



Ultra Cloud Core 5G Session Management Function, Release 2023.01 - Release Change Reference

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About this Guide



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This Release Change Reference (RCR) describes new and modified feature and behavior change information for the applicable 5G SMF release(s).



CHAPTER 1

UCC 5G SMF - Release Change Reference

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- [3GPP LI ETSI Encoding Support, on page 3](#)
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Features and Behavior Changes Quick Reference

The following table indicates the default values for features and behavior changes in this release.

Features/ Behavior Changes	Default	Release Introduced/ Modified
3GPP LI ETSI Encoding Support	Enabled – Always-on	2023.01.0
Appinfra Metrics Collection	Enabled – Always-on	2023.01.0
Dynamic and Static Policy Removal, on page 6	Enabled – Configuration required to disable	2023.01.0
Handling Charging Disable Functionality, on page 8	Disabled – Configuration required to enable	2023.01.0

Features/ Behavior Changes	Default	Release Introduced/ Modified
Heartbeat on Sx	Disabled – Configuration required to enable	2023.01.0
IPAM Periodic Reconciliation, on page 10	Enabled – Always-on	2023.01.0
IPv6 Support on N3, on page 11	Disabled - Configuration Required	2023.01.0
IPv6 Pool Next Hop Support on Address Range and Prefix Range, on page 13	Disabled – Configuration required to enable	2023.01.4
Performance Optimization Features: <ul style="list-style-type: none"> • Cache Pod Optimization • Encoder and Decoder Optimization for GTPC Endpoint Pod • Flag DB Database Updates • Resiliency Handling, on page 16 	Enabled – Always-on	2023.01.0
QoS Group of Ruledefs Support over N7, on page 18	Disabled – Configuration required to enable	2023.01.0
Secure Group Tag Support for RADIUS Access Response Attributes	Disabled – Configuration required to enable	2023.01.4
SMF Serviceability, on page 21	Enabled – Always-on	2023.01.0
Troubleshooting SMF Production and Serviceability Issues with Meaningful Debug Logs, on page 22	Enabled – Always-on	2023.01.0
UPF Fallback Functionality	Enabled – Always-on	2023.01.0
VoNR Multiple N2 Setup, on page 25	Not applicable	2023.01.0
VRF Capacity Enhancement, on page 26	Not applicable	2023.01.0

3GPP LI ETSI Encoding Support

Feature Summary and Revision History

Summary Data

Table 1: Summary Data

Applicable Product(s) or Functional Area	SMF
Applicable Platform(s)	SMI
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
Added the support for 3GPP LI ETSI encoding.	2023.01.0
Added the support for: <ul style="list-style-type: none"> • TCP LI. As part of this support, added the following configurations: <ul style="list-style-type: none"> • Non-3GPP LI TCP • Non-3GPP LI UDP • mTLS for LI interfaces • Updated the Failed Procedure Type values 	2022.04.0
First Introduced	2020.02.0

Feature Description

SMF supports 3GPP Stage 3 ETSI 103 221 interfaces and TLS 1.2 for full 3GPP LI 5G compliance.

For more information on 3GPP LI ETSI encoding support, contact your Cisco Account representative.

Appinfra Metrics Collection

Feature Summary and Revision History

Summary Data

Table 3: Summary Data

Applicable Products or Functional Area	SMF
Applicable Platform(s)	SMI
Feature Default Setting	Enabled – Always-on
Related Documentation	Not Applicable

Revision History

Table 4: Revision History

Revision Details	Release
Updated the CLI for metrics collection	2023.01.0
As part of the IP pool allocation per slice and DNN feature, added example configuration to configure NSSAI labels of smf_service_stats metrics.	2022.04.0
Introduced support for classification and configuration of application metrics	2021.02.3

