Oracle® Communications Performance Intelligence Center

Troubleshooting Application Guide

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Oracle® Communications Performance Intelligence Center Troubleshooting Application Guide, Release 10.3.0


CAUTION: Use only the guide downloaded from Oracle Help Center.

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Chapter 1: About this Help Text

Scope and Audience

This User's Guide provides information about Troubleshooting concepts. It is designed to be a general guide to working with Troubleshooting. Beginners and experienced users alike should find the information they need to cover all important administration activities required to use and manage Troubleshooting. Depending on your user access role, some functions in this guide may not be available. Only users with BusinessManager role can see PDUs and their decoding.

General Information

You can find general information about Oracle® Communications Performance Intelligence Center, such as product overview, list of other guides, workstation requirements, login and logout procedures, user preference settings, in the Quick Start Guide. This document is available from the Portal menu or can be downloaded from Oracle Help Center (OHC)

Chapter 2: Introduction to Troubleshooting

Introduction to Troubleshooting

Troubleshooting is a near real-time, end-to-end, multi-protocol call tracing application. Troubleshooting has the capability of performing scenario-less traces for in-progress and completed calls, transactions and sessions.

Troubleshooting traces the calls, transactions and sessions based on xDRs generated by an Mediation Subsystem. Troubleshooting can perform an in-progress display of a traced transaction/call/data session. The capability to perform the scenario-less inter-protocol tracing is the Troubleshooting built-in feature eliminating the need for defining complex scenarios. This section provides the high level architecture of the Troubleshooting application.

Troubleshooting is built on the Management Application Platform and uses the various Management Application common components such as Data Access Layer (DAL) and Centralized Configuration for its functionality. The data access layer provides the APIs to access the Mediation Oracle database (for xDR sessions) through user-defined filters. Centralized Configuration provides the configuration elements such as network view constituents (dictionaries, filters, link-sets etc), for the Troubleshooting application.

Troubleshooting operates within a network (sessions) context and enables you to manage (create, modify and delete) as well as store queries for a particular network view.

This figure depicts the overall architecture and interaction of Troubleshooting with the Management Application server.

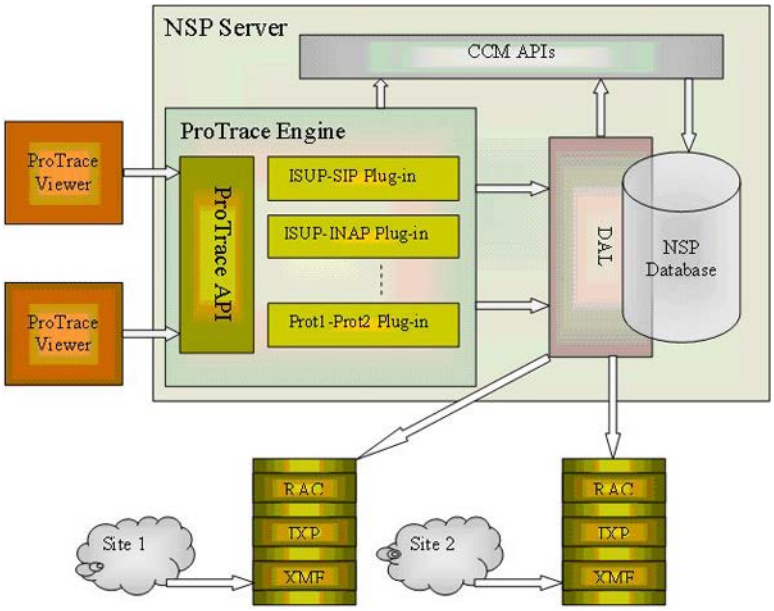


Figure 1: Troubleshooting Block Diagram

The Troubleshooting Engine and the Troubleshooting Viewer components comprise the Troubleshooting application. The Troubleshooting engine component provides the logic for inter-protocol call tracing. It also provides the plug-ins that support inter-protocol tracing. These plug-ins provide the mapping of EPIs for co-relating protocols. The Troubleshooting engine supports intra-protocol tracing by utilizing Transaction Identifiers generated by the Mediation subsystem as well as partial xDRs (xDRs which are generated before the transaction or call is finished). In addition, the Troubleshooting engine also provides the APIs for the Troubleshooting viewer to initiate various operations such as: XDR filtering, initiating

Trace, and managing Troubleshooting Filters.
The Troubleshooting viewer component serves as the end-user interface. This enables you to initiate and view either single or multiple traces (maximum five). Multiple users (the number of users is based on purchased licenses) can connect to Troubleshooting using a Web interface provided by the Management Application platform. Troubleshooting provides the following functionality:

- Real-time call in-progress trace display with message sequence diagram as required by the network troubleshooting users, in as many network situations and contexts as possible.
- Off-line tracing on stored data with at least 24HR back-search window capability

Note: The amount of back search available depends on the amount of storage and the call volume of your network.

- Easy tracing in advanced mobile networks or hybrid wireline PSTN/VoIP networks which can be very complex. Short-lived temporary identifiers allocated by networks makes tracing difficult (ex: TMSI, PTMSI) and are replaced by the identifier reference number that is based on a Tekelec patent.
- Anticipates migration constraints, especially in terms of display possibilities and handling of SS7 LSL level 2/level 3 tracing.
- Optimizes tracing process by taking advantage of enrichment techniques during capture.

Configuring Network Views for Troubleshooting

Troubleshooting allows you to trace customer calls or transactions over SS7, GPRS, Gb and other IP-based networks. The application is capable of performing intra as well as inter-network/protocol tracing. The tracing feature of Troubleshooting is designed to start with a context of a Network View.

This section provides an overview of configuring network views. The ability to configure Troubleshooting is limited to a user with the role NSPConfigManager. For more details on configuring Troubleshooting or the Performance Intelligence Center System see the Centralized Configuration Guide.

Network Views-Overview

Network views are logical, user-defined groupings of elements and are used to denote some aspect, or perspective, of a customer network. For example, it could be the physical elements comprising a network, or at sub-networks, another carrier's network or a certain type of traffic on the network.

Network views can be nested and contain other network views that themselves may contain network views. Grouping elements together into network views allows you to divide up a network into more manageable units, not only for convenience (elements in a network view can be referred to from other parts of the system as a single unit, by referring to the network view) but also for authorization purposes.

For example, a Network View might consist of all nodes in a particular region. This means that when you start with a context (selection) of that region you are able to trace the calls or transactions that are monitored from the nodes defined within region network view. In case of real-time trace of a mobile call where the location of the mobile is not known, you can select the entire network to start the trace. But if you know the location of the mobile call, you can select the corresponding node in the network view for faster access.

Note: The directionality of a call is in context of whether it is node-centric or eagle-centric. Performance Intelligence Center is node-centric and all directionality is based on this orientation.

Types of Network Views

There are three types of network views handled by Troubleshooting.

- Link views - that cover the management of linksets and links.
- All Sessions - Shows all the sessions
- Session views - that cover management for xDR sessions.

Setting up a Network View

These are the general steps in setting up a Network view for Troubleshooting.
Note: The ability to set up network and link views in Troubleshooting is limited to a user with the role NSPConfigManager.
Using Centralized Configuration you:
1. Create a site.

(For more information on creating sites refer to the Centralized Configuration Guide)
2. Create a host on the site.

(For more information on creating hosts refer to the Centralized Configuration Guide)
3. Create link/Session based on network view.

(For more information on creating sites refer to the Centralized Configuration Guide.)

Setting up a Link View

Link-based network views (SS7) can be grouped together to create a view of the network that a system administrator can use for routing link data to the Mediation and for other purposes. All links in an SS7 linkset are considered part of any network view containing the linkset. Network views can be hierarchical in nature. You can configure two types of link-based network views:
Note: The ability to set up Network and link views in Troubleshooting is limited to a user with the role NSPConfigManager.

- Container Network View: A network view containing other network views.
- Link Network Views: A network view containing one or more links of the type SS7 linkset. Using Centralized Configuration you:

1. Create a site
2. Create a host on the site
3. Create a Network Link View
4. Configure the Network Link View

For more information on these tasks see the Centralized Configuration Guide.

Opening Troubleshooting

Note: Management Application only supports versions of IE 7.0 or later and Firefox 3.6 or later. Before using Management Application, turn off the browser pop up blocker for the Management Application site.

As an application on the Management Application platform, Troubleshooting can be accessed from the Management Application portal. To open Troubleshooting you must first log into Management Application.

Logging into Management Application

Complete these steps to log into Management Application.
1. Using a Web browser, type the following URL:
   http://management_server_IP/nsp

2. To log into **Management Application,** enter the following

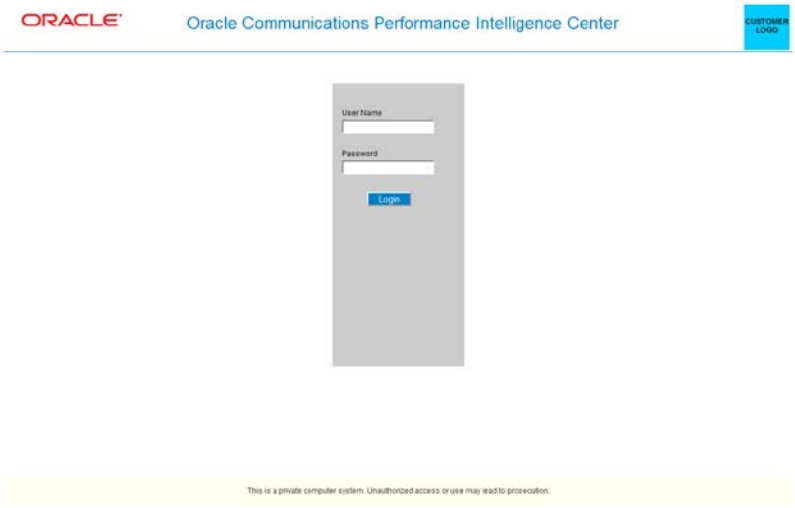


Figure 2: Login Page

Note: Contact your system administrator to find out the IP address for the Application portal.
a) **Your User id**
b) **Your Password**
Note: You must have a username and password assigned to you by your system administrator.
3. The Management Application portal opens showing all currently deployed applications.
Click the Troubleshooting icon (located in the Applications section) to open the Troubleshooting application.
You can now begin using Troubleshooting.

Understanding the Troubleshooting Interface

Note: Do not use the Function Keys (F1 through F12) when using the Management Application. Function keys work in unexpected ways. For example, the F1 key will not open Management Application help but will open help for the browser in use. The F5 key will not refresh a specific screen, but will refresh the entire session and will result in a loss of any entered information.
For more information on the Troubleshooting screens, see:

- The Troubleshooting Main Screen
- Main Menu
- Menu Bar
- Header Section

The Troubleshooting Main Screen

The Troubleshooting main screen is divided into three main sections:

- Menu - shows application menus
- Network View Tree - lists all the sessions and link-based network views
- Session List - list of current sessions
- Query List - includes application toolbar

Section/Field	Description
Header	This Section shows the : • Hide Banner feature - that lets you collapse the banner section (see • Banner section) • Link to Management Application Platform Guide - this link opens the online help on how to use Management Application interface and platform • User - shows the user name • Logout option • Client Logo
Banner	This section shows: • Application area • Option Menu Bar Note: This section can be hidden by clicking Hide Banner
Toolbar	This section shows all the feature buttons for each page.
Network Tree	Shows the two Network views Session - shows the xDR sessions in a network view • Link - shows all link-based network views • All sessions - shows all the sessions The Network Tree can be expanded or collapsed by clicking + or -.
Session List	Shows all the sessions for a network view or all sessions.
Query List	Shows all the queries for a network or session element.

Table 1: Troubleshooting Main Screen

Header Section

The Menu section provides two menus as well as User Preferences and Logout functions. The Main menu and the Menu bar both are discussed in this section.

Note: For more information on working with User Preferences, see the Quick Start Guide..

Main Menu

The menu section includes a navigation menu on the top left-hand side of the page shows the *Main* menu part of the *Menu* section

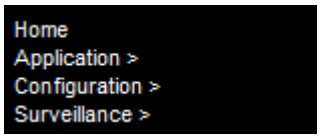


Figure 3: Main Menu

This menu brings you to the various application areas in Management Application such as:

- Home - the Management Application Home page
- Management/Surveillance - contains Management and Diagnostic Utility, Audit Viewer, Security and System Alarms
- Applications - contains Management Applications such as Dashboard, Alarm, Troubleshooting, etc.
- Configuration – contains Management Applications such as Centralized configuration, KPI, Historical KPI etc.

Menu Bar

The Menu bar is part of the Banner section and has five pull-down menus.
Note: This section can be hidden by clicking Hide Banner in the Header section.

- Troubleshooting - that contains:
  - Import Trace - allows you to import trace files that were exported

- Views - that contains the main functionality of Troubleshooting
  - Display Main Screen - Displays the main Troubleshooting screen
  - Preferences - opens a pop-up window for configuring Troubleshooting for more information, see Setting Preferences

- Configuration - that contains:
  - EPI - provides a means of working with EPI configuration (protocols) for more information see EPI Configuration

- Help - that contains:
  - Dictionary Help – provides information about the Mediation Protocols
  - User Manual - the online help system for Troubleshooting
  - About - provides information on the version of Troubleshooting

- Debug - that contains:
  - Management Application_<log level>- enables you to set particular logging level for Management Application
  - TRC_<log level>- enables you to set particular log level for Troubleshooting Application

Note: Debug option is only available to users with Management Application Administrator privilege

Figure 4: Troubleshooting Menu Bar

Network View Tree Section

The Network View tree section functions as the directory for Troubleshooting and lists the network views from the Network View perspective. The headings entitled Sessions View shows the network views and the Link View shows all the link-based network views.

Sessions List Section

The session list shows either all the sessions as a list, or a list of only those sessions associated with the network view selected:

- **All Sessions** - This list shows all sessions in the system. With this view, you can select a single session and execute a query on the selected session.
- **Sessions View -** This list shows the sessions associated with the selected network view. With this view, the sessions in the session list are not selectable. Any query that is run is executed on all sessions from the selected network view.
- **Links View -** This list shows the sessions associated with the selected link-based network view. The sessions can be associated with a link-based network view in Centralized Configuration. With this view, the sessions in the session list are not selectable. Any query that is run is executed on all sessions from the selected network view.
- The session list contains 13 columns. You may need to scroll to see them all. Most of the column headings can be used to sort the displayed session list by clicking on the heading. Click once to sort in ascending order and again to sort in descending order for that column.

The column headings are:

- Session - session name.
- Start Date - the start date and time for the session
- End Date - the end date and time session

Note: Last calculated time shown as a tooltip for Start date, End date columns denote the last update time from Mediation

- Dictionary Type - type of the dictionary
- Format - the format of the session
- Protocol - the protocol of the dictionary
- Dictionary - name of the dictionary used
- Subsystem - the subsystem where the session is built and stored
- User Information - any other information about the session
- Owner - the owner of the session
- State – State of the object (that can be obsolete, normal or modified)
- Created - the date the session was created
- PC Format- Point Code Format associated with Session.

Note: If Session Point Code Feature is enabled then session listing will also show PC Format as one of the fields otherwise "PC Format" field will be absent.

Note: Point Code Flavors supported are

- Default
- ANSI
- ETSI N

- ETSI I
- Chinese
- Japanese

Some of the columns have a Quick Filter pull down you can select to only display sessions with that trait. For example, to only see sessions that use the ISUP ANSI protocol select ISUP ANSI from the Protocol pull down. The columns that can be used for quick filters are:

- Dictionary Type
- Format
- Protocol
- Dictionary
- Subsystem

Note: The Start Date and End Date information is updated every minute by an oracle job running in the background. To display the updated information click refresh button in the session list toolbar.

Session	Start date	End date	Dictionary Type	Format	Protocol	Dictionary	Subsystem	User Information
* All	* All	* All	* All	* All	* All	* All	* All	* All
CapacityManagement	18/01/2038 19:14:07	-	STATISTICS	SINGLE	N/A	Generic FlowMonitor Stats_1.1.2	DWH_Pool	Automatically created by system for capa
ixp1002AggSessionMonitor	18/01/2038 19:14:07	-	STATISTICS	SINGLE	N/A	AggSessionMonitor	DWH_Pool	Automatically created by system for IXP m
ixp1002BuildMonitor	18/01/2038 19:14:07	-	STATISTICS	SINGLE	N/A	BuildMonitor	DWH_Pool	Automatically created by system for IXP m
ixp1002BuildThreadMonitor	18/01/2038 19:14:07	-	STATISTICS	SINGLE	N/A	BuildThreadMonitor	DWH_Pool	Automatically created by system for IXP m
ixp1002ItfStreamMonitor	18/01/2038 19:14:07	-	STATISTICS	SINGLE	N/A	ItfStreamMonitor	DWH_Pool	Automatically created by system for IXP m
ixp1002OperateMonitor	18/01/2038 19:14:07	-	STATISTICS	SINGLE	N/A	OperateMonitor	DWH_Pool	Automatically created by system for IXP m
ixp1002PoolMonitor	18/01/2038 19:14:07	-	STATISTICS	SINGLE	N/A	PoolMonitor	DWH_Pool	Automatically created by system for IXP m
ixp1002StreamMonitor	18/01/2038 19:14:07	-	STATISTICS	SINGLE	N/A	StreamMonitor	DWH_Pool	Automatically created by system for IXP m
MAP_SESS_ARJ	18/01/2038 19:14:07	-	RECONSTITUTION	SINGLE	MAP ETSI	SS7 MAP2 TDR_1.1.1	DWH_Pool	-
Test_DFP_Nit_Session	18/01/2038 19:14:07	-	RECONSTITUTION	SINGLE	MAP ETSI	SS7 MAP SM TDR_7.2.1	DWH_Pool	-

Figure 5: Session List with Session Point Code Enabled Sessions List Toolbar

The toolbar provides a means of selecting and organizing xDR sessions. Below is a description of each button on the toolbar.

Select column- clicking this button opens a Hide/Show column popup where you can select which column to display and the order in which they are displayed.

Filter - clicking this button opens the System Query Dialog popup where you can filter the list of sessions displayed by the various columns and their values.

First page - clicking this button opens the first page of sessions.

Previous page - clicking this button opens the previous page of sessions.

Next page - clicking this button opens the next page of sessions.

Last page - clicking this button opens the last page of sessions.

Set Size - use this button to set the session list size from 10-20,000 per page.

Refresh - clicking this button re-loads the current screen and shows any changes that have been made.

Export - clicking this button opens up the Export popup window.

 **Permissions** - use this to set the permissions for accessing the sessions. You must be a user with the role NSP ConfigManager to set permissions.

 **Printer Friendly Version-** clicking this button opens a printer friendly list of sessions to be printed.

 **Multilink** - clicking on this button opens the multilink popup screen where you can select more than one link to filter.

Last Refresh: This label displays the time when Refresh button was last clicked.

 **Selected Session or Network view** - This icon shows the session or network view you have selected. Hover over the icon to see the type of the selected session or network view.

In addition to these buttons there is also a saved filters pull-down you can use to select a saved filter, and a page count showing what page out of the total sessions pages you are viewing.

Query List Section

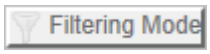
The query table contains five columns. The table queries change depending on what view is selected (According to the protocol selected or included in the sessions view) but the columns are constant. Most of the column headings can be used to sort the list by clicking on the heading. Click once to sort in ascending order and again to sort in descending order for that column.

The column headings are:

- Query Name - that shows the name of the query
- Query Description – that shows the description of the query
- Owner - shows the user name that created the query
- State – that shows the state of the query
- Created - shows the date the query was created

Query List Toolbar

The toolbar provides a means of selecting and organizing queries.
Below is a description of each button on the toolbar.



Filtering Mode/In Progress Trace - clicking this button toggles between Filtering Mode and In Progress Tracing. The button name will change to reflect this.

 **Select column**- clicking this button opens a Hide/Show column popup where you can select which column to display and the order in which they are displayed.

 **Filter** - clicking this button opens the System Query Dialog page where you can filter out all non-essential queries.

 **First page** - clicking this button opens the first page of sessions.

 **Previous page** - clicking this button opens the previous page of sessions.

 **Next page** - clicking this button opens the next page of sessions.

 **Last page** - clicking this button opens the last page of sessions.

 **Set Size** - use this button to set the session list size from 10-20,000 per page.

 **Refresh** - clicking this button re-loads the current screen and shows any changes that have been made.

 **Export** - clicking this button opens up the Export popup window.

 **Printer Friendly Version-** clicking this button opens a printer friendly list of sessions to be printed.

 **Create -** clicking this button opens the Query Dialogue screen to add a specific query**.**

 **Modify -** clicking this button opens the current query for modification.

 **Delete** - clicking this button deletes the current query.

 **Add To Hotlist** - clicking this button adds a query to the *Hot List*. A hot list is a list of frequently used queries that is separate from the total list of queries.

 **View** - clicking this button enables you to toggle the display mode between all queries and only the Hot List queries. This feature is especially handy when you have very large lists of queries.

 **Execute query -** clicking this button runs the selected query on the selected network view.

 **Execute link query -** clicking this button runs an empty query on the selected link-based network view or on the selected links.

 **Permissions -** clicking this button opens the Permissions Dialogue page that shows what privileges you have on the selected query and allows you to manage queries you have permission to access.

In addition to these buttons there is also a queries count showing how many queries are in the list and what range you are viewing.

xDR Viewer Page

The xDR viewer page shows the results of a query.

