

System Logs

This chapter describes how to configure parameters related to the various types of logging and how to viewing their content. It includes the following sections:

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Feature Summary and Revision History

Summary Data

Table 1: Summary Data

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

Related Documentation	*UCC 5G UPF Configuration and Administration Guide*

Revision History

Table 2: Revision History

Revision Details	Release
First introduced.	2020.02.0

System Log Types

There are five types of logs that can be configured and viewed on the system:

Important Not all Event Logs can be configured on all products. Configurability depends on the hardware platform and licenses in use.

- **Event**: Event logging can be used to determine system status and capture important information pertaining to protocols and tasks in use by the system. This is a global function that will be applied to all contexts, sessions, and processes.
- **Active**: Active logs are operator configurable on a CLI instance-by-CLI instance basis. Active logs that are configured by an administrative user in one CLI instance cannot be viewed by an administrative user in a different CLI instance. Each active log can be configured with filter and display properties that are independent of those configured globally for the system. Active logs are displayed in real time as events are generated.
- **Trace**: Trace logging can be used to quickly isolate issues that may arise for a particular connected subscriber session. Traces can be taken for a specific call identification (callid) number, IP address, mobile station identification (MSID) number, or username.
- **Monitor**: Monitor logging records all activity associated with a particular session. This functionality is available in order to comply with law enforcement agency requirements for monitoring capabilities of particular subscribers. Monitors can be performed based on a subscriber's MSID or username.
- **Crash**: Crash logging stores useful information pertaining to system software crashes. This information is useful in determining the cause of the crash.

Important Stateful Firewall and NAT supports logging of various messages on screen if logging is enabled for firewall. These logs provide detailed messages at various levels, like critical, error, warning, and debug. Stateful Firewall and NAT attack logs also provide information on the source IP address, destination IP address, protocol, or attack type for any packet dropped due to an attack and are also sent to a syslog server if configured in the system. For more information on logging support for Stateful Firewall and NAT, see the *Logging Support* chapter of *PSF Administration Guide* or *NAT Administration Guide*.

Configuring Event Logging Parameters

The system can be configured to generate logs based on user-defined filters. The filters specify the facilities (system tasks or protocols) that the system is to monitor and severity levels at which to trigger the generation of the event entries.

Event logs are stored in system memory and can be viewed via the CLI. There are two memory buffers that store event logging information. The first buffer stores the active log information. The second buffer stores inactive logging information. The inactive buffer is used as a temporary repository to allow you to view logs without having data be overwritten. Logs are copied to the inactive buffer only through manual intervention.

Each buffer can store up to 50,000 events. Once these buffers reach their capacity, the oldest information is removed to make room for the newest.

To prevent the loss of log data, the system can be configured to transmit logs to a syslog server over a network interface.

Configuring Event Log Filters

You can filter the contents of event logs at the Exec mode and Global Configuration mode levels.

Exec Mode Filtering

These commands allow you to limit the amount of data contained in logs without changing global logging parameters.

Follow the examples below to filter logs via Exec mode commands.

Active Filtering

logging active [copy runtime filters] [event-verbosity *event_level* **] [pdu-data** *format* **] [pdu-verbosity** *pdu_level* **]**

Notes:

- **copy runtime filters** – Copies the runtime filters and uses that copy to filter the current logging session.
- **event-verbosity** *event_level* – Specifies the level of verboseness to use in logging of events as one of:
  - *min* – Displays minimal information about the event. Information includes event name, facility, event ID, severity level, date, and time.
  - *concise* – Displays detailed information about the event, but does not provide the event source within the system.
  - *full* – Displays detailed information about event, including source information, identifying where within the system the event was generated.
- **pdu-data** *format* – Specifies output format for packet data units when logged as one of:
  - *none* – raw format (unformatted).
  - *hex* – hexadecimal format
  - *hex-ascii* – hexadecimal and ASCII similar to a main-frame dump

- **pdu-verbosity** *pdu_level* – Specifies the level of verboseness to use in logging of packet data units as an integer from 1 through 5, where 5 is the most detailed.

Disable or Enable Filtering by Instance(s)

logging filter active facility *facility* **level** *severity_level* **[critical-info | no-critical-info]**

logging filter { disable | enable } facility *facility* **{ all | instance** *instance_number* **}**

Notes:

- **active** – Indicates that only active processes are to have logging options set.
- **disable** – Disables logging for a specific instance or all instances. This keyword is only supported for aaamgr, hamgr and sessmgr facilities.
- **enable** – Enables logging for a specific instance or all instances. This keyword is only supported for aaamgr, hamgr and sessmgr facilities. By default logging is enabled for all instances of aaamgr, hamgr and sessmgr.
- **facility** *facility* and **level** *severity_level* – Configure the logging filter that determines which system facilities should be logged and at what levels.
- **all | instance** *instance_number* – Specifies whether logging will be disabled or enabled for all instances or a specific instance of aaamgr, hamgr or sessmgr. Run the **show session subsystem facility** *facility* command to identify specific instance numbers.

Note These keywords are only supported with the **disable** and **enable** keywords.

- **level** *severity_level* – Specifies the level of information to be logged from the following list which is ordered from highest to lowest:
  - critical - display critical events
  - error - display error events and all events with a higher severity level
  - warning - display warning events and all events with a higher severity level
  - unusual - display unusual events and all events with a higher severity level
  - info - display info events and all events with a higher severity level
  - trace - display trace events and all events with a higher severity level
  - debug - display all events

Note This keyword is only supported in conjunction with the **active** keyword.

- **critical-info** – Specifies that events with a category attribute of critical information are to be displayed. Examples of these types of events can be seen at bootup when system processes and tasks are being initiated. This is the default setting.

  no-critical-info – Specifies that events with a category attribute of critical information are not to be displayed.

Note These keywords are only supported in conjunction with the **active** keyword.

Important To enable logging of a single instance of a facility, you must first disable all instances of the facility (**logging filter disable facility** *facility* **all**) and then enable logging of the specific instance (**logging filter enable facility** *facility* **instance** *instance_number*. To restore default behavior you must re-enable logging of all instances (**logging filter enable facility** *facility* **all**).

You can display the instance numbers for enabled instances per facility using the Exec mode **show instance-logging** command.

Global Configuration Mode Filtering

You can filter the contents of event logs at the Exec mode and Global Configuration mode levels.

Follow the example below to configure run time event logging parameters for the system:

```
configure
   logging filter runtime facility facility level report_level
   logging display { event-verbosity | pdu-data | pdu-verbosity }
   end
```

Notes:

- **facility** *facility* and **level** *severity_level* – Configure the logging filter that determines which system facilities should be logged and at what levels.
- Repeat for every facility that you would like to log.
- *Optional:* Configure event ID restrictions by adding the **logging disable eventid** command. The system provides the ability to restrict the sending of a specific event ID or a range of event IDs to minimize the amount of data logged to that which is most useful. Repeat to disable logging for additional event IDs or event ID ranges.
- If an administrator restricts event logging for an Event ID or Event ID range using the above command (**logging disable eventid**), the system will generate a Critical Event log "cli 30999 critical" as well as an SNMP trap "1361 (DisabledEventIDs)" with the specific Event IDs or Event ID range that was disabled.

  These event logs and traps are enabled by default in this release, and cannot be disabled.
- If an administrator lowers the logging level (using the **logging filter runtime facility *facility* level *report_level*** command below the default level of "error", the system will generate a Critical Event log "cli 30998 critical" as well as an SNMP trap "1362 (LogLevelChanged)" with the specific Event IDs or Event ID range that was disabled.

  These event logs and traps are enabled by default in this release, and cannot be disabled.

