

# User Guide

NEMO 5.1



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# **1** Introduction

NEMO is an All-In-One product for VoIP Services and Networks, covering the following functions:

- Monitoring
- Reporting
- Troubleshooting



- Alarming
- Debugging
- Fraud detection

NEMO is a vendor agnostic monitoring and reporting platform, designed to reflect the usage of a VoIP network by gathering data using probes and CDRs, irrespective of format.

Following Netaxis Solutions' product philosophy, NEMO has been thought and designed from day one for flexibility and easiness to operate. Indeed, NEMO can be deployed in many different ways thanks to the range of probes developed by Netaxis: from the portable probe (not bigger than a book, can be easily moved from one place to another) to the Probe L which can cope with thousands of simultaneous calls.

In case probes are complicated to be deployed, NEMO can rely on CDRs produced by network equipment to provide valuable network indicators. NEMO can also work in hybrid mode (Probes and CDRs) when needed.

# 1.1 Flexible Reporting

The reporting aspect of NEMO is particularly strong, allowing network operators to flexibly "slice and dice" information for resellers and end-users in many ways: by reseller, customer, site, individual end-user etc. This flexibility, combined with the fact that NEMO is natively multi-tenant and comes with fine-grained user profile definition, gives the possibility to make the NEMO portal accessible to different types of users: from very technically skilled engineers for troubleshooting, to customers for end-user reporting only.

# **1.2 Troubleshooting features**

The gathering of SIP/RTP data using probes allows NEMO to troubleshoot problems with calls, by providing end-to-end call flows, SIP message details, media stream analysis and media replay possibility. Netaxis Solutions' probes are not passive probes that only sniff the network traffic: they are also capable to generate programmable traffic patterns that will be monitored by NEMO.

# 2 NEMO Basic Notions

This *User Guide* is designed to assist NEMO users and administrators in managing all the features NEMO offers:

• plotting graphs with statistical results,



- listing and searching calls and traces,
- inspecting traffic anomalies and SNMP traces,
- and selecting and exporting reports.

# 2.1 NEMO Terminology

NEMO framework (and documentation) uses a terminology with some rather specific meanings. It is important that the user has a clear understanding of this terminology.

#### 2.1.1 Network elements

*Network elements* in NEMO are essentially the CDR sources. Other data applications interfacing with NEMO through a Rest API to extract statistics are preferably called *third party equipment* (see below).

#### 2.1.2 Entities

An entity is a physical or logical element of the telecommunication network under monitoring by NEMO. In a broader meaning, *entity* can also designate any element under monitoring in the network, or accessing the network (like third party equipment).

#### Warning

In some locations in the interface and in this document, the logical entities of the devices are called 'objects', e.g. in the *Settings > User > Access Privileges* tab.

#### 2.1.3 Third-party equipments

In NEMO terminology, a *third party equipment* is an equipment **external to the telecom network** under monitoring. This equipment accesses NEMO Stats DB through a rest API in order to collect statistics of interest.

#### 2.1.4 Devices

NEMO devices are the names assigned to the physical entities covered by the deployment: in a multiplugin mode deployment, *devices* would be, for example:

• Nemo Capture (probes), made of Probes (physical entity) and Trunks (logical entities)



- Net-Net SD (commercial name for Oracle SBC, CDR-emitting network element), made of Session Border Controller(s) (physical entities) and Realms, Endpoints, Source and Destinations ranges, all logical entities of the SBCs
- *Broadworks*, Cisco CDR-emitting network element, made of Application Servers (physical entities) and Service Providers or Groups[^1] (logical entities).
- Audiocodes, etc.

# 2.1.5 Plugins

NEMO plugins are the software components responsible for adapting the behavior of NEMO with respect to the monitored network element. While some equipments may provide detailed information about RTP, others may provide only information about SIP. In this case, only some of the functionality would be available. These equipments are built around different concepts and contexts (e.g. realms, enterprises, trunks, ...) for which NEMO adapts its level of aggregation for statistics. Refer to the chapter [Plugins Features List] for a detailed list of the features supported by each plugin.

# 2.1.6 Collectors

NEMO collectors are the software components responsible for collecting CDR data from monitored network equipments. They work hand-in-hand with plugins to ingest data and insert them into the DB. The protocols supported by the collectors depend on each type of plugin, as different network equipments use different protocols for CDR sending (e.g. Radius, SFTP, ...) as well as different formats (e.g. CSV, XML, ...).

# 2.1.7 Groups

Widely used in NEMO GUI, a *group* is a selection made of one or more entities (aka « groups » or « configuration objects ») belonging to the devices that are part of the deployment, and possibly also including label(s) (see above). A group selection of 7 groups belonging to 3 different devices is legitimate ; a group selection of *one* group, however self-contradictory in the common language, is legitimate as well.

You can « promote » a selection of groups to a permanent status by creating a *label* for it (see next section).

*Group* is the first field to fill in in any browser page of Call Statistics, Voice Quality and Anomalies modules. The field presents a drop-down list with all groups / configuration objects or entities available for each device part of the deployment. Labels are also listed and can be part of any group selection.



Groups for which some criteria are not present (for example, QoS in Broadworks groups) are simply ignored in the resulting display (see Modal Behavior below).

The selection made for Group (possibly a single group) in any browser page of Call Statistics or Voice Quality modules is kept active in any other browser page of these modules until modified by the user. Anomalies' browser page always opens 'clean', with no prior selection kept for Group.

# 2.1.8 Labels

In NEMO terminology, *labels* are permanent, user-defined logical groups of entities. Several labels can be assigned to the same entity. For instance, a label can be created to tag all realms or all trunks belonging to small and medium enterprises, and another label can be created to tag all realms or all trunks with a specific IP access network. Labels can later be used to produce reports for groupings of entities.

Note that in some occasions, *label* can also be used in its usual meaning. *Nemo Capture* or *Net-Net SD* are labels used in the GUI to designate the physical and logical entities of the Probes (Probes and Trunks) or of the Oracle SBCs (Realms, Endpoints, Ranges...).

#### 2.1.9 Nodes

*Node* is used to designate a hardware equipment part of the telecom network being monitored, typically a server. Note however that a node can also be virtual if the network has been designed with virtual machines.

#### 2.1.10 Contexts

Not used in this document. A context is a selection of multiple groups belonging or not to the same device: a group of groups. The term "Groups" is the one used in the graphical interface.

# 2.2 Logical Architecture

NEMO logical architecture is a three-layer one: Interface Layer, Data Storage Layer and Application Layer.

NEMO has been designed to be modular: all these logical layers can either run on the same computing instance or be spread on different computing instances.

One NEMO instance can handle several CDR sources together (SBC, Broadworks, Probes...) in multiplugin mode (see NEMO 4.1 User Guide below).







# 2.3 Modules

The following list enumerates the modules NEMO is based upon and provides for each module the list of related commands.

Each module and each of its items are described in full details in the section 00\_nemo4\_User\_Guide\_ book.xml#features (from a logical viewpoint) and the section 00\_nemo4\_User\_Guide\_book.xml#mod ules.

- Call Statistics Module
  - Sessions
  - Registrations
  - Call Durations



- Call Destinations & Sources
- Release Causes
- Voice Quality Module
  - Packet Loss
  - Packet Jitter
  - Packet Latency
  - MOS
  - Codecs
  - Media Bandwidth
- Calls Module
  - Search Calls
  - Search Traces
  - Trace Analysis
- Anomalies Module
  - Anomalies Browser
  - SNMP Alarms
- Reporting Module
  - Service Provider Reports
  - Third-party Reports
  - Customer Reports
  - Statistics Exports
  - CDR Exports
- Settings Module

The extensive set of configuration settings allows the Administrator user to tailor NEMO to the needs and environment.

- Users
- Nemo Capture (if probes)
- Plugin(s) For example, depending on actual deployment:
  - \* Net-Net SD (plugin for Oracle SBC)
  - \* Broadworks (plugin for Cisco SBC)
- Labels
- Reports



- Statistics Exports
- CDR Exports
- Anomalies
- SNMP
- Tracing
- Metrics
- System
- Logs

# 2.4 Modularity

NEMO is natively modular: all logical layers can either run on the same physical entity or be spread on different physical entities. NEMO also presents a multi-tenant architecture, with possibility to create dashboards & reports that can be exposed to internal/external customers.

# 2.5 Modal Behavior

NEMO can monitor environments in four different modes, depending on how the solution has been deployed (a.o. on which plugins are installed):

- CDR mode with CDR-emitting equipment, or
- probe mode with call data capturing probes,
- with both: hybrid mode,
- with probes and more than one CDR-emitting device: **multi-plugin mode**.

Each mode collects, stores and processes different data, which will produce monitoring statistics accessible through graphs, lists and reports.

For more details about which output may be expected with each mode, please refer to the table below:

				Multi-plugin
Module	CDR mode	Probe mode	Hybrid mode	mode
Call Statistics Module				
Sessions	YES	YES	YES	YES
Registrations	YES*	YES	YES*	YES*



				Multi-plugin
Module	CDR mode	Probe mode	Hybrid mode	mode
Call Durations	YES	YES	YES	YES
Call Destinations & Sources	YES	YES	YES	YES
Release Causes	YES	YES	YES	YES
Voice Quality Module				
Packet Loss	YES**	YES	YES	YES**
Packet Jitter	YES**	YES	YES	YES**
Packet Latency	YES**	YES	YES	YES**
MOS	YES**	YES	YES	YES**
Codecs	YES**	YES	YES	YES**
Media Bandwidth	YES**	YES	YES	YES**
Calls Module				
Search Calls	YES***	YES	YES	YES***
Search Traces	NO	YES	YES	YES****
Trace Analysis	YES	YES	YES	YES
Anomalies Module				
Anomalies Browser	YES	YES	YES	YES
Alarming (SNMP trap, mail, SMS)	YES	YES	YES	YES

\* Only if CDRs for registration are produced.

\*\* Only if CDR contains media flow information.

\*\*\* Search calls is possible but:

- end-to-end call flow feature is not available
- SIP message content is not available
- RTP flows are not recorded.

\*\*\*\* If one of the plugins is Probes.



# **3 NEMO and GDPR**

NEMO is a Network Monitoring tool which provides service providers and enterprises with insights in their VoIP traffic as well as the capability to monitor the quality of their network and, in case of issues, to trace down the root cause.

To achieve this, NEMO analyzes IP traffic and/or CDRs (call detail records). Consequently, this data contains personal data like phone numbers of calling and called users, as well as potentially media content related to individual phone calls. The platform monitors the network in real time but also provides capabilities to do historical searches.

As a consequence, service providers and enterprises deploying and using NEMO act as data controller and/or processor in relation to all users that explicitly or implicitly make use of the VoIP network under observation.

As indicated in the GDPR (ref: recital 47 and 49), the processing of personal data for network information and security can be considered as a legitimate purpose. Of course, given the sensitive nature of the collected and processed data, special care has to be taken. NEMO provides a set of features and capabilities which help the service provider or enterprise to use NEMO without breaching their obligations under the GDPR.

# 3.1 4 Key Principles

In terms of features, NEMO relies on 4 main principles :

- 1. Data minimization:
  - Only collect data you really need
  - Restrict data retention to what is needed to ensure your operations
  - Anonymize for long term retention
- 2. Data protection:
  - Protection of data at rest
  - Protection of data in transit
- 3. Limit data exposure
  - Ensure that only qualified people have access to the most sensitive data
- 4. Audit
  - Monitor usage and detect abuses



# 3.2 Guidelines for Implementation

This section provides reference to descriptions of NEMO features in this User Guide in relation with the above principles.

#### 3.2.1 Data Minimization

• How to configure which traffic is monitored

Monitored traffic is defined by declaring Groups and Labels.

• How to configure which RTP traffic is monitored

Monitored RTP traffic is defined by activating Tracing, see Tracing.

• How to configure the CDRs retention time in the system:

Retention time for CDRS is configured by accessing *Settings>System>HealthMonitor/Advanced options* and adapting the value of *max age of CDRs in days* setting as desired.

• How to configure the total amount of CDRs allowed in the database:

Total amount of CDRs allowed is configured by accessing *Settings*>*System*>*HealthMonitor/Advanced options* and adapting the value of *max number of CDRs to keep in database* setting as desired.

- How to limit access to individual calls:
  - Access to all individual calls and traces can be blocked per user, see Edit an Existing User, Access Privileges>Modules or Groups or Reports, simply by revoking the corresponding privilege(s): Search Calls, Search Traces, Retrieve Media Streams, etc.
  - While NEMO collects CDRs or traces, the StatEngine sub-module computes the stats and stores them in DB, aggregated per trunk for reports, graphs, anomalies etc. Once CDRs are purged (see above: CDRs retention time), access to individual calls is not possible anymore (anonymisation) – but aggregated statistical data remain accessible.

#### 3.2.2 Data Protection

The protection of data collected by NEMO is determined by the network topology and security rules enforced by service providers and enterprises. Usually, NEMO GUI is located in a DMZ, while the DB server is located in a secured zone (« core » or the like), with a firewall between the DMZ and the core zone, preventing access to the data stored in DB.



#### 3.2.3 Limit Data Exposure

NEMO provides two mechanisms allowing NEMO users acting as Data Controllers and Data Processors in the GDPR framework to activate the following:

- Individual (per user) granting / revoking of Access Privileges to actions related with or subject to GDPR, through the *Settings>Users>Edit Users>Access Privileges* page where such privileges can be configured.
- Recording individual user authorized accesses (or attempted and rejected ones) as well as
  individual actions belonging to the list *Actions Logged* below, through the logging feature using
  the audit.log file located on NEMO server at /var/log/nemo/audit.log (accessible through *Settings>Logs audit.log View*).

#### 3.2.4 Audit

#### Danger

Note the following information with regard to the logging of individual user access and of their actions into the audit.log file present in the system (see above).

- 1. The audit.log file rotates every day for a non-configurable duration of 100 days.
- 2. The file located on NEMO server remains editable by system operators or administrators.

# It is the customer responsibility to enforce their own security rules by limiting group access rights to this file and by ensuring it is timely backed up to an external and secure system.

#### 3.2.4.1 Actions Logged

The following list enumerates the monitoring actions that are logged to the audit.log file.

- activation of new tracing
- removal of tracing
- trace download of call
- search calls
- search traces
- export calls
- live calls
- live traces
- open details of live trace
- open details of trace



- open details of call
- retrieval of media stream

#### 3.2.4.2 Logging Syntax

• Granted / Blocked Authorization logging (based on Access Privileges):

```
1 ACCEPTED username: %s, name: %s, module: %s, request: %s
2 FORBIDDEN username: %s, name: %s, module: %s, request: %s
```

• Actions logging:

```
1 ACTION username: %s, name: %s, request: %s, action: %s
2 ACTION retrieval of media stream %s
```

#### 3.2.4.3 Examples

The following examples are extracted from an operational audit.log:

```
1 2019-07-02 09:25:53,646-40278-INF0-[] ACCEPTED username: admin, name:
     → Administrator, module: dashboard, request: POST /dashboard/jsonDataPanels

→ ?refreshId=1562052353638 HTTP/1.1

2 2019-07-02 09:38:46,720-40278-INFO-[] FORBIDDEN username: admin, name:
     🛶 Administrator, module: dashboard, request: GET /dashboard/
     \hookrightarrow jsonDataDashboard HTTP/1.1
3 2019-07-02 09:42:47,873-40278-INFO-[] ACCEPTED username: admin, name:
     → Administrator, module: calls->searchCalls, request: GET /calls/

→ searchCalls HTTP/1.1

4 2019-07-02 09:45:23,684-40278-INFO-[] ACTION username: admin, name:
     → Administrator, request: GET /calls/htmlDataCallDetails?cid=sonus-5
     \hookrightarrow d14c8f9fcdc7b176f783a24 HTTP/1.1, action: details of call id 5
     \leftrightarrow d14c8f9fcdc7b176f783a24 on device type sonus (calling=32000000001 called

→ =32000000002 time=2019-06-27 14:09)

5 2019-07-02 09:43:49,389-40278-INFO-[] ACTION username: admin, name:
     → Administrator, request: POST /settings/editTracing?action=createTracing
     → HTTP/1.1, action: activation of new tracing (details={'rtpStats': False,
     \rightarrow 'description': u'trace name', 'rtpCapture': False, 'methods': [''], '

    calling': u'', 'src_ip': u'', 'trace_reason_extra': u'', 'dst_ip': u'', '

     → _id': ObjectId('5d1b0b35fcdc7b9d56f36df0'), 'called': u'', 'trace_reason'

    : u'Customer Complaint'})

6 2019-07-02 09:44:43,034-40278-INFO-[] ACTION username: admin, name:
     ↔ Administrator, request: GET /settings/editTracing?action=removeTracing&
     → tracingId=5d1b0b35fcdc7b9d56f36df0 HTTP/1.1, action: removal of tracing 5

→ d1b0b35fcdc7b9d56f36df0
```



# 3.3 Further Customer Guidance

Netaxis Solutions Support team can provide NEMO Administrators with appropriate guidance on how to ensure smooth network operations while remaining GDPR compliant.

# **4 NEMO Features**

The NEMO interface is a web-based Graphical User Interface (GUI). It can be accessed with any modern browser supporting the HTML5 standard.

# 4.1 Login Page

Once connected with a Web browser to the GUI of NEMO, the first step for the user is to authenticate and get access to the application using a combination of user name and password. Please refer to [Users] to learn how to create, modify and remove users.



bruce.wayne	
*****	
Log in	

Figure 2: Login Form



If the user has set up MFA, a second page will appear during login, requiring them to enter the code currently displayed in their authenticator app.



Please enter the one-time passcode (TOTP) currently displayed on your device to complete the authentication process.

123456			
Submit			
Reset MFA			

Figure 3: MFA Form

If the user's assigned role allows MFA reset via email, the TOTP reset form will be displayed, requiring them to enter the temporary code received by email.





If you have lost access to your authenticator device, you can reset your Multi-Factor Authentication (MFA) settings via email. A verification code has been sent to your registered email address, allowing you to securely reset your MFA settings.

This process ensures you can regain access to your account while maintaining security. Please contact support if you no longer have access to your registered email.

Please enter the one-time passcode you received by email.

Code		
Submit		
Resend a new code		

Figure 4: MFA Reset

# 4.2 Main Interface

Once the user has got access, the browser displays the main interface, as shown below.

At the top right, the name of the user is displayed with the status flag. The status flag informs about the health of the system. The flag is only visible if "status" module has been assigned to the user profile (see [Users] for information about module assignment).

							Welcome, Administrator (admin) - sign out [status: 🛕 6]
NEMO	Call Statistics	Voice Quality	Calls	Anomalies	Reporting	Settings	



# 4.3 The Dashboard

At first launch, the main interface may be empty, depending on the user profile, or display a Dashboard (cloned from the profile used to create the current user profile (see [Create a User] for more details).

The picture below shows a Dashboard with its tabs and graphs.

NEMO Call Statistics Voice Quality	Calls Anomalies Reporting	g Settings	
Session Statistics Quality of Service TestJSDE RBEN TRAFFIC INTENSITY DORY 8 000 15 Feb15 Feb	Grac Ingress calls Egress calls Total	ACTIVE REGISTRATIONS SBC REGISTRAR	↓ Ingress registrations ■Egress registrations
AVERAGE ALERTING PHASE DURATION DORY A 40 secs 35 secs 30 secs	DESTINATION DISTRIBUTIO	DN: NATIONAL DORY B	STATUS DISTRIBUTION DORY A Normal clearing: 94.34% 408 Request Timeout: 5,66%

Figure 5: Dashboard

If no Dashboard exists in the user profile, the **Configure Dashboard** button at the bottom of the screen allows creating one.

