

## **Oracle® Communications**

### **Performance Intelligence Center**

Release Notice  
Release 10.4.0

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**ORACLE®**

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# Chapter 1: Introduction

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**Topics:**

PIC Release 10.4 Introduction  
Software Lifecycle

This Release Notice includes information on new Features, Supported Hardware Baseline, Media and Documentation pack contents, and identifies Firmware and Supported Upgrade Paths for Release 10.4.0.0.0. This document also includes listing of both Resolved and Known Bugs for this Release.

Release Notice is included in the Documentation Pack and made available with every Software Release.

## PIC Release 10.4 Introduction

Oracle Communications Performance Intelligence Center provides the tools that service providers need to capture network traffic data and convert it into useful Business Intelligence for troubleshooting and for managing traffic, roaming, and services, in addition to revenue. With its powerful and configurable filtering, operators can sort through the data to create comprehensive dashboards and key performance indicators (KPIs) for all departments within the service provider. They can also leverage a comprehensive array of performance management and service management capabilities based on network traffic.

## Software Lifecycle

The section describes the content description of 10.4.0 including the updates done in the latest patch 10.4.0.4.4

- Remediation of 3<sup>rd</sup> party libraries based on various security scans
- Username not displayed when login authentication failure in ProAlarm and Audit Viewer
- HTTP2 data frame Re-assembly support in MED-PROT
- Major Upgrade support without OS re-install
- Platform upgrade w.r.t TPD and COMCOL
- vSTP monitoring support in PIC
- Modern Browser Support(Chrome, Edge, Firefox)
- PIC integration with Observability Server (Grafana)
- Automatic server selection during data flow processing creation
- Auto redistribution of DFPs on Centralized Configuration Manager
- xDR Field Reduction Support
- Trace export support in PCAP format.
- PCAP export limit increase from existing 10K to 1lac records
- Sorting by Begin time support in Troubleshooting application
- New Production interface support in Probe and Mediation server
- Observability application enhancement to support the multiple sessions for the same dictionary in the same pre-packaged dashboard
- Installation support to Oracle 19C database in PIC
- Mediation Protocols Features and Improvements
  - Adding Field rating group in Gy TDR
  - 5G RAT Type -4G/5G Subscriber distinguish
  - S6t diameter interface support
  - OpCode support in INAP/Camel TDR Builder
  - 5G UDM and AUSF Monitoring Support in Evolved HTTP Builder
  - Get the TP-Originating-Address and the TP-Destination-Address field values displayed for SMS over SGs
  - Databroker MAP builder enhancement
  - Feature List AVP support for LTE Diameter S6 TDR.
  - Addition of support for 4 new xDR field(CancellationType, TerminationCause, RequestCause, ServerAssignmentType) in the LteDiameterTdr builder
  - Session Code - Decode HEX to ASCII in xDR

- NB-IoT Traffic RAT Type (1005) is missing currently in PIC on LTE s6a builder
  - TDR - Payload Protocol Identifier - (sctp payload protocol identifier)
  - Decoding the field TP-PID in the TDR format (SS7 MAP builder and RAN SMS builder)
  - Evolution of generic LTE Diameter TDR
  - Adding PCC rules fields in the Gx TDR transaction
  - Mapping of STIR/SHAKEN Headers and Tags for SIP and SIP-T Builders
  - Additional enhancement to the RFE 25516544 to support the “parity information parameter” in filling Generic Name field.
  - Cancellation Type - Not included in the MAP dictionary available fields (PIC SS7 analyzer)
  - Populate "released by" field in SIP builder when 487 is present
  - PIC Mapping for SIP to address SHAKEN, Diversion, and RCD PASSports
- Security Fixes
  - PIC database potential security vulnerabilities
  - Cookies without Secure and HttpOnly flags
  - Missing HTTP relevant security headers
  - External LDAP user lock and unlocking
  - Password capability of more than 8characters and automatic reset every 30 days
  - Telnet package removal from the acquisition server
  - Telnet package removal from the mediation server
  - 3’rd party jar upgrade based on Black Duck scan.
  - NGHTTP2 upgrade to latest version 1.61.0

# Chapter 2:

## Feature Descriptions

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### Topics:

PIC Release 10.4 Introduction  
Software Lifecycle  
5G UDM and AUSF Monitoring  
Support  
PIC integration with Observability  
Server (Grafana)  
Automatic Server Selection and  
Redistribution  
xDR Field Reduction  
Media Pack  
Load Line Up  
Documentation Pack  
Supported Upgrade Paths  
Severity Definitions  
Resolved Bug List  
Customer Known Bug List  
My Oracle Support (MOS)  
Emergency Response  
SS7 Protocols  
GPRS/IP Protocols  
GPRS Protocols  
IP Protocol  
UMTS Protocol  
VoIP Protocol  
IMS Protocols  
LTE Protocols

This chapter provides a summary of important features released in PIC release 10.4.

## 5G UDM and AUSF Monitoring Support

PIC 10.4.0. Has a monitoring support for UDM and AUSF 5G NFs. The support has been added into the existing EVOLVED HTTP TDR BUILDER that is used to correlate HTTP2 frames in transaction mode. The correlation is done using the combination of IP Addresses, Ports and Stream ID. A single HTTP2 packet can contain multiple HTTP2 frames, however the evolved http tdr builder will work only on the individual frames, so each of the HTTP2 frame should be de-chunked from the packet before evolved http tdr builder can process it. The UDM and AUSF messages come into the payload of the HTTP2 messages, so the HTTP2 data frames reassembly and de-chunking is required. This de-chunking of HTTP2 frames shall be done on the PROBE and HTTP2 data frame reassembly shall be done on the EVOLVED HTTP TDR BUILDER itself. The EVOLVED HTTP TDR BUILDER can also perform the de-chunking of HTTP2 frames, but it is highly recommended to configure the de-chunking on the PROBE for better performance of the evolved http tdr builder.

Following enhancements have been done in PIC 10.4.0 components for 5G UDM and AUSF NFs monitoring.

- De-chunking of HTTP2 frames on PROBE and HTTP2 data frames reassembly on the EVOLVED HTTP TDR BUILDER.
- The builder “EvolvedHttpTdr” is enhanced further for JSON payload and 5G NFs decoding
  - JSON Payload decoding of HTTP2 Data frames
  - Transaction level correlation of AUSF and UDM messages on MEDPROT
  - The following fields have been added for AUSF:
    - IMSI, PATH, LOCATION, NAI, SUCI, AUTHRESULT, AUTHTYPE, ACCESSTECH, PGWADDRES, AUTHLINK, AUSFMAC, TRACEREF, MCC, MNC, PROBLEM DETAILS.
  - The following fields have been added for UDM:
    - IMSI, MSISDN, IMEI\_SV, RATETYPE, NAI, ULMBR, DLMBR, NFINSTANCEID, CALLBACKURI, SERVICENAME, MCC, MNC, SUCI, PROBLEMDetails, SUBSCRIPTIONID, SMSFMAPADDRESS, IMSVOPS, DEREGREASON, EXTGROUPID, PGWADDRESS
- Prolib decoding support for HTTP2 frames on Mediation
- PCAP Export Support on MGMT for HTTP2 frames
- EPI Couplet for the HTTP2 messages in Troubleshooting

## Configuration- HTTP2 Monitoring

- Create a Traffic Classification using one of the following allowed combinations
  - Protocol as ALL with Forwarding as TcpFlow & Chunks
  - Protocol as TCP with Forwarding as TcpFlow
- Create an IP Dataflow using one more TC created with suggested configuration above.

- Create a Data Flow Processing and select EVOLVED HTTP TDR BUILDER and create an XDR session.
- Refer EVOLVED HTTP TDR BUILDER content document to configure builder specific parameters.

## Limitation of HTTP2 monitoring

- Deciphering of TLS messages is not supported in current delivery.
- Reassembly of HTTP2 extension frames is not supported in current delivery.

## Observations and Troubleshooting steps

**Important:** None of these issues are impacting the XDR Builder Correlation.

- The decoding of the JSON data in the packet could get truncated in the 4th window in Troubleshooting Application if the size of incoming packet is more than the size mentioned by PmFrSize in LongParamTable in PROBE. The "PmFrSize" parameter value in LongParamTable in PROBE should be set to a value higher than incoming packet length for correct decoding of JSON data in prolib. The default value of PmFrSize is 2000. After increasing the value, the pmiaMonitor process needs to be restarted. Post this the JSON data should be correctly decoded.
- The decoding of Header Frames in the 4th Window is not displayed correctly. The workaround is to restart "dsapi" process on the IXP server where the build process is hosted or spawned. The decoding is correctly shown after the process restart. This is a random issue and occurs rarely.
- The HTTP2 Response status code 451 is mapped as "ID Error" in dictionary and thus it is showing "ID Error" in Troubleshooting Application. Whereas some specs indicate status code 451 should be "Unavailable For Legal Reasons"

## PIC integration with Observability Server (Grafana)

The new observability feature in PIC will provide rich visualization by leveraging Grafana's dashboard capabilities. PIC will provide the integration with the Grafana Server, it will provide an option to the user to configure the data source for the Grafana server. The Grafana server will have the InfluxDB installed on it. The InfluxDB will store the KPIs exported from the PIC system and dashboards will be created using the Grafana. The mediation server will be enhanced to support writing into InfluxDB along with the Oracle database. The IxpStore process in the mediation server will use an HTTP interface to write into InfluxDB.

The configuration for the Grafana and InfluxDB data source shall be provided by a new Observability Application available on the PIC portal. The application additionally shall support the export of the custom KPIs and pre-packaged KPIs towards Grafana Server. The new Observability application shall be developed in OJET and Spring boot. The observability

Application shall be available inside the Configuration perspective on the Management application portal.

The following enhancements have been covered under this feature:

- New Observability Application available in NSP application portal. This will be only available to the NSP Admin users.
- Enhancement in mediation store process to write the KPIs into the InfluxDB.
- Datasource configuration for the Grafana and InfluxDB.
- API Key configuration for the Grafana Server.
- Support to export the already created PIC KPIs into the Observability Server.
- Support to export the Pre-Packaged KPIs into the Observability Server.

In PIC 10.4.0.1, the following enhancements are added into the Observability Application:

- Modification of Grafana Server
- Modification of InfluxDB and datasources
- Deletion of InfluxDB
- Auto scaling of Observability Configuration application

## **Configuration- Observability Server**

The new Observability application developed in OJET shall be used to perform the configuration required for the Observability Server. It shall support the following configuration:

- Grafana API Key and Datasource Configuration
- InfluxDB Datasource Configuration
- Pre-Packaged Dashboard Configuration
- Custom KPI Export Configuration

The detailed configuration and workflows are available in the Observability Application Guide. The software and hardware requirements for the Observability server are also available in the Observability Application Guide.

## **Limitations- Observability**

- At present only one Grafana organization can be added. The multi organization support shall be added in the later version of the application.
- The Pre-Packaged dashboard is created using generic KPIs and any specific customer specific rule or filter can't be applied. In case any specific filter is needed in the Pre-Packaged dashboard then Oracle consulting should be contacted for the support.

- The drill down feature is not available in the current release.

## Troubleshooting- Observability

- In case the dashboard panels are showing lag in the plotted points, the check the corresponding Operate and Storage DFPs on the mediation server. There should be no lag in the operate and storage DFPs on the mediation server, if the lag is there then the points will be delayed on the dashboards.
- The Observability Server should have the NTP server running, in case it is not running then dashboard shall not represent the correct plotting of the points.
- The retention period should be carefully selected during the InfluxDB datasource configuration. The retention period will define how long the KPIs will be stored in the InfluxDB and hence available in the Grafana Dashboards.

For more details, refer to *Observability Application Guide*.

## Automatic Server Selection and Redistribution

The feature is a pre-cursor for the IXP auto load balancing. The current feature supports the auto-matic mediation server selection during the creation of dataflow processing (DFP) using either the assistant mode or the manual mode. The server selection algorithm runs on the Centralized Configuration Manager (CCM) application and depends on the Metrics provided by the mediation sub-system on which the dataflow processing is being created. The server selection service on the CCM works in on-demand mode and only queries the mediation sub-system for the required Metrics when a user initiates data flow processing creation action. In case the server selection algorithm fails, the manual selection mode is enabled. The feature is designed to prevent the skewed configuration in which only few servers are handling the load of the DFPs. The algorithm works on the average load on the servers during the last one hour.

The auto redistribution of the data flow processing is an extension of the auto-matic server selection feature. The auto redistribution feature rebalances the DFPs across all the servers in the mediation sub-system. The feature is available in the Distribution screen of the CCM application.

The auto server selection and redistribution features are controlled by system parameter in the CCM application and in case user wishes to turn off the feature, then this parameter can be turned off in the database.

The details of the feature is available in the Centralized Configuration Manager application guide.

## Configuration- Auto server selection and redistribution

- The feature is enabled using a system parameter. The parameter is enabled by default.

- The auto server selection is available under DFP configuration in assistant and manual mode on CCM. It requires no special configuration step, however in case the algorithm fails then manual server selection is enabled.
- A timeout of 1min has been kept to fetch the Metrics from the mediation sub-system. In case the algorithm is not able complete in 1min then manual server selection is allowed.
- The auto redistribution feature is available under the Distribution screen on CCM. The auto redistribute is enabled by default and in this case user will not be allowed to manually select the server for the distribution of the DFPs. If the auto redistribute is unchecked then user can select the servers manually for the distribution.

### **Limitations- Auto server selection and redistribution**

- The algorithm for the server selection and redistribution takes into account the server load over the period of 1hr. This can result in the skewed configuration if the system is fresh installed, and the user creates many DFPs at one go.
- In the current version of the feature, the algorithm does not take into account all the Metrics for the server load e.g. Network bandwidth, Protocol mix. This will be improved later on.
- The CSV store process needs to be moved back manually if the CSV shared directories(StoreExport) are configured on a specific IXP base server.