The following examples show the CLI output of the traps generated when event logging or logging levels are changed.

```
show snmp trap statistics
SNMP Notification Statistics:
  ...
Trap Name                           #Gen #Disc  Disable Last Generated
---------------------------------- ----- -----  ------- --------------------
…
DisabledEventIDs                       1     0       0  2021:05:11:15:35:25
LogLevelChanged                        2     0       0  2021:05:11:15:28:03
```

```
show snmp trap history
There are x historical trap records (5000 maximum)

Timestamp                Trap Information
-------------------------
```

```
…
Thu May 11 15:28:03 2021 Internal trap notification 1362 (LogLevelChanged) Logging level
of facility resmgr is changed to critical by user #initial-config# context local privilege
 level Security Administrator ttyname /dev/pts/0 address type IPV4 remote ip address
209.165.202.129
…
Thu May 11 15:35:25 2021 Internal trap notification 1361 (DisabledEventIDs) Event IDs from
 100 to 1000 have been disabled by user adminuser context context privilege level security
 administrator ttyname tty address type IPV4 remote ip address 209.165.202.134
…
Mon May 15 10:14:56 2021 Internal trap notification 1362 (LogLevelChanged) Logging level
of facility sitmain is changed to critical by user staradmin context local privilege level
 Security Administrator ttyname /dev/pts/1 address type IPV4 remote ip address 209.165.202.120
```

Configuring Syslog Servers

Syslog Architecture

System Logging (syslog) is the architecture which produces and sends event information from the UPF over the UDP transport layer to a centralized Event Message Collector. Syslog uses a client/server architecture:

- **Syslog Client:** A set of processes running on UPF, which operate as the sending device for event messages.
- **Syslog Server:** An external server configured to receive the event messages sent from the UPF.

UPF transports event messages using the Syslog Protocol without expecting acknowledgment of receipt. The system forwards event messages regardless if a Syslog Server is available to receive the messages.

Configuring the System to Sent Event Messages to an External Syslog Server

Information that is generated by the run time event logging filters can be transmitted to a syslog server for permanent storage.



Important The data transmitted to the Syslog server is meant to be used for informational purposes. Functions such as billing and performance monitoring should not be based on syslogs.



Important Although the system provides the flexibility to configure syslog servers on a context-by-context basis, it is recommended that all servers be configured in the *local* context in order to isolate the log traffic from the network traffic.

Use the following example to configure syslog servers:

```
configure
   context  context_name
logging syslog ip_address [ event-verbosity { min | concise | full } |
facility facilities |  msg-format { rfc3164 | rfc5424 } | pdu-data { none
| hex | hex-ascii } | pdu-verbosity pdu_level |  port number  |  rate value
]
     end
```

NOTES:

- **syslog** *ip_address*: Specifies the IP address of a system log server on the network in IPv4 dotted-decimal or IPv6 colon-separated-hexadecimal notation.
- **event-verbosity { min | concise | full }**: Specifies the level of detail to use in logging of events. Detail level must be one of the following:
  - **min**: Displays minimal detail.
  - **concise**: Displays summary detail.
  - **full**: Displays full detail.
- **facility** *facilities*: Specifies the local facility for which the system logging server's logging options are applied. Local facility must be one of the following:
  - **local0**—Pertains to syslog severity level of 0, Emergency
  - **local1**—Pertains to syslog severity level of 1, Alert
  - **local2**—Pertains to syslog severity level of 2, Critical
  - **local3**—Pertains to syslog severity level of 3, Error
  - **local4**—Pertains to syslog severity level of 4, Warning
  - **local5**—Pertains to syslog severity level of 5, Notice
  - **local6**—Pertains to syslog severity level of 6, Informational
  - **local7**—Pertains to syslog severity level of 7, Debug

  Default: **local7**

  If local facility is not specified, then **local7** is applied by default.

  Multiple system log servers can share the logging options of a given local facility. This allows for the logical grouping of system log servers and the options which affect all of those associated with the same local facility.
- **msg-format { rfc3164 | rfc5424 }**: Configures the message format for each system log server as per RFC3164 or RFC5424. Default: rfc3164.

- **pdu-data { none | hex | hex-ascii }**: Specifies output format for packet data units when logged. Format must be one of the following:
  - **none**: Displays data in raw format.
  - **hex**: Displays data in hexadecimal format.
  - **hex-ascii**: Displays data in hexadecimal and ASCII format (similar to a mainframe dump).
- **pdu-verbosity** *pdu_level*: Specifies the level of verboseness to use in logging of packet data units as a value from 1 through 5, where 5 is the most detailed.
- **port** *number* : Specifies an alternate port number for the system log server. Default: 514.

  number must be an integer value from 1 through 65535.
- **rate** *value*: Specifies the rate at which log entries are allowed to be sent to the system log server. No more than the number specified by *value* is sent to a system log server within any given one-second interval.

  value must be an integer from 0 through 100000. Default: 1000
- Repeat as necessary to configure extra syslog servers. There is no limit to the number of syslog servers that can be configured.

Configuring Active Logs

Active logs are event logs that are operator configurable on a CLI instance-by-CLI instance basis. Active logs configured by an administrative user in one CLI instance are not displayed to an administrative user in a different CLI instance. Each active log can be configured with filter and display properties that are independent of those configured globally for the system. Active logs are displayed in real time as they are generated.

Active logs are not written to the active memory buffer by default. To write active logs to the active memory buffer execute the following command in the Global Configuration mode:

```
logging runtime buffer store all-events
```

When active logs are written to the active memory buffer, they are available to all users in all CLI instances.

Use the following example to configure active logging in Global Configuration mode:

```
logging filter runtime facility facility level report_level
```

NOTES:

- Configure the logging filter that determines which system facilities should be logged and at what levels.
- Repeat for every facility that you want to log.
- *Optional:* Configure event ID restrictions by adding the **logging disable eventid** command. The system provides the ability to restrict the sending of a specific event ID or a range of event IDs to minimize the amount of data logged to that which is most useful. Repeat to disable logging for more event IDs or event ID ranges.

Once all the necessary information has been gathered, the Active log display can be stopped by entering the following command in the EXEC mode:

```
no logging active
```

Specifying Facilities

The following facilities can be configured for logging event data:

- **a10**: A10 interface facility
- **a11**: A11 interface facility
- **a11mgr**: A11 Manager facility
- **aaa-client**: Authentication, Authorization and Accounting (AAA) client facility
- **aaamgr**: AAA manager logging facility
- **aaaproxy**: AAA Proxy facility
- **aal2**: ATM Adaptation Layer 2 (AAL2) protocol logging facility
- **acl-log**: Access Control List (ACL) logging facility
- **acsctrl**: Active Charging Service (ACS) Controller facility
- **acsmgr**: ACS Manager facility
- **afctrl**: Fabric Controller facility [ASR 5500 only]
- **afmgr**: Fabric Manager logging facility [ASR 5500 only]
- **alarmctrl**: Alarm Controller facility
- **alcap**: Access Link Control Application Part (ALCAP) protocol logging facility
- **alcapmgr**: ALCAP manager logging facility
- **all**: All facilities
- **bfd**: Bidirectional Forwarding Detection (BFD) protocol logging facility
- **bgp**: Border Gateway Protocol (BGP) facility
- **bindmux**: IPCF BindMux-Demux Manager logging facility
- **bngmgr**: Broadband Network Gateway (BNG) Demux Manager logging facility
- **bssap+**: Base Station Sub-system Application Part+ protocol facility for the login interface between the SGSN and the MSC/VLR (2.5G and 3G)
- **bssgp**: Base Station Sub-system GPRS Protocol logging facility handles exchange information between the SGSN and the BSS (2.5G only)
- **callhome**: Call Home application logging facility
- **cap**: CAMEL Application Part (CAP) logging facility for protocol used in prepaid applications (2.5G and 3G)
- **cbsmgr**: Cell Broadcasting Service (CBS) logging facility [HNBGW]
- **cdf**: Charging Data Function (CDF) logging facility

- **cfctrl**: Content filtering controller logging facility
- **cfmgr**: Content filtering manager logging facility
- **cgw**: Converged Access Gateway (CGW) logging facility
- **cli**: Command Line Interface (CLI) logging facility
- **cmp**: Certificate Management Protocol (IPSec) logging facility
- **confdmgr**: ConfD Manager proclet (NETCONF) logging facility
- **connectedapps**: SecGW ASR 9000 oneP communication procotol
- **connproxy**: Controller Proxy logging facility
- **credit-control**: Credit Control (CC) facility
- **csp**: Card/Slot/Port controller facility
- **css**: Content Service Selection (CSS) facility
- **css-sig**: CSS RADIUS Signaling facility
- **cx-diameter**: Cx Diameter Messages facility [CSCF <--> HSS]
- **data-mgr**: Data Manager Framework logging facility
- **dcardctrl**: IPSec Daughter Card Controller logging facility
- **dcardmgr**: IPSec Daughter Card Manager logging facility
- **demuxmgr**: Demux Manager API facility
- **dgmbmgr**: Diameter Gmb Application Manager logging facility
- **dhcp**: Dynamic Host Configuration Protocol (DHCP) logging facility
- **dhcpv6**: DHCPv6
- **dhost**: Distributed Host logging facility
- **diabase**: Diabase messages facility
- **diactrl**: Diameter Controller proclet logging facility
- **diameter**: Diameter endpoint logging facility
- **diameter-acct**: Diameter Accounting
- **diameter-auth**: Diameter Authentication
- **diameter-dns**: Diameter DNS subsystem
- **diameter-ecs**: ACS Diameter signaling facility
- **diameter-engine**: Diameter version2 engine logging facility
- **diameter-hdd**: Diameter Horizontal Directional Drilling (HDD) Interface facility
- **diameter-svc**: Diameter Service
- **diamproxy**: DiamProxy logging facility