#### To create a Dashboard from scratch

- 1. Click the **Configure Dashboard** button.
- 2. In the *New Tab* screen, fill in a name for the dashboard first tab then click **Create Tab**.

New tab		
	New dashboard tab title	
	Enter text	
	Create tab	dashboard



3. Using **Add row of panels**, select a layout (one graph in the tab or more).

Graphs are displayed in one or more panels on a row. Graphs can use the row's full width (one graph) or 1:2/1:2 (2 graphs on the row), 1:3/1:3/1:3 (3 graphs on the row), or 1:3/2:3 or 2:3/1:3 (2 graphs with different sizes).

In this example, a row with two panels 1:2/1:2 will be created.

First Tab New tab				
Add row of panels -	Rotate to next tab after	never	♦ Modify tab +	
1/1 (full width)				
1/2 - 1/2				Save dashboard
1/3 - 1/3 - 1/3				
1/3 - 2/3				
2/3 - 1/3				

4. With each **Select Data**, select a group, a statistic and a duration for the graph. If data are available, the resulting graph is shown on screen.

Select data			Select	data		
Group	Select a group	\$				
Statistic	Select a statistic	¢				
Duration	Select a duration	\$				
Duration	Select a duration	\$				

5. Select a rotation time for the tab (how long the tab is displayed before the Dashboard shows the next tab, if any).

First Tab	New tab				
Add r	ow of panels -	Rotate to next tab after	<ul> <li>never after 15 secs after 30 secs after 1 minute after 5 minutes after 15 minutes</li> </ul>	Modify tab -	Save dashboard



6. Select a relative position for the tab (to the left, to the right — when other tabs are present), or remove the tab.

First Tab	New tab					
Add ro	ow of panels <del>-</del>	Rotate to next tab after	never	¢	Modify tab 🗸	
					Remove this tab Move tab left Move tab right	ve dashboard

- 7. If desired, add more rows to the tab the same way.
- 8. If desired, create more tabs the same way by clicking **New tab**.
- 9. Click **Save Dashboard**. This resumes the display of the main page with the selected graphs shown in the Dashboard zone.

#### 4.4 The Main Menu Bar

The menu bar at the top provides access to the NEMO modules.

							Welcome, admin (admin) – sign out 🛛 [ status: 🗹 ]
NEMO	Call Statistics	Voice Quality	Calls	Anomalies	Reporting	Settings	



The interface is organized around six modules and their sub-menus. Depending on the user's access rights, not all six modules might be visible in the menu bar. Please refer to [Users] to learn how to set access privileges for the users.

The modules are divided in sub-menus. The complete menu hierarchy is as follows:

- Call Statistics Module
  - Sessions
  - Registrations
  - Call Durations
  - Call Destinations & Sources
  - Release Causes
- Voice Quality Module



- Packet Loss
- Packet Jitter
- Packet Latency
- MOS
- Codecs
- Media Bandwidth
- Calls Module
  - Search Calls The 3 following sub-menus are present in Probes only mode, hybrid mode or multi-plugins mode.
  - Search Traces
  - Search Recordings
  - Trace Analysis
- Anomalies Module
  - Anomalies Browser
  - SNMP Alarms
- Reporting Module
  - Service Provider Reports
  - Third-party Reports
  - Customer Reports
  - Statistics Exports
  - CDR Exports
- Settings Module
  - Users
  - Nemo Capture and/or NetNetSD and/or other label, depending on installed plugins and network elements
  - Labels
  - Reports
  - Statistics Exports
  - CDR Exports
  - Anomalies
  - SNMP
  - Tracing (present in Probes only mode or hybrid mode)
  - Metrics
  - System



- Logs

# 4.5 Results Browsers (List Pages)

The **Calls** and **Anomalies** modules query the NEMO database to return data according to the criteria set in the *Search* tool. All these results lists share common elements, which allow filtering and browsing the results. These list pages are known, in NEMO terminology, as *browsers*.

The figure and table below describe these common elements.

SEARCH F	IESULTS					
Show 10	• entries 1					2 Search:
	Start	▼ End	Calling	Called	Ingress Group	Egress Group
00	03-21 10:11:42	03-21 10:11:56	027956710	0477457494	Dory A	Kamailio
00	03-21 10:11:42	03-21 10:11:56	027956710	0477457494	Kamailio	Dory B
00	03-21 10:11:30	03-21 10:11:47	027956710	0477910242	Dory A	Kamailio
00	03-21 10:11:30	03-21 10:12:13	027956710	0477910242	Kamailio	Dory B
00	03-21 10:11:28	03-21 10:11:43	027956710	0477385655	Dory A	Kamailio
00	03-21 10:11:02	03-21 10:11:20	027956710	0477388592	Dory A	Kamailio
00	03-21 10:11:02	03-21 10:11:39	027956710	0477388592	Kamailio	Dory B
00	03-21 10:10:38	03-21 10:10:58	027956710	0477420877	Dory A	Kamailio
00	03-21 10:10:38	03-21 10:11:27	027956710	0477420877	Kamailio	Dory B
0 😉	03-21 10:10:37	03-21 10:11:02	027956710	0477973838	Dory A	Kamailio
Showing 1 t	o 10 of 5,271 entries 3				4 First	Previous 1 2 3 4 5 528 Next Last
Export cal	5					

Figure 7: Common elements in Search Tools

#	Name	Description
1	Show	Allows selecting the number of entries displayed per page (10 - 25 - 50 - 100)
2	Search	Allows specifying a chain of characters or digits to filter the results - refresh is immediate
3	Showing	Displays the scope of the current display and the total number of results for the query
4	Navigation	Allows navigating through the list from page to page
5	Button	Action button (depending on context) for further action on the list

# 4.6 Data & Charts

The **Call Statistics** and **Voice Quality** modules allow the user to retrieve charts about metrics calculated by NEMO. They share a common data selection interface, described below.



#### Info

The availability of the charts is user-based: not all users have access to all the charts. Access is defined in the user profile: for more details, see [Edit an Existing User].

#### 4.6.1 Data Selection

The data selection interface allows the user to quickly retrieve a chart for a specific group selection (group, realm, trunk...) and a recent period.

This selection conveniently remains active as the user switches from the module where it was made first to another module. However, it may change according to specific actions like, for example, a Zoom in a chart: the value in *Date Range* is adapted to the range zoomed into.

Sessions				
Group	Sele	ct a group from the list		•
Date Range		2015-05-16 00:00 - 2015-	05-16 23:59	
Smooth Data	no	Last Hour	•	
Aggregate Data	0	Today Yesterday		
	_	Last 7 Days		
		Last 30 Days		
		This Month		
		Last Month		
		FROM TO		
		2015-05-1 2015-05-1		
		Apply Cancel		

Figure 8: Data Selection form

Use the *Group* drop-down menu to select the realms, labels, endpoints or trunks you want to inspect. Several items can be selected. In that case, you can check the *Aggregate Data* check-box to group statistics, or uncheck it to visualize them separately.

Smooth data: select a post-processing filter from the drop-down list to smooth the graph.

A *simple moving average* is the unweighted mean of the previous *n* data points. The number of data points, *n*, is calculated as a percentage of the total number of data points. The larger this percentage, the smoother the charts.



An *exponential moving average* is a weighted average that has exponentially decreasing weighting factors applied to the previous data points. The coefficient *alpha* represents the degree of weighting decrease. The smaller this value, the smoother the charts.

Use the *Date Range* drop-down menu to select one of the range options among these:

- Last hour
- Today
- Yesterday
- Last 7 days
- Last 30 days
- This month
- Last month
- Custom Range

#### 4.6.2 Charts Types

NEMO provides charts for the calls statistics and voice quality statistics.

Two types of charts are available, depending on the selected metric.

Time-based charts illustrate the evolution of a particular metric over a specific time range, for example the evolution of traffic intensity over the last day.

Histogram-based charts illustrate the statistical distribution of values for a specific metric. A variant of the histogram chart is the pie chart, which illustrates proportions.

#### 4.6.3 Charts Tools

#### 4.6.3.1 Chart Overview

The charts displayed in the results window provide several tools illustrated below.







Figure 9: Charts Tools

These tools include:

- 1. The chart type
- 2. The legend, providing the value for each series at the currently selected chart position (vertical blue line, used to select a position in the chart), with check-boxes to show or hide individual data series.
- 3. *Zoom out* button: to reset the zoom to its original setting. Refer to the next section for zoom details.
- 4. *Calls list* button: to retrieve the list of calls that occurred during this period of time and for this realm/trunk.
- 5. Export data button: to consult and export the metrics data related to the chart.

#### Warning

The legend (2) and buttons (3-4-5) are not available for some charts, depending on the chart's type and the data selection.

If appropriate data are available, the buttons are shown. Note also that the selection of several groups is authorized for listing calls and exporting data.

#### 4.6.3.2 Zoom Tool

The *Zoom* feature allows seeing more precisely what happened during a specific period. To zoom in, click with the mouse at the desired start position, hold down the button, drag the mouse horizontally to the desired end position and release the button, as illustrated below.





Figure 10: Zoom

The chart precision will be refined dynamically to improve accuracy, as illustrated below. At the same time, the vertical range (Y-axis) is adapted to reflect the new values range.



Figure 11: Chart Precision Auto Adjust



#### 4.6.3.3 Calls list button

The *Calls list* button conveniently opens the *Search Calls* browser page in the **Calls** module with the data selection active in the chart being displayed : group, date range.

However, the data selection in *Search Calls* being much more detailed, you will have to confirm and possibly complete that selection on the *Search Calls* page, and validate it by clicking the *Search* button to display the corresponding list of calls. Please refer to <u>Search Calls</u> for more information.

#### 4.6.3.4 Export Data Tool

The *Export data* button allows retrieving the raw data used to compute and plot the graph. These data can also be exported as a CSV file. When clicking this button, the *Data Export* window is displayed, as illustrated below.

DATA SELECTION			
Groups	Demo Dory	•	
Statistic	Traffic Intensity	•	
Aggregation Mode	series (default precision)	•	]
Date Range	series (default precision) series (1 minute precision) series (5 minutes precision) series (20 minutes precision) series (1 hour precision) series (4 hours precision)		
DATA	series (24 hours precision) average values		
Date	maximum values		Egress
Wed Mar 23 19:20:00 2022		0.00 erlangs	0.00 erlangs
Wed Mar 23 19:25:00 2022		0.00 erlangs	0.00 erlangs
Wed Mar 23 19:30:00 2022		0.00 erlangs	0.00 erlangs
Wed Mar 23 19:35:00 2022		0.00 erlangs	0.00 erlangs
Wed Mar 23 19:40:00 2022		0.00 erlangs	0.00 erlangs



The Data Selection zone shows the following elements:

- The Group drop-down menu allows selecting a particular realm, label, endpoint or trunk.
- The Statistics drop-down menu allows selecting the metric you are interested in.
- The *Aggregation Mode* drop-down menu allows you to select the precision among the possible values: 1 minute, 5 minutes, 20 minutes, 1 hour, 4 hours or 24 hours. This determines the time step in the results table. Alternatively, you can select the average, maximum values or default precision (recommended value).



• The *Date Range* indicates the desired time range.

Click the *Retrieve data* button to refresh the raw data display in the DATA list. Changing the values of any of the selected elements is allowed, for example to change the Date range, etc.

Click the *Export as CSV* button to export the raw data as a CSV file.

# 4.7 Calls Statistics Module

The **Calls Statistics** module is divided in five sub-menus, each containing several charts described in the tables below. These statistics are computed based on the signaling metrics present in the CDRs generated by the SBCs, or in the data captured by the probes, or both ("hybrid mode" or "multi-plugins mode"). See [Call data and Trace data – Understanding the differences] for more information.

#### 4.7.1 Sessions

Title	Description	Туре	Unit
Total Capacity Usage	This chart illustrates the proportion of time where various levels of total capacity usage have been reached.	Pie	Proportion (%)
Minutes of Usage	This chart describes the total duration of calls in minutes, hourly or daily, depending on the window of time selected.	Time- based	Minutes
Calls Count over Time	This chart shows the number of calls per hour or per day.	Time- based	Number of calls
Traffic Intensity	This chart illustrates the number of voice channels busy.	Time- based	Erlangs
Maximum Simultaneous Calls	This chart shows a measurement of the maximum number of concurrent channels busy.	Time- based	Number of voice channels
Call Rate	This chart illustrates the number of call setup attempts (successful or failed) per second.	Time- based	Calls/second

#### 4.7.2 Registrations



Title	Description	Туре	Unit
Active Registrations	This chart shows the number of successfully registered subscribers over time.	Time- based	Ingress/Egress Registra- tions
Registrations Rate	This chart shows the number of registration attempts (successful and failed) per second.	Time- based	Proportion (%)

# 4.7.3 Call Durations

Title	Description	Туре	Unit
Connection Phase Duration Distribution	The connection phase is the period of time between the moment the call is answered (connected) and the moment the call is released (disconnected). This chart represents the distribution of these durations. Each bar represents the percentage of calls (vertical axis) which have a specific duration (horizontal axis).	Histogram	Proportion (%)
Average Connection Phase Duration	This chart illustrates the evolution of the average calls connection duration over time.	Time- based	Seconds
Alerting Phase Duration Distribution	The alerting (ringing) phase is the period of time between the moment the call is initiated (setup) and the moment the call is answered (connected). This chart represents the distribution of these durations. Each bar represents the percentage of calls (vertical axis) which have a specific duration (horizontal axis).	Histogram	Proportion (%)
Average Alerting Phase Duration	This chart illustrates the evolution of the average calls alerting phase duration over time.	Time- based	Seconds
Post Dial Delay	Post dial delay is the time between the start of the call and the moment the phone of the called party starts ringing.	Time- based	Milliseconds



Title	Description	Туре	Unit
Post Dial Delay Distribution	Post dial delay is the time between the start of the call and the moment the phone of the called party starts ringing. This histogram represents the distribution of these durations. Each bar represents the percentage of calls (vertical axis) which have a specific post dial delay (horizontal axis).	Histogram	Proportion (%)

# 4.7.4 Caller and Callee Distribution

The charts listed in the table below exist for each combinations of:

- direction: ingress or egress
- party: calling party number (caller) or called party number (callee)
- metric type: volume (number of minutes) or count (number of calls)

From the base 3 type of charts: National vs International, National and International breakdowns, 24 different charts are available.

Title	Description	Туре	Unit
Ingress Callee Distribution: International (Count)	This chart illustrates the called party number distribution for international calls. Calculation is based on number of calls.	Pie	Proportion (%)
Ingress Callee Distribution: International (Volume)	This chart illustrates the called party number distribution for international calls. Calculation is based on volume.	Pie	Proportion (%)
Ingress Callee Distribution: National (Count)	This chart illustrates the called party number distribution for national calls. Calculation is based on number of calls.	Pie	Proportion (%)
Ingress Callee Distribution: National (Volume)	This chart illustrates the called party number distribution for national calls. Calculation is based on volume.	Pie	Proportion (%)



Title	Description	Туре	Unit
Ingress Callee Distribution: National vs International (Count)	This chart illustrates the called party number distribution between national and international calls. Calculation is based on number of calls.	Pie	Proportion (%)
Ingress Callee Distribution: National vs International (Volume)	This chart illustrates the called party number distribution between national and international calls. Calculation is based on volume.	Pie	Proportion (%)
Ingress Caller Distribution: International (Count)	This chart illustrates the calling party number distribution for international calls. Calculation is based on number of calls.	Pie	Proportion (%)
Ingress Caller Distribution: International (Volume)	This chart illustrates the calling party number distribution for international calls. Calculation is based on volume.	Pie	Proportion (%)
Ingress Caller Distribution: National (Count)	This chart illustrates the calling party number distribution for national calls. Calculation is based on number of calls.	Pie	Proportion (%)
Ingress Caller Distribution: National (Volume)	This chart illustrates the calling party number distribution for national calls. Calculation is based on volume.	Pie	Proportion (%)
Ingress Caller Distribution: National vs International (Count)	This chart illustrates the calling party number distribution between national and international calls. Calculation is based on number of calls.	Pie	Proportion (%)
Ingress Caller Distribution: National vs International (Volume)	This chart illustrates the calling party number distribution between national and international calls. Calculation is based on volume.	Pie	Proportion (%)
Egress Callee Distribution: International (Count)	This chart illustrates the called party number distribution for international calls. Calculation is based on number of calls.	Pie	Proportion (%)
Egress Callee Distribution: International (Volume)	This chart illustrates the called party number distribution for international calls. Calculation is based on volume.	Pie	Proportion (%)



Title	Description	Туре	Unit
Egress Callee Distribution: National (Count)	This chart illustrates the called party number distribution for national calls. Calculation is based on number of calls.	Pie	Proportion (%)
Egress Callee Distribution: National (Volume)	This chart illustrates the called party number distribution for national calls. Calculation is based on volume.	Pie	Proportion (%)
Egress Callee Distribution: National vs International (Count)	This chart illustrates the called party number distribution between national and international calls. Calculation is based on number of calls.	Pie	Proportion (%)
Egress Callee Distribution: National vs International (Volume)	This chart illustrates the called party number distribution between national and international calls. Calculation is based on volume.	Pie	Proportion (%)
Egress Caller Distribution: International (Count)	This chart illustrates the calling party number distribution for international calls. Calculation is based on number of calls.	Pie	Proportion (%)
Egress Caller Distribution: International (Volume)	This chart illustrates the calling party number distribution for international calls. Calculation is based on volume.	Pie	Proportion (%)
Egress Caller Distribution: National (Count)	This chart illustrates the calling party number distribution for national calls. Calculation is based on number of calls.	Pie	Proportion (%)
Egress Caller Distribution: National (Volume)	This chart illustrates the calling party number distribution for national calls. Calculation is based on volume.	Pie	Proportion (%)
Egress Caller Distribution: National vs International (Count)	This chart illustrates the calling party number distribution between national and international calls. Calculation is based on number of calls.	Pie	Proportion (%)
Egress Caller Distribution: National vs International (Volume)	This chart illustrates the calling party number distribution between national and international calls. Calculation is based on volume.	Pie	Proportion (%)



# 4.7.5 Release Causes

Title	Description	Туре	Unit
Ingress/Egress Calls Disconnect Causes Distribution	The charts illustrate the distribution of individual SIP error codes *.	Pie	Proportion (%)
Ingress/Egress Calls ISDN Causes Distribution	The charts illustrate the distribution of ISDN disconnect causes. The possible ISDN cause are define in ITU-T Q850 specification *.	Pie	Proportion (%)
Ingress/Egress Calls SIP Status Distribution	The charts illustrate the distribution of calls SIP error codes for ingress and egress calls. The possible SIP error codes are defined in IETF RFC 3261.	Pie	Proportion (%)
Session Establishment Ratio	The Session Establishment ratio (SER, also known as Answer Seizure Ratio, ASR) is the percentage of calls answered with respect to the total number of call attempts. The scale goes form 0% (no calls answered) to 100% (all calls answered).	Histogra	r杼roportion (%)
Session Establishment Effectiveness Ratio	The Session Establishment Effectiveness Ratio (SEER, also known as Network Efficiency Ratio, NER) is the percentage of calls answered with respect to the total number of call attempts. Calls released because User busy, No answer, etc are excluded form this metric. It is designed to eliminate user behaviour as a factor and better represent pure network performance.	Histogra	rĦroportion (%)
Ineffective Session Attempts Ratio	The ineffective session attempts ratio (ISA) is the percentage of calls released with a failed or overload condition. The scale goes from 0% (no ineffective session attempts) to 100% (all session attempts are ineffective).	Histogra	r杼roportion (%)

 $^{\star}$  These charts are specific to Oracle SBC and will not appear if Probes / Trace Capture are used.


