Dynamic Configuration Change Support for SCTP and SBI Endpoints

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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 allows you to configure the SCTP and SBI endpoints dynamically.

This feature supports the following dynamic configurations:

- VIP-IP, Port addition and removal in SCTP endpoint
- TAI addition and removal in SBI
- Slice addition and removal in SBI

Feature Configuration

Configuring this feature involves the following steps:

- SCTP Endpoint Configuration—This configuration provides new SCTP VIP-IP and port addition, removal of existing SCTP VIP-IP and port information. For more information, refer to Configuring the SCTP Endpoint, on page 2 and Configuring the SCTP VIP-IP Port Removal , on page 3.
- SBI Endpoint Configuration—This configuration enables the NRF Registration, Deregistration, or NRF Update using internal VIP. For more information, refer to Configuring the SBI Endpoint, on page 3.
- Internal VIP-IP for the UDP Proxy Configuration—This configuration enables internal communication between UDP proxy and GTPC-EP using internal VIP-IP. For more information, refer to Configuring the Internal VIP-IP for the UDP Proxy, on page 6.

Configuring the SCTP Endpoint

To configure the SCTP endpoint, use the following configuration:

```
config
   instance instance-id instance_id
      endpoint sctp
         vip-ip existing_ipv4_address offline
            vip-ip new_ipv4_address vip-port port_number
         vip-ipv6 existing_ipv6_address offline
            vip-ipv6 new_ipv6_address vip-ipv6-port port_number
            end
```

NOTES:

- **endpoint sctp**—Specify the endpoint name as sctp.
- **vip-ip** *existing_ipv4_address* **offline**—Specify IPv4 address and mark it as offline.
- **vip-ip** *new_ipv4_address* **vip-port** *port_number*—Specify the new IPv4 address and port number.
- **vip-ipv6** *existing_ipv6_address* **offline**—Specify the IPv6 parameters of the pod on which VIP is enabled.
- **vip-ipv6** *new_ipv6_address* **vip-ipv6-port** *port_number*—Specify new IPv6 address and port number.

Use the following procedure to update the SCTP VIP-IP and port:

1. Add the new VIP-IP port.
2. Modify the gNB configuration to refer to the new VIP-IP and port.
3. When all gNBs refer to new VIP-IP, remove the old VIP-IP and port.

Note

- Post VIP-IP changes, AMF supports only resuming of IDLE mode subscribers with EEA0/EIA0 as the security algorithm.
- The change in the SCTP IP address isn't supported dynamically but the port change is supported.
- For any addition, deletion, or update of a new IP to the existing SCTP service requires the AMF restart.

Configuration Example

The following is an example configuration for IPv4.

```
config
   instance instance-id 1
      endpoint sctp
         vip-ip 209.165.200.226 offline
         vip-ip 209.165.200.228 vip-port 1000
         end
```

The following is an example configuration for IPv6.

```
config
   instance instance-id 1
      endpoint sctp
         vip-ip 209.165.202.158 vip-port 1001
         vip-ipv6 2001:420:54ff:a4::139:251 vip-ipv6-port 1000
         end
```

Configuring the SCTP VIP-IP Port Removal

When the gNB refers to the new VIP-IP port, remove the older ports.

To configure the SCTP VIP-IP port removal, use the following configuration.

```
config
   instance instance-id instance_id
      endpoint sctp
         no vip-ip existing_ip
         end
```

NOTES:

- **instance instance-id** *instance_id*—Specify the instance ID.
- **endpoint sctp**—Specify the endpoint as sctp.
- **no vip-ip** *existing_ip*—Specify the old IPv4 address and port number that must be removed.

Configuring the SBI Endpoint

Configuring the SBI endpoint involves the following steps:

- Endpoint Configuration—This configuration provides the commands to configure the endpoint. For more information, refer to Configuring the Endpoint, on page 4.

- AMF Registration with NRF—This configuration provides the commands to configure AMF Registration, Deregistration with NRF. For more information, refer to Configuring AMF Registration with NRF, on page 4.
- NRF Profile Update—This configuration provides the commands to configure the trigger to NRF Profile Update. For more information, refer to Configuring the Trigger to NRF Profile Update, on page 5.

Configuring the Endpoint

SBI endpoint changes don't result in the pod restart.

After an existing IP is marked as offline and the new IP is added, the existing sessions continue, and callback URI is considered based on the previously configured IP. After this IP change, the newly registered subscribers have the callback URI based on the new IP.