- **doulosuemgr**: Doulos (IMS-IPSec-Tool) user equipment manager
- **dpath**: IPSec Data Path logging facility
- **drvctrl**: Driver Controller logging facility
- **eap-diameter**: Extensible Authentication Protocol (EAP) IP Sec urity facility
- **eap-ipsec**: Extensible Authentication Protocol (EAP) IPSec facility
- **eap-sta-s6a-s13-s6b-diameter**: EAP/STA/S6A/S13/S6B Diameter messages facility
- **ecs-css**: ACSMGR <-> Session Manager Signalling Interface facility
- **egtpc**: eGTP-C logging facility
- **egtpmgr**: enhanced GPRS Tunneling Protocol (eGTP) manager logging facility
- **egtpu**: eGTP-U logging facility
- **embms**: evolved Multimedia Broadcast Multicast Services Gateway facility
- **embms**: eMBMS Gateway Demux facility
- **epdg**: evolved Packet Data (ePDG) gateway logging facility
- **event-notif**: Event Notification Interface logging facility
- **evlog**: Event log facility
- **famgr**: Foreign Agent manager logging facility
- **firewall**: Firewall logging facility
- **fng**: Femto Network Gateway (FNG) logging facility
- **gbmgr**: SGSN Gb Interface Manager facility
- **gmm**:
  - For 2.5G: Logs the GPRS Mobility Management (GMM) layer (above LLC layer)
  - For 3G: Logs the access application layer (above the RANAP layer)
- **gprs-app**: GPRS Application logging facility
- **gprs-ns**: GPRS Network Service Protocol (layer between SGSN and the BSS) logging facility
- **gq-rx-tx-diameter**: Gq/Rx/Tx Diameter messages facility
- **gss-gcdr**: GTPP Storage Server GCDR facility
- **gtpc**: GTP-C protocol logging facility
- **gtpcmgr**: GTP-C protocol manager logging facility
- **gtpp**: GTP-prime protocol logging facility
- **gtpu**: GTP-U protocol logging facility
- **gtpumgr**: GTP-U Demux manager

- **gx-ty-diameter**: Gx/Ty Diameter messages facility
- **gy-diameter**: Gy Diameter messages facility
- **h248prt**: H.248 port manager facility
- **hamgr**: Home Agent manager logging facility
- **hat**: High Availability Task (HAT) process facility
- **hdctrl**: HD Controller logging facility
- **henbapp**: Home Evolved NodeB (HENB) App facility
- **henbgw**: HENB-GW facility
- **henbgw-pws**: HENB-GW Public Warning System logging facility
- **henbgw-sctp-acs**: HENB-GW access Stream Control Transmission Protocol (SCTP) facility
- **henbgw-sctp-nw**: HENBGW network SCTP facility
- **henbgwdemux**: HENB-GW Demux facility
- **henbgwmgr**: HENB-GW Manager facility
- **hnb-gw**: HNB-GW (3G Femto GW) logging facility
- **hnbmgr**: HNB-GW Demux Manager logging facility
- **hss-peer-service**: Home Subscriber Server (HSS) Peer Service facility
- **iftask**: Internal Forwarder Task (Intel DPDK) used on VPC-SI and VPC-DI platforms
- **igmp**: Internet Group Management Protocol (IGMP)
- **ikev2**: Internet Key Exchange version 2 (IKEv2)
- **ims-authorizatn**: IP Multimedia Subsystem (IMS) Authorization Service facility
- **ims-sh**: HSS Diameter Sh Interface Service facility
- **imsimgr**: SGSN IMSI Manager facility
- **imsue**: IMS User Equipment (IMSUE) facility
- **ip-arp**: IP Address Resolution Protocol facility
- **ip-interface**: IP interface facility
- **ip-route**: IP route facility
- **ipms**: Intelligent Packet Monitoring System (IPMS) logging facility
- **ipne**: IP Network Enabler (IPNE) facility
- **ipsec**: IP Security logging facility
- **ipsecdemux**: IPSec demux logging facility
- **ipsg**: IP Service Gateway interface logging facility
- **ipsgmgr**: IP Services Gateway facility

- **ipsp**: IP Pool Sharing Protocol logging facility
- **kvstore**: Key/Value Store (KVSTORE) Store facility
- **l2tp-control**: Layer 2 Tunneling Protocol (L2TP) control logging facility
- **l2tp-data**: L2TP data logging facility
- **l2tpdemux**: L2TP Demux Manager logging facility
- **l2tpmgr**: L2TP Manager logging facility
- **lagmgr**: Link Aggregation Group (LAG) manager logging facility
- **lcs**: Location Services (LCS) logging facility
- **ldap**: Lightweight Directory Access Protocol (LDAP) messages logging facility
- **li**: Refer to the *Lawful Intercept Configuration Guide* for a description of this command.
- **linkmgr**: SGSN/BSS SS7 Link Manager logging facility (2.5G only)
- **llc**: Logical Link Control (LLC) Protocol logging facility; for SGSN: logs the LLC layer between the GMM and the BSSGP layers for logical links between the MS and the SGSN
- **local-policy**: Local Policy Service facility
- **location-service**: Location Services facility
- **m3ap**: M3 Application Protocol facility
- **m3ua**: M3UA Protocol logging facility
- **magmgr**: Mobile Access Gateway manager logging facility
- **map**: Mobile Application Part (MAP) protocol logging facility
- **megadiammgr**: MegaDiameter Manager (SLF Service) logging facility
- **mme-app**: Mobility Management Entity (MME) Application logging facility
- **mme-embms**: MME evolved Multimedia Broadcast Multicast Service facility
- **mme-misc**: MME miscellaneous logging facility
- **mmedemux**: MME Demux Manager logging facility
- **mmemgr**: MME Manager facility
- **mmgr**: Master Manager logging facility
- **mobile-ip**: Mobile IP processes
- **mobile-ip-data**: Mobile IP data facility
- **mobile-ipv6**: Mobile IPv6 logging facility
- **mpls**: Multiprotocol Label Switching (MPLS) protocol logging facility
- **mrme**: Multi Radio Mobility Entity (MRME) logging facility
- **mseg-app**: Mobile Services Edge Gateway (MSEG) application logging facility

- **mseg-gtpc**: MSEG GTP-C application logging facility
- **mseg-gtpu**: MSEG GTP-U application logging facility
- **msegmgr**: MSEG Demux Manager logging facility
- **mtp2**: Message Transfer Part 2 (MTP2) Service logging facility
- **mtp3**: Message Transfer Part 3 (MTP3) Protocol logging facility
- **multicast-proxy**: Multicast Proxy logging facility
- **nas**: Non-Access Stratum (NAS) protocol logging facility [MME 4G]
- **netwstrg**: Network Storage facility
- **npuctrl**: Network Processor Unit Control facility
- **npudrv**: Network Processor Unit Driver facility [ASR 5500 only]
- **npumgr**: Network Processor Unit Manager facility
- **npumgr-acl**: NPUMGR ACL logging facility
- **npumgr-drv**: NPUMGR DRV logging facility
- **npumgr-flow**: NPUMGR FLOW logging facility
- **npumgr-fwd**: NPUMGR FWD logging facility
- **npumgr-init**: NPUMGR INIT logging facility
- **npumgr-lc**: NPUMGR LC logging facility
- **npumgr-port**: NPUMGR PORT logging facility
- **npumgr-recovery**: NPUMGR RECOVERY logging facility
- **npumgr-rri**: NPUMGR RRI (Reverse Route Injection) logging facility
- **npumgr-vpn**: NPUMGR VPN logging facility
- **npusim**: NPUSIM logging facility [ASR 5500 only]
- **ocsp**: Online Certificate Status Protocol logging facility.
- **orbs**: Object Request Broker System logging facility
- **ospf**: OSPF protocol logging facility
- **ospfv3**: OSPFv3 protocol logging facility
- **p2p**: Peer-to-Peer Detection logging facility
- **pagingmgr**: PAGINGMGR logging facility
- **pccmgr**: Intelligent Policy Control Function (IPCF) Policy Charging and Control (PCC) Manager library
- **pdg**: Packet Data Gateway (PDG) logging facility
- **pdgdmgr**: PDG Demux Manager logging facility
- **pdif**: Packet Data Interworking Function (PDIF) logging facility