# 4.8 Voice Quality Module

The **Voice Quality** module is divided in seven sub-menus, each presenting several charts as described in the tables below. These statistics are computed based on the media metrics present in the CDRs generated by the SBC, or in the data captured by the probes if present, or both ("hybrid mode", see [Call data and Trace data – Understanding the differences]).

In the graphs plotting data Over Time, the light violet bars show week-ends:

MEDIA BA	NDWIDTH		
	Group	Dory A 🔹	
	Date Range	<b>2</b> 2019-06-15 09:47 - 2019-07-15 09:47	
	Smooth Data	no post-processing \$	
	Aggregate Data		
DORY A		Week-ends	
Media	Bandwidtl Over Time		
30			
25		M handling of the second of the second of the second	7
20			
15			
10			
5			
0 -			

#### 4.8.1 Packet Loss



Title	Description	Туре	Unit
RTP Average Packet Loss Distribution	Packet loss occurs when one or more packets of RTP data travelling across a VoIP network fail to reach their destination. This chart represents the packet loss distribution: for each interval indicating a packet loss level on the horizontal axis, the bar height indicates the percentage of calls affected by this packet loss level. The statistics are measured based on the RTP flows observed by the SBC.	Histogram	Proportion (%)
RTP Average Packet Loss Over Time	The chart illustrates the evolution of the proportion of packets lost over time, based on the RTP streams observed by the SBC.	Time-based	Proportion (%)
RTCP Average Packet Loss Distribution	The chart illustrates the packet loss distribution (expressed in percentage). The statistics are measured based on the RTCP reports sent by both call endpoints. The accuracy of the RTCP reports can vary depending on the endpoint type.	Histogram	Proportion (%)
RTCP Average Packet Loss Over Time	The chart illustrates the evolution of the proportion of packets lost over time. The statistics are measured based on the RTCP reports sent by both call endpoints. The accuracy of the RTCP reports can vary depending on the endpoint type.	Time-based	Proportion (%)

## 4.8.2 Packet Jitter



Title	Description	Туре	Unit
RTP Average Jitter Distribution	Jitter is the variability over time of the packet latency across a network. This chart represents the jitter distribution: for each interval indicating a jitter level in milliseconds, the bar height indicates the percentage of calls affected by this jitter level. The statistics are measured based on the RTP flows observed by the SBC.	Histogram	Proportion (%)
RTP Average Jitter Over Time	This chart represents the measured jitter over time. The statistics are measured based on the RTP flows observed by the SBC.	Time- based	Milliseconds
RTCP Average Jitter Distribution	This chart represents the jitter distribution: for each interval indicating a jitter level in ms, the bar height indicates the percentage of calls affected by this jitter level. The statistics are measured based on the RTCP reports sent by both call endpoints. The accuracy of the RTCP reports can vary depending on the endpoint type.	Histogram	Proportion (%)
RTCP Average Jitter Over Time	This chart represents the measured jitter over time. The statistics are measured based on the RTCP reports sent by both call endpoints. The accuracy of the RTCP reports can vary depending on the endpoint type.	Time- based	Milliseconds

# 4.8.3 Packet Latency



Title	Description	Туре	Unit
RTCP Max Latency Distribution	One-way packet latency is the time between the moment a voice packet is transmitted and the moment it reaches its destination. It leads to delay and may lead to echo. This chart represents the maximum latency distribution: for each interval indicating a maximum delay on the horizontal axis, the bar height indicates the percentage of calls affected by this delay. The statistic endpoints. The accuracy of the RTCP reports can vary depending on the endpoint type.	Histogram	Proportion (%)
RTCP Avg Latency Distribution	This chart represents the average latency distribution: for each interval indicating an average delay on the horizontal axis, the bar height indicates the percentage of calls affected by this delay. The statistics are measured based on the RTCP reports sent by both call endpoints. The accuracy of the RTCP reports can vary depending on the endpoint type.	Histogram	Proportion (%)

## 4.8.4 MOS

Title	Description	Туре	Unit
Ingress/Egress MOS Overview	The charts illustrate the proportion of calls with various predefined score levels. Some SBC releases do not provide the MOS value. In this case, the MOS is calculated by NEMO, according to ITU-T recommendation G.107.	Pie	Proportion (%)



Title	Description	Type	Unit
RTP MOS Distribution	This chart represents the Mean Observation Score distribution: for each interval indicating a score on the horizontal axis, the bar height indicates the percentage of calls with this score. Some SBC releases do not provide the MOS value. In this case, the MOS is calculated by NEMO, according to ITU-T	Histogram	Proportion (%)
RTP MOS Over Time	The chart illustrates the evolution of the Mean Observation Score (expressed as a score) calculated by the SBC over time. Some SBC releases do not provide the MOS value. In this case, the MOS is calculated by NEMO, according to ITU-T recommendation G.107.	Time- based	Score

## 4.8.5 R-Factor

Title	Description	Туре	Unit
R-Factor Distribution	This histogram represents the R-Factor distribution: for each interval indicating a score on the horizontal axis, the bar height indicates the percentage of calls with this score.	Histogram	Proportion (%)
R-Factor Over time	This chart represents the R-Factor over time.	Histogram	Proportion (%)

# 4.8.6 Codecs

Title	Description	Туре	Unit
Codecs Distribution	The chart illustrates the distribution of codecs for ingress & egress calls.	Pie	Proportion (%)
Packetization Time distribution	The chart illustrates the distribution of the packetization time for ingress & egress calls.	Pie	Proportion (%)



## 4.8.7 Media Bandwidth

Title	Description	Туре	Unit
Media bandwidth Over Time	The chart illustrates the evolution of the bandwidth consumption. Calculation is based on the "bytes sent/received" information received in the CDRs.	Time-based	Seconds

# 4.9 Calls Module : Searching Calls and Traces

The **Calls** module allows searching the CDRs stored in the database to analyse calls.

It also allows searching call traces (see [Search Traces]) and analyzing traces (see [Trace Analysis]), downloaded from the *Search Calls* tool or captured externally.

# 4.9.1 Call Data and Trace Data - Understanding the Differences

*Call data* come from the CDRs stored in the database, originating from the third-party equipment being monitored.

*Trace data* come from traces captured by the probes, if present, or by an external trace capture tool. The probes create their own internal CDRs.

*Call details* in *Search Calls* display:

- in a deployment with network equipment and installed plugin: the data available in the CDRs from the equipment being monitored
- in a deployment with probes only: the data available in the internal CDRs from the trace, and a link to the end-to-end call trace
- in a deployment with third-party equipment, plugin *and* probes ("hybrid mode"): a combination of data from both CDRs.

# 4.9.2 Search Calls

The Search Calls command allows selecting:

• the device that will be searched (Capture, Netnetsd, Broadsoft, etc.)



SEARCH CALLS Tabs for device	e selection (Capture	e tab selected	i)				
Search Device Capture Net	tnetsd Broadsoft	Sre					
Calling & Called IP Addresses	Groups SIP	Packet Loss	Packet Jitter	Packet Latency	MOS	Media streams	User agent
Normalized calling number ~	0123456789						
	and	~					
Normalized called number ~	0123456789						
Columns	Nothing selected					~	
Time d	Date range						
Correlated Calls	Combine correlated	calls in a single e	ntry				

• calls within this device, according to a very extended set of criteria, grouped in tabs.

SEARCH CALLS Tabs for dev	vice selection (Captur	e tab selecte	d)	Tabs f	or criteria	type selection	
Search Device Capture	Netnetsd Broadsoft	Sre		(Callin selecte	g & Calle ed for Ca	ed criteria pture device)	
Calling & Called IP Addresse	es Groups SIP	Packet Loss	Packet Jitter	Packet Latency	MOS	Media streams	User agent
Normalized calling number ~	0123456789						
	and	~					
Normalized called number ~	0123456789						
Columns	Nothing selected					*	
Time	Date range     Date range     Date range     Date range						
Correlated Calls	Combine correlated	calls in a single e	entry				

## 4.9.2.1 Search Criteria

Tabs/criteria are device-specific: not all tabs/criteria are available for each device or shown in each device tab. *Calling & Called, IP Addresses* and *Groups* tabs/criteria are common to all devices.



## 4.9.2.1.1 Criteria Common to all Tabs: Sources and Destinations

#### • Calling and Called

## Warning

Calls can be searched either by specifying the first digits of the normalized number (e.g. 123, 123456) or by specifying the original party. In the later case, \* may be used as wildcard (e.g. 123456, 123\*, \*456).

The *Normalized calling number* and *Normalized called number* drop-down boxes allow specifying criteria for the calling and/or called party numbers, in normalized or original format (see Warning above). The search results will return all calls from and/or to the numbers specified in the criteria as selected via the drop-down list.

#### • IP Addresses tab

The *Ingress remote address* and *Egress remote address* text fields allow specifying one IP address for ingress traffic and/or one for egress traffic. IPv6 format is supported.

• Groups tab

The *Ingress group / Egress group* drop-down lists allow specifying a combination of ingress and/or egress entities (including labels).

For device-specific criteria, refer to the chapter [Plugins Features List].

#### 4.9.2.1.2 Other Common Criteria

- **Time / Date Range** The *Date Range* drop-down box allows specifying the time range using one the following criteria:
  - Last Hour
  - Last 4 Hours
  - Last 12 Hours
  - Last 24 Hours
  - Today (all calls from today 00:00 until 23:59).
  - Yesterday (all calls from yesterday 00:00 until yesterday 23:59).
  - Last 7 days
  - Custom Range (allows defining a customized range)



Time	Date range		
	<ul> <li>Live</li> </ul>		
Columns	Nothing selected -		
Correlated Calls	Combine correlated calls in a single entry		
	Start Clear		



The **Live** radio button under **Date Range** switches from the time window-based range mode to live mode, allowing to automatically refresh the results by performing a new search at regular intervals. When **Live** is active, the **Search** button becomes **Start**. Click it to launch the live search; when started, click it again (**Stop**) to stop the live search mode.

- **Columns** The *Columns* drop-down menu allows specifying additional parameters that will be displayed in the search results. The following parameters are present by default in the result:
  - Start Time
  - End Time
  - Calling Number
  - Called Number
  - Ingress Group
  - Egress Group

Using the *Columns* drop-down menu, other items can be added to the search results. For device-specific criteria, refer to the chapter [Plugins Features List].

• **Correlated calls** When checked, all call legs of multi-legs calls are grouped into one line. All details remain available, see below [Display Call Details].

# 4.9.2.2 Search Results Browser (Calls)

Once the search criteria are supplied, click the *Search* button. The search results are displayed in the *Search Results* browser.



SEARCH	RESULTS													
Show 25	+ entries											Search:		
	Start	▼ End	¢ Calling	¢ Called	Ingress 🕴 Group	Egress 🖨 Group	Calling Number (normalized)	Called Number (normalized)	¢ Src IP	¢ Dst IP	Src ¢ Hostname	Dst Hostname	Call 🕴 Id	SIP Method
٥٠	06-06 15:29:04	06-06 15:29:05	+3225885215	+32123456789	Demo Dory		+3225885215	+32123456789	54.39.67.96	54.172.60.3	#N/A	#N/A	152904- 8041	INVITE
٥٥	06-06 15:28:31	06-06 15:28:49	027956710	022108710	Dory B		+27956710	+22108710	10.100.2.10	10.100.2.6	#N/A	#N/A	152831- 8075	INVITE
00	06-06 15:28:31	06-06 15:28:49	027956710	022108710	SBC Registrar	Dory A	+27956710	+22108710	10.100.1.5	10.100.1.10	#N/A	#N/A	152831- 8075	INVITE
00	06-06 15:28:29	06-06 15:28:47	027956710	038926623	Dory B		+27956710	+38926623	10.100.2.10	10.100.2.6	#N/A	#N/A	152829- 1864	INVITE
٥٥	06-06 15:28:29	06-06 15:28:47	027956710	038926623	SBC Registrar	Dory A	+27956710	+38926623	10.100.1.5	10.100.1.10	#N/A	#N/A	152829- 1864	INVITE
٥٥	06-06 15:27:31	06-06 15:27:49	027956710	077273560	Dory B		+27956710	+77273560	10.100.2.10	10.100.2.6	#N/A	#N/A	152731- 8289	INVITE
٥٥	06-06 15:27:31	06-06 15:27:49	027956710	077273560	SBC Registrar	Dory A	+27956710	+77273560	10.100.1.5	10.100.1.10	#N/A	#N/A	152731- 8289	INVITE

Figure 14: Search Results browser (Calls)

## Release Cause Color Code

Note the vertical bar on the left (in the blue square): the color shows the release cause of the call according to the code below:

- pink: live
- green: successful call (2XX and BYE)
- blue: redirected call (3XX)
- orange: «soft» error (No answer, Busy, etc.) (4XX and CANCEL)
- red: severe error (server down, etc.) (5XX and 6XX)

#### Info

This feature is not supported by all plugins.

## 4.9.2.2.1 Display Call Details

In the *Search Results* window, click the <sup>O</sup> icon of a call to expand the call details. This action provides details about the selected call, as illustrated below.

More than one call can be inspected at the same time: clicking another <sup>(O)</sup> icon does not close the first opened one.

Displayed results may differ from the examples below, depending on the equipment, call type, etc.

The picture below shows a Call Details page for Capture:

necaxis
SOLUTIONS

SEARCH RESULTS					
Show 25 ‡ entries					Search:
Start	End	Calling	Called 🔶	Ingress Group	Egress Group
<ul> <li>O9-12 11:41:57</li> </ul>	09-12 11:41:57	026260120	026260120	SBC Registrar	Dory A
<ul> <li>O9-12 11:41:57</li> </ul>	09-12 11:41:57	026260120	026260120	Dory B	
O9-12 11:41:54	09-12 11:42:12	027956710	047068785	Dory B	
Call Data Record Call Flow	Messages List Media Streams				
Call					
Capture probe	nemo3-bridge-b				
SIP method	INVITE				
Calling	027956710				
Called	047068785				
Setup time	Tue Sep 12 11:41:54 2017				
Connect time	Tue Sep 12 11:41:57 2017 (+3.17 secs)				
Disconnect time	Tue Sep 12 11:42:12 2017 (+18.12 secs)				
Disconnect reason	BYE				
Record id	59b7abff4120d45e0e1eb9cb				
Signaling					
	Calling		Called		
Address	10.100.2.10		10.100.2.6		
Media Streams					
	Calling		Called		
Packets received	754		753		
Packets lost observed	0 (0.00 %)		37 (4.68 %)		
Average jitter observed	0.0 ms		0.0 ms		

#### The picture below shows a Call Details page for NetnetSD:

SEARCH RESULTS						
Show 25 • entries	5					Search:
Start		End	Calling	Called	Ingress Group	Egress Group
0 0 11-17 09:47	7:52	11-17 09:52:02	064431268	085287864	4 ABC Telecom A	ABC Telecom C
Call Data Record	Call Flow	Messages List				
Call						
Calling		<sip:064431268@voip.belgacom.be> ;tag=6f99ac96</sip:064431268@voip.belgacom.be>				
Called		<sip:085287864@voip.belgacom.be></sip:085287864@voip.belgacom.be>				
Setup time		Tue Nov 17 09:47:52 2020				
Connect time		Tue Nov 17 09:48:09 2020 (+17.00 secs)				
Disconnect time		Tue Nov 17 09:52:02 2020 (+250.71 secs)				
Disconnect cause		Normal clearing				
SIP status		Normal clearing				
Signaling						
		Ingress		Egress		
Realm		RA004		RC00	4	
Network Interface		access:25		core:1	13	
Remote Address		10.1.86.96:5060		10.48	.1.139:5060	
SBC Address		80.200.248.228:5060		10.3.8	36.96:5060	
Call Id		3aae20eab4307e72b91de26629e99d79		b75a7	db1105c75f69e41ac95275b47fa	

# Call Data Record Tab

This tab displays the data available in the CDR(s) related with the selected call (see [Call data and Trace data – Understanding the differences] for more details). This content depends on the plugin activated. Refer to the chapter [Plugins Features List] for an overview of the data provided for a particular plugin.



# Call Flow tab (with Capture)

This tab displays the call flow diagram.

SEARCH RESULTS					
Show 10 - entries	Call being inspected				Search:
Start	🗸 End	Calling	Called	Ingress Group	Egress Group
0 3-21 11:40:21	03-21 11:40:40	027956710	0477684766	Dory A	Kamailio
0 0 03-21 11:40:21	03-21 11:40:40	027956710	0477684766	Kamailio	Dory B
<ul> <li>O3-21 11:40:19</li> </ul>	03-21 11:40:33	027956710	0477140244	Dory A	Kamailio
Call Data Record Call Flow					
Flow Call timing					Event duration
10.100.2.6		10.100.0.4			10.100.1.5
11:40:19.616	INVITE sip:0477140244@10.100.1.5				+ 0.0005
11:40:19.633				INVITE sip:0477140244@10.100.1.5	5 + 0.018s
11:40:19.636	100 trying your call is imp				+ 0.020s
11:40:19.639				100 Trying	+ 0.023s
11:40:19.640				180 Ringing	+ 0.025s
11:40:19.663	180 Ringing				+ 0.047s
11:40:22.652				200 OK	+ 3.036s
11:40:22.675	200 OK		RTP flows		+ 3.059s
11:40:22.705	ACK sip:0477123456@10.100.1.5:		1 1		+ 3.089s
11:40:22.723				ACK sip:0477123456@10.100.1.5:	+ 3.107s
11:40:22.736		· · · · · · · · · · · · · · · · · · ·			+ 3.121s
11:40:22.742			<b>*</b>		+ 3.127s
11:40:32.715	BYE sip:0477123456@10.100.1.5:				+ 13.099s
11:40:32.733				BYE sip:0477123456@10.100.1.5:	+ 13.117s
11:40:32.737				200 OK	+ 13.121s
11:40:32.760	200 OK				+ 13.144s
	Other c	alls in the resu	ılts list		
O3-21 11:40:19	03-21 11:40:33	027956710	0477140244	Kamailio	Dory B
0 3-21 11:40:11	03-21 11:40:27	027956710	0477190477	Dory A	Kamailio

Figure 15: Call flow diagram

The animated RTP flow lines show the direction of the RTP stream, and allow replaying the audio data. Click the animated line to display the call flow details and audio player, and click again the line to close it.

## **Call flow details**

NEMO probes can be placed at various locations in the network, including at several locations within the same network segment, which allows multi-RTP capture. In this case, more than one RTP capture is shown in the Call flow details window that opens when you click the RTP flow line.



