



## UCC 5G UPF - Release Change Reference

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## Features and Behavior Change Quick Reference

Features / Behavior Changes	Release Introduced / Modified
<a href="#">Changing UPF State from Pending-Active to Active, on page 4</a>	2021.02.0

Features / Behavior Changes	Release Introduced / Modified
Charging Support, on page 5	2021.02.0
Configuring RCM through Network Services Orchestrator, on page 6	2021.02.0
Cybersecurity ATP Support in UPF, on page 7	2021.02.0
Deferring SSH IP Installation, on page 8	2021.02.2
Device ID in EDNS0 Records, on page 9	2021.02.1
Disabling UDP Checksum, on page 10	2021.02.0
Display FAR, URR, and PDR Count Received over N4 Interface, on page 11	2021.02.2
Downlink Data Notification, on page 11	2021.02.0
DSCP Marking for Collapsed Call, on page 12	2021.02.0
Indirect Forwarding Tunnel, on page 13	2021.02.0
Invoking NSO Registration Notification, on page 14	2021.02.2
IP Readdressing, on page 15	2021.02.0
LTE - Wi-Fi Seamless Handover, on page 16	2021.02.0
Monitor Subscriber, on page 17	2021.02.0
Multiple cnSGW Support, on page 18	2021.02.0
New Standard QCI Support, on page 18	2021.02.0
PDN Update Procedure - eNodeB F-TEIDu, on page 19	2021.02.0
QUIC IETF Support, on page 20	2021.02.0
Rule-matching for Bearer-specific Filters, on page 21	2021.02.0
Session Prioritization during Recovery, on page 22	2021.02.0
Session Report Rejection Procedure, on page 23	2021.02.0
TCP Maximum Segment Size, on page 24	2021.02.0
WiFi to LTE Handover for Converged UPF, on page 25	2021.02.0
Zero Accounting Loss and Early PDU Recovery, on page 26	2021.02.0

## Feature Defaults Quick Reference

The following table indicates what features are enabled or disabled by default.

Feature	Default
Changing UPF State from Pending-Active to Active	Disabled - Configuration Required
Charging Support	Disabled - Configuration Required
Configuring RCM through Network Services Orchestrator	Disabled - Configuration Required
Cybersecurity ATP Support in UPF	Enabled – Always-on
Deferring SSH IP Installation	Disabled - Configuration Required
Device ID in EDNS0 Records	Disabled – Configuration Required
Disabling UDP Checksum	Disabled - Configuration Required
Display FAR, URR, and PDR count received over N4 interface	Enabled – Always-on
Downlink Data Notification	Disabled - Configuration Required
DSCP Marking for Collapse Calls	Disabled - Configuration Required
Indirect Forwarding Tunnel	Disabled - Configuration Required
Invoking NSO Registration Notification	Disabled - Configuration Required
IP Readdressing	Disabled - Configuration Required
LTE - Wi-Fi Seamless Handover	Enabled - Always-on
Monitor Subscriber	Disabled - Configuration Required
Multiple SMF/cnSGW Support	Disabled - Configuration Required
New Standard QCI Support	Enabled – Always-on
PDN Update Procedure - eNodeB F-TEIDu	Enabled – Always-on
QUIC IETF Support	Disabled - Configuration Required
Rule-matching for Bearer-specific Filters	Disabled - Configuration Required
Session Prioritization during Recovery	Enabled - Always-on
Session Report Rejection Procedure	Enabled - Always-on
TCP Maximum Segment Size	Disabled - Configuration Required
WiFi to LTE Handover for Converged UPF	Disabled - Configuration Required

Feature	Default
Zero Accounting Loss and Early PDU Recovery	Enabled - Always-on

## Changing UPF State from Pending-Active to Active

### Feature Summary and Revision History

#### Summary Data

Applicable Product(s) or Functional Area	5G-UPF
Applicable Platform(s)	VPC-SI
Feature Default Setting	Disabled – Configuration Required
Related Changes in this Release	Not Applicable
Related Documentation	Not Applicable

