Call Data Records (CDR) for T1/E1 and Packets over IP
Index

- Call Data Records (CDR)
- Analyzing CDR output using EXCEL®
- CCA, PPP Analyzer, PacketScan™
- Voice Band Analyzer (VBA)
- Call Management Utility
T1 E1 Hardware Platforms

- Dual T1 E1 Express (PCIe) Board
- 16-Port T1 E1 Breakout-Box
- Quad / Octal T1 E1 PCIe Card
- Rackmount Quad T1 E1 Analyzer
- tProbe™ - Portable USB based T1 E1 VF FXO FXS and Serial Datacom Analyzer
- Portable USB based Dual T1 E1 Analyzer Unit
- Dual HD Universal T1 E1 PCI Card
What is Call Data Records?

- **CDR provides comprehensive information on each and every call occurring on T1 and E1 lines, including,**
  - Voice capture for both directions.
  - Complete signaling information for each direction for CAS, ISDN, MFC-R2, and SS7.
  - All alarms and errors occurring during the call including BPV, Frame Errors, CRC errors, LOS, and more.
  - Detailed voiceband event information occurring during the call including dual tones (DTMF, MF, MFC-R2), fax tones, modem signals, and more.
  - Detailed analysis of the voiceband call including noise level, speech level, speech activity factor, echo measurements, and more.
  - Categorization of the call as voice, fax, modem, or data.
What's New?

- **Enhanced Software**
  - PPP, SIP, CAS, ISDN Calls Support.
  - Easy Invocation of Voice Files.
  - Easier Filtering of Calls of Different Durations.
  - Advanced Filtering (Mid Call Digits, Release Cause, Carrier Loss).
  - Mid Call Digits in Summary Report and Detail Report.
  - User configuration names within CCA.
Call Capture Applications and Analysis Apps

Call Capture Analysis (CCA)
- CCA captures bidirectional channel data over T1E1 and records to PCM signal files on a per call basis.
- Records CAS, ISDN, SS7 signaling and alarm events, as well as producing a summary record for each call.
- Logs the capture events in CSV or binary files and feeds these results into VBA & CDR.

Voice Band Analyzer (VBA)
- File Based application that immediately analyzes PCM recorded files from CCA. It is continuously looking for files that CCA has finished capturing.
- Noise, digits, voice activity, echo, speech level, DC offset, etc. are measured and recorded.

Call Data Records (CDR)
- Compiles information from CCA and VBA for completed calls into two types of reports Call Summary Report and Call Detail Report.
Call Capture Applications and Analysis Apps

PacketScan™
- Used to capture and monitor live IP, VoIP, and IP based video traffic.
- Stand-alone tool as well as a probe in a distributed system using a central database such as Oracle as implemented in GL’s PacketScanWeb™ application.
- A powerful Trigger Action feature that can be used to select and save calls (audio or PCAP), sending an email, generating an alert summary, create Call Detail Records, and viewing custom calls in summary view.
- Call Detail Record outputs 3 CSV files, call master record, call side record, and call events record, along with the voice file recordings for each direction.

PPP Analyzer
- Used to capture and monitor PPP Protocols over T1/E1.
- A powerful Trigger and Action feature that can be used to save calls (audio or PCAP), sending an email, generating an alert summary, create Call Detail Records, and viewing custom calls in summary view.
- Call Detail Record outputs 3 CSV files, call master record, call side record, and call events record, along with the voice file recordings for each direction.
Overall Configuration with CCA
Overall Configuration with PPP Analyzer
Overall Configuration with PacketScan™
CDR monitors output of Call Capture Application and VBA and generates Call Summary and Call Detail Reports along with Voice Files.

Working with Call Capture Applications, and VBA…
Call Capture Applications & VBA output directories are set as CDR Source Directories.

Source types to be analyzed are selected – Call Summary, Signaling, Facility Status, and Voiceband.