SEARCH	RESULTS									
Show 25	¢ entries				Probe		nemo3-demo-probe-lab-vmware3			Search:
	Start			- End	Source		10.0.12.72:10544		a Ingress Group	Forress Group
	10-23.17	-03-32		10-23 17:03:51	Destina	tion	10.0.12.71:20004		Broadsoft MS	Broadsoft AS
••	10 20 17	.00.02		10 10 17:00:01	VLAN		12		biolaboremb	broadbirthb
Call D	ata Record	Call Flow	Messages L	ist Media Streams	SSRC		0x1ab38ded			
Flow					First page	:ket	17:03:32.137			
11000					Last pac	ket	17:03:41.833			
			10.0.12.	71	Packets	received	486		10.	0.12.72
		1	7:03:31.884	INVITE sip:27778025@tempsahpbx	Packets	lost observed	0 (0.00 %)			+ 0.000s
		- 1	7:03:31.955	100 trying your call is imp	Total pa	yload bytes	83592 bytes			+0.071s
		-	7-03-32 032		Average	jitter observed	0.0 ms		INVITE sip:ivr@10.0.12.72	+0.148
		-	7-02-22.050		Max jitte	er observed	787 ms		200 OK	+ 0.147
			7.02.22.052		Latency	reported (RTCP)	0 ms		ACK sip:10.0.12.72:5060	+ 0.1693
			7.03.32.053	200 OK	Record i	d	59ee04d19c51e6231d8a6191			+ 0.1075
		1	/.03.32.06/	ACK sip:10.0.12.74:5060	Playbac	<	► 000 (000 <b>— 1</b> )			+0.1035
		1	/:03:32.104				• 0.007 0.08 • • • • • • • • •	• <u>•</u>	INFO sip:10.0.12.72:5060	+ 0.221s
		1	/:03:32.109						]	+ 0.225s
		1	7:03:32.137						200 OK	+ 0.254s
		1	7:03:32.151					•		+ 0.267s
		1	7:03:33.342	BYE sin:10.0.12.74:5060						+ 1.458s
		1	7:03:45.594	200.0K	-					+ 13.710s
		1	7:03:45.610						INFO sig-10.0.12.72-5060	+ 13.726s
		1	7:03:45.613						INEO sig-10.0.12.74-5060	+ 13.730s
		1	7:03:45.625					•	200 OK	+ 13.741s
		1	7:03:45.625					•	200 0K	+ 13.741s
		1	7:03:45.627						200 OK	+ 13.743s



SEARCH RESULTS															
Show 25 + entries														Search:	
Start				•	Probe	nemo3-	demo-probe-lab-	-vmware3		nemo3-demo-i	probe-lab-ymware3	ss Group		Egress Group	¢
	:03:32			1	Source	10.0.12	.71:20004			10.0.12.71:200	104	oft MS		Broadsoft AS	
Call Data Record	Call Flow	Messages	List	Media Str	Destination	10.0.12	.72:10544			10.0.12.72:105	44				
					VLAN	0			(	12		-			
Flow					SSRC	0x10f10	Dbe			0x10f10be					
		10.0.1	2.71		First packet	17:03:3	3.342			17:03:33.342		-	10.0.12.	.72	
	1	7:03:31.884		INVITE s	Last packet	01:00:0	0.365			01:00:00.365				+ 0.000s	
	1	7:03:31.955		100	Packets received	157				157				+ 0.071s	
	1	7:03:32.032			Packets lost observed	0 (0.00	%)			0 (0.00 %)		.72		+ 0.148s	
	1	7:03:32.050			Total payload bytes	15562 b	oytes			15562 bytes			+	+ 0.167s	
	1	7:03:32.053			Average jitter observed	0.5 ms				0.5 ms		60	<b>-</b>	+ 0.169s	
	1	7:03:32.067			Max jitter observed	1964 m	\$)		(	1900 ms		_		+ 0.183s	
	1	7:03:32.104		AC	Latency reported (RTCF	) 0 ms	_			0 ms				+ 0.221s	
	1	7:03:32.109			Record id	59ee04	d79c51e62322d	2ac85		59ee04d19c51	e6231d8a6192	060	<b></b> +	+ 0.225s	
	1	7:03:32.137			Playback	▶ 0:0	0 / 0:01	- 🕪 -	<b>→ ±</b>	0:00 / 0:01	•••• •		•	+ 0.254s	
	1	7:03:32.151												+ 0.267s	
	1	7:03:33.342		DV	E circ10.0.12.74/5040								•	+ 1.458s	
	1	7:03:45.594			200.0K	•							- +	+ 13.710s	
	1	7:03:45.610									INFO sin:10.0.12.3	72:5060	+	+ 13.726s	
	1	7:03:45.613									INFO sip:10.0.12.7	74:5060	-•  *	+ 13.730s	
	1	7:03:45.625									4 200 OK		- +	+ 13.741s	
1	1	/:03:45.625									-			+ 13./415	

Figure 17: Two RTP captures within the same segment

The figure below shows the controls available in the player: Play / Pause key, position being played (0:00), whole duration (0:09), adjustable Volume and Download key. When more than one RTP capture is shown, a second player allows playing back the second stream.



Figure 18: Audio Player Controls for multi-RTP capture

Messages Lists Tab (with Capture)

This tab displays the list of SIP messages exchanged for the selected call. Click a message to display (and copy if needed) its SIP details, as illustrated below.

The vertical colored bars on the left help identifying the different call legs.

O9-12 11:4	0:54	(	09-12 11:41:12	0:	27956710 010166817 Dory B
Call Data Record	Call Flow	Messages List	Media Streams		
Timestamp	Delta	Session	Src	Dst	Message
11:40:54.183	+ 0.000s	#1 TX	10.100.1.5	10.100.1.10	INVITE sip:010166817@10.100.0.4 SIP/2.0 -
11:40:54.183	+ 0.000s	#2 TX	10.100.2.10	10.100.2.6	INVITE sip:010166817@10.100.0.4 SIP/2.0 -
11:40:54.184	+ 0.001s	#1 RX	10.100.1.10	10.100.1.5	SIP/2.0 100 Trying -
11:40:54.196	+ 0.014s	#2 RX	10.100.2.6	10.100.2.10	SIP/2.0 100 Trying -
11:40:54.200	+ 0.017s	#2 RX	10.100.2.6	10.100.2.10	SIP/2.0 180 Ringing -
From: <sip:027950 To: <sip:0101668 Call-ID: 114054- CSeq: 102 INVITE Contact: <sip:04 Content-Length: (</sip:04 </sip:0101668 </sip:027950 	5710@voip.net 17@10.100.0.4 7409 77123456@10.1 0	axis.be>;tag=114 >;tag=114054-56 00.2.6:5060>	054-58		
11:40:54.202	+ 0.020s	#1 RX	10.100.1.10	10.100.1.5	SIP/2.0 180 Ringing -
11:40:57.212	+ 3.030s	#2 RX	10.100.2.6	10.100.2.10	SIP/2.0 200 OK 👻
11:40:57.216	+ 3.034s	#1 RX	10.100.1.10	10.100.1.5	SIP/2.0 200 OK -
11:40:57.231	+ 3.049s	#2 TX	10.100.2.10	10.100.2.6	ACK sip:0477123456@10.100.2.6:5060 SIP/2.0 -
11:40:57.232	+ 3.050s	#1 TX	10.100.1.5	10.100.1.10	ACK sip:0477123456@10.100.1.10:5060;transport=udp SIP/2.0 ~
11:41:12.373	+ 18.190s	#2 RX	10.100.2.6	10.100.2.10	BYE sip:027956710@10.100.2.10:5060;transport=udp SIP/2.0 -
11:41:12.376	+ 18.194s	#1 RX	10.100.1.10	10.100.1.5	BYE sip:027956710@10.100.1.5:5060 SIP/2.0 -
11:41:12.385	+ 18.202s	#2 TX	10.100.2.10	10.100.2.6	SIP/2.0 200 OK -
11:41:12.386	+ 18.203s	#1 TX	10.100.1.5	10.100.1.10	SIP/2.0 200 OK -

#### Media Streams Tab (with Capture)

This tab displays the forward and reverse media streams for the selected call, with all details and a playback player. The media file(s) can be downloaded locally (mp3 format). The picture below shows the Forward stream of the expanded call (the Reverse stream, not shown, appears below).



SEARCH RESULTS		
Show 25 \$ entries		Search:
Start	<ul> <li>End</li> </ul>	Calling Called Ingress Group Egress Group
O7-15 13:05:31	07-15 13:05:49	027956710 018004730 Dory B
Call Data Record Call Flow	Messages List Media Streams	
Forward stream (from calling p	arty to called party)	
Probe	nemo3-bridge-a	nemo3-bridge-b
Source	10.100.1.5:11298	10.100.2.10:17392
Destination	10.100.1.10:17392	10.100.2.6:11298
VLAN	0	0
SSRC	0x53	0x53
First packet	13:05:34.342	13:05:34.343
Last packet	13:05:49.363	13:05:49.343
Packets received	752	706
Packets lost observed	0 (0.00 %)	45 (5.99 %)
Total payload bytes	129344 bytes	121432 bytes
Average jitter observed	0.1 ms	0.1 ms
Max jitter observed	1.8 ms	1.7 ms
Latency reported (RTCP)	0 ms	0 ms
Record id	5d2c5e0dd9da0033ff1f467d	5d2c5e0e9d9e3b3d9962374e
Playback	O Retrieve audio stream	O Retrieve audio stream

# Warning

If you can't see *Playback - Retrieve audio stream* control as last item of the Stream details list, your user account has not been granted the corresponding access privilege. This is due to the enforcement of GDPR rules in NEMO.

If you are entitled to retrieve (playback and download) audio files, ask your NEMO administrator to grant you this access via *Settings > Users > Edit Users > Access Privileges*, as shown below.



E	DIT USERS						
	User Account	Active Charts	Chart	s Options	Notifications	Anomalies	Access Privileges
		Mod	dules	dashboa	ard		
				traffic s	tatistics (all pages)		
				✓ traffic st	tatistics - sessions		
				✓ traffic st	tatistics - registration	ons	
				✓ traffic st	tatistics - calls dura	itions	
				✓ traffic st	tatistics - calls dest	inations & sou	irces
				🕑 traffic s	tatistics - release ca	auses	
				traffic s	tatistics - RCS sessi	ion types	
				traffic s	tatistics - user-ager	nts	
				traffic st	tatistics - RCS file t	ransfers	
				🖉 voice qu	uality (all pages)		
				🗷 voice qu	uality - packet loss		
				🕑 voice qu	uality - packet jitter		
				🗷 voice qu	uality - packet laten	ю	
				🗷 voice qu	uality - MOS		
				🖉 voice qu	uality - R-Factor		
				🖉 voice qu	uality - codecs		
				🖉 voice qu	uality - media band	width	
				search of	calls		
				search r	ecordings		
				🗷 search t	races		
				🗷 trace an	alysis		
				retrieve	media stream (aud	io playback &	media capture download)
				🕑 anomali	es		
				SNMP a	alarms		
				🕑 reportin	ıg (all pages)		

Once the control is visible, click it to display the audio player.



# **Registrations Tab**

This tab is only shown for calls of REGISTER type.



In the *Search Calls* screen, select from the *Columns* drop-down list the value « SIP Method », set a time range and click **Search**.

The *Search Results* screen shows the calls within the time range, with the indication of the SIP Method used. In the picture below, the calls with *SIP Method* circled in green will show the *Registrations* tab when expanded ; those circled in red (not: REGISTER) will not show this tab. You may want to type « Register » in the Search field at the top right to filter the result list to REGISTER type calls only.



When expanded, a REGISTER type call will show the *Registrations* tab. Select a time range then click Show to display the graph.

Mouse over any spot in the graph shows the call details (white on black display below).

User	Guide	2



v 25 \$ entries						Search:
Start	<ul> <li>End</li> </ul>	Calling	Called	Ingress Group	Egress Group	SIP Method
<ul><li>07-15 10:02:17</li></ul>	07-15 10:02:35	027956710	037351931	Dory B		INVITE
<ul> <li>07-15 10:02:17</li> </ul>	07-15 10:02:35	027956710	037351931	SRE		INVITE
O7-15 10:02:17	07-15 10:02:35	027956710	037351931	SBC Registrar	Dory A	INVITE
O7-15 10:02:16	07-15 10:02:16	026260127	026260127	Dory B		REGISTER
Call Data Record Call Flow Registration Hist	Messages List Media Streams	Registrations				
Call Data Record Call Flow Registration Hist Time range	Messages List Media Streams ory 2019-07-15 06:02	Registrations		Show		
Call Data Record Call Flow Registration Hist Time range 026260127-vbv4um3150gne@10.100. 026260127-0kv6en7t6ggre@10.100.	Messages List         Media Streams           cory         2019-07-15 06:02           2.10:5060         000000000000000000000000000000000000	Registrations	₿10.100.1.5:5061 100.1.5:5061 branch=z 27@voip.netais.bss-ita	Show 9hG4bK-084641-6589 =084641-74	Contact 026260127-v Contact 026260127-0 Contact 026260127@ Contact 026260127@	bv4um3150gne@10.100.2.10:506 kv8en7t6ggre@10.100.2.10:5060 10.100.1.5:5060 10.100.1.5:5061

## 4.9.2.2.2 Export Calls

The **Export Calls** button at the bottom of the *Search Results* browser page allows exporting the search results to a . csv file. This . csv file contains the same columns as the columns displayed in the search results browser.

## 4.9.2.2.3 Download Trace

In the *Search Results* list, click the <sup>(1)</sup> icon of a call to download the call flow trace for further inspection using the *Trace Analysis* tool.

You can open the file using an external application or save the file, then submit it back to NEMO for further analysis. See [Trace Analysis] below for more details.

## 4.9.3 Search Traces

When probes are present and **Tracing** has been activated (see [Tracing]), the *Search Traces* command allows selecting and viewing traces captured by the probes.

The Search Traces selection window, illustrated below, allows setting criteria to filter the traces.



SEARCH TRACES	
Method	INVITE \$
Calling	
	and $\blacklozenge$
Called	
Source address	
	and 🔶
Destination address	
Date Range	
Search results	One row per correlated call
Live tracing	
Live status	Inactive capture
	► Start

Figure 19: Search Traces selection tool

The *Method* drop-down list allows specifying one SIP method from the list: INVITE, NOTIFY, REGISTER, OPTIONS, SUBSCRIBE.

The *Calling* and *Called* text boxes allow specifying criteria for the calling and/or called party numbers. The search results will return all calls from and/or to the numbers starting with the digits specified in the *Calling* and/or *Called* criteria.

The *Source address* and *Destination address* text boxes allows specifying the IP address for the source and/or destination endpoint(s). IPv6 format is supported.

The Date Range drop-down box allows specifying the time range using the following criteria:

- Last Hour
- Last 4 Hours
- Last 12 Hours



- Last 24 Hours
- Today (all calls from today 00:00 until 23:59).
- Yesterday (all calls from yesterday 00:00 until yesterday 23:59).
- Last 7 days
- Custom Range (allows defining a customized range)

The *Search Results* drop-down list allows aggregating the flow of each leg in a call into one single row ("one row per correlated call") or having each leg's flow available separately ("one row per individual call leg").

The *Live tracing* checkbox activates the live capture mode. The **Search** button becomes **Start**. Click it to launch the live capture; when started, click it again (**Stop**) to stop the capture.

The *Live status* zone displays a message indicating the status of the live capture. Reported status can be:

• Grey : "Inactive capture"

No active request at GUI level.

• Orange/Red: "Inactive capture"

Active request at GUI level, but unknown at probe level.

• Red : "Unknown capture status"

Active request at GUI level, but status cannot be collected due to a communication issue.

• Yellow: "Updating captured calls only"

Active request, but new calls are not monitored, only the captured calls are updated. A limit (time limit or maximum number of captured calls) has been reached.

• Green: "Capture enabled"

Click Search / Start to display the results in the Search Results browser window below.

The picture below shows the *Live tracing* mode active, the *Live Status* « Capture enabled », and in the Search Results browser below, one call with Live status (pink) and two with release cause 2XX or BYE (green) (see Release cause Color code).



# SEARCH RESULTS

<u> </u>		Start	<ul> <li>Method</li> </ul>
Ι	0	07-04 10:26:46.635	REGISTER
	0	07-04 10:26:16.496	INVITE
	0	07-04 10:26:16.461	REGISTER
<b>L</b> -			

Showing 1 to 3 of 3 entries

# 4.9.3.1 Search Results Browser (Traces)

In the *Search Results* browser window, click <sup>(O)</sup> to display the call flow for the call legs or correlated call, as illustrated below. See [Call Flow Tab] above for the description of the call flow diagram.



	Search results	One row per individual call leg	·				
		Q, Search					
SEARCH	RESULTS						
Show 100	entries					Sear	ch:
	Start	- Method		Calling	Called	Src IP	Dst IP
00	04-04 10:24:49.494	INVITE	102449-4203	027956710	0477199630	10.100.2.6	10.100.0.4
00	04-04 10:24:49.457	INVITE	102449-4203	027956710	0477199630	10.100.0.4	10.100.1.5
0 3	04-04 10:24:33.405	INVITE	102433-2493	027956710	0477632080	10.100.2.6	10.100.0.4
0 3	04-04 10:24:33.368	INVITE	102433-2493	027956710	0477632080	10.100.0.4	10.100.1.5
0 3	04-04 10:24:28.353	INVITE	102428-2362	027956710	0477808506	10.100.2.6	10.100.0.4
0 3	04-04 10:24:28.316	INVITE	102428-2362	027956710	0477808506	10.100.0.4	10.100.1.5

# Figure 20: Trace details - Call flow for individual legs

	Search results	One row per correlated call	·					
		Q, Search						
SEARCH R	ESULTS							
Show 100	- entries					Sear	ch:	
	Start	Method	≑ Call-Id	Calling	Called	Src IP	Dst IP	÷
0 3	04-04 10:24:49.457	INVITE	102449-4203	027956710	0477199630	10.100.0.4	10.100.1.5	
0 3	04-04 10:24:33.368	INVITE	102433-2493	027956710	0477632080	10.100.0.4	10.100.1.5	
0 🕹	04-04 10:24:28.353	INVITE	102428-2362	027956710	0477808506	10.100.2.6	10.100.0.4	
00	04-04 10:24:28.316	INVITE	102428-2362	027956710	0477808506	10.100.0.4	10.100.1.5	



Info	
In some cases, N legs are listed wi	IEMO cannot correlate legs into one row. When this situation happens, the two th the same Call-Id, as illustrated below (orange rectangle).
South results	

	Search results	One row per correlated call	-					
		Q. Search						
SEARCH	RESULTS							
Show 100	- entries					Sean	:h:	
	Start	Method	Call-Id	¢ Calling	Called	Src IP	Ost IP	φ
00	04-04 10:24:49.457	INVITE	102449-4203	027956710	0477199630	10.100.0.4	10.100.1.5	
0 🕑	04-04 10:24:33.368	INVITE	102433-2493	027956710	0477632080	10.100.0.4	10.100.1.5	
00	04-04 10:24:28.353	INVITE	102428-2362	027956710	0477808506	10.100.2.6	10.100.0.4	
00	04-04 10:24:28.316	INVITE	102428-2362	027956710	0477808506	10.100.0.4	10.100.1.5	)



# 4.9.3.2 Download Trace



In the *Search Results* window, click the ④ icon of a call to download the call flow trace for further inspection using the *Trace Analysis* tool.

You can open the file using an external application or save the file, then submit it back to NEMO for further analysis. See [Trace Analysis] below for more details.