#### Revision History

Revision Details	Release
Support is added for the following functionality: <ul style="list-style-type: none"> <li>• Zero Accounting Loss in User Plane Function</li> <li>• Early PDU Recovery</li> <li>• Session Prioritization during Recovery</li> <li>• Configuration to change the state of UPF from Pending-Active to Active</li> </ul>	2021.02.0
First introduced.	2020.02.0

### Feature Description

The UPF chassis can turn into Pending-Active state for one of the following reasons:

- When Sx/N4 heartbeat times out during SMF upgrade, the Sx/N4 connection is teared down. So, Sx/N4 monitoring failure triggers ICSR switchover in UPF. This switchover causes the old Standby UPF to transition to Pending-Active state. The UPF in Pending-Active state neither receives any Sx/N4 heartbeats from SMF nor any subscriber traffic. As a result, the UPF remains in Pending-Active state indefinitely and can't be utilized without a manual intervention.
- When appropriate procedure to upgrade UPF is not followed, one of the UPF may end up in Pending-Active state. Also, if SMF goes down during the UPF upgrade or if the UPF switchover takes more time than the SMF heartbeat timeout, then one of the UPF remains in Pending-Active state indefinitely.

- When Sx/N4 session times out between SMF and UPF due to network issues, and if a UPF ICSR switchover happens almost simultaneously (Double fault scenario), the UPF in Pending-Active state doesn't transition to Active state.

For more information, refer to the [UCC 5G UPF Configuration and Administration Guide > 1:1 Redundancy](#) chapter.

# Charging Support

## Feature Summary and Revision History

### Summary Data

**Table 1: Summary Data**

Applicable Product(s) or Functional Area	5G-UPF
Applicable Platform(s)	VPC-SI
Feature Default Setting	Disabled - Configuration Required
Related Changes in this Release	Not Applicable
Related Documentation	Not Applicable

### Revision History

**Table 2: Revision History**

Revision Details	Release
The feature is enhanced to support following functionality: <ul style="list-style-type: none"> <li>• PTT no-quota Limited Pass</li> <li>• PTT quota exhaust Limited Pass</li> <li>• Tariff Time</li> <li>• TCP Maximum Segment Size</li> </ul>	2021.02.0
Usage reporting with Rating-Group and Service ID is introduced.	2020.02.5
First introduced.	2020.02.0

## Feature Description

The Charging Support feature has been enhanced to support the following functionalities:

- PTT no-quota Limited Pass
- PTT quota exhaust Limited Pass
- Tariff Time
- TCP Maximum Segment Size

For more information, refer to the [UCC 5G UPF Configuration and Administration Guide > Charging Support](#) chapter.

# Configuring RCM through Network Services Orchestrator

## Feature Summary and Revision History

### Summary Data

**Table 3: Summary Data**

Applicable Product(s) or Functional Area	5G-UPF
Applicable Platform(s)	VPC-SI
Feature Default Setting	Disabled – Configuration Required
Related Changes in this Release	Not Applicable
Related Documentation	<i>UCC 5G RCM Configuration and Administration Guide</i>

### Revision History

**Table 4: Revision History**

Revision Details	Release
Support has been added to defer SSH IP installation.	2021.02.2
Support has been added for configuring the RCM through Network Services Orchestrator (NSO).	2021.02.0
First introduced.	2021.01.0

## Feature Description

Redundancy of UPs is achieved through RCM. Currently, the UPs are configured from RCM and the redundancy module is also managed by RCM. RCM uses a String-based configuration approach to configure the UPs. However, this approach results in several issues such as configuration validation, failure handling such as rollback, and most importantly configuration automation by orchestrators such as Network Services Orchestrator

(NSO). This feature addresses all these issues by moving the configuration out of RCM and let the NSO (or any third part Orchestrator) deal with configuration. With this feature, NSO pushes all day-1 and day-N configurations to UP and RCM. RCM manages redundancy functionality by pushing only the configuration required during UP switchover.

For more information, refer to the *UCC 5G RCM Configuration and Administration Guide*.

