



## Multiple N4/Sx Interfaces

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## 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	<i>UCC 5G UPF Configuration and Administration Guide</i>

### Revision History

Revision Details	Release
UPF supports the following functionality: <ul style="list-style-type: none"><li>• Multiple N4/Sx interfaces with any number of control plane NFs</li><li>• Maximum configuration of 18 Nx/Sx peer nodes</li></ul>	2023.04.0

Revision Details	Release
First introduced.	2021.01.0

## Feature Description

*Table 2: Feature History*

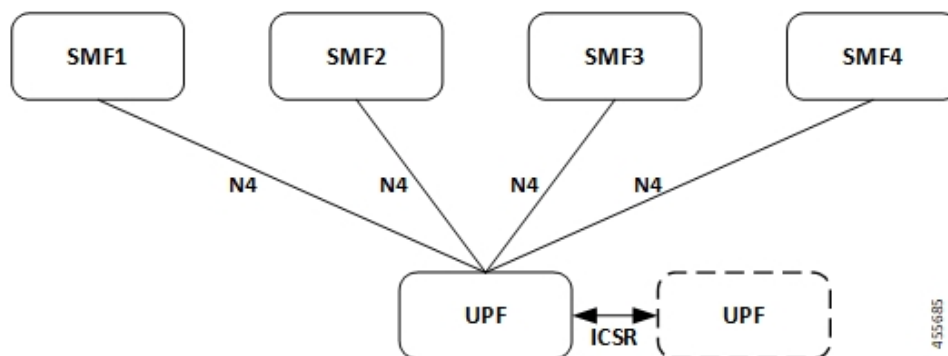
Feature Name	Release Information	Description
Support for Multiple N4/Sx Interfaces	2023.04	A single UPF can establish multiple N4 or Sx interfaces with any number of control plane network functions such as SMF, cnSGWc, SAEGW-C, PGW-C, and SGW-C. The maximum number of supported N4/Sx peer nodes has been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