## 4.9.4 Search Recordings

The *Search Recordings* command allows selecting calls to playback a record of the call or download an audio file. Calling part and called part are played back in the same player. Call details (call flow, etc.) are not available in this display.

The picture below shows a partial list of records, with the first one opened and its player ready to playback. For the controls of the player, see [Call flow details] above.

SEARCH RECORDINGS						
Call	0123456789					
	and	\$				
Cal	0123456789					
т	ime Date range	5 13:20:32 - 2018-06-15 14:20:32				
	Search Clear					
SEARCH RESULTS						
Show 25 + entries						Search:
	Start	🔻 End	Calling	Called	Ingress Group	Egress Group
► 0:00 / 0:13 ● ● ● ●	• • 06-15 14:19:55	66-15 14:20:1	3 027956710	012207842	2 Dory B	
Retrieve audio	06-15 14:19:55	06-15 14:20:1	3 027956710	012207842	2 SBC Registrar	Dory A
Retrieve audio	06-15 14:19:53	8 06-15 14:20:5	8 027956710	045015559	Dory B	
Retrieve audio	06-15 14:19:53	06-15 14:20:3	4 027956710	045015559	SBC Registrar	Dory A

Figure 23: Search Recordings browser

# 4.9.5 Trace Analysis

The *Trace analysis* command allows selecting a saved call flow trace file (.pcap file) and submitting it to NEMO. Once uploaded, the *Manual Trace Upload* window displays:

- the *Call Flow* tab: this one is identical with the *Call Flow* tab shown in the *Search Results* window of the *Search Calls* sub-menu for the same call.
- the *RTP analysis* tab: it displays the graphical representation of the RTP stream.







The figure below describes the components in the graphical representation.





Figure 25: RTP Analysis components

# 4.10 Anomalies Module

# 4.10.1 Anomalies Browser

The *Anomalies Browser*, part of the **Anomalies** module, lists all the anomalies detected by the platform. The selection interface illustrated below allows searching the anomalies database for a specific group and period of time.





Group	Ette	rbeek	•	
Date Range		2015-05-14 14:39 - 2015-	05-20 14:39	
		Last Hour		
		Today		
Anomalies		Yesterday		
		Last 7 Days		
how 25 • entries		Last 30 Days		Search:
Time		This Month	Group	
No data available in table		Last Month		
howing 0 to 0 of 0 entries		Custom Range		First Prev
		FROM TO		

Figure 26: Anomalies Selection

The results list, illustrated below, displays the anomalies matching the criteria defined in the selection interface, and shows the following columns:

- The start date/time of the time window during which the anomaly has been detected
- The anomaly type
- The group associated to this anomaly
- The severity



Anomalies			
Show 25 • entries			Search:
Time	<ul> <li>Anomaly</li> </ul>	🔶 Group	Severity
2015-05-20 14:00 - 14:05	low ingress MOS	Uccle	Major
2015-05-20 13:45 - 13:50	low ingress MOS	Uccle	Major
2015-05-20 12:00 - 12:05	low ingress MOS	Uccle	Major
2015-05-20 11:25 - 11:30	low ingress MOS	Uccle	Major
2015-05-20 10:55 - 11:00	low ingress MOS	Uccle	Major
2015-05-20 10:40 - 10:45	low ingress MOS	Uccle	Major
2015-05-20 10:25 - 10:30	low ingress MOS	Uccle	Major
2015-05-20 10:10 - 10:15	low ingress MOS	Uccle	Major
2015-05-20 09:45 - 09:50	low ingress MOS	Uccle	Major
2015-05-20 09:40 - 09:45	low ingress MOS	Uccle	Major
2015-05-20 09:30 - 09:35	low ingress MOS	Uccle	Major
2015-05-20 09:25 - 09:30	low ingress MOS	Uccle	Major
2015-05-20 09:20 - 09:25	low ingress MOS	Uccle	Major
2015-05-20 09:00 - 09:05	low ingress MOS	Uccle	Major
2015-05-19 23:55 - 00:00	low ingress MOS	Uccle	Major

Figure 27: Anomalies results list

On the top right of the browser, the *Search* box provides a real-time filtering tool for the table.

The anomalies reported are filtered according to the realm privileges that the user has. In addition to that, a user can be configured to either see all anomalies profiles or only the anomalies profile he owns. See [Users] to know how to adapt these privileges.

The thresholds may differ for each realm, depending on the Anomalies Profile associated to the realms. See [Anomalies] for more information on Anomalies Profiles.

An Anomalies profile can contain several anomalies, and an anomaly can be defined using a set of up to five conditions. The anomalies are defined in *Settings>Anomalies* (Anomalies) : see [Anomalies Profile Properties] for more information.

## 4.10.2 SNMP Alarms

The *SNMP Alarms* browser window, illustrated below, selectively displays the alarms raised by the SNMP system(s) of the monitored equipment(s), on the condition that SNMP rules have been defined in [SNMP].



Alarms	Events				
	Alarms				
	Show 100 - entries			Search:	
	Device 🍦 Alarm	First Occurence	Last Occurence	Severity  Cleared	🔷 🛛 Ack 🌲
	10.0.0.15 Auth failed from console	2017-04-07 14:44:53	2017-04-07 14:44:53 (1)	Informational Open	
	10.0.0.15 Auth failed from console	2017-04-07 14:44:33	2017-04-07 14:44:44 (4)	Informational Open	
	10.0.0.15 Session agent 10.0.201.20 d	own 2017-03-27 10:50:02	2017-03-27 10:50:02 (1)	Major 2017-03-27 10:51:18	8
	10.0.0.15 Session agent 10.0.201.20 d	own 2017-03-27 10:40:02	2017-03-27 10:40:02 (1)	Major 2017-03-27 10:41:18	3

Figure 28: SNMP Alarms Browser

The window shows the following columns:

- Device is the IP address or reference of the emitting element
- Alarm is the name of the alarm as defined in [Create an SNMP Rule]
- First and Last Occurrence display the date, time and [number of occurrences] of the alarm
- Severity indicates the severity level defined in the alarm rule
- *Cleared* indicates when the alarm has been cleared
- *Ack*[knowledged] can be checked to indicate that a user has noticed the alarm (and, possibly, has taken action to clear it).

When hovering the mouse over the alarm name in the *Alarm* column, the variables of the alarm are shown onscreen in a white-on-black tooltip, as illustrated below.

Alarms	Events	
	Alarms	
	Show 100 - entries Search:	
	Device 🔷 Alarm 🔶 First Occurence 🔶 Last Occurence 🗸 Severity 🔶 Cleared 🔶 Ac	: <b>k</b> \$
	10.0.0.15 Auth failed from console 2017-04-07 14:44:53 2017-04-07 14:44:53 open (1)	I
	apysMgmtAuthFailProto: console (0) 10.0.0.15 Auth failed from console apSysMgmtAuthFailLevel: user (1) apSysMgmtAuthFailOrigin: console	I
	10.0.0.15 Session agent 10.0.201.20 down 2017-03-27 10:50:02 2017-03-27 10:50:02 Major 2017-03-27 10:51:18 (1)	

Figure 29: SNMP Alarms Browser - Variables



## 4.11 Reporting Module

#### 4.11.1 Reports

The **Reporting** module presents a browser window showing the reports available for three possible audiences, and accessible through the sub-menus by the name of the audience:

- Service Provider: typically the company delivering the VoIP service to the Customer
- Third Party, if present: acts as an interface between the Customer and the Service Provider
- Customer: the user of the VoIP service.

#### Info

Mixed reports or reports aggregating different audiences are not available. The title of the Reports browser shows the target audience for the listed reports.

The [Audience] Reports browser, illustrated below, shows the following columns:

- Groups: the group name (realm name, group of realms (label), endpoint, trunk)
- Date: the start date of the report
- Frequency: the frequency of the report: daily, weekly or monthly
- Template: the name of the reporting template used to build this report
- Download: action button to download the report file.

Service Provider Reports						
Show 25 • entries				Search:		
Groups	Date	🔻 Frequency 🍦	Template	Download 🔶		
Ixelles	2015-05-19	Daily	default template (DOCX)	() Download		
Bronze access network: Ixelles Uccle Woluwe St Lambert YTRF C UYRF C	2015-05-19	Daily	default template (DOCX)	Download		
Etterbeek	2015-05-19	Daily	Daily Full	<ul> <li>Download</li> </ul>		
Etterbeek	2015-05-19	Daily	default template (DOCX)	Ownload		
B corporation: Allied Biscuit C Smith and Co. A Foo Bars A ABC Telecom A Allied Biscuit A	2015-05-19	Daily	Daily Full	Download		
Uccle	2015-05-19	Daily	default template (DOCX)	Ownload		
Uccle CPAS	2015-05-19	Daily	default template (DOCX)	• Download		





# 4.11.2 Statistics Exports

The *Statistics exports* sub-menu presents a browser window allowing users to search and filter statistics and download them in .csv format. The CSV files are created according to a Statistics Profile. For more information about Statistics Profile, see [Statistics exports].

The Statistics Exports browser, illustrated below, shows the following columns:

- Export Profile: the profile defining the frequency and content of the .csv file.
- Date: only statistics for that specific date are present in the .csv file.
- Frequency
- Download: button allowing to download the stats . csv file.

ow 25 • entries			Search:
Export Profile	A Date	<b>Frequency</b>	Download 🍦
estProfile	2015-05-19	Daily	Download
estProfile	2015-05-18	Daily	Ownload
estProfile	2015-05-17	Daily	<ul> <li>Download</li> </ul>



# 4.11.3 CDR Exports

The *CDR Exports* sub-menu presents a browser window allowing users to search and filter CDRs and download them in .csv format. The CSV files are created on a daily basis.

The CDR Exports browser, illustrated below, shows the following columns:

- Groups: the realms, group of realms (label), endpoints or trunks the .csv file is related to.
- Export Profile: the profile defining which CDR fields will be present in the .csv file.
- Date: only CDRs for that specific date are present in the .csv file.
- Records count: the number of CDRs in the .csv file.
- Download: action button to download the CDRs .csv file.



CDR Exports				
Show 25 🗸 entries				Search:
Groups	Export Profile	Date	<ul> <li>Records Count</li> </ul>	Download 🔶
Three Waters A	Session fields	2015-05-19	17	Ownload
Western Gas & Electric A	Session fields	2015-05-19	17	Ownload
Omni Consimer Products A	Session fields	2015-05-19	11	Ownload
Ixelles Uccle Woluwe St Lambert YTRF C UYRF C	Session fields	2015-05-19	888	Ownload
	Session fields	2015-05-19	0	Ownload
Ixelles	Session fields	2015-05-19	548	O Download
Allied Biscuit C Smith and Co. A Foo Bars A ABC Telecom A Allied Biscuit A	Test Export Profile	2015-05-19	219	(2) Download



# 4.12 Settings Module

The **Settings** module provides an access to every configurable or editable setting of NEMO. Given the potential impact of configuration changes over the behaviour of NEMO, access rights to this module should be granted to NEMO Administrators and experienced users only.

#### Warning

Some technical, low-level settings in the *System* sub-menu are not described in this *User Guide*. They are managed at installation and deployment time by Netaxis Installation and Support team, and should not be modified by NEMO administrators or users.

## 4.12.1 Roles

The main *Edit Roles* interface displays all the roles currently provisioned. These roles can be assigned to users to grant them access to various objects, such as graphs, based on their assigned roles.

#### Info

Roles define the object access scope for users, determining which objects they can access. However, the data scope is defined at the user level, specifying the subset of data each user is permitted to access.



#### Danger

A built-in role named *admin* grants unconditional access to all objects, providing full permissions across the system without any restrictions. This role is intended for admin users only.

EDIT ROLES				
+ Add new role				
25 v entries per page			Search	1:
Name	*	Users	Edit 🔶	Delete
Graphs access only		0	🕼 Edit role	× Remove role
Reports access		0	🕼 Edit role	× Remove role
Showing 1 to 2 of 2 entries			æ	< 1 > »

#### Figure 33: Roles List

## 4.12.1.1 Create a Role

To create a new role, click the *Add new role* button. A new page will appear, allowing you to configure the following for the role:

- Role name
- Authentication configuration
- Pages the user is granted access to:
  - Dashboard
  - Graphs
  - Search calls
  - Reporting
  - Anomalies
  - Settings
- Visible graphs for the user
- Graph display options
- Anomaly conditions accessible to the user
- Available reports
- Accessible stats exports
- Anomaly profiles
- API access



## 4.12.1.2 Edit a Role

To edit an existing role, click the *Edit* button next to it in the roles list. Any changes made to the role take immediate effect and are reflected for users assigned to that role.

#### 4.12.1.3 Remove a Role

To remove a role, click the *Remove* button next to it in the roles list. Ensure that no users are assigned to the role before proceeding with the removal.

#### 4.12.2 Users

The main *Edit Users* interface, illustrated below, lists all the users currently provisioned on the system.

The *Export* button (bottom left) allows saving locally a CSV file having all the entries in the list.

EDIT USERS										
+ Add new user										
25 ✓ entries per page								Sea	arch:	
Username 🍦	Full Name	Active	Role 🛓	Data Selection	Last Connection	Last Activity	Edit	÷	Delete	\$
bruce.wayne	Bruce Wayne	yes	Graphs access only	3 groups			🕼 Edit user		× Remove user	
cark.kent	Clark Kent	yes	Reports access	All			🕼 Edit user		× Remove user	
zeratul	Zeratul	yes	Administrator	All			🕼 Edit user		× Remove user	
Showing 1 to 5 o	f 5 entries							0	: ( 1 )	3
Export										

#### Figure 34: Users List

#### 4.12.2.1 Create a User

To create a user, click the Add new user button to open the user creation form.

The user creation form allows you to define the following:

- Username (must be unique)
- Email address
- Full name



- Password, with the option to generate a random one and optionally force a password change on next login
- Active status (whether the user is enabled or disabled)
- Assigned role
- Data scope, defining the subset of data the user can access and interact with
- Email addresses for receiving reports, stats exports, CDR exports, and anomaly notifications
- Mobile numbers for receiving alarm notifications via text

Once all details are filled in, click the *Save* button to create the user.

EDIT USERS	
Username	bruce.wayne
Emai	bruce.wayne@netaxis.cloud
Full name	Bruce Wayne
Password	
	□ Generate a new random password and send it to the user via email
	Force password change on next login
Active	Yes 🗸
Role	Graphs access only
	A role defines the types of data available (e.g., alarms, reports, statistics).
Data selection	) O prevent access to groups
	○ grant access to all groups
	grant access to these groups:
	PROD5610, PROD6198, PROD6390, PROD8147 -
	Data selection specifies the scope or subset of data that users are allowed to access and interact with.

Figure 35: User Creation Form

#### 4.12.2.2 Edit an Existing User

To modify an existing user profile, click the *Edit* button next to it in the users list.



## 4.12.2.3 Remove a User

To remove a user, click the *Remove* button next to it in the users list.

## 4.12.3 Configuration Objects Provisioning

Depending on the plugin(s) currently active and the access privileges granted for the current user, several menus are available, to configure so-called device objects. These device objects are composed of root elements (e.g. Oracle SBC, Probe, Broadworks Application Server, ...), parent of base groups. These base groups are the root level of aggregation (from a statistical point of view) for a plugin. There may be sub-groups, children of these base groups.

## 4.12.4 Labels

Labels can be used to create logical groups of realms or endpoints or of trunks. Several labels can be assigned to the same realm or endpoint, or trunk. For instance, a label can be created to tag all realms or all trunks belonging to small and medium enterprises, and another label can be created to tag all realms or all trunks with a specific IP access network.

Labels can later be used to produce reports for grouped realms or grouped trunks.

## 4.12.4.1 Edit Labels

The *Edit Labels* list, illustrated below, lists all the labels currently provisioned on the system and lets you modify the label names or specify the total calls capacity for this range. This capacity is displayed in the *Max Simultaneous Calls* chart as an horizontal line. This table allows you also to delete the labels. This can be achieved by selecting the label and clicking the *Delete Selected* button.

#### Warning

Deleting a label does NOT delete any of the items tagged with this label.

The *Export* button (bottom left) allows saving locally a CSV file having all the entries in the list (not only the ones displayed: in this case, 26 entries, not only the 10 shown).



EDIT I	ARELS					
LDIT						
Use the	e table hereafter to set edit labels.					
🗹 Sa	ve changes					
Show	25 v entries			Search:		
¢	Name	Capacity	Trunks			÷
		0				
	Doc Test Label 01	Undefined	Dory A			
	DoryAB	3	Dory A Dory B			
	Test99	0				
	testjsde	100				
Showir	ng 1 to 5 of 5 entries			First Previous	1 Next	Last
⊡ Sa	ve changes X Delete selected					
Ехро	rt					



#### 4.12.4.2 Create a New Label

The *Create label* section, illustrated below, lets you create a new label by defining its name and capacity. After creation, the label needs to be assigned to one or more realms or endpoints or one or more trunks.

Name					
Capacity					
+ Create I	abel				



## 4.12.4.3 Assign a Label to Groups.

To assign a label:

- 1. Select the appropriate tab
- 2. Click the check-box next to the objects to which you want to assign a label
- 3. Select a label from the drop-down list under the table
- 4. Click the Assign label button, as illustrated below.

The newly assigned label will appear in the *Labels* column.


To deassign a label, click on the X next to it in the *Labels* column.

5. Click the Save changes button to store your changes in the database.

	SD 4250 Namur	RA022	Etterbeek			
	SD 4250 Namur	RA023	Strickland Propane A			
	SD 4250 Namur	RA024	Thatherton Fuels A			
	SD 4250 Namur	RA025	Three Waters A			
	SD 4250 Namur	RA026	Water and Power A			
	SD 4250 Namur	RA027	Western Gas & Electric A			
	SD 4250 Namur	RA028	Mammoth Pictures A	test ×		
	SD 4250 Namur	RA029	Mooby Corp A			
	SD 4250 Namur	RA030	Gringotts A	test ×		
	SD 4250 Namur	RC021	ZiffCorp C			
	SD 4250 Namur	RC022	ABFT C			
	SD 4250 Namur	RC023	Strickland Propane C			
	SD 4250 Namur	RC024	Thatherton Fuels C			
	SD 4250 Namur	RC025	Three Waters C			
	SD 4250 Namur	RC026	Water and Power C			
	SD 4250 Namur	RC027	Western Gas & Electric C			
	SD 4250 Namur	RC028	Mammoth Pictures C			
	SD 4250 Namur	RC029	Mooby Corp C			
	SD 4250 Namur	RC030	Gringotts C	test X		
	SD 4500 Antwerpen	RA011	Ixelles	Bronze access network X D_test X		
Showin	Showing 1 to 25 of 64 entries       First       Previous       1       2       3       Next       Last         Save changes					
s As	Assign label All traffic • to selected objects					

Figure 38: Labels Assignment

#### 4.12.5 Reports

NEMO can produce downloadable daily, weekly or monthly reports. The report generation system is built on reporting templates that describe what the reports must contain. These reporting templates are then associated to realms, endpoints, labels or ranges.

Two types of reports can be generated: PDF or DOCX. Reports based on the PDF reporting templates offer great portability among platforms, while reports based on DOCX reporting templates are editable and offer great flexibility over the content and look.

The main *Reporting Templates* browser, illustrated below, lists the reporting templates currently present on the system and provides tools to edit and remove them, and to create new templates.



