

# **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, page 1
- Macro-checkpoints, page 1
- Micro-checkpoints, page 3

# **Overview of Checkpointing**

Interchassis Session Recovery (ICSR) provides a framework for sessing instance-level checkpointing within an ICSR framework. A checkpoint is a snapshot of the status of an application. Checkpointing can be used by sessing 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 sessingrs 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 4
- DCCA Category, on page 5
- ECS Category, on page 5
- ePDG Category, on page 9
- Firewall/ECS Category, on page 11
- GGSN Category, on page 12
- Gx Interface Category, on page 14
- NAT Category, on page 14
- P-GW Category, on page 17
- Rf Interface Category, on page 19
- S6b Interface Category, on page 21
- SaMOG Category, on page 21

# 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**

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# 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

## 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

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• 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

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• 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

# 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\_INF01

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