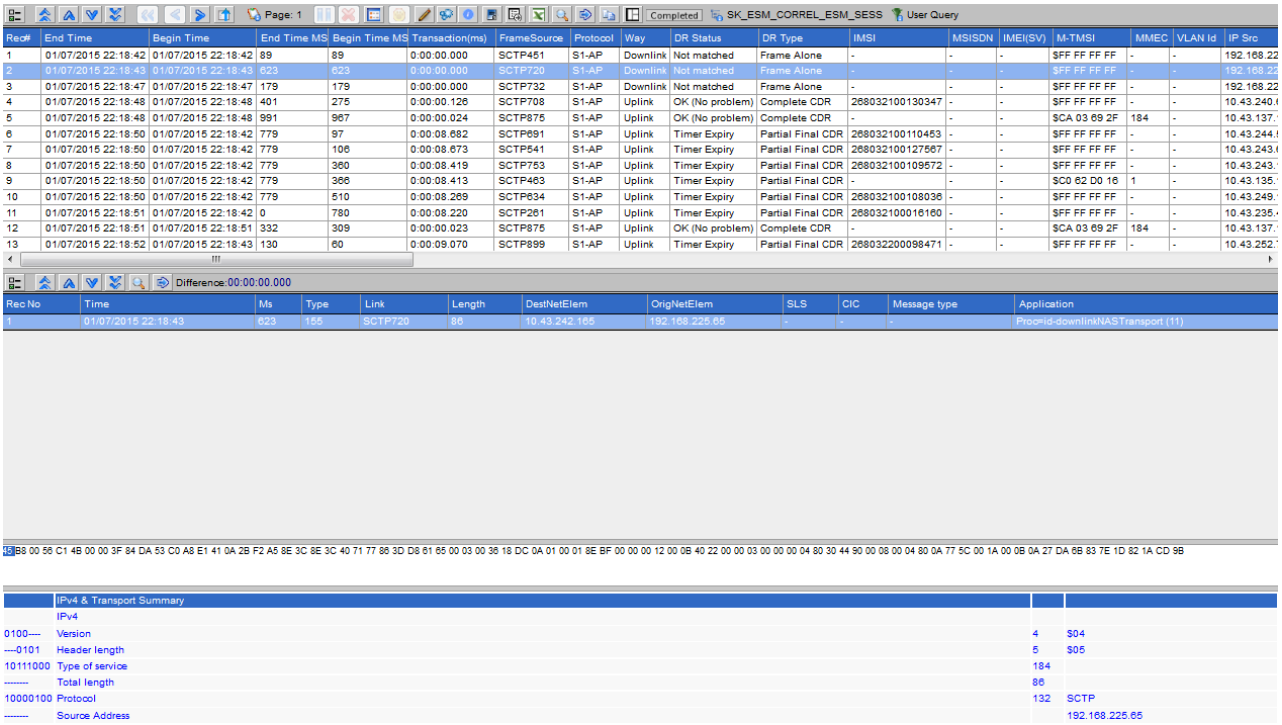


Figure 6: xDR Viewer Page

The xDR viewer page can be divided into several different Layouts.

If you want to see the PDU and the PDU decode each in a separate window, you can set the xDR viewer layout to single window and double click on an xDR. This will display the list of PDUs in a separate window. Subsequently, you can double click on a PDU to see it's decoded in a separate window as well.

Note: Only one PDU and decode window can be open at one time.
Note: If Session Point Code Feature is enabled then

- On focusing on Point Code field cells the tooltip should display the flavor according to which the Point Code Value has been formatted.
- The Point Code Fields in the Result Set are formatted according to the User Preferences Format of the Flavor used in the Query.

xDR Viewer Toolbar

Each of the function buttons unique to the xDR viewer toolbar is described separately.

Select Column - enables you to select what columns are displayed in the table as well as what order they appear in.

First row - clicking this button selects the first record row on the page**.**

Previous row - clicking this button selects the record row directly above the current record.

Next row - clicking this button selects the record row directly below the current record.

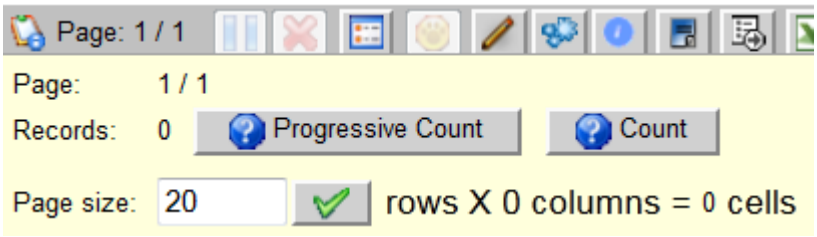
Last row - clicking this button selects the last record row on the page.

First page - clicking this button opens the first page of queries

Previous page - clicking this button opens the previous page of queries**.**

Next page - clicking this button opens the next page of queries**.**

Reverse Sorting - clicking this button reverses the sort order of the xDR list**.**



Set xDR Page Size - this shows how many xDRs are displayed per page, you can modify the number of xDRs on the page by typing in another number and clicking the check to the right. You can set the page size from 10 to 20,000 xDRs per page (page size can be from 10-5000). A larger page size will take longer to display. You can also increase the display speed by reducing the number of columns shown. In addition, when you place the cursor on this icon, you get: the current page, the position (number), how the xDR is sorted and the number of xDRs on a page.

Pause refresh - stops automatic refresh so that you can work on filters or records without data changing.

Cancel - cancels the current process.

Display Main Screen - closes the current query and opens the initial query list page.

Start trace - executes a trace process.

Modify query - opens the Query dialog screen of an existing query.

Recall filter - reruns the query using original filter.

Explain Plan - displays the detailed plan information.

 XDR Finder - Opens the XDR Finder window.

 Export - opens up the Export window.

 Direct Excel Export - Exports directly to Excel.

 Search - searches for specific xdr records.

 Next search - continues search of xdr records.

 Copy PDUs/Decoding - Copies the selected PDU or decoding information.

 Change layout - enables you to change the page layout using a variety of combinations. See Figure 15: Layout Button with Layout Choices

 Session/Network view Selected - Shows the session or network view that is selected.

 Query selected - clicking on this icon opens a small information pop-up showing the name and description of the query being run (see Figure 23: Query with Multiple Conditions for a view of the query information pop-up).

Column Heading Descriptions

Troubleshooting xDR page has a rollover function that shows the column description when the cursor is placed on the column heading. The column being described is underlined. The figure shown here shows an example of the rollover feature.

Rec#	End Time	Begin Time	End Time MS	Begin Time MS	Transaction(ms)
1	01/07/2015 22:18:42			89	0:00:00.000
2	01/07/2015 22:18:43			623	0:00:00.000
3	01/07/2015 22:18:47			179	0:00:00.000
4	01/07/2015 22:18:48	01/07/2015 22:18:48	401	275	0:00:00.126

Date in seconds of observation of the first message of the xDR for a transaction.

Figure 7: Column Heading Description Feature

Sorting by Columns

In the xDR viewer, you can sort by columns. To sort by column heading place the cursor over the Column Heading and click on it. The displayed records for that page (not the entire set) are sorted according that heading. If you click the heading again, the sort order is reversed.

Hidden xDRs, PDUs and Decoding

xDRs, PDUs and PDU decoding can be hidden in Troubleshooting. The ability to hide xDRs, PDUs and PDU decoding is configured in Centralized Configuration (for more information see the Centralized Configuration Guide) from the Home page or the Mediation perspective. The following data can be hidden in Troubleshooting.

Note: For users with role NSPBusinessUser or NSPBusinessPowerUser if Decode layer is set to Hide or

Summary, then all hex codes for that layer will be masked (hex numbers replaced by **).

- **xDR Hiding**
  Fields
  Number of characters (up to total number of characters)
  Columns

- **PDU Hiding**
  Fields
  Number of characters (up to total number of characters)
  PDU Summary

- **PDU Decode Hiding**
  Hexadecimal values (header of the decoding section)
  Columns 1, 3 and 4
  PDU decode title (column 2)

Chapter 3: Setting Troubleshooting Preferences

Overview

This chapter provides information on setting preferences, system parameters, EPI settings, and Page Layout in Troubleshooting.

Configuring Trace Display Preferences

The Troubleshooting View menu contains a Preference option that enables you to configure attributes and decode colors.

Opening the Preference Option

To open the Preference option:
From the menu bar Select View > Preferences, the Preferences page opens shown in

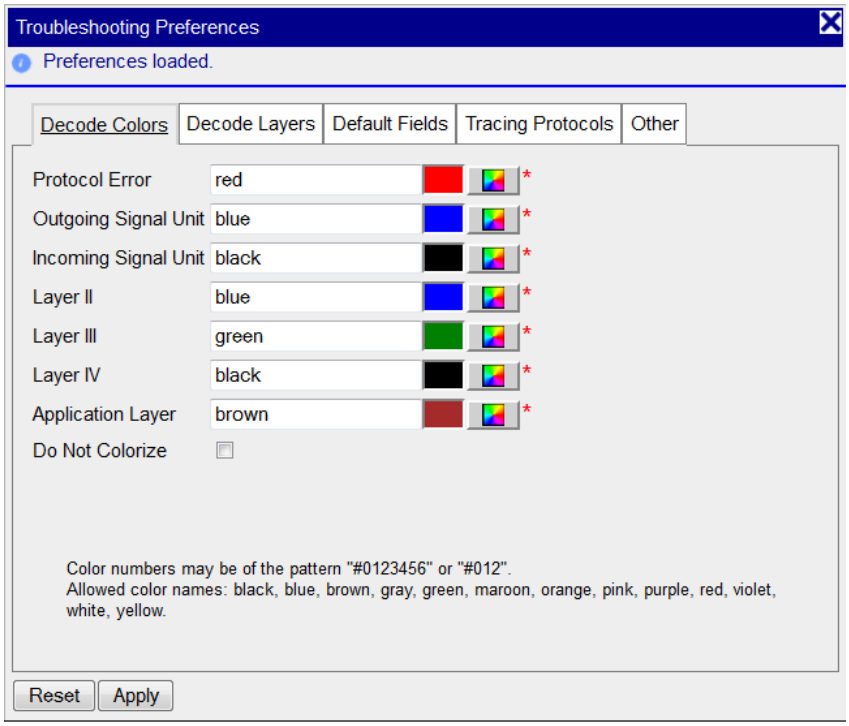


Figure 8: Preferences Page

The Preferences page has five tabs. They are:

- Decode Color - enables you to customize the colors for protocol errors, outgoing signal unit, incoming signal unit, etc.
- Decode Layers - enables you to hide, show a summary or show detail of records
- Default Fields - enables you to select fields for each protocol, that are displayed during filtering
- Tracing Protocols - enables you to specify if the xDRs and PDUs of each protocol will be displayed in trace.

Note: In "Trace Viewer" you have an option to modify the "tracing protocols" selection for a particular trace. See Managing Protocol Filters

.

Setting Preferences

Follow these general steps to set Troubleshooting preferences.

1. Select **View >Preferences**, the Preferences page opens.
2. Select the **Tab** where modifications are to be made.
3. Make the desired modifications (setting colors or enabling/disabling a feature).
4. Click Apply.

The modifications are saved.

Note: To reset the preferences to default settings, click Reset**.**
Note: For users with role NSPBusinessUser or NSPBusinessPowerUser if Decode layer is set to Hide or Summary, then all hex codes for that layer will be masked (hex numbers replaced by **).

Configuring PDU Decode Colors

This feature enables you to configure PDU decode color preferences. Follow these steps to configure decode color preferences.

1. From the menu, select **View -> Preferences**.
2. Select the **Decode Colors** tab.
3. Changes decode colors in **Layer 1** and **Layer 2**.
4. Click **Apply** the colors are set for this preference.

Enabling and Disabling Flex Matching

This function enables or disables extended matching during tracing. With flex matching you can filter on a subset of address digits.

Flexible Matching is available for all filters and traces, (whether predefined or not), when address digits are involved.

Note: The field (EPI) will be queried by flex matching if the "Flex Matching" function is enabled and if a given EPI is enabled for flex matching. (See Configuring EPIs
Note: Enabling of flex matching function has a strong impact on performance. Complete these steps to enable the Flex matching feature.

1. From the menu, select **View -> Preferences**.
2. Select the **Other** tab.
3. Click the **Flex matching** check box.
4. Click **Apply**.

Flex matching is enabled.

System Parameters

The System Parameters feature enables you to set the following functions:

- Flex Matching Prefixes - (default - none) a semi-colon separated list of prefixes, for example, 0; 31; 0031 or none if turned off.
- **Flex Number Length** - (default - 0) length of the pattern number used for analysis without a prefix, for example, if set to 9, Troubleshooting will try to find the same pattern of 9 consecutive digits.

Note: These two parameters are related to the Flex Matching function for tracing. When these two parameters are not set (FlexMatching Prefixes=When FlexMatchingPrefixes) and FlexNumberLength

is set, then the flex matching is restricted to the prefixes from Flex Matching Prefixes. (See Enabling and Disabling Flex Matching

- **Network Latency**- range 5 seconds with no upper limit (default 10 seconds). The time (in seconds) between when the last MSU is captured and the xDR are generated and appear in the database. This is crucial for real-time. The xDRs have timestamp X, but it appears in the database in time X+latency. If the NetworkLatency is less than real latency then we may miss some XDRs, if it is dramatically more than the real latency, we have to search a bigger interval and the query may take longer depending on the traffic.
- **Trace Latency** - (in seconds, default 0) When starting an in-progress call trace, this parameter extends (to the past) the time interval in which Troubleshooting searches the xDRs from the initial query.(the query used when starting the call trace). For example: when Trace Latency is set to 600, and in-progress call trace is started with an ISUP query, Troubleshooting will extend the search for ISUP calls 10 minutes back into the past. This may result in finding partial xDRs for calls in progress as well as final xDRs of already finished calls.
- **PDU Limit** - is the maximum number of PDUs allowed to display in the PDU view (the second view) of Trace Viewer. If the number of PDUs exceeds the limit the trace is stopped (default is 5000).
- **Query time out** - (default 600 seconds) provides a time limit for the query to run.
- **Refresh interval** - (default 10 seconds) the refresh time interval (in seconds) for the XDR Viewer (filter results) in real-time filtering. After this interval the query is re-executed and new results displayed.
- **Trace Optimization** - (default - 2) defines the Oracle optimization for tracing queries.
    - 0 - Oracle will decide on its own optimization based on internal Oracle indexes.
    - 1 - Oracle will access the rows using TimeTag index instead of field indexes.
    - 2 - Default value, supposed to give the best performances. It uses field indexes when it is possible for all EPIs. If any field is not indexed, then StartDate/TimeTag indexes (TO-1) is automatically used.

- **Trace Refresh Interval** - the refresh time interval (in mili-seconds) for the Trace Viewer (trace result). In this interval the Trace GUI is updated and displays new xDRs and PDUs which belong to the call/transaction (default 10 seconds).
- **XDR Limit** -maximum number of xDRs allowed displaying in the XDR view (the first view) of Trace Viewer. If the number of XDRs exceeds the limit (1000) the trace is stopped.

1. To open the **System Parameters** screen, select **Configuration > System Parameters.**

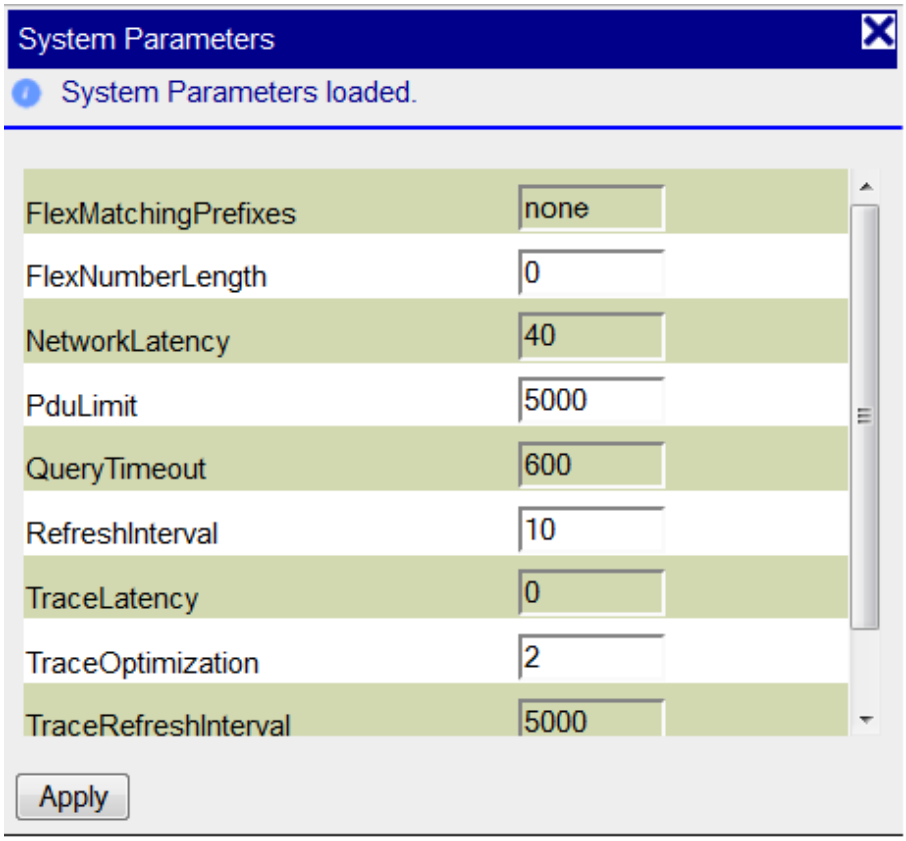


Figure 9: System Parameters Screen

2. To set Troubleshooting parameters, type in a specific value (number) or time interval, (in seconds or milliseconds), suitable for your traces for each of the parameters and click **Apply**. The changes are saved.

EPI Configuration

End Point Identifiers (EPI) are the fields used in a scenario-less tracing to correlate between different protocols or legs of a call/transaction/session.

Defining a field as an EPI means that the value contained in this field will be taken into account to correlate other records based on this value. This means that an EPI must not be too generic (for example, a Calling SCCP Address is not specifically related to a customer but to many transactions). Also, it is very important to adapt EPI rules to avoid having too many records not related to the trace found by the system. This can happen if a field defined as an EPI (such as an MSISDN) is filled by a "generic" value. In this case, the content of the field should not be kept as a value to use for further queries.

Note: EPI configuration is only available to users with Management Application Administrator privilege.

Configuring EPIs

Follow these steps to configure EPIs.

1. Select Configuration > EPI. The EPI screen opens.
2. Select a Mediation Protocol from the pull-down menu.
   The screen changes to show the parameters for that protocol.
3. Fill in the Builder Time Parameters.
   The Builder Time Parameters define the time range used for searching for new xDRs. This time range

is related to BEGIN TIME and END TIME of discovered xDRs and uses a Positive and a Negative value.The ranges for both positive and negative rules are 2-90000 seconds.

The **Guaranteed length** parameter allows you to enhance the search period to END_TIME + Guaranteed length. This parameter is used for search optimization and corresponds to the longest call or transaction the system is guaranteed to find.

4. Select (or de-select), the EPI parameters for that protocol.
    - Flex - defines whether the "Flex matching" is used for given field (see Enabling and Disabling Flex Matching
    - Enabled - enabling/disabling the particular field as EPI
5. Click Apply. The changes are saved.

EPI Rule Classes

EPI rules should be used to "clean-up" the results of a call trace and limit the hits when tracing a call. For instance, an EPI rule can be constructed to exclude some numbers in call tracing, for example, the short number for calling voice mail.

Note: EPI Rules follow Java Regular Expressions.

Rule Classes and Explanations:

Character Classes (bracket expression)	
[abc]	a,b or c (simple class)
[^abc]	Any character except a, b or c (negative)
[a-z A-Z]	a through z, or A through Z, inclusive (range)
[a-d[m-p]]	a through d ,or m through p [a-dm-p] (union)
[a-z&& [def]]	d, e or f (intersection)
[a-z&& [^bc]]	a through z, except for b and c: [ad-z] (subtraction)
[a-z&& [^m-p]]	a through z, and not m through p: [a-lq-z] (subtraction)

Predefined Character Classes	
.	Any character (may or may not match line terminators)

\d	A digit: [0-9]
\D	A non-digit: [^0-9]
\s	A white space character: [\ t \ n \ x0B \ f\ r]
\S	A non-white space character: [^ \ s]
\w	A word character: [a-zA-Z_0-9]
\W	A non-word character: [^ \ w]

Rule classes combined with Meta characters:

Meta character	Meaning
X?	X, once or not at all
X*	X, zero or more times
X+	X, one or more times
X{n}	X, exactly n times
X{n,}	X, at least n times
X{n,m}	X, at least n but not more than m times

Builder Time Parameters for EPI Rules:

Builder time parameters allow some tolerance in the time comparison done in finding matching xDRs. The time comparison rule for a given EPI "X" found in xDR with start time "S" and end time "E" is: LOOK for X where TIMETAG between (S;E) OR START_DATE between (S;E)

Note: TIMETAG = End Date
Two examples of builder time parameter use

- Negative (2-90000) and Positive (2-90000) effect

The time protocol tolerances fields (called here negativeT and positiveT) are used to determine the time range for the search.

The extended rule will be:
LOOK for X where TIMETAG between (S - negativeT; E + positiveT) OR START_DATE
between (S - negativeT; E + positiveT)

This comparison of time is based on each xDR from which a new query is launched to find other xDRs

(Based on EPI values found in the xDR).