REPORTING TEMPLATES												
+ Add new PDF reporting template	+ Add nev	v customized PDF reporting template	+ Ad	d new DOCX reporting ten	nplate							
Show 10 ¢ entries										Sear	ch:	
Reporting Template		Document Type	φ	Active 0	Report Type	Frequency	Start 0	End 0	Edit	0 Re	move	φ
Actis		PDF		enabled	Service Provider	Daily	-	-	GP Edit	×	Remove	
Default PDF		PDF		enabled	Service Provider	Daily	-	-	GP Edit	×	Remove	
DoryAB		PDF		enabled	Service Provider	Daily	-	-	GP Edit	×	Remove	
ITSPA template		DOCX		enabled	Service Provider	Daily	-	-	GP Edit	×	Remove	
Test DOCX template		DOCX		enabled	Service Provider	Daily	-		GP Edit	×	Remove	
Showing 1 to 5 of 5 entries									First	Previou	is 1 Next I	Last



## 4.12.5.1 Create a new PDF reporting template

To create a new PDF reporting template, click the *Add new PDF reporting template* button. The *New Reporting Template* menu is displayed.

The *Template Properties* tab, illustrated below, lets you set or select:

- a name for the reporting template
- the target audience
- the frequency
- the title and subtitle to be used on the generated reports' front pages and page headers.

The *Enabled* check-box makes this report template available for assignment to a group. See [Assign a Reporting Template to Realms / Endpoints / Ranges, or Labels, or Trunks] for more details.

New Reporting Tem	New Reporting Template				
Template Properties	harts Options Notifications Report Elements				
Name ReportDaily					
Enabled					
Report Type	Service provider     Third party     End customer				
Frequency	<ul> <li>Daily</li> <li>Weekly</li> <li>Monthly</li> </ul>				
Title	Big enterprise				
Subtitle	Statistics reporting				
🖼 Save					

**Figure 40:** PDF Reporting Template → Template Properties



The *Charts Options* tab, illustrated below, lets you set various options for charts included in the report, such as renaming ingress & egress terms.

New Reporting Ter	New Reporting Template					
Template Properties	Charts Options Notifications Report Elements					
Display total capacity line when max total simultaneous calls reach	80					
"ingress" term renaming	ingress					
"egress" term renaming	egress					
Save						

Figure 41: PDF Reporting Template → Charts Options

The *Notifications* tab, illustrated below, lets you activate/deactivate the sending of the reports by e-mail. Reports are sent only to users having access to this report and having an e-mail address specified in their User Notification parameter.

New Reporting Te	New Reporting Template					
Template Properties	Charts Options	Notifications	Report Elements			
Email report to authorised users	D 🗆					
Save						

Figure 42: PDF Reporting Template → Notification

The *Report Elements* tab, illustrated below, lets you select which elements will be present in the report. These can be charts or tables. The table below specifies the type of each element available for selection.



# NEW REPORTING TEMPLATE

Template P	roperties	Charts O	otions	Notifications	Report Elements	
Template P	roperties Report Ele	Charts O	Ditions Total Total Minu Traffi Max Call F Calls Calls Relea RTP RTCF RTCF RTCF RTCF RTCF	Notifications Capacity Usage tes of Usage c Intensity Simultaneous Ca Rate Durations nations ase Causes Packet Loss Packet Loss Packet Jitter Packet Jitter Packet Latency Packet MOS Ove	Report Elements Distribution alls	rt)
Save			Anon	nalies		

**Figure 43:** PDF Reporting Template → Report Elements

Table 15: PDF Report Elements - Types

Element	Туре
Total Capacity Usage Distribution	pie chart



Element	Туре
Minutes of Usage	histogram
Traffic Intensity	time-based chart
Max Simultaneous Calls	time-based chart
Call Rate	time-based chart
Calls Durations	histogram
Destinations	pie chart
Release Causes	table
RTP Packet Loss	time-based and histogram
RCTP Packet Loss	time-based and histogram
RTP Packet Jitter	time-based and histogram
RCTP Packet Jitter	time-based and histogram
RCTP Packet Latency	histogram
RTP Packet MOS Overview	pie chart
RTP Packet MOS	time-based and histogram
Anomalies	table

# 4.12.5.2 Create a New DOCX Reporting Template

To create a new DOCX reporting template, click the *Add new DOCX reporting template* button. The *New Reporting Template* menu is displayed.

The *Template Properties* tab, illustrated below, lets you set or select:

- a name for the reporting template
- the target audience
- the frequency
- the title and subtitle to be used on the generated reports' front pages and page headers.
- the starting date for generating the reports
- the date in the future when the reports stop being generated.

The *Enabled* check-box makes this report template available for assignment to a group. See [Assign a Reporting Template to Groups] for more details.



NEW REPORTING TEMPLATE					
Template Properties Charts Options Notifications DOCX Template					
Name					
Enabled					
Report Type	<ul> <li>Service provider</li> <li>Third party</li> <li>End customer</li> </ul>				
Frequency	<ul> <li>Daily</li> <li>Weekly</li> <li>Monthly</li> </ul>				
Title					
Subtitle					
Start on	now				
Stop on	no end				
Save					

Figure 44: DOCX Reporting Template → Template Properties tab

The *Charts Options* tab, illustrated below, lets you set various options for charts included in the report, such as renaming ingress & egress terms.



New Reporting Te	New Reporting Template					
Template Properties	Charts Options Notifications DOCX Template					
Display total capacity line when max total simultaneous calls reach	80					
"ingress" term renaming	ingress					
"egress" term renaming	egress					
Save						

Figure 45: DOCX Reporting Template → Charts Options tab

The *Notifications* tab, illustrated below, lets you activate/deactivate the sending of the reports by e-mail. Reports are sent only to users having access to this report and having an e-mail address specified in their User Notification parameter.

New Reporting Template				
Template Properties	Charts Options	Notifications	DOCX Template	
Email report t authorised use	to 🗸 rs			
& Save				

Figure 46: DOCX Reporting Template → Notifications tab

The *DOCX Template* tab, illustrated below, lets you upload a DOCX template that will be used as a basis for the report generation by the system.

New Reporting Templ	New Reporting Template					
Template Properties Cha	rts Options Notifications DOCX Template					
Template file	NemoDOCXTemplate_2015.docx					
Save						

Figure 47: DOCX Reporting Template → DOCX Template tab

Charts and values will replace specific codes, known as *placeholders*, in the template document. The placeholders supported by the system are listed in the table below.



## Table 16: DOCX Placeholders

	Replaceme	nt
Placeholder	Туре	Description
\$title	text	reporting template title
\$subtitle	text	reporting template subtitle
\$customerName	text	realm friendly name
\$realm	text	realm system name
\$trunkCapacity	text	configured trunk capacity
\$labelName	text	label name
\$labelCapacity	text	label capacity
\$reportFrequency	text	report frequency (daily, weekly or monthly)
\$period	text	start date – end date
\$ingressCallsCount	value	total ingress calls
\$egressCallsCount	value	total egress calls
<pre>\$totalCallsCount</pre>	value	total calls
\$ingressCallsDuration	value	ingress calls total duration
\$egressCallsDuration	value	ingress calls total duration
<pre>\$totalCallsDuration</pre>	value	calls total duration
\$ingressCallsAvgDuration	value	average ingress call duration
\$egressCallsAvgDuration	value	average egress call duration
<pre>\$totalCallsAvgDuration</pre>	value	average call duration
\$ingressMaxIntensity	value	ingress calls max traffic intensity
\$egressMaxIntensity	value	egress calls max traffic intensity
\$ingressMaxBHCA	value	ingress calls max BHCA
\$egressMaxBHCA	value	egress calls max BHCA
<pre>\$totalCapacityWarning</pre>	value	warning message if 80% of the configured realm capacity is reached





	Replacement	
Placeholder	Туре	Description
\$ingressH323DisconnectCauses	table	table listing the SIP error classes for ingress calls
\$egressH323DisconnectCauses	table	table listing the SIP error classes for egress calls
\$ingressSIPStatus	table	table listing the SIP status codes for ingress calls
\$egressSIPStatus	table	table listing the SIP status codes for egress calls
\$ingressAvgRTPPacketLoss	value	average ingress packet loss (RTP)
\$egressAvgRTPPacketLoss	value	average egress packet loss (RTP)
\$ingressAvgRTCPPacketLoss	value	average ingress packet loss (RTCP)
\$egressAvgRTCPPacketLoss	value	average egress packet loss (RTCP)
\$ingressAvgRTPPacketJitter	value	average ingress packet jitter (RTP)
\$egressAvgRTPPacketJitter	value	average egress packet jitter (RTP)
\$ingressAvgRTCPPacketJitter	value	average ingress packet jitter (RTCP)
\$egressAvgRTCPPacketJitter	value	average egress packet jitter (RTCP)
\$ingressAvgRTCPPacketLatency	value	average ingress packet latency (RTCP)
<pre>\$egressAvgRTCPPacketLatency</pre>	value	average egress packet latency (RTCP)
\$ingressAvgPacketMOS	value	average ingress MOS
\$egressAvgPacketMOS	value	average egress MOS
\$graphTotalCapacityUsage	chart	total capacity usage distribution
\$graphTrafficIntensity	chart	traffic intensity over time
\$graphMaxSimultaneousCalls	chart	max simultaneous calls over time
\$graphCallRate	chart	call rate over time
\$graphConnectionDurations	chart	connection phase duration histogram
\$graphAlertingDurations	chart	alerting phase duration histogram
\$graphConnectionDurationsOverTime	chart	Alerting phase duration over time
\$graphAlertingDurationsOverTime	chart	Alerting phase duration over time



	Replacement	
Placeholder	Туре	Description
\$graphHomeDestinations	chart	home network destinations pie
\$graphInternationalDestinations	chart	international network destinations pie
\$graphNationalVsInternatDestinations	chart	Traffic distribution between national and international traffic
\$graphRTPPacketLossOverTime	chart	packet loss over time (RTP)
\$graphRTPPacketLossDistribution	chart	packet loss histogram (RTP)
\$graphRTCPPacketLossOverTime	chart	packet loss over time (RTCP)
\$graphRTCPPacketLossDistribution	chart	packet loss histogram (RTCP)
\$graphRTPPacketJitterOverTime	chart	packet jitter over time (RTP)
\$graphRTPPacketJitterDistribution	chart	packet jitter histogram (RTP)
\$graphRTCPPacketJitterOverTime	chart	packet jitter over time (RTCP)
\$graphRTCPPacketJitterDistribution	chart	packet jitter histogram (RTCP)
\$graphRTCPPacketLatencyDistribution	chart	packet latency histogram (RTCP)
\$graphIngressPacketMOSSimplifiedPie	chart	MOS overview (ingress media)
\$graphEgressPacketMOSSimplifiedPie	chart	MOS overview (egress media)
\$graphPacketMOSOverTime	chart	MOS over time
\$graphPacketMOSDistribution	chart	MOS histogram
\$graphIngressCodecsDistribution	chart	Ingress codec pie
\$graphIngressCodecsDistribution	chart	Egress codec pie

# 4.12.5.3 Create a customized PDF report template

In case the customization possible with the two existing types of PDF / DOCX templates described above would not enough match customer needs, Netaxis Solutions Professional Services can develop along customer specifications custom PDF templates totally tailored to meet any need.

Such templates are delivered as zip files ; the *Add new customized PDF reporting template* tab allows defining the report's properties, chart options, notifications as above, and uploading the template provided by Netaxis.



#### 4.12.5.4 Assign a Reporting Template to Groups

To assign a Reporting template:

- 1. Select the appropriate tab.
- 2. Click the check-box next to the groups to which you want to assign a Reporting Template.
- 3. Select a Reporting Template from the drop-down list under the table.
- 4. Click the Assign Reporting Template button, as illustrated below.

The newly assigned Reporting Template will appear in the *Reporting Templates* column.

To deassign a Reporting Template, click on the X next to it in the *Reporting Templates* column.

5. Click the Save changes button to store your changes in database.

፼ Sa	10 - entries						Sea	arch:				
¢	SBC	System Name	Name	Å	Reporting T	empla	ates					
	sbc-engo1	bebank-access	BeBank									
	sbc-engo1	core	core									
	sbc-engo1	espresso-access	Espresso Inc.									
	sbc-engo1	euwood-access	European Wood Industries									
	SD 4250 Namur	RA021	ZiffCorp A		CXX report N							
	SD 4250 Namur	RA022	Etterbeek		Daily Full X Se	rvice Pr	ovider	Full (P	DF) 🗙 🛛	default	template (	DOCX) 🗙
	SD 4250 Namur	RA023	Strickland Propane A									
	SD 4250 Namur	RA024	Thatherton Fuels A		CXX report #							
	SD 4250 Namur	RA025	Three Waters A		Service Provider	Full (PD	F) ¥ [	defaul	t templ	ate (DO	CX) ×	
	SD 4250 Namur	RA026	Water and Power A		ABC #							
owir	a 1 to 10 of 64 entries			First Previ	ous 1 2	3	4	5	6	7	Next	Last

Figure 48: Realms - Reporting Templates Assignment Matrix

<b>net</b> axis
SOLUTIONS

ASSIGN REPOR	TING TEMPLATES			
Trunks Labo	els			
Save changes				
Show 25 ¢ entri	es			Search:
\$	Probe	Name	Reporting Templates	\$
	•	Broadsoft AS		
	•	Broadsoft MS		
•	•	Broadsoft NS		
	•	Dory A	Default PDF M	
	•	Dory B	Default PDF x	
•	•	Kamailio	Default PDF x ITSPA template x Test DOCX template x	
•	•	Residential Registrar server		
•	•	Residential SBC Access		
•	•	SBC Broadsoft Access		
	•	SBC Broadsoft Core		
	•	SBC Registrar		
Showing 1 to 11 of	f 11 entries			First Previous 1 Next Last
Save changes				
Assign reporting	ng template Default PDF			

Figure 49: Trunks - Reporting Templates Assignment Matrix

# 4.12.6 Statistics exports

NEMO offers the possibility to download .csv files containing different statistics computed by NEMO. The .csv files are generated on a daily/weekly/monthly basis and can be retrieved thanks to the *Statistics Exports* browser. The file generation is based on a profile describing which statistics must be included in the .csv files and for which groups. The files contain 1 value for each statistics and for each group configured.

For instance, if the profile is configured like this:

- Frequency: daily
- Statistics: statistic 1, statistic 2 and statistic 3
- Group: Group 1 and Group 2

then a file will be created every day. This file has 2 rows containing the groups and 3 columns containing the value of the statistics. Note that depending of the statistics selected, the value can be the total, the average or the maximum for the whole day. The main *Statistics Export Profiles* menu, illustrated below, lists the Statistics export profiles currently present on the system and provides tools to edit and remove them, and to create new profiles.



Statistics Export Profiles						
+ Add new statistics export profile						
Show 10 • entries				Search	:	
Statistics Export Profile	Active	Frequency	edit	$\stackrel{\wedge}{=}$	Remove	Å
TestProfile	enabled	Daily	🕼 Edit		X Remove	
Showing 1 to 1 of 1 entries				First Pre	evious 1	Next Last
+ Add new statistics export profile						

Figure 50: Statistics export profiles List

## 4.12.6.1 Create a New Statistics Export Profile

To create a new Statistics export profile, click the *Add New statistics export profile* button. A new menu is displayed.

The Profile Properties tab, illustrated below, lets you set:

- a name for the statistics export profile
- the frequency of the .csv file production. You can choose between Daily/Weekly/Monthly
- a start date for the .csv file production. The file production can start in the past, in the future, or now.
- If needed, the step interval allows grouping stats in smaller time windows than the global one set in Frequency above. Windows are: default (same as Frequency), 30 mins, 1h, 2h, 4h, 12h, 24h. If a step interval of 1h is set and the frequency is Daily, the exported stats will be split into 24 sections in a single daily file.
- the flag activating the sending of the file by mail. Files are sent only to users having access to this report and having an e-mail address specified in the user notification parameter.
- the flag to activate/deactivate this profile.



EDIT STATISTICS EXPORT PRO	DFILE	
Profile Properties Groups	Statistics Output format	SFTP Push
Name	FLEG stats	
Frequency	<ul> <li>Daily</li> <li>Weekly</li> <li>Monthly</li> </ul>	
Start on	2020-11-08	
Step interval	default as frequency 🗸	
Email report		
Active		
Save stats export profile		

#### Figure 51: New Statistics export profile → Profile Properties tab

The *Groups* tab, illustrated below, lets assign groups (of realms, endpoints, ranges, or of trunks, or of labels to the statistics export profile. The .csv file that will be produced will only contain statistics for those groups. Note also that a .csv file will be presented to a user only if this user has access to all the groups configured in the Statistics Export Profile.





New Statistics Export Profile						
Profile Properties Groups Statistics						
Realms on SD 4250 Namur	Select a group from the list					
Realms on SD 4500 Antwerpen	Select a group from the list					
Realms on SD 4500 Brussels	Select a group from the list					
Realms on sbc-engo1	Select a group from the list					
Endpoints on SD 4250 Namur	Select a group from the list					
Endpoints on SD 4500 Antwerpen	Select a group from the list					
Endpoints on sbc-engo1	Select a group from the list					
Ranges on SD 4250 Namur	Select a group from the list					
Labels	Select a group from the list					
Save stats export profile						

#### Figure 52: Statistics export profile $\rightarrow$ Groups tab

NEW STATISTICS EXPORT PROFILE						
Profile Properties	Groups	Statistics				
			Trunks	Select a group from the list 🔹		
			Labels	Select a group from the list		
𝔅 Save stats export profile						

Figure 53: Statistics export profile (Probes) → Groups tab

The *Statistics* tab, illustrated below, lets you selects the statistics that will be present in the .csv file.



#### **New Statistics Export Profile**

Profile Properties Gro	ups Statistics							
Generic	Generic 🛛 ld							
	Group system name							
	🗆 Group name							
	Date YYYY-MM-DD (local)							
	Duration (secs)							
Sessions	Ingress calls setup count							
	Egress calls setup count							
	Total calls setup count							
	Ingress calls setup & answered count							
	Egress calls setup & answered count							
	<ul> <li>Total calls setup &amp; answered count</li> </ul>							
	Ingress calls disconnect count							
	Egress calls disconnect count							
	Total calls disconnect count							
	Ingress traffic intensity (erlangs)							
	Egress traffic intensity (erlangs)							
	Total traffic intensity (erlangs)							
	<ul> <li>Ingress max simultaneous calis (channels)</li> </ul>							
	Egress max simultaneous calls (channels)							
	Total max simultaneous calls (channels)							
	Ingress call rate (calls/min)							
	Egress call rate (calls/min)							
	Total call rate (calls/min)							
	<ul> <li>Ingress calls ringing duration (secs)</li> </ul>							
	Egress calls ringing duration (secs)							
	<ul> <li>Ingress calls connection duration (secs)</li> </ul>							

Figure 54: Statistics export profile → Statistics tab

The following statistics are common to all plugins:

- Id
- Group system name
- Group name
- Date YYYY-MM-DD (local)
- hh:mm:ss (local)
- Date YYYY-MM-DD hh:mm:ss (local)
- Duration (secs)

Refer to the chapter [Plugins Features List] for a list of plugin-specific exportable statistics.

The *Output format* tab allows customizing the CSV delimiter, filename format and compression method to use for the stats export file.