CDR report directory contains the CDR output in CSV/ASCII format along with the voice files.
Working with Call Capture Applications, and VBA…

**CDR Output**

- C:/ Inetpub/ftproot/TestFiles/Reports
  - (*_m.csv) Call Master Files
  - (*_s.csv) Call Side Information Files
  - (*_e.csv) Call Event Files
  - (*_v.csv) VBA Files

- C:/ Inetpub/ftproot/TestFiles/Voicefiles
Output Formats

CDR can be configured to output its results to Text (ASCII) or Comma-Separated Values (“CSV”) files:

- **Text Report**
  - Call Summary Report
  - Call Detail Report

- **CSV** – Call Data Records can be configured to output its results to comma-separated values (CSV) files. The CSV format is a widely-recognized format understood by many popular data management programs including Microsoft® Excel Access. The file name extensions of the CSV files produced by CDR is always *.csv.
  - **Call Master** - This includes the time and duration of the call, the identification of the parties involved in the call, an indication of the protocol used for call supervision, the side that originated the call, the success or failure of the call, and the file system location of call recordings.
  - **Call Side** – This is a record concerning each party participating in the call, i.e., “endpoint”-specific data.
  - **Call Events** – Gives an event-by-event account of the call. Events include channel supervision events, sporadic echo, alarms, ISDN calls, & others.
  - **In-band Summary** – Display depends on the Display Fields configurations for each algorithm in the VBA.
### ISDN Calls

![Call Summary Report (ASCII Output Format) ISDN Calls](image)

- Each call occupies one line of the report with Channel, CRV, Called Number, Calling Number, Time (Seize/Release information), Call Duration, Call Direction.

### CAS Calls

![Call Summary Report (ASCII Output Format) CAS Calls](image)
## Call Summary (ASCII Output Format)