- Guaranteed length (-1-90000) effect

The concept of guaranteed length is used to give better guarantee to find "long transactions." This guaranteed length extends the query to:

LOOK for X where TIMETAG between (S - negativeT; E + positiveT) OR
[START_DATE between (S - negativeT; E = positiveT) and TIMETAG between (S
- negativeT; E + positiveT + GUARANTEED_LENGTH)]

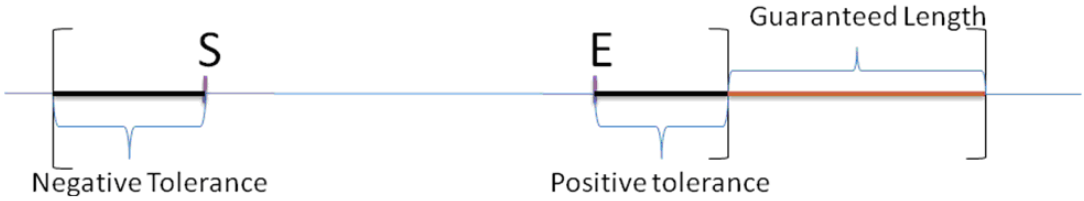


Figure 10: Graphical Representation of Guaranteed Length

The goal is to limit the search duration, by giving boundaries for the "end" of the search within an identified limit, as on the one hand, there are possibilities of long transactions, and on the other hand, (Because of the data storage mechanism), it optimizes the query efficiency. The value of this parameter is given in seconds.
The value "-1" means the system takes a default value that is 2 hours (7200 seconds).

EPI Rule Examples

These are two examples of using EPI rules.
In the first example there are two rules stated:

- Do not consider as a valid EPI, all values like FF, FFFF, etc.
- Do not consider as a valid EPI the value 888, for example in a voice mail number.

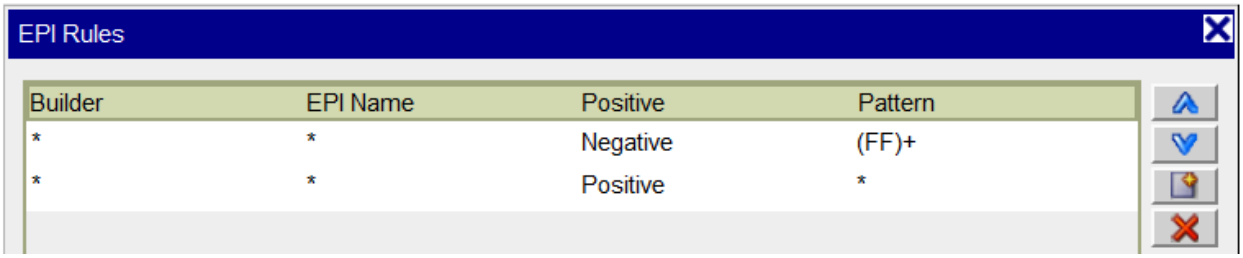


Figure 11: Example1 of EPI Rule Usage

In the second example a rule that states:

- Ignore for all protocols when a B_Number starts with 65 (considered as a prefix) followed or not by several digits.

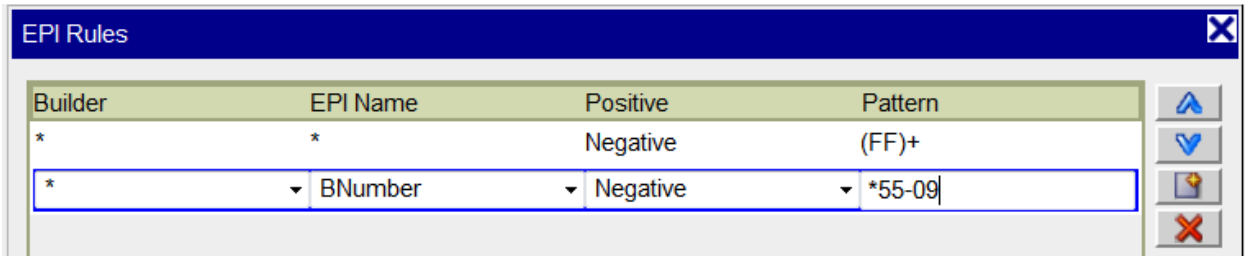


Figure 12: Example 2 of EPI Rule Usage

EPI Rules

Troubleshooting also provides a means of setting up EPI filtering rules that help you select specific records to trace. The following recommendations apply to EPI rules.

- If the EPI candidate passes the positive rule, it is considered as true EPI and no other rules are checked and the process is finished.
- If the EPI candidate passes the negative rule, it means that the tested EPI is not a real EPI and it is ignored. In both cases if the rule doesn't pass, the next rule is tested.
- If there are no other rules, the candidate is validated as the real EPI (the implicit rule is that every EPI is valid).

Note: EPI rules can only be configured, modified or deleted by users with Management Application Administrator privileges.

Configuring EPI Rules

Complete these steps to configure the EPI rules for your system.

1. Select Configuration **> EPI Rules**.

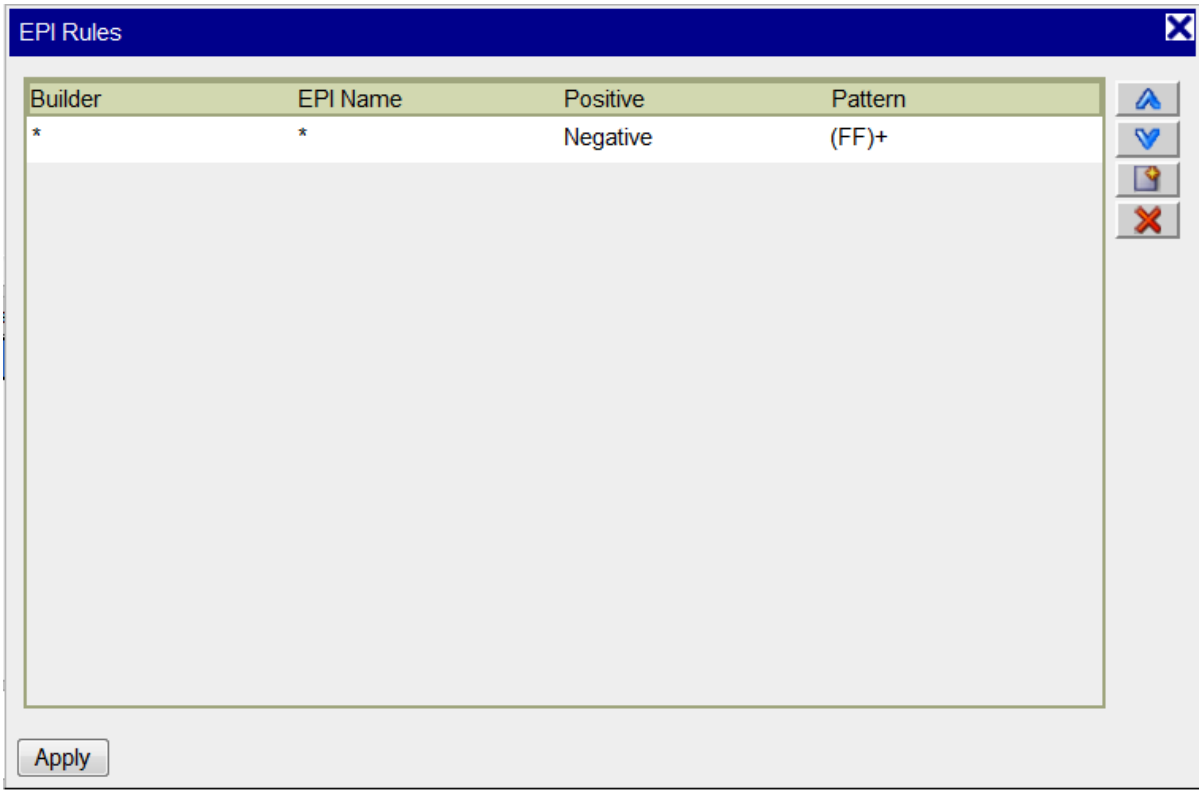


Figure 13: Epi Rules Screen

2. Click **Add**. The screen change to add another row shown in Figure 14 : Epi Rules Screen Add
Note: Adding a rule provides you with ways to broaden or narrow your traces.
Note: *'s signify wildcards. To specify specific rules you select from the options in each of the fields.

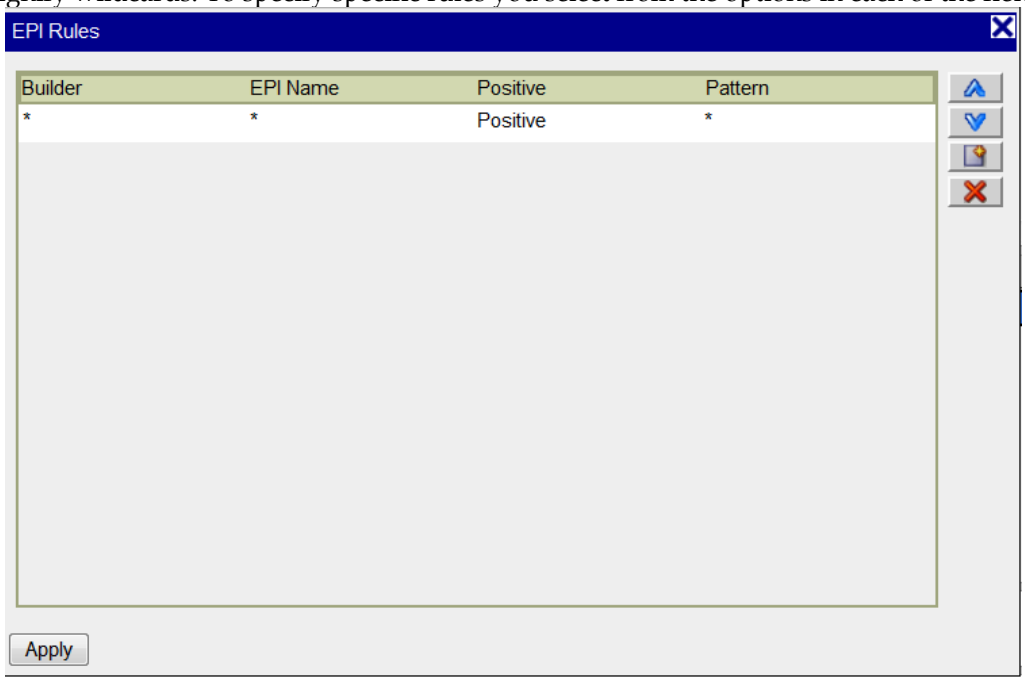


Figure 14 : Epi Rules Screen Add

3. Double-click on the row to open the fields.
4. Select the Mediation Protocol from the pull-down list.
5. Select the EPI Name from the pull-down list
6. Select whether the rule will be Positive or Negative. (See EPI Configuration)

Note: Type a specific Pattern for the rule. The pattern form is defined by "Java Regular Expression" rules. Here is an example: http://java.sun.com/docs/books/tutorial/essential/regex/

7. Click **Apply**. The rule is saved to the system.
8. Click **Close** to close the screen.

Modifying an EPI Rule

Complete these steps to modify an existing EPI rule.

1. Select Configuration > EPI Rules.
2. Select a rule and double-click on it. The record row changes to show pull-down lists.
3. Make the appropriate modifications to the rule.
4. Click Apply. The modifications are saved to the system.
5. Click Close to close the screen.

Deleting an EPI Rule

Complete these steps to delete an EPI rule.

1. Select Configuration > EPI Rules.
2. Select the Rule to be deleted.
3. Click Delete.
4. Click Apply. The rule is deleted from the system.
5. Click Close to close the screen.

Changing the Page Layout

You can change the page layout of the XDR viewer (or Trace viewer) to re-arrange or hide the xDR, PDU, and Full Decode views. To change the layout follows these steps.

Note: Only users with the Management Application Business Manager privileges can change the layout.

1. Click **Change Layout**. The layout pop-up opens.

Figure 15: Layout Button with Layout Choices

2. Select a **Layout**. The page layout changes to match your choice. This will now be the default layout for this session type.

Setting User Preferences

User Preferences feature provides a way to configure the following parameters:

- Time format
- Directory
- Mapping
- CIC settings
- Point Code
- Default Period

Setting Time Format

Follow these steps to set the time format.

1. Click User Preferences on the Application board page. The User Preferences page opens.
2. Select the Time tab to open the Time formatting interface.

Note: You can follow the Tips provided on the page to help you configure the time format to your needs.

3. Select the "**Date Format**" format.
4. Select the "**Time Format**" format.
5. Select the **Date and time fields** format.
   (Optional) Select the **Duration fields** format.
   (Optional) Select the **Time zone**.

Note: You must set the time to the correct location to get correct time.

6. Click **Apply** to save settings.

Note: To reset the time format to default settings, click Reset Tab**.**

Setting Enumeration Preferences

You can set the Mapping settings using the User Preferences feature. Mapping is used by xDRs to display the text values instead of numeric values.

Follow these steps to set enumeration Mapping preferences.

1. Click **User Preferences** on the Application board page. The User Preferences page opens.
2. Select the **Mapping** tab to open the Directory interface.
3. Check **Translate ENUM values** if you need to translate values.
4. Click Apply to save the changes.
5. (Optional) You can click Reset Tab to reset the default values.

Setting Point Code Preferences

The User Preferences feature enables you to set the Point Code preferences for your system. A Point Code is a unique address for a node (Signaling Point), used to identify the destination of a message signal unit (MSU).

Follow these steps to set the Point Code preferences.

1. Click **User Preferences** in the Application board. The User Preferences page is displayed.
2. Click the **Point Code** tab. The Point Code page is displayed. The red asterisk denotes a required field.

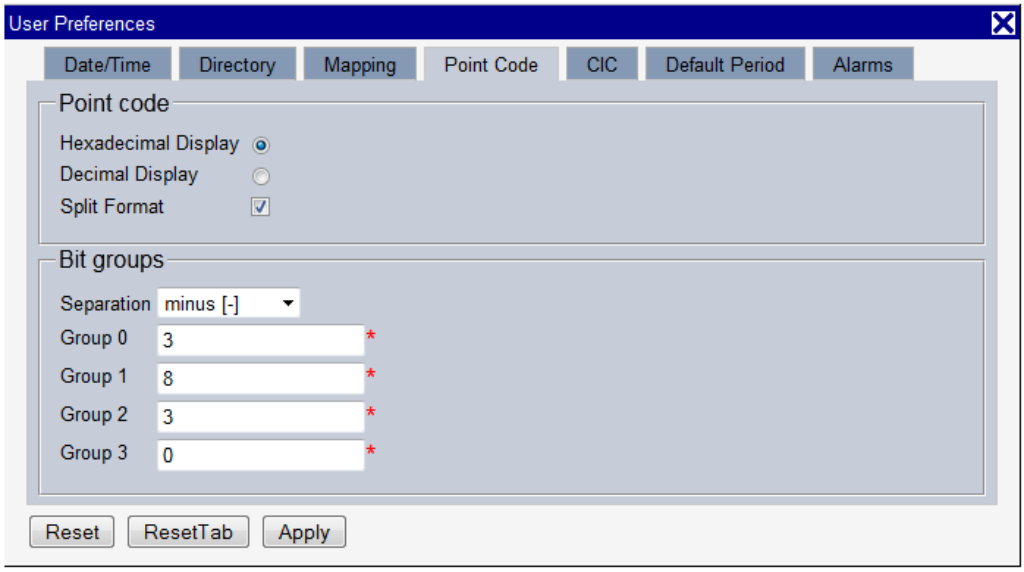


Figure 16: Point Code Tab

3. Select either **Hexadecimal display** or **Decimal display**.
4. Select or de-select Split format. If Split format is checked, the Bit groups settings in the box below are active. If Split format is not checked, Bit groups settings are not applicable.
5. If you selected Split format above, go to the next step. If you did not select Split format, go to step Step8.
6. In the Bit groups panel, use the drop-down box to select the **Separation** type.
7. Type in values for **Groups 0-3**.
8. To reset the point code preferences to default settings, click **Reset for Point code**. (The bottom **Reset** button resets all the tabbed pages to default settings.)
9. Click **Apply** to save your settings.

Note: if Session Point Code feature is enabled the Point Code tab will look like :

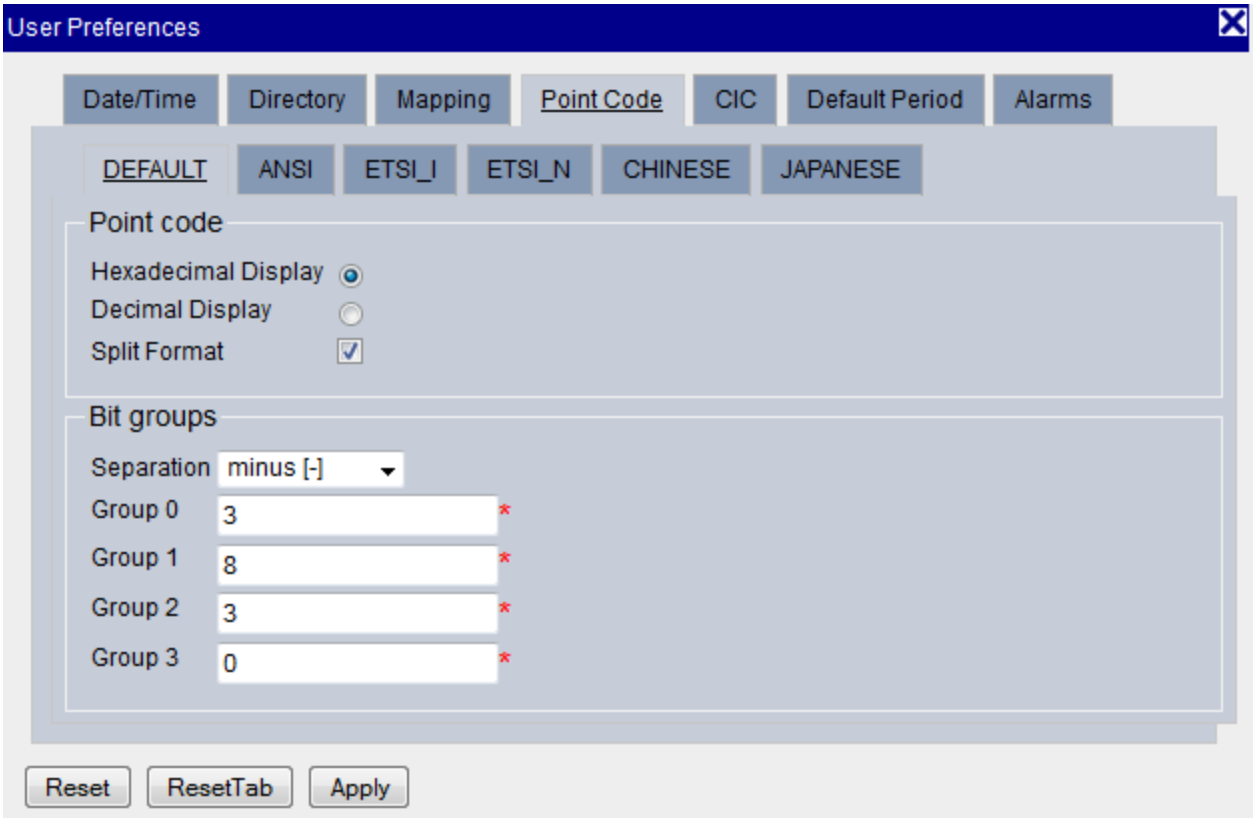


Figure 17: Point Code Tab with Session Point Code Enabled

User can follow the same steps mentioned above for setting preferences

Setting CIC Preferences

The Circuit Identification Code (CIC) provides a way to identify which circuit is used by the MSU. You can use the User Preferences feature to set the CIC settings for your system.

Follow these steps to set the CIC preferences.

1. Click **User Preferences** on the Application board page. The User Preferences page opens.
2. Select the CIC tab to open the CIC interface shown in.
3. Select the type of CIC (Hexadecimal, Decimal).
4. Select or de-select **Split format**.
5. Select the **Bit group Separation** (if split format is selected).
6. Type in the values for **Group 0** and **Group 1** values.
7. Click **Apply** to save your settings.

Note: To reset the time format to default settings, click Reset Tab.

Note: The North American defaults are:

a) CIC = Decimal display

b) Bit groups

- Group 0:8
- Group 1:8

Setting Directory Preferences

You can use the User Preferences feature to set the Directory preferences for your system. Follow these steps to set the Directory preferences.

1. Click **User Preferences** on the Application board page. The User Preferences page opens.
2. Select the **Directory** tab to open the Point Code interface.
3. Enter the exact path of the **Export Directory**, **Upload Directory**, and/or the **Download directory**.

Note: These directories must exist on the server for the Export, Upload/Download to work correctly.

4. Click **Apply** to save your settings.

Setting Default Period Preferences

The User Preferences feature enables you to set the Default Period preferences for your system. Follow these steps to set the Default Period preferences.

1. Click **User Preferences** in the Application board. The User Preferences page is displayed.
2. Click the **Default Period** tab. The Default Period page is displayed.
3. Enter the Default Period in hours.
4. Click **Apply** to save your settings.

Chapter 4: Transaction/Call/Data Traces

Trace Overview

Troubleshooting provides you with the ability to perform a trace in order to identify a particular customer or network related problem. You can identify the customer-related problem by starting a trace based on customer-related identifiers. For the historical customer-related trace, you initiate the trace by performing two steps.

