Cisco ASR 5000 SGSN/MME

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# **Recommendations for Manual Health Check Analysis**

## **Uptime and NTP status**

# Check the amount of time the system has been operational since the previous down

# time (maintenance or otherwise).

show system uptime

# Check the status of the local network timing protocol (NTP) for its synch status.

Ntp associations should be present, one association should be in sync state with \* mark, other associations should be available to synchronize in case if 1st \*association got failed.

# system clock issues

show ntp status

## **Licenses**

# Check the status of the licenses for reference. Pay attention to the license validity, if it matches SMC Flash SN, not expired.

show license information full

## **Boot configuration**

# Check the boot config for reference

dir /flash/\*cfg

dir /flash/\*bin

show boot initial-config

show boot

## **Configuraion**

# Output the running config for reference

show configuration

# Check the config errors if any

show configuration error

## **Crashes, alarms, logs**

# Check the crash list to determine frequency of crashes or if crashes occur at some

# specific time of day. This command can also be used to view information for a

# specific crash

# Count the crashes. In next HC reports, compare the amount against the same in the previous HC report(s). The amount of crashes should not increase unexpectedly.

show crash list

# Check current alarms to ensure that there have been no critical alarms raised over

# the last 7 days.

# Count the alarms in history. In next HC reports, compare the amount against the same in the previous HC report(s). The amount of alarms should not increase unexpectedly.

show alarm outstanding all

show alarm all

# Check SNMP event traps as part of the system verification. The trap history

# displays up to 5000 time-stamped trap records stored in a buffer

# Check the output for unexpected traps

show snmp trap history verbose

# Displays active and inactive logs filtered by the options specified

# Check the output for unexpected logs

show logs

show logs level error

## **Services**

# Check the configuration for the SGSN services in the current context - for example,

# in the display check if the "state" is "STARTED"

show service all

show sgsn-service all

show gprs-service all

show sgs-service all

show mme-service all

show egtp-service all

show sgtp-service all

# Check the configuration for the Mobile Application Part (MAP) services. The

# generated display includes MAP service features, MAP operational configuration, and

# some related HLR and EIR configuration information - for example, in the display

# check if the "state" is "STARTED" for the Gr interface

show map-service all

# Check the status and configuration of the Iu-PS services - for example, in the

# display check if the "state" is "STARTED" for the Iu interface

show iups-service all

# Check the status and configuration of the SGTP services - for example, in the

# display check if the "state" is "STARTED"

show sgtp-service all

## **Hardware**

# Check if no unexpected SPOF cards, no OFFLINE cards appeared in the system

show card table

# Display information about each line card

show linecard table

# Check the RCT statistics: no unexpected card migrations and switchovers

show rct stats verbose

## **Ports, Interfaces and Routing**

# Use the below outputs to check unexpected port DOWN states, unexpected zero utilization or overutilization, unexpected routing changes against previous reports

show port table all

show port utilization table

context local

show ip interface summary

show ip route

context iugb

show ip interface summary

show ip route

show ip ospf neighbor

show ip ospf database

context gns4

show ip interface summary

show ip route

show ip ospf neighbor

show ip ospf database

context ga

show ip interface summary

show ip route

show ip ospf neighbor

show ip ospf database

context sigtran

show ip interface summary

show ip route

show ip ospf neighbor

show ip ospf database

context s1mmes11

show ip interface summary

show ip route

show ip ospf neighbor

show ip ospf database

context s6a

show ip interface summary

show ip route

show ip ospf neighbor

show ip ospf database

# Check NPU statistics for unexpected growth of " error", "non-operational", "Unknown", "Bad", "exceeded", "discard", "dropped".

show port npu counters

## **SS7 Links, Routing, SCCP, MAP, RANAP**

# SCTP and M3UA status for Gr interface; no links in unexpected DOWN state

Eg.