- **pgw**: Packet Data Network Gateway (PGW) logging facility
- **pmm-app**: Packet Mobility Management (PMM) application logging facility
- **ppp**: Point-To-Point Protocol (PPP) link and packet facilities
- **pppoe**: PPP over Ethernet logging facility
- **proclet-map-frwk**: Proclet mapping framework logging facility
- **push**: VPNMGR CDR push logging facility
- **radius-acct**: RADIUS accounting logging facility
- **radius-auth**: RADIUS authentication logging facility
- **radius-coa**: RADIUS change of authorization and radius disconnect
- **ranap**: Radio Access Network Application Part (RANAP) Protocol facility logging info flow between SGSN and RNS (3G)
- **rct**: Recovery Control Task logging facility
- **rdt**: Redirect Task logging facility
- **resmgr**: Resource Manager logging facility
- **rf-diameter**: Diameter Rf interface messages facility
- **rip**: Routing Information Protocol (RIP) logging facility [RIP is not supported at this time.]
- **rlf**: Rate Limiting Function (RLF) logging facility
- **rohc**: Robust Header Compression (RoHC) facility
- **rsvp**: Reservation Protocol logging facility
- **rua**: RANAP User Adaptation (RUA) [3G Femto GW - RUA messages] logging facility
- **s102**: S102 protocol logging facility
- **s102mgr**: S102Mgr logging facility
- **s1ap**: S1 Application Protocol (S1AP) Protocol logging facility
- **sabp**: Service Area Broadcast Protocol (SABP) logging facility
- **saegw**: System Architecture Evolution (SAE) Gateway facility
- **sbc**: SBc protocol logging facility
- **sccp:** Signalling Connection Control Part (SCCP) Protocol logging (connection-oriented messages between RANAP and TCAP layers).
- **sct**: Shared Configuration Task logging facility
- **sctp**: Stream Control Transmission Protocol (SCTP) Protocol logging facility
- **sef_ecs**: Severely Errored Frames (SEF) APIs printing facility
- **sess-gr**: SM GR facility

- **sessctrl**: Session Controller logging facility
- **sessmgr**: Session Manager logging facility
- **sesstrc**: session trace logging facility
- **sft**: Switch Fabric Task logging facility
- **sgs**: SGs interface protocol logging facility
- **sgsn-app**: SGSN-APP logging various SGSN "glue" interfaces (for example, between PMM, MAP, GPRS-FSM, SMS).
- **sgsn-failures**: SGSN call failures (attach/activate rejects) logging facility (2.5G)
- **sgsn-gtpc**: SGSN GTP-C Protocol logging control messages between the SGSN and the GGSN
- **sgsn-gtpu**: SGSN GTP-U Protocol logging user data messages between the SGSN and GGSN
- **sgsn-mbms-bearer**: SGSN Multimedia Broadcast/Multicast Service (MBMS) Bearer app (SMGR) logging facility
- **sgsn-misc**: Used by stack manager to log binding and removing between layers
- **sgsn-system**: SGSN System Components logging facility (used infrequently)
- **sgsn-test**: SGSN Tests logging facility; used infrequently
- **sgtpcmgr**: SGSN GTP-C Manager logging information exchange through SGTPC and the GGSN
- **sgw**: Serving Gateway facility
- **sh-diameter**: Sh Diameter messages facility
- **sitmain**: System Initialization Task main logging facility
- **slmgr**: Smart Licensing manager logging facility
- **sls**: Service Level Specification (SLS) protocol logging facility
- **sm-app**: SM Protocol logging facility
- **sms**: Short Message Service (SMS) logging messages between the MS and the SMSC
- **sndcp**: Sub Network Dependent Convergence Protocol (SNDCP) logging facility
- **snmp**: SNMP logging facility
- **sprmgr**: IPCF Subscriber Policy Register (SPR) manager logging facility
- **srdb**: Static Rating Database
- **srp**: Service Redundancy Protocol (SRP) logging facility
- **sscfnni**: Service-Specific Coordination Function for Signaling at the Network Node Interface (SSCF-NNI) logging facility
- **sscop**: Service-Specific Connection-Oriented Protocol (SSCOP) logging facility
- **ssh-ipsec**: Secure Shell (SSH) IP Security logging facility
- **ssl**: Secure Socket Layer (SSL) message logging facility

- **stat**: Statistics logging facility
- **supserv**: Supplementary Services logging facility [H.323]
- **system**: System logging facility
- **tacacsplus**: TACACS+ Protocol logging facility
- **tcap**: TCAP Protocol logging facility
- **testctrl**: Test Controller logging facility
- **testmgr**: Test Manager logging facility
- **threshold**: threshold logging facility
- **ttg**: Tunnel Termination Gateway (TTG) logging facility
- **tucl**: TCP/UDP Convergence Layer (TUCL) logging facility
- **udr**: User Data Record (UDR) facility (used with the Charging Service)
- **user-data**: User data logging facility
- **user-l3tunnel**: User Layer 3 tunnel logging facility
- **usertcp-stack**: User TCP Stack
- **vim**: Voice Instant Messaging (VIM) logging facility
- **vinfo**: VINFO logging facility
- **vmgctrl**: Virtual Media Gateway (VMG) controller facility
- **vmgctrl**: VMG Content Manager facility
- **vpn**: Virtual Private Network logging facility
- **vpp**: Vector Packet Processing (VPP) logging facility
- **wimax-data**: WiMAX DATA
- **wimax-r6**: WiMAX R6
- **wsg**: Wireless Security Gateway (ASR 9000 Security Gateway)
- **x2gw-app**: X2GW (X2 proxy Gateway, eNodeB) application logging facility
- **x2gw-demux**: X2GW demux task logging facility

Configuring Trace Logging

Trace logging is useful for quickly resolving issues for specific sessions that are currently active. They are temporary filters that are generated based on a qualifier that is independent of the global event log filter configured using the **logging filter** command in the Exec mode. Like event logs, however, the information generated by the logs is stored in the active memory buffer.

All debug level events associated with the selected call are stored.

Important Trace logs impact session processing. They should be implemented for debug purposes only.

Use the following example to configure trace logs in the Exec mode:

logging trace { callid *call_id* **| ipaddr** *ip_address* **| msid** *ms_id* **| username** *username* **}**

Once all of the necessary information has been gathered, the trace log can be deleted by entering the following command:

no logging trace { callid *call_id* **| ipaddr** *ip_address* **| msid** *ms_id* **| username** *username* **}**

Configuring Monitor Logs

Monitor logging records all activity associated with all of a particular subscriber's sessions. This functionality is available in compliance with law enforcement agency requirements for monitoring capabilities of particular subscribers.

Monitors can be performed based on a subscriber's MSID or username, and are only intended to be used for finite periods of time as dictated by the law enforcement agency. Therefore, they should be terminated immediately after the required monitoring period.

This section provides instructions for enabling and disabling monitor logs.

Enabling Monitor Logs

Use the following example to configure monitor log targets:

```
configure
  logging monitor { ip_addr | ipv6_addr | msid id | username name }
  end
```

Repeat to configure additional monitor log targets.

Disabling Monitor Logs

Use the following example to disable monitor logs:

```
configure
  no logging monitor { ip_addr | ipv6_addr | msid id | username name }
  end
```

Viewing Logging Configuration and Statistics

Logging configuration and statistics can be verified by entering the following command from the Exec mode:

show logging [active | verbose]

When no keyword is specified, the global filter configuration is displayed as well as information about any other type of logging that is enabled.

The following table provides information and descriptions of the statistics that are displayed when the **verbose** keyword is used.