The first step is to filter the xDRs based on the user-defined criteria. For example, you create a filter to list all the xDRs whose ANumber = 9192436596. Troubleshooting lists all the xDRs for completed calls. The second step is to select a particular xDR and start a trace.

For the real time customer related traces, you enter the customer identifier for the protocol(s) to be traced (See EPI). Based on the identifier you specify, Troubleshooting has the capability of tracing the transactions, calls and data sessions that transcend intra or inter protocols. Troubleshooting starts the trace in response to the customer/terminal identifier specified by the actor, for example, ANumber, MSISDN, IMSI, IMEI, SIP@, etc.

In addition, you can identify network-related problems by starting a trace based on network-related identifiers. As with historical customer traces, you go through a two-step process to initiate a network-related trace.

The first step, is to filter the xDRs based on the user-defined criteria. For example, you create a filter to list all the xDRs whose CAUSE VALUE = 'Unsuccessful'. Troubleshooting lists all the xDRs for completed and in-progress calls. In the second step you select a particular xDR and start a trace. Based on the chosen xDR, Troubleshooting has the capability of tracing the calls, data sessions and transactions that transcend intra or inter-protocols. In achieving a network-related trace you manage (create, modify, delete) protocol filters that enable you to create simple or complex filters. In addition, you can focus on a particular xDR data set and choose the desired xDR for starting a trace. Executing the filter results in an xDR Viewer display enabling you to browse xDRs and choose the desired one for initiating the trace.

Filtering Modes and Managing Queries

You obtain the information you want by creating and managing queries. Troubleshooting provides a wizard to help you create queries. Once a query is created, you can run, modify or delete the query.

When using Troubleshooting queries there are two modes available: Filtering Mode and In Progress Tracing, which are selected using the **Filtering Mode/In Progress Trace** toggle button in the Query list toolbar. When Troubleshooting is in **Filtering mode**, executing a query will always display the XDR viewer with result of the query.

When Troubleshooting is in **In Progress Tracing** mode, executing a query will always start a real-time trace in the Trace viewer. In this mode you can only create a trace query with EPI conditions using only the equal operator.

Note: In Progress Tracing may not be available depending on your product licensing and installation. **Note:** If an Mediation storage server is in "Query" state, no configuration actions can be undertaken. All servers must be in "Active" state when sessions are created for queries on such sessions to be successful.
Otherwise, if a query is launched in Troubleshooting on a newly created session, a "Unable to execute query: ORA-00942: table or view does not exist." will appear.

Naming and Describing a Query

Complete the following steps to name and describe a query.

1. Select a session from **All Sessions** or **Network View**. A list of saved queries compatible with the selected session or network view is displayed.
Note: The query list is filtered based on your privacy rights.

2. Click **Create** to create a new query. The Query dialog opens.
3. Type in the **Name** of the query.
4. (Optional) Type in a **Description** of the filter. This is useful if the filter is shared with other users.

Adding One or More Dictionaries to a Query

Note: Dictionaries are discovered in Centralized Configuration and imported into Troubleshooting.
When creating a query, you can add one or more dictionaries. This enables you to select one or more protocols for your queries. After you have named and described the query, can select one or more Dictionaries for the query. Complete the following steps to add dictionaries to a query.

1. In the Available dictionaries field, select the Dictionary for the filter.
2. Click the Add button beside the Available Dictionaries field.
3. Repeat steps 1 and 2 to add additional dictionaries. You can add multiple dictionaries. For each dictionary selected, another tab appears with the name of the dictionary.

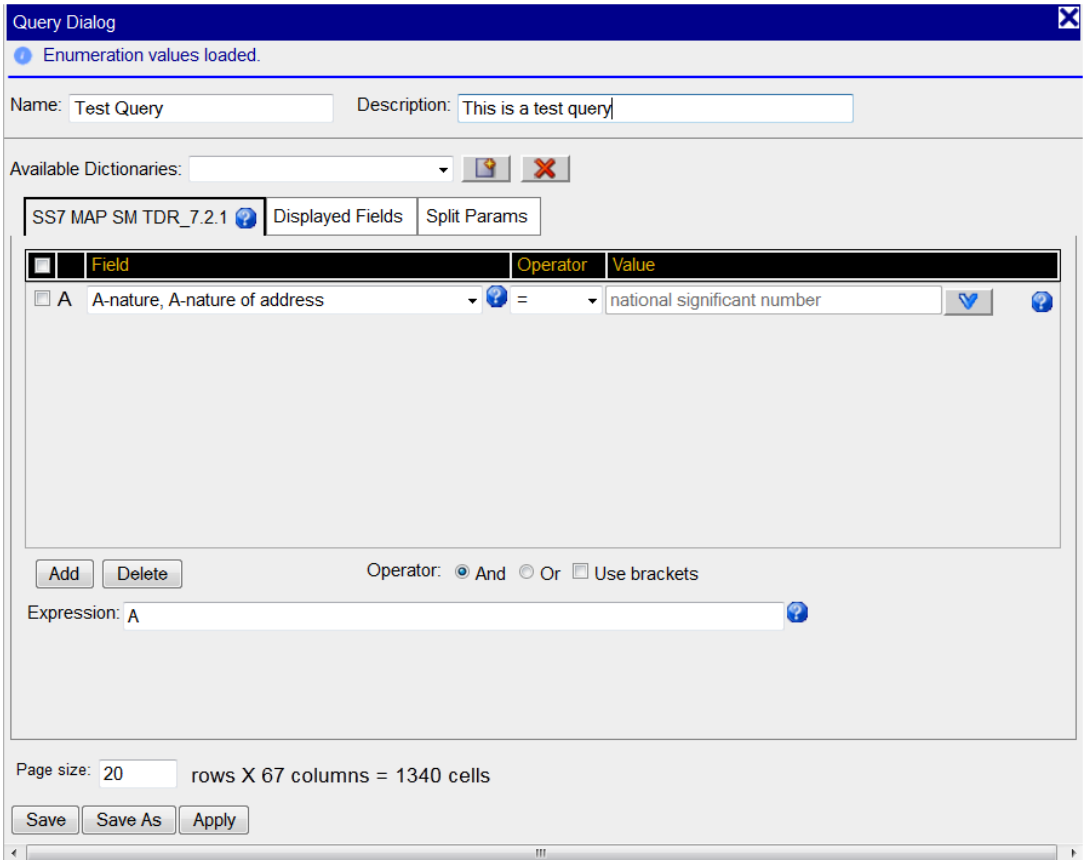


Figure 18: Query with a Dictionary Selected

Creating Conditions for a Query

You can fine-tune your query by creating conditions. Complete these steps to add a condition to your query.

1. Select the Dictionary tab for the condition you want to create.
Note: If there are multiple dictionaries for the filter, create the conditions for each dictionary separately.

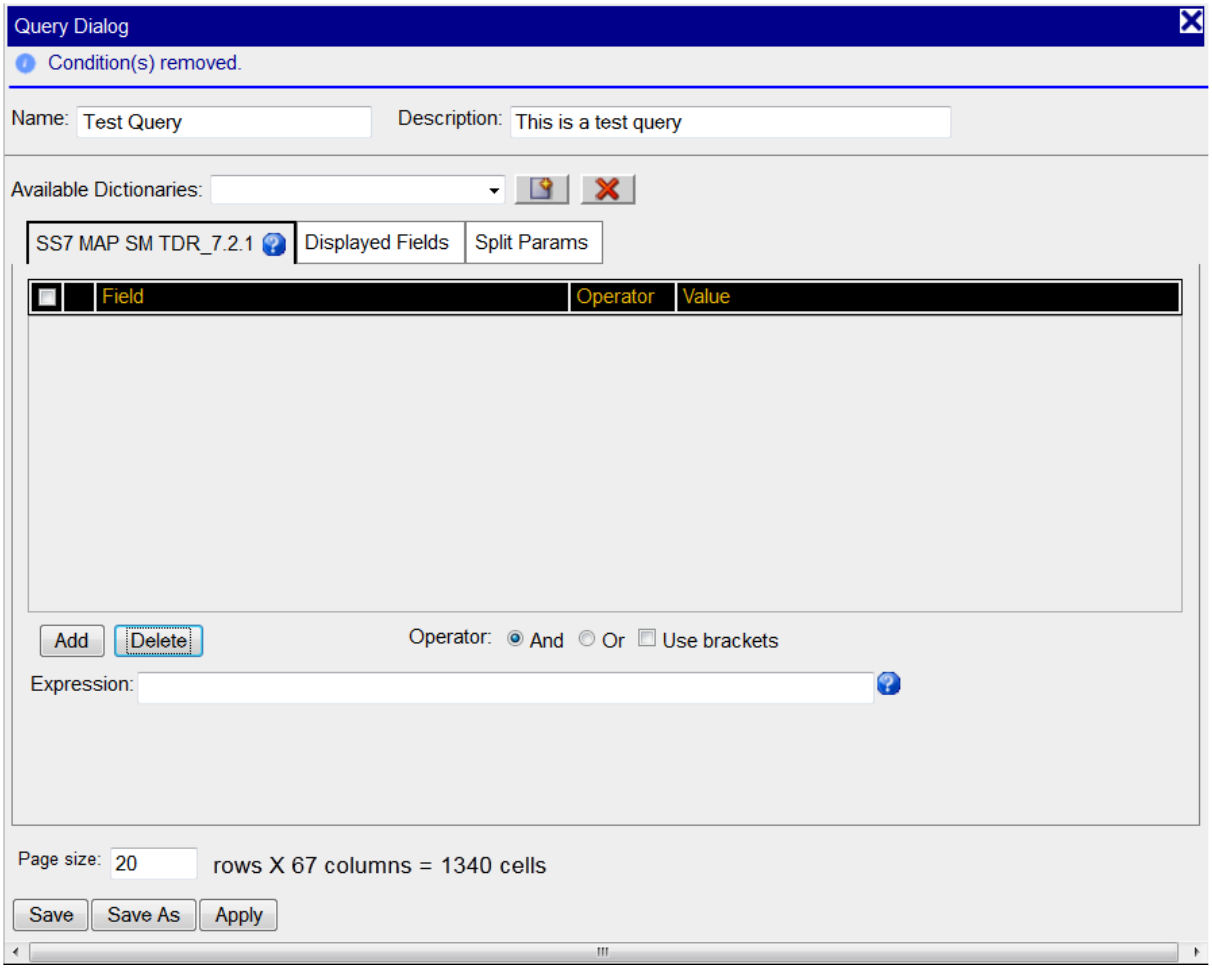


Figure 19: Dictionary Screen

2. Click **Add** (located on the bottom section of the screen) to create a condition for the filter. The condition fields appear on the Dictionary screen.

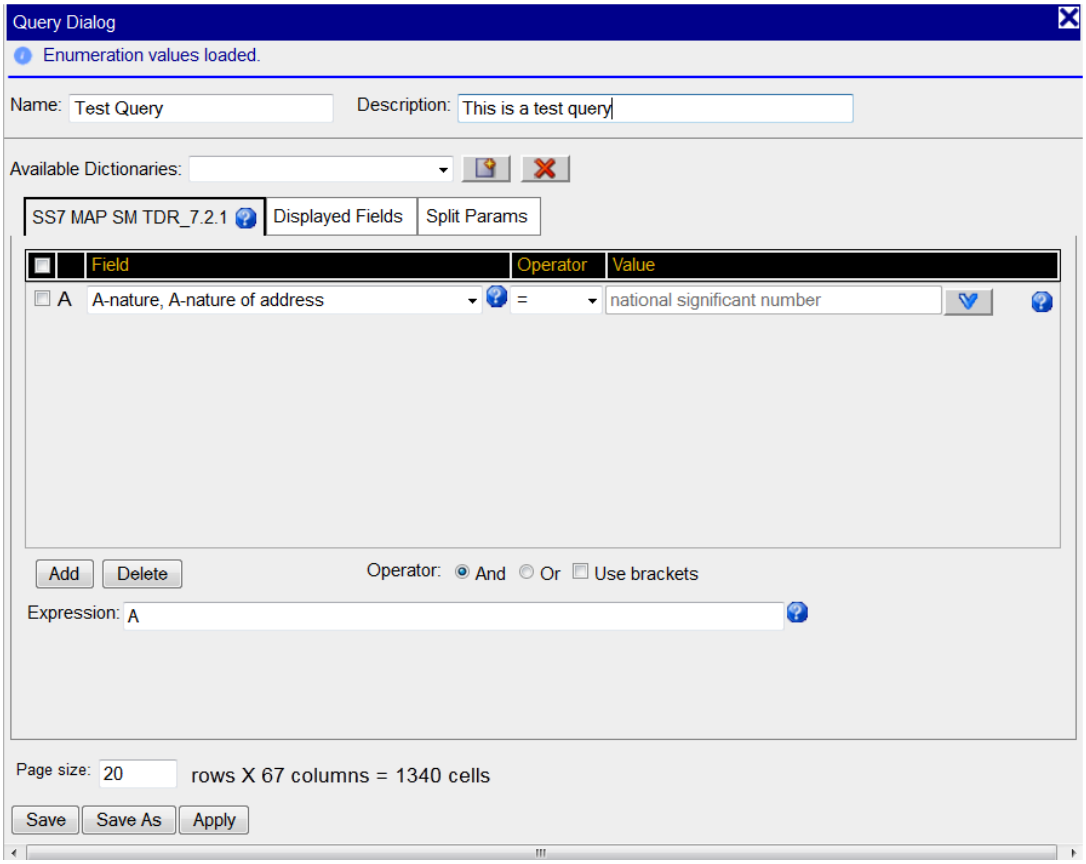


Figure 20: Dictionary Screen with One Condition for A-Nature, A-Nature of Address

3. Select a **Field** from the field list. You can mouse over the question mark icon next to the Field pull down to see information about the selected field.
Note: Indexed Fields are highlighted in Red.

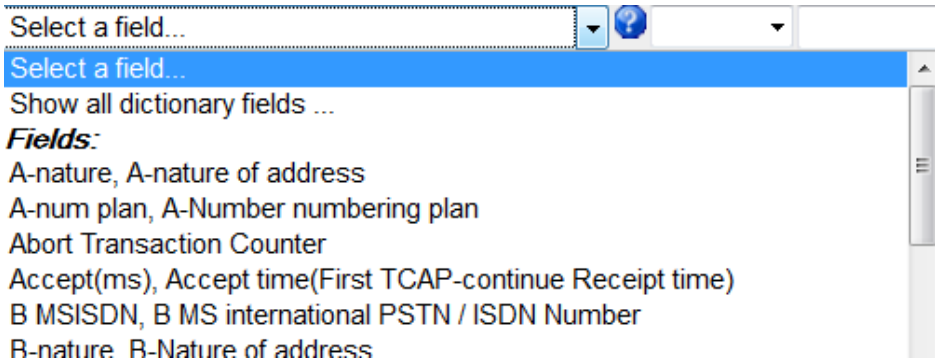


Figure 21: Example of Indexed Fields

4. Select an **Operator** from the Operator field. You can mouse over the question mark icon next to the Operator pull down to see information about the selected operator.

Note: The only operators that are listed are those that can be used with that field.
5. Select or enter a **value** for the condition.

Note: For example, all A-numbers greater than 000-000-0000.

At this stage you can go to the Displayed Fields tab to select the fields you want or you can create more conditions. See Figure 22: Query Dialog with Session Point Code Enabled

Note: To find records with a NULL property, make sure to use "equals NULL" condition. For example, MSISDN = NULL.

Note:

- The format supported for IP-V4 is as usual 4 groups in decimal separated by **'.'** : xxx.xxx.xxx.xxx.
- The format supported for IP-V6 fields is 8 groups in hexadecimal separated by **':'** with canonical way
  xxxx: xxxx: xxxx: xxxx: xxxx: xxxx: xxxx: xxxx
- It will be possible to use prefixes notation to be able to find range. This will be available for IPV4 and V6.
  For Example: 1082::8:800:200C:417A/11
  Will search all IPs between
  '10800000000000000000000000000000' AND '109FFFFFFFFFFFFFFFFFFFFFFFFFFFFF'

Note: If Session Point Code Feature is enabled:

- For all the Query Conditions with Point Code fields the Value Drop Down displays "Please Specify other in <flavor> format" where <flavor> is the Session Flavor in case of Session Query
- In case of Network View the Drop Down should display an entry each for the distinct possible flavors of all the sessions constituting the Network View.
- On selecting a Flavor Item, Text Box should display [<flavor>]. User should be able to enter the Point Code Value after that.

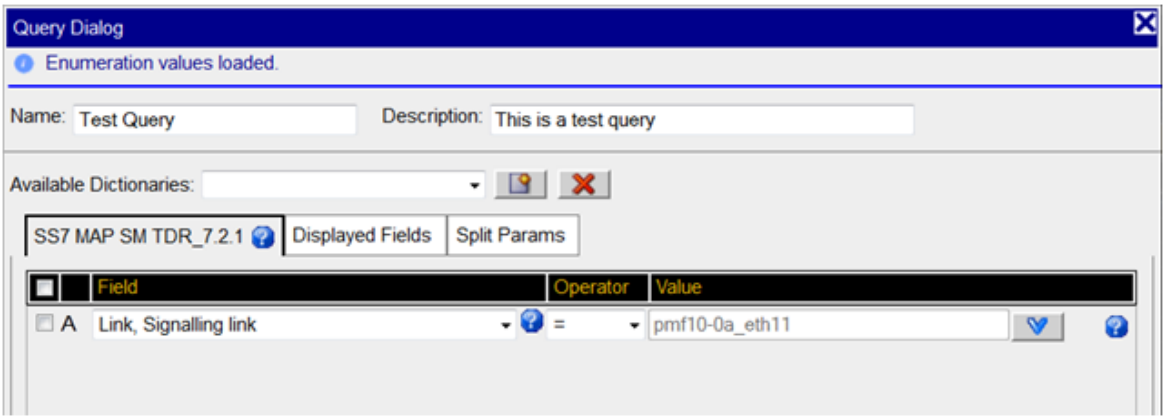


Figure 22: Query Dialog with Session Point Code Enabled

Creating Multiple Conditions for a Query

Troubleshooting provides specific Operators that you can use when creating multiple conditions for a query. Complete these steps to create multiple conditions.

Note: If you have multiple dictionaries you can create conditions for each dictionary.

1. Select the Dictionary for the condition you want to create.
2. Select the Operation to be used for the condition. You can select any one of three operations.

- And
- Or
- Use Brackets (if you want to tailor your filter for specific operators.)

The figure shows a query with multiple conditions and an operator. The expression for the query is shown in the expression field.

3. To create a new condition, click Add (located on the bottom section of the screen).
4. Select a Field from the Field list.
5. Select an Operator from the Operator field.
Note: The only operators that appear are the ones allowed with the field.
6. Select or enter a value for the field.

Note: Acceptable values are validated against the data type of the field. You have an option of entering wild card characters such as: "*" or "?". In addition to wild cards, you can use "~=" for address Digits and enter the subset of digits to use the Flex Matching feature. Lastly, for address fields like CdPN, CGPN, redirecting number, dialed digits and routing number, you also have the option of entering the HEX digits like B, C and D.

Note:

- The format supported for IP-V4 is as usual 4 groups in decimal separated by **'.'**
  : xxx.xxx.xxx.xxx.
- The format supported for IP-V6 fields is 8 groups in hexadecimal separated by **':'** with canonical way
  xxxx: xxxx: xxxx: xxxx: xxxx: xxxx: xxxx: xxxx
- It will be possible to use prefixes notation to be able to find range. This will be available for IPV4 and V6.
  For Example: 1082::8:800:200C:417A/11
  Will search all IPs between
  '10800000000000000000000000000000' AND '109FFFFFFFFFFFFFFFFFFFFFFFFFFFFF'

Note: If Session Point Code Feature is enabled:

- For all the Query Conditions with Point Code fields the Value Drop Down displays "Please Specify other in <flavor> format" where <flavor> is the Session Flavor in case of Session Query
- In case of Network View the Drop Down should display an entry each for the distinct possible flavors of all the sessions constituting the Network View.
- On selecting a Flavor Item, Text Box should display [<flavor>]. User should be able to enter the Point Code Value after that.

Type	Format	Multiple Values	Wildcards (“?” for single character, "*" (start) for multiple characters)
BCD_ADDRESS	All hexadecimal characters (0-9, A-B) No prefix needed	Yes	Yes, in all places
CIC	$ as prefix for hexadecimal values, none as prefix for decimal, “-“ for field separator depending on user preferences, * for wildcard	Yes	Only * (Only at the end)
DUMP	$ as prefix (With or without space between hexadecimal values) (0-9,A-B)	Yes	No
ENUM	ENUM Integer *, ? for wildcards	Yes	Yes, in all places on label only
HEXADECIMAL	$ as prefix for hexadecimal (0-9, A-B) values, none as prefix for decimal	Yes	No
INTEGER	All numbers	Yes	No
IP_V4	4 numbers (0-255) separated by "."	Yes	No
IP_V6	Hexadecimal	Yes	No
MS	hhh:mm:ss.ms	Yes	No

	mm:ss.ms ss.ms ms		
POINT_CODE	Name of a node (text) $ for hexadecimal values “-“ separator * for wildcards	As CIC	As CIC
STRING	All chars	Yes	Yes
UNIX_TIME	Depending on user preferences	No	No
UNSIGNED	All numbers	Yes	No
UNSIGNED3	All numbers	Yes	No
VARSTRING	As string	As string	As string

Table 2: Field Types and their Values

Note: For example, all A-numbers greater than 000-000-0000.

