

# ICSR Checkpointing

This appendix lists and describes macro- and micro-checkpoints employed by the Interchassis Session Recovery framework. Checkpoints are exchanged between the active and standby ICSR chassis via the Service Redundancy Protocol (SRP).

The following topics are discussed:


- Overview of Checkpointing, on page 1
- Macro-checkpoints, on page 1
- Micro-checkpoints, on page 3


## Overview of Checkpointing

Interchassis Session Recovery (ICSR) provides a framework for sessmgr instance-level checkpointing within an ICSR framework. A checkpoint is a snapshot of the status of an application. Checkpointing can be used by sessmgr to push instance level information to the peer chassis.

Instance-level checkpointing sends messages to specific sessmgr instances. Each application, such as GGSN, PDSN, P-GW, S-GW or SGSN, is responsibility for encoding and decoding the checkpoint message. The ICSR framework provides the APIs for transport of the instance-level checkpoint information and associated statistics.

Macro-checkpoints contain full session information and micro-checkpoints contain only a few variables. Macro-checkpoints are sent initially from the active chassis to the standby chassis on power up and reload, and periodically thereafter. When a standby chassis receives macro-checkpoints, it clears any existing CRR (Call Recovery Record) or CLP (Call Line Pointer) related to that session, and creates a new CRR or CLP. Macro-checkpoints are also known as full checkpoints (FCs).

To conserve processing cycles and memory, dynamic and periodic updates from an active chassis to a standby chassis are done using micro-checkpoints.

The output of the Exec mode **show srp info** command displays a complete list of SRP checkpoints.

## Macro-checkpoints

This section lists and briefly describes ICSR macro-checkpoints.

# GGSN_APN ID MAPPING

This macro-checkpoint is sent from the active to the standby chassis to map APN names on the standby chassis.

- **Time based:** No
- **Frequency:** N/A
- **Event based:** Yes
- **Events:** Occurs whenever a TCP connection is established between the sessmgrs and they move to READY_STATE.
- **Accounting:** No
- **Delta/Cumulative:** N/A
- **Related CLI command: show session subsystem facility sessmgr instance** <*instance no*> **debug-info** and **show srp micro-checkpoint statistics**

# INSTANCE LEVEL CHECKPOINT

This macro-checkpoint is generated by ECS (Enhanced Charging System) to send new rules to the standby chassis. It is also used by ECS to delete or modify a rule on the standby chassis.

- **Time based:** Yes
- **Frequency:** 30 minutes
- **Event based:** Yes
- **Events:** Occurs:
  1. When a new rule is added or deleted on the active chassis.
  2. Every 30 minutes if the ECS is registered for periodic micro-checkpointing.
- **Accounting:** —
- **Delta/Cumulative:** —
- **Related CLI command: show session subsystem facility sessmgr instance** <*instance no*> **debug-info** and **show srp micro-checkpoint statistics**

# SERVICE_ID MAPPING

This macro-checkpoint is sent from the active to the standby chassis to map Service IDs on the standby chassis.

- **Time based:** No
- **Frequency:** N/A
- **Event based:** Yes
- **Events:** Occurs whenever a TCP connection is established between the sessmgrs and they move to READY_STATE.
- **Accounting:** No
- **Delta/Cumulative:** N/A
- **Related CLI command: show session subsystem facility sessmgr instance** <*instance no*> **debug-info**

# VPNMGR_ID MAPPING

This macro-checkpoint is sent from the active to the standby chassis to map VPNs on the standby chassis.

- **Time based:** No

- **Frequency:** N/A
- **Event based:** Yes
- **Events:** Occurs whenever a TCP connection is established between the sessmgrs and they move to READY_STATE.
- **Accounting:** No
- **Delta/Cumulative:** N/A
- **Related CLI command: show session subsystem facility sessmgr instance** <*instance no*> **debug-info**

# Micro-checkpoints

This section lists and briefly describes the characteristics of micro-checkpoints by application category.

Micro-checkpoints are listed in alphabetical order under the following categories:


- Uncategorized, on page 3
- DCCA Category, on page 4
- ECS Category, on page 4
- ePDG Category, on page 7
- Firewall/ECS Category, on page 9
- GGSN Category, on page 9
- Gx Interface Category, on page 11
- NAT Category, on page 11
- P-GW Category, on page 13
- Rf Interface Category, on page 15
- S6b Interface Category, on page 16
- SaMOG Category, on page 17


## Uncategorized

### SESS_UCHKPT_CMD_INVALIDATE_CRR

This micro-checkpoint is sent to the standby chassis to clear a deleted call. It carries the Call ID and other information that must be deleted on the standby chassis.