Table 3: Logging Configuration and Statistics Commands

Field	Description
General Logging Statistics	
Total events received	Displays the total number of events generated by the system.
Number of applications receiving events	Displays the number of applications receiving the events.
Logging Source Statistics	
Event sequence ids by process	Displays a list of system processes that have generated events and the reference identification number of the event that was generated.
Msg backlog stat with total cnt	Displays the number of event messages that have been back logged in comparison to the total number of events generated.
LS L2 filter drop rate	Displays the percentage of logging source (LS) layer 2 (L2) event drops.
Abnormal Log Source Statistics	Displays abnormal logging source (LS) statistics, if any.
Runtime Logging Buffer Statistics	
Active buffer	Displays the number of events currently logged in the active memory buffer and a timestamp for the oldest and most recent entries in the buffer.
Inactive buffer	Displays the number of events currently logged in the inactive memory buffer.

Viewing Event Logs Using the CLI

Event logs generated by the system can be viewed in one of the following ways:

- **From the syslog server:** If the system is configured to send logs to a syslog server, the logs can be viewed directly on the syslog server.
- **From the system CLI:** Logs stored in the system memory buffers can be viewed directly from the CLI.
- **From the console port:** By default, the system automatically displays events over the console interface to a terminal provided that there is no CLI session active.

This section provides instructions for viewing event logs using the CLI. These instructions assume that you are at the root prompt for the Exec mode.

Procedure

Step 1 Copy the active log memory buffer to the inactive log memory buffer.

When the active log memory buffer is copied to the inactive log memory buffer existing information in the inactive log memory buffer is deleted.

Both active and inactive event log memory buffers can be viewed using the CLI in Exec mode. However, it is preferable to view the inactive log in order to prevent any data from being over-written. The information from the active log buffer can be copied to the inactive log buffer by entering the following command:

```
logs checkpoint
```

Step 2 View the logs by entering the following command:

```
show logs
```

Configuring and Viewing Crash Logs



Note In the CN-5G 2025.02 release, crash enable URL is not configured, crash cores will be placed at `/var/lib/systemd/coredump/`

In the unlikely even of a software crash, the system stores information that could be useful in determining the reason for the crash. This information can be maintained in system memory or it can be transferred and stored on a network server.

The system supports the generation of the following two types of logs:

- **Crash log:** Crash logs record all possible information pertaining to a software crash (full core dump). Due to their size, they can not be stored in system memory. Therefore, these logs are only generated if the system is configured with a Universal Resource Locator (URL) pointing to a local device or a network server where the log can be stored.
- **Abridged crash log:** Crash event records are automatically generated when a software crash occurs and are stored in flash memory on management cards. The abridged crash log contains a list crash event records along with associated dump files. This log allows you to view event records and dump files via CLI commands.

Crash Logging Architecture

The crash log is a persistent repository of crash event information. Each event is numbered and contains text associated with a CPU (minicore), NPU, or kernel crash. The logged events are recorded into fixed-length records and stored in /flash/crashlog2.

Whenever a crash occurs, the following crash information is stored:

1. The event record is stored in /flash/crashlog2 file (the crash log).
2. The associated minicore, NPU, or kernel dump file is stored in the /flash/crsh2 directory.
3. A full core dump is stored in a user-configured directory.

Important The crashlog2 file along with associated minicore, NPU, and kernel dumps are automatically synchronized across redundant management cards (SMC, MIO/UMIO). Full core dumps are not synchronized across management cards.

The following behaviors apply to the crash logging process.

- When a crash event arrives on an active management card, the event record is stored in its crashlog2 file along with the minicore, NPU, or kernel dump file in /flash/crsh2. The crash event and dump file are also automatically stored in the same locations on the standby management card.
- When a crash log entry is deleted through CLI command, it is deleted on both the active and standby management cards.
- When a management card is added or replaced, active and standby cards automatically synchronize crash logs and dump files.
- When a crash event is received and the crash log file is full, the oldest entry in the crash log and its related dump file will be replaced with the latest arrived event and dump file on both management cards. Information for a maximum of 120 crash events can be stored on management cards.
- Duplicate crash events bump the count of hits in the existing record and update the new record with the old crash record. Additions to the count use the timestamp for the first time the event happened.

Configuring Software Crash Log Destinations

The system can be configured to store software crash log information to any of the following locations:

- On VPC
  - **Flash memory:** Accessible by the virtual machine
  - **USB memory stick:** Installed in the USB slot of the platform (USB slot has been enabled via the hypervisor)
- **Network Server:** Any workstation or server on the network that the system can access using the Trivial File Transfer Protocol (TFTP), the File Transfer Protocol (FTP), the Secure File Transfer Protocol (SFTP), or the Hyper-Text Transfer Protocol (HTTP); this is recommended for large network deployments in which multiple systems require the same configuration

Crash log files (full core dumps) are written with unique names as they occur to the specified location. The name format is *crash-card-cpu-time-core*. Where *card* is the card slot, *cpu* is the number of the CPU on the card, and *time* is the Portable Operating System Interface (POSIX) timestamp in hexadecimal notation.

Use the following example to configure a software crash log destination in the Global Configuration mode:

```
configure
  crash enable [ encrypted ] url crash_url
  end
```

NOTES:

- Repeat to configure additional software crash log destinations. There is no limit to the number of destinations that can be configured.

Viewing Abridged Crash Log Information Using the CLI

You can view abridged crash information that is stored as a set of event records in flash memory on management cards (**/flash/crashlog2**). Each crash event record has an associated dump file (minicore, NPU or kernel) that can also be displayed (**/flash/crsh2**)

Follow the instructions in this section to view software crash events that have occurred on the system. These instructions assume that you are at the root prompt for the Exec mode.

Procedure

Step 1 View a list of software crash events by entering the following Exec mode command:

show crash { all | list | number *crash_num* **}**

NOTES:

- Run **show crash list** to obtain the number for a specific crash event.
- Run **show crash number** *crash_num* to display the output for the target crash event.

The resulting output may not be the same for all platforms:

Information about similar crash events is suppressed in the output of this command.

Step 2 View the dump file associated with a specific crash event.

The information contained in the dump file helps identify and diagnose any internal or external factors causing the software to crash.

- Crash # – unique number assigned by StarOS when logging the crash event
- SW Version – StarOS build release in format: RR.n(bbbbb)
- Similar Crash Count – number of similar crashes
- Time of first crash – timestamp when first crash occurred in format: YYYY-MMM-DD+hh:mm:ss
- Failure message – text of event message
- Function – code identifier
- Process – where the crash occurred (Card, CPU, PID, etc.)
- Crash time – timestamp for when the crash occurred in the format: YYYY-MMM-DD+hh:mm:ss time zone
- Recent errno – text of most recent error number.
- Stack – memory stack information
- Last Bounce – information about the messaging received prior to the crash
- Registers – memory register contents
- Current inbound message – hexadecimal information for the current inbound message
- Address Map
- Recent heap activity (oldest first)
- Recent events (oldest first)

- Profile depth

Reducing Excessive Event Logging

Event logging (evlogd) is a shared medium that captures event messages sent by StarOS facilities. When one or more facilities continuously and overwhelmingly keep sending a high volume of event messages, the remaining non-offender facilities are impacted. This scenario degrades system performance, especially as the number of facilities generating logs increases.

Rate-control of event message logging is handled in the Log Source path. Essentially, every second a counter is set to zero and is incremented for each log event that is sent to evlogd. If the count reaches a threshold before the second is up, the event is sent, queued, or dropped (if the evlogd messenger queue is full).

When any facility exceeds the upper threshold set with this command for the rate of message logging and remains in the same state for prolonged interval, StarOS notifies the user through an SNMP trap or alarm.

A new threshold command allows you to specify the percentage of facility event queue full. When this threshold is exceeded, an SNMP trap and alarm are generated that specifies the offending facility.

The formats for the SNMP traps that are associated with this command are as follows:

- **ThreshLSLogsVolume**

```
<timestamp> Internal trap notification <trap_id> (ThreshLSLogsVolume) threshold
<upper_percent>%
measured value <actual_percent>% for facility <facility_name> instance <instance_id>
```

- **ThreshClearLSLogsVolume**

```
<timestamp> Internal trap notification <trap_id> (ThreshClearLSLogsVolume) threshold
<upper_percent>%
measured value <actual_percent>% for facility <facility_name> instance <instance_id>
```

If a trigger condition occurs within the polling interval, the alert or alarm is not generated until the end of the polling interval.