### **Troubleshooting- Auto server selection and redistribution**

- The auto server selection and redistribution depend on the key sharing between the NSP' "tekelec" user and mediation server's "cfguser". In case the auto server selection is failing then verify if the keys are exchanged, if not then execute the Sync Database credentials procedure from the maintenance guide.

## **xDR Field Reduction**

The feature is provided to reduce the xDR storage requirements for the customer. The reconstitution sessions generally consist of many fields that many customers are not interested in storing, however since the fields are part of the dictionary so all the fields are stored in the xDR session. The compact mode for some of the builders are available but it requires separate configuration of DFPs. The xDR field reduction shall provide a mechanism to the user to store the lesser number of fields than the total available fields in the dictionary. The CCM dataflow creation will allow user to select the fields that user is interested in storing, the feature will work only for the new sessions that will be created. The dictionary of the builder will not be modified only the selected fields will be provided as the parameters to the Store process in mediation server and the store process will create the session with the selected fields only.

The feature is extended to the Troubleshooting, data feed and browser export applications, where the query on the sessions with reduced fields will work only if only the selected fields are part of the query.

**Note:** this feature should only be used by the admin user and when the less data storage is needed. This will not modify the existing configuration, but new configuration should be required. The care should be taken in using the existing queries on the session with reduced fields as the queries may not work if the reduced fields do not contain the fields in the existing query. This is applicable to all such application that uses query filter e.g. Troubleshooting, Browser export, Data Feed etc.

### **Configuration- xDR field reduction**

- The feature shall be available from the CCM application during the creation of data flow processing under assistant mode. The session creation screen will allow the user to select the fields from the total available fields in the dictionary.
- The mandatory fields for the selected dictionary are automatically selected.
- The query creation screen on the session with reduced fields will only allow the selected field for the query in Troubleshooting, DataFeed and xDR browser application.

The user guides of the CCM, Troubleshooting, Mediation Datafeed and xDR Browser export will have more details on the configuration steps.

### **Limitation- xDR field reduction**

- The feature is not available in case a user is selecting the multiple builders during the DFP creation.
- Queries are associated with the dictionary, so the previously created queries on the reduced sessions will not work.
- The session view is currently not supported on the session with reduced fields.
- Historical KPIs are not supported for the session with reduced fields.

### **Troubleshooting- xDR field reduction**

- In case the queries are not working on the reduced sessions then query should be modified to use only the selected fields.
- In case the PDUs are not loading in the session then verify if the FsuUnitLink field is available in the selected fields.

# Chapter 3: Obsolescence

The following are the obsolescence for this release:

- In Historical KPI Specific Parameters field is deprecated for Execute every day and Day Scheduling.
- HP G6 Bare metal servers are not supported.
- HP G8 Blades servers are not supported.
- Direct support of P2000 and attached D2700 is no more supported.
- Performance Intelligent Center is no longer compatible with
  - Neptune 3G Probe
  - PMF SS7
  - Cross-connect
- Web service to apply queries without connecting to UI
- Mediation Protocols End of Service Life for the following protocols:

| Family | Builder                | SKU    | SW license name         | Legacy Part Number |
|--------|------------------------|--------|-------------------------|--------------------|
| GPRS   | Gn Gp Stats            | L99462 | OC Protocol Mediation I | 950-0180-01MKT     |
| SS7    | IUP CDR Reconstitution | L99462 | OC Protocol Mediation I | 950-0214-01MKT     |
| SS7    | TUP CDR Reconstitution | L99462 | OC Protocol Mediation I | 950-0082-01MKT     |
| VoIP   | RTCP stats             | L99462 | OC Protocol Mediation I | 950-0124-01MKT     |

**Note:** These are already part of 10.3.x release.

# Chapter 4:

## Media and Documentation

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### Topics:

Media Pack  
PIC Release 10.4.0  
Load Line Up  
Documentation Pack

Oracle Communications software is available for electronic download on the Oracle Software Delivery Cloud (OSDC). Documentation is delivered electronically on the Oracle Help Center (OHC). Both the software Media Pack and Documentation Pack are listed in this chapter.

## Media Pack

All components available for download from the Oracle Software Delivery Cloud (<https://edelivery.oracle.com/>) are in [Load Line Up](#)

**Note:** This list is accurate at the time of release but is subject to change. See the Oracle software delivery website for the latest information.

In addition, look for the latest patches for this release in the Knowledge Management note [Information Center: Patches for Oracle Communications Performance Intelligence Center \(Doc ID 1989320.2\)](#) in <https://support.oracle.com>

### PIC Release 10.4.0

|                                                                  |         |
|------------------------------------------------------------------|---------|
| Oracle Communications Performance Intelligence Center 10.4.0.4.4 | Tekelec |
| Tekelec Platform Distribution 7.8.11.0.0                         | Tekelec |

## Load Line Up

| PIC 10.4.0.4.4                                                                                          | Software Version      | Platform     |
|---------------------------------------------------------------------------------------------------------|-----------------------|--------------|
| Mediation Server – IXP Base (on Tekelec Platform Distribution)                                          | 10.4.0.4.4_1.3.0      | Tekelec      |
| Management – NSP (on Oracle Linux)                                                                      | 10.4.0.4.4_1.3.1      | OL           |
| Probed and Integrated Acquisition – xMF(on Tekelec Platform Distribution)                               | 10.4.0.4.4_1.3.0      | Tekelec      |
| Mediation Protocol - xDR Builder                                                                        | 10.4.0.4.4_1.3.0      | Tekelec      |
| Acquisition Data Feed - Tadapt(32bits)                                                                  | 10.4.0.4.4_1.3.0      | Tekelec      |
| Performance Intelligence Center MIBS                                                                    | 10.3.0.0.0            | Tekelec      |
| Compatible Software                                                                                     |                       |              |
| Tekelec Platform Distribution                                                                           | 7.8.11.0.0_89.36.0    | Tekelec      |
| Java 8                                                                                                  | 8U431 or later        | Linux-x86-64 |
| Oracle Linux 7                                                                                          | Update 9              | Linux-x86-64 |
| Oracle Database 19c Enterprise Edition Release 64bit                                                    | 19.0.0.0.0/19.3.0.0.0 | Linux-x86-64 |
| Oracle WebLogic Server enterprise Edition (FMW, WLS, WebLogic Server 12c) for platform Linux x86-64     | 12.2.1.4.0 or later   | Linux-x86-64 |
| Oracle WebLogic Server Plug-in from Oracle WebLogic Server Standard Edition 12.1.0.0.0 for Linux x86-64 | 12.1.3.0.0 or later   | Linux-x86-64 |

|                                    |                                            |              |
|------------------------------------|--------------------------------------------|--------------|
| Oracle ASMLib                      | 2.0.8 or later                             | Linux-x86-64 |
| KVM hypervisor                     | 1.5.3 or later                             | Linux-x86-64 |
| Open vSwitch                       | 2.5.5 or later                             | Linux-x86-64 |
| Compatible Products                |                                            |              |
| Eagle                              | 46.5, 46.6, 46.7, 46.8, 46.9, 47.x, 45.0.1 |              |
| Diameter Signaling Router          | 8.0, 8.1, 8.2, 8.4, 8.5, 8.6.0.x, 9.0.2    |              |
| Falco                              | Latest                                     |              |
| Oracle Database Appliance          | Latest                                     |              |
| Oracle ZFS Storage Appliance       | Latest                                     |              |
| Firmware                           |                                            |              |
| HP Solutions Firmware Upgrade Pack | 2.2.10 or later                            |              |
| Oracle Firmware Upgrade Pack       | 3.1.6 or later                             |              |

**Note:** Management on TPD support is deprecated.

PIC is tested with the above versions of Compatible Software. For the latest versions:

- All latest CPU patches should be applied as per Oracle CPU publications
- Java 8 refer to My Oracle Support Information Center: Installation & Configuration for Oracle Java SE (Doc ID 1412103.2)
- HP Firmware refer to Oracle Help Center <https://docs.oracle.com/en/industries/communications/tekelec-platform/index.html>
- Oracle Firmware refer to Oracle Help Center <https://docs.oracle.com/en/industries/communications/tekelec-platform/index.html>
- Oracle Linux refer to Oracle Software Delivery Cloud <https://edelivery.oracle.com/>
- Oracle Database and related patches refer to Oracle Software Delivery Cloud <https://edelivery.oracle.com/> and My Oracle Support <https://support.oracle.com/>
- Oracle WebLogic Server and Proxy Plugins refer to Oracle Software Delivery Cloud <https://edelivery.oracle.com/>
- Oracle ASMLib refer to Oracle Technology Network <http://www.oracle.com/technetwork/server-storage/linux/asmlib/ol7-2352094.html>

## Documentation Pack

PIC customer documentation and online help are created whenever significant changes are made that affect system operation or configuration. Revised editions of the documentation and online help are distributed and installed on the customer system. Consult your Installation Manual for details on how to update user documentation. Additionally, all customer documentation is available on the Oracle Help Center. Release Notes are available on Oracle Help Center with each new release of software. The Release Notes list the bugs that have been resolved in the current release and the bugs that are known to exist in the current release.

All documents available for download from the [Oracle Help Center \(OHC\)](#) site.

|                                                                            |
|----------------------------------------------------------------------------|
| <b>Release Notices and Licensing Information User Manuals Document Set</b> |
| PIC 10.4.0 Release Notice                                                  |
| PIC 10.4 Licensing Information User Manual                                 |
| <b>Installation, Upgrade, Configuration, and Maintenance Document Set</b>  |
| Installation Guide                                                         |
| Configuration Files                                                        |
| Upgrade Guide                                                              |
| Patch Installation Guide                                                   |
| Maintenance Guide                                                          |
| Acquisition Data Feed Installation and Configuration Guide                 |
| Feature Guide                                                              |
| Planning Guide                                                             |
| Security Guide                                                             |
| Hardware Installation Guidelines                                           |
| <b>Core Documents Set</b>                                                  |
| Quick Start Guide                                                          |
| Alarm Forwarding Administration Guide                                      |
| Audit Viewer Administration Guide                                          |
| Centralized Configuration Guide                                            |
| On Demand UP Guide                                                         |
| Data Feed Configuration Guide                                              |
| Browser Export Guide                                                       |
| Management Security User's Guide                                           |
| Alarm Configuration User's Guide                                           |
| Alarm Application User's Guide                                             |
| SS7 Surveillance Guide                                                     |
| Dashboard Configuration User's Guide                                       |
| Dashboard Application User's Guide                                         |
| Troubleshooting Application User's Guide                                   |
| KPI Configuration User's Guide                                             |

|                                 |
|---------------------------------|
| Browser Export Scheduler Guide  |
| SIGTRAN Surveillance Guide      |
| System Alarms Guide             |
| Observability Application Guide |

# Chapter 5:

## Supported Hardware Baseline

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**Topics:**  
**No table of contents entries found.**

Refer to the [Hardware Installation Guidelines](#) F26306-01 for the hardware and server versions that have been verified with this release.

# Chapter 6:

## Supported Upgrade Paths

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**Topics:**  
Supported Upgrade Paths

This release has been tested for upgrade from specific prior releases. This chapter contains the exact paths for upgrade. Please verify your current installed release is listed on a valid upgrade path.

## Supported Upgrade Paths

Upgrade/Installation are supported with the software distributions described in these Release Notes.

All documents are available on Oracle Help Center.

### Major Upgrade

The possible upgrade paths to Performance Intelligent Center 10.4.0.4.4 are listed in the following table.

| From                                                        | To                                        |
|-------------------------------------------------------------|-------------------------------------------|
| Performance Intelligent Center 10.2.1                       | Performance Intelligent Center 10.4.0.4.4 |
| Performance Intelligent Center 10.3.x                       | Performance Intelligent Center 10.4.0.4.4 |
| Performance Intelligent Center 10.4.0 and all prior patches | Performance Intelligent Center 10.4.0.4.4 |

### Patch Install Support:

The patch install is supported for any subsequent PIC MR of 10.4.0.

For example: Performance Intelligent Center 10.4.0.4.4

### Fresh Install Support:

- NSP for PIC 10.4.0.4.4 does not support fresh installation. Customer can only upgrade to 10.4.0.4.4 from 10.4.0.4.1 or 10.4.0.4.2 or 10.4.0.4.3.
- IXP and XMF Fresh Installation is supported.

### Disaster Recovery:

Disaster Recovery is supported for the Performance Intelligent Center 10.4.0.4.4 release.

Disaster Recovery (HW failure) shall replace existing supported server with the same HW if available. If not possible, a fresh install of the new hardware shall be done in PIC 10.4.0.4.4

# Chapter 7:

## Resolved and Known Bugs

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**Topics:**

- Severity Definitions
- Resolved Bug List
  - Fixed in 10.4.0.4.4 Patch
  - Fixed in 10.4.0.4.3 Patch
  - Fixed in 10.4.0.4.2 Patch
  - Fixed in 10.4.0.4.1 Patch
  - Fixed in 10.4.0.4 Patch
  - Fixed in 10.4.0.3 Patch
  - Fixed in 10.4.0.2 Patch
  - Fixed in 10.4.0.1 Patch
  - Fixed in 10.4.0 Release
- Customer Known Bug List

This chapter lists the resolved and known bugs for PIC release 10.4.

These lists are distributed to customers with a new software release at the time of General Availability (GA) and are updated for each maintenance release.