# Cybersecurity ATP Support in UPF

## Feature Summary and Revision History

### Summary Data

**Table 5: Summary Data**

Applicable Product(s) or Functional Area	5G-UPF
Applicable Platform(s)	VPC-SI
Feature Default Setting	Enabled - Always-on
Related Changes in this Release	Not Applicable
Related Documentation	Not Applicable

### Revision History

**Table 6: Revision History**

Revision Details	Release
First introduced. This is a customer-specific feature. For more information, contact your Cisco Account representative.	2021.02.0

## Feature Description

Cisco 5G-UPF supports customer-specific Cybersecurity Advanced Threat Protection (ATP). The 5G-UPF complies with the following standards:

- 3GPP TS 33.117 V16.6.0: 3rd Generation Partnership Project Technical Specification Group Services and System Aspects Catalogue of general security assurance requirements
- FS.31 GSMA Baseline Security Controls



**Note** The following Technical Baseline is currently not supported in 5G-UPF: Accounts shall allow unambiguous identification of the user (Section 4.2.3.4.1.2 in 3GPP TS 33.117 V16.6.0)



**Note** Cybersecurity ATP Support in UPF is a customer-specific feature. For more information, contact your Cisco Account representative.

## Deferring SSH IP Installation

### Feature Summary and Revision History

#### Summary Data

Applicable Product(s) or Functional Area	5G-UPF
Applicable Platform(s)	VPC-SI
Feature Default Setting	Disabled - Configuration Required
Related Changes in this Release	Not Applicable
Related Documentation	<i>UCC 5G RCM Configuration and Administration Guide</i>

#### Revision History

*Table 7: Revision History*

Revision Details	Release
Support has been added to defer SSH IP installation.	2021.02.2
Support has been added for configuring the RCM through Network Services Orchestrator (NSO).	2021.02.0
First introduced.	2021.01.0

### Feature Description

After UPF is up, the Day-0.5 configuration is executed on UPF. When UPFs register with RCM, the Controller pushes the hostID and SSH IP to UPF along with the state. The SSH IP received may get configured and saved as part of Day-0.5 configuration. To avoid that, we must defer the SSH IP installation until the Day-0.5 configuration is saved.

The Deferring SSH IP Installation functionality is CLI-controlled.



For more information, refer to the *UCC 5G RCM Configuration and Administration Guide*.

## Device ID in EDNS0 Records

### Feature Summary and Revision History

#### Summary Data

**Table 8: Summary Data**

Applicable Product (s) or Functional Area	5G-UPF
Applicable Platforms	VPC-SI
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

**Table 9: Revision History**

Revision Details	Release
TCP support is added.	2021.02.1
First introduced.	2021.01.2

### Feature Description

The Device ID in EDNS0 Records allows each enterprise with a customized domain-blocking functionality through Umbrella. To enable this functionality:

- The UPF must reformat a subscriber DNS request into an EDNS0 request, and
- The UPF must include an Umbrella “Device ID” in the EDNS0 packet so that the Umbrella DNS resolver can use the Device ID to apply the domain filter associated/configured with the Device ID in the EDNS0 packet.

For more information, refer to the [UCC 5G UPF Configuration and Administration Guide > Device ID in EDNS0 Records](#) chapter.

# Disabling UDP Checksum

## Feature Summary and Revision History

### Summary Data

*Table 10: Summary Data*

Applicable Product(s) or Functional Area	5G-UPF
Applicable Platform(s)	VPC-SI
Feature Default Setting	Enabled – Always-on
Related Changes in this Release	Not Applicable
Related Documentation	Not Applicable

### Revision History

*Table 11: Revision History*

Revision Details	Release
Optimization of UDP checksum is added in this release.	2021.02.0
First introduced	2020.02.0

## Feature Description

This functionality disables the UDP checksum in UDP header of the GTP-U packet. The value of the UDP checksum is set to zero.

Use the following configuration to disable the UDP checksum in UDP header of the GTP-U packet.

```
configure
  context context_name
    gtpu-service service_name
      no udp-checksum
    end
```

For more information, refer to the [UCC 5G UPF Configuration and Administration Guide > GTP-U Support](#) chapter.

