Multiple N4/Sx Interfaces

Feature Summary and Revision History

Summary Data

Table 1: Summary Data

Applicable Product (s) or Functional Area	5G-UPF
Applicable Platforms	VPC-SI SMI
Feature Default Setting	Disabled – Configuration Required
Related Changes in this Release	Not Applicable
Related Documentation	*UCC 5G UPF Configuration and Administration Guide*

Revision History

Revision Details	Release
UPF supports the following functionality: • Multiple N4/Sx interfaces with any number of control plane NFs • Maximum configuration of 18 Nx/Sx peer nodes	2023.04.0

Revision Details	Release
First introduced.	2021.01.0

Feature Description

Table 2: Feature History

Feature Name	Release Information	Description
Support for Multiple N4/Sx Interfaces	2023.04	A single UPF can establish multiple N4 or Sx interfaces with any number of control plane network functions such as SMF, cnSGWc, SAEGW-C, PGW-C, and SGW-C. The maximum number of supported N4/Sx peer nodes has been increased from 16 nodes to 18 nodes in this release.

The Multiple N4/Sx Interfaces feature enables a single UPF to establish multiple N4 or Sx interfaces with any number of control plane NFs. The control plane NFs include SMF, SAEGW-C, PGW-C, SGW-C, and cnSGWc.

The integration of multiple control plane nodes with a single UPF results in optimal usage of resources. UPF supports a maximum configuration of 18 N4 or Sx peer nodes per control-plane-group.

Architecture

The following figure illustrates the architecture of multiple N4 interfaces with a single UPF.
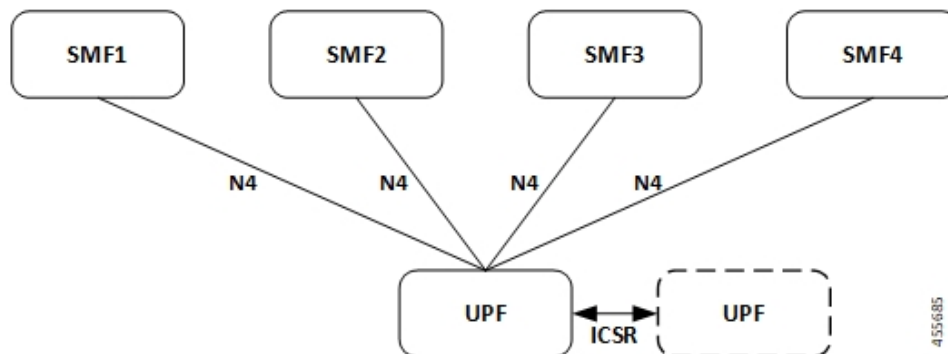
How it Works

The functionality of the Multiple N4/Sx Interfaces feature involves:

- The ECS/ACS configuration at UPF is a union of all individual control plane specific configurations.

For example:

SMF1 has rulebase *RB1* and no *RB2*

SMF2 has rulebase *RB2* and no *RB1*

The UPF has both rulebase, *RB1* and *RB2* to cater the sessions from *RB1* and *RB2*.

- There is no slicing of configuration in UPF per individual SMF.

- A maximum number of four SMF peers are connected to a single UPF.

- Overlapping IP pools from multiple SMFs are segregated based on the VRF ID.

- Individual N4 association release purges sessions of the impacted SMF peer.

- UPF redundancy works seamlessly.

- During any conflict with different SMF configurations, it will be installed in the sequence of configured CLIs and not resolved at UPF.

Configuring Multiple N4/Sx Interfaces

This section provides information about CLI commands that are available in support of this feature.

Configuring Multiple Peer Nodes

To configure multiple peer nodes on UPF, use the following sample configuration:

```
configure
  user-plane-service service_name
    associate control-plane-group group_name
  control-plane-group group_name
    peer-node-id ipv4-address ipv4_address interface n4
    peer-node-id ipv4-address ipv4_address interface n4
    peer-node-id ipv4-address ipv4_address
    . . .
    . . .
    . . .
    end
```

NOTES:

- **peer-node-id ipv4-address** *ipv4_address*—Specify the IPv4 address of the peer node.

- **interface n4**—Identify the N4 interface.

- A maximum number of 18 peer nodes can be configured per control plane group.

  When the limit exceeds beyond 18 peer nodes, he following error message displays:

  Failure: Maximum Control Plane Group Nodes Limit exceeded!

Monitoring and Troubleshooting

This section provides information about monitoring and troubleshooting the Multiple N4/Sx Interface feature.

Show Commands and/or Outputs

This section describes the show commands that are available in support of this feature.

show ip chunks

The output of this CLI command is enhanced to display the IP pools pushed to the UPF from multiple SMFs in Gi context.

show ipv6 chunks

The output of this CLI command is enhanced to display the IPv6 pools pushed to the UPF from multiple SMFs in Gi context.

show subscribers user-plane-only full all

The output of this CLI command is enhanced to display the corresponding Control Plane address.

show sx peers

The output of this CLI command is enhanced to display the peer ID with corresponding number of sessions.

show user-plane-service statistics peer-address <address>

The output of this CLI command is enhanced to display per peer statistics in SMF.