## Severity Definitions

The following sections refer to Bug severity levels. Definitions of these levels can be found in the following publication: *TL9000 Quality Management System – R 5.5*

## Resolved Bug List

### Fixed in 10.4.0.4.4 Patch

| Bug      | Components | Title                                                                                                   | Severity |
|----------|------------|---------------------------------------------------------------------------------------------------------|----------|
| 36994476 | MGMT       | Syniverse: KPI'snmp trap showing wrong format for OTID, LinkName and OpCode                             | 2        |
| 31465102 | MGMT       | nsp_update_proc.sh script terminates due to missing file                                                | 3        |
| 36944865 | MEDSRV     | Internal ASN1 decoder is decoding incorrectly the IMSI, MSISDN & Protocol field for 30 reported Opcodes | 2        |
| 31887944 | MGMT       | NSP Nightly Backup script is taking invalid backups when oracle database isn't opened                   | 3        |

**Note:** Along with above bugs, PIC 10.4.0.4.4 includes all Bugs fixed in PIC 10.5 release

### Fixed in 10.4.0.4.3 Patch

| Bug      | Components | Title                                                                                  | Severity |
|----------|------------|----------------------------------------------------------------------------------------|----------|
| 34784542 | MEDPROT    | S6a xDR Result Code does not match PDU Result-Code (5004)                              | 3        |
| 35445049 | MEDPROT    | PIC and Databroker feed show a rounded IMSI instead of the IMSI in the MSU             | 3        |
| 35683461 | MEDPROT    | IMSI and header does not match MSU                                                     | 3        |
| 35876879 | INT_OPS    | Incorrect display and search by equipment status field                                 | 3        |
| 34132868 | MEDPROT    | One More Translation ms 2hTimer Expiry                                                 | 4        |
| 34132876 | MEDPROT    | Why XDR remained armed 2h                                                              | 4        |
| 34132864 | MEDPROT    | 2h Timer Expiry On 500                                                                 | 4        |
| 34132819 | MEDPROT    | 2h Timer Expiry on 404                                                                 | 4        |
| 34113366 | MEDPROT    | 2 hours Timer Expiry on 302 status code                                                | 4        |
| 34813629 | MGMT       | Invalid Format for Cron expression when propagated from NSP to IXP                     | 2        |
| 35591665 | MEDSRV     | STIR/SHAKEN feature is not enabled on xDR Builder config                               | 4        |
| 35529390 | MEDSRV     | BUG 35529390 - LAB ~ TR533 Queries (IN 0) are no longer being seen in lab AIN searches | 2        |

|          |         |                                                                                        |   |
|----------|---------|----------------------------------------------------------------------------------------|---|
| 35892266 | MEDPROT | BUG 35892266 - LAC field is showing incorrect value in Gy xDR                          | 3 |
| 35813144 | MEDPROT | TotalVis/Databroker output header shows App Context Version of 1 but true version is 3 | 2 |

### Fixed in 10.4.0.4.2 Patch

| Bug      | Components | Title                                     | Severity |
|----------|------------|-------------------------------------------|----------|
| 34878966 | MGMT       | Dashboard display: 100% is displayed 10%0 | 3        |

### Fixed in 10.4.0.4.1 Patch

| Bug      | Components | Title                                                              | Severity |
|----------|------------|--------------------------------------------------------------------|----------|
| 33605057 | MEDPROT    | Incorrect SMS level correlation in case of TP-MTI: SMS Deliver     | 2        |
| 33737638 | MEDPROT    | invalid Conversation calculation                                   | 2        |
| 31975712 | MEDPROT    | 19 ARE ADDED TO MSISDN                                             | 2        |
| 32693230 | MEDPROT    | MSISDN summary column does not match PDU                           | 2        |
| 34813629 | MGMT       | Invalid Format for Cron expression when propagated from NSP to IXP | 2        |

### Fixed in 10.4.0.4 Patch

| Bug      | Components | Title                                                                    | Severity |
|----------|------------|--------------------------------------------------------------------------|----------|
| 33400604 | MGMT       | Hourly scheduler export task is not working                              | 2        |
| 33399899 | MGMT       | Not able to de-associate enrichment from sessions created before upgrade | 2        |
| 33399819 | MGMT       | Historical KPI scenario cannot be deleted                                | 2        |

|          |         |                                                                                  |   |
|----------|---------|----------------------------------------------------------------------------------|---|
| 33399765 | MGMT    | Query created for reduced session is not visible in GUI                          | 2 |
| 33399750 | MGMT    | The Saved OPC-DPC query is not working in troubleshooting                        | 2 |
| 33399875 | MGMT    | Elements are not getting updated correctly when items in "include By" is changed | 3 |
| 33399545 | MGMT    | ftp browser export is not working after upgrade                                  | 3 |
| 33247189 | MGMT    | CCMBulkConfig export is not generating properly                                  | 3 |
| 33148045 | MGMT    | Protocol Hiding Feature not working                                              | 3 |
| 33778272 | MEDPROT | Dead thread found in SGS session                                                 | 1 |
| 33014181 | MEDSRV  | OSCS scan thirdparty jar upgrade                                                 | 3 |
| 32881000 | MGMT    | OSCS scan thirdparty jar upgrade                                                 | 3 |

### Fixed in 10.4.0.3 Patch

| Bug      | Components | Title                                                                                 | Severity |
|----------|------------|---------------------------------------------------------------------------------------|----------|
| 31941093 | MGMT       | Sync not completing for all items                                                     | 2        |
| 32772084 | MGMT       | The server timezone value is unrecognized                                             | 2        |
| 32573224 | MGMT       | "Add Condition" in Troubleshooting query xDRs is not working for hyphen ("-") values  | 2        |
| 31946971 | MGMT       | Monitoring group doesn't work properly when assoc are deleted and re-added from Eagle | 2        |
| 31945403 | MGMT       | NSP ProTrace/Troubleshooting must allow wildcard filter                               | 3        |
| 31973219 | MGMT       | Browser export creates an entry even if it is throwing error or cancelled             | 3        |
| 31975922 | MEDPROT    | Refresh timer not working for some REGISTER and OPTIONS scenarios                     | 3        |
| 31989239 | MGMT       | Username field is accepting " ' " character while creating new user in Security       | 3        |
| 32044020 | MGMT       | NSP NSP_EXPT tablespace issue                                                         | 3        |
| 32135606 | MGMT       | Error thrown in sync when assoc is deleted and re-added with different name           | 3        |
| 32144728 | MGMT       | Influx Server updation shows error                                                    | 3        |

|          |        |                                                                                                          |   |
|----------|--------|----------------------------------------------------------------------------------------------------------|---|
| 32174142 | MGMT   | ZIP export gets enables for reduced fields if user selects "first n records" or "All result"             | 3 |
| 32175465 | MGMT   | Global Configuration Backup Restore is failing due to Observability configurations                       | 3 |
| 32175498 | MGMT   | Unable to delete Datasource from Observability, when there are two sessions in KPI with the same name    | 3 |
| 31954438 | MGMT   | Wrong error message displayed for locked user after maximum failed login attempts                        | 3 |
| 31971239 | MGMT   | Pcap export limit enhancement is not updated in troubleshooting user manual.                             | 3 |
| 31973288 | MGMT   | The MGMT build number is different in Observability application as compared to other applications of PIC | 3 |
| 32552483 | MGMT   | ISUP/SIP ANSI and ITU session doesnot have traffic due to corrupted q708 and q850 files                  | 3 |
| 32151662 | MGMT   | The JMX agent is not started on NSP after the upgrade or when the server reboots                         | 3 |
| 32052299 | MGMT   | Field selection option doesnot work after we go back to previous page and come back.                     | 3 |
| 31989264 | MGMT   | Troubleshooting query name is allowing all types of string                                               | 3 |
| 31995152 | MGMT   | Sql injection and Cross-site scripting for input fields for adding Mediation Data feed                   | 3 |
| 31057328 | MEDSRV | Dataexport log files being created with only a partial name                                              | 4 |
| 32178918 | MGMT   | alert_NSP log reporting frequent logs for Influx db connection                                           | 4 |
| 32062446 | MGMT   | While creating any dfp the check box that activates the dfp is unchked                                   | 4 |
| 32135641 | MGMT   | "About" section missing in Sigtran Surveillance application                                              | 4 |
| 31433054 | MGMT   | Apply change banner for DWS server when a live filter is modified                                        | 4 |
| 31491380 | MGMT   | Event count & Alarm ID Filter allows to enter special characters in System Alarm                         | 4 |
| 32707477 | MEDSRV | Wrong database job scheduled                                                                             | 4 |

**Fixed in 10.4.0.2 Patch**

| Bug      | Components | Title                                                                                                                          | Severity |
|----------|------------|--------------------------------------------------------------------------------------------------------------------------------|----------|
| 32073497 | MEDPROT    | HTTP2 traffic parser errors due to index of compressed header blocks not matching impacting correlation                        | 2        |
| 31893212 | MGMT       | Changes in RESP_CODE values after upgrade                                                                                      | 3        |
| 31692431 | PROBED     | SR: IMF-1e high increase in data at Same time kPmiaMem_40 jumped in bytes                                                      | 3        |
| 31509797 | MGMT       | Start trace in Troubleshooting application does not contain all the related xDRs.                                              | 2        |
| 31484975 | MGMT       | One extra xDR is exported in pcap export in multi protocol tracing.                                                            | 3        |
| 31398751 | PROBED     | PMIA Kernel panic BUG: unable to handle kernel paging request                                                                  | 2        |
| 31389213 | MEDPROT    | [SIP] some scenarios which should have been Closed with OK status on receipt of BYE/200OK and invalid Conversation calculation | 3        |
| 31357388 | MGMT       | Store processes are not providing the correct Date Format on CSV files                                                         | 3        |
| 31320884 | MEDPROT    | [SIP] some CANCEL scenarios closed after 2h with Timer Expiry and displaying <error> in Conversation field                     | 3        |
| 31019051 | PROBED     | Improve or Remove TCP and SCTP truncation limit of 4000 bytes                                                                  | 3        |
| 31018835 | PROBED     | Document the TCP and SCTP truncation parameters and behavior                                                                   | 4        |
| 30379560 | MGMT       | Pie chart taking only default colour orange                                                                                    | 4        |
| 27778763 | MGMT       | System asks to delete Association from MGMT before re-discovering it                                                           | 3        |
| 25427413 | PROBED     | Unable to apply changes on IMF DbAssociation Data truncation: Incorrect datetime                                               | 3        |
| 32005739 | MGMT       | Import KPI configuration not working                                                                                           | 3        |
| 31903136 | MGMT       | Users assigned to the APP_ORAPIC_PROD_OPS profile cannot see or unlock locked accounts                                         | 2        |
| 31898886 | MGMT       | Observability: Apply change fails after deleting influxdb datasource.                                                          | 3        |
| 31903101 | MEDPROT    | OpCode support in INAP/Camel TDR Builder                                                                                       | 2        |

|          |         |                                                                                                        |   |
|----------|---------|--------------------------------------------------------------------------------------------------------|---|
| 30689091 | MEDPROT | TCAP message encapsulation                                                                             | 2 |
| 31351496 | INT_OPS | New interface (subnet) in IMF/IXP for PIC                                                              | 2 |
| 31697367 | MGMT    | ProTrace is unable to sort xDRs by Begin Time                                                          | 3 |
| 31707943 | MGMT    | Unable to add Grafana in Observability where the NSP is installed with new WebLogic Version 12.2.1.4.0 | 3 |
| 31708002 | MGMT    | Influxdb cannot be added in Observability if the Influxdb IP is same as NSP server IP                  | 3 |
| 31720687 | MEDPROT | Modify RAT Type field in PIC CSV feed for 5G NSA Transactions                                          | 2 |
| 31989517 | MEDPROT | Bad XDR builder reordering observed in SS7 MAP SM TDR                                                  | 3 |
| 31437587 | MGMT    | Major upgrade with OS installation is failing for upgrade from 10.3.x to 10.4.0                        | 2 |
| 31456363 | MGMT    | NSP pic_global_backup is not generating properly                                                       | 2 |
| 31829060 | MEDPROT | Add S6t Application ID to OCPIC Release 10.4.0.2                                                       | 2 |
| 31720597 | MGMT    | PCAP export of specific traces                                                                         | 2 |
| 30860810 | PROBED  | IMF not syncing time in DbAssociation table                                                            | 3 |
| 31904604 | MGMT    | Confirmation Dialog and Message on Grafana server deletion is not available                            | 3 |
| 31461244 | MGMT    | The apply change notification is not consistent across browser and across users.                       | 3 |
| 31412344 | MGMT    | Incorrect message for failed apply change in Observability                                             | 3 |

### Fixed in 10.4.0.1 Patch

| Bug      | Components | Title                                                                                   | Severity |
|----------|------------|-----------------------------------------------------------------------------------------|----------|
| 30725711 | MEDPROT    | SR: IMSI missing from S1_MME sessions xDRs                                              | 3        |
| 30677621 | MEDSRV     | Unable to read data warehouse configuration                                             | 3        |
| 30673538 | MEDPROT    | SIP call terminated with status code 487. Unexpected dr status and duration calculation | 3        |
| 30560231 | MGMT       | SR:Count of exported data is less compared to real data present                         | 3        |

|          |         |                                                                                                     |   |
|----------|---------|-----------------------------------------------------------------------------------------------------|---|
| 30528053 | MEDPROT | KPI store processes are not providing the correct output as configured since upgrade                | 3 |
| 30056013 | MGMT    | SR: Popup window not opening for Link details                                                       | 3 |
| 29638808 | MGMT    | Troubleshooting: number of simultaneous queries per user does not work properly for Mozilla         | 3 |
| 29034849 | MGMT    | Troubleshooting: number of simultaneous queries per user does not work properly                     | 3 |
| 31058650 | MGMT    | The Selected and Available fields are blank while creating E2E for builder "SS7 L2L3 STATS 8.0.0.2" | 2 |
| 31118785 | MGMT    | Output session name accepts all the special characters                                              | 3 |
| 30898778 | MGMT    | Deprecated ENUM Field Value in Builders are not getting removed after builder upgrade               | 3 |
| 30894550 | MGMT    | Datafeed configuration details popup is not opening                                                 | 4 |
| 30894473 | MGMT    | Tool tip for OPC/DPC filter option is not loading in Query Dialog                                   | 4 |
| 30950494 | MGMT    | Multiprotocol Call Tracing Error                                                                    | 3 |
| 31428354 | MEDSRV  | After upgrade to 10.3.0.1, PDU not loading issue for Gp_GPRS and Gn_GPRS sessions                   | 2 |
| 31313570 | MEDSRV  | Script ViewSessionFlow.sh hangs on IXP server where Influx DB is discovered                         | 3 |
| 31307440 | MGMT    | Datafeed configuration do not allow to modify once created                                          | 3 |