# Display FAR, URR, and PDR Count Received over N4 Interface

## Feature Summary and Revision History

### Summary Data

Applicable Product(s) or Functional Area	5G-UPF
Applicable Platform(s)	VPC-SI
Feature Default Setting	Enabled – Always-on
Related Changes in this Release	Not Applicable
Related Documentation	UCC 5G UPF Configuration and Administration Guide

### Revision History

Revision Details	Release
<b>show user-plane-service statistics all</b> command has been enhanced to display PFCP IEs received in Sx Establishment or Modification messages over N4 interface.	2021.02.2
PDN Update procedure is introduced in this release.	2021.02.0
First introduced.	2020.02.0

## Feature Changes

**Previous Behavior:** The **show user-plane-service statistics all** CLI command does not display the PFCP IEs received in Sx Establishment or Sx Modification messages.

**New Behavior:** The **show user-plane-service statistics all** CLI command is enhanced to display the PFCP IEs such as FAR, URR, and PDRs received over N4 interface in Sx Establishment and Sx Modification messages.

**Impact on customer:** Improved debuggability

## Downlink Data Notification

### Feature Summary and Revision History

#### Summary Data

Applicable Product(s) or Functional Area	5G-UPF
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Applicable Platform(s)	VPC-SI
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
First introduced.	2021.02.0

## Feature Description

The Downlink Data Notification (DDN) is supported in 5G-UPF. The functionality includes the support for:

- DDN Delay and DDN Throttling
- Buffering in SAEGW when UE is in Idle State

For more information, refer to the [UCC 5G UPF Configuration and Administration Guide > Downlink Data Notification](#) chapter.

# DSCP Marking for Collapsed Call

## Feature Summary and Revision History

**Table 12: Summary Data**

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

**Table 13: Revision History**

Revision Details	Release
First introduced	2021.02.0

## Feature Description

The QCI-based DSCP markings are applicable for Pure-S and Pure-P calls. The DSCP markings are based on QCI-QOS-Mapping associated with respective S-GW service or P-GW service. For collapse calls, QCI-QOS-Mapping associated with PGW-service is applicable. This feature helps to apply the DSCP markings for collapse calls based on the associated S-GW and P-GW services for uplink and downlink traffic. For uplink traffic DSCP markings associated with logical P-GW service are applicable. For downlink traffic DSCP markings associated with logical S-GW service are applicable. The DSCP markings are present in IP header of data traffic as a part of GTP-U header and Inner IP. There's option to enable or disable this functionality by CLI configuration. When you enable the feature, then only the new functionality is applicable otherwise existing functionality also works. By default, this feature is disabled so that there's no impact on customers who upgrade to this feature.

For more information, refer to the [UCC 5G UPF Configuration and Administration Guide > DSCP Marking for Collapse Calls](#) chapter.

# Indirect Forwarding Tunnel

## Feature Summary and Revision History

### Summary Data

**Table 14: Summary Data**

Applicable Product (s) or Functional Area	5G-UPF
Applicable Platforms	VPC-SI
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
First introduced	2021.02.0

## Indirect Forwarding Tunnel

The UPF supports Indirect Forwarding Tunnel (IDFT) procedures for creation and deletion, which are applicable for Pure-S and Collapsed calls with dedicated bearers. This feature is applicable for IDFT support with S-GW Relocation.

For more information, refer to the [UCC 5G UPF Configuration and Administration Guide > Indirect Forwarding Tunnel](#) chapter.

# Invoking NSO Registration Notification

## Feature Summary and Revision History

### Summary Data

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

### Revision History

Revision Details	Release
First introduced.	2021.02.2

## Feature Changes

UPF redeployment needs Registration notification from RCM toward NSO. In production environment where DeploymentMode flag is set to FALSE, only Config-Push notification is sent from RCM toward NSO when UPF boots.

