Customization of StarOS-based UPF on N4 Interface

Feature Summary and Revision History

Summary Data

Table 1: Feature Summary

Applicable Product(s) or Functional Area	SMF
Applicable Platform(s)	SMI
Feature Default Setting	Enabled – Always-on
Related Changes in this Release	Not Applicable
Related Documentation	Not Applicable

Revision History

Table 2: Revision History

Revision Details	Release
First introduced.	Pre-2020.02.0

Feature Description

The SMF interacts with the already available StarOS-based UPF node for initial trials. The SMF must meet some non-standard requirements on the UPF node to interwork with this UPF.

Support for Prime PFD Message

The StarOS-based UPF node needs basic ECS rules configuration pushed from SMF. These default rules need to be provisioned in UPF dynamically even for dynamic PCC policy.

- The StarOS UPF expects SMF to send the configuration in a new custom message. This message is called SX_PRIME_PFD_MANAGEMENT_REQUEST. The custom message ID of this message is 0x2F.
- The response sent by UPF for this message is SX_PRIME_PFD_MANAGEMENT_RESPONSE with message ID 0x30.

The following snapshot shows the contents of this message:

```
[U-PLANE]PFCP Rx PDU, from 192.60.181.6:40259 to 192.60.181.2:8805 (81)
SEID: NA, Message type: SX_MSG_PRIME_PFD_MANAGEMENT_REQUEST (0x2F)
Sequence Number: 0x000001 (1)
PFCP HEADER
        Version number: 1
        SEID flag: Not present
        Message Length: 0x004D (77)
INFORMATION ELEMENTS
        CONFIG ACTION:
            Type: 202  Length: 1
            Value: ADD
            Hex: 00CA 0001 01
        CORRELATION ID:
            Type: 203  Length: 2
            Value: 4
            Hex: 00CB 0002 0004
        SUB PART NUMBER:
            Type: 204  Length: 1
            Value: 245
            Hex: 00CC 0001 F5
        CONTENT TLV:
            Type: 206  Length: 53
            Value:
                Content Type: ACS_LEVEL_INFO
                Content Length: 50
            Hex: 00CE 0035 0B00 325C 00F1 015F 5F64 657F
                 6661 756C 745F 5F10 0113 2C01 0111 C801
                 132C 0101 132C 0101 532C 0101 0155 01FF
                 01FF 0101 1001 032C 01
Tuesday August 21 2018
<<<<OUTBOUND  09:43:39:380 Eventid:221302(3)
[U-PLANE]PFCP Tx PDU, from 192.60.181.2:8805 to 192.60.181.6:40259 (19)
SEID: NA, Message type: SX_MSG_PRIME_PFD_MANAGEMENT_RESPONSE (0x30)
Sequence Number: 0x000001 (1)
PFCP HEADER
        Version number: 1
        SEID flag: Not present
        Message Length: 0x000F (15)
INFORMATION ELEMENTS
        CAUSE:
```

```
    Type: 19  Length: 1
    Value:
        Cause: PFCP_CAUSE_REQUEST_ACCEPTED (0x01)
    Hex: 0013 0001 01
CORRELATION ID:
    Type: 203  Length: 2
    Value: 4
    Hex: 00CB 0002 0004
```

Dynamic IP Pool Provisioning on UPF

The StarOS UPF expects SMF to send the configured IP pool range for assigning the IP address to UE during PDU session creation. The UPF uses this information to install static routes for the entire range of IP addresses and advertises the same. The IP pool range information consists of:

- Start and end IP address of the pool range
- VPN context ID in which the pool must be dynamically configured in the UPF.

  The SMF does not have any VPN ID supported in this release. It sends a configured value that also must be configured on the UPF.
- IP pool chunk ID

  The SMF currently does not break the pool into smaller chunks. Hence, it always sends 1 as the chunk ID.
- IP pool information

  The pool information is sent to the UPF in an N4 Association Update Request message after the N4 Association Setup Request or Response has been successfully exchanged with UPF and also after the SX Prime PFD Management Request or Response has been exchanged. The Content TLV IE (IE type 206) is used to send this pool information in the N4 Association Update Request.

Absence of NodeID Attribute from N4 Messages

As per the 3GPP specifications, the NodeID attribute uniquely identifies the SMF to the UPF. This IE is a mandatory attribute in the N4 Session Establishment Request or Response message. The UPF currently does not support this IE in any of the Session Management related messages. As a customization, the SMF does not send this IE and does not expect this IE in the response messages.

Non Standard Attribute Type

As per 3GPP specifications, the FAR ID attribute has an ID type 108. The StarOS UPF assumes this IE type as 200. As a customization, the SMF sets 200 as the FAR ID IE type.

Single QFI Support

As per 3GPP specifications, the PDR sent to UPF may have a list of QFIs associated to all the QERs. The StarOS UPF currently supports only one QFI. As a customization, the SMF includes only one QFI.