Revision Details	Release
<p>Added support for the following enhancements:</p> <ul style="list-style-type: none"> • The show subscriber nf-service smf <i>smf_url</i> command to show subscriber details based on the IP address value of the vSMF or hSMF. • The clear subscriber nf-service smf <i>smf_url</i> command to clear subscriber details based on the IP address value of the vSMF or hSMF. • The clear subscriber nf-service smf <i>smf_url</i> command to clear subscriber details based on the IP address value of the vSMF or hSMF. • The show subscriber supi supi_idpsid <i>psid_value</i> full command to show detailed subscriber information for roaming-specific use case as hSMF and vSMF. • The show subscriber supi supi_idpsid <i>psid_value</i> summary command to show detailed information about subscriber sessions for roaming-specific use case as hSMF and vSMF. 	2021.02.2
<p>Added support for the following enhancements:</p> <ul style="list-style-type: none"> • The show subscriber supi supi_value psid <i>psid_value</i> summary command to provide detailed information about subscriber sessions. • The clear subscriber nf-service smf and show subscriber nf-service <i>smf</i> commands with supported keywords and filters. • The clear subscriber and clear subscriber nf-service <i>smf</i> commands to support the reactivation keyword to clear sessions when release cause as reactivation-required is configured. This enhancement also supports disconnect and release reasons. • The imei keyword for monitor subscriber, clear subscriber, and show subscriber CLI commands. 	2021.02.0
First introduced.	Pre-2020.02.0

Feature Description

This release provides support for verbosity and CLI configuration to enable or disable individual app infra metrics based on pod type (load-balancer, protocol, or service).

For more information, refer to the [UCC 5G SMF Configuration and Administration Guide > Troubleshooting Information](#) chapter.

Dynamic and Static Policy Removal

Feature Summary and Revision History

Summary Data

Table 5: Summary Data

Applicable Product(s) or Functional Area	SMF
Applicable Platform(s)	SMI
Feature Default Setting	Disabled – Configuration Required
Related Changes in this Release	Not Applicable
Related Documentation	Not Applicable

Revision History

Table 6: Revision History

Revision Details	Release
The following enhancements are introduced: <ul style="list-style-type: none"> • Extended the maximum number of VRFs to 129 • Static and Dynamic Policy Removal 	2023.01.0
Support overlapping AAA server addresses for PAPN use case	2022.04.0
First introduced.	2020.02.5

Feature Description

SMF supports removal of the static and dynamic BGP policies based on the UDP interfaces only. SMF uses VRF to replace the policies with one default route per interface to improve the operational performance.

For more information, see the [UCC 5G SMF Configuration and Administration Guide > Virtual Routing and Forwarding](#) chapter.

GTPC Endpoint Initialization With and Without UDP Proxy

Behavior Change Summary and Revision History

Summary Data

Table 7: Summary Data

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

Revision History

Table 8: Revision History

Revision Details	Release
First introduced.	2023.01.0

Behavior Change

Previous Behavior: The UDP proxy pod was used as an endpoint for the GTPC, PFCP, and RADIUS messages. If GTP default VIP, such as S11, S5, S5e, and S2b, was configured, the GTP endpoints started into the UDP proxy. Multiple protocol microservices depend on UDP proxy for UDP transport. Hence, UDP proxy was a scaling bottleneck. A surge of messages led to packet drops.

New Behavior: The UDP proxy functionality merges into the respective protocol microservice to mitigate the scaling bottleneck. The UDP proxy bypass improves the CPU usage by reducing one hop across microservices in the signaling path. With this new behavior:

- If the GTP interface VIP is configured in the endpoint protocol, the GTP endpoints start into the UDP proxy.
- If only the GTP default VIP is configured in the GTP endpoint and no VIP is configured in the endpoint protocol, then the GTP endpoints start into the GTPC endpoint.



Note In this software release, you must deploy SMF in merged mode only. For more information on this mode, see the *UCC SMF Configuration and Administration Guide* and *UCC cnSGWc Configuration and Administration Guide*.

Handling Charging Disable Functionality

Feature Summary and Revision History

Summary Data

Table 9: Summary Data

Applicable Products or Functional Area	SMF
Applicable Platforms	SMI
Feature Default Setting	Disabled – Configuration Required
Related Changes in this Release	Not Applicable
Related Documentation	Not Applicable

Revision History

Table 10: Revision History

Revision Details	Release
Added support for the following features: <ul style="list-style-type: none"> • Charging Disable functionality • Processing QoS Descriptor for Static and Predefined Rules 	2023.01.0
Added support for extension in Charging Characteristics ID range values.	2021.02.3.t3
Added support for Query Interface IE.	2021.02.0
Introduced support for reconciliation of billing records when CHF is unreachable.	2021.02.0
Added session-level limitations on the N4 interface.	2021.01.1
Introduced support for the following: <ul style="list-style-type: none"> • Zero Usage Report Suppression • Dynamic ACS Configuration Change 	2021.01.0

Revision Details	Release
First introduced.	Pre-2020.02.0

Feature Description

The SMF used to send the custom IE "Charging Disabled" in the "subscriber params" attribute to UPF when the charging transactions are disabled on the N40 interface.