7. Repeat **steps 1-6** to create filter conditions for different fields.
8. Combine the conditions to create a filter condition by using a condition operator such as AND, OR, Use Brackets.

Here is an example of a query with multiple conditions.

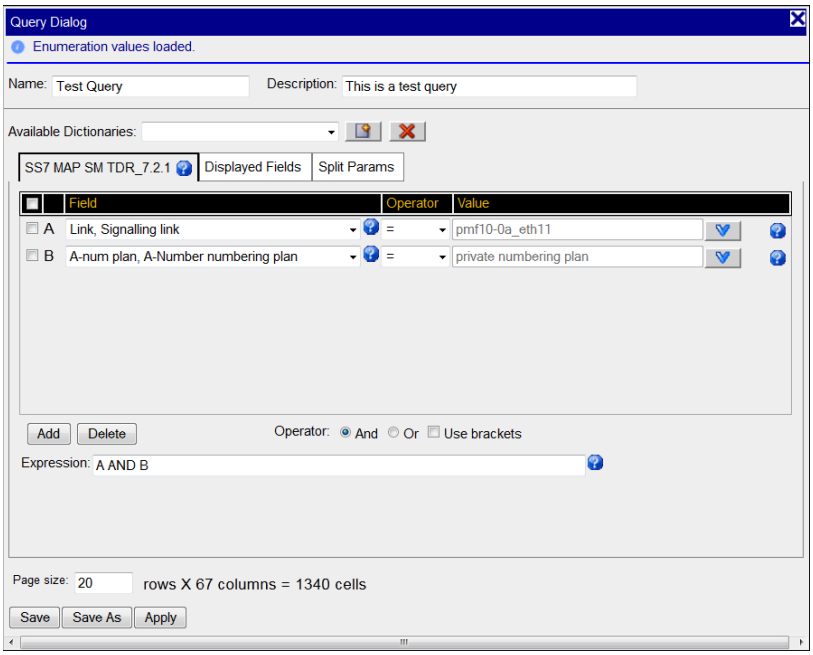


Figure 23: Query with Multiple Conditions

At this point you have two options. You can save the filter for future use or you can apply the filter for immediate use.
Note: Applying a filter does not save it. You must use the save function to keep the filter in the system for future use.

Selecting Displayed Fields for a Query

The **Displayed Fields** tab provides three options for selecting fields that are displayed in the query.

- All fields - selecting this option incorporates all fields in the dictionary.
- Common fields - selecting this options enables you to see all common fields if you using multiple dictionaries.
- Custom fields - enables you to select specific fields for the query. This is the default setting.

Selecting the Displayed Fields tab opens the screen. Multiple fields can be selected using the CONTROL and SHIFT keys.

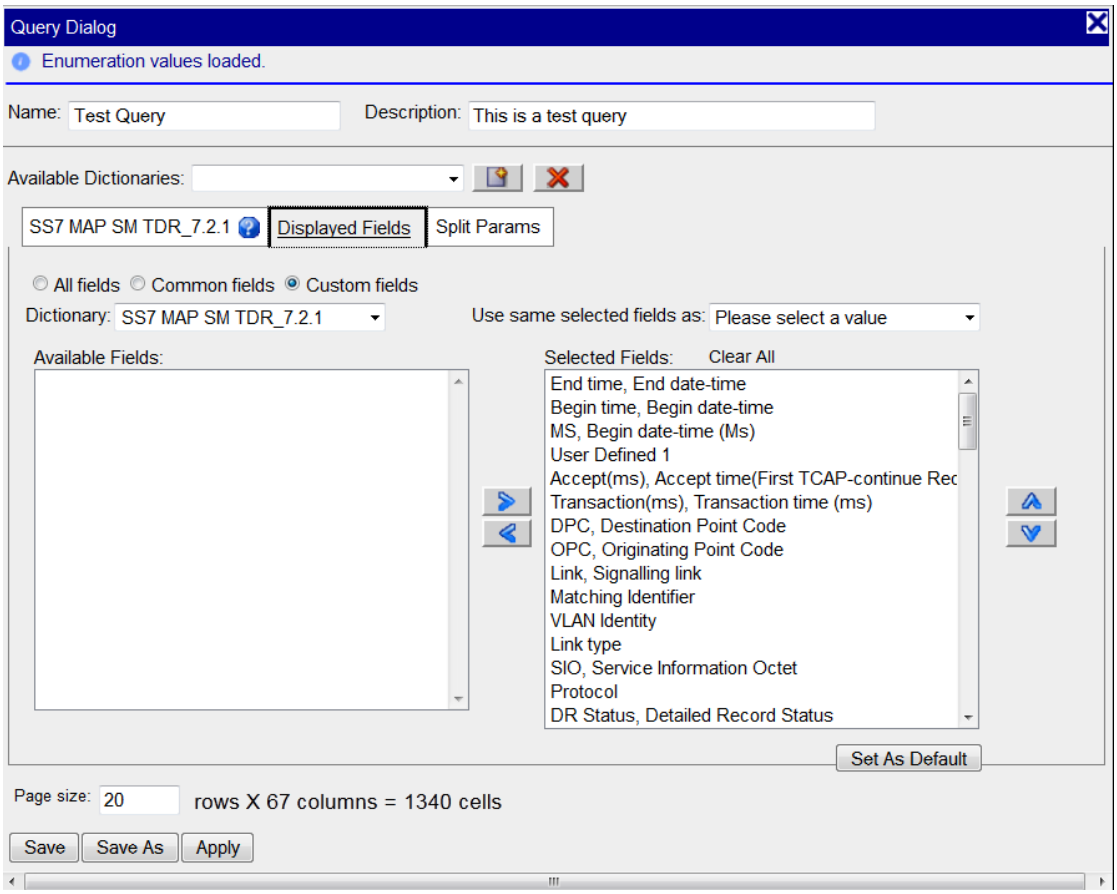


Figure 24: Displayed Fields Screen

Using Split Params Function

The split query function provides a mechanism to split queries executed for a large time duration into a sequence of queries of shorter intervals. This option enables you to get query results faster rather than waiting to process the whole result set. Each query of shorter duration is executed sequentially one after the other as the demand for more results is received.

You execute a query for the time period 10:00:00 A.M to 10:30:00 A.M. If the Split Period is configured as 5 minutes, then this query will be split into 7 queries of shorter duration, for example, 10:00:00 - 10:04:59, 10:05:00 - 10:09:59, 10:10:00 - 10:14:09, 10:15:00 - 10:19:59, 10:20:00 - 10:24:59, 10:25:00 - 10:29:59, 10:30:00 - 10:30:00 The query between 10:00:00 - 10:05:00 is the first query executed and depending on the number of results returned the next query in sequence is initiated.

The figure shown here is an example of a split query screen.

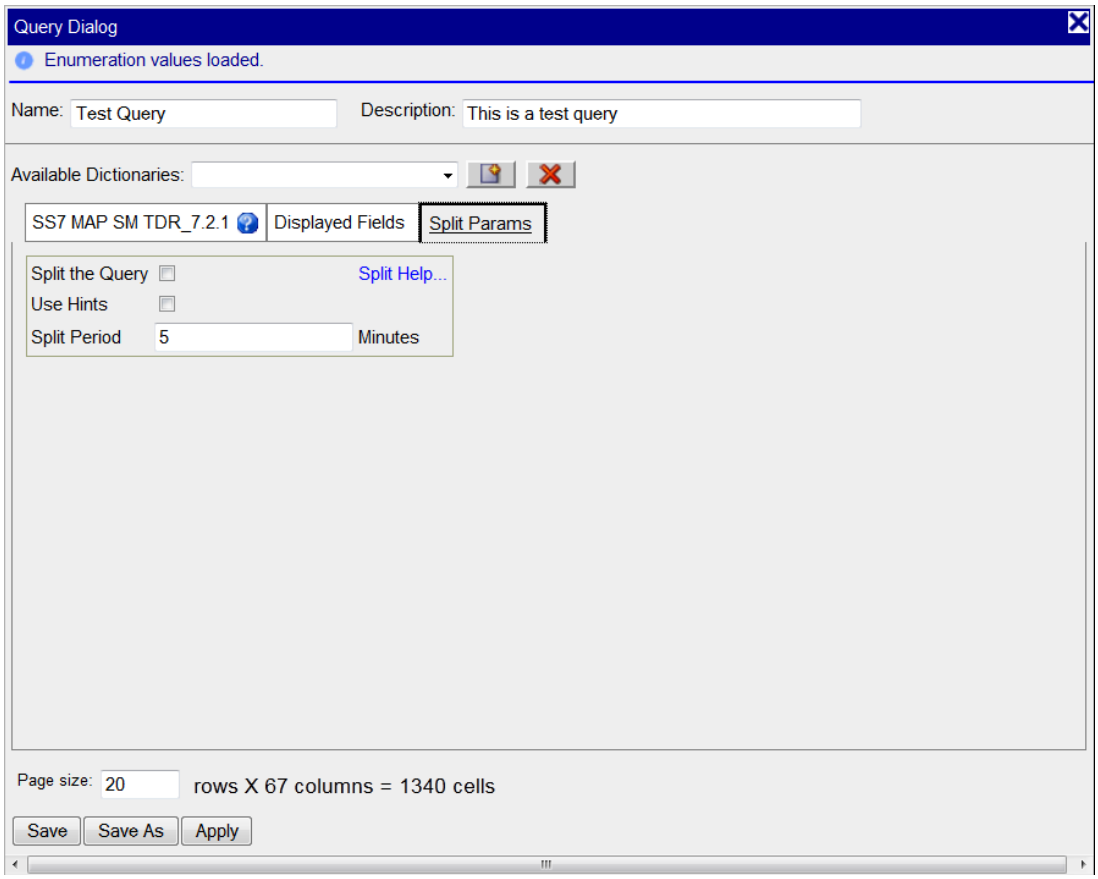


Figure 25: Split Query Screen

Follow these guidelines to create a split query.

- Choose to **split** the query - Clicking this option means that the query will be split. You can also save the query with this information so that the query is split every time it is executed.
- Select the **Hint** option - this option provides an indication that is submitted with the query and tells the database to perform the split query search in a way that can potentially speed up the query. The option not selected by default and should be changed only after consulting a certified Oracle representative.
- Select a **time interval** - this option defines intervals the query is divided into. If this option is selected, then the query is split into shorter queries with each query's duration equal or similar to the *Split Period* that you define. The *Split Period* can have any value equal to or greater than zero. The value of zero means the query is not split at all. By default, the split period is set to 5 minutes and should be changed only after consulting with a certified Oracle representative.

Note: The choice of Split Period is normally governed by the cardinality of data with respect to time. A smaller Split Period will be very effective for data that repeats itself almost every second of the time period chosen.

Recommendations for using Split Query Function

Query splitting is most effective for the queries on fields having low cardinality. Low cardinality means that the fields queried upon have few unique values or are very common. For example, phone number fields

have high cardinality as they are unique customer identifiers. But fields like OPC and DPC have low cardinality because many calls will have same OPC and/or DPC. In general, Query Splitting should not be used for queries on phone number fields like A-Number, B-Number and MIN. Here are two general recommendations for using split queries.

- Recommendations on using the Split Query option - In order to be sure whether your query runs faster with or without Query Splitting you can execute the query with Splitting off and then Re-execute it with splitting on. Based on response time, the query can be saved with the desired preference for re-use. This enables you to make the decision once for their subsequent executions.
- Recommendations on setting the Split Period - The system will initiate the queries in split mode until it checks that the page size asked by the user is completely filled. For example, if you have set a preference of 300 records per page, the system will keep on executing the split queries until it finds 300 or more records. This means that a smaller page size can potentially result into faster response to get the first set of data as the system may have to execute less number of split queries in sequence to fill the page.

Saving a Query

You have two choices in saving a query.

- You can click **Save** and the query is saved for future use. The query is added to the list for that Network View or session.
- Or, if the query already exists, you can click **Save as** and save the query with another name.

Note: Please refer **Appendix C: Queries During Protocol Upgrade** for behavior during Protocol Upgrade.

Using Save as Feature

The query dialog screen has a Save As button to enable you to quickly create variations of a query without having to go through the full process each time.

Note: Please refer **Appendix** C: Queries During Protocol Upgrade, for behavior during Protocol Upgrade.

Applying a Query

Complete these steps to apply a filter for immediate use.

1. Create a query.
2. After creating the query, click **Apply** to validate the condition(s) and set the time period.
3. Specify the **time period** for the filter in the Time/Date tab in the Query Settings screen.
   Select **Predefined** and use the pull down to select a predefined time period or select **Real Time** for a real time query.

   a) Select **Begin Date** and **time**.
   To select the date and time, you can use the calendar and clock icons beside the fields.
   When using the date icon, clicking on << or >> moves the selected year back or forward. Clicking on < or > moves the selected month back or forward. For example, clicking > twice moves the date forward two months.
   When using the clock icon, the time interval (hours, minutes, seconds) element changes after selecting the previous interval. For example after selecting the hours, the minutes pop-up opens.
   b) Select **End Date** or **time**.
   c) Select whether the time is to be the local time zone or a specific user preference. (The default is Use preferences time zone).
   d) (Optional) Refresh the **First time** and **Last time** information using the **Refresh Session Periods** button to show the date and time of the first and last available data.

Note: If a query is being made for data that was stored within a period that includes the Daylight Savings Time change, you must specify the Begin Time before the time change period. If you specify a Begin time that falls within the DST time change period (usually 1 hour), only data that was stored after the clock change will be displayed.

4. Click **Execute** to run the query or **Execute in New** to run the query in a new window.
Note: Up to 5 query windows can be open at one time.

Using a parameter to initiate multiple Queries

Troubleshooting enables you to create a parameterized query. When the query is executed Troubleshooting prompts you for the parameter. For one parameter it displays one prompt which is then filled into one condition
(for example an A-number). This feature enables you to use one prompt for several conditions. For example, to create a query with a single prompt "A-B-C Number:" which would be used for A-number, B-number, and C-number.

1. Click the **Create** button on the Query list page. The *Query Dialog* is displayed.
2. Add a **dictionary**.
3. Add **several conditions** (for example A-number, B-number, and C-number).

Define the values so that these conditions are parameterized. The value must be in the following format: #{<prompt text>}
You can mix parameterized and non-parameterized conditions in the same query.
Note: To share the prompt, the prompt text has to be the same for all shared parameters.
Note: It is not possible to share prompts for Enumeration fields.

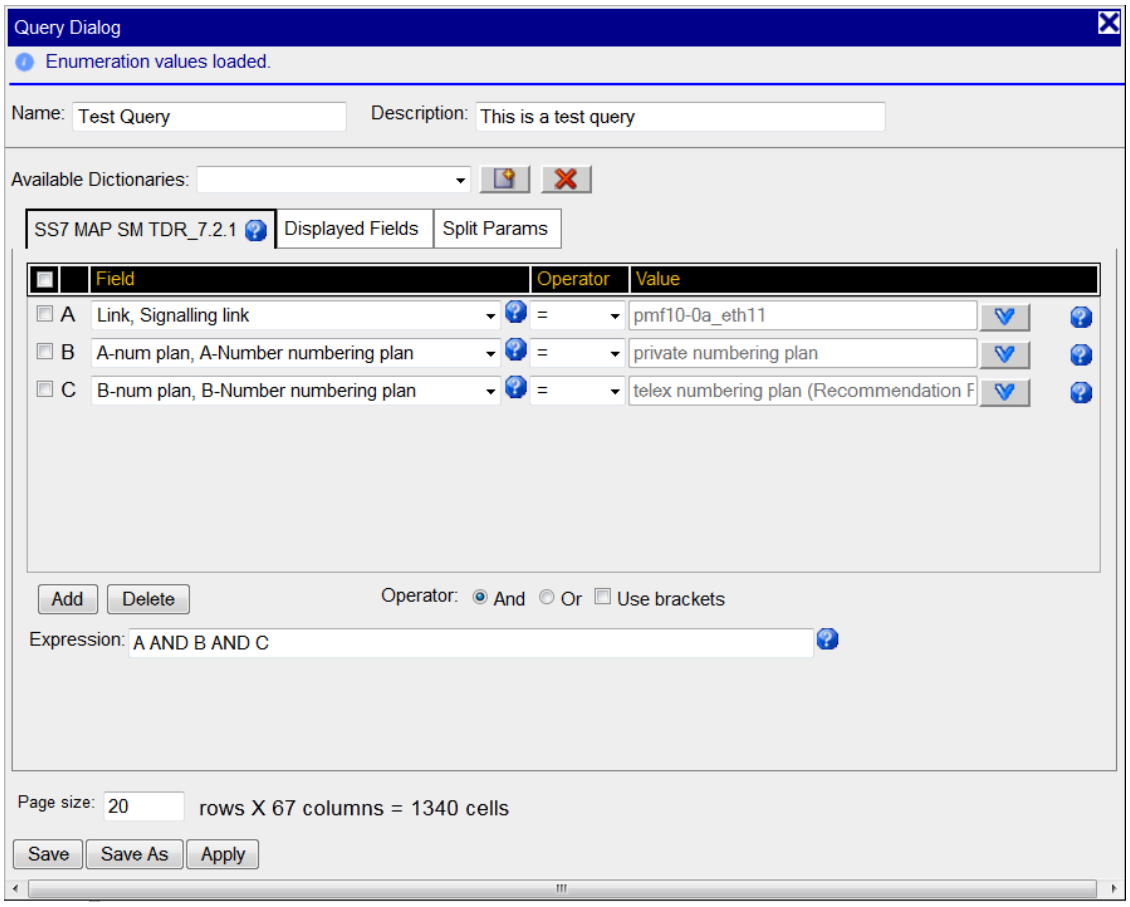


Figure 26: One Parameter for Multiple Queries

Note: It is not possible to share prompts for Enumeration fields.

4. Save the query.

Note: When a parameterized query is executed, the Query Settings dialog contains an additional Parameters tab with the new parameters.

Note: Please refer **Appendix C: Queries During Protocol Upgrade** for behavior during Protocol Upgrade.

Using Pre-defined Time Intervals for Real-time Traces

You can use pre-defined time intervals in your queries when initiating real-time traces. Complete these steps when utilizing this option.

1. Create new query or select a query from query list.
2. Click the **Execute** button. The Query Settings screen opens.
3. Select **RealTime**. The screen options change.

Note: When you select Real Time the Predefined option is automatically selected and the date and time fields are grayed out.

4. Select a **time interval** (the options range from the next 5 minutes all the way to until canceled).
5. Click **Apply** to initiate the trace.

Using Save as Feature

The query dialog screen has a Save As button to enable you to quickly create variations of a query without having to go through the full process each time.

Testing a Query Using the Plan Function

Clicking the plan button on the bottom of the Options tab (or in the xDR viewer menu bar) enables you to initiate the plan function. When the test is completed, the screen opens to show the results.

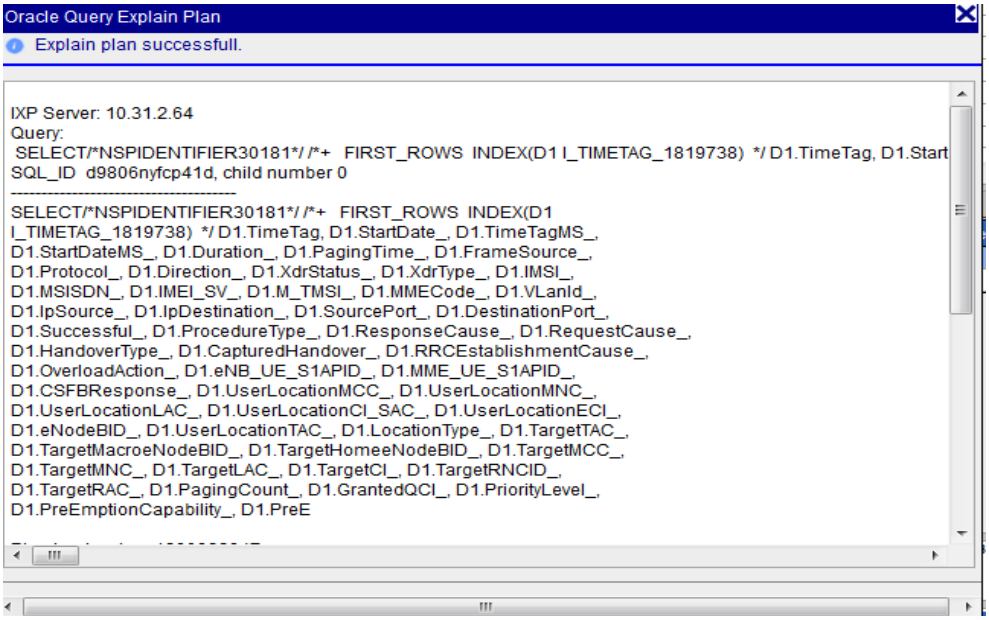


Figure 27: Plan Function Screen - Test Completed

The screen shows all the planned steps for completing the query. When finished, click **Close** to close the screen.

Using Flex Matching in Queries

With flex matching filters, you can also use the ~= operator between fields. This operator allows you to filter on a subset of address digits and eliminates the need for an early determination on whether the address digits include an area code, country code or trailing characters.

The following rules apply to flex matching filters:

- The minimum length of the match must be more than half the length of the longer number. For example, if the target is a thirteen digit number, a number which matches it will have to be at least seven digits long. A filter match for 4119194605500 will match 4605500, but will not match 605500, because 605500 is not longer than half of the filter target.
- The minimum length of the match must also be at least five digits in length. For example, A filter match for 4605500 will not match 5500 because it is not at least five digits.
- Flexible Matching is available for all filters and traces (whether predefined or not) when address digits are involved unless overridden by Wildcard Matching.