NEW STATISTICS EXPORT PROFILE							
Profile Properties Groups	Statistics	Output format	SFTP Push				
CSV delimiter	,						
Filename format	t \${ID}-\${Y}-\${m}-\${d}						
	Do not include the extension in the filename format. Placeholders: \${ID}: export record id \${d}: day of the month as a zero-padded decimal number \${m}: month as a zero-padded decimal number \${y}: year without century as a zero-padded decimal number \${Y}: year with century as a decimal number						
Compression	ZIP						
	⊖ gzip						
Save stats export profile							

**Figure 55:** Statistics export profile → Output format

The *Push SFTP* tab collects the information needed for exporting stats through an SFTP connection.



NEW STATISTICS EXPORT PROFILE						
Profile Properties Groups	Statistics Output format SFTP Push					
Active						
Destination	host:port/path					
Authentication	<ul> <li>Username and password</li> <li>Private Key</li> </ul>					
Username						
Password						
Max retries						
Retry interval (mins)						
Save stats export profile						

Figure 56: Statistics export profile → Push SFTP tab

#### 4.12.7 CDR Exports

NEMO offers the possibility to download .csv files containing the CDRs received from the different monitored equipments. The .csv files are generated on a daily basis and can be retrieved thanks to the CDR exports browser. The file generation is based on a profile describing which CDR fields must be included in the .csv file. These profiles are then associated to realms, endpoints, ranges or labels (meaning that .csv files will be produced according to the profile for specific realms/endpoints/ranges/labels).

The main **CDR export** menu, illustrated below, lists the CDR export profiles currently present on the system and provides tools to edit and remove them, and to create new templates.



CDR Export Profiles							
+ New CDR export Profile							
Show 10 - entries				Search	:		
CDR Export Profile	Active	Fields Count	Edit	\$	Remove		*
Re-Billing	enabled	13	🕼 Edit		X Remove		
Session fields	enabled	80	🕼 Edit		X Remove		
Test Export Profile	enabled	10	🕼 Edit		X Remove		
Showing 1 to 3 of 3 entries				First Pro	evious 1	Next	Last

Figure 57: CDR export profiles List

# 4.12.7.1 Create a New CDR Export Profile

To create a new CDR export profile, click the New CDR export profile button. A new menu is displayed.

The *Profile Properties* tab, illustrated below, lets you set a name for the CDR export profile, as well as its status (enabled or not).

NEW CDR EXPORT PROFILE								
Profile Properties	CDR Fields -	Session	CDR Fields - Quality of Se	ervice O	Output format	SFTP Push		
	Name							
	Frequency	24h					~	
	Enabled							
Save								

Figure 58: CDR export profile → Profile Properties tab

The *CDR Fields-Session* tab, illustrated below, lets you select the session fields that will be present in the .csv file.



Profile Properties CDR Fields - Session CDR Fields - Quality of Service Output format SFTP Push	
Fields       Setup Time (YYYY-MM-DD HH:MM:SS)         □ Connect Time (YYYY-MM-DD HH:MM:SS)         □ Disconnect time (YYYY-MM-DD HH:MM:SS)         □ Calling Party Number         □ Calling Party Number (normalized)         □ Called Party Number (normalized)         □ Called Party Number (normalized)         □ SIP Method         □ SIP Status         □ Call Id         □ Probe         □ St IP         □ Dst IP         □ VLAN	

**Figure 59:** CDR export profile → CDR Fields-Session tab

In addition to the session fields, Quality of Service-related fields can be selected the same way.

The *Output format* tab allows customizing the CSV delimiter, filename format and compression method to use for the CDR export file.



# EDIT CDR EXPORT PROFILE **Profile Properties CDR Fields - Session** CDR Fields - Quality of Service Output format SFTP Push CSV delimiter Filename format ${ID}-{GROUP_ID}-{W}-{d}$ Do not include the extension in the filename format. Placeholders: \${ID}: export record id \${GROUP\_ID}: group record id \${d}: day of the month as a zero-padded decimal number \${m}: month as a zero-padded decimal number \${y}: year without century as a zero-padded decimal number \${Y}: year with century as a decimal number \${START}: custom start date format \${END}: custom end date format ZIP Compression $\bigcirc$ GZIP Save Save

Figure 60: CDR export profile → Output format

The Push SFTP tab collects the information needed for exporting CDRs through an SFTP connection.



EDIT CDR EXPORT PROFILE								
Profile Properties CDR Fields	- Session CDR Fields - Quality of Service Output format SFTP Push							
CSV delimiter	,							
Filename format	\${ID}-\${GROUP_ID}-\${Y}-\${m}-\${d}							
	Do not include the extension in the filename format. Placeholders: \${ID}: export record id \${GROUP_ID}: group record id \${d}: day of the month as a zero-padded decimal number \${m}: month as a zero-padded decimal number \${y}: year without century as a zero-padded decimal number \${Y}: year with century as a decimal number \${Y}: year with century as a decimal number \${START}: custom start date format \${END}: custom end date format							
Compression	<ul><li>ZIP</li><li>GZIP</li></ul>							
☑ Save								

Figure 61: CDR export profile → Push SFTP tab

## 4.12.7.2 Assign a CDR Export Profile to Groups

To assign a CDR export profile:

- 1. Select the appropriate tab.
- 2. Click the check-box next to the objects to which you want to assign a "CDR Export Profile".
- 3. Select a "CDR Export Profile" from the drop-down list under the table.
- 4. Click the Assign CDR Export profile button, as illustrated below.

The newly assigned "CDR Export profile" will appear in the "CDR Export Profiles" column.

To deassign a "CDR Export Profile", click on the X next to it in the "CDR Export Profiles" column.

5. Click the *Save changes* button to store your changes in database.

SOLUTIONS

Ass	Assign CDR Export Profiles										
Rea	Realms Endpoints Ranges Labels										
⊠r s	🐱 Save changes										
Show	Show 10 v entries Search:										
4	SBC A	System Name	Name		÷	CD	OR Exp	ort Pro	files		\$
	sbc-engo1	bebank-access	BeBank								
	sbc-engo1	core	core								
	sbc-engol espresso-access Espresso Inc.										
	sbc-engo1	euwood-access	European Wood Industries								
	SD 4250 Namur	RA021	ZiffCorp A								
	SD 4250 Namur	RA022	Etterbeek			Re-E	illing X				
	SD 4250 Namur	RA023	Strickland Propane A			Sess	ion field	×			
	SD 4250 Namur	RA024	Thatherton Fuels A			Sess	ion field	×			
	SD 4250 Namur	RA025	Three Waters A			Sess	ion field:	×			
	SD 4250 Namur	RA026	Water and Power A			Re-E	tilling 🗙				
Showi	Showing 1 to 10 of 64 entries										
⊠ S	Save changes										
	ssign CDK Export prome										

Figure 62: Realms - CDR export profile Assignment Matrix (Oracle)

ASSIGN CDR EXPORT PROFILES										
Trunks Labels										
Save changes										
Show 25 ¢ entries Search:										
	Probe	Name	CDR Export Profiles	\$						
•	•	Broadsoft AS								
	•	Broadsoft MS								
	•	Broadsoft NS								
	•	Dory A	Doc Test Label 01 X							
	•	Dory B								
	•	Kamailio								
	•	Residential Registrar server								
	•	Residential SBC Access								
	•	SBC Broadsoft Access								
	•	SBC Broadsoft Core								
	•	SBC Registrar								
First Previous 1 Next Last										
Save changes										
Assign CDR E	Assign CDR Export profile Doc Test Label 01 + to selected objects									

Figure 63: Trunks - CDR export profile Assignment Matrix (Probes)



## 4.12.8 Anomalies

Thanks to its pattern analysis system, NEMO is able to detect anomalies in the network, such as a sudden call rate drop, packet loss over threshold, etc. These anomalies detection rules are described in *anomalies profiles*, which are then assigned to realms, endpoints, ranges or trunks, or labels to activate the detection of anomalies.

If the VoIP network is heterogeneous, these profiles allow setting different test thresholds depending on the network quality that can be expected.

#### Warning

On top of anomalies profiles assignment, the Anomalies Engine must be running for the detection to be active. Please contact Netaxis support if anomalies are **not** detected after an Anomalies Profile has been assigned to your groups.

The anomalies profiles currently provisioned on the system are listed in the *Anomalies Profile* main menu, illustrated below.

Anomalies Profiles				
+ Add new anomalies profile				
Show 10 - entries			Search:	
Name	Owner 🔶	Edit 🔶	Remove	\$
abnormal call duration	admin (admin)	🕼 Edit profile	<b>X</b> Remove profile	
MOS anomalies	admin (admin)	☑ Edit profile	<b>X</b> Remove profile	
packet loss anomalies	admin (admin)	🕼 Edit profile	<b>X</b> Remove profile	
Showing 1 to 3 of 3 entries			First Previous	1 Next Last



#### 4.12.8.1 Create a new Anomalies Profile

Click on the *Add new anomalies profile* button to create a new anomalies profile. The *New Anomalies Profile* menu shows up, as illustrated below.

The Profile Properties tab allows defining:

- The name for this new anomalies profile
- Whether or not to also send the anomalies as SNMP notifications
- The IP address of the network management system (NMS)



- The SNMP community name to be used in the SNMP protocol
- The IP address of the second network management system (NMS), if any
- The SNMP community name to be used in the SNMP protocol for the second SNMP connection.
- Whether or not to also send the anomalies as e-mail notifications
- Whether or not to also send the anomalies as SMS notifications.

New Anomalies Prot	file
Profile Properties Ano	malies
Name	
SNMP traps	
SNMP manager #1	
SNMP community #1	
SNMP manager #2	
SNMP community #2	
Email notifications	
SMS notifications	
Save anomalies profile	

**Figure 65:** Anomalies Profile → Profile Properties tab

An Anomalies profile can contain several anomalies and an anomaly can be defined using a set of up to five conditions. The *Anomalies* tab, illustrated below, lists the already defined anomalies, if any, and lets you create new anomalies.

New Anomalies Profile							
Profile Properties	Anomalies						
lame	Description	Severity	Active	Edit	Remove		
+ New anomaly							
☞ Save anomalies profile							



Click on the New Anomaly button to create an anomaly. The Anomaly Definition menu shows up, as



illustrated below. This menu allows defining:

- The name of the anomaly
- A description
- The severity (informational, warning, minor, major, critical)
- The observation window for anomalies detection. (For example, if observation window is set to 5 minutes and the condition is that MOS score must be above 4, then NEMO computes the average MOS score by 5-minute slots and will produce an alarm only if this average is higher than 4).
- The active/inactive status
- The set of conditions (up to five)

Anomaly Definition			×
Name	Default anomaly		
Description	Default anomaly		
Severity	Major 🗸		
Window	5 minutes 🔹		
Active Generate an alarm when ingress traffic intensit	✓ Il of the following conditions are met: ✓ is greater the ✓	500	
ingress call rate	▼ is greater tha ▼	100	
ingress media MOS	▼ is less than ▼	3	
ingress media bandwi	th • is greater tha •	100000	
			Close Save changes

Figure 67: Anomalies Profile → Anomaly Definition

The following conditions are available to define anomalies.

The tables below list the conditions available for all plugins.



Condition Type	Operator	Parameters
Day of week	is/is not	Mon, Tue, Wed, Thu, Fri, Sat, Sun
Time of day	is between/is not between	Configurable time range
ingress [custom metric]	is less than/is greater than	depending on metric type
egress [custom metric]	is less than/is greater than	depending on metric type

Refer to the chapter [Plugins Features List] for a list of plugin-specific anomaly tests.

## 4.12.8.2 Edit an Anomalies Profile

To edit an anomalies profile, click on the *Edit anomalies profile* link illustrated in [Anomalies Profiles list].

#### 4.12.8.3 Remove an Anomalies Profile

To remove an anomalies profile, click on the *Remove anomalies profile* link illustrated in [Anomalies Profiles list].

#### 4.12.8.4 Assign an Anomalies Profile to Groups

To assign an Anomalies Profile:

- 1. Select the appropriate tab.
- 2. Click the check-box next to the objects to which you want to assign an Anomalies Profile.
- 3. Select an Anomalies Profile from the drop-down list under the table.
- 4. Click the Assign Anomalies profile button, as illustrated below.

The newly assigned Anomalies profile will appear in the *Anomalies Profiles* column.

To deassign an Anomalies Profile, click on the X next to it in the Anomalies Profiles column.

5. Click the *Save changes* button to store your changes in database.



Assi	gn Anomalies Profile	s		
Realr	ms Endpoints Range	s Labels		
🖾 Sav	ve changes			
Show	10 • entries			Search:
\$	SBC	System Name	Name	Anomalies Profiles
	sbc-engo1	bebank-access	BeBank	
	sbc-engol	core	core	
	sbc-engol	espresso-access	Espresso Inc.	
	sbc-engo1	euwood-access	European Wood Industries	
	SD 4250 Namur	RA021	ZiffCorp A	
	SD 4250 Namur	RA022	Etterbeek	packet loss anomalies x
	SD 4250 Namur	RA023	Strickland Propane A	
	SD 4250 Namur	RA024	Thatherton Fuels A	
	SD 4250 Namur	RA025	Three Waters A	
	SD 4250 Namur	RA026	Water and Power A	
Showing	g 1 to 10 of 64 entries		First Previous 1	2 3 4 5 6 7 Next Last
🖼 Sav	ve changes			
S As	sign anomalies profile pa	cket loss anomalies 🛛 🖬 to selected objects		

Figure 68: Anomalies Profile Assignment Matrix (Oracle)

ASSIGN ANOMA	LIES PROFILES			
Trunks Lab	els			
Save changes				
Show 25 \$ entri	ies		Se	arch:
\$	Probe	Name	Anomalies Profiles	φ
	•	Broadsoft AS		
	•	Broadsoft MS		
	•	Broadsoft NS		
	•	Dory A	Test 02 × Test ×	
	•	Dory B	Test 02 × Test ×	
	•	Kamailio		
	•	Residential Registrar server		
	•	Residential SBC Access	Test ×	
	•	SBC Broadsoft Access		
	•	SBC Broadsoft Core		
	•	SBC Registrar		
Showing 1 to 11 of	f 11 entries		First Pr	evious 1 Next Last
Save changes				
Section Assign anomal	lies profile Test 02 \$ to selected objects			

Figure 69: Anomalies Profile Assignment Matrix (Probes)



# 4.12.9 Tracing

When probes are installed in the network and the CaptureEngine and CaptureOrchestrator engines are running, the *Tracing* sub-menu allows you to define traces and to activate them.

Tracing being a heavy resources consuming process, especially when the capture of RTP streams is desired, it is advisable to define traces to limit the RTP capture to selected called or called numbers, while tracing RTP stats can be activated for all numbers.

The Add Trace tool, illustrated below, allows defining a trace with the following criteria:

- Description: a user-friendly name
- Calling and Called: patterns to limit the tracing to the matching number(s)

#### Warning

If these fields are left empty, **all** numbers will be traced.

- *Source IP(s)* and *Destination IP(s)*: pattern to limit the tracing to the matching IP(s). CIDR ranges can be used.
- Methods: allows selecting one SIP method as filter for tracing.
- *RTP Stats*: when checked, will trace the RTP stats for the numbers defined in *Calling / Called* above
- *RTP Capture*: when checked, will trace the RTP streams for the numbers defined in *Calling / Called* above
- Trace Reason: drop-down list to document the reason for tracing personal data (GDPR)
- *Reason details*: free text field for detailing the reason selected above.



Description	
Calling	
	Any call whose calling number contains this pattern will be traced.
Called	
	Any call whose called number contains this pattern will be traced.
Source IP(s)	
	An IP range as CIDR (ex: 192.168.0.0/24).
Destination IP(s)	
	An IP range as CIDR (ex: 192.168.0.0/24).
Methods	• INVITE REGISTER PUBLISH
	The methods considered for tracing
RTP Stats	Generate QoS stats.
RTP Capture	
	Capture RTP media payload for audio playback functionality.
	Telecommunication tapping is strictly regulated in many countries where its usage must be authorized.
Trace Reason	Customer complaint \$
	The reason for the trace.
Reason Details	
	Extra information about the reason (incident reference,)
	+ Save

Figure 70: Tracing - Add Trace tool

Click the Save button to save this trace and have it shown in the Active Traces browser.

The *Active traces* browser window, illustrated below, shows the traces currently active on the equipment.

## Info

This trace, added for demo purposes, would capture **all** RTP stats and **all** RTP flows for **all** calling or called numbers. This is **not** recommended.



ACTIVE TRACES					
Show 25 - entries				Se	arch:
Description	Calling	Called 🔺	RTP Stats	RTP Capture	♦ Remove
Capture all	**	**	yes	yes	* Remove
Showing 1 to 1 of 1 entries				First	Previous 1 Next Last



To remove a trace (and permanently delete it from the system), click the Remove red button.

#### 4.12.10 Metrics

*Metrics* allow computing specific statistics that are not provided in NEMO standard results.

As metrics are based on values from CDR fields, their creation and usage are targeted at administrators with an in-depth understanding of the underlying equipment's call data records.

The results computed by the metrics are shown in custom charts. The custom charts can be linked to the existing categories of result graphs (in *Calls Statistics* and *Voice Quality* menus). They are displayed together with the other graphs or in the Dashboard.

The custom metrics can also be included as elements in anomalies' definitions, which can in turn be used in configurable reports. Finally, they can be exported as elements of Statistics Reports.

The main *Edit Metrics* interface, illustrated below, lists the custom metrics currently provisioned on the system.

EDIT METRICS						
Metrics Charts						
Show 10 v entries					Search:	
Id 🔺	Label $ rianglet$	Metric type	Active $\Rightarrow$	Edit	Delete	$\stackrel{\wedge}{=}$
rben_custom_status_code	Custom error codes metric	Event counter	Yes	🕼 Edit	× Remove	
test01_doc_metric	Label for test01 doc metric	Event counter	Yes	C Edit	× Remove	
Showing 1 to 2 of 2 entries				First	Previous 1 Next	Last
+ New metric						

Figure 72: Edit Metrics list

#### 4.12.10.1 Create a Metric



To create a metric, click the **+ New metric** button to open the *Edit Metrics* form, illustrated below. Use this form to provide metric parameters (explained below the picture).

#### Warning

Any newly defined metric must be authorized in the user privileges to be used as a condition in *Anomaly Definition* (see below **Active** field and Anomalies Profile  $\rightarrow$  Anomaly Definition above).

EDIT METRICS	
Metric id	
Metric label	
Metric type	<ul> <li>Event counter</li> <li>Ratio counter</li> </ul>
	○ Computed session value
	Computed media value
	Interval-based media distribution     Interval-based session distribution
	<ul> <li>Key-based session distribution</li> </ul>
Formula	
	Available CDR fields -
Aggregation type	⊖ Average
	⊖ Sum
Export	
Active	
	Test it
Save	

Figure 73: + New Metric → Edit Metrics → Metrics

#### Fields

• **Metric id**: unique id for the metric. Lower case, digits and underscore (\_) are the only authorized characters



- Metric label: text string used in help tooltip, lists and reports
- Metric type: 6 types are available.
  - Event Counter: count of events which occurred, based on CDR criteria

The output of the formula is True (the counter is incremented) or False (the counter is unchanged).

Example: Number of calls where the post dial delay is more than 5000 msecs:

POST\_DIAL\_DELAY > 5000

- Ratio counter: result of the division of 2 existing metrics

The base metric is divided by the divisor.