## Fixed in 10.4.0 Release

| Bug      | Components | Title                                                                                | Severity |
|----------|------------|--------------------------------------------------------------------------------------|----------|
| 30113480 | MGMT       | Export fails and gets aborted if it crosses 30 minutes                               | 3        |
| 29899110 | PROBED     | CS: incorrect header version being set by the fcMonitor                              | 3        |
| 29813984 | MEDSRV     | After Upgrade to PIC R10.3.0.1, All the Diameter AVP Values are Decoded as "UNKNOWN" | 3        |

|          |         |                                                                                      |   |
|----------|---------|--------------------------------------------------------------------------------------|---|
| 29813519 | MEDPROT | SS7 MAP2 TDR decoding issue, the PDUs decoded as message type =202                   | 3 |
| 29681139 | MGMT    | CS: GUI Display issue in PIC 10.3                                                    | 3 |
| 29550117 | MGMT    | SR: Limit the size of alart_NSP.log                                                  | 3 |
| 29004774 | PROBED  | CS: E_NOMEM error in IMF leads to input traffic loss                                 | 2 |
| 25427413 | PROBED  | Unable to apply changes on IMF DbAssociation<br>Data truncation: Incorrect date time | 3 |
| 28429367 | INT_OPS | SR: COR_LOG purge not working                                                        | 3 |
| 28861858 | INT_OPS | SR:ITU-SLS value under MAP session "SS7 MAP2 TDR_1.4.0" not decoding properly        | 3 |
| 29238480 | PROBED  | Integrated OCDSR PMF is not capturing traffic after installation                     | 4 |
| 29538865 | MGMT    | SR: Alarm events have Hex values even if User preference is Decimal                  | 3 |
| 28838701 | INT_OPS | SR: Escape characters incorrectly added to the query.                                | 3 |
| 29440514 | MGMT    | SR: Disable SQL Tuning Advisor from the NSP server                                   | 3 |
| 30808988 | MEDPROT | SS7 MAP Data Broker TDR 7.2.4 holds Incorrect operation resolution value             | 2 |
| 25221791 | MGMT    | SS7 Surveillance application is filling up application.log and COR_LOG               | 3 |
| 30209251 | MEDPROT | Typo in the xDR field 'TCAP ERROR' value                                             | 4 |
| 30208521 | MEDPROT | MAP Multileg builder continuously restarting                                         | 4 |
| 30088115 | MEDPROT | SR: add correlation for erroneous frames                                             | 4 |
| 30677621 | MEDSRV  | Unable to read data warehouse configuration                                          | 3 |
| 30528053 | MGMT    | KPI store processes are not providing the correct output as configured since         | 3 |
| 30056013 | MGMT    | SR: Popup window not opening for Link details                                        | 3 |

## Customer Known Bug List

| Bug      | Component | Title                                                                            | Severity | Customer Impact                                                                                                                                                                                                  | Workaround                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|----------|-----------|----------------------------------------------------------------------------------|----------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 27347747 | PROBED    | E_NOMEM error in IMF leads to input traffic drop                                 | 3        | The issue has an impact on the IMFs with less memory e.g. E5-APP-B with 8GB RAM. The fcMonitor hogs upto 60% of physical memory and during failover the system might get into in No Memory state and drops MSUs. | When E_NOMEM, error is observed in fcMonitor or eagleMonitor process traces and shl.op is showing Deny counts increasing continuously in its output, then perform the following steps: <ol style="list-style-type: none"> <li>1. Login as cfguser on IMF server</li> <li>2. Run command pm.set off fcMonitor</li> <li>3. Run command pm.set on fcMonitor</li> <li>4. Execute shl.op command to verify that Deny count in the output is not increasing.</li> <li>5. Apart from the above work around, it is recommended that FC links and associations are distributed across other spare servers if available in IMF sub-system.</li> </ol> |
| 27340452 | MGMT      | Unable to execute Historical Protraq sessions                                    | 3        | In case the issue is encountered then concerned historical KPI does not work and also the running historical KPI can't be stopped.                                                                               | If the status goes to cancelled instead of idle when you click on Stop then <ol style="list-style-type: none"> <li>1. Click the stop button again.</li> <li>2. The status will be changed back to idle.</li> </ol> Now check and verify that the session can be started.                                                                                                                                                                                                                                                                                                                                                                    |
| 29680982 | MEDSRV    | PIC 10.3.0.1 Max value of all Unsigned Datatype is not available in first window | 3        | The max value of all unsigned datatypes of the dictionary fields is not displayed in 1 <sup>st</sup> window of the XDR session in Troubleshooting Application.                                                   | Not Available.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |

|          |        |                                                          |   |                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|----------|--------|----------------------------------------------------------|---|----------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 30400051 | MGMT   | The PIC System generating TKPIC00001 alarms continuously | 4 | The PIC System generating TKPIC00001 alarms continuously | <p>Work Around.</p> <ol style="list-style-type: none"> <li>1. Edit the file <code>"/opt/TKLCjmxagent/in/agent.properties"</code> on xMF which is reporting the alarms and update the parameter <code>"Heartbeat=300"</code> to 120</li> <li>2. Restart jmxAgent process.</li> </ol>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| 30278288 | MEDSRV | Datafeed issue due to IxpStore restart(RT 20158)         | 3 | No records are fetched in the exported file.             | <p>Below is the WA to add the record in StreamHistory table:</p> <ol style="list-style-type: none"> <li>1) Get the newly added stream details from the server where the operate process is located with the below command. <pre>[cfguser@ixp0005-1d ~]\$ iqt -p StreamSubpart   grep KPI_datafeed_Test 55 K_KPI_datafeed_Test_151482 102 12/31/1969 18:00:00.000000000 [cfguser@ixp0005-1d ~]\$</pre> <p>From here we need. stream details <code>"K_KPI_datafeed_Test_151482"</code> s ubpart <code>"102"</code> and server <code>"ixp0005-1d"</code></p> </li> <li>2) Connect to Master server</li> <li>3) ivi the StreamHistory table</li> <li>4) Search and Copy the entry of any one stream related to the problematic session(this is to add the new entry in the same format) example : <pre>732 K_KPI_datafeed_Test_15112 0 31 ixp0005- 1a 1672694126031667200 0</pre> </li> <li>5) Go to end of the StreamHistory table</li> <li>6) Add a new entry with an increment to the last line number of the StreamHistory table.</li> </ol> <p>Example. The last entry in the table was 767</p> <pre>764 K_UM_IS_ISUP_v3_3152 5 ix p0005-1d 1668887088495329280 0 765 K_UM_IS_ISUP_v3_3137 43 i xp0005- 1d 1668887088495329280 0 766 K_UM_IS_ISUP_v3_3245 19</pre> |

|          |        |                                                                    |   |                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|----------|--------|--------------------------------------------------------------------|---|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|          |        |                                                                    |   |                                                                                                                                                                         | <p>2 ixp0005-1d 1668887088495329280 0767 K_UM_IS_AIN_CLG_PA_v3_150838 113 ixp0005-1d 1668887088495329280 0!!!!</p> <p>Now add a new entry with 768, with new stream details "K_KPI_datafeed_Test_151482" subpart "102" and server "ixp0005-1d" captured in step 1)</p> <p>Example :</p> <p>766 K_UM_IS_ISUP_v3_3245 192 ixp0005-1d 1668887088495329280 0768 K_KPI_datafeed_Test_151482 102 ixp0005-1d 1672697669379686400 0!!!!</p> <p>Note: All the steps needs to be opted with respect to the configurations of problematic session.</p> |
| 29532884 | MEDSRV | SR: Pool Connection Error in IXP servers                           | 3 | IxpStore process restart during the nightly job                                                                                                                         | This issue needs to be documented as known bug as Pool Connection error is due to aggressive resource utilization by some system process during maintenance window. This leaves very little resource for the OCPIC related operation, due to which the IxpStore process thread strucks.This is coming from Oracle DB.                                                                                                                                                                                                                       |
| 30460437 | MGMT   | ORA-00001: unique constraint (NSP.AK1_COR_MANAGED_OBJECT) violated | 3 | The managed object ID is not generated uniquely if the names of the KPI session are similar e.g. KPI session name 'xx_yy_zz_v3' to a new KPI session name 'xx_yy_zz_v4' | Work Around: Use the new KPI session name with multiple characters/digits (added or changed) in the existing name.                                                                                                                                                                                                                                                                                                                                                                                                                          |

|          |        |                                                                      |   |                                                    |                                                                                                                                                                                                                           |
|----------|--------|----------------------------------------------------------------------|---|----------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 32151713 | PROBED | Duplicate entries observed on PMF after upgrade or Disaster Recovery | 4 | User can get confused about the link/route status. | Work Around:<br><br>1. Edit the corresponding IDB table using ivi <table_name><br><br>2. Remove the duplicate entry against which the NodeId is 0 instead of the hostname<br><br>3. Save the table : Apply the change [y] |
|----------|--------|----------------------------------------------------------------------|---|----------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

|          |         |                                                                     |   |                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|----------|---------|---------------------------------------------------------------------|---|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|          |         |                                                                     |   |                                                                                       | TABLE for<br>mfDisp=DbMsgFeederStat.0<br><br>TABLE for<br>routDisp=DbDestStat.0                                                                                                                                                                                                                                                                                                                                                                                                                   |
| 33357071 | MGMT    | SR: Chrome and Edge Browsers are not fully compatible with PIC 10.4 | 3 | Filter icon in chrome and edge is greyed out                                          | <ul style="list-style-type: none"> <li>Disabled/Greyed the filter icon in chrome and edge as it was hampering the table display. Awaiting few of the fixes from browser.</li> <li>Filter option is compatible in Firefox browser</li> </ul> <p>Work Around:<br/>To use latest Firefox browser</p>                                                                                                                                                                                                 |
| 31656570 | MGMT    | Sigtran Servellience tables not getting updated with data           | 3 | The SIGTRAN surveillance application will not show the statistics                     | <p>Work Around: Check if the inetmerge process is running on all the IMF servers, if not then start it on all the servers in the sub-system.</p> <p>If inetmerge is running on all the servers in the sub-system in IMF then Restart the IDB on all the IMF servers in the sub-system</p> <p>As cfguser,<br/>prod.dbdown -i<br/>prod.start</p>                                                                                                                                                    |
| 33962008 | MGMT    | Sometimes the child paned is not opening                            | 3 | Sometimes the child panel does not open within the parent panel                       | <p>Workaround:</p> <p>Create and configure the child panel manually</p>                                                                                                                                                                                                                                                                                                                                                                                                                           |
| 36809211 | MGMT    | Unable to Mask the xdr/PDU columns in troubleshooting application   | 4 | User cannot be able to Mask the xDR/PDU columns Values in troubleshooting application | User can Hide that column from display in troubleshooting application. 1. User needs to enable the PDU Hiding from CCM 2. In CCM --> Mediation --> Dictionaries --> find the respective XDR and Edit the "dictionary attribute info" where you have check box option to display and mask and hide. 3. Cross the application and check respective map/ISUP etc. which you have modified and applied changes done for the masking column. with this 10.5 you cannot mask the value for that column. |
| 31190626 | MEDSERV | SSL connection is using few deprecated ciphers                      | 2 | Security Scans scowing this error                                                     | <p>No code changes required to fix this issue. After PIC installation please refer below page which explains how to resolve cipher issues<br/> <a href="https://gbuconfluence.oraclecorp.com/display/SP/OCPIC+Cipher+Scan+Analysis">https://gbuconfluence.oraclecorp.com/display/SP/OCPIC+Cipher+Scan+Analysis</a> refer to below section to remove deprecated ciphers :- 3.<br/>         Action item to remove ciphers..</p>                                                                     |

|  |      |                                                                                              |   |                                                                               |                                                                                                                                                                                                               |
|--|------|----------------------------------------------------------------------------------------------|---|-------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  | MGMT | All Configuration apps are not visible for all NSP accounts except tekelec after NSP upgrade | 1 | After upgrade from 10.4.0.4.2 to 10.4.0.4.4, NSP user account are not visible | Run the below query in NSP DB<br>select RESTRICTED_ACCESS from COR_USERS where USER_ID='tekelec';<br><br>output - S<br><br>update COR_USERS set RESTRICTED_ACCESS='X' where USER_ID='tekelec';<br><br>commit; |
|--|------|----------------------------------------------------------------------------------------------|---|-------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

# Chapter 8:

## Oracle References and Services

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**Topics:**

My Oracle Support (MOS)  
Emergency Response

This chapter describes how to obtain help, where to find related documentation, and provides other general information.

## My Oracle Support (MOS)

MOS (<https://support.oracle.com>) is your initial point of contact for all product support and training needs. A representative at Customer Access Support (CAS) can assist you with MOS registration.

Call the CAS main number at 1-800-223-1711 (toll-free in the US), or call the Oracle Support hotline for your local country from the list at <http://www.oracle.com/us/support/contact/index.html>. When calling, make the selections in the sequence shown below on the Support telephone menu:

1. Select 2 for new service request.
2. Select 3 for hardware, networking, and Solaris operating system support.
3. Select one of the following options:
  - For technical issues such as creating a new Service Request (SR), select 1.
  - For non-technical issues such as registration or assistance with MOS, select 2.

