

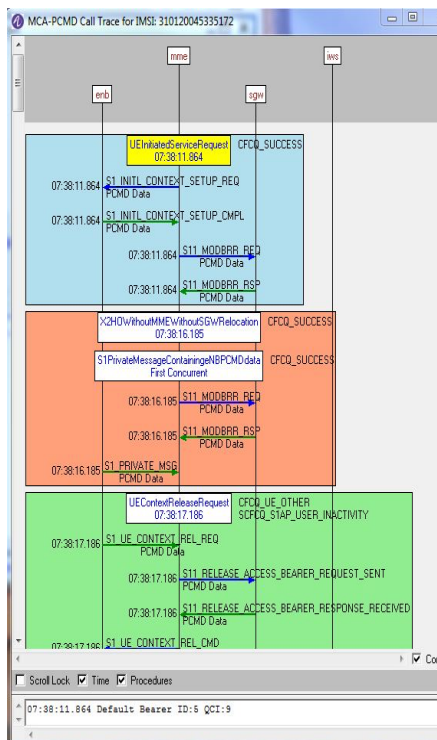


An efficient and easy-to-use voice and data analysis tool, designed for faster problem identification and resolution on the Nokia LTE wireless switch.

As competition for the wireless telephone market increases, quality of service becomes an important factor in obtaining and retaining customers. Service quality and customer revenue can be negatively impacted in many ways including incorrect switch configuration, network problems, vendor incompatibilities, unintentional feature interaction, software/hardware deficiencies, acts of nature, etc. For every call generated in the Nokia LTE network a set of Per-Call Measurement Records (PCMD) is created. The Mobile Call Analyzer (MCA) is a state-of-the-art, easy-to-use tool, designed to greatly assist in analyzing PCMD records, and enhancing the resolution time to resolve, in real time, both reproducible and no reproducible problems.

DECODES & ANALYZES PCMD RECORDS

The Mobile Call Analyzer (MCA) tool provides network troubleshooting of PCMD records, enabling wireless service providers to immediately recognize and resolve call processing delivery problems. It offers an end-to-end view of mobile calls and facilitates quickly pinpointing problem areas while enhancing the understanding of interaction among network elements.



BENEFITS

- MCA can analyze PCMD data which is generated for every single call processed by the switch
- MCA helps resolve call-processing issues quickly by facilitating problem identification and root causes for reproducible and non-reproducible problems (no scenario recreation needed).
- Enhances problem analysis by providing side-by-side good-call, bad-call comparisons in a state-of-the-art graphical user interface display.
- Generates, organizes, decodes, and correlates data both in an overview and on a per-call basis.
- Helps to simplify complex switch interactions for rapid exposure to a problem's root cause.
- Greatly accelerates the learning curve for both expert & novices.

MCA STRENGTHS

- Optimized data mining and process engine
- Secure access to live network elements for data generation and data gathering
- Provides for both off-line historical and on-line real-time data analysis
- Can export data to enhanced CSV format for importing into Excel and advanced analysis via Pivot Tables
- Allows for custom user scripts to be applied to data for advanced problem solving.

KEY FEATURES

- Easy to use and understand graphical user interface
- Aggregates & Organizes Output
- Multiple Graphical Views (Text, Pictures, Diagrams, etc.)
- User Selectable Level of Details
- Provides for Drill-down to Lowest Levels
- Extensive Correlation Between All Views
- Runs on off-switch Processor (Networked to MME)
- Multi-platform (Windows, Unix, Linux, etc.)
- Provides an overview of all calls in output file
- Provides easy navigation thru various analysis outputs
- Highlights phases of each call
- Can be:
 - Exported to spreadsheet
 - Exported to text

To learn more about the Peoplegistics Mobile Call Analyzer (MCA) contact The Peoplegistics support center via e-mail at support@peoplegistics.com.

You can also visit us at our web site:

<http://mca.peoplegistics.com>

ANALYSIS EXAMPLE

MCA-PCMD MME Interface (Version 2)

Verizon-Wireless:MME_SLL_056 [Analysis Launched] 10:16:41

File Count: 1500

Raw Data | Unix Cmd Test | TopIMSI | lastPcmd

Unix Command Filter

Status Analyze Quit

```

4 /storage/pcmd/2016-02-04-16:34.-0600.MMEpcmd.gz
4 /storage/pcmd/2016-02-04-16:38.-0600.MMEpcmd.gz
4 /storage/pcmd/2016-02-04-16:32.-0600.MMEpcmd.gz
4 /storage/pcmd/2016-02-04-16:31.-0600.MMEpcmd.gz
4 /storage/pcmd/2016-02-04-16:30.-0600.MMEpcmd.gz
4 /storage/pcmd/2016-02-04-16:29.-0600.MMEpcmd.gz
4 /storage/pcmd/2016-02-04-16:28.-0600.MMEpcmd.gz
4 /storage/pcmd/2016-02-04-16:27.-0600.MMEpcmd.gz
4 /storage/pcmd/2016-02-04-16:26.-0600.MMEpcmd.gz
4 /storage/pcmd/2016-02-04-16:25.-0600.MMEpcmd.gz
4 /storage/pcmd/2016-02-04-16:24.-0600.MMEpcmd.gz
4 /storage/pcmd/2016-02-04-16:23.-0600.MMEpcmd.gz
4 /storage/pcmd/2016-02-04-16:22.-0600.MMEpcmd.gz
4 /storage/pcmd/2016-02-04-16:21.-0600.MMEpcmd.gz
4 /storage/pcmd/2016-02-04-16:20.-0600.MMEpcmd.gz
4 /storage/pcmd/2016-02-04-16:19.-0600.MMEpcmd.gz
4 /storage/pcmd/2016-02-04-16:18.-0600.MMEpcmd.gz
4 /storage/pcmd/2016-02-04-16:17.-0600.MMEpcmd.gz
4 /storage/pcmd/2016-02-04-16:16.-0600.MMEpcmd.gz
4 /storage/pcmd/2016-02-04-16:15.-0600.MMEpcmd.gz
4 /storage/pcmd/2016-02-04-16:14.-0600.MMEpcmd.gz
4 /storage/pcmd/2016-02-04-16:13.-0600.MMEpcmd.gz
4 /storage/pcmd/2016-02-04-16:12.-0600.MMEpcmd.gz
4 /storage/pcmd/2016-02-04-16:11.-0600.MMEpcmd.gz
4 /storage/pcmd/2016-02-04-16:10.-0600.MMEpcmd.gz
4 /storage/pcmd/2016-02-04-16:09.-0600.MMEpcmd.gz
  