Note: The field (EPI) will be queried by flex matching if the "Flex Matching" function is enabled and if a given EPI is enabled for flex matching. (See EPI Configuration

Note: Enabling of flex matching function has a strong impact on performance.

Using the Multiprotocol Function

You can run your query using multiple protocols when you select the multiprotocol function in the Options tab. In Multi-Protocol tracing other protocols may be examined to find other legs or transactions of the

trace.
Complete this step when using multiprotocol option.

1. Select **Options** tab.
2. Select **Use Multiprotocol** shown here.

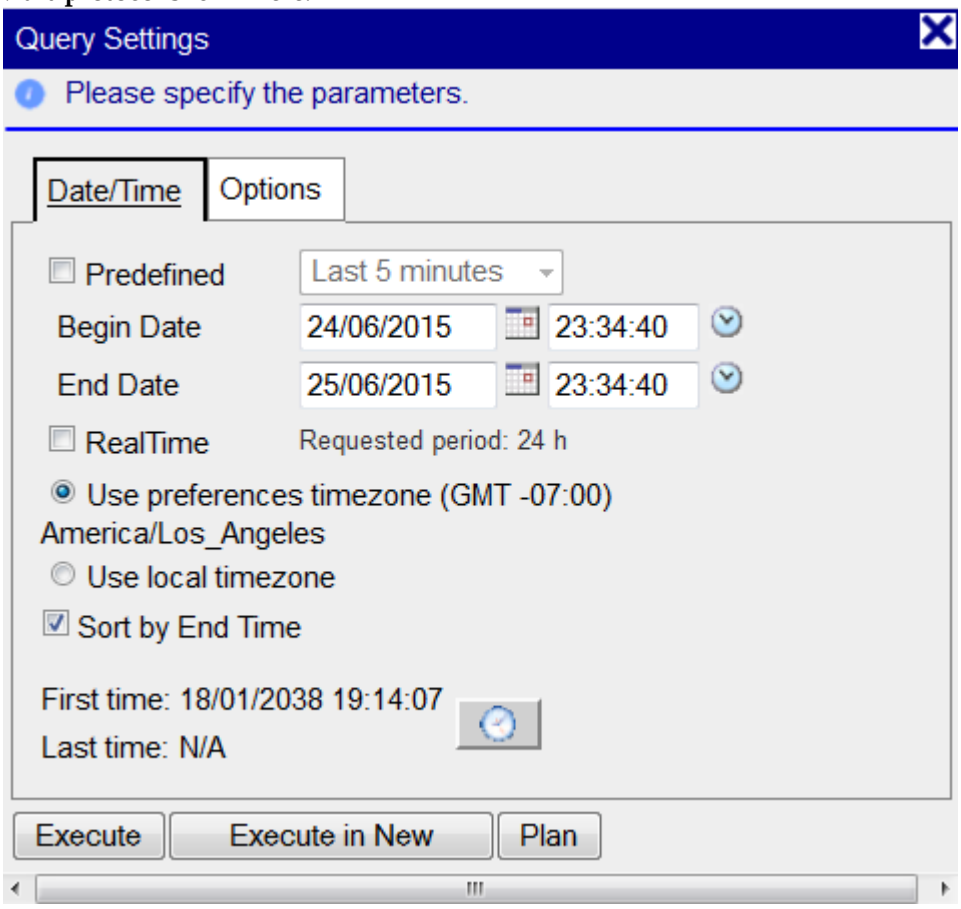


Figure 28: Options Tab with Multiprotocol Selected

3. Click **Execute** to run the query. The query is initiated and a status bar appears that shows the progress of the query.

Note: You can cancel the query by clicking Cancel under the progress bar. Only those records that have been completed up to the time of cancelling will appear.

The xDR viewer is displayed with the filter criteria and xDRs for each of the filtered protocols. The filtered protocols appear at the bottom table. In the case of real-time queries, all results are updated every five seconds by default.

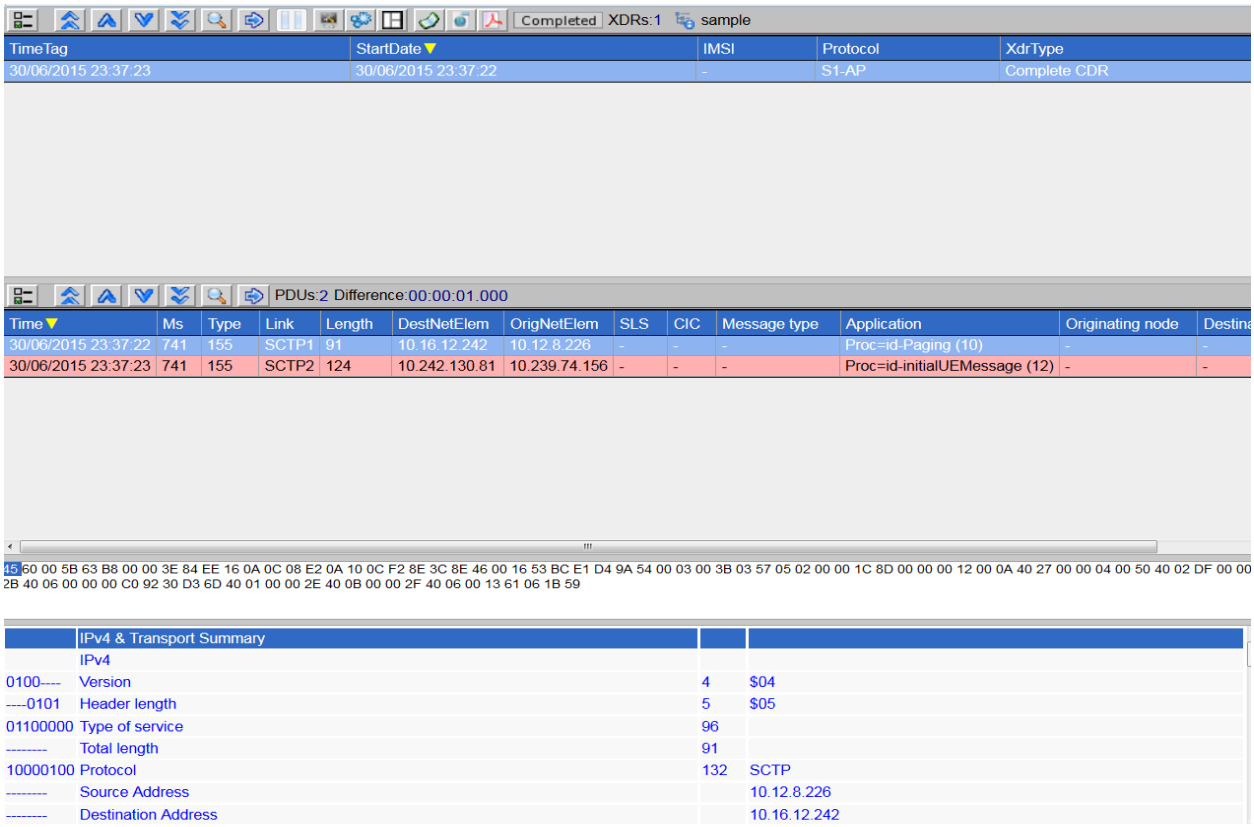


Figure 29: Trace View Screen

You can save the filter for future use. The filter will be added to the list for that Network view.
Note: The directionality of a call is in context of whether it is node-centric or eagle-centric.

PDU Delete Prompt

If there have been some configuration changes that result in PDUs being deleted from the system, a screen prompt appears when the trace is completed. The figure shown here shows a completed trace with the prompt located at the bottom of the screen.

Figure 30: Deleted PDU Prompt

How to Display Time Difference for PDUs

This function enables you to display the time difference between two PDUs. Complete these steps to display the PDU time difference.

1. Select a PDU.
2. Move the **cursor** over another PDU.
3. Troubleshooting shows a time difference in the PDU view toolbar in form of HH:MM:SS.sss (HH – hours, MM – minutes, SS – seconds, sss – milliseconds).

The figure below shows a PDU difference.

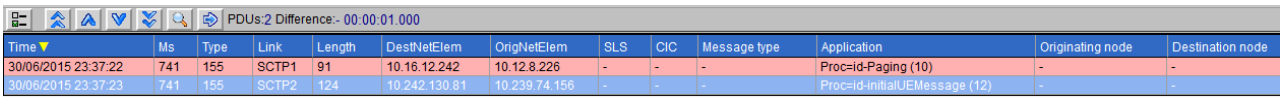


Figure 31: Time Difference between PDUs

Modifying a Filter

Complete these steps to modify an existing filter.

1. In the initial page, select a **Network view** or **Session** from the query list (left section).
2. Select a Filter from the list.

In this example the filter selected is Answered.

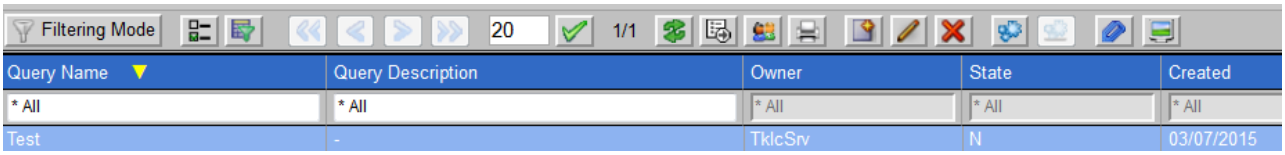


Figure 32 : Selected Filter

3. Click **Modify** button on the toolbar. The Query Dialog opens with the existing filter shown in Figure 33: Filter Opened for Modification.

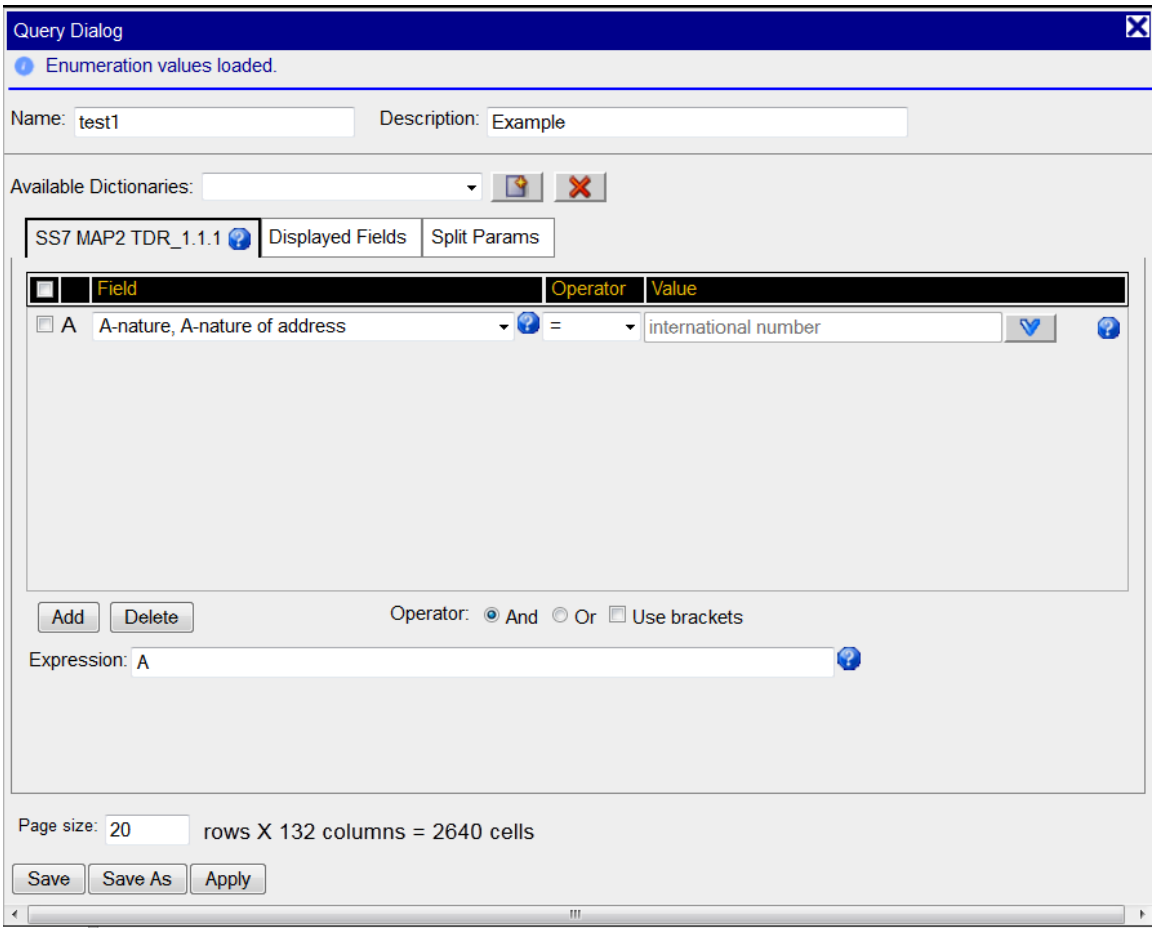


Figure 33: Filter Opened for Modification

4. Make the necessary modifications. In this example a Description is added.

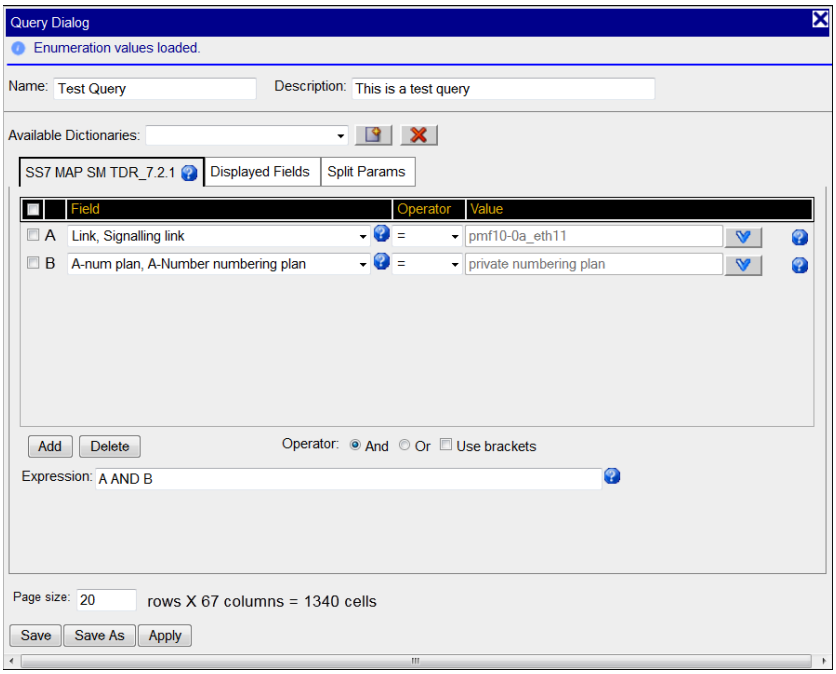


Figure 34: Filter Modification - Description Added

5. Click **Save**.The filter is validated and changes are saved.
Note: If there is an error in the validation, you are shown the error.
Note: If you want to save the modifications as a new query use the Save As option.
Note: Please refer **Appendix C: Queries During Protocol Upgrade** for behavior during Protocol Upgrade.

Deleting a Filter

Follow these steps to delete an existing filter.

1. Select the Filter to be deleted.
2. Click Delete.
3. Click OK at the prompt. The filter is deleted.

Multi-link Filter and Traces

You can use the multi-link filter trace feature to filter/trace several links or linksets at once. Complete these steps to use this feature.

1. Select a **link-based network** in the network tree. (Left-hand section of initial page.)
2. Click **Multi-link**.

The multi-selection screen opens.

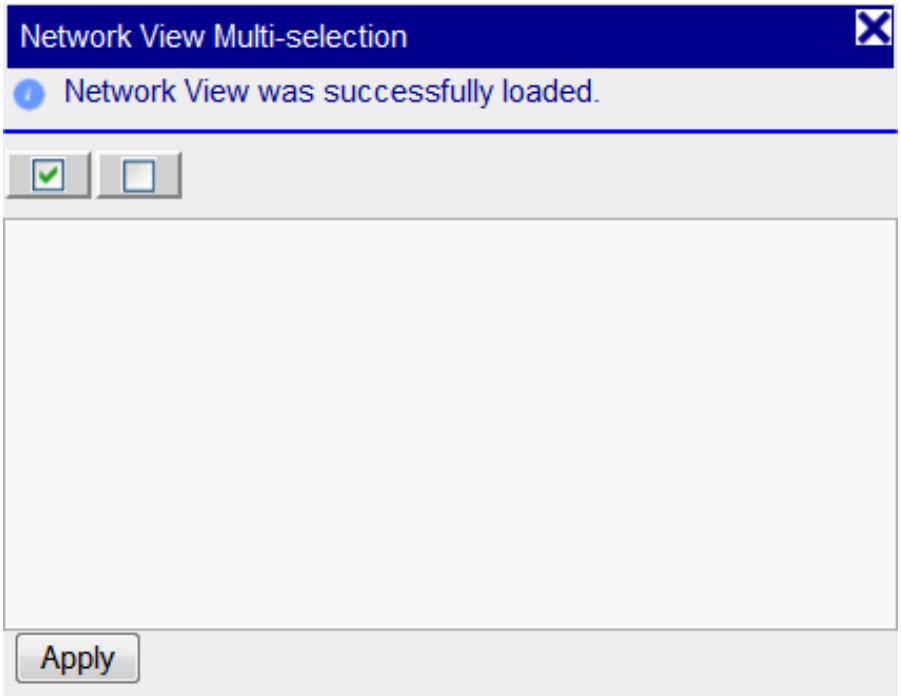


Figure 35: Multi Selection Screen

3. Select the **linksets or links** to be included in the trace.
Note: Click the Check box to select all the linksets/links in the list or click the empty box to select none of the linksets/links.

4. Click **Apply**. The selection is used in the query and tracing.
Note: Multi-link selections cannot be saved.
Note: The multi-link selection is cancelled by selecting another link-based or session-based network view.

xDR Viewer

You can view specific xDRs using the xDR Viewer. Using the xDR Viewer you can choose a specific xDR in order to initiate a trace. This view is used for both Filtering and In Progress Traces. The xDR Viewer can display three different views:

- xDR display
- PDU display
- Decoding display

Using xDR Viewer

The XDR Viewer in Troubleshooting enables you to choose a desired xDR in order to view the corresponding PDUs (as a list and individual decode) and to initiate the trace. Complete these steps to launch a trace using an xDR.

Note: The Start Trace feature is may not be available depending on your product license and installation. PDUs and decode are only available to the Business Manager role.

1. Create or select an existing Query for a network view. See Filtering Modes and Managing Queries
2. Execute the **Query**.

The xDR viewer page opens.

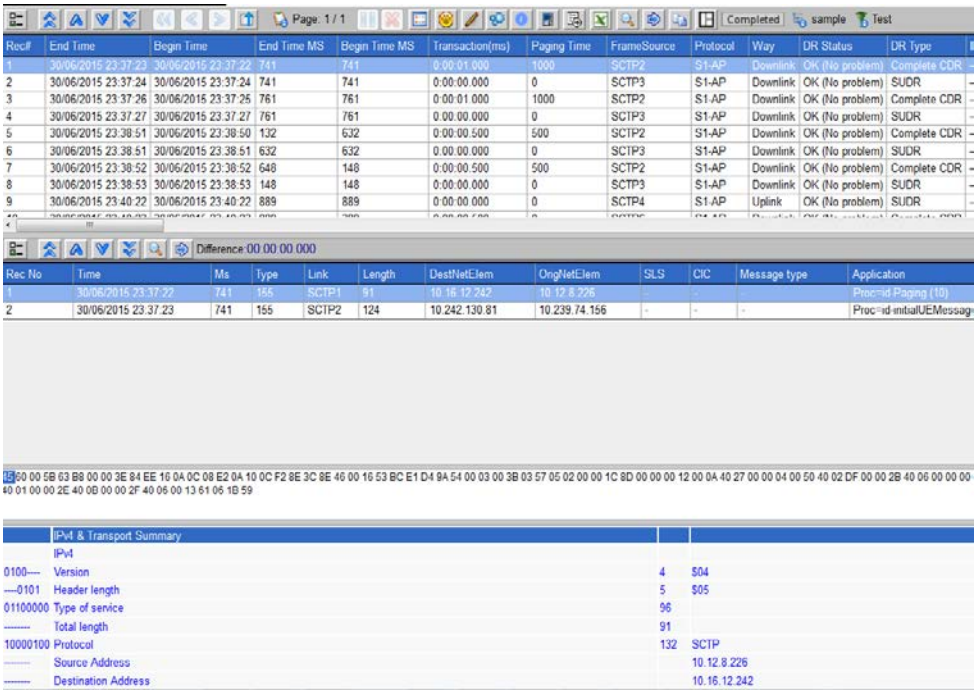


Figure 36: XDR Viewer Page

3. Select an **xDR record** (in this example the first record is selected).
4. Click **Start Trace**.

The trace viewer page opens showing Trace records, calls per trace and de-coded traces.
Note: The PDUs appear in two different colors. The pink PDUs belong to the currently selected xDR. The PDUs that belong to unselected xDRs appear with a white background.
Note: You can open up to five traces from the xDR Viewer screen.