You are connected to a live agent who can assist you with MOS registration and opening a support ticket.

MOS is available 24 hours a day, 7 days a week, and 365 days a year.

## Emergency Response

In the event of a critical service situation, emergency response is offered by the Customer Access Support (CAS) main number at 1-800-223-1711 (toll-free in the US) or by calling the Oracle Support hotline for your local country from the list at <http://www.oracle.com/us/support/contact/index.html>. The emergency response provides immediate coverage, automatic escalation, and other features to ensure the critical situation is resolved as rapidly as possible.

A critical situation is defined as a problem with the installed equipment that severely affects service, traffic, or maintenance capabilities, and requires immediate corrective action. Critical situations affect service and/or system operation resulting in one or several of these situations:

- A total system failure that results in loss of all transaction processing capability
- Significant reduction in system capacity or traffic handling capability
- Loss of the system's ability to perform automatic system reconfiguration
- Inability to restart a processor or the system
- Corruption of system databases that requires service affecting corrective actions
- Loss of access for maintenance or recovery operations
- Loss of the system ability to provide any required critical or major trouble notification

Any other problem severely affecting service, capacity/traffic, billing, and maintenance capabilities may be defined as critical by prior discussion and agreement with Oracle.

# Appendix A: List of Supported protocols and Builders

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The following table identifies the protocols supported by PIC and the version of the protocol specification implemented based on the protocol family.

## SS7 Protocols

| Protocol                                 | Organization         | Complete Reference                                                                                                                            | PIC 10.2 standards                                        | Final builder                                                                   |
|------------------------------------------|----------------------|-----------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------|---------------------------------------------------------------------------------|
| <b>ISUP V1</b>                           | ITU-T                |                                                                                                                                               |                                                           | see ISUP V3                                                                     |
| <b>ISUP V2</b>                           | ITU-T                |                                                                                                                                               |                                                           | see ISUP V3                                                                     |
| <b>ISUP V3</b>                           | ITU-T                | Signaling system N°7 - ISDN user part formats and codes                                                                                       | Q.763 / Sept_97 (Q.761 to Q.764, Q.766 and Q.767)         | SS7IsupEtsiCdr<br>SS7IsupEtsiSudrAccounting<br>Ss7IsupEtsiSuperCdr<br>SS7UMSudr |
| <b>BT NUP (UK)</b>                       | National UK BT       | BT Network Requirement                                                                                                                        | BTNR 167 Jul-87                                           | SS7BtntpCdr                                                                     |
| <b>ISUP ANSI</b>                         | ANSI                 | Signaling System N°7 (SS7) - Integrated Services Digital Network (ISDN) User Part                                                             | T1.113-1995 Jun-05                                        | SS7IsupAnsiCdr<br>Ss7IsupAnsiSentinelCdr<br>SS7UMSudr                           |
| <b>Party Information Parameter (PIP)</b> |                      | Calling Party Name Convention Facility Specification                                                                                          | TICO076E Feb-98                                           |                                                                                 |
| <b>ISUP Chinese</b>                      |                      | ETSI ISUP support with 24 bits OPC/DPC                                                                                                        |                                                           | see ISUP V3                                                                     |
| <b>ISUP Russian Variant (Sovintel)</b>   | National             | CIS ISUP - Functional Description                                                                                                             | CIS ISUP - Functional Description                         | see ISUP V3                                                                     |
| <b>ISUP Portuguese Variant (NOVIS)</b>   | National Portugal PT | ESPECIFICAÇÃO DE INTERFACE COM A REDE PÚBLICA INTERFACE DE COMUTADOR (2 Mbit/s) Sinalização Canal Comum SS#7 - Procedimento de taxaço em ISUP | Spécifications PT - Procedimento de taxaço em ISUP Apr-99 | see ISUP V3                                                                     |
| <b>ISUP Brazilian Variant</b>            | TELEBRAS             | #7 Common Channel Signaling System ISDN User part - ISUP, Issue 3                                                                             | TB 220-250-732 Apr-98                                     | see ISUP V3                                                                     |

|                                      |                               |                                                                                                |                                                   |                                                             |
|--------------------------------------|-------------------------------|------------------------------------------------------------------------------------------------|---------------------------------------------------|-------------------------------------------------------------|
| <b>ISUP Colombian Variant</b>        | Ministerio des Comunicaciones | Norma Nacional de Señalización por Canal Comun N.º7 - SCC7                                     | Norma Nacional Apr-98                             | see ISUP V3                                                 |
| <b>ISUP Mexican Variant</b>          | Telmex                        | E-801.04 Sepcification - Integrated Services Digital Network user Part (ISUP), Edition "C-3"   | E-801.04 Dec-97                                   | see ISUP V3                                                 |
| <b>ISUP Argentina variant</b>        | Telefonica Argentina          | RDSI User Part Specification Signaling System N°7                                              | General Specification AR.EG.s1.002 Ed 1 corrected | see ISUP V3                                                 |
| <b>Cisco E-ISUP</b>                  | Cisco                         | EISUP Specification - Cisco Systems                                                            | Cisco ENG-46168 Release 44                        | SS7_EISUP_CDR                                               |
|                                      | IETF                          | Reliable UDP Protocol                                                                          | draft-ietf-sigtran-reliable-udp-00.txt Feb-1999   |                                                             |
| <b>LSSU</b>                          | ITU-T                         | Signaling link                                                                                 | Q.703 Jul-96                                      |                                                             |
| <b>MTP ITU-T Level 2 &amp; 3</b>     | ITU-T                         | Functional description of the Message Transfer Part (MTP) of Signaling System No. 7            | Q.701 Mar-93                                      | SS7L2L3EtsiSudr<br>SS7Q752EtsiStats                         |
|                                      |                               | Signaling link                                                                                 | Q.703 / Q.704 Jul-96                              |                                                             |
| <b>MTP ANSI Level 2 &amp; 3</b>      | ANSI                          | Signaling System N°7 - Message Transfer Part (MTP)                                             | T1.111-1996 Mar-96                                | SS7L2L3AnsiSudr                                             |
| <b>SCCP ITU-T</b>                    | ITU-T                         | Signaling connection control part formats and codes                                            | Q.713 Jul-96                                      | Ss7SccpSuaSudr                                              |
| <b>SCCP ANSI</b>                     | ANSI                          | Signaling System Number 7 - Signaling Connection Control Part (SCCP)                           | T1.112-1996 Jan-96                                | Ss7SccpSuaSudr                                              |
| <b>TCAP (MAP &amp; INAP support)</b> | ITU-T                         | Transaction capabilities formats and encoding                                                  | Q.773 Jun-97                                      |                                                             |
| <b>TCAP (IS-41 support)</b>          | ANSI                          | Signaling System Number 7 (SS7) - Transaction Capabilities Application Part (TCAP)             | T1.114-1996 Mar-96                                |                                                             |
|                                      | ANSI                          | Signaling System Number 7 (SS7) - Transaction Capabilities Application Part (TCAP)             | T1.114-2000 Jun-00                                |                                                             |
| <b>INAP Siemens</b>                  | Specific: Siemens             | Siemens Core INAP                                                                              | P30308-A7128-A120-01-7659 May-98                  | SS7InapSudrAccounting<br>SS7InapTdr<br>SS7_INAP_Compact_TDR |
| <b>INAP CS1</b>                      | ETSI                          | Intelligent Network (IN); Intelligent Network Capability Set 1 (CS1); Core Intelligent Network | ETS 300 374-1 Sep-94                              | SS7InapSudrAccounting<br>SS7InapTdr<br>SS7_INAP_Compact_TDR |

|                                   |          |                                                                                                                                                                                         |                                                  |                                                             |
|-----------------------------------|----------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------|-------------------------------------------------------------|
|                                   |          | Application Protocol (INAP);                                                                                                                                                            |                                                  |                                                             |
|                                   | ITU-T    | Introduction to intelligent network capability set 1                                                                                                                                    | ITU-T Q.1211<br><i>Mar-93</i>                    |                                                             |
|                                   | ITU-T    | Distributed functional plane for intelligent network CS-1                                                                                                                               | ITU-T Q.1214<br><i>Oct-95</i>                    |                                                             |
|                                   | ITU-T    | Interface Recommendation for intelligent network CS-1                                                                                                                                   | ITU-T Q.1218<br><i>Oct-95</i>                    |                                                             |
| <b>INAP CS2</b>                   | ITU-T    | Intelligent Network (IN); Intelligent Network Application Protocol (INAP); Capability Set 2 (CS2)                                                                                       | ETS 301 140-1<br><i>Jun-96</i>                   | SS7InapSudrAccounting<br>SS7InapTdr<br>SS7_INAP_Compact_TDR |
| <b>INAP Ericsson CS1</b>          | Ericsson | ERICSSON SUPPORT OF ETSI CORE INAP CS1<br>Ericsson Support of ETSI Core INAP CS1                                                                                                        | 87/155-CRT 249 12 Uen<br><i>May-98</i>           | SS7InapSudrAccounting<br>SS7InapTdr<br>SS7_INAP_Compact_TDR |
| <b>INAP Ericsson CS1+</b>         | Ericsson | Ericsson INAP CS1+, Services assumed from TCAP, revision A                                                                                                                              | 4/155 17-CRT 249 09 Uen<br><i>Aug-96</i>         | SS7InapSudrAccounting<br>SS7InapTdr<br>SS7_INAP_Compact_TDR |
|                                   |          | Ericsson INAP CS1+, Abstract Synthax, revision B                                                                                                                                        | 171/155 17-CRT 249 12 Uen<br><i>Jun-03</i>       |                                                             |
| <b>INAP Ericsson V2 / V3 / V4</b> | Ericsson | Ericsson's Protocol for Intelligent Networks, version 4, Formats and Codes                                                                                                              | 2/155 17-CRT 249 01 Uen D (V2)<br><i>Jan-96</i>  | SS7InapSudrAccounting<br>SS7InapTdr<br>SS7_INAP_Compact_TDR |
|                                   |          |                                                                                                                                                                                         | 7/155 17-CRT 249 01 Uen B (V3)<br><i>Jan-97</i>  |                                                             |
|                                   |          |                                                                                                                                                                                         | 12/155 17-CRT 249 01 Uen A (V4)<br><i>Jan-98</i> |                                                             |
| <b>INAP Alcatel V3</b>            | Alcatel  | INAP for E10 Version 3                                                                                                                                                                  | ALCATEL E10 Version 3<br><i>Sep-96</i>           | SS7InapSudrAccounting<br>SS7InapTdr<br>SS7_INAP_Compact_TDR |
| <b>INAP Alcatel V4</b>            | Alcatel  | INAP for E10 Version 5                                                                                                                                                                  | ALCATEL E10 Version 5<br><i>Jan-99</i>           | SS7InapSudrAccounting<br>SS7InapTdr<br>SS7_INAP_Compact_TDR |
| <b>INAP Alcatel CS1</b>           | Alcatel  | INAP Alcatel CS1                                                                                                                                                                        | ALCATEL INAP CS1                                 | SS7InapSudrAccounting<br>SS7InapTdr<br>SS7_INAP_Compact_TDR |
| <b>CAMEL Phase 2</b>              | ETSI     | Digital cellular telecommunications system (Phase 2+); Customised Applications for Mobile network Enhanced Logic (CAMEL); CAMEL Application Part (CAP) specification - <b>GSM 09.78</b> | TS 101 046 V7.0.0 (Release 98)<br><i>Aug-99</i>  | SS7InapSudrAccounting<br>SS7InapTdr<br>SS7_INAP_Compact_TDR |

|                                    |      |                                                                                                                                                                                                                                            |                                                        |                                                              |
|------------------------------------|------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------|--------------------------------------------------------------|
| <b>CAMEL Phase 3</b>               | ETSI | Digital cellular telecommunications system (Phase 2+); Universal Mobile Telecommunications System (UMTS); Customized Applications for Mobile network Enhanced Logic (CAMEL); CAMEL Application Part (CAP) specification - <b>GSM 29.78</b> | TS 129 078<br>V5.9.0<br>(Release 5)<br><i>Sep-04</i>   | SS7InapSudrAccounting<br>SS7InapTdr<br>SS7_INAP_Compact_TDR  |
| <b>CAMEL Phase 4</b>               | ETSI | Digital cellular telecommunications system (Phase 2+); Universal Mobile Telecommunications System (UMTS); Customized Applications for Mobile network Enhanced Logic (CAMEL); CAMEL Application Part (CAP) specification - <b>GSM 29.78</b> | TS 129 078<br>V6.5.0<br>(Release 6)<br><i>Jun-06</i>   | SS7InapSudrAccounting<br>SS7InapTdr<br>SS7_INAP_Compact_TDR  |
| <b>BSSAP (Phase 2+)<br/>BSSMAP</b> | ETSI | Digital cellular telecommunications system (Phase 2+); Mobile-services Switching Centre – Base Station System (MSC – BSS) interface; Layer 3 specification - <b>3GPP TS 08.08</b>                                                          | TS 48.008<br>V12.0.0<br>(Release 12)<br><i>Sept-14</i> | RanCC2Cdr<br>RanMMTdr<br>RanSMSTdr<br>RanUSSD<br>SS7BssapTdr |
| <b>DTAP</b>                        |      | Digital cellular telecommunications system (Phase 2+); Mobile Radio Interface; Layer 3 specification - <b>3GPP TS 04.08</b>                                                                                                                | TS 24.008<br>V12.7.0<br>(Release 12)<br><i>Sept-14</i> |                                                              |
| <b>SMS</b>                         |      | Digital cellular telecommunications system (Phase 2+); Point-to-Point (PP) Short message Service support on mobile radio interface - <b>3GPP TS 04.11</b>                                                                                  | TS 24.011<br>V12.0.0<br>(Release 12)<br><i>Sept-14</i> |                                                              |
| <b>SMS SM-TP</b>                   |      | Digital cellular telecommunications system (Phase 2+); Technical realization of the short Message Service (SMS) - <b>3GPP TS 03.40</b>                                                                                                     | TS 23.040<br>V12.2.0<br>(Release 12)<br><i>Dec-14</i>  |                                                              |
| <b>Supplementary Services</b>      |      | Digital cellular telecommunications system (Phase 2+); Mobile Radio interface layer 3 supplementary service specification; Formats and Coding - <b>3GPP TS 04.80</b>                                                                       | TS 24.080<br>V12.0.0<br>(Release 12)<br><i>Sept-14</i> |                                                              |
| <b>BSSAP+ (Gs Interface)</b>       | ETSI | Digital Cellular Telecommunications System (Phase 2+);                                                                                                                                                                                     | TS 29.018<br>V6.5.0                                    | Ss7GsInterfaceTdr                                            |