In 2023.01.0 and later releases, the SMF stops sending this custom IE to avoid the functional impact on other kinds of charging like RADIUS accounting.

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

Heartbeat on Sx

Feature Summary and Revision History

Summary Data

Table 11: Summary Data

Applicable Product(s) or Functional Area	SMF
Applicable Platform(s)	SMI
Feature Default Setting	Disabled – Configuration Required
Related Changes in this Release	Not Applicable
Related Documentation	Not Applicable

Revision History

Table 12: Revision History

Revision Details	Release
Heartbeat on Sx	2023.01.0
First introduced.	2020.02.0

Feature Description

A heartbeat is used to monitor the status of a UPF node in terms of its responsiveness. The heartbeat initiates a bilateral flow of request and response between the SMF and UPF.

In accordance with the 3GPP standard, the node-level Heartbeat procedures support over the Sx interface. The support gets enabled between the SMF and the legacy interfaces or with User Plane (UP) functions.

For more information, refer to the [UCC 5G SMF Configuration and Administration Guide > UPF Path Management and Restoration](#) chapter.

IPAM Periodic Reconciliation

Feature Summary and Revision History

Summary Data

Table 13: Summary Data

Applicable Product(s) or Functional Area	SMF
Applicable Platform(s)	SMI
Feature Default Setting	IPAM: Enabled – Always-on Unique IP Pools for UPF: Disabled – Configuration required to enable
Related Changes in this Release	Not Applicable
Related Documentation	Not Applicable

Revision History

Table 14: Revision History

Revision Details	Release
Added support for the following features: <ul style="list-style-type: none"> • IPAM Periodic Reconciliation • UPF Fallback functionality 	2023.01.0
Added support for the following features: <ul style="list-style-type: none"> • IPAM reconciliation CLI commands for IPAM hardening. • IP pool allocation per slice and DNN feature. • SMF to allocate UPFs with unique IP pools. 	2022.04.0

Revision Details	Release
Added support for the following features: <ul style="list-style-type: none"> • New calls with static IP address. • Quarantine queue size. • IP address validation with CDL Configuration and statistics. 	2021.02.0
IP Address Validation with CDL Configuration introduced.	2021.02.0
Updated quarantine time range to 3600 seconds.	2021.02.0
VRF Support introduced.	2020.02.5
First introduced.	Pre-2020.02.0

Feature Description

In the existing settings, you can only perform the IPAM reconciliation activity manually, through the CLI framework on the nodemgr startup. This process needs upgradation to a system or a software-dependent procedure. It requires a support to provide the IPAM reconciliation configuration, to run a time-driven activity, periodically in the background.

You can schedule to run a daily IPAM reconciliation activity, using the CLI configuration framework for the following:

- Specific GR instances ID
- Specific address pool under a GR instance ID

For more information, refer to the [UCC 5G SMF Configuration and Administration Guide > IP Address Management](#) chapter.

IPv6 Support on N3

Feature Summary and Revision History

Summary Data

Table 15: Summary Data

Applicable Product(s) or Functional Area	SMF
Applicable Platform(s)	SMI
Feature Default Setting	Disabled – Configuration Required
Related Changes in this Release	Not Applicable

Related Documentation	Not Applicable
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Revision History