- **Time based:** No
- **Frequency:** N/A
- **Event based:** Yes
- **Events:** Occurs when a call is deleted on the active chassis.
- **Accounting:** No
- **Delta/Cumulative:** N/A
- **CMD-ID:** 1
- **Related CLI command:** None

### SESS_UCKKPT_CMD_UPDATE_CLPSTATS

This micro-checkpoint sends VoLTE data statistics.

- **Time based:** Yes

- **Frequency:** —
- **Event based:** Yes
- **Events:** Occurs during ICSR background checkpointing. A chassis switchover triggers the sending of VoLTE data stats.
- **Accounting:** —
- **Delta/Cumulative:** —
- **CMD-ID:** 4
- **Related CLI command:** None

### SESS_UCHKPT_CMD_UPDATE_IDLESECS

This micro-checkpoint sends remaining number of seconds before idle timeout.

- **Time based:** Yes
- **Frequency:** —
- **Event based:** No
- **Events:** Occurs during ICSR background checkpointing.
- **Accounting:** No
- **Delta/Cumulative:** N/A
- **CMD-ID:** 2
- **Related CLI command:** None

## DCCA Category

### SESS_UCHKPT_CMD_DCCA_SESS_INFO

This micro-checkpoint sends Credit Control (CC) related information.

- **Time based:** Yes
- **Frequency:** 18 seconds for GR micro-checkpoint
- **Event based:** Yes
- **Events:** Sent along with the macro-checkpoint/CCA/Assume-positive-state-transitions.
- **Accounting:** Yes
- **Delta/Cumulative:** Cumulative
- **CMD-ID:** 19
- **Related CLI command:** None

## ECS Category

### SESS_UCHKPT_CMD_ACS_CALL_INFO

This micro-checkpoint sends critical ECS call level data.

- **Time based:** Yes
- **Frequency:** —
- **Event based:** Yes
- **Events:** Occurs whenever ECS call level information is created or modified.
- **Accounting:** No

- **Delta/Cumulative:** N/A
- **CMD-ID:** 179
- **Related CLI command:** None

## SESS_UCHKPT_CMD_ACS_GX_LI_INFO

This micro-checkpoint sources lawful intercept (LI) related information maintained by ECS.

- **Time based:** Yes
- **Frequency:** —
- **Event based:** Yes
- **Events:** Occurs whenever LI information is created or modified.
- **Accounting:** No
- **Delta/Cumulative:** N/A
- **CMD-ID:** 75
- **Related CLI command:** None

## SESS_UCHKPT_CMD_ACS_SESS_INFO

This micro-checkpoint sends ECS-level bearer-related data

- **Time based:** Yes
- **Frequency:** —
- **Event based:** Yes
- **Events:** Occurs whenever ECS bearer information is created or modified.
- **Accounting:** No
- **Delta/Cumulative:** N/A
- **CMD-ID:** 33
- **Related CLI command:** None

## SESS_UCHKPT_CMD_DEL_ACS_CALL_INFO

This micro-checkpoint notifies that a Release Call event has occurred.

- **Time based:** No
- **Frequency:** N/A
- **Event based:** Yes
- **Events:** Occurs whenever an ECS Release Call message is processed.
- **Accounting:** No
- **Delta/Cumulative:** N/A
- **CMD-ID:** 188
- **Related CLI command:** —

## SESS_UCHKPT_CMD_DEL_ACS_SESS_INFO

This micro-checkpoint notifies that a Release Bearer event has occurred.

- **Time based:** No
- **Frequency:** N/A
- **Event based:** Yes
- **Events:** Occurs whenever an ECS Release Bearer message is processed.

- **Accounting:** No
- **Delta/Cumulative:** N/A
- **CMD-ID:** 187
- **Related CLI command:** None

## SESS_UCHKPT_CMD_DYNAMIC_CHRG_CA_INFO

This micro-checkpoint sends dynamic charging action information maintained by ECS.

- **Time based:** Yes
- **Frequency:** —
- **Event based:** Yes
- **Events:** Occurs whenever dynamic charging action information is created or modified.
- **Accounting:** No
- **Delta/Cumulative:** N/A
- **CMD-ID:** 141
- **Related CLI command:** None

## SESS_UCHKPT_CMD_DYNAMIC_CHRG_DEL_CA_INFO

This micro-checkpoint notifies that a dynamic charging action has been deleted.