|                                                                       |                                         |                                                                                                                                                                                                                        |                                                     |                                                                                                                                       |
|-----------------------------------------------------------------------|-----------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------|
|                                                                       |                                         | Universal Mobile Telecommunications System (UMTS); general Packet radio Service (GPRS); Serving GPRS Support Node (SGSN) - Visitor Location register (VLR); Gs Interface layer 3 Specification - <b>3GPP TS 29.018</b> | (Release 6)<br><i>Dec-06</i>                        |                                                                                                                                       |
| <b>GSM MAP</b>                                                        | ETSI                                    | Digital cellular telecommunications system (Phase 2+); Universal Mobile Telecommunications System (UMTS); Mobile Application Part (MAP) specification - <b>3GPP TS 29.002</b>                                          | TS 29.002<br>V12.6.0<br>(Release 12)<br><br>Sept-14 | Ss7HLRVtdr<br>SS7MapTdr<br>SS7MapSudrAccounting<br>SS7MapSmTdr<br>SS7MapMultiLegTdr<br>SS7MapDB<br>SS7Smdr<br><br>SS7_MAP_Compact_TDR |
| <b>IS-41 Révisions B, C, D &amp; E (MAP)</b>                          | ANSI                                    | Cellular Radiotelecommunications Intersystem Operations                                                                                                                                                                | ANSI/TIA/EIA-41-D-1997<br><i>Nov-97</i>             | SS7IS41DB<br>SS7IS41DE<br>SS7IS41Tdr                                                                                                  |
| <b>MEID</b>                                                           | 3GPP2                                   | 3G Mobile Equipment identifier (MEID) - Stage 1                                                                                                                                                                        | 3GPP2<br>S.R0048-A<br>Ver 4.0<br><i>Jun-05</i>      |                                                                                                                                       |
|                                                                       | Telecommunications Industry Association | MEID Standards Update, version 1.8.4                                                                                                                                                                                   | TIA-MEID<br><i>Apr-06</i>                           |                                                                                                                                       |
| <b>IS-41-P</b>                                                        | Lucent                                  | ANSI -41 Protocol Extensions for Interfaces C and D (HLR - VLR/MSC) - Issue 2.0                                                                                                                                        | IS-41-P<br><i>Nov-04</i>                            |                                                                                                                                       |
| <b>IS-41-EE</b>                                                       | Ericsson                                | IS-41 Intersystem Call delivery Signaling                                                                                                                                                                              | IS-41-EE<br><i>Jan-99</i>                           |                                                                                                                                       |
| <b>ISDN over IUA</b>                                                  | ITU-T                                   | ISDN user-network interface layer 3 specification for basic call control                                                                                                                                               | Q.931<br><i>May-98</i>                              | VoIP_Q_931_Cdr                                                                                                                        |
| <b>AIN</b>                                                            |                                         |                                                                                                                                                                                                                        |                                                     | SS7AinTdr                                                                                                                             |
| <b>MTP ANSI Level 2 &amp; 3</b>                                       | ANSI                                    | Signaling System N°7 - Message Transfer Part (MTP)                                                                                                                                                                     | T1.111-1996<br><i>Mar-96</i>                        |                                                                                                                                       |
| <b>SCCP ANSI</b>                                                      | ANSI                                    | Signaling System Number 7 - Signaling Connection Control Part (SCCP)                                                                                                                                                   | T1.112-1996<br><i>Jan-96</i>                        |                                                                                                                                       |
| <b>TCAP (IS-41 support)</b>                                           | ANSI                                    | Signaling System Number 7 (SS7) - Transaction Capabilities Application Part (TCAP)                                                                                                                                     | T1.114-2000<br><i>Jun-00</i>                        |                                                                                                                                       |
| <b>Services - CNAM - ATF - NS 800 - LNP - Flexible Number Routing</b> | Telcordia                               | Telcordia Technologies Generic Requirements, GR-1188-CORE: Calling Name Delivery Generic Requirements, Issue 2                                                                                                         | GR-1188-CORE<br><i>Dec-00</i>                       |                                                                                                                                       |
|                                                                       | Telcordia                               | Telcordia Technologies Generic Requirements, GR-533-CORE: Databases Services Service Switching Points - Toll-Free Service                                                                                              | GR-533-CORE<br><i>Jun-01</i>                        |                                                                                                                                       |

|              |           |                                                                                                                                                                                       |                        |             |
|--------------|-----------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------|-------------|
|              |           | Generic Requirements, Issue 2                                                                                                                                                         |                        |             |
|              | Telcordia | Telcordia Technologies Generic Requirements, GR-1299-CORE: Switch - Service Control Point (SCP) / Adjunct Interface Generic requirements, Issue 6                                     | GR-1299-CORE<br>Nov-00 |             |
|              | Telcordia | Telcordia Technologies Generic Requirements, GR-1519-CORE: CCS Network Interface Specification (CCSNIS) Supporting TR-NWT-001188 Calling Name Delivery Generic Requirements, Issue 1A | GR-1519-CORE<br>Oct-94 |             |
|              | Telcordia | Telcordia Technologies Generic Requirements, GR-2982-CORE: Local Number LNP Capability, Issue 1                                                                                       | GR-2982-CORE<br>Dec-97 |             |
|              | Telcordia | Telcordia Technologies Generic Requirements, GR-246-CORE: Specification of Signaling System Number 7, Issue 5                                                                         | GR-246-CORE<br>Dec-00  |             |
|              | Telcordia | Telcordia Technologies Generic Requirements, GR-2892-CORE: Switching and Signaling Generic Requirements for Toll-Free Service using AIN, Issue 1                                      | GR-2892-CORE<br>Apr-95 |             |
| <b>LIDB</b>  | Telcordia | Telcordia Technologies Generic Requirements, GR-1158-CORE : OSSGR Section 22.3: Line Information Database, Issue 4                                                                    | GR-1158-CORE<br>Dec-00 | SS7LidbTdr  |
|              |           | Telcordia Technologies Generic Requirements, GR-1149-CORE - OSSGR Section 10: System Interfaces, Issue 6                                                                              | GR-1149-CORE<br>Sep-06 |             |
| <b>CLASS</b> | Telcordia | Telcordia Technologies Generic Requirements, GR-1188-CORE: Calling Name Delivery Generic Requirements, Issue 2                                                                        | GR-1188-CORE<br>Dec-00 | SS7ClassTdr |
|              |           | Telcordia Technologies Generic Requirements, GR-215-CORE: LSSGR: CLASS Feature: Automatic Callback (FSD 01-02-1250), Issue 2                                                          | GR-215-CORE<br>Apr-02  |             |
|              |           | Telcordia Technologies Generic Requirements, GR-220-CORE: LSSGR: CLASS Feature:                                                                                                       | GR-220-CORE<br>Apr-02  |             |

|                     |                                         |                                                                                                                            |                                          |                  |
|---------------------|-----------------------------------------|----------------------------------------------------------------------------------------------------------------------------|------------------------------------------|------------------|
|                     |                                         | Screening List Editing (FSD 30-28-0000), Issue 2                                                                           |                                          |                  |
|                     |                                         | Telcordia Technologies Generic Requirements, GR-227-CORE: LSSGR: CLASS Feature: Automatic Recall (FSD 01-02-1260), Issue 2 | GR-227-CORE<br><i>Apr-02</i>             |                  |
| <b>WIN Services</b> | Telcordia                               | Wireless Intelligent Network                                                                                               | EIA/TIA IS-771<br><i>Jul-99</i>          | SS7WinServiceTdr |
| <b>IS-771</b>       | Telcordia                               | Wireless Intelligent Network - Addendum 1                                                                                  | EIA/TIA IS-771<br><i>Aug-01</i>          |                  |
|                     | Telcordia                               | Cellular Radio telecommunications intersystem Operations, Revision B to E                                                  | EIS/TIA IS-41<br><i>Nov-97</i>           |                  |
|                     | 3GPP2                                   | Win Phase 1, Version 1.0                                                                                                   | 3GPP2 N.S0013-0<br><i>Dec-98</i>         |                  |
|                     | 3GPP2                                   | Win Phase 2, Version 1.0                                                                                                   | 3GPP2 N.S0004-0<br><i>Apr-01</i>         |                  |
|                     | 3GPP2                                   | ANSI -41-D Miscellaneous Enhancements, Version 1.0.0, Revision 0                                                           | 3GPP2 N.S0015<br><i>Jan-00</i>           |                  |
| <b>IS-826</b>       | Telcordia                               | Wireless Intelligent Network Capabilities for pre-paid Charging                                                            | TIA/EIA/IS-826 (1 to 7)<br><i>Aug-00</i> |                  |
| <b>J-STD-036B</b>   | ANSI                                    | Enhanced Wireless SP-3-3890-RV2 9-1-1 Phase II                                                                             | J-STD-036-B<br><i>Jan-08</i>             |                  |
| <b>IS-843</b>       | Telecommunications Industry Association | Wireless Intelligent network Support for Location Based Services                                                           | TIA-843<br><i>Aug-04</i>                 |                  |
| <b>IS-801</b>       | Telecommunications Industry Association | Position Determination Service for cdma2000 Spread Spectrum Systems                                                        | TIA-801-A<br><i>Apr-04</i>               |                  |
| <b>IS-881</b>       | Telecommunications Industry Association | TIA/EIA-41-D Location Services Enhancements                                                                                | TIA-881<br><i>Mar-04</i>                 |                  |
| <b>IS-725</b>       | Nortel                                  | TIA/EIA-41-D Enhancements for Over-The-Air Service Provisioning (OTASP) & Parameter Administration (OTAPA), Version 1      | TIA/EIA/IS-725-A<br><i>Mar-99</i>        |                  |
| <b>IS-764</b>       | Telecommunications Industry Association | TIA/EIA-41-D Enhancements for Wireless Calling Name - Feature Descriptions                                                 | TIA-764<br><i>Jan-02</i>                 |                  |
| <b>IS-756</b>       | Telcordia                               | TIA/EIA-41-D Enhancements for Wireless Number Portability Phase II                                                         | TIA/EIA/IS-756-A<br><i>Dec-98</i>        |                  |

|                  |       |                                                                                                                        |                                                                      |                                                                                                                                                                                           |
|------------------|-------|------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>BICC ETSI</b> | ITU-T | Bearer Independent Call Control protocol                                                                               | Q.1901<br><i>Apr-02</i>                                              | Ss7BICCetsiCdr                                                                                                                                                                            |
|                  |       | Signaling System N°7 - ISDN User Part                                                                                  | Q.763<br><i>Sep-97</i><br>(Q.761 to Q.764, Q.766 and Q.767)          |                                                                                                                                                                                           |
| <b>BICC ANSI</b> | ANSI  | Specifications of the Bearer Independent Call Control                                                                  | ANSI<br>T1.BICC.1-2000 to<br>ANSI<br>T1.BICC.7-2000<br><i>Jan-00</i> | Ss7BICCAnsiCdr                                                                                                                                                                            |
| <b>SIGTRAN</b>   | IETF  | <b>Support only for ISUP Family<br/>Planned for MAP, INAP and IS-41</b>                                                |                                                                      | IPSctpStats<br>IPSctpSudr<br>SS7M2paStats<br>SS7M2PaSudr<br>Ss7M2uaStats<br>Ss7M2uaSudr<br>SS7M3uaStats<br>Ss7M3uaSudr<br>Ss7SccpSuaSudr<br>Ss7SuaStats<br><br>SS7_SIGTRAN_Transport_SUDR |
| <b>SCTP</b>      |       | Stream Control Transmission Protocol . Used as support for SIGTRAN                                                     | RFC 2960<br><i>Oct-00</i>                                            |                                                                                                                                                                                           |
| <b>M3UA</b>      |       | Signaling System 7 (SS7) Message Transfer Part 3 (MTP3) - User Adaptation Layer (M3UA). SUDR & Statistics              | RFC 4666<br><i>Sep-06</i>                                            |                                                                                                                                                                                           |
| <b>M2UA</b>      |       | Signaling System 7 (SS7) Message Transfer Part 2 (MTP2) - User Adaptation Layer                                        | RFC 3331<br><i>Sep-02</i>                                            |                                                                                                                                                                                           |
| <b>SUA</b>       |       | Signaling Connection Control Part User Adaptation Layer (SUA)                                                          | RFC 3868<br><i>Oct-04</i>                                            |                                                                                                                                                                                           |
| <b>M2PA</b>      |       | Signaling System 7 (SS7) Message Transfer Part 2 (MTP2) - User Peer-to-Peer Adaptation Layer (M2PA). SUDR & Statistics | RFC 4165<br><i>Sep-05</i>                                            |                                                                                                                                                                                           |