### PPP Calls

### Table: Call List Report

<table>
<thead>
<tr>
<th>Call ID</th>
<th>Caller</th>
<th>Callee</th>
<th>Time Settled</th>
<th>Time Released</th>
<th>Duration</th>
<th>Direction</th>
<th>Release Code</th>
<th>PB Delay</th>
<th>SD Delay</th>
</tr>
</thead>
<tbody>
<tr>
<td>GLP14-136131.1234.1236</td>
<td>00018192.168.40.245</td>
<td>00018192.168.20.20</td>
<td>09:56:52</td>
<td>09:56:57</td>
<td>00010005</td>
<td>Left</td>
<td>Normal Call Cleared</td>
<td>7</td>
<td>0</td>
</tr>
<tr>
<td>GLP14-136131.1234.1236</td>
<td>00018192.168.40.245</td>
<td>00018192.168.20.20</td>
<td>09:56:19</td>
<td>09:56:20</td>
<td>00010006</td>
<td>Left</td>
<td>Normal Call Cleared</td>
<td>7</td>
<td>0</td>
</tr>
<tr>
<td>GLP14-136131.1234.1236</td>
<td>00018192.168.40.245</td>
<td>00018192.168.20.20</td>
<td>09:57:07</td>
<td>09:57:08</td>
<td>00010002</td>
<td>Left</td>
<td>Normal Call Cleared</td>
<td>7</td>
<td>0</td>
</tr>
<tr>
<td>GLP14-136131.1234.1236</td>
<td>00018192.168.40.245</td>
<td>00018192.168.20.20</td>
<td>09:57:12</td>
<td>09:57:25</td>
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<td>0</td>
</tr>
<tr>
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<td>00018192.168.20.20</td>
<td>09:57:26</td>
<td>09:57:39</td>
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</tr>
<tr>
<td>GLP14-136131.1234.1236</td>
<td>00018192.168.40.245</td>
<td>00018192.168.20.20</td>
<td>09:57:40</td>
<td>09:57:45</td>
<td>00010005</td>
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<td>Normal Call Cleared</td>
<td>7</td>
<td>0</td>
</tr>
<tr>
<td>GLP14-136131.1234.1236</td>
<td>00018192.168.40.245</td>
<td>00018192.168.20.20</td>
<td>09:57:45</td>
<td>09:57:50</td>
<td>00010005</td>
<td>Left</td>
<td>Normal Call Cleared</td>
<td>7</td>
<td>0</td>
</tr>
<tr>
<td>GLP14-136131.1234.1236</td>
<td>00018192.168.40.245</td>
<td>00018192.168.20.20</td>
<td>09:57:52</td>
<td>09:57:56</td>
<td>00010004</td>
<td>Left</td>
<td>Normal Call Cleared</td>
<td>7</td>
<td>0</td>
</tr>
<tr>
<td>GLP14-136131.1234.1236</td>
<td>00018192.168.40.245</td>
<td>00018192.168.20.20</td>
<td>10:12:36</td>
<td>10:12:36</td>
<td>00010000</td>
<td>Left</td>
<td>Normal Call Cleared</td>
<td>7</td>
<td>0</td>
</tr>
<tr>
<td>GLP14-136131.1234.1236</td>
<td>00018192.168.40.245</td>
<td>00018192.168.20.20</td>
<td>10:12:22</td>
<td>10:12:30</td>
<td>00010009</td>
<td>Left</td>
<td>Normal Call Cleared</td>
<td>7</td>
<td>0</td>
</tr>
<tr>
<td>GLP14-136131.1234.1236</td>
<td>00018192.168.40.245</td>
<td>00018192.168.20.20</td>
<td>10:12:07</td>
<td>10:12:15</td>
<td>00010008</td>
<td>Left</td>
<td>Normal Call Cleared</td>
<td>7</td>
<td>0</td>
</tr>
<tr>
<td>GLP14-136131.1234.1236</td>
<td>00018192.168.40.245</td>
<td>00018192.168.20.20</td>
<td>10:11:42</td>
<td>10:12:01</td>
<td>00010009</td>
<td>Left</td>
<td>Normal Call Cleared</td>
<td>7</td>
<td>0</td>
</tr>
<tr>
<td>GLP14-136131.1234.1236</td>
<td>00018192.168.40.245</td>
<td>00018192.168.20.20</td>
<td>10:11:41</td>
<td>10:11:49</td>
<td>00010008</td>
<td>Left</td>
<td>Normal Call Cleared</td>
<td>7</td>
<td>0</td>
</tr>
</tbody>
</table>
## Call Summary (ASCII Output Format)

### SIP Calls

![SIP Call List Report](attachment:image.png)
Call Detail Report (ISDN Calls)

Call Summary

Call Side Information
- voice file names
- called/calling party address

Call Events
- supervisory messages
- digit detection

InBand Summary
- signal level, activity factor
- RMS power level, noise level
Call Detail (CAS Calls)

Call Summary

Call Side Information
- voice file names
- called/calling party address

Call Events
- supervisory messages
- digit detection

InBand Summary
- signal level, activity factor
- RMS power level, noise level
Call Detail (SIP Calls)

Call Details (SIP Calls)

Call Summary

Call Side Information
- voice file names
- called/calling party address
- packet stats

Call Events
- supervisory messages
- digit detection

InBand Summary
- signal level, activity factor
- RMS power level, noise level
Call Detail (PPP Calls)