- **Time based:** No
- **Frequency:** N/A
- **Event based:** Yes
- **Events:** Occurs whenever a dynamic charging action has been deleted.
- **Accounting:** No
- **Delta/Cumulative:** N/A
- **CMD-ID:** 183
- **Related CLI command:** None

## SESS_UCHKPT_CMD_DYNAMIC_CHRG_DEL_QG_INFO

This micro-checkpoint notifies that a dynamic QoS group has been deleted.

- **Time based:** No
- **Frequency:** N/A
- **Event based:** Yes
- **Events:** Occurs whenever a dynamic QoS group has been deleted.
- **Accounting:** No
- **Delta/Cumulative:** N/A
- **CMD-ID:** 182
- **Related CLI command:** None

## SESS_UCHKPT_CMD_DYNAMIC_CHRG_QG_INFO

This micro-checkpoint sends dynamic QoS group related information maintained by ECS.

- **Time based:** Yes
- **Frequency:** —
- **Event based:** Yes

- **Events:** Occurs whenever dynamic QoS group information is created or modified.
- **Accounting:** No
- **Delta/Cumulative:** N/A
- **CMD-ID:** 140
- **Related CLI command:** None

### SESS_UCHKPT_CMD_DYNAMIC_RULE_DEL_INFO

This micro-checkpoint notifies that a dynamic rule has been deleted.

- **Time based:** No
- **Frequency:** —
- **Event based:** Yes
- **Events:** Occurs whenever a dynamic rule has been deleted.
- **Accounting:** No
- **Delta/Cumulative:** N/A
- **CMD-ID:** 178
- **Related CLI command:** None

### SESS_UCHKPT_CMD_DYNAMIC_RULE_INFO

This micro-checkpoint sources predefined and dynamic rule related information maintained by ECS.

- **Time based:** Yes
- **Frequency:** —
- **Event based:** Yes
- **Events:** Occurs whenever a dynamic rule is created or modified.
- **Accounting:** No
- **Delta/Cumulative:** N/A
- **CMD-ID:** 43
- **Related CLI command:** None

## ePDG Category

### SESS_UCHKPT_CMD_DELETE_EPDG_BEARER

This micro-checkpoint synchronizes deleted ePDG bearers between the active and standby chassis.

- **Time based:** No
- **Frequency:** N/A
- **Event based:** Yes
- **Events:** N/A
- **Accounting:** Yes
- **Delta/Cumulative:** Cumulative
- **CMD-ID:** 110
- **Related CLI command: show srp micro-checkpoint statistics debug-info**

## SESS_UCHKPT_CMD_UPDATE_EPDG_BEARER

This micro-checkpoint synchronizes ePDG bearers between the active and standby chassis.

- **Time based:** No
- **Frequency:** N/A
- **Event based:** No
- **Events:** N/A
- **Accounting:** Yes
- **Delta/Cumulative:** Cumulative
- **CMD-ID:** 110
- **Related CLI command: show srp micro-checkpoint statistics debug-info**

## SESS_UCHKPT_CMD_UPDATE_EPDG_PEER_ADDR

This micro-checkpoint synchronizes ePDG peer addresses between the active and standby chassis.

- **Time based:** No
- **Frequency:** N/A
- **Event based:** Yes
- **Events:** —
- **Accounting:** Yes
- **Delta/Cumulative:** Cumulative
- **CMD-ID:** 110
- **Related CLI command: show srp micro-checkpoint statistics debug-info**

## SESS_UCHKPT_CMD_UPDATE_EPDG_REKEY

This micro-checkpoint synchronizes ePDG rekey statistics between the active and standby chassis.

- **Time based:** Yes
- **Frequency:** 30 seconds
- **Event based:** No
- **Events:** N/A
- **Accounting:** Yes
- **Delta/Cumulative:** Cumulative
- **CMD-ID:** 110
- **Related CLI command: show srp micro-checkpoint statistics debug-info**

## SESS_UCHKPT_CMD_UPDATE_EPDG_STATS

This micro-checkpoint synchronizes session statistics between the active and standby chassis.

- **Time based:** Yes
- **Frequency:** 30 seconds
- **Event based:** No
- **Events:** N/A
- **Accounting:** Yes
- **Delta/Cumulative:** Cumulative
- **CMD-ID:** 110

- **Related CLI command: show srp micro-checkpoint statistics debug-info**

# Firewall/ECS Category

## SESS_UCHKPT_CMD_SFW_DEL_RULE_INFO

This micro-checkpoint is sent when a ruledef is deleted for a bearer.