To configure the SBI endpoint, use the following configuration:

```
config
    instance instance-id instance_id
        endpoint sbi
            vip-ip existing_ip offline
            vip-ip new_ip vip-port port_number
            end
```

NOTES:

- **endpoint sbi**—Specify the endpoint name as sbi.
- **vip-ip** *existing_ip* **offline**—Specify the IPv4 address and mark it as offline.
- **vip-ip** *new_ip* **vip-port** *port_number*—Specify the new IPv4 address.

Note This feature doesn't support multiple SBI endpoint IP configurations during the start of the system.

Configuration Example

The following is an example configuration.

```
config
   endpoint sbi
      vip-ip 209.165.200.226 offline
      vip-ip 209.165.200.225
      end
```

Configuring AMF Registration with NRF

If AMF has no active registration towards NRF, and when AMF adds or removes an SBI endpoint from offline mode, AMF sends a Registration Request towards NRF by sending its NF profile in the Registration Request.

To trigger the AMF registration with NRF when the VIP-IP is offline, use the following configuration:

```
config
    instances instance-id instance_id
        endpoint sbi
```

```
no vip-ip vip_ip_address offline
end
```

NOTES:

- **instances instance-id** *instance_id*—Specify the instance ID.
- **endpoint sbi**—Specify the endpoint name as SBI.
- **no vip-ip** *vip_ip_address* **offline**—Specify the VIP-IP adress for SBI to remove this endpoint from offline mode.

Configuring the Trigger to NRF Profile Update

When a TAI or slice is added or removed, the AMF notifies the NRF by sending an NF Update request. The request contains the profile with the new TAI or slice information.

Configuring the NRF profile update involves the following steps:

- TAI Addition and Removal—This configuration enables the addition or removal of TAI. For more information, refer to Configuring the TAI Addition and Removal, on page 5.
- Slice Addition—This configuration enables the addition of a slice. For more information, refer to Configuring the Slice Addition, on page 5.
- Slice Removal—This configuration enables the removal of a slice. For more information, refer to Configuring the Slice Removal, on page 6.

Configuring the TAI Addition and Removal

To configure the TAI addition or removal, use the following configuration:

```
config
   tai-group name tai_group_name
      tais name tai_list_name
         mcc mcc
         mnc mnc
            tac list updated_tac_list
            end
```

NOTES:

- **tai-group name** *tai_group_name*—Specify the TAI group name to which the list of TAIs must be added.
- **tais name** *tai_list_name*—Specify the list of TAIs.
- **mcc** *mcc* —Specify the three-digit Mobile Country Code. Must be an integer with three digits.
- **mnc** *mnc*—Specify the two or three-digit Mobile Country Network. Must be an integer with three digits.
- **tac list** *updated_tac_list*—Specify the modified Tracking area code (TAC) list.

Configuring the Slice Addition

To configure an addition of a Slice, use the following configuration:

```
config
   amf-services service_name
```

```
slices name slice_name
   sst sst
   sdt sdt
   end
```

NOTES:

- **amf-services** *service_name*—Specify the AMF service.
- **slices name** *slice_name*—Specify the slice name that must be added to the service.
- **sst** *sst* —Specify the slice or service type to signify the expected network slice behaviour in terms of features and services. Must be an integer in the range of 0–255.
- **sdt** *sdt*—Specify the slice differentiator value. It complements one or more slice or service types to allow differentiation among multiple network slices of the same slice or service type. Must be a hexadecimal.

Configuring the Slice Removal

To configure removal of a Slice, use the following configuration:

```
config
   no amf-services service_name
      slices name slice_name
      end
```

NOTES:

- **amf-services** *service_name*—Specify the AMF service name.
- **slices name** *slice_name*—Specify the slice name that must be removed from the service.

Configuring the Internal VIP-IP for the UDP Proxy

When the internal VIP-IP is configured for the UDP-proxy (protocol) pod, the internal communication between the GTPC-EP and UDP-proxy happens over this IP address. The internal VIP-IP provides a secure channel for communication.

Note The VIP-IP doesn't support dynamic change. To update a VIP-IP, reconfigure the VIP-IP.

To configure the Internal VIP-IP for the UDP proxy, use the following configuration:

```
config
   instance instance-id instance_id
      endpoint protocol
         internal-vip vip_address
         end
```

NOTES:

- **endpoint protocol**—Specify the endpoint name as protocol.
- **instance instance-id** *instance_id*—Specify the instance ID.
- **internal-vip** *vip_address*—Specify the virtual IP address.