```

MCA-PCMD Advanced Window (Ver...)

Commands | Data

```

Running hostcmd:
PATH=$PATH:/opt/exp/bin; export PATH; /opt/MME/sbin

EXIT: 0
STDOUT:
PCMD RESULTS
starting file time: 2015-06-22.07:38
ending file time: 2015-06-22.07:42
number of files / minutes: 5
Procedure ID: INITIAL_ATTACH (1)
1-100 74795 61.74% <== Success:
1-104 405 0.33% <== Collision:
1-104-1 24 0.02% <== Collision: initial_attach
1-104-11 181 0.15% <== Collision: ue_context_release_request
1-104-99 16 0.01% <== Collision: detach_collision
2-202 8 0.01% <== Unknown ue_at_mme:
2-207-127 177 0.15% <== Failure_at_enb: slap_failure_in_radio_interface_pro
2-207-146 16 0.01% <== Failure_at_enb: slap_message_not_compatible_with_req
2-207-154 2 0.00% <== Failure_at_enb: slap_cause_misc_unspecified
2-207-25 2 0.00% <== Failure_at_enb: nas_error
2-207-7 22 0.02% <== Failure_at_enb: response_timeout
2-208-23 94 0.08% <== Failure_at_ue: sec_mode_reject
2-220-404 1 0.00% <== Auth_failure_at_hss: eps_emm_cause_eps_and_noneps_s
  
```

MCA-PCMD Browser for IMSI: 310120045335172

```

[00454] 2015/06/22 07:38:11.864 [1/100/000] (01,00) UEInitiatedServiceRequest
[00455] 2015/06/22 07:38:16.185 [1/100/000] (01,00) X2HWithoutMMEWithout
[00456] 2015/06/22 07:38:17.186 [1/103/121] (01,00) UEContextReleaseReque
[00457] 2015/06/22 07:38:24.840 [1/100/000] (01,00) UEInitiatedServiceReq
[00458] 2015/06/22 07:38:37.306 [2/249/022] (01,00) S1HWithoutMMEWithout
[00459] 2015/06/22 07:38:46.419 [1/100/000] (01,00) UEInitiatedServiceReq
[00460] 2015/06/22 07:38:46.774 [1/100/000] (01,00) X2HWithoutMMEWithout
  
```

MCA-PCMD Call Trace for IMSI: 310120045335172

```

===== 2015/06/22 07:38:11.864
--Primary (271) (310):
[1] PCMD Version=8
[2] PCMD ID=0261f41e
[3] Sending Node ID=310:120:8013:01
[4] MME Timezone=-07:00
[5] MonthDay=06:22
[6] Year=2015
[7] Procedure ID=16(UE_INITIATED_SR)
[8] Procedure Start Time=52691864(2015/06/22 07:38:11.864)
[9] Record Sequence Number=454
[10] Service Initiation Number=218
[11] Procedure Duration=114
[12] Procedure CFC=1(CFC_NORMAL)
[13] Procedure CFCQ=100(CFCQ_SUCCESS)
[15] Type of Initiation=1(UE_ORIG)
[16] IMEI/SV=99000476:070854:01
[17] Subscriber Number=5054863224
[18] IMSI=310120045335172
[19] M-TIMSI=c03faf33
[21] Current Cell ID=310:120:bf48733
[33] Time Of Service Request Received=52691864(2015/06/22 07:38:11.864)
[35] Duration To Re-setup eNodeB SGW=67
[38] Current SGW ID=10.148.0.130
[41] Previous Cell ID=310:120:bf48733
[51] UE Protocol Capability from HSS=1
[53] FB Capable=4
[54] SRVCC Capable=1
[55] Procedure Marker1=57(S1_INITL_CONTEXT_SETUP_REQ)
[56] Procedure Marker2=56(S1_INITL_CONTEXT_SETUP_CMPL)
[57] Procedure Marker3=36(S11_MODBRR_REQ)
[58] Procedure Marker4=37(S11_MODBRR_RSP)
[83] UE VLR Index=455927
[85] S11 GTP Cause Code=16(Request accepted)
[127] Cell Measurement Reports=0
[128] Time Zone Offset of Current Cell=-07:00
[161] UE Emergency Call=2
  
```