## GPRS/IP Protocols

| Protocol                | Organization | Complete Reference                                                                                                                                                              | PIC 10.2 Standards                              | Final Builder                                         |
|-------------------------|--------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------|-------------------------------------------------------|
| <b>GPRS Gn &amp; Gp</b> | ETSI         | Digital cellular telecommunications system (Phase 2+); General Packet Radio Service (GPRS); GPRS Tunneling Protocol (GTP) across the Gn and Gp Interface - <b>3GPP TS 09.60</b> | TS 101 347 V7.8.0 (Release 98)<br><i>Sep-01</i> | GprsGnGpCdr<br>GprsGnGpTdr<br>IP_Sessions_summary_TDR |

|  |  |                                                                                                                                                                                                                                    |                                           |  |
|--|--|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------|--|
|  |  | Digital cellular telecommunications system (Phase 2+); Universal Mobile Telecommunications System (UMTS); General Packet Radio Service (GPRS); GPRS Tunneling Protocol (GTP) across the Gn and Gp Interface - <b>3GPP TS 09.60</b> | TS 29.060 V12.6.0 (Release 12)<br>Sept-14 |  |
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## GPRS Protocols

| Protocol                                                        | Organization | Complete Reference                                                                                                                                                                                                    | PIC 10.2 Standards                      | Final Builder |
|-----------------------------------------------------------------|--------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------|---------------|
| <b>GPRS Gb</b>                                                  |              |                                                                                                                                                                                                                       |                                         | GprsGbTdr     |
| Network Service (NS)                                            | ETSI         | Digital cellular telecommunications system (Phase 2+); General Packet Radio Service (GPRS); Base Station System (BSS) - Serving GPRS Support Node (SGSN) Interface; Network Service - <b>3GPP TS 48.016</b>           | TS 48.016 V7.4.0 (Release 7)<br>Mar-08  |               |
| <b>BSS GPRS Protocol (BSSGP)</b>                                | ETSI         | Digital cellular telecommunications system (Phase 2+); General Packet Radio Service (GPRS); Base Station System (BSS) - Serving GPRS Support Node (SGSN) Interface; BSS GPRS Protocol (BSSGP) - <b>3GPP TS 48.018</b> | TS 48.018 V7.13.0 (Release 7)<br>Dec-09 |               |
| <b>Logical Link Control (LLC)</b>                               | ETSI         | Digital cellular telecommunications system (Phase 2+); General Packet Radio Service (GPRS); Mobile Station - Serving GPRS Support Node (MS - SGSN) Logical Link Control Layer (LLC) - <b>3GPP TS 04.64</b>            | TS 44.064 V7.3.0 (Release 7)<br>Mar-08  |               |
| GPRS Mobility Management (GMM)<br>GPRS Session Management (GSM) | ETSI         | Digital cellular telecommunications system (Phase 2+)(GSM); Mobile Radio Interface; Layer 3 Specification - <b>3GPP TS 04.08</b>                                                                                      | TS 24.008 V7.12.0 (Release 7)<br>Jun-08 |               |

|                                    |      |                                                                                                                                                                                                                                                                                                                               |                                                                                            |                                  |
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| <b>SNDP</b>                        | ETSI | Digital cellular telecommunications system (Phase 2+); General Packet Radio Service (GPRS); Mobile Station - Serving GPRS Support Node (MS - SGSN); Subnetwork Dependent Convergence Protocol (SNDP) - <b>3GPP TS 04.65</b>                                                                                                   | TS 24.065 V7.0.0<br>(Release 7)<br>Dec-06                                                  |                                  |
| <b>Short Message Service (SMS)</b> | ETSI | Digital cellular telecommunications system (Phase 2+); Point-to-Point (PP) Short Message service (SMS) Support on Mobile Radio Interface - <b>3GPP TS 04.11</b><br><br>Digital cellular telecommunications system (Phase 2+); Technical realization of Short Message Service (SMS) Point-to-Point (PP) - <b>3GPP TS 03.40</b> | TS 24.011 V7.1.0<br>(Release 7)<br>Jun-09<br><br>TS 23.040 V7.2.0<br>(Release 7)<br>Mar-09 |                                  |
| <b>GPRS Gr &amp; Gd</b>            | ETSI | Digital cellular telecommunications system (Phase 2+); Universal Mobile Telecommunications System (UMTS); Mobile Application Part (MAP) specification - <b>3GPP TS 29.002</b>                                                                                                                                                 | TS 29.002 V12.6.0<br>(Release 12)<br>Sept-14                                               | SS7MapTdr<br>SS7_MAP_Compact_TDR |

## IP Protocol

| Protocol   | Organization | Complete Reference                     | PIC 10.2 Standards                                                                                                                                                                                  | Final Builder |
|------------|--------------|----------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|
| <b>DNS</b> | IETF         | Domain Names - Concepts and Facilities | RFC 1034<br>Nov-87<br><br>Not relevant or supported: RFC1101, RFC1183, RFC1348, RFC1876, RFC1982, RFC2065, RFC2181, RFC2308, RFC2535, RFC4033, RFC4034, RFC4035, RFC4343, RFC4035, RFC4592, RFC5936 | IpDnsTdr      |

|                 |                 |                                                                 |                                                                                                                                                                                                                                                                  |                                |
|-----------------|-----------------|-----------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------|
|                 |                 | Domain Names - Implementation and Specification                 | RFC 1035<br><i>Nov-87</i><br><br>Not relevant or supported: RFC1101, RFC1183, RFC1348, RFC1876, RFC1982, RFC1995, RFC1996, RFC2065, RFC2136, RFC2181, RFC2137, RFC2308, RFC2535, RFC2845, RFC3425, RFC3658, RFC4033, RFC4034, RFC4035, RFC4343, RFC5936, RFC5966 |                                |
| <b>DNS ENUM</b> | IETF            | E.164 Number and DNS                                            | RFC 2916<br><i>Sep-00</i>                                                                                                                                                                                                                                        | IpDnsEnumTdr                   |
| <b>RADIUS</b>   | IETF            | Remote Authentication Dial In User Service (RADIUS)             | RFC 2865<br><i>Jun-00</i><br><br>RFC2866<br><i>Jun-00</i><br><br>Not relevant or supported:<br>RFC2868, RFC3575, RFC5080                                                                                                                                         | IpRadius                       |
| <b>DHCP</b>     |                 |                                                                 |                                                                                                                                                                                                                                                                  | IpDhcpTdr                      |
| <b>BOOTP</b>    | IETF            | Bootstrap protocol (BOOTP)                                      | RFC 951<br><i>Sep-85</i><br><br>Not relevant or supported: RFC1395, RFC1497, RFC1532, RFC1542, RFC5494                                                                                                                                                           |                                |
| <b>DHCP</b>     | IETF            | Dynamic Host Configuration Protocol                             | RFC 2131<br><i>May-97</i><br><br>Not relevant or supported: RFC3396, RFC4361, RFC5494                                                                                                                                                                            |                                |
| <b>WAP</b>      |                 |                                                                 |                                                                                                                                                                                                                                                                  | IpWapv1Tdr                     |
| <b>WTP</b>      | WAP Forum / OMA | Wireless Transaction protocol                                   | WAP-224-WTP-20010710-a<br><i>Jul-01</i>                                                                                                                                                                                                                          |                                |
| <b>WSP</b>      | WAP Forum / OMA | WAP - Wireless Session Protocol Specification                   | WAP-230-WSP-20010705-p<br><i>Jul-01</i>                                                                                                                                                                                                                          |                                |
| <b>MMS</b>      | OMA             | Multimedia Messaging Service Encapsulation Protocol Version 1.1 | OMA-MMS-ENC-v1_1-20021030-C<br><i>Oct-02</i>                                                                                                                                                                                                                     | IpMmsWapv1Tdr<br>IpMmsWapv2Tdr |
| <b>HTTP</b>     | IETF            | Hypertext Transfer Protocol - HTTP/1.1                          | RFC 2616<br><i>Jun-99</i><br><br>Not relevant or supported: RFC2817, RFC5785, RFC6266                                                                                                                                                                            | IpHttpTdr                      |

|              |                 |                                                                |                                                                                                        |                |
|--------------|-----------------|----------------------------------------------------------------|--------------------------------------------------------------------------------------------------------|----------------|
| <b>HTTP2</b> | IETF            | Hypertext Transfer Protocol - HTTP/2                           | RFC 7540, 7541                                                                                         | EvolvedHttpTdr |
| <b>WAP2</b>  | IETF            | Hypertext Transfer Protocol - HTTP/1.1                         | RFC 2616<br><i>Jun-99</i><br><br>Not relevant or supported: RFC2817, RFC5785, RFC6266                  | IpWapv2Tdr     |
|              | WAP Forum / OMA | WAP Architecture                                               | WAP-210-WAPArch-20010712<br><i>Jul-01</i>                                                              |                |
| <b>POP3</b>  | IETF            | Post Office protocol - Version 3                               | RFC 1460<br><i>Jun-93</i>                                                                              | IpPop3Tdr      |
| <b>SMTP</b>  | IETF            | Simple Mail Transfer Protocol                                  | RFC 2821<br><i>Apr-01</i>                                                                              | IpSmtptdr      |
| <b>IMAP4</b> | IETF            | Internet Message Access Protocol - Version 4rev1               | RFC 2060<br><i>Mar-03</i>                                                                              | IpImap4Tdr     |
| <b>FTP</b>   | IETF            | File Transfer Protocol                                         | RFC 959<br><i>Oct-85</i><br><br>Not relevant or supported: RFC2228, RFC2640, RFC2773, RFC3659, RFC5797 | IpFtpTdr       |
| <b>TCP</b>   | IETF            | Transmission Control Protocol                                  | RFC 793<br><i>Sep-81</i><br><br>Not relevant or supported: RFC1122, RFC3168, RFC6093                   | IpTcpCdr       |
| <b>RTSP</b>  | IETF            | Real Time Streaming Protocol (RTSP)                            | RFC 2326<br><i>Apr-98</i>                                                                              | IpRtspTdr      |
|              | IETF            | SDP:Session Description Protocol                               | RFC 2327<br><i>Apr-98</i>                                                                              |                |
| <b>SMPP</b>  | SMS Forum       | Short Message Peer-to-Peer protocol Specification, Version 5.0 | SMPP v5.0<br><i>Feb-03</i>                                                                             | IpSmppTdr      |
| <b>UCP</b>   | Logica CMG      | Short Message Service center; EMI - UCP Interface 4.6          | EMI UCP Interface<br><i>May-05</i>                                                                     | IpUcpTdr       |

## UMTS Protocol

| Protocol                                                                 | Organization | Complete Reference                                                                         | PIC 10.2 Standards                           | Final Builder                                                         |
|--------------------------------------------------------------------------|--------------|--------------------------------------------------------------------------------------------|----------------------------------------------|-----------------------------------------------------------------------|
| <b>UMTS</b>                                                              |              |                                                                                            |                                              |                                                                       |
| <b>Iu-CS Control Plane over IP</b><br><b>Iu-PS Control Plane over IP</b> |              | Universal Mobile Telecommunications System (UMTS); UTRAN Iu interface Radio Access Network | TS 25.413 V12.3.0 (Release 12)<br><br>Dec-14 | Ran_CC2_Cdr<br>Ran_MM_Tdr<br>Ran_SMS_Tdr<br>Ran_USSD<br>UMTS_Iu_C_TDR |

|                          |      |                                                                                                                                                                                                                                    |                                              |                                                        |
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|                          |      | Application Part (RANAP) signaling - <b>3GPP TS 25.413</b>                                                                                                                                                                         |                                              | UMTS_Iu_P_GMM_TDR<br>UMTS_Iu_P_TDR<br>UMTS_Iu_P_SM_TDR |
|                          |      | Digital cellular telecommunications system (Phase 2+); Universal Mobile Telecommunications System (UMTS); Mobile radio interface layer 3 specification; Radio Resource Control (RRC) protocol - <b>3GPP TS 44.018</b>              | TS 44.018 V12.3.0<br>(Release 12)<br>Sept-14 |                                                        |
|                          |      | Digital cellular telecommunications system (Phase 2+); Mobile Radio interface layer 3 supplementary service specification; Formats and Coding - <b>3GPP TS 04.80</b>                                                               | TS 24.080 V12.0.0<br>(Release 12)<br>Sept-14 |                                                        |
|                          |      | Digital cellular telecommunications system (Phase 2+); Universal Mobile Telecommunications System (UMTS); Technical realization of Short Message Service (SMS) Point-to-Point (PP) - <b>3GPP TS 24.011</b>                         | TS 24.011 V12.0.0<br>(Release 12)<br>Sept-14 |                                                        |
|                          |      | Digital cellular telecommunications system (Phase 2+); Universal Mobile Telecommunications System (UMTS); Mobile radio interface Layer 3 specification; Core network protocols; Stage 3 - <b>3GPP TS 24.008</b>                    | TS 24.008 V12.7.0<br>(Release 12)<br>Sept-14 |                                                        |
| Iu-PS User Plane over IP | ETSI | Digital cellular telecommunications system (Phase 2+); Universal Mobile Telecommunications System (UMTS); General Packet Radio Service (GPRS); GPRS Tunneling Protocol (GTP) across the Gn and Gp Interface - <b>3GPP TS 09.60</b> | TS 29.060 V12.6.0<br>(Release 12)<br>Sept-14 |                                                        |