- **Time based:** No
- **Frequency:** N/A
- **Event based:** Yes
- **Events:** Occurs whenever PCRF sends a command to disable the predefined stateful firewall access rules.
- **Accounting:** No
- **Delta/Cumulative:** N/A
- **CMD-ID:** 186
- **Related CLI command:** None

## SESS_UCHKPT_CMD_SFW_RULE_INFO

This micro-checkpoint notifies the addition of dynamically enabled stateful firewall (SFW) access rules.

- **Time based:** No
- **Frequency:** N/A
- **Event based:** Yes
- **Events:** Occurs whenever PCRF sends a command to enable the predefined SFW access rules.
- **Accounting:** Yes
- **Delta/Cumulative:** Cumulative
- **CMD-ID:** 185
- **Related CLI command:** None

# GGSN Category

## SESS_UCHKPT_CMD_GGSN_DELETE_SUB_SESS

This micro-checkpoint sends an update when a secondary bearer is deleted.

- **Time based:** No
- **Frequency:** N/A
- **Event based:** Yes
- **Events:** Occurs upon secondary bearer deletion
- **Accounting:** —
- **Delta/Cumulative:** —
- **CMD-ID:** 117
- **Related CLI command:** None

## SESS_UCHKPT_CMD_GGSN_UPDATE_RPR

If RPR (Resilient Packet Ring) is configured in the GGSN service, an RPR timer is started during secondary bearer creation. This checkpoint is sent upon expiry of this timer.

- **Time based:** Yes
- **Frequency:** RPR timer
- **Event based:** Yes
- **Events:** Occurs when the secondary bearer creation RPR timer expires.
- **Accounting:** —
- **Delta/Cumulative:** —
- **CMD-ID:** 118
- **Related CLI command:** —

## SESS_UCHKPT_CMD_GGSN_UPDATE_SESSION

This micro-checkpoint is sent in a Network or UE initiated update procedure except for updates that result in the following scenarios:

- Creation or deletion of the beare
- TFT change or inter-RAT handovers
- Gn-Gp handoff

Parameters associated with this micro-checkpoint are shown below.

- **Time based:** No
- **Frequency:** N/A
- **Event based:** Yes
- **Events:** Occurs for a network initiated or UE initiated update.
- **Accounting:** No
- **Delta/Cumulative:** N/A
- **CMD-ID:** 171
- **Related CLI command: show srp checkpoint statistics active verbose**, and **show session subsystem facility sessmgr instance** <*instance_number*> **debug-info**.

## SESS_UCHKPT_CMD_GGSN_UPDATE_STATS

This micro-checkpoint periodically sends session statistics.

- **Time based:** Yes
- **Frequency:** Every five minutes
- **Event based:** No
- **Events:** N/A
- **Accounting:** Yes
- **Delta/Cumulative:** Cumulative
- **CMD-ID:** 116
- **Related CLI command:** None

## SESS_UCHKPT_CMD_UPDATE_COA_PARAMS

This micro-checkpoint updates input and output ACL parameters.

- **Time based:** —
- **Frequency:** —
- **Event based:** Yes
- **Events:** COA (Change of Authorization) response
- **Accounting:** —
- **Delta/Cumulative:** —
- **CMD-ID:** 83
- **Related CLI command:** None

# Gx Interface Category

## SESS_UCHKPT_CMD_ACS_VOLUME_USAGE

This micro-checkpoint sends volume usage over Gx accounting buckets.

- **Time based:** Yes
- **Frequency:** 4 seconds for aamgr micro-checkpoint and 18 seconds for GR micro-checkpoint
- **Event based:** No
- **Events:** Send along with macro-checkpoint
- **Accounting:** Yes
- **Delta/Cumulative:** Cumulative
- **CMD-ID:** 79
- **Related CLI command:** —None

## SESS_UCHKPT_CMD_UPDATE_SGX_INFO

This micro-checkpoint sends Gx session-related information.

- **Time based:** No
- **Frequency:** N/A
- **Event based:** Yes
- **Events:** Triggered on receiving CCA-I/U or RAR from PCRF.
- **Accounting:** Yes
- **Delta/Cumulative:** Cumulative
- **CMD-ID:** 137
- **Related CLI command:** None

# NAT Category

## SESS_UCHKPT_CMD_GR_UPDATE_NAT_REALM_PORT_INFO1

This micro-checkpoint is sent when a port chunk is allocated or deallocated for a subscriber sharing a NAT IP address with other subscribers. The port chunk is allocated or deallocated while data is being received for that subscriber.