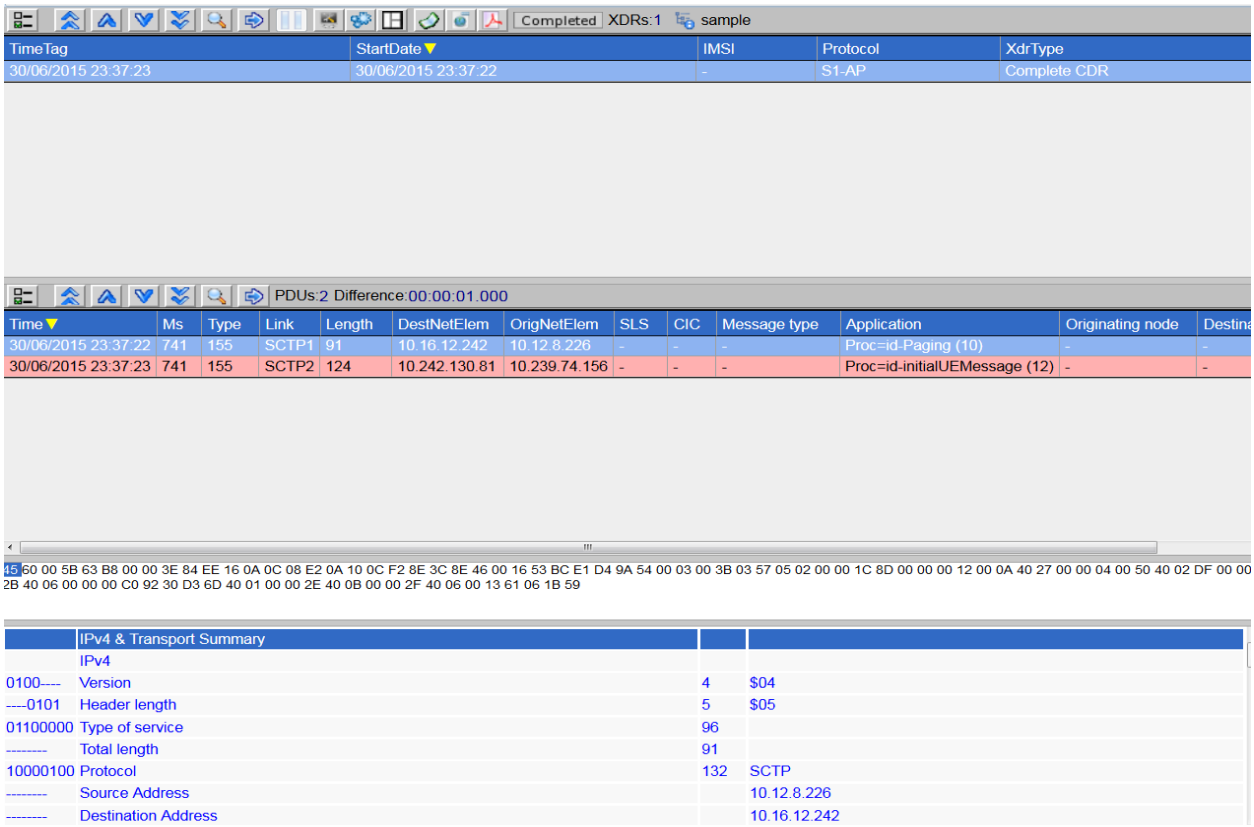


Figure 37: Trace Viewer Page

5. You can now export the xDR's and PDU's.

Using Drill Down with Statistical Sessions

When viewing Statistical sessions (from KPI), you can use the drill down feature to view the list of xDRs that were used to calculate the KPI along with the associated protocol decoding.

To do this:

1. Right click on a session in the sessions list. Two buttons will appear next to the selection, Drill Down and Add Condition.
2. Click on the **Drill Down** button. The xDR information is displayed. If the sessions are also sessions generated using KPI, you can drill down further.

Note: This feature is only available when viewing statistical sessions from KPI and it must be configured in KPI. See the KPI Configuration Guide for more information.

xDR Finder Option

Troubleshooting comes with an xDR search feature. Clicking the **xDR Finder** icon (next to the Export icon) on the xDR viewer page opens the xDR Finder screen. There are several options to limit the search results that you can select before initiating an xDR search.

Possible Search Parameters

- The **Text** field is for the xDR name or other text.
- Limit the search by selecting **Case Sensitive**.
- Limit the search to a specific xDR by selecting **Search within XDRs**.
- Limit the search by selecting **Search within Frames.**
- Limit the search by selecting **Search within Full Decoding**.
- Limit the search by selecting **Search within Frame Bytes**.
- The **Record Limit** field allows you to limit the search to the first *n* records where *n* is a number.

Search Results

The xDR search results are presented in a table format. You can page through the results with the page arrows and you can set the number of records per page in the Set Size (check icon) text box.

Column	Description
xDR Number	The xDR number
SU Number	The frame number for this xDR.
Decoding Number	The line number in full decoding
Found Text	The complete line where the string was found. It can be an xDR, a frame, a line in full decoding, or the complete hexadecimal. The searched string is highlighted.

Table 3: xDR Search Results Columns

Copying xDR information

When viewing xDRs you can copy the information for the currently selected xDR, it's PDUs, and full decodes as text information. To do this click the Copy button on the xDR viewer toolbar. The information will be available in the system clipboard.

Note: This feature is only available when viewing statistical sessions from KPI and it must be configured in KPI. See the KPI Configuration Guide for more information.

Exporting Results

You can export any list of sessions, list of queries, or xDR results by using the **Export** facility of Troubleshooting. You can export to the following file formats:

- XML
- XLS
- CSV

- HTML
- TXT
- PCAP

Note: You can only export SUs in case of PCAP.
You will also be able to export SU and Full Decoding and to ZIP when exporting xDR results.

You can also export xDR information directly to Excel format using the **Direct Excel Export** button in the xDR list window.
Note: Direct to Excel export will export all xDR information except the number of PDUs and the decode information.

System Export Limits

The table shows the system export limits for each format.

Format	Max. # of xDRs for Interactive Exports
ZIP	100,000
TXT	10,000
XML	1,000
HTML	1,000
CSV	650,000
XLS	65535
PCAP	100,000

Table 4: System Export Format Limits

Note: The export will be limited to a maximum of 10,000 PDUs or 100,000 xDRs (xDRs matching the export criteria). Once one of these limits gets reached, PCAP export will stop and store the exported file as it is.

Exporting

To open the Export screen, click the **Export** icon in the sessions list or query list toolbars for to export sessions or query lists. Use the Export icon in the toolbar of the query results window to export results.

Exporting Files

Complete these steps to export a file.

1. Select the data to be exported. You can choose:
   a) Current page
   b) All results
   c) First records

Note: If you select First records type in a number for the number of records that will be exported. For example, entering the number 100 designates that only the first 100 records are to be exported.

2. Type in the file name in the **Enter a filename** field.
3. (Optional) you can select whether to have the title inserted at the beginning of the exported file by selecting the option by the **Enter a title** field.
4. (Optional) you can type a comment or description in the **Comment** field.

Note: The file is saved in the same extension type as in the list.

5. Select the format type in the Export Type section. You can choose:
   a) XML
   b) XLS
   c) CSV
   d) HTML
   e) TXT
   f) ZIP
   g) PCAP

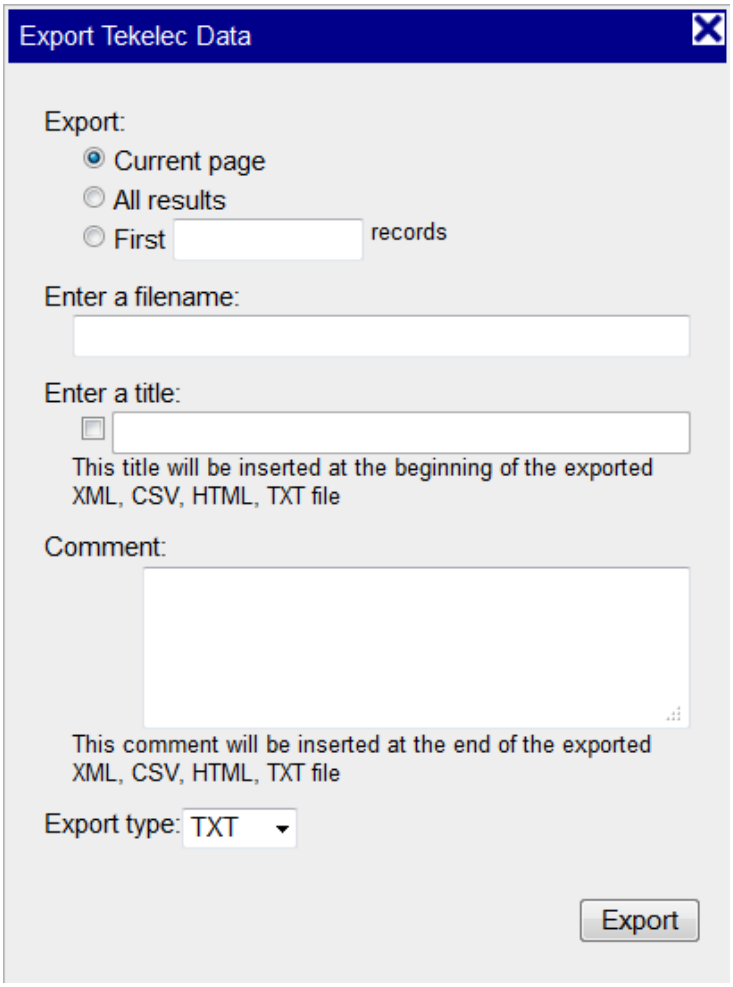


Figure 38: Export Type

Note:

- PCAP is only available for users with Management Application Business Manager role.
- ZIP is only available for users with Management Application Business Power User role.
- ZIP is not available for the current page option.
- ZIP is available for single dictionary queries only.
- PCAP is available to export all the Sigtran PDUs of a given trace (current page, all results of the query or the first n(xDRs) into a Wireshark compatible PCAP file.
- On selecting PCAP option "with SU" and " Full decoding" options will be grayed out and " with SU" option will be checked by default
- The SU and Full Decoding options are only available for users with Management Application business Manager Role.
- The Stored in the Management Application database option is only available for users with Management Application Business Power User role.

6. Select what to do with the exported data. **Download now** (default) or Stored in the Management Application database. Files stored in database will be stored as archive session in the Management Application database. These sessions can be seen in the session list of the Troubleshooting or exported file list of the scheduler and can be queried as other sessions in Troubleshooting..
7. Click **Export** to export the file.

Note: If the export will take longer than the current allotted time for exports (currently 30 minutes) it will automatically be canceled and you will receive a error message. This can happen when the query is too large or the Mediation is overloaded. You can resolve this by running the export at a later time or using the Split Query option.

Chapter 5: Analyzing Traces

Overview

Troubleshooting provides the ability to analyze the trace results returned by historical and in-progress traces. You can choose to view the trace in historical mode or real time mode. You are able to view the incoming trace messages for both real-time and historical trace. For real-time trace the application checks for new messages every 5 seconds (by default) starting from the current time.
Note: Tracing is supported for Network views only. It is not available for single sessions or archives.

Analyzing Traces

You can view the trace results returned sorted by time-stamp. You can initiate 5 different traces, thus troubleshooting more than one problem at the same time. For enhanced troubleshooting you are provided with all PDUs for a selected record from the summary and detailed protocol decoding for the selected PDU. You can also export the trace results in html and binary formats for offline troubleshooting. You can then import them back into Troubleshooting using the Import option.

Note: When viewing xDRs, PDUs and PDU decodes some sensitive information may be hidden using the "*" character (except for the Business Manager user). This hiding may be present for some PDUs but not for others depending on the configuration parameters. This functionality is configured in the Centralized Configuration. See the Centralized Configuration Guide for more information.

Viewing Real-Time Traces

Complete this step to view a real-time trace.
Launch a trace. The records are displayed and the Trace Summary page opens where you can see the summary of all the traces displayed in chronological order in real time. From the summary page you can view the following elements and perform the following actions:

- In the PDU display you can view the PDUs returned by the trace. Even those PDUs that may not be related to an xDR/TDR but are retrieved from the related interface.
- Level 4 messages (Circuit Blocking, Reset) can be viewed as part of a normal call-related trace, in order to correlate events occurring during a call, or shown separately.
- The PDU decoding section is displayed where you can view the Decoding for each trace PDU.
- You can browse through the Trace PDUs and the decoding section automatically displays the decoding for the currently selected PDU.
- New trace messages are scanned every 5 seconds from current time and displays them to you. You are able to view new PDUs arriving while browsing the already displayed PDUs.
- The trace stops when the time period configured expires.

Viewing Historical Traces

Complete this step to view historical traces.
Launch a **trace**. The records are displayed and the Trace Summary page opens where you can see the summary of all the traces displayed in chronological order in begin time. From the Summary page you can view the following elements and perform the following functions.

- In the PDU display you can view the PDUs returned by the trace. Even those PDUs that may notbe related to an xDR/TDR but are retrieved from the related interface.
- Non-call messages are displayed (e.g. Circuit blocking, Reset).
- The PDU decoding section is displayed where you can view the Decoding for each trace PDU.

- You can browse through the Trace PDUs and the decoding section automatically displays the decoding for the currently selected PDU. New trace messages are scanned and displayed.

Managing Protocol Filters

You can select displayed protocols for executed traces. Complete these steps to select protocols for a trace.

1. Select the **xDR** to be traced.
2. Click **Start Trace** to begin new trace.
3. Click **Display filter** on the toolbar. The Protocol Filter Dialog opens.

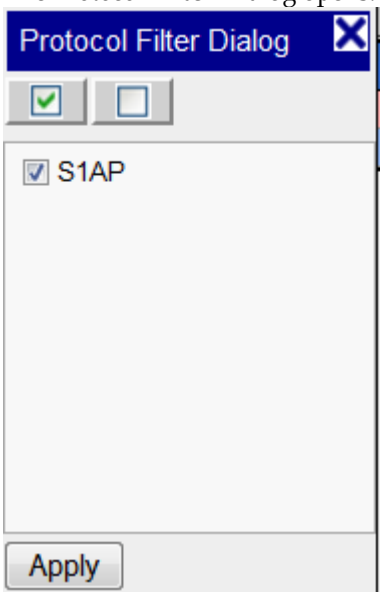


Figure 39: Filter Selection Dialog

4. Select or de-select the desired **Protocols.**

Note: To select ALL protocols check the left-hand check box located at the top of the dialog. To de-select ALL protocols click the right-hand check box located at the top of the dialog.

5. Click **Apply** to display the trace with the selected protocols.

Viewing a Message Sequence

Troubleshooting enables you to view the sequence of messages in the graphical format for the selected trace. Each node is represented in the form of a vertical line in the diagram. If a node has multiple IP Addresses or Point Codes, there are two options of sequencing:

- If there is no access to a database giving the list of IP Addresses or Point Codes per Node, Troubleshooting uses one vertical line per IP Address or Point Code, that can make the diagram difficult to read
- If there is an access to a database with the list of IP Addresses or Point Codes for each node represented by a Label, Troubleshooting uses one vertical line per Node (using the Label), and the IP Addresses or Point Codes appear in the messages arrows between the nodes.
- The Message Sequence Diagram (MSD) feature is developed for real-time as well as historical traces. It can be used for PDUs. There are some useful features to the MSD layout.

- Graphic layout for easy viewing - can view details of PDU in graphic instead of tabular format

- Associated decode and background views - select a PDU and the associated background information and decode information is shown.
- Time difference indicator - cursor over a selected PDU and time difference is shown

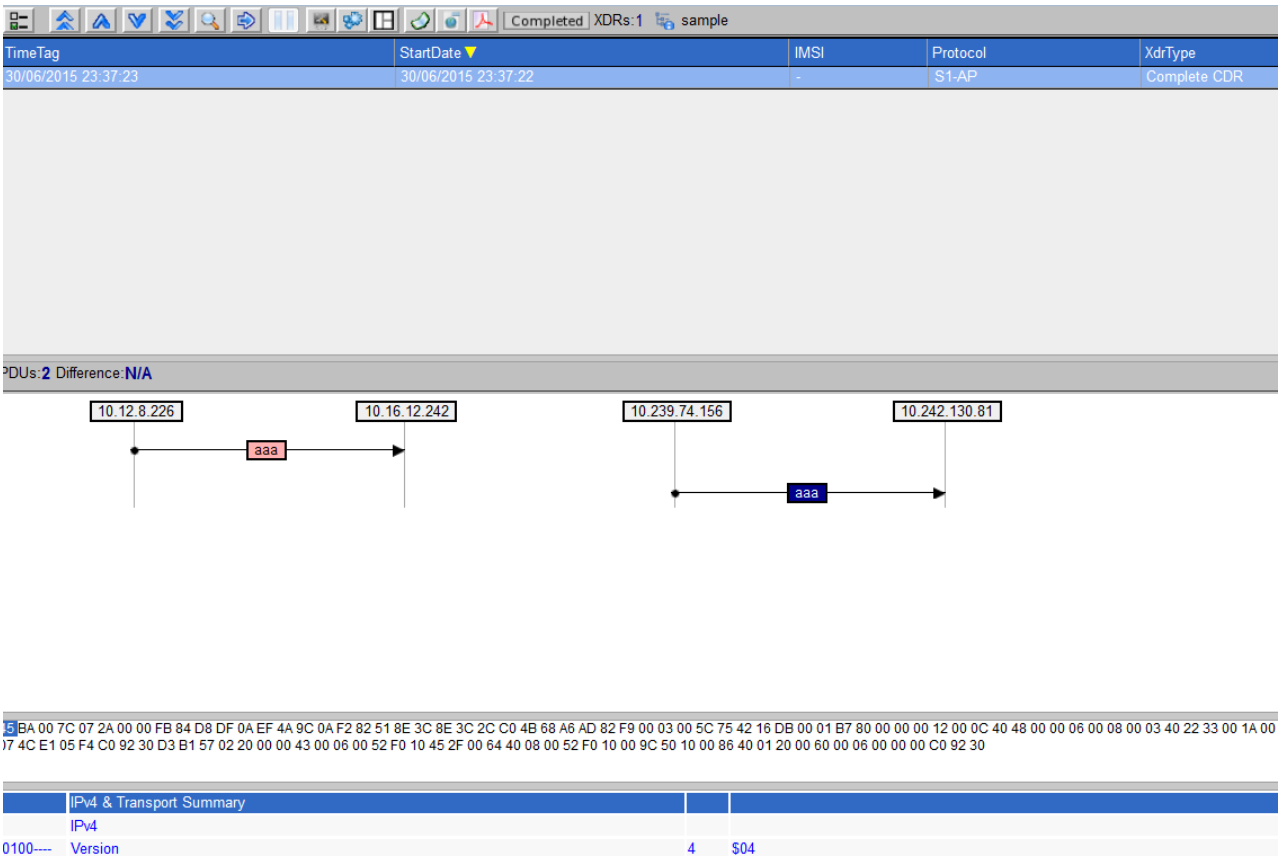


Figure 40: MSD Layout Screen

These features include:

Viewing MSDs

You have the option to toggle between the display of MSDs and PDUs. Complete these steps to view the message sequence.