## VoIP Protocol

| Protocol                 | Organization | Complete Reference                                                                                                     | PIC 10.2 Standards                                                                                                                                            | Final Builder                                   |
|--------------------------|--------------|------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------|
| VoIP SIP / SIP-T / SIP-I | IETF         | <b>SIP</b> Session Initiation Protocol                                                                                 | RFC 3261<br><i>Jun-02</i><br><br>Not relevant or supported: RFC3853, RFC4320, RFC4916, RFC5393, RFC5621, RFC5626, RFC5630, RFC5922, RFC5954, RFC6026, RFC6141 | VoipSipCdr<br>VoipSiptAnsiCdr<br>VoipSiptItuCdr |
|                          | IETF         | Reliability of Provisional Responses in the Session Initiation Protocol (SIP)                                          | RFC 3262<br><i>Jun-02</i>                                                                                                                                     |                                                 |
|                          | IETF         | Session Initiation Protocol (SIP) - Specific Event Notification                                                        | RFC 3265<br><i>Jun-02</i><br><br>Not relevant or supported: RFC5367, RFC5727, RFC6446                                                                         |                                                 |
|                          | IETF         | The Session Initiation Protocol (SIP) UPDATE Method                                                                    | RFC 3311<br><i>Sep-02</i>                                                                                                                                     |                                                 |
|                          | IETF         | The Session Initiation Protocol (SIP) Refer Method                                                                     | RFC 3515<br><i>Apr-03</i>                                                                                                                                     |                                                 |
|                          | IETF         | The SIP INFO Method                                                                                                    | RFC 2976<br><i>Oct-00</i>                                                                                                                                     |                                                 |
|                          | IETF         | Session Initiation Protocol for Telephones ( <b>SIP-T</b> ): Context and Architectures                                 | RFC 3372<br><i>Sep-02</i>                                                                                                                                     |                                                 |
|                          | IETF         | SDP:Session Description Protocol                                                                                       | RFC 2327<br><i>Apr-98</i>                                                                                                                                     |                                                 |
|                          | IETF         | Session Description Protocol (SDP) Simple Capability Declaration                                                       | RFC 3407                                                                                                                                                      |                                                 |
|                          | ITU-T        | Interworking between Session Initiation Protocol (SIP) and Bearer Independent Call Control Protocol or ISDN User Part. | Q.1912-5<br><i>Mar-04</i>                                                                                                                                     |                                                 |
|                          | Nortel       | CS2000 SIP/SIP-T Interoperability Specification (Issue 0.82)<br>System Requirement Document                            | Nortel CS2000<br><i>01/10/2003</i><br><br><i>RFC5057</i>                                                                                                      |                                                 |

|                         |       |                                                                                                                                                          |                                                                                                                             |                            |
|-------------------------|-------|----------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------|----------------------------|
|                         |       | Multiple Dialog Usages in the Session Initiation Protocol                                                                                                |                                                                                                                             |                            |
| <b>VoIP H.225/Q.931</b> | ITU-T | Series H: Audiovisual and Multimedia Systems - Call Signaling protocols and media stream packetisation for packet-based multimedia communication systems | H.225.0<br><i>Jul-03</i>                                                                                                    | VoipQ931Cdr                |
|                         | ITU-T | ISDN user-network interface layer 3 specification for basic call control                                                                                 | Q.931<br><i>Dec-99</i>                                                                                                      |                            |
| <b>VoIP H.225/RAS</b>   | ITU-T | Call Signaling protocols and media stream packetisation for packet-based multimedia communication systems                                                | H.225.1<br><i>Jul-03</i>                                                                                                    | VoipRasTdr                 |
| <b>VoIP H.245</b>       | ITU-T | Control Protocol for multimedia communication                                                                                                            | H.245<br><i>Jul-03</i>                                                                                                      | VoipH245Tdr                |
| <b>VoIP RTP</b>         | IETF  | RTP: A Transport Protocol for Real-Time Application                                                                                                      | RFC 3550,<br><i>Jul-03</i><br>RFC3551<br><i>Jul-03</i><br><br>Not relevant or supported: RFC5506, RFC5761, RFC6051, RFC6222 | VoipSipCdr                 |
| <b>MGCP</b>             | IETF  | Media Gateway Control Protocol (MGCP) version 1.0                                                                                                        | RFC 3435<br><i>Jan-03</i><br><br>Not relevant or supported: RFC3661                                                         | VoipMgcpCdr<br>VoipMgcpTdr |
|                         | IETF  | Media Gateway Control Protocol (MGCP) Return Code Usage                                                                                                  | RFC 3661<br><i>Dec-03</i>                                                                                                   |                            |
|                         | IETF  | Media Gateway Control Protocol (MGCP) Packages                                                                                                           | RFC 3660<br><i>Dec-03</i>                                                                                                   |                            |
| <b>MEGACO</b>           | IETF  | Gateway Control Protocol Version 1.0                                                                                                                     | RFC 3525<br><i>Jun-03</i>                                                                                                   | VoipMEGACOTdr              |
| <b>H.248</b>            | ITU-T | Gateway Control Protocol: Version 2                                                                                                                      | H.248.1<br><i>May-02</i><br><br>Supported packages H.248.2 until H.248.31                                                   | VoipH248Tdr                |

## IMS Protocols

| Protocol                                     | Organization | Complete Reference                                                                                                                                                                                                      | PIC 10.2 Standards                               | Final Builder                                                                                                          |
|----------------------------------------------|--------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------|------------------------------------------------------------------------------------------------------------------------|
| Diameter                                     | IETF         | Diameter Base Protocol                                                                                                                                                                                                  | RFC 3588<br><i>Sep-03</i>                        | ImsDiameterCcTdr<br>ImsDiameterCxTdr<br>ImsDiameterGqTdr<br>ImsDiameterShTdr<br>ImsDiameterTdr<br><br>LTE_Diameter-TDR |
| Diameter Credit-Control (Cc, Ro, Rf, Gy, Ga) | IETF         | Diameter Credit-Control Application                                                                                                                                                                                     | RFC 4006<br><i>Aug-05</i>                        |                                                                                                                        |
|                                              | ETSI / 3GPP  | 3rd Generation Partnership Project; Technical Specification Group Service and System Aspects; Telecommunication management; Charging management;<br><br>Diameter charging applications                                  | TS 32.299 V12.6.0<br>(Release 12)<br><br>Sept-14 |                                                                                                                        |
| Diameter Gq                                  | ETSI         | Universal Mobile Telecommunications System (UMTS); Policy control over Gq interface (3GPP TS 29.209 version 6.5.0 Release 6). Replaced by Rx in LTE                                                                     | TS 29.209 V6.5.0<br>(Release 6)<br><i>Jun-06</i> |                                                                                                                        |
| Diameter Cx/Dx                               | ETSI         | Digital cellular telecommunications system (Phase 2+); Universal Mobile Telecommunications System (UMTS); IP Multimedia (IM) Subsystem Cx and Dx Interfaces; Signaling flows and message contents <b>3GPP TS 29.228</b> | TS 29.228 V12.3.0<br>(Release 12)<br><br>Sept-14 |                                                                                                                        |
|                                              | ETSI         | Digital cellular telecommunications system (Phase 2+); Universal Mobile Telecommunications System (UMTS); Cx and Dx interfaces based on the Diameter protocol <b>3GPP TS 29.229</b>                                     | TS 29.229 V12.3.0<br>(Release 12)<br><br>Sept-14 |                                                                                                                        |
|                                              | ETSI         | Digital cellular telecommunications system (Phase 2+);                                                                                                                                                                  | TS 29.230 V12.6.0<br>(Release 12)                |                                                                                                                        |

|                    |      |                                                                                                                                                                              |                                           |  |
|--------------------|------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------|--|
|                    |      | Universal Mobile Telecommunications System (UMTS); Diameter applications; 3GPP specific codes and identifiers <b>3GPP TS 29.230</b>                                          | Sept-14                                   |  |
| <b>Diameter Sh</b> | ETSI | Digital cellular telecommunications system (Phase 2+); Universal Mobile Telecommunications System (UMTS); Sh interface based on the Diameter protocol; <b>3GPP TS 29.329</b> | TS 29.329 V12.4.0 (Release 12)<br>Sept-14 |  |

## LTE Protocols

| Protocol              | Organization | Complete Reference                                                                                                                                                                                                                                         | PIC 10.2 Standards                        | Final Builder                                                           |
|-----------------------|--------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------|-------------------------------------------------------------------------|
| <b>Diameter S6</b>    | 3GPP         | 3rd Generation Partnership Project; Technical Specification Group Core Network and Terminals; Evolved Packet System (EPS); Mobility Management Entity (MME) and Serving GPRS Support Node (SGSN) related interfaces based on Diameter protocol (Release 9) | TS 29.272 V12.6.0 (Release 12)<br>Sept-14 | LTE_Diameter_S6_TDR<br>LTE_Diameter_SUDR_Accounting<br>LTE_Diameter-TDR |
| <b>Diameter Gx/S7</b> | 3GPP         | 3rd Generation Partnership Project; Technical Specification Group Core Network and Terminals; Policy and Charging Control over Gx reference point (Release 9)                                                                                              | TS 29.212 V12.6.0 (Release 12)<br>Sept-14 | LTE_Diameter_Gx_TDR<br>LTE_Diameter-TDR                                 |
| <b>Diameter Rx</b>    | 3GPP         | 3rd Generation Partnership Project; Technical Specification Group Core Network and Terminals; Policy and Charging Control over Rx reference point (Release 9)                                                                                              | TS 29.214 V12.5.0 (Release 12)<br>Sept-14 | LTE_Diameter_Rx_TDR<br>LTE_Diameter-TDR                                 |

|                     |      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                               |                                             |
|---------------------|------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------|
| <b>Diameter Gy</b>  | 3GPP | 3rd Generation Partnership Project;<br>Technical Specification Group Services and System Aspects;<br>Telecommunication management;<br>Charging management;<br>Diameter charging applications                                                                                                                                                                                                                                                                                          | TS 32.299<br>V12.6.0<br>(Release 12)<br><br>Sept-14                                                                                           | LTE_DIAMETER_Gy_TDR<br><br>LTE_Diameter-TDR |
| <b>Diameter S9</b>  | 3GPP | 3rd Generation Partnership Project;<br>Technical Specification Group Core Network and Terminals;<br>Policy and Charging Control (PCC) over S9 reference point;<br>Stage 3                                                                                                                                                                                                                                                                                                             | TS 29.215<br>V12.5.0<br>(Release 12)<br><br>Sept-14                                                                                           | LTE_DIAMETER_S9_TDR<br><br>LTE_Diameter-TDR |
| <b>Diameter AAA</b> | 3GPP | 3rd Generation Partnership Project;<br>Technical Specification Group Core Network and Terminals;<br><br>Evolved Packet System (EPS);<br>3GPP EPS AAA interfaces                                                                                                                                                                                                                                                                                                                       | TS 29.273<br>V12.5.0<br>(Release 12)<br><br>Sept-14                                                                                           | LTE_Diameter_AAA_TDR                        |
| <b>Diameter LCS</b> | 3GPP | 3rd Generation Partnership Project;<br>Technical Specification Group Core Network and Terminals;<br><br>Location Services (LCS);<br>Evolved Packet Core (EPC) LCS Protocol (ELP) between the Gateway Mobile Location Centre (GMLC) and the Mobile Management Entity (MME);<br>SLg interface<br><br><br><br><br><br><br><br><br><br>3rd Generation Partnership Project;<br>Technical Specification Group Core Network and Terminals;<br>Location Services (LCS);<br>Diameter-based SLh | TS 29.172<br>V12.4.0<br>(Release 12)<br><br>Mar-14<br><br><br><br><br><br><br><br><br><br>TS 29.173<br>V12.2.0<br>(Release 12)<br><br>Sept-14 | LTE_Diameter_LCS_TDR                        |

|                                                 |      |                                                                                                                                                                                                                                                  |                                                             |                                                                                             |
|-------------------------------------------------|------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------|---------------------------------------------------------------------------------------------|
|                                                 |      | interface for Control Plane LCS                                                                                                                                                                                                                  |                                                             |                                                                                             |
| <b>GTPv2</b>                                    | 3GPP | 3rd Generation Partnership Project; Technical Specification Group Core Network and Terminals; 3GPP Evolved Packet System (EPS); Evolved General Packet Radio Service (GPRS) Tunnelling Protocol for Control plane (GTPv2-C); Stage 3 (Release 9) | TS 29.274<br>V12.6.0<br>(Release 12)<br>Sept-14             | LTE_GTP_v2_Tunnel_Management_TDR<br>LTE_GTP_v2_Mobility_Management_TDR<br>LTE_GTP_v2_Sv_TDR |
| <b>S1-AP</b>                                    | 3GPP | 3rd Generation Partnership Project; Technical Specification Group Radio Access Network; Evolved Universal Terrestrial Radio Access Network (E-UTRAN); S1 Application Protocol (S1AP) (Release 9)                                                 | TS 36.413<br>V12.3.0<br>(Release 12)<br>Sept-14             | LTE_S1AP_TDR<br>RAN_ESM_TDR<br>RAN_EMM_TDR                                                  |
|                                                 | 3GPP | 3rd Generation Partnership Project; Technical Specification Group Core Network and Terminals; Non-Access-Stratum (NAS) protocol for Evolved Packet System (EPS); Stage 3 (Release 9)                                                             | TS 24.301<br>V12.6.0<br>(Release 12)<br>(Release 12)Sept-14 |                                                                                             |
| <b>SGs</b>                                      | 3GPP | 3rd Generation Partnership Project; Technical Specification Group Core Network and Terminals; Mobility Management Entity (MME) – Visitor Location Register (VLR) SGs interface specification (Release 9)                                         | TS 29.118<br>V12.6.0<br>(Release 12)<br>Sept-14             | LTE_SGsAP_TDR                                                                               |
| <b>LTE User Plane (S5-U, S8-U, S1-U, S12-U)</b> | 3GPP | 3rd Generation Partnership Project; Technical Specification Group Core Network and Terminals; General Packet Radio System                                                                                                                        | TS 29.281<br>V11.6.0<br>(Release 11)<br>Mar-13              | LTE_GTP_User_Plane_Capture                                                                  |

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|  |  | (GPRS) Tunnelling<br>Protocol User Plane<br>(GTPv1-U) (Release<br>9) |  |  |
|--|--|----------------------------------------------------------------------|--|--|