Table 16: Revision History

Revision Details	Release
Added support for the following features: <ul style="list-style-type: none"> • QoS group of ruledefs over N7 • IPv6 support for N3 interface on UPF 	2023.01.0
Added support for SMF— <ul style="list-style-type: none"> • to allocate UPFs with unique IP pools • to select the UPF based on PDN type 	2022.04.0
Introduced support for Diff-Serv-Code-Point (DSCP) or Type of Service (ToS) QoS functions during interaction with PCF.	2021.02.3.t3
Introduced support for the following features: <ul style="list-style-type: none"> • Usage Monitoring over PCF • N4 QoS Mismatch Correction • Dynamic QoS Flow-based Application Detection and Control • IP Threshold-based UPF Selection 	2021.02.3
Introduced support for non-standard QCI for dynamic PCC and session rules	2021.02.2
Introduced support for the following features: <ul style="list-style-type: none"> • Bit rate mapping • UPF Selection based on Slice and Location • UP Optimization 	2021.02.0
Introduced support for the following: <ul style="list-style-type: none"> • Co-located UPF Selection • Enhanced Limits for Maximum Groups in Bandwidth Policy Configuration • Handling Session Report Rejection Procedure • New Format of Outer Header information element (IE) 	2021.01.0

Revision Details	Release
Introduced support for the following: <ul style="list-style-type: none"> • UPF node selection based on DNN and PDU Session type • Modification of authorized default QoS • Additional session report and UPF node report request 	2020.03.0
First introduced.	Pre-2020.02.0

Feature Description

SMF supports a new CLI command **dual-stack-transport** in the UPF profile to send Outer Header Removal IE.

This IE instructs the UPF to remove the GTP-U, UDP, or IP header regardless of whether it is IPv4 or IPv6. The SMF sends this IE to support IPv6 on N3 interface.

For more information on this feature, see the [UCC 5G SMF Configuration and Administration Guide > Policy and User Plane Management](#) chapter.

IPv6 Pool Next Hop Support on Address Range and Prefix Range

Feature Summary and Revision History

Summary Data

Table 17: Summary Data

Applicable Product(s) or Functional Area	SMF
Applicable Platform(s)	SMI
Feature Default Setting	Disabled - Configuration Required
Related Changes in this Release	Not Applicable
Related Documentation	Not Applicable

Revision History

Table 18: Revision History

Revision Details	Release
Nexthop forwarding address configuration added to IPv6 address range and prefix range.	2023.01.4
First introduced.	Pre-2020.02.0

Feature Description

SMF supports next hop configuration for IPv4 and IPv6 pools along with address ranges and prefix ranges.



Note For uniform compatibility, the **nexthop-forwarding-address** configuration option is available in both the Internet Assigned Numbers Authority (IANA) and Identity Association for Prefix Delegation (IAPD) IPv6 configuration profiles. SMF doesn't use the IANA configuration but uses only the IAPD configuration. BNG uses the IANA IPv6 configuration.

For more information, refer the [UCC 5G SMF Configuration and Administration Guide > IP Address Management](#) chapter.

Performance Optimization Features

Feature Summary and Revision History

Summary Data

Table 19: Summary Data

Applicable Products or Functional Area	SMF
Applicable Platforms	SMI

Feature Default Setting	<p>Batch ID Allocation, Release, Reconciliation Support: Disabled – Configuration required to enable</p> <p>Cache Pod Optimization</p> <p>CDL Flush Interval and Session Expiration Tuning Configuration: Enabled – Configuration required to disable</p> <p>Edge Echo Implementation: Enabled – Always-on</p> <p>Encoder and Decoder Optimization for GTPC Endpoint Pod: Disabled – Configuration required to enable</p> <p>ETCD Peer Optimization Support: Enabled - Always-on</p> <p>Flag DB Database Updates: Enabled – Always-on</p> <p>GTPC IPC Cross-rack Support: Disabled – Configuration required to enable</p> <p>Interservice Pod Communication: Disabled – Configuration required to enable</p> <p>Resiliency Handling: Enabled - Always-on</p>
Related Documentation	Not Applicable

Revision History

Table 20: Revision History

Revision Details	Release
<p>Added the following support:</p> <ul style="list-style-type: none"> • Encoder and Decoder Optimization for GTPC Endpoint Pod. • Flag DB Database Updates • Cache Pod Optimization • Resiliency Handling 	2023.01.0
First introduced.	2022.04.0

Cache Pod Optimization

Feature Description

SMF supports the cache pod optimization to reduce the cache pod query at GTPC endpoint to receive the affinity information in the outgoing request or response message.