**Previous Behavior:** Single UPF cannot be redeployed for scenarios wherein Deployment Mode flag is set to FALSE.

**New Behavior:** A new executable mode CLI command is introduced in RCM that invokes RCM to send a Registration notification towards NSO when the specified UPF boots in deployment environment with DeploymentMode flag set to FALSE.

**Impact on customer:** None

## Command Changes

Use the following executable mode CLI command in RCM to send a Registration notification towards NSO when the specified UPF boots in deployment environment with Deployment Mode flag set to FALSE.

```
rcm force-nso-registration management-ip mgmt_ip { true | false }
```

### MOP

1. Verify in RCM configuration: **k8 smf profile rcm-config-ep switchover deployment false**.
2. Set the CLI for the UPF (to be redeployed) to TRUE. Verify with **rcm show-statistics controller** CLI command.

3. Reload/Boot the UPF. RCM sends Registration notification toward NSO.
4. Let NSO complete configuration push and UPF status change from "Pending Active" to "Active" or from "Pending Standby" to "Standby" in the output of **rcm show-statistics controller**.
5. Set the CLI for the UPF to FALSE. Verify with **rcm show-statistics controller**. Now for subsequent reload of this UPF, RCM sends Config-Push notification towards NSO.

NOTE: Redeploy only one UPF at a time.

## IP Readdressing

### Feature Summary and Revision History

#### Summary Data

Applicable Product(s) or Functional Area	5G-UPF
Applicable Platform(s)	VPC-SI
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
Support has been added for the following functionality: <ul style="list-style-type: none"> <li>• IP Readdressing</li> <li>• RTP Dynamic Flow Detection</li> <li>• Rule-matching for Bearer-specific Filters</li> <li>• QUIC IETF implementation</li> </ul>	2021.02.0
New L7 protocols have been introduced as part of Deep Packet Inspection (DPI).	2021.01.0
The following EDR attributes have been added for TCP: <ul style="list-style-type: none"> <li>• SYN and SYN-ACK packet</li> <li>• SYN-ACK and ACK packet</li> </ul>	2021.01.0
New DNS attributes have been introduced in EDRs.	2021.01.0
First introduced.	2020.02.0

## Feature Description

The IP Readdressing feature enables redirecting unknown gateway traffic based on the destination IP address of the packets to known/trusted gateways. IP Readdressing is configured in the flow action defined in a charging action. IP readdressing works for traffic that matches particular ruledef, and hence the charging action. IP readdressing is applicable to both uplink and downlink traffic. In the Enhanced Charging Subsystem, uplink packets are modified after packet inspection, rule matching, and so on, where the destination IP/port is determined, and replaced with the readdress IP/port just before they are sent out. Downlink packets (containing the readdressed IP/port) are modified as soon as they are received, before the packet inspection, where the source IP/port is replaced with the original server IP/Port number.

For more information, refer to the [UCC 5G UPF Configuration and Administration Guide > Deep Packet Inspection and Inline Services](#) chapter.

## LTE - Wi-Fi Seamless Handover

### Feature Summary and Revision History

#### Summary Data

Applicable Product(s) or Functional Area	5G-UPF
Applicable Platform(s)	VPC-SI
Feature Default Setting	Enabled - Always-on
Related Changes in this Release	Not Applicable
Related Documentation	Not Applicable

#### Revision History

Revision Details	Release
First introduced.	2021.02.0

## Feature Description

Seamless handover between LTE and Wi-Fi (S2b) is supported in the 5G-UPF for UEs that need continuity with their ongoing data session.

For more information, refer to the [UCC 5G UPF Configuration and Administration Guide > LTE - Wi-Fi Seamless Handover](#) chapter.



# Monitor Subscriber

## Feature Summary and Revision History

### Summary Data

*Table 15: Summary Data*

Applicable Product (s) or Functional Area	5G-UPF
Applicable Platforms	VPC-SI
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
In this release, enhancement related to MonSub CLI, subscriber tracing limits, packet processing throughput, PCAP success and, error code notifications are added to this feature. The CP and UP SMGR functionality is also added for this release.	21.22.x
First introduced.	21.16.1

## Feature Description

The Monitor Subscriber (MonSub) feature enables tracing of subscriber related information which includes user and control traffic, and events such as charging and internal events that are useful for debugging. By default, this information is displayed on the Control Plane console, where the user executes MonSub tracing CLI command and captured in a Packet Capture (PCAP) file on the User Plane.