- **Time based:** No
- **Frequency:** N/A
- **Event based:** Yes

- **Events:** Triggered when a new NAT port chunk is allocated or deleted.
- **Accounting:** No
- **Delta/Cumulative:** N/A
- **CMD-ID:** 105
- **Related CLI command:** None

## SESS_UCHKPT_CMD_GR_UPDATE_NAT_REALMS

This micro-checkpoint is sent when a NAT IP address is allocated to or deallocated from a subscriber.

For an on-demand case, it is triggered when the first packet matching a particular NAT realm is received and the NAT IP address is allocated to the subscriber.

If this is not an on-demand case, the NAT IP address is allocated during call setup and this micro-checkpoint is sent.

- **Time based:** No
- **Frequency:** N/A
- **Event based:** Yes
- **Events:** Triggered when a NAT IP address is allocated to or deallocated from a subscriber.
- **Accounting:** No
- **Delta/Cumulative:** N/A
- **CMD-ID:** 45
- **Related CLI command:** None

## SESS_UCHKPT_CMD_NAT_SIP_ALG_CALL_INFO

This micro-checkpoint is sent when a new SIP flow is created or deleted for a subscriber (while SIP data is being passed via the subscriber).

- **Time based:** No
- **Frequency:** N/A
- **Event based:** Yes
- **Events:** Triggered when a new SIP flow is created or deleted.
- **Accounting:** No
- **Delta/Cumulative:** N/A
- **CMD-ID:** 98
- **Related CLI command:** None

## SESS_UCHKPT_CMD_NAT_SIP_ALG_CONTACT_PH_INFO

This micro-checkpoint is sent when a received SIP packet is analyzed and pinholes are created in the NAT firewall.

- **Time based:** No
- **Frequency:** N/A
- **Event based:** Yes
- **Events:** Triggered when a SIP packet creates pinholes in the NAT firewall.
- **Accounting:** No
- **Delta/Cumulative:** N/A
- **CMD-ID:** 97

- **Related CLI command:** None

### SESS_UCHKPT_CMD_UPDATE_DSK_FLOW_CHKPT_INFO

This micro-checkpoint is sent when a new NAT flow is created or deleted for a subscriber (while data is being passed via the subscriber).

This checkpoint is sent from a timer but it is not timer based. The timer is used to pace (10 micro-checkpoints) whenever the timer fires (granularity = 2 sec). This only occurs if there are new flows that need to be micro-checkpointed. Otherwise, no micro-micro-checkpoints are sent.

- **Time based:** No
- **Frequency:** See explanation above.
- **Event based:** Yes
- **Events:** Triggered when a new NAT flow is created or deleted.
- **Accounting:** No
- **Delta/Cumulative:** N/A
- **CMD-ID:** 96
- **Related CLI command:** None

### SESS_UCHKPT_CMD_UPDATE_NAT_BYPASS_FLOW_INFO

This micro-checkpoint is sent when NAT is enabled for a subscriber but bypass-nat (no NATing) is configured for this flow (based on a rule-match), and a new bypass flow is created.

This checkpoint is sent when the flow is both added and deleted.

- **Time based:** No
- **Frequency:** N/A
- **Event based:** Yes
- **Events:** Triggered when a new flow with bypass-nat enabled is created or deleted.
- **Accounting:** No
- **Delta/Cumulative:** N/A
- **CMD-ID:** 60
- **Related CLI command:** None

## P-GW Category

### SESS_UCHKPT_CMD_PGW_DELETE_SUB_SESS

Reserved for future use.

### SESS_UCHKPT_CMD_PGW_OVRCHRG_PRTCTN_INFO

This micro-checkpoint indicates that the S-GW has set the Overcharging Protection bit in the MBR.

- **Time based:** No
- **Frequency:** N/A
- **Event based:** Yes
- **Events:** Triggered when the S-GW sets the Over Charging Protection Bit.
- **Accounting:** No

- **Delta/Cumulative:** N/A
- **CMD-ID:** 159
- **Related CLI command:** None

## SESS_UCHKPT_CMD_PGW_SGWRESTORATION_INFO

This micro-checkpoint indicates the interval that a call will remain up when the S-GW is down.