**Call Summary**

**Call Side Information**
- voice file names
- called/calling party address
- packet stats

**Call Events**
- supervisory messages
- digit detection

**InBand Summary**
- signal level, activity factor
- RMS power level, noise level
### Call Events

<table>
<thead>
<tr>
<th>Time of Day</th>
<th>Event</th>
<th>Supvr.</th>
<th>Direction</th>
<th>Event</th>
<th>Duration</th>
<th>Call Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>12:36:11.000</td>
<td>.000</td>
<td>.000</td>
<td>New York</td>
<td>SETUP</td>
<td></td>
<td></td>
</tr>
<tr>
<td>12:36:11.194</td>
<td>.085</td>
<td>0.000</td>
<td>Washington</td>
<td>PROGRESS</td>
<td></td>
<td></td>
</tr>
<tr>
<td>12:36:11.394</td>
<td>.000</td>
<td>.000</td>
<td>Washington</td>
<td>ALERTING</td>
<td></td>
<td></td>
</tr>
<tr>
<td>12:36:11.394</td>
<td>.000</td>
<td>.000</td>
<td>Washington</td>
<td>CONNECT</td>
<td></td>
<td></td>
</tr>
<tr>
<td>12:36:11.609</td>
<td>.015</td>
<td>.015</td>
<td>New York</td>
<td>CONN_ACK</td>
<td></td>
<td></td>
</tr>
<tr>
<td>12:36:21.572</td>
<td>.963</td>
<td>.000</td>
<td>Washington</td>
<td>DTMF-0</td>
<td>0.101</td>
<td></td>
</tr>
<tr>
<td>12:36:21.776</td>
<td>.204</td>
<td>.000</td>
<td>Washington</td>
<td>DTMF-#</td>
<td>0.088</td>
<td></td>
</tr>
<tr>
<td>12:36:21.900</td>
<td>.204</td>
<td>.000</td>
<td>Washington</td>
<td>DTMF-A</td>
<td>0.101</td>
<td></td>
</tr>
<tr>
<td>12:36:22.171</td>
<td>.0191</td>
<td>.0191</td>
<td>Washington</td>
<td>DTMF-B</td>
<td>0.101</td>
<td></td>
</tr>
<tr>
<td>12:36:22.375</td>
<td>.204</td>
<td>.000</td>
<td>Washington</td>
<td>DTMF-C</td>
<td>0.088</td>
<td></td>
</tr>
</tbody>
</table>

#### Summary of Signaling and duration of each signaling:

- BIPV, Line Sync Loss, Carrier Loss, Frame Error, and other errors inserted during the call.

- **Call Events:** displays an event-by-event account of the call. Events include channel supervision events, mid call digits, and alarms.
Call Summary and Side Information in Detail Report

- **Call summary**: Displays an overall summary of the call, including Probe ID, Call Id, Timeslot, Call Reference Value, Type of Protocol, Data Rate, Start Time, Release Time, Call Duration, Originating Side, Terminating Side, Called and Caller Number, Release Code, Source Folder, and Archive Folder.

- **Call Side Information**: Displays information about Call Side Information, in the above figure call side details are furnished for Washington and New York includes Telephone Number, Port and Timeslot Number, Mid-call Digits, and Captured File Name.
In-Band Statistics in Detail Report

- **In-band summary**: displays in-band summary details dependent on the fields chosen during VBA configuration.
- In the example, various Active Speech Level measurements as well as traffic classification estimates are displayed.
View Captured Voice Files

Goldwave

Adobe Audition
• Call Master Record gives information about Protocol Type, Start Date and Time, Released Date and Time, Duration, Originator, Term, Release Code Source Directory, Archive Directory, and other Protocol Specific Parameters.
Call Side Information(*_s.csv Output Format)

- Provides information about Address, File name, MC Digits, and other Protocol Specific Parameters.
Call Events Information(*_e.csv Output Format)

- It gives information about the events for each call, such as Protocol Type, Signaling Messages, Data, Start, and Duration.
Voice Band Call Details(*_v.csv Output Formats)

- Voice band call provides the details about Input Points, ASL, AF, RMS, Noise, %Voice, %Digits, %Quiet, and %Idle.
Analyzing CDR output using EXCEL®
- Imports new CSV files or opens an existing work book files for filtering.
Call Statistics and Advanced Filter

- User can customize the filters by selecting options in Main Record, Side Record, Voiceband, and Event Filters in CDR Filter Form.
Users can customize filtering based on any measurements (ASL, AF, % Digits, %Voice, Mid-call-digits) or signaling messages (ISDN Signaling, CAS Signaling, Release Codes, Call Duration, Call Events).
Play and Download Voice Files from Calls of Interest