For more information, refer to the [UCC 5G UPF Configuration and Administration Guide > Monitor Subscriber](#) chapter.

# Multiple cnSGW Support

## Feature Summary and Revision History

### Summary Data

*Table 16: Summary Data*

Applicable Product (s) or Functional Area	5G-UPF
Applicable Platforms	VPC-SI
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
First introduced.	2021.02.0

## Feature Description

The Multiple cnSGW Support feature enables a single UPF to establish multiple N4/Sx interfaces with cnSGWs and their paired SMFs. Integration of multiple SMF and cnSGW combination with a single UPF results in optimal usage of resources.

For more information, refer to the [UCC 5G UPF Configuration and Administration Guide > Multiple cnSGW Support](#) chapter.

# New Standard QCI Support

## Feature Summary and Revision History

### Summary Data

*Table 17: Summary Data*

Applicable Product(s) or Functional Area	5G-UPF
Applicable Platform(s)	VPC-SI

Feature Default Setting	Enabled – Always-on
Related Changes in this Release	Not Applicable
Related Documentation	<i>UCC 5G UPF Configuration and Administration Guide</i>

## Revision History

Revision Details	Release
First introduced.	2021.02.0

## Feature Description

The 5G-UPF supports new standard QoS Class Index (QCIs) based on 3GPP TS 23.203 Release 12, for Mission Critical and Push-to-Talk (MC/PTT) applications.

For more information, refer to the [UCC 5G UPF Configuration and Administration Guide > New Standard QCI Support](#) chapter.

# PDN Update Procedure - eNodeB F-TEIDu

## Feature Summary and Revision History

### Summary Data

**Table 18: Summary Data**

Applicable Product(s) or Functional Area	5G-UPF
Applicable Platform(s)	VPC-SI
Feature Default Setting	Enabled – Always-on
Related Changes in this Release	Not Applicable
Related Documentation	Not Applicable

## Revision History

Revision Details	Release
<b>show user-plane-service statistics all</b> command has been enhanced to display PFCP IEs received in Sx Establishment or Modification messages over N4 interface.	2021.02.2
PDN Update procedure is introduced in this release.	2021.02.0

Revision Details	Release
First introduced.	2020.02.0

## Feature Description

A procedure to initiate an N4/Sx Modification Request message for S-GW or SAEGW is implemented for the following:

- eNodeB F-TEIDu update
- Release Access Bearer (RAB) Request for an eNodeB release

For more information, refer to the [UCC 5G UPF Configuration and Administration Guide > N4 Session Management, Node Level, and Reporting Procedures](#) chapter.

## QUIC IETF Support

### Feature Summary and Revision History

#### Summary Data

Applicable Product(s) or Functional Area	5G-UPF
Applicable Platform(s)	VPC-SI
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
Support has been added for the following functionality: <ul style="list-style-type: none"> <li>• IP Readdressing</li> <li>• RTP Dynamic Flow Detection</li> <li>• Rule-matching for Bearer-specific Filters</li> <li>• QUIC IETF implementation</li> </ul>	2021.02.0
New L7 protocols have been introduced as part of Deep Packet Inspection (DPI).	2021.01.0

Revision Details	Release
The following EDR attributes have been added for TCP: <ul style="list-style-type: none"> <li>• SYN and SYN-ACK packet</li> <li>• SYN-ACK and ACK packet</li> </ul>	2021.01.0
New DNS attributes have been introduced in EDRs.	2021.01.0
First introduced.	2020.02.0

## Feature Description

The QUIC IETF support is added in P2P plugin to decrypt and obtain the Server Name Indication (SNI) for detection.

For more information, refer to the [UCC 5G UPF Configuration and Administration Guide > Deep Packet Inspection and Inline Services](#) chapter.

