parameters and Hyperthreading Enable

In case the total number of AMF peers exceed 500, the following recommended sysctl parameter values should be configured:

```
net.ipv4.neigh.default.gc_thresh1=4096
net.ipv4.neigh.default.gc_thresh2=8192
net.ipv4.neigh.default.gc_thresh3=8192
net.ipv6.neigh.default.gc_thresh1=4096
net.ipv6.neigh.default.gc_thresh2=8192
net.ipv6.neigh.default.gc_thresh3=8192
```

1. Create a `sysctl.yaml` file and add the following contents:

```
cat sysctl.yaml

---
profiles:
  bios:
    name: cndp_default_settings
    description: "HyperThreading Enabled CIMC BIOS settings for CNDP"
    pids:
      ULTM-C220-M5SX-CM:
        description: "HyperThreading Enabled CIMC BIOS settings for ULTM-C220-M5SX-CM"
        tokens:
          cpuPerformance: hpc
          cpuEnergyPerformance: balanced-performance
          eppProfile: Performance
          intelHyperThreadingTech: enabled
          packageCstateLimit: C0 C1 State
          usbPortInternal: disabled
          usbPortKvm: enabled
          usbPortRear: disabled
          usbPortSdCard: disabled
  linux:
    name: sysctl_settings
    sysctl:
      net.ipv4.neigh.default.gc_thresh1: 4096
      net.ipv4.neigh.default.gc_thresh2: 8192
      net.ipv4.neigh.default.gc_thresh3: 8192
      net.ipv6.neigh.default.gc_thresh1: 4096
      net.ipv6.neigh.default.gc_thresh2: 8192
      net.ipv6.neigh.default.gc_thresh3: 8192
```

2. Run the following commands:

```
tar -czvf sysctl.tgz ./sysctl.yaml
./sysctl.yaml

sha256sum sysctl.tgz
d3496cd26cbd7a35b06581ad4af7cd507b89000a34f6531b990edc4a14326e26  sysctl.tgz
```

3. Host `sysctl.yaml` file in any HTTP server accessible from the setup.

4. Add the new host-profile in cluster deployer Ops Center configuration.

Note Create a new host profile instance and link it to node. Do not update the existing one.

```
config
 software host-profile sysctl
 url http://10.84.114.208:9080/sysctl.tgz
  allow-dev-image true
  sha256          42b64b2860826136079e8c7146086fce3e98fd8933ef837e1484f2682abdb38f
 exit
commit
```

5. Link the host profile in each of the nodes using the following in cluster deployer Ops Center:

```
config
 clusters <cluster-name> nodes <node-name> host-profile sysctl
 clusters <cluster-name> nodes <node-name> os tuned enabled
commit
```

6. After cluster sync is complete, verify whether the changes are complete on each server.

```
sysctl -a | grep -i net.ipv6.neigh.default.gc_thresh

net.ipv6.neigh.default.gc_thresh1 = 4096
net.ipv6.neigh.default.gc_thresh2 = 8192
net.ipv6.neigh.default.gc_thresh3 = 8192

sysctl -a | grep -i net.ipv4.neigh.default.gc_thresh

net.ipv4.neigh.default.gc_thresh1 = 4096
net.ipv4.neigh.default.gc_thresh2 = 8192
net.ipv4.neigh.default.gc_thresh3 = 8192

lscpu | grep Thread
Thread(s) per core: 2
```

Deploying and Accessing AMF

This section describes how to deploy AMF and access the AMF Ops Center.

Deploying AMF

The SMI platform is responsible for deploying and managing the Cloud Native 5G AMF application and other network functions.

For information on how to deploy AMF Ops Center on a vCenter environment, see Deploying and Upgrading the Product section in the Ultra Cloud Core Subscriber Microservices Infrastructure — Operations Guide.

For information on how to deploy AMF Ops Center on bare metal servers (currently Cisco UCS-C servers) environment, see Operating the SMI Cluster Manager on Bare Metal section in the Ultra Cloud Core Subscriber Microservices Infrastructure — Operations Guide.

Accessing the AMF Ops Center

You can connect to the AMF Ops Center through SSH or the web-based CLI console.

• SSH:

1. Log in to Master node.

2. SSH to Ops Center pod IP using the following command:

ssh admin@ops_center_pod_ip -p 2024

- Web-based console:

  1. Log in to the Kubernetes Master node.

  2. Run the following command:

     kubectl get ingress <namespace>

     The available ingress connections get listed.

  3. Select the appropriate ingress and access the AMF Ops Center.

  4. Access the following URL from your web browser:

     cli.<namespace>-ops-center.<ip_address>.nip.io

By default, the Day 0 configuration is loaded into the AMF.

Configuring Ops Center

This section describes how to configure the AMF Ops center.

1. Log in to Master node.

2. SSH to Ops Center pod IP using the following command.

   ssh admin@ops_center_pod_ip -p 2024

3. Copy the contents from the configuration file and paste it in the AMF Ops Center CLI to load the configuration.

   ```
   config
     <Paste the contents from configuration file here>
   commit
   exit
   ```

Sample Configuration

You can use **show running-config** command to view the sample configuration that is provided only for reference. You must create and modify your own configuration file according to the specific needs of your deployment.

To check the sample configuration file, refer to Sample Configuration.

Post Configuration Check

You can use the following commands from AMF Ops Center to check AMF status post configuration.

- show system
- show helm

Additionally, log in to master node and check AMF pod health and running state using kubectl get pod -n amf_namespace command.