- Example: metric counting calls with release cause 500 divided by total number of calls
- Computed session value: derive a value from one or more fields from the CDR

The output of the formula is a numerical value.

Example: ringing duration:

CONNECT\_TIME - SETUP\_TIME

- Computed media value: derive a value from one or more fields from the CDR

Distinct formulas can be defined for ingress & egress calls so that media statistics are aggregated by media direction and not by call direction.

The output of the formula are numerical values.

Example: packet loss:

\* ingress:

```
CALLING_RTCP_PACKETS_LOST_FS1 / CALLING_RTCP_PACKETS_LOST_FS1 + 

→ CALLING_PACKETS_FS1
```

\* egress:

```
CALLED_RTCP_PACKETS_LOST_FS1 / CALLED_RTCP_PACKETS_LOST_FS1 + CALLED_PACKETS_FS1 ↔
```

- Interval-based media distribution: like a computed media value, the output value is derived from one or more CDR fields

The output value is used to increment one of the intervals of the distribution

Example: packet latency, in intervals of 10 msecs

CALLING\_RTCP\_AVG\_LATENCY\_FS1 / 10, CALLED\_RTCP\_AVG\_LATENCY\_FS1 / 10



 Interval-based session distribution: like a computed session value, the output value is derived from one or more CDR field

The output value is used to increment one of the intervals of the distribution

Example: post-dial delay, in intervals of 100 msecs:

POST\_DIAL\_DELAY / 100

- Key-based session distribution: derive a value from one or more fields from the CDR

The output value is text and is used to classify calls in "bins".

Example: distinguish calls based on codec type:

FLOWTYPE\_FS1\_F

#### • Formula

#### Warning

The text string of the formula must be compliant with Python syntax. Some examples have been provided in **Metric types** above.

The formula is based on one or more CDR fields, to be copied from the drop-down list *Available CDR fields*. This list shows the CDR fields by name and value type (string, integer, float...).

The CDRs and their fields are equipment- and plugin-dependent (NEMO Capture or Net-NetSD).

- **Aggregation type:** when the metric is used on more than one group (trunk), selects how the resulting value is computed: by average or sum.
- **Export:** if checked, the metric is listed in the exportable statistics to be selected in Statistics export profile → Statistics tab.
- Active: if checked, the metric is active, is computed from the moment it has been created, and appears:
  - in the selectable conditions list in Settings → Anomalies → Anomalies Profile → Anomalies → Anomaly definition



Anomaly Definition		×
Name		
Description		
day of week time of day ingress calls setup count egress calls setup count egress calls setup & answered count egress calls setup & answered count ingress calls disconnect count egress calls disconnect count ingress traffic intensity egress traffic intensity ingress traffic intensity variation (%) egress traffic intensity variation (%) ingress max simultaneous calls egress max simultaneous calls total capacity usage ingress call rate egress call rate egress call rate		
ingress calls connection duration		
egress calls connection duration		
ingress media packet loss (RTP) egress media packet loss (RTP) ingress media packet jitter (RTP) egress media packet jitter (RTP)	Close	Save changes
ingress media MOS		
egress media MOS ingress registration messages count egress registrations messages count ingress session establishment ratio (SFR/ASR)		
egress session establishment ratio (SER/ASR) ingress session establishment effectiveness ratio (SEER/NER) egress session establishment effectiveness ratio (SEER/NER)		
ingress Custom error codes metric		
egress Custom error codes metric ingress Call duration > 4s egress Call duration > 4s		

- and in selectable metrics list in Settings  $\rightarrow$  Metrics  $\rightarrow$  Edit Metrics  $\rightarrow$  Charts



Chart id		
Chart label		
Chart description		
Group	None	~
Chart type	• Time series	
	$\bigcirc$ Distribution histogram	
	○ Distribution pie	
Plot total (ingress + egress)		
Metric	✓ None	ł
	Call duration > 4s	
Unit	Custom error codes metric Label for test01 doc metric	

If unchecked (Inactive), the metric stops being computed and is not shown anymore in the selectable conditions list in *Anomaly Definition*. If a chart is linked to the metric, it is displayed but shows only results prior to the moment the metric's status becomes Inactive.

Click the *Save* button to save the new metric.

# 4.12.10.2 Create a Chart

To create a chart, click the **+ New chart** button to open the *Edit Metrics* form, illustrated below. Use this form to provide chart parameters (explained below the picture).

## Warning

- Any newly defined chart must be authorized in the user privileges to be visible (see Edit User
   → Active charts above).
- For the chart to plot current values, the reference metric must be active.


EDIT METRICS	
Chart id	
Chart label	
Chart description	
Group	None 🗸
Chart type	Time series
	$\bigcirc$ Distribution histogram
	○ Distribution pie
Plot total (ingress + egress)	
Metric	None 🗸
Unit	
Active	
Save	

Figure 74: + New Chart → Edit Metrics → Chart

# Fields

- **Chart id**: unique id for the chart. Lower case, digits and underscore (\_) are the only authorized characters
- Chart label: text string used in lists and reports
- Chart description: more verbose text string used in help tooltip
- Group: one category of results in Call Statistics or Voice Quality this chart is associated with
- Chart type:
  - Time Series: evolution of a metric over time: relies on events counter, ratio counter, computed session value or computed media value. X axis is time, Y axis is value



- Distribution histogram: distribution of characteristics of calls. X axis is intervals, Y axis is proportion of occurrences of that specific interval value
- Distribution pie: distribution of characteristics of calls, identified by labels: relies on keybased session distribution
- **Plot total (ingress + egress):** if Plot total is active, the chart displays 3 lines: ingress, egress, total and the legend displays these 3 data series. If disabled, the chart displays 2 lines: ingress, egress and the legend displays these 2 data series.
- Metric: a reference metric providing the values to plot
- Unit: the unit of the values, to be used as unit label in the legend of the plotted chart
- Active: if checked, the chart is active and appears in the selectable statistics list for the Dashboard charts.

Session Statistics	Quality of Service	Test New tab			
Select data					Selec
Group	Dory B			~	
Statistic	Custom Status Cod	le Metric		~	
Duration	Last 24 hours			~	
Add row of pan	els - Rotate to nex	t tab after never	✓ Modify tal	•	
				Save da	shboard

If unchecked (Inactive), the chart is not shown anymore in the selectable statistics list for the Dashboard charts and disappears from the category in *Call Statistics* and *Voice Quality* results it has been associated with when created.

#### Warning

Any newly defined chart must be authorized in the user privileges to be visible (see Edit User → Active charts above).





# 4.12.10.3 Edit an Existing Metric

To edit an existing metric, click the *Edit* blue button in the *Edit* column of the *Metric* tab in the main *Edit Metrics* window (see [Edit Metrics List] above).

Changes to an existing metric exclude changing the metric id and the metric type. Other settings (Description, Formula, Aggregation type, Export and Active) can be modified.

Changes must be saved using the **Save** button (action often forgotten after testing).

# 4.12.10.4 Edit an Existing Chart

To edit an existing chart, click the *Edit* blue button in the *Edit* column of the *Chart* tab in the main *Edit Metrics* window (see [Edit Metrics List] above).

Changes to an existing chart exclude changing the chart id and the chart type. Other settings (Label, Description, Group, Plot total, Metric, Unit, Active) can be modified.

Changes must be saved using the **Save** button.

# 4.12.10.5 Remove a Metric or Chart

To remove an existing metric or chart from the system, click *Remove* red button in the *Remove* column of the *Metric* or *Chart* tab in the *Edit Metrics* window (see [Edit Metrics List] above).

### 4.12.11 System

The System sub-menu allows you to configure the core applications part of the NEMO platform.

#### Warning

Only the system administrator or Netaxis support team should perform such configuration changes, as they might impact the whole processing chain.

### 4.12.11.1 Configure the GUI

Use the menu illustrated below to set various global parameters for the Web GUI:

• maximum number of calls returned by the calls search tool: specifies the maximum number of calls returned in the calls search results table. Default: 10000. Larger values increase load on the system and can impact browser performance.



• list of ranges to use for traffic intensity distribution pie: ranges to use for total capacity usage in format label1,limit1;label2,limit2;...

Example: usage 0%-80% of total capacity,0.8;usage 80%-95% of total capacity,0.95;usage 95%-100% of total capacity.

1.0 will create 3 ranges from 0 to 80% of total capacity, from 80% to 95% of total capacity and from 95% to 100% of total capacity.

• list of ranges to use for MOS simplified pie chart: ranges to use for MOS overview chart in format label1,limit1;label2,limit2;...

Example: bad,2.0;medium,3.0;good,4.25;very good.

5.0 will create the 4 ranges "bad" from 0.0 to 2.0, "medium" from 2.0 to 3.0, "good" from 3.0 to 4.25 and "very good" from 4.25 to 5.00.

correlated sessions search window: window of time (in seconds) for searching correlating sessions. For a call from 10:32:15 to 10:33:45, NEMO will look for other sessions with the methods defined in the parameter below between 10:32:15 - 300 secs and 10:33:45 + 300 secs.

Example : 300

 correlated sessions search SIP methods: defines additional SIP methods used to correlate call legs.

Example: REGISTER, SUBSCRIBE, NOTIFY

hostname mapping: defines the mapping between the names of the probes and their URL.
 Needed to reach the probes to download traces from them.

Example:

nemo3-demo-probe-lab-vmware3,http://10.0.10.18:8081/;nemo3-router-b,http://10.100.0.8:8081/;nemo3-router-a,http://10.100.0.7:8081/;nemo3-bridge-a,http://10.100.0.14:8081/;nemo3-bridge-b,http://10.100.0.15:8081/;dory-nemo3-probe-demo,http://10.100.0.13:8081/

 csv file with hosts mapping: location of a csv file having mappings to replace hosts' IP addresses with user-friendly names, with mandatory header IP-address, hostname as shown below. IPv6 format is supported.

Example: /opt/nemo/etc/hosts\_mappings.csv





- max log file size in bytes: maximum log file size, in bytes. Once this limit is reached, the log file is rotated and a new log file is created.
- number of log files to keep: number of log files to keep, including the current one and the rotated ones.
- log level: sets the logging severity level (2: data, 5: trace, 10: debug, 20: info, 30: warning, 40: error, 50: critical)
- GUI syslog server: URL of a remote syslog server to send the GUI logs to
- GUI syslog port: the port for this server
- GUI syslog facility (auth, authpriv, cron, daemon, ftp, kern, lpr, mail, news, syslog, user, uucp, local0 to local7): the log category/ies to filter
- AUDIT syslog server: URL of a remote syslog server to send the AUDIT logs to
- AUDIT syslog port: the port for this server
- AUDIT syslog facility (auth, authpriv, cron, daemon, ftp, kern, lpr, mail, news, syslog, user, uucp, local0 to local7) the log category/ies to filter

SYSTEM	ISETTINGS	
Basic of	otions Advanced options	
GUI	QueueRunner SMXRCSCDRCollector StatsEngine	AnomaliesEngine ReportingEngine StatsExportEngine CDRExportEngine HealthMonitor
	maximum number of calls returned by the calls search tool	10000
	list of ranges to use for MOS simplified pie charts in format label1,limit1;label2,limit2;	bad,2.0;medium,3.0;good,4.0;very good,5.0
	list of ranges to use for traffic intensity distribution pie in format label1,limit1;label2,limit2;	usage 0%-80% of total capacity,0.8;usage 80%-95% of total capacity,(
	correlated sessions search window	300
	correlated sessions search SIP methods	REGISTER,SUBSCRIBE,NOTIFY
	hostname mapping	IP-in-IP-probe-AWS1,http://18.216.167.158:8081/;nemo3-demo-pro
	csv file with hosts mapping	/opt/nemo/etc/hosts_mappings.csv
	max log file size in bytes	1000000
	number of log files to keep	10
	log level	10
		+ Save settings

Figure 75: GUI Configuration



### 4.12.11.2 Configure the Queue Runners

The Queue Runners process the CDRs received at regular intervals from the SBC and insert them into the NEMO database. Use the menu illustrated below to set various parameters:

- max number of records processed per CDR queue file: a single queue runner can process from 10 to 1000 CDR files. A small value guarantees that the CDRs are processed in a chronological order but increases the load on the system. A large value improves performance but does not guarantee the chronological order of the CDRs processing.
- max number of records processed per run: absolute maximum of CDRs to process per run. A run consists in the queue runner examining all the queue files present once.
- auto-enable stats per realm for realms matching regular expression: regular expression that a newly detected realm system name must match to have the stats per realm automatically enabled. Example: R.\*core\$ will match any realm starting with an R and ending with core.
- auto-enable stats per IP for realms matching regular expression: regular expression that a newly
  detected realm system name must match to have the stats per IP automatically enabled. Example:
  peer[0-9]+\$ will match any realm starting with peer, followed by at least one digit.
- max log file size in bytes: maximum log file size, in bytes. Once this limit is reached, the log file is rotated and a new log file is created
- number of log files to keep: number of log files to keep, including the current one and the rotated ones.
- log level: sets the logging severity level (2: data, 5: trace, 10: debug, 20: info, 30: warning, 40: error, 50: critical)

System Settings	
GUI QueueRunner SMXRCSCDRCollector Stats	Engine AnomaliesEngine ReportingEngine StatsExportEngine CDRExportEngine HealthMonitor
max number of records processed per CDR queue file	1000
max number of records processed per run	10000
auto-enable stats per realm for realms matching regular expression	٨
auto-enable stats per IP for realms matching regular expression	٤
max log file size in bytes	1000000
number of log files to keep	10
log level	10
	+ Save settings

Figure 76: Queue Runners Configuration



# 4.12.11.3 Configure the Collectors

This operation is strictly reserved to Netaxis support personnel.

#### Warning

The picture below shows collectors that could be present in the system, depending on configuration and deployment. These collectors (red square) should NOT BE USED or MODIFIED by users or even system administrators.

SYSTEM SETTINGS		
Basic options Advanced options		
GUI RestAPI QueueRunner	SMXRCSCDRCollector SDCDRCSVCollector SonusCDRCSVCollector BWCDRXMLCollector BWCDRCSVCollector Mediant	DRSyslogCollector
GUI RestAPI QueueRunner NetmatchSLECDRCollector VivoCI	SMXRCSCDRCollector         SDCDRCSVCollector         SonusCDRCSVCollector         BWCDRXMLCollector         BWCDRCSVCollector         Mediant           RCollector         MetaswitchCDRXMLCollector         SRECDRCSVCollector         StatsEngine         AnomaliesEngine         ReportingEngine         StatsExport	DRSyslogCollector rtEngine



### 4.12.11.4 Configure the Stats Engine

The Stats Engine processes the CDRs present in the database and computes consolidated metrics which are used to produce charts. Use the menu illustrated below to set various parameters:

- max log file size in bytes: maximum size, in bytes, for the log file. Once this limit is reached, the log file is rotated and a new log file is created.
- number of log files to keep: the number of log files to keep. This includes the current one and the rotated ones.
- log level: sets the logging severity level (2: data, 5: trace, 10: debug, 20: info, 30: warning, 40: error, 50: critical)



Syste	m Settings							
GUI	QueueRunner	SMXRCSCDRCollector	StatsEngine	AnomaliesEngine	ReportingEngine	StatsExportEngine	CDRExportEngine	HealthMonitor
		max log file size in by	/tes 1000	000				
		number of log files to k	<b>eep</b> 10					
		log le	evel 10					
			+ Sav	e settings				
module StatsEngine (instance 0) with id 11218 last monitored 19 secs ago on node ns387188.ovh.net								

Figure 78: Stats Engine Configuration

# 4.12.11.5 Configure the Anomalies Engine

The Anomalies Engine runs at regular intervals to process the statistics produced by the Stats Engine and run anomaly tests on them. Use the menu illustrated below to set various parameters:

- SMTP server: IP address of the SMTP server Nemo will send the traps to.
- SMTP port: destination port of the SMTP server
- SMTP SSL: flag to enable/disable to usage of SSL
- SMTP StartTLS: flag allowing to use this ancient specification to switch to encrypted mode
- SMTP username: Username for SMTP connection
- SMTP password: password for SMTP connection
- From email name: Name that will be displayed for the e-mail sent by Nemo.
- From email address: e-mail address for the e-mail sent by Nemo.
- HTTPS SMS URL: URL that will be used by Nemo to send the "HTTP GET" request to.
- max log file size in bytes: maximum size, in bytes, for the log file. Once this limit is reached, the log file is rotated and a new log file is created.
- number of log files to keep: the number of log files to keep. This includes the current one and the rotated ones.
- log level: sets the logging severity level (2: data, 5: trace, 10: debug, 20: info, 30: warning, 40: error, 50: critical)



NetmatchSLECDRCollector VivoCDRCollector MetaswitchCDF	XMLCollector SRECDRCSVCollector StatsEngine AnomaliesEn	ngine ReportingEngine StatsExportEngine
CDRExportEngine HealthMonitor CaptureEngine Capture	Orchestrator ItaltelCollector	
SMTP server	127.0.0.1	
SMTP port	25	
SMTP SSL		
SMTP STARTTLS		
SMTP username	admin	
SMTP password	•••••	
From email name	Nemo VoIP Reporting	
From email address	noreply@nemo.netaxis.be	
HTTP SMS URL	http://127.0.0.1/send_sms?to=\$number&text=\$message	
max log file size in bytes	1000000	
number of log files to keep	10	
log level	1	
	+ Save settings	

Figure 79: Anomalies Engine Configuration

### 4.12.11.6 Configure the Reporting Engine

The Reporting Engine runs at regular intervals to produce reports based on the statistics computed by the Stats. Use the menu illustrated below to set various parameters:

- max points per chart: the maximum number of data points per chart. This setting affects the precision of time-based charts.
- path to logo file to include in reports: this the path (in Linux format) to a logo image file on the system to include in PDF reports. This image must be in PNG format.
- SMTP server: IP address of the SMTP server where Nemo will send the report to.
- SMTP port: destination port of the SMTP server
- SMTP SSL: flag to enable/disable to usage of SSL
- SMTP StartTLS: flag allowing to use this ancient specification to switch to encrypted mode
- SMTP username: username for SMTP connection
- SMTP password: password for SMTP connection
- From email name: Name that will be displayed for the e-mail sent by Nemo.
- From email address: e-mail address for the e-mail sent by Nemo.
- max log file size in bytes: maximum size, in bytes, for the log file. Once this limit is reached, the log file is rotated and a new log file is created.



- number of log files to keep: the number of log files to keep. This includes the current one and the rotated ones.
- log level: sets the logging severity level (2: data, 5: trace, 10: debug, 20: info, 30: warning, 40: error, 50: critical)

NetmatchSLECDRCollector VivoCDRCollector MetaswitchCE	RXMLCollector SRECDRCSVCollector St	atsEngine Anomal	iesEngine ReportingEngine	StatsExportEngine
CDRExportEngine HealthMonitor CaptureEngine Capture	eOrchestrator ItaltelCollector			
path to logo file to include in reports				
SMTP server	127.0.0.1			
SMTP port	25			
SMTP SSL				
SMTP STARTTLS				
SMTP username	admin			
SMTP password	•••••			
From email name	Nemo VoIP Reporting			
From email address	noreply@nemo.netaxis.be			
max log file size in bytes	1000000			
number of log files to keep	10			
log level	10			

Figure 80: Reporting Engine Configuration

# 4.12.11.7 