## Rule-matching for Bearer-specific Filters

### Feature Summary and Revision History

#### Summary Data

Applicable Product(s) or Functional Area	5G-UPF
Applicable Platform(s)	VPC-SI
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
Support has been added for the following functionality: <ul style="list-style-type: none"> <li>• IP Readdressing</li> <li>• RTP Dynamic Flow Detection</li> <li>• Rule-matching for Bearer-specific Filters</li> <li>• QUIC IETF implementation</li> </ul>	2021.02.0

Revision Details	Release
New L7 protocols have been introduced as part of Deep Packet Inspection (DPI).	2021.01.0
The following EDR attributes have been added for TCP: <ul style="list-style-type: none"> <li>• SYN and SYN-ACK packet</li> <li>• SYN-ACK and ACK packet</li> </ul>	2021.01.0
New DNS attributes have been introduced in EDRs.	2021.01.0
First introduced.	2020.02.0

## Feature Description

The Rule-matching for Bearer-specific Filters functionality includes:

- IMSI-based rules that are matched as per the subscribers IMSI.
- APN-based rules that allows you to define rule expressions to match Access Point Name (APN) of the bearer flow.
- RAT-Type that allows you to define rule expressions to match Radio Access Technology (RAT) in the bearer flow.

For more information, refer to the [UCC 5G UPF Configuration and Administration Guide > Deep Packet Inspection and Inline Services](#) chapter.

## Session Prioritization during Recovery

### Feature Summary and Revision History

#### Summary Data

Applicable Product(s) or Functional Area	5G-UPF
Applicable Platform(s)	VPC-SI
Feature Default Setting	Disabled – Configuration Required
Related Changes in this Release	Not Applicable
Related Documentation	Not Applicable

## Revision History

Revision Details	Release
Support is added for the following functionality: <ul style="list-style-type: none"> <li>• Zero Accounting Loss in User Plane Function</li> <li>• Early PDU Recovery</li> <li>• Session Prioritization during Recovery</li> <li>• Configuration to change the state of UPF from Pending-Active to Active</li> </ul>	2021.02.0
First introduced.	2020.02.0

## Feature Description

As part of Session Prioritisation during Recovery functionality, a separate skiplist is maintained only for priority calls so that these records can be sent from AAAMgr immediately without going through the loop, thus leading to quicker recovery of the priority calls and reducing the data outage time.

For more information, refer to the [UCC 5G UPF Configuration and Administration Guide > 1:1 Redundancy](#) chapter.

## Session Report Rejection Procedure

### Feature Summary and Revision History

#### Summary Data

Applicable Product(s) or Functional Area	5G-UPF
Applicable Platform(s)	VPC-SI
Feature Default Setting	Enabled – Always-on
Related Changes in this Release	Not Applicable
Related Documentation	<i>UCC 5G SMF Configuration and Administration Guide</i>

#### Revision History

Revision Details	Release
First introduced.	2021.02.0

## Feature Description

The SMF rejects the UPF-originated Session Report Request with a specific cause code during any mismatch in the charging configuration of SMF and UPF.

For any session report rejection by the SMF, the UPF locally purges the sessions. The SMF is unaware of the purging operation and continues to send the N4 message to the UPF. This action triggers the UPF to send “context not found” message to the SMF for the locally purged sessions.

This behavior impacts the UE experience and results in the loss of charging data. So, the current implementation of handling the session report errors is modified to avoid local purging of sessions on the UPF and also to support graceful clearing of sessions.

With this modification, the UPF ignores the Session Report Error Response. The SMF triggers the Session Deletion Request followed by the rejection of Session Report. The UPF responds to the delete request and clears the session gracefully.

For more information, refer to the [UCC 5G UPF Configuration and Administration Guide > Session Report Rejection Procedure](#) chapter.