Both traps can be enabled or suppressed through the Global Configuration mode **snmp trap** command.

Configuring Log Source Thresholds

There are three Global Configuration mode commands associated with configuring and implementing Log Source thresholds.

1. **threshold ls-logs-volume** – sets the parameters for the upper and lower thresholds for generating and clearing traps/alarms respectively.
2. **threshold poll ls-logs-volume interval** – establishes the polling interval for this threshold.
3. **threshold monitoring ls-logs-volume** – turns monitoring of this threshold on and off.

Use the following example to configure syslog servers:

```
configure
  [ default ] threshold ls-logs-volume upper_percent [ clear lower_percent ]
  [ default ] threshold poll ls-logs-volume interval duration
```

```
[ no ] threshold monitoring ls-logs-volume
end
```

Notes:

- *upper_percent* and *lower_percent* are expressed as integers from 0 to 100. Default value for *upper_percent* is 90%. If *lower_percent* is not specified, the default clear value is *upper_percent*.
- **threshold poll ls-logs-volume interval** sets the polling interval in seconds. The default interval is 300 seconds (5 minutes).
- **threshold monitoring ls-logs-volume** enables or disables this feature.

You can verify the configuration of this threshold by running the Exec mode **show threshold** command.

Checkpointing Logs

Checkpointing identifies logged data as previously viewed or marked. Checkpointing allows you to only display log information since the last checkpoint.

Individual logs may have up to 50,000 events in the active log. Checkpointing the logs results in at most 50,000 events being in the inactive log files. This gives a maximum of 100,000 events in total which are available for each facility logged.

Checkpoint log data through the EXEC mode logs checkpoint command to set the log contents to a well-known point prior to special activities taking place. This command may also be a part of periodic regular maintenance to manage log data.

Checkpointing logs moves the current log data to the inactive logs. Only the most recently check pointed data is retained in the inactive logs. A subsequent check pointing of the logs results in the prior check pointed inactive log data being cleared and replaced with the newly check pointed data. Checkpointed log data is not available for viewing.



Important Checkpointing logs should be done periodically to prevent the log files becoming full. Logs which have 50,000 events logged discard the oldest events first as new events are logged.



Important An Inspector-level administrative user cannot execute this command.

Saving Log Files

Log files can be saved to a file in a local or remote location specified by a URL. Use the following EXEC mode command to save log files:

```
save logs { url } [ active ] ] [ inactive ] [ callid call_id ]
[event-verbosity evt_verboseness ] [ facility facility ] [level severity_level ]
[ pdu-data pdu_format ] [ pdu-verbosity pdu_verboseness ] [ since from_date_time
[ until to_date_time ] ] [ | { grep grep_options | more } ]
```

OPTIONS:

- *url*: Specifies the location to store the log file(s). *url* may refer to a local or a remote file and must be entered in the following format.
- **active**: Saves data from active logs.
- **inactive**: Saves data from inactive logs.
- **callid** *call_id*: Specifies a call ID for which log information is to be saved as a 4-byte hexadecimal number.
- **event-verbosity** *evt_verboseness*: Specifies the level of verboseness to use in the displaying of event data as one of:
  - *min*: Logs minimal information about the event. Information includes event name, facility, event ID, severity level, date, and time.
  - *concise*: Logs detailed information about the event, but does not provide the event source within the system.
  - *full*: Logs detailed information about event, including source information, identifying where within the system the event was generated.
- **facility** *facility*: Specifies the facility to modify the filtering of logged information.
- **level** *severity_level*: Specifies the level of information to be logged in the following list which is ordered from highest to lowest:
  - *critical*: Logs critical events
  - *error*: Logs error events and all events with a higher severity level
  - *warning*: Logs warning events and all events with a higher severity level
  - *unusual*: Logs unusual events and all events with a higher severity level
  - *info*: Logs info events and all events with a higher severity level
  - *trace*: Logs trace events and all events with a higher severity level
  - *debug*: Logs all events
- **pdu-data** *pdu_format*: Specifies output format for the display of packet data units as one of:
  - *none* - raw format (unformatted).
  - *hex* - hexadecimal format.
  - *hex-ascii* - hexadecimal and ASCII similar to a main-frame dump.
- **pdu-verbosity** *pdu_verboseness* : Specifies the level of verboseness to use in the displaying of packet data units as a value from 1 to 5, where 5 is the most detailed.
- **since** *from_date_time*: Saves only the log information which has been collected more recently than *from_date_time*
- **until** *to_date_time*: Saves no log information more recent than *to_date_time*. Defaults to current time when omitted.

- *from_date_time* and *to_date_time* must be formatted as YYYY:MM:DD:HH:mm or YYYY:MM:DD:HH:mm:ss. Where:
  - YYYY = 4-digit year
  - MM = 2-digit month in the range 01 through 12
  - DD = 2-digit day in the range 01 through 31
  - HH = 2-digit hour in the range 00 through 23
  - mm = 2-digit minute in the range 00 through 59
  - ss = 2 digit second in the range 00 through 59

  to_date_time must be a time which is more recent than *from_date_time*.

  Using the **until** keyword allows for a time range of log information; using only the **since** keyword will display all information up to the current time.
- **grep** *grep_options* | **more**: Pipes (sends) the output of this command to the specified command. You must specify a command to which the output of this command is sent.

Event ID Overview

Important The use of event IDs depends on the platform type and the licenses running on the platform.

Identification numbers (IDs) are used to reference events as they occur when logging is enabled on the system. As described previously, logs are collected on a per facility basis. Each facility possesses its own range of event IDs as indicated in the following table.

Table 4: System Facilities and Event ID Ranges

Facility	Description	Event ID Range
a10	A10 Protocol Facility	28000-28999
a11	A11 Protocol Facility	29000-29999
a11mgr	A11 Manager Facility	9000-9999
aaa-client	AAA Client Facility	6000-6999
aaamgr	AAA Manager Facility	36000-36999
aaaproxy	AAA Proxy Facility	64000-64999
aal2	AAL2 Protocol Facility	173200-173299
acl-log	IP Access Control List (ACL) Facility	21000-21999
acsctrl	Active Charging Service Controller (ACSCtrl) Facility	90000-90999
acsmgr	Active Charging Service Manager (ACSMgr) Facility	91000-91999
afctrl	Ares Fabric Controller (ASR 5500 only)	186000-186999

Facility	Description	Event ID Range
afmgr	Ares Fabric Manager (ASR 5500 only)	187000-187999
alarmctrl	Alarm Controller Facility	65000-65999
alcap	Access Link Control Application Part (ALCAP) Protocol Facility	160900-161399
alcapmgr	ALCAP Manager Facility	160500-160899
asf	ASF Facility	73000-73999
asfprt	ASFPRT Facility	59000-59999
asngwmgr	Access Service Network (ASN) Gateway Manager Facility	100000-100499
asnpcmgr	ASN Paging/Location-Registry Manager Facility	100500-100999
bcmcs	Broadcast/Multicast Service (BCMCS) Facility	109000-109999
bfd	Bidirectional Forwarding Detection (BFD) Protocol Facility	170500-170999
bgp	Border Gateway Protocol (BGP) Facility	85000-85999
bindmux	BindMux Manager Facility [Intelligent Policy Control Function (IPCF)]	158200-158999
bngmgr	Broadband Network Gateway (BNG) Manager Facility	182000-182999
bssap	Base Station System Application Part+ (BSSAP+) Service Facilities	131000-131199
bssgp	Base Station System GPRS Protocol (BSSGP) Facility	115050-115099
callhome	Call Home Facility	173600-173999
cap	CAMEL Application Part (CAP) Facility	87900-88099
chatconf	CHATCONF Facility	74000-74999
cli	Command Line Interface (CLI) Facility	30000-30999
connproxy	Connection Proxy Facility	190000-190999
crdt-ctl	Credit Control Facility	127000-127999
csg	Closed Subscriber Groups (CSG) Facility	188000-188999
csg-acl	CSG Access Control List (ACL) Facility	189000-189999
csp	Card/Slot/Port (CSP) Facility	7000-7999
css	Content Steering Service (CSS) Facility [ESC]	77000-77499
css-sig	Content Service Selection (CSS) RADIUS Signaling Facility	77500-77599
cx-diameter	Cx Diameter Message Facility	92840-92849
dcardctrl	Daughter Card Controller Facility	62000-62999
dcardmgr	Daughter Card Manager Facility	57000-57999
demuxmgr	Demux Manager Facility	110000-110999
dgmbmgr	Diameter Gmb (DGMB) Application Manager Facility	126000-126999
dhcp	DHCP Facility	53000-53999