1. Select the **xDR or PDU** you want to view.

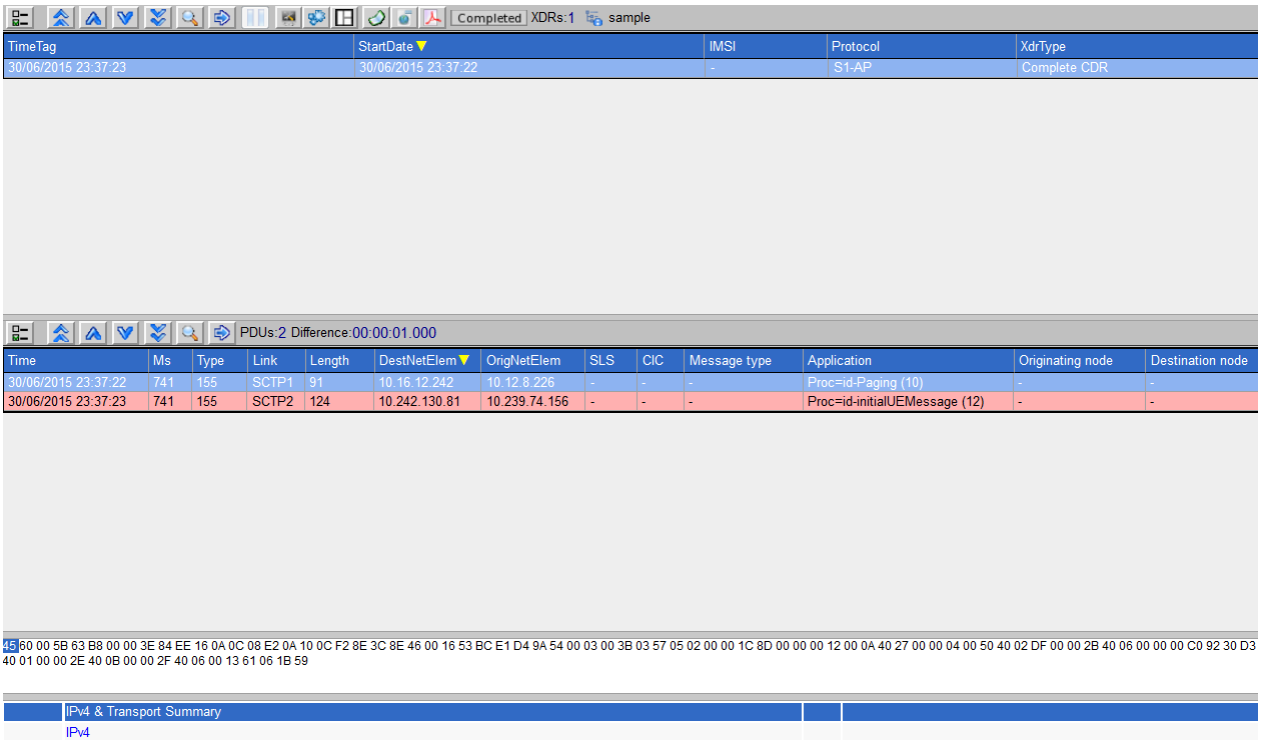


Figure 41: xDR Viewer with xDR And PDU Selected

2. Click the **Execute** button  The page layout changes to show the view sequence.

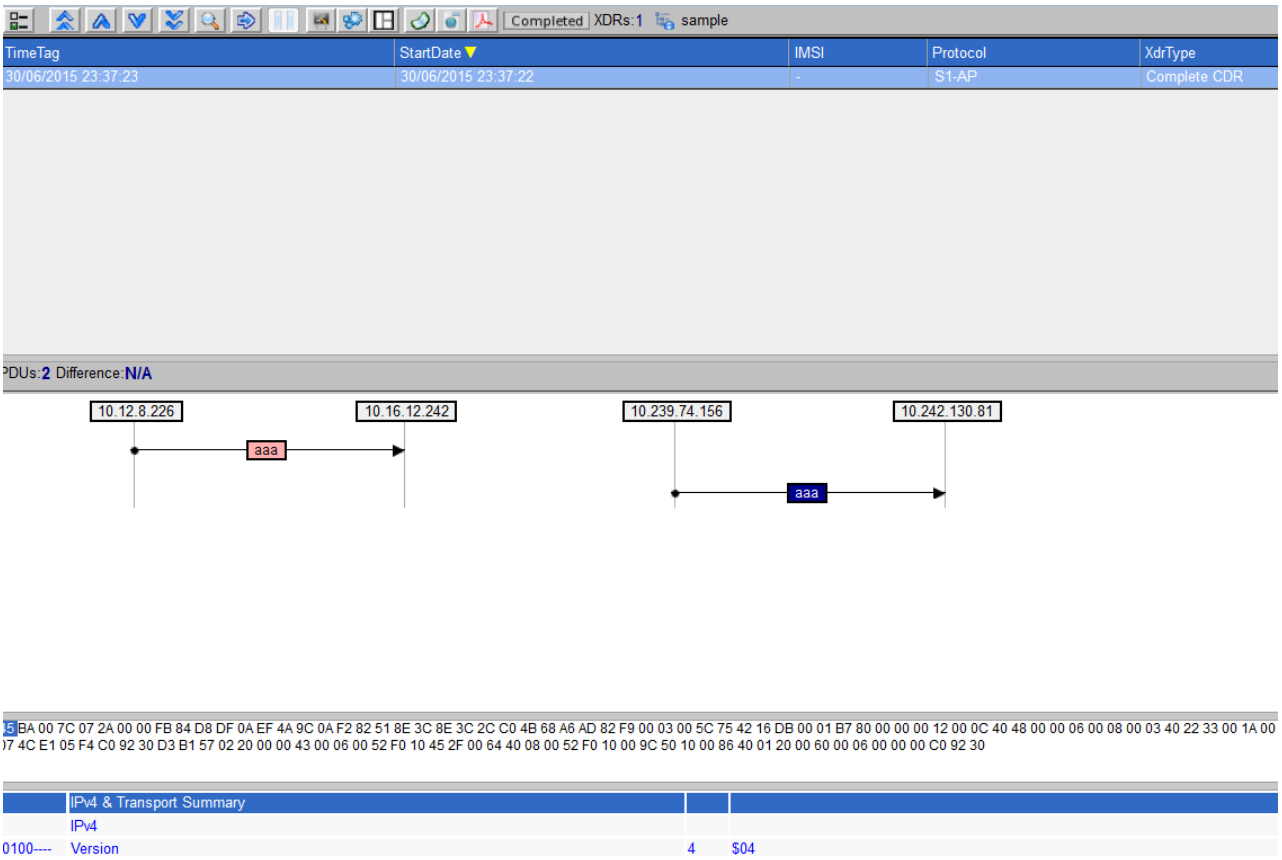


Figure 42: Message Sequence View

Viewing Real-time Message Sequences

Complete these steps to view real-time message sequences.

1. Click Message Sequence Diagram to initiate the display. The application responds by displaying all the messages as a message sequence diagram.
2. You can then browse through the diagram displaying the trace.

Viewing Historical Message Sequences

Complete these steps to view historical message sequences.

1. Click Message Sequence Diagram to initiate the display. Troubleshooting displays all the messages as a Message sequence diagram.
2. You can browse through the diagram displaying the trace.

About Exporting Traces

Troubleshooting enables you to export the trace. You can export the trace in either html or binary format. See Exporting a Trace File for more information.

Exporting a Trace File

Once you have created a filter, run the filter query, selected a record to trace, the Trace Viewer screen opens. Complete these steps to export trace files.

1. Click Export to initiate the export of trace results. You are prompted to either Save (export) or Open the file.
   a) Click **Export** to create a zip file with Binary format.

b) Click **Export HTML** to create a zip file with HTML format.

Note: You have two buttons on the Trace viewer page. Export and Export HTML. Click the button appropriate to your needs.

Note: When you export a Binary or HTML file, the a progress bar appears showing the progress of the export and the time remaining for the export to finish.

Figure 43: Export Progress Bar

Note: To cancel the export, click the red "X" located on the right-hand side of the export bar. A prompt opens stating that the export process has been canceled.

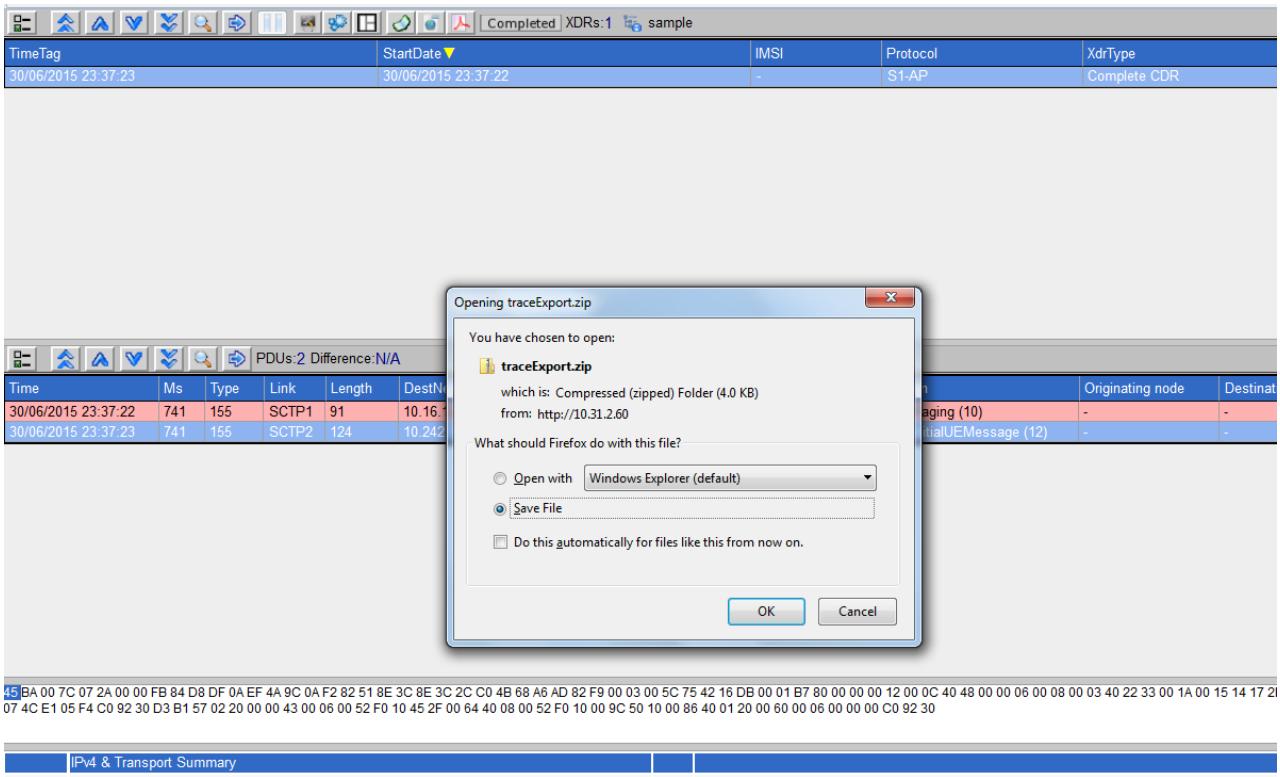


Figure 44: Export Screen

2. To export the file, click Save. The PDUs are exported in the desired file format and stores it at the path you specified.
3. To open the file, click Open and your Zip application opens.

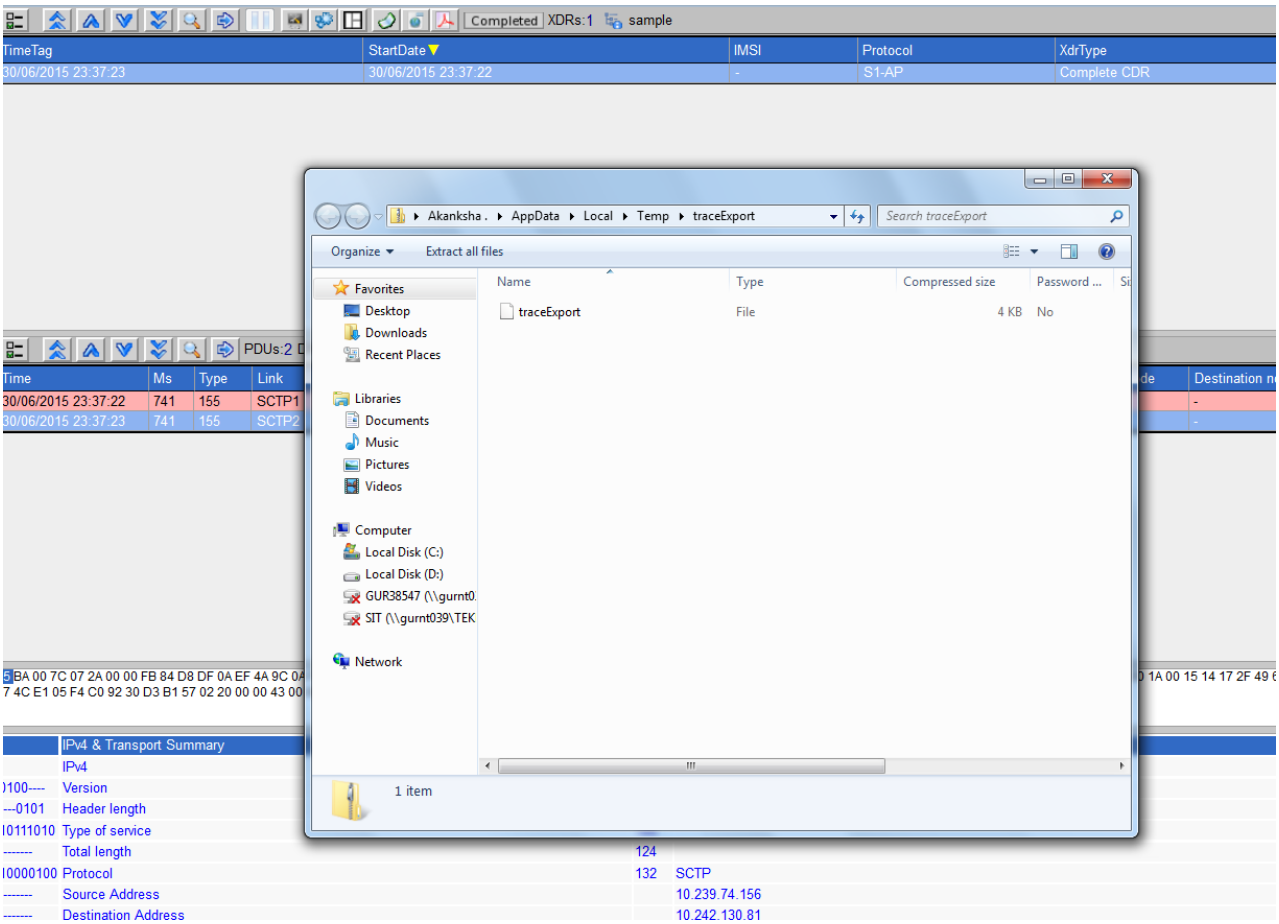


Figure 45: WinZip File Screen

Importing a Trace File

You can import a trace file that has been exported to a directory by using the Import function. Complete these steps to import a trace file.

1. Select **File > Import Trace**. The import screen opens.
2. Browse for the **file** you want.
3. Click **Import**. The file is imported and shows up on the Trace viewer page.

Note: User will be allowed to browse only those files which were initially exported in ZIP format after they are subsequently imported.

Appendix A: Level 2_3 Traces

About Level 2/3 Traces

Troubleshooting gives you the ability to perform a trace to identify non-call related issues. It can trace various MTP3 (Network Management) and MTP2 (SS7 LSL, SS7 Sigtran) messages.

Note: You must have the L2/L3 protocol builder installed in order trace non-call related issues.

Tracing Level 2 and Level 3 Messages

Complete these steps to trace level 2 or level 3 messages.

1. Select View >Non-call related menu option.
2. Select the Session or Link-based view that will need the query.
3. Select or create a filter.
4. Analyze the results in the xDR viewer.

Note: In XDR viewer the trace icon will be disabled for this level of call.

Appendix B: Master Data Information

About Master Data Information

Troubleshooting gives you the ability to perform a trace to identify non-call related issues. It can trace various MTP3 (Network Management) and MTP2 (SS7 LSL, SS7 Sigtran) messages.
Note: You must have the L2/L3 protocol builder installed in order trace non-call related issues. This appendix provides information on the supported protocols and protocol combinations for In-Progress calls.

Supported Protocols

This table shows the list of supported protocols used by Troubleshooting.

Protocol A		Protocol B
AIN	<->	BICC ANSI
AIN	<->	ISUP ANSI
AIN	<->	TUP
BICC ANSI	<->	AIN
BICC ANSI	<->	BICC ANSI
BICC ANSI	<->	CLASS
BICC ANSI	<->	INAP
BICC ANSI	<->	IS41 ANSI
BICC ANSI	<->	LIDB
BICC ANSI	<->	MAP ETSI
BICC ETSI	<->	BICC ETSI

BICC ETSI	<->	BSSAP
BICC ETSI	<->	INAP
BICC ETSI	<->	IS41 ANSI
BICC ETSI	<->	LIDB
BICC ETSI	<->	MAP ETSI
BSSAP	<->	BICC ETSI
BSSAP	<->	BSSAP
BSSAP	<->	ISUP ANSI
BSSAP	<->	ISUP ETSI
BSSAP	<->	MAP ETSI
CLASS	<->	BICC ANSI
CLASS	<->	CLASS
CLASS	<->	ISUP ANSI
Gprs Gb	<->	Gprs Gb
Gprs Gb	<->	Gprs Gn
Gprs Gb	<->	GSM MAP
Gprs Gb	<->	IPMultimedia
Gprs Gb	<->	IPRadius
Gprs Gn	<->	Gprs Gb

Gprs Gn	<->	Gprs Gn
Gprs Gn	<->	GSM MAP
Gprs Gn	<->	IPMultimedia
Gprs Gn	<->	IPRadius
INAP	<->	BICC ANSI
INAP	<->	BICC ETSI
INAP	<->	INAP
INAP	<->	ISUP ETSI
INAP	<->	MAP ETSI
IP Multimedia	<->	Gprs Gb
IP Multimedia	<->	Gprs Gn
IP Multimedia	<->	IPMultimedia
IP Multimedia	<->	IPRadius
IP Radius	<->	Gprs Gb
IP Radius	<->	Gprs Gn
IP Radius	<->	IPMultimedia
IP Radius	<->	IPRadius
IS41	<->	MAP ETSI
IS41 ANSI	<->	BICC ANSI

IS41 ANSI	<->	BICC ETSI
IS41 ANSI	<->	IS41 ANSI
IS41 ANSI	<->	IS41 SERVICES
IS41 ANSI	<->	ISUP ANSI
IS41 ANSI	<->	ISUP ETSI
IS41 SERVICES	<->	IS41 ANSI
IS41 SERVICES	<->	IS41 SERVICES
IS41 SERVICES	<->	ISUP ANSI
IS41 SERVICES	<->	ISUP ETSI
IS41 WIN services ANumber	<->	GSM MAP MSISDN
IS41 WIN services BNumber	<->	GSM MAP BMSISDN
IS41 WIN services CNumber	<->	GSM MAP CMSISDN
IS41 WIN services MIN/IMSI	<->	GSM MAP IMSI
IS41 WIN services CgSccpAdd	<->	GSM MAP CgSccpAdd
IS41 WIN services CdSccpAdd	<->	GSM MAP CdSccpAdd
IS41 WIN services MDN	<->	GSM MAP MSISDN
IS41 WIN services TLDN	<->	GSM MAP CMSISDN
ISUP ANSI	<->	AIN
ISUP ANSI	<->	BSSAP

ISUP ANSI	<->	CLASS
ISUP ANSI	<->	INAP
ISUP ANSI	<->	IS41 ANSI
ISUP ANSI	<->	IS41 SERVICES
ISUP ANSI	<->	ISUP ANSI
ISUP ANSI	<->	ISUP ETSI
ISUP ANSI	<->	LIDB
ISUP ANSI	<->	MAP ETSI
ISUP ANSI	<->	MAP SMS
ISUP ANSI	<->	VOIP MGCP
ISUP ANSI	<->	VOIP SIP
ISUP ANSI	<->	VOIP SIPT
ISUP ANSI	<->	MGCP CDR
ISUP ANSI	<->	VOIP Q931
ISUP ETSI	<->	BSSAP
ISUP ETSI	<->	INAP
ISUP ETSI	<->	IS41 ANSI
ISUP ETSI	<->	IS41 SERVICES

ISUP ETSI	<->	ISUP ANSI
ISUP ETSI	<->	ISUP ETSI
ISUP ETSI	<->	MAP ETSI
ISUP ETSI	<->	MAP SMS
ISUP ETSI	<->	VOIP MGCP
ISUP ETSI	<->	VOIP SIP
ISUP ETSI	<->	VOIP SIPT
ISUP ETSI	<->	VOIP Q931
LIDB	<->	BICC ANSI
LIDB	<->	BICC ETSI
LIDB	<->	ISUP ANSI
LIDB	<->	LIDB
LIDB	<->	TUP
MAP ETSI	<->	BICC ANSI
MAP ETSI	<->	BICC ETSI
MAP ETSI	<->	BSSAP
MAP ETSI	<->	INAP
MAP ETSI	<->	ISUP ANSI
MAP ETSI	<->	ISUP ETSI
MAP ETSI	<->	MAP ETSI

MAP ETSI	<->	MAP SMS
MAP SMS	<->	ISUP ANSI
MAP SMS	<->	ISUP ETSI
TUP	<->	AIN
TUP	<->	LIDB
TUP	<->	TUP
VOIP MGCP	<->	ISUP ANSI
VOIP MGCP	<->	ISUP ETSI
VOIP Q931	<->	ISUP ANSI
VOIP Q931	<->	ISUP ETSI
VOIP SIP	<->	ISUP ANSI
VOIP SIP	<->	ISUP ETSI
VOIP SIP	<->	VOIP SIP
VOIP SIPT	<->	ISUP ANSI
VOIP SIPT	<->	ISUP ETSI
VOIP SIPT	<->	VOIP SIPT
VoipH245	<->	VoipQ931
VoipH248	<->	VoipQ931
VoipQ931	<->	VoipH245

VoipQ931	<->	VoipH248
VoipQ931	<->	VoipQ931
VoipQ931	<->	**VoipRas**
VoipRas	<->	VoipQ931

Table 5: Supported Protocols

Appendix C: Queries during Protocol Upgrade

During Protocol Upgrade, if all the sessions based on a dictionary are not upgraded then the dictionary is considered as not completely upgraded. In this intermediate state there are some limitations on creation and modification of query as described below.

Creating a Query

While creating a query if user selects a dictionary, which has been replaced (upgraded) by dictionary of different version then the creation of query is not allowed. An error is displayed to user mentioning that "The dictionary:<DICTIONARY_NAME> has been upgraded. Query creation using old dictionary is not allowed."

Modifying a Query

While modifying a query if user selects a dictionary which is not completely upgraded then an error message is displayed to user mentioning "All Sessions are not upgraded for this dictionary. Please upgrade all sessions and then try again."

Also in case if user selects a dictionary which has been replaced (upgraded) by dictionary of different version then an error message is displayed to user mentioning "This dictionary(s) has been upgraded. Query modification using old dictionary is not allowed."

Appendix D: My Oracle Support

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:

5. Select 2 for New Service Request
6. Select 3 for Hardware, Networking and Solaris Operating System Support
7. Select 2 for Non-technical issue

You will be connected to a live agent who can assist you with MOS registration and provide Support Identifiers. Simply mention you are a Tekelec Customer new to MOS.

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