show ss7-routing-domain 1 sctp asp all status peer-server all peer-server-process all

show ss7-routing-domain 1 m3ua status peer-server all

# SCTP and M3UA status for Iu-PS interface; no links in unexpected DOWN state

show ss7-routing-domain 2 sctp asp all status peer-server all peer-server-process all

show ss7-routing-domain 2 m3ua status peer-server all

# Displays destination-point-code's routing table; no routes in unexpected UNAVAILABLE state

show ss7-routing-domain all routes

# Check the SS7 Signalling Connection Control Part (SCCP) network configuration and

# status information: no SCCP destinations in unexpected UNAVAILABLE state

show sccp-network all status all

# Statistics for SS7 links:

# SCTP: no unexpected amount of Init, Abort, Shutdown chunks

# M3UA: no unexpected amount of DUNA, DRST, DEREG, ASPDN events

show ss7-routing-domain 1 sctp asp all statistics end-point

show ss7-routing-domain 1 sctp asp all statistics gen

show ss7-routing-domain 1 m3ua statistics gen

show ss7-routing-domain 2 sctp asp all statistics end-point

show ss7-routing-domain 2 sctp asp all statistics gen

show ss7-routing-domain 2 m3ua statistics gen

## **Tasks and Resources**

# Resource allocations and usage for tasks.

# No tasks in states besides “good” i.e. warn, over, start

# Tasks are running below **80%** of allocated memory, CPU time, files, sessions

# Task resource utilization has not been changed unexpectedly.

# Amount of tasks did not change unexpectedly

show task resources

show task resources max

show task resources | grep -v good

show task resources | grep Total

# Check CPU statistics to confirm usage levels are within healthy range - this

# statistic is useful for spotting overload conditions. Ensure none of the Process

# are running in excess of 70% CPU load

show cpu table

# Check session resources;

# No unexpected Busy-out sessmgrs,

# License Status is “Within Acceptable Limits”,

# Max Used are lower than Limit

show resources

# Check if Session Recovery is “Ready For Recovery”, all CPUs are in “Good” state

## **Sessions and Subscribers**

# Statistic for sessions and subscribers

# Use it for reference comparing with the same data from previous periods;

# No unexpected bursts or drops in number of subscribers and sessions

show subscribers data-rate

show subscribers summary

show subscribers sgsn-only summary

show subscribers gprs-only summary

show subscribers mme-only summary

# No unexpected raise or drop of sessions currently being established, comparing to previous periods

show session progress

# No unexpected raise in number of long session setups

show session setuptime

# No unexpected raise or drop of session duration, comparing to previous periods

show session duration

# No unexpected raise of disconnect reasons which were not growing in previous periods

show session disconnect-reasons

show session disconnect-reasons verbose

show session disconnect-reasons sgsn-only

# No unexpected raise or drop of arrived, rejected, failed calls, comparing to previous 15-min periods in the table

show session counters historical all

show session counters historical failed table

show session counters historical rejected table

# No unexpected raise of rejected, failed events, comparing to previous reports; for reference for more detailed analysis vs previous reports

show gmm-sm statistics verbose

show mme-service statistics

show sgtpc statistics

show sgtpu statistics

show map statistics

show sgsn-map-app statistics

## **SGSN access network status**

# Check if no unexpected offloading is running;

# No unexpected NSE are UNAVAILABLE

# No unexpected RNC are UNAVAILABLE

show gprs-service name 2g-sgsn

show gprs-service name 2g-sgsn nsei all

show network-service-entity fr-config

show network-service-entity ip-config

show network-service-entity consolidated-status

show sgsn-service name 3g-sgsn

show iups-service name iups

show iups-service name iups rnc all

show iups-service name iups gtpu-table

## **MME status**

# Check if no unexpected spikes or drops in number of eNodeB

# Check if no unexpected MME offloading is running or ran recently

# No unexpected raise of rejected, failed events, comparing to previous reports; for reference for more detailed analysis vs previous reports

show mme enodeb-association

show mme-service name mme offload statistics

show mme-service enodeb-association all

show mme-service enodeb-association full all

show mme-service db statistics

show mme-service statistics

## **Bulkstats**

# Check if bulkstats are collected and transferred; Server state = Enabled; Records are transferred, amount of discarded records is not increasing

show bulkstats

## **Diameter**

# Check that all expected HSS/DRA connections are OPEN, no unexpected growth of any “errors”, “unknown AVPs”, Route misses”, “Link state UP/Down”, “Unexpected Answers Read”, “Timed out”

show diameter peers full all

show diameter statistics

## **Sgs**

# Check that all expected VLR connections are UP, no unexpected growth of any “Aborts”, “Rejects”, “Timeouts”, “Unknown”, “Reset”;