- The voice files of a particular call from the filtered records in Excel® can be downloaded or played back using third-party audio editing tools such as Goldwave®.
Call Capture Applications and Analysis (CCA)
PPP Analyzer
PacketScan™
Voice Band Analyzer
Call Capture and Analysis
CCA Capture Modes

- CCA can be set to Auto Scan Mode – with relevant trigger mode for ISDN, CAS, SS7, and other Traffic to automatically start capturing on detecting the require signaling or traffic.
- Set corresponding configuration options.
CCA Call Storage Options (directory, event logging, and file naming convention) is set to allow CDR directly analyze the captured call records.
CCA Call Storage

- Captured file names are named sequentially or with the date/time; File names can be prefixed with Probe names.

- Allows to save the captured files into a single folder or in several subfolders.

- Option to save call summary records, facility alarms, and supervisory signals into either CSV or binary format.

- Default extension such as .pcm, ala, .ula or any other file extension can be given to the captured files.
CCA Output

- CCA captures bidirectional channel data and records it into PCM signal files.
- Records signaling and alarm events, as well as producing a summary record for each call.
- CCA logs the capture events in CSV or binary files and feed these results into VBA & CDR.
PPP Analyzer
Analysis and Capture Application
PPP Analyzer Features

- Ability to test and perform numerous measurements across WAN-LAN or LAN-LAN connection.
- Ability to test and analyze HDLC based PPP protocol, PPP SIGTRAN, and PPP over IP protocols in synchronous environment.
- Supports Packet Data Analysis module for real-time IP call analysis including SIP, RTP, MEGACO, H.323, MGCP, & T.38 Fax calls.
- Supports decoding of frames with two MLPPP layers.
- Triggered Actions and E-mail Support.
- Real-time audio/video monitoring of RTP streams; record audio and video data of a session to a file in QuickTime format.
- Support for H.263+ provides video capture and videoconference monitoring capability.
PacketScan™
SIP Analysis and Capture Application
PacketScan™ features

- Supports SIP (SIP Session Initiation Protocol -3261), Megaco3525, Megaco3015, MGCP, H323/H225, and RTP protocols.
- Supports decoding of MAC, IP, SIP-I, SIP-T, UDP, TCP, RTP, RTCP, MEGACO, T.38 (Fax over IP), and SMPP (Short Message Peer to Peer Protocol).
- Call detail records (CDR) isolates call specific information i.e., status of each call (i.e., active/completed), duration of completed call, Src & Dst addresses, Call type, Release cause, Conference ID, Call identifier, and more.
- Capability to export detail decodes information into an ASCII file.
- Packet Data Analysis (PDA) view displays call information in graphical format (Traffic Analyzer Call Quality Matrix- Summary View) as well as in tabular format (RTP Diagnostic - Detail View).
- Call capturing based on call agents or trigger actions such as MOS, R-Factor, jitter, packet loss, duplicate packets, or called / calling numbers (SIP/H323/ MEGACO).
- Supports saving the selected calls from traffic analyzer into *.HDL or *.PCAP formats.
Voice Band Analyzer (VBA)

- VBA can be set Auto Analysis mode to automatically analyze the PCM files captured by CCA.
▪ Various parameters that can be included in VBA reports can be selected.
VBA Features

- Provides voice band measurements of the captured signals, including active speech levels, noise level, percent time active, and DC offset.

- Standard modules are -ITU-T P.56 Active Voice Level analysis, Line Echo (Hybrid) analysis.

- Other Optional Modules include - 2-Wire Echo analysis, Traffic Classifier analysis, and Fax Demodulate / Decode.

- Single VBA instance can analyze any number of files.

- Analysis of data files continues indefinitely until the execution is stopped manually.
Analyzing CDR output using Voice Call Management Utility
GL's Call Management Utility (CMU) application coupled with the GL's T1/E1 Call Capture and Analysis (CCA) provides all the necessary management tools to perform voice calls recording functionality.
Voice Call Management Utility (CMU)
Voice Call Management Utility (CMU)
Thank You

For more information, visit Call Data Records webpage.