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

Encoder and Decoder Optimization for GTPC Endpoint Pod

Feature Description

The new **enable-direct-encdec** CLI command is introduced to optimize the encoding and decoding of the IEs that are associated with the GTPC endpoint pod. With this optimization, the memory management is improved and garbage collection time is reduced.

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

Flag DB Database Updates

Feature Description

SMF updates the CDL when the subscriber state changes from idle to active, and when the ULI, UeTz, UCI, or the serving network is modified. When the transaction requests driven to CDL increases, SMF incurs a higher CPU utilization. To prevent the needless CPU utilization, SMF updates only a subset of the CDL with the changed attributes.

SMF supports the Flag DB database updates for the following procedures:

- MBR with only ULI change
- 4G RAT Handover
- N2 Handover

For more information, see the [UCC 5G SMF Configuration and Administration Guide > Performance Optimization Support](#) chapter.

Resiliency Handling

Feature Description

The Resiliency Handling feature introduces a CLI-controlled framework to support the service pod recovery, when you observe a system fault or a reported crash. It helps in recovering one of the following service pods:

- sgw-service pod
- smf-service pod
- gtpc-ep pod
- protocol pod

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

QoS Descriptor for Static and Predefined Rules

Feature Summary and Revision History

Summary Data

Table 21: Summary Data

Applicable Products or Functional Area	SMF
Applicable Platforms	SMI
Feature Default Setting	Disabled – Configuration Required
Related Changes in this Release	Not Applicable
Related Documentation	Not Applicable

Revision History

Table 22: Revision History

Revision Details	Release
Added support for the following features: <ul style="list-style-type: none"> • Charging Disable functionality • Processing QoS Descriptor for Static and Predefined Rules 	2023.01.0
Added support for extension in Charging Characteristics ID range values.	2021.02.3.t3
Added support for Query Interface IE.	2021.02.0
Introduced support for reconciliation of billing records when CHF is unreachable.	2021.02.0
Added session-level limitations on the N4 interface.	2021.01.1
Introduced support for the following: <ul style="list-style-type: none"> • Zero Usage Report Suppression • Dynamic ACS Configuration Change 	2021.01.0
First introduced.	Pre-2020.02.0

Feature Description

For a static rule, the SMF uses the active charging service configuration during run time to derive the QoS Descriptor information to be relayed towards CHF.

For predefined rules, the associated charging action results in creation of QoS Descriptor in session data with a combination of Rating Group (RG), service ID, and bandwidth ID values. When SMF relays the usage report to CHF, it checks for a match against the RG and service ID and uses the QoS that is applicable for the matched charging action.

For more information on this functionality, see the [UCC 5G SMF Configuration and Administration Guide > Subscriber Charging](#) chapter.

QoS Group of Ruledefs Support over N7

Feature Summary and Revision History

Summary Data

Table 23: Summary Data

Applicable Product(s) or Functional Area	SMF
Applicable Platform(s)	SMI
Feature Default Setting	Disabled – Configuration Required
Related Changes in this Release	Not Applicable
Related Documentation	Not Applicable

Revision History

Table 24: Revision History

Revision Details	Release
Added support for the following features: <ul style="list-style-type: none"> • QoS group of ruledefs over N7 • IPv6 support for N3 interface on UPF 	2023.01.0
Added support for SMF— <ul style="list-style-type: none"> • to allocate UPFs with unique IP pools • to select the UPF based on PDN type 	2022.04.0
Introduced support for Diff-Serv-Code-Point (DSCP) or Type of Service (ToS) QoS functions during interaction with PCF.	2021.02.3.t3

Revision Details	Release
Introduced support for the following features: <ul style="list-style-type: none"> • Usage Monitoring over PCF • N4 QoS Mismatch Correction • Dynamic QoS Flow-based Application Detection and Control • IP Threshold-based UPF Selection 	2021.02.3
Introduced support for non-standard QCI for dynamic PCC and session rules	2021.02.2
Introduced support for the following features: <ul style="list-style-type: none"> • Bit rate mapping • UPF Selection based on Slice and Location • UP Optimization 	2021.02.0
Introduced support for the following: <ul style="list-style-type: none"> • Co-located UPF Selection • Enhanced Limits for Maximum Groups in Bandwidth Policy Configuration • Handling Session Report Rejection Procedure • New Format of Outer Header information element (IE) 	2021.01.0
Introduced support for the following: <ul style="list-style-type: none"> • UPF node selection based on DNN and PDU Session type • Modification of authorized default QoS • Additional session report and UPF node report request 	2020.03.0
First introduced.	Pre-2020.02.0

Feature Description

The Service Group QoS Management feature enables the PCF to define and enforce Fair-Usage-Policy (FUP) per subscriber. This feature enables changing certain charging-action parameters and all QoS-group-of-ruledefs parameters per individual subscriber session. QoS Group of Ruledefs is also called as QGR.