# On SCTP level, no unexpected growth of INIT, ABORT, SHUTDOWN chunks

show sgs-service all

show sgs-service vlr-status

show sgs-service statistics all

## **SSD**

# Take a dump of SSD periodically, by schedule

# Store the dumps on a storage server

# Take SSD twice a day, 03:00 AM and 03:00 PM

# Store the SSD dumps for at least 6 months, preferably

# Upload 2 recent SSDs to SR

show sgs-service all

show sgs-service vlr-status

show sgs-service statistics all

# **Recommendations for Automated Health Check monitoring**

## **Number of running Tasks**

# Visualize the number of running instances of each traffic/service Task Facility

# multiple instances per graph

show task resources facility imsimgr all (1)

show task resources facility linkmgr all (4 to 12)

show task resources facility gbmgr all (4)

show task resources facility mmgr all (1)

show task resources facility sessmgr all (324)

show task resources facility diamproxy all (1 for diamproxy single or 14 for multiple)

show task resources facility egtpemgr all (2)

show task resources facility sgtpcmgr all (2)

show task resources facility vpnmgr all (8)

show task resources facility npungr all (16)

show task resources facility lagmgr (1)

# Count the amount of tasks in the output (bottom line, ‘Total’)

# During normal operation, the graphs should remain flat

# If the amount of critical tasks (above) has been dropped, open a P1 SR

## **Number of Tasks in Warn, Over, Start states**

show task resources | grep warn

show task resources | grep over

show task resources | grep start

# Count the amount of tasks in appropriate state.

# During normal operation, it should be zero;

# If the traffic/service related tasks got into ***warn, over, start*** states

* imsimgr, linkmgr, gbmgr, mmgr, sessmgr, diamproxy, egtpemgr, sgtpcmgr, vpnmgr, npungr, lagmgr

# Open a TAC SR if the number of ***warn, over, start*** tasks is remaining the same or is growing during 15 minutes

## **Memory, CPU utilization of key potential bottleneck Tasks**

# Visualize the % of utilization per Task Facility and per resource (CPU, Memory);

# multiple instances per graph

# % of memory utilization should be calculated as 100\*(used/allc)

# % of CPU utilization should be taken directly from allc column

show task resources facility imsimgr all

show task resources facility mmemgr all

show task resources facility linkmgr all

show task resources facility gbmgr all

show task resources facility mmgr all

# During normal operation, the profile of the graphs should follow the traffic profile, day by day; no unexpected drops and spikes;

# Open a TAC SR if the CPU or Memory utilization exceeded 70% unexpectedly and is remaining at 70% … 80%

# Open a TAC SR if the CPU or Memory utilization exceeded 80% unexpectedly and continues growing

## **Memory, CPU utilization of PSC Cards**

# Visualize the % of utilization per Card and per resource (CPU, Memory);

# CPU-0 for signaling/data processing; direct impact of taffic on CPU-0 utilization

# CPU-1 for NPU control, no direct impact of traffic on CPU-1 utilization

# CPU-1 visualization is optional

# CPU-0 is recommended to get visualized

# multiple instances per graph

# % of Memory Usage should be calculated as 100\*(now/Total)

# % of CPU Usage should be taken directly from now column

show cpu table

# During normal operation, the profile of the graphs of PSC CPU-0 should follow the traffic profile, day by day; no unexpected drops and spikes;

# Open a TAC SR if the CPU or Memory utilization exceeded 70% unexpectedly and is remaining at 70% … 80%

# Open a TAC SR if the CPU or Memory utilization exceeded 80% unexpectedly and continues growing

## **Number of Crashes**

# Visualize the number of crashes met during the last polling period

# The Increment instead of absolute count is recommended to be visualized.

show crash list

# The data source should be taken from the bottom of the output, “Total Crashes :”

# During normal operation, the graph should remain on zero level

# Open a TAC SR if the number of crashes is growing unexpectedly, the crashes are continuing raising but the Session Recovery is working fine to save the service uninterrupted

# Open a TAC SR if the number of crashes is growing rapidly so that the Session Recovery cannot save the service uninterrupted.

## **Recent config changes**

# Visualize the config lines changed during the current calendar day; polling every 30 minutes is enough to inform the personnel about recent changes made on the system

show configuration