- **Time based:** No
- **Frequency:** N/A
- **Event based:** Yes
- **Events:** Triggered when the S-GW goes into Restoration mode.
- **Accounting:** No
- **Delta/Cumulative:** N/A
- **CMD-ID:** 158
- **Related CLI command:** None

## SESS_UCHKPT_CMD_PGW_UBR_MBR_INFO

This micro-checkpoint is sent at the end of a UBR (Update Bearer Request ) or MBR (Modify Bearer Request ) except when the UBR /MBR procedure results in the following scenarios:

- TFT change
- Bearer updat or modification for a collapsed call
- Pure P to collapsed or collapsed to Pure P change
- Inter-technology handoff, for example, WiFi to LTE

Parameters associated with this micro-checkpoint are show below.

- **Time based:** No
- **Frequency:** N/A
- **Event based:** yes
- **Events:** Occurs as a result of a UBR or MBR procedure.
- **Accounting:** No
- **Delta/Cumulative:** N/A
- **CMD-ID:** 193
- **Related CLI command: show srp checkpoint statistics active verbose** and **show session subsystem facility sessmgr instance** <*instance_number*> **debug-info**.

## SESS_UCHKPT_CMD_PGW_UPDATE_APN_AMBR

Reserved for future use.

## SESS_UCHKPT_CMD_PGW_UPDATE_INFO

Reserved for future use.

## SESS_UCHKPT_CMD_PGW_UPDATE_LI_PARAM

This micro-checkpoint indicates the state of Lawful Intercept (LI) for this call.

- **Time based:** No

- **Frequency:** N/A
- **Event based:** Yes
- **Events:** Triggered when there is a change in the LI state for this call.
- **Accounting:** No
- **Delta/Cumulative:** N/A
- **CMD-ID:** 151
- **Related CLI command:** None

### SESS_UCHKPT_CMD_PGW_UPDATE_PDN_COMMON_PARAM

Reserved for future use.

### SESS_UCHKPT_CMD_PGW_UPDATE_QOS

Reserved for future use.

### SESS_UCHKPT_CMD_PGW_UPDATE_SGW_CHANGE

Reserved for future use.

### SESS_UCHKPT_CMD_PGW_UPDATE_STATS

This micro-checkpoint periodically sends session statistics.

- **Time based:** Yes
- **Frequency:** Every five minutes
- **Event based:** No
- **Events:** N/A
- **Accounting:** Yes
- **Delta/Cumulative:** Cumulative
- **CMD-ID:** 65
- **Related CLI command:** None

## Rf Interface Category

### SESS_UCHKPT_CMD_ACS_ACCOUNTING_TYPE_QCI_RF

This micro-checkpoint indicates a change in the SDF+QCI-based Rf accounting buckets.

- **Time based:** Yes
- **Frequency:** 4 seconds for aamgr checkpoint and 18 seconds for GR checkpoint
- **Event based:** No
- **Events:** N/A
- **Accounting:** Yes
- **Delta/Cumulative:** Cumulative
- **CMD-ID:** 126
- **Related CLI command:** None

## SESS_UCHKPT_CMD_ACS_ACCOUNTING_TYPE_QCI_RF_WITH_FC

This micro-checkpoint indicates complete SDF+QCI-based Rf accounting buckets.

- **Time based:** Yes
- **Frequency:** 4 seconds for aamgr checkpoint and 18 seconds for GR checkpoint
- **Event based:** No
- **Events:** Sent along with macro-checkpoint.
- **Accounting:** Yes
- **Delta/Cumulative:** Cumulative
- **CMD-ID:** 164
- **Related CLI command:** None

## SESS_UCHKPT_CMD_ACS_ACCOUNTING_TYPE_RATING_GROUP_RF

This micro-checkpoint indicates a change in the SDF-based Rf accounting buckets.

- **Time based:** Yes
- **Frequency:** 4 seconds for aamgr checkpoint and 18 seconds for GR checkpoint
- **Event based:** No
- **Events:** N/A
- **Accounting:** Yes
- **Delta/Cumulative:** Cumulative
- **CMD-ID:** 125
- **Related CLI command:** None

## SESS_UCHKPT_CMD_ACS_ACCOUNTING_TYPE_RATING_GROUP_RF_WITH_FC

This micro-checkpoint indicates complete SDF-based Rf accounting buckets.