## TCP Maximum Segment Size

### Feature Summary and Revision History

#### Summary Data

*Table 19: Summary Data*

Applicable Product(s) or Functional Area	5G-UPF
Applicable Platform(s)	VPC-SI
Feature Default Setting	Disabled - Configuration Required
Related Changes in this Release	Not Applicable
Related Documentation	Not Applicable



## Revision History

**Table 20: Revision History**

Revision Details	Release
The feature is enhanced to support following functionality: <ul style="list-style-type: none"> <li>• PTT no-quota Limited Pass</li> <li>• PTT quota exhaust Limited Pass</li> <li>• Tariff Time</li> <li>• TCP Maximum Segment Size</li> </ul>	2021.02.0
Usage reporting with Rating-Group and Service ID is introduced.	2020.02.5
First introduced.	2020.02.0

## Feature Description

TCP IP Stack always inserts Maximum Segment Size (MSS) field in the header. This causes difference in MSS insertion behavior with and without TCP Proxy.

Using **tcp mss** configurations, TCP MSS can be limited if already present in the TCP SYN packets. If there are no errors detected in IP header/TCP mandatory header, and there are no memory allocation failures, TCP optional header is parsed. If TCP MSS is present in the optional header and its value is greater than the configured MSS value, the value present in the TCP packet is replaced with the one that is configured.

If the TCP optional header isn't present in the SYN packet and there are no errors in already-present TCP header, the configured TCP MSS value is inserted while sending out the current packet.

For more information, refer to the [UCC 5G UPF Configuration and Administration Guide > Charging Support](#) chapter.

# WiFi to LTE Handover for Converged UPF

## Feature Summary and Revision History

### Summary Data

**Table 21: Summary Data**

Applicable Product(s) or Functional Area	5G-UPF
Applicable Platform(s)	VPC-SI
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

**Table 22: Revision History**

Revision Details	Release
Support added for WiFi to LTE handover, and configuration to enable Converged Datapath feature at UPF.	2021.02.0
First introduced.	2021.01.0

## Feature Description

Support is added for WiFi to LTE handover and configuration to enable Converged Datapath feature at UPF.

For more information, refer to the [UCC 5G UPF Configuration and Administration Guide > Converged Datapath](#) chapter.

# Zero Accounting Loss and Early PDU Recovery

## Feature Summary and Revision History

### Summary Data

Applicable Product(s) or Functional Area	5G-UPF
Applicable Platform(s)	VPC-SI
Feature Default Setting	Disabled – Configuration Required
Related Changes in this Release	Not Applicable
Related Documentation	Not Applicable

## Revision History

Revision Details	Release
Support is added for the following functionality: <ul style="list-style-type: none"> <li>• Zero Accounting Loss in User Plane Function</li> <li>• Early PDU Recovery</li> <li>• Session Prioritization during Recovery</li> <li>• Configuration to change the state of UPF from Pending-Active to Active</li> </ul>	2021.02.0
First introduced.	2020.02.0

## Feature Description

### Zero Accounting Loss for User Plane Function

Zero accounting loss feature is implemented on User Plane Function (UPF) so that accounting-data/billing loss is reduced from 18 seconds, which is the default checkpoint time from Active UPF to Standby UPF, or for the configured accounting checkpoint time.

This change in UPF is to support the Gz, Gy, VoGx, and RADIUS URRs. Only planned switchover is supported for zero accounting loss/URR data counters loss. This feature does not impact the current ICSR framework or the way checkpointing is done and recovered.

The Sx/N4 usage report is blocked during the “pending active state” till the chassis becomes Active.

### Early PDU Recovery for UPF Session Recovery

Early PDU Recovery functionality overcomes the earlier limitation of Session Recovery feature wherein it did not prioritize the CRRs that were selected for recovery. All the CRRs were fetched from the AAAMgr and then the calls were recovered sequentially. The time taken to fetch all the CRRs was a major factor in the perceived delay during session recovery. When a failure occurred, the delay was sometimes very long if there were a lot of sessions in a Session Manager. Also, since the calls were recovered in no particular order, the idle sessions were sometimes recovered before active sessions.



**Note** The Early PDU Recovery functionality can recover a maximum of 5 percent sessions.

For more information, refer to the [UCC 5G UPF Configuration and Administration Guide > 1:1 Redundancy](#) chapter.