Facility	Description	Event ID Range
dhcpv6	DHCPv6 Protocol Facility	123000-123999
dhost	Distributed Host Manager Facility	83000-83999
diameter	Diameter Endpoint Facility	92000-92599
diabase	Diabase Message Facility	92800-92809
diameter-acct	Diameter Accounting Protocol Facility	112000-112999
diameter-auth	Diameter Authentication Protocol Facility	111000-111999
diameter-dns	Diameter DNS Subsystem Facility	92600-92699
diameter-ecs	ECS Diameter Signaling Facility	81990-81999
diameter-hdd	Diameter Horizontal Directional Drilling (HDD) Interface Facility	92700-92799
diameter-svc	Diameter Service Facility	121200-121999
diamproxy	Diameter Proxy Facility	119000-119999
dpath	Data Path for IPSec Facility	54000-54999
drvctrl	Driver Controller Facility	39000-39999
ds3mgr	DS3 and DS3/E Line Card Manager Facility (part of NPU Manager Controller Facility)	40000-40999
eap-diameter	Extensible Authentication Protocol (EAP) Diameter Facility	92870-92879
eap-ipsec	EAP IPSec Facility	118000-118999
ecs-css	ACS Session Manager (ACSMgr) Signalling Interface Facility	97000-97099
edr	Event Data Record (EDR) Facility	80000-80999
egtpc	eGTP-C Facility	141000-141999
egtpmgr	eGTP Manager Facility	143000-143999
egtpu	eGTP-U Facility	142000-142999
epdg	Evolved Packet Data Gateway (ePDG) Facility	178000-178999
evlog	Event Log Facility	2000-2999
famgr	Foreign Agent (FA) Manager Facility	33000-33999
firewall	Firewall Facility	96000-96999
fng	Femto Network Gateway (FNG) Facility	149000-149999
gbrmgr	Gb-Manager Facility	201900-202699
gcdr	GGSN-Charging Data Record (G-CDR) Facility	66000-66999
gmm	GPRS Mobility Management (GMM) Facility	88100-88299
gprs-app	General Packet Radio Service (GPRS) Application Facility	115100-115399
gprs-ns	GPRS-NS Protocol Facility	115000-115049
gq-rx-tx-diameter	Gq/Rx/Tx Diameter Messages Facility	92830-92839

Facility	Description	Event ID Range
gss-gcdr	GTPP Storage Server GCDR Facility	98000-98099
gtpc	GTPC Protocol Facility	47000-47999
gtpcmgr	GTPC Signaling Demultiplexer Manager Facility	46000-46999
gtpp	GTP-PRIME Protocol Facility	52000-52999
gtpu	GTPU Protocol Facility	45000-45999
gtpumgr	GTPU Manager Facility	157200-157999
gx-ty-diameter	Gx/Ty Diameter Messages Facility	92820-92829
gy-diameter	Gy Diameter Messages Facility	92810-92819
h248prt	H.248 Protocol Facility	42000-42999
hamgr	Home Agent (HA) Manager Facility	34000-34999
hat	High Availability Task (HAT) Facility	3000-3999
hdctrl	Hard Disk (HD) Controller Facility	132000-132999
hddshare	HDD Share Facility	184000-184999
henb-gw	Home eNodeB-GW Facility	195000-195999
henbapp	Home eNodeB Application Facility	196000-196999
henbgwdemux	Home eNodeB-GW Demux Facility	194000-194999
henbgwmgr	Home eNodeB-GW Manager Facility	193000, 193999
hnb-gw	Home NodeB (HNB) Gateway Facility	151000-151999
hnbmgr	HNB Manager Facility	158000-158199
hss-peer-service	Home Subscriber Server (HSS) Facility [MME]	138000-138999
igmp	Internet Group Management Protocol (IGMP) Facility	113000-113999
ikev2	IKEv2 Facility	122000-122999
ims-authorizatn	IMS Authorization Service Library Facility	98100-98999
ims-sh	IMS SH Library Facility	124000-124999
imsimgr	International Mobile Subscriber Identity (IMSI) Manager Facility	114000-114999
imsue	IMS User Equipment (IMSUE) Facility	144000-145999
ip-arp	IP Address Resolution Protocol (ARP) Facility	19000-19999
ip-interface	IP Interface Facility	18000-18999
ip-route	IP Route Facility	20000-20999
ipms	Intelligent Packet Monitoring System (IPMS) Facility	134000-134999
ipne	IP Network Enabler (IPNE) Facility	192000-192999
ipsec	IPSec Protocol Facility	55000-56998

Facility	Description	Event ID Range
ipsg	IP Services Gateway (IPSG) Facility	128000-128999
ipsgmgr	IPSG Manager (IPSGMgr) Facility	99000-99999
ipsp	IP Pool Sharing Protocol (IPSP) Facility	68000-68999
kvstore	Key/Value Store (KVSTORE) Facility	125000-125999
l2tp-control	L2TP Control PDU Protocol Facility	50000-50999
l2tp-data	L2TP Data PDU Protocol Facility	49000-49999
l2tpdemux	L2TP Demux Facility	63000-63999
l2tpmgr	L2TP Manager Facility	48000-48999
lagmgr	Link Aggregation Group (LAG) Manager Facility	179000-179999
ldap	Lightweight Directory Access Protocol (LDAP) Request Facility	160000-160499
li	Lawful Intercept (LI) Log Facility	69000-69999
linkmgr	Link Manager Facility	89500-89999
llc	Logical Link-Control (LLC) Layer Facility (GPRS)	115700-115799
local-policy	Local Policy Configuration Facility	161400-162399
m3ap	M3 Application Protocol (M3AP) Facility	211500-211999
m3ua	MTP Level 3 (M3UA) Protocol Facility [SIGTRAN]	87500-87699
magmgr	Mobile Access Gateway (MAG) Manager Facility	137500-137999
map	Mobile Application Part (MAP) Protocol Facility [SS7]	87100-87299
megadiammgr	MegaDiameter Manager Facility	121000-121199
mme-app	Mobility Management Entity (MME) Application Facility	147000-147999
mme-embms	MME evolved Multimedia Broadcast Multicast Service (eMBMS) Facility	212000-212499
mme-misc	MME Miscellaneous Facility	155800-156199
mmedemux	MME Demux Manager Facility	154000-154999
mmemgr	MME Manager Facility	137000-137499
mmgr	Master Manager (MMGR) Facility	86000-86399
mobile-ip	Mobile IP (MIP) Protocol Facility	26000-26999
mobile-ip-data	MIP Tunneled Data Facility	27000-27999
mobile-ipv6	Mobile IPv6 Facility	129000-129999
mpls	Multiprotocol Label Switching (MPLS) Facility	163500-163999
mseg-app	Mobile Services Edge Gateway (MSEG) Application Facility Not supported in this release.	172300-172999

Facility	Description	Event ID Range
mseg-gtpc	MSEG GTPC Application Facility Not supported in this release.	172000-172199
mseg-gtpu	MSEG GTPU Application Facility Not supported in this release.	172200-172299
msegmgr	MSEG Manager Facility Not supported in this release.	171000-171999
mtp2	Message Transfer Part 2 (MTP2) Service Facility [SS7]	116900-116999
mtp3	Message Transfer Part 3 (MTP3) Service Facility [SS7]	115600-115699
multicast-proxy	Multicast Proxy Facility	94000-94999
nas	Network Access Signaling (NAS) Facility	153000-153999
netwstrg	Network Storage Facility	78000-78999
npuctrl	Network Processing Unit (NPU) Control Facility	16000-16999
npudrv	NPU Driver Facility	191000-191999
npumgr	NPU Manager (NPUMGR) Facility	17000-17999
npumgr-acl	NPUMGR ACL Facility	169000-169999
npumgr-drv	NPUMGR Driver Facility	185000-185999
npumgr-flow	NPUMGR Flow Facility	167000-167999
npumgr-fwd	NPUMGR Forwarding Facility	168000-168999
npumgr-init	NPUMGR Initialization Facility	164000-164999
npumgr-lc	NPUMGR LC Facility	180000-180999
npumgr-port	NPUMGR Port Facility	166000-166999
npumgr-recovery	NPUMGR Recovery Facility	165000-165999
npumgr-vpn	NPUMGR VPN Facility	181000-181999
npusim	NPUSIM Facility	176000-176999
ntfy-intf	Event Notification Interface Facility	170000-170499
orbs	Object Request Broker (ORB) System Facility	15000-15999
ospf	Open Shortest Path First (OSPF) Protocol Facility	38000-38999
ospfv3	OSPFv3 Protocol Facility [IPv6]	150000-150999
p2p	Peer-to-Peer (P2P) Facility	146000-146999
pccmgr	Policy Charging and Control (PCC) Manager Facility	159000-159499
pdg	Packet Data Gateway (PDG) Facility	152010-152999