- **Time based:** Yes
- **Frequency:** 4 seconds for aamgr checkpoint and 18 seconds for GR checkpoint;
- **Event based:** No
- **Events:** Sent along with macro-checkpoint.
- **Accounting:** Yes
- **Delta/Cumulative:** Cumulative
- **CMD-ID:** 163
- **Related CLI command:** None

# S6b Interface Category

## SESS_UCHKPT_CMD_S6B_INFO

This micro-checkpoint sends the Restoration Priority Indicator when reauthorization occurs over the S6b interface.

- **Time based:** No
- **Frequency:** N/A
- **Event based:** Yes

- **Events:** Occurs when an Sb6 reauthorization results in a change in value of the Restoration Priority Indicator.
- **Accounting:** No
- **Delta/Cumulative:** N/A
- **CMD-ID:** 202
- **Related CLI command:** None

# SaMOG Category

## SESS_UCHKPT_CMD_CGW_DELETE_BEARER

Reserved for future use.

## SESS_UCHKPT_CMD_CGW_DELETE_PDN

This micro-checkpoint indicates a PDN connection has been deleted.

- **Time based:** No
- **Frequency:** N/A
- **Event based:** Yes
- **Events:** Occurs whenever SaMOG sends a Delete-Session-Req or upon receiving a Delete-Bearer-Request.
- **Accounting:** No
- **Delta/Cumulative:** N/A
- **CMD-ID:** 169
- **Related CLI command: show subscriber samog-only full**

## SESS_UCHKPT_CMD_CGW_UPDATE_BEARER_QOS

This micro-checkpoint indicates a QoS update for the bearer.

- **Time based:** No
- **Frequency:** N/A
- **Event based:** Yes
- **Events:** Occurs when a change in Bearer QoS is received from the P-GW due to a reauthorization (AAR Received from AAA Server) or Update-Bearer-Request.
- **Accounting:** No
- **Delta/Cumulative:** N/A
- **CMD-ID:** 167
- **Related CLI command: show subscriber samog-only full**

## SESS_UCHKPT_CMD_CGW_UPDATE_PDN

This micro-checkpoint indicates a PDN update for a change in APN-AMBR.

- **Time based:** No
- **Frequency:** N/A
- **Event based:** Yes
- **Events:** Occurs when a change in APN-AMBR is received from the P-GW due to a reauthorization (AAR Received from AAA Server) or Update-Bearer-Request.

- **Accounting:** No
- **Delta/Cumulative:** N/A
- **CMD-ID:** 168
- **Related CLI command: show subscriber samog-only full**

## SESS_UCHKPT_CMD_CGW_UPDATE_STATS

Reserved for future use.

## SESS_UCHKPT_CMD_CGW_UPDATE_UE_PARAM

Reserved for future use.

## SESS_UCHKPT_CMD_SAMOG_ACCT_INTERIM_INFO

This micro-checkpoint is sent for a SaMOG session on receipt of an Accounting Req (INTERIM-UPDATE) from the WLC

- **Time based:** No
- **Frequency:** N/A
- **Event based:** Yes
- **Events:** Occurs on receipt of an Accounting Req (INTERIM-UPDATE) from the WLC.
- **Accounting:** No
- **Delta/Cumulative:** N/A
- **CMD-ID:** 177
- **Related CLI command: show subscriber samog-only full**

## SESS_UCHKPT_CMD_SAMOG_ACCT_START_INFO

This micro-checkpoint is sent for a SaMOG session on receipt of an Accounting Req (START) from the WLC (Wireless LAN Controller).

- **Time based:** No
- **Frequency:** N/A
- **Event based:** Yes
- **Events:** Occurs when a Account Req (START) request is received from the WLC.
- **Accounting:** No
- **Delta/Cumulative:** N/A
- **CMD-ID:** 174
- **Related CLI command: show subscriber samog-only full**

## SESS_UCHKPT_CMD_SAMOG_EOGRE_TUNNEL_INFO

This micro-checkpoint is sent for an Inter-RG handoff for EoGRE subscriber sessions. This checkpoint updates the VMAC Address and WLC EoGRE tunnel end-point address.

- **Time based:** No
- **Frequency:** N/A
- **Event based:** Yes
- **Events:** Occurs whenever a DHCP-Discover message is received over a different EoGRE tunnel.
- **Accounting:** No

- **Delta/Cumulative:** N/A
- **CMD-ID:** 201
- **Related CLI command: show subscriber samog-only full**

## SESS_UCHKPT_CMD_SAMOG_GTPV1_UPDATE_PDN_INFO

This micro-checkpoint is sent for a SaMOG session upon receipt of an Update-PDP-Context-Req from the GGSN to update the PDN information.