For more information, refer to the [UCC 5G SMF Configuration and Administration Guide > Policy and User Plane Management](#) chapter.

Secure Group Tag Support for RADIUS Access Response Attributes

Feature Summary and Revision History

Summary Data

Table 25: Summary Data

Applicable Product(s) or Functional Area	SMF
Applicable Platform(s)	SMI
Feature Default Setting	Disabled – Configuration Required
Related Changes in this Release	Not Applicable
Related Documentation	Not Applicable

Revision History

Table 26: Revision History

Revision Details	Release
Added the Secure Group Tag support for RADIUS access response attributes.	2023.01.4
Introduced new CLI option in charging profile to generate the RADIUS accounting trigger on TFT change.	2021.02.0
To support instance awareness on RADIUS, the SMF allows: <ul style="list-style-type: none"> Instance-level configuration under RADIUS profile NAS-IP-Address and NAS-Identifier attribute configuration per instance-id in RADIUS profile configuration RADIUS Disconnect-Request VIP configuration per instance-id in RADIUS endpoint configuration 	2021.02.0

Revision Details	Release
Added support for the following: <ul style="list-style-type: none"> • PAP, CHAP, and MSCHAP-based RADIUS authentication • Multiple RADIUS NAS-IP source addresses • Handling RADIUS Disconnect and CoA Requests • RADIUS Accounting on SMF • New attributes in the RADIUS Access Response message 	2020.02.5.t1
First introduced.	Pre-2020.02.0

Feature Description

Cisco Identity Services Engine (ISE) sends the Secure Group Tag (SGT) to SMF in the RADIUS Access Response attributes. Then, SMF forwards this tag to the UPF in a proprietary IE on the N4 interface. UPF includes the SGT in the ethernet header on N6 for all the messages for the session for the default bearer or a dedicated bearer.

The Cisco RADIUS implementation supports one vendor-specific option using the format that is recommended in the Internet Engineering Task Force (IETF). The SGT tag is in the following format:

```
Cisco-AV-pair="cts:security-group-tag=<sgt tag>-<gen id>"
```

where

<sgt tag> is the security group that the device is associated to. This tag is a 16-bit value expressed as four hexadecimal characters.

<gen id> is the generation-ID, which identifies a specific instantiation of the SGT.

For more information, refer to the [UCC 5G SMF Configuration and Administration Guide > RADIUS Authentication and Accounting](#) chapter.

SMF Serviceability

Feature Summary and Revision History

Summary Data

Table 27: Summary Data

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 28: Revision History

Revision Details	Release
First introduced.	2023.01.0

Feature Description

The SMF logs and serviceability feature perform in the following modes:

- It helps and captures capabilities to enable limited debug logs in the production with a chain of troubleshooting tools.
- These further help in improving the time taken in finding a root cause of any issue found during the production.

This feature allows the operator to enable specific log tag to debug call failures and procedure failures, to facilitate a better RCA. It has the following characteristics:

- The SMF must provide a tool or utility to generate core dumps that help in downloading and investigating the problem further.
- The SMF must print the SUPI of the failed subscriber along with the error details in the logs.
- The required subscriber information gathered through **monitor subscriber** command helps in debugging a particular subscriber.

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

Troubleshooting SMF Production and Serviceability Issues with Meaningful Debug Logs

Behavior Change Summary and Revision History

Summary Data

Table 29: Summary Data

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

Revision History

Table 30: Revision History

Revision Details	Release
First introduced.	2023.01

Behavior Change

Previous Behavior: It was a difficult and time consuming procedure for the operator to debug a root cause of issues found in the SMF production and serviceability activities.