Facility	Description	Event ID Range
pdgdmgr	PDG TCP Demux Manager (pdgdmgr) Facility (this is a customer-specific facility)	162400-162999
pdif	Packet Data Interworking Function (PDIF) Facility	120000-120999
pgw	Packet Data Network Gateway (PGW) Facility	139000-139999
pmm-app	Packet Mobility Management (PMM) Application Facility [SGSN]	89200-89499
ppp	Point-To-Point Protocol (PPP) Facility	25000-25999
pppoe	Point-to-Point Protocol over Ethernet (PPPoE) Facility	183000-183999
ptt	PTT Facility	76000-76999
push	PUSH (VPNMgr CDR Push) Facility	133000-133999
radius-acct	RADIUS Accounting Protocol Facility	24000-24999
radius-auth	RADIUS Authentication Protocol Facility	23000-23999
radius-coa	RADIUS Change of Authorization (CoA) and Disconnect Facility	70000-70999
ranap	Radio Access Network Application Part (RANAP) Facility	87700-87899
rct	Recovery Control Task (RCT) Facility	13000-13999
rdt	Redirector Task (RDT) Facility	67000-67999
resmgr	Resource Manager (RM) Facility	14000-14999
rf-diameter	Rf Diameter Messages Facility	92860-92869
rip	Routing Information Protocol (RIP) Facility	35000-35999
rohc	Robust Header Compression (ROHC) Protocol Facility	103000-103999
rsvp	RSVP Protocol Facility	93000-93999
rua	RANAP User Adaptation (RUA) Protocol Facility	152000-152009
s1ap	S1 Application Protocol (S1AP) Facility	155200-155799
saegw	System Architecture Evolution Gateway Facility	191000-191999
sccp	Signalling Connection Control Part (SCCP) Protocol Facility [SS7]	86700-86899
sct	Shared Configuration Task (SCT) Facility	32000-32099
sctp	Stream Control Transmission Protocol (SCTP) Protocol Facility	87300-87499
sess-gr	SESS-GR Facility	77600-77999
sessctrl	Session Controller Facility	8000-8999
sessmgr	Session Manager Facility	10000-12999
sesstrc	Session Trace Facility	155000-155199
sft	Switch Fabric Task (SFT) Facility	58000-58999
sgs	SGs Interface Protocol Facility [MME]	173000-173199
sgsn-app	SGSN Application Interface Facility	115900-115999

Facility	Description	Event ID Range
sgsn-failures	SGSN Call Failures Facility	89100-89199
sgsn-gtpc	SGSN GTP-C Protocol Facility	116000-116599
sgsn-gtpu	SGSN GTP-U Protocol Facility	86900-87099
sgsn-mbms-bearer	SGSN MBMS Bearer Application (SMGR) Facility	116600-116799
sgsn-misc	SGSN Miscellaneous Facility	88800-89099
sgsn-system	SGSN System Components Facility	86400-86499
sgsn-test	SGSN Tests Facility	88700-88799
sgsn2	SGSN2 Facility	114000-117999
sgtpcmgr	SGSN GTP-C (SGTPC) Manager Facility	117000-117999
sgw	Serving Gateway (SGW) Facility	140000-140999
sh-diameter	Sh Diameter Messages Facility	92850-92859
sipcdprt	SIPCDPRT Facility	95000-95999
sitmain	System Initiation Task (SIT) Main Facility	4000-4999
sm-app	Short Message Service (SMS) Facility	88300-88499
sms	SMS Service Facility	116800-116899
sndcp	Sub Network Dependent Convergence Protocol (SNDCP) Facility	115800-115899
snmp	Simple Network Management Protocol (SNMP) Facility	22000-22999
sprmgr	Subscriber Policy Register (SPR) Manager Facility	159500-159999
srdb	Static Rating Database Facility	102000-102999
srp	Service Redundancy Protocol (SRP) Facility	84000-84999
sscfnni	SSCFNNI Protocol Facility [ATM]	115500-115599
sscop	SSCOP Protocol Facility [ATM]	115400-115499
ssh-ipsec	SSH IP Security Facility	56999-56999
ssl	SSL Facility (this is a customer-specific facility)	156200-157199
stat	Statistics Facility	31000-31999
system	System Facility	1000-1999
tacacs+	TACACS+ Protocol Facility	37000-37999
taclcp	TACLCP Facility	44000-44999
tcap	Transaction Capabilities Application Part (TCAP) Protocol Logging Facility [SS7]	86500-86699
testctrl	Test Controller Facility	174000-174999
testmgr	Test Manager Facility	175000-175999
threshold	Threshold Facility	61000-61999

Facility	Description	Event ID Range
ttg	Tunnel Termination Gateway (TTG) Facility	130000-130999
tucl	TCP/UDP Convergence Layer (TUCL) Facility [SS7]	88500-88699
udr	User Data Record (UDR) Facility	79000-79999
user-data	User-Data Facility	51000-51999
user-l3tunnel	User L3 Tunnel Facility	75000-75999
usertcp-stack	User TCP Stack Facility	173300-173499
vim	Voice Instant Message (VIM) Facility	60000, 60999
vinfo	VINFO Facility	82000, 82999
vmgctrl	Virtual Media Gateway (VMG) Controller Facility	41000, 41999
vmgctxmgr	VMG Context Manager Facility	43000, 43999
vpn	Virtual Private Network (VPN) Facility	5000-5999
wimax-data	WiMAX DATA Facility	104900-104999
wimax-r6	WiMAX R6 Protocol (Signaling) Facility	104000-104899

Event Severities

The system provides the flexibility to configure the level of information that is displayed when logging is enabled. The following levels are supported:

- **critical:** Logs only those events indicating a serious error has occurred that is causing the system tor a system component to cease functioning. This is the highest severity level.
- **error:** Logs events that indicate an error has occurred that is causing the system or a system component to operate in a degraded state. This level also logs events with a higher severity level.
- **warning:** Logs events that may indicate a potential problem. This level also logs events with a higher severity level.
- **unusual:** Logs events that are very unusual and may need to be investigated. This level also logs events with a higher severity level.
- **info:** Logs informational events and events with a higher severity level.
- **trace:** Logs events useful for tracing and events with a higher severity level.
- **debug:** Logs all events regardless of the severity.

Each of the above levels correspond to the "severity" level of the event ID. Therefore, only those event IDs with a "severity" level equal to the logging level are displayed.

Understanding Event ID Information in Logged Output

This section explains the event information that is displayed when logging is enabled.

The following displays a sample output for an event that was logged.

```
2011-Dec-11+5:18:41.993 [cli 30005 info] [8/0/609 cli:8000609 _commands_cli.c:1290] [software
 internal system] CLI session ended for Security Administrator admin on device /dev/pts/2
```

The following table describes the elements of contained in the sample output.

Table 5: Event Element Descriptions

Element	Description
2011-Dec-11+5:18:41.993	Date/Timestamp indicating when the event was generated
[cli 30005 info]	Information about the event including: • The facility the event belongs to • The event ID • The event's severity level In this example, the event belongs to the CLI facility, has an ID of 3005, and a severity level of "info".
[8/0/609 cli:8000609 _commands_cli.c:1290]	Information about the specific CLI instance.
[software internal system]	Indicates that the event was generated because of system operation.
CLI session ended for Security Administrator admin on device /dev/pts/2	The event's details. Event details may, or may not include variables that are specific to the occurrence of the event.