- **Time based:** No
- **Frequency:** N/A
- **Event based:** Yes
- **Events:** Occurs after successful SaMOG processing of an Update-PDP-Context-Req from the GGSN.
- **Accounting:** No
- **Delta/Cumulative:** N/A
- **CMD-ID:** 191
- **Related CLI command: show subscriber samog-only full**

## SESS_UCHKPT_CMD_SAMOG_HANDOFF_AUTHEN_INFO

This micro-checkpoint is sent for a SaMOG session that is Re-authenticating the subscriber while the subscriber session is in Handoff state.

- **Time based:** No
- **Frequency:** N/A
- **Event based:** Yes
- **Events:** Occurs on completion of Re-Authentication for an existing SaMOG subscriber session currently in Handoff state.
- **Accounting:** No
- **Delta/Cumulative:** N/A
- **CMD-ID:** 176
- **Related CLI command: show subscriber samog-only full**

## SESS_UCHKPT_CMD_SAMOG_HANDOFF_INIT_INFO

This micro-checkpoint is sent for a SaMOG session on receipt of an Accounting Req (STOP) from the WLC (Wireless LAN Controller).

SaMOG will delay handoff as it expects an Accounting Req (START) from the subscriber.

- **Time based:** No
- **Frequency:** N/A
- **Event based:** Yes
- **Events:** Occurs when a Account Req (STOP) request is received from the WLC.
- **Accounting:** No
- **Delta/Cumulative:** N/A
- **CMD-ID:** 175
- **Related CLI command: show subscriber samog-only full**

## SESS_UCHKPT_CMD_SAMOG_LI_PROV_INFO

This micro-checkpoint is sent for a SaMOG session that is on lawful intercept (LI) Active-Camp-on mode.

- **Time based:** No
- **Frequency:** N/A
- **Event based:** Yes
- **Events:** Occurs after an LI trigger is received after SaMOG session has been created.
- **Accounting:** No
- **Delta/Cumulative:** N/A
- **CMD-ID:** 189
- **Related CLI command: show subscriber samog-only full**

## SESS_UCHKPT_CMD_SAMOG_MIPV6_TIMER_INFO

This micro-checkpoint updates the Binding Cache Life timer and MIPv6 biding status for a SaMOG session.

- **Time based:** No
- **Frequency:** N/A
- **Event based:** Yes
- **Events:** Occurs whenever a PMIPv6 PBU is received with a lifetime of zero from the WLC.
- **Accounting:** No
- **Delta/Cumulative:** N/A
- **CMD-ID:** 190
- **Related CLI command: show subscriber samog-only full**

## SESS_UCHKPT_CMD_SAMOG_MULTI_ROUND_AUTHEN_INFO

This micro-checkpoint is sent for a SaMOG session when SaMOG is waiting on the UE after sending an Access-Challenge while Re-authenticating the subscriber session.

- **Time based:** No
- **Frequency:** N/A
- **Event based:** Yes
- **Events:** Occurs after SaMOG sends an Access-Challenge for an existing SaMOG subscriber session during Re-authentication.
- **Accounting:** No
- **Delta/Cumulative:** N/A
- **CMD-ID:** 184
- **Related CLI command: show subscriber samog-only full**

## SESS_UCHKPT_CMD_SAMOG_REAUTHEN_INFO

This micro-checkpoint is sent for a SaMOG session when subscriber Re-authentication is completed.

- **Time based:** No
- **Frequency:** N/A
- **Event based:** Yes
- **Events:** Occurs on completion of Re-Authentication for an existing SaMOG subscriber session.
- **Accounting:** No
- **Delta/Cumulative:** N/A

- **CMD-ID:** 172
- **Related CLI command: show subscriber samog-only full**

## SESS_UCHKPT_CMD_SAMOG_REAUTHOR_INFO

This micro-checkpoint is sent for a SaMOG session when subscriber Re-authorization is completed.

- **Time based:** No
- **Frequency:** N/A
- **Event based:** Yes
- **Events:** Occurs on receiving and successfully processing AAR from the AAA Server to re-authorize the subscriber
- **Accounting:** No
- **Delta/Cumulative:** N/A
- **CMD-ID:** 173
- **Related CLI command: show subscriber samog-only full**

SESS_UCHKPT_CMD_SAMOG_REAUTHOR_INFO