New Behavior: The new behavior activities listed are as the following:

- The SMF now supports meaningful logs such as the additional Generic Procedure Failure LogTag which can be enabled in the CLI mode.
- The SMF now has the enhancement to print Transaction Log with level as Warning.
- With these enhancements, the operator can get the following information:
 - Transaction ID
 - Procedure Name
 - Event Trace
 - Detailed Error (It contains the failure reason or cause and also the disconnect reason)

Customer Impact: The feature updates, related meaningful logs, and content enhancement help operators to troubleshoot the SMF production and serviceability issues.

UPF Fallback Functionality

Feature Summary and Revision History

Summary Data

Table 31: Summary Data

Applicable Product(s) or Functional Area	SMF
Applicable Platform(s)	SMI
Feature Default Setting	IPAM: Enabled – Always-on Unique IP Pools for UPF: Disabled – Configuration required to enable
Related Changes in this Release	Not Applicable
Related Documentation	Not Applicable

Revision History

Table 32: Revision History

Revision Details	Release
Added support for the following features: <ul style="list-style-type: none"> • IPAM Periodic Reconciliation • UPF Fallback functionality 	2023.01.0
Added support for the following features: <ul style="list-style-type: none"> • IPAM reconciliation CLI commands for IPAM hardening. • IP pool allocation per slice and DNN feature. • SMF to allocate UPFs with unique IP pools. 	2022.04.0
Added support for the following features: <ul style="list-style-type: none"> • New calls with static IP address. • Quarantine queue size. • IP address validation with CDL Configuration and statistics. 	2021.02.0

Revision Details	Release
IP Address Validation with CDL Configuration introduced.	2021.02.0
Updated quarantine time range to 3600 seconds.	2021.02.0
VRF Support introduced.	2020.02.5
First introduced.	Pre-2020.02.0

Feature Description

With this feature, SMF enables the fallback to centrally located UPF based on the DNN when any of the following conditions are met:

- IP pool and UPF selected based on location fails
- UPF of the configured DNN is down
- Location of the UE is not configured

For more information, refer to the [UCC 5G SMF Configuration and Administration Guide > IP Address Management](#) chapter.

VoNR Multiple N2 Setup

Behavior Change Summary and Revision History

Summary Data

Table 33: Summary Data

Applicable Product(s) or Functional Area	SMF
Applicable Platform(s)	SMI
Default Setting	Not Applicable
Related Changes in this Release	Not Applicable
Related Documentation	Not Applicable

Revision History

Table 34: Revision History

Revision Details	Release
First introduced.	2023.01.0

Behavior Change

Previous Behavior: During idle to active procedure, SMF activates the N3 connection (gNB <-> UPF) by sending an N2 setup request message to gNB. If gNB responds with failure by including the cause `multiple-sess-id` (resources are already created at gNB), then SMF keeps the subscriber in an idle state (no n3 connection) only.

New Behavior: During the idle to the active procedure, the SMF activates the N3 connection (gNB <-> UPF) by sending an N2 setup request message to gNB. If the gNB responds with a failure note including the cause `multiple-sess-id` then the SMF creates new resources at the gNB by sending an N2 release request (acts as an old resource cleanup) followed by an N2 setup request (new resource creation).

Customer Impact: The gNB failure scenario will be handled effectively by the SMF, when creating resources for gNB.

VRF Capacity Enhancement

Feature Summary and Revision History

Summary Data

Table 35: Summary Data

Applicable Product(s) or Functional Area	SMF
Applicable Platform(s)	SMI
Feature Default Setting	Disabled – Configuration Required
Related Changes in this Release	Not Applicable
Related Documentation	Not Applicable

Revision History

Table 36: Revision History

Revision Details	Release
The following enhancements are introduced: <ul style="list-style-type: none"> Extended the maximum number of VRFs to 129 Static and Dynamic Policy Removal 	2023.01.0
Support overlapping AAA server addresses for PAPN use case	2022.04.0
First introduced.	2020.02.5

Feature Description

In this release, SMF supports up to 129 VRFs for private APNs and DNNs.

For more information, see the [UCC 5G SMF Configuration and Administration Guide > Virtual Routing and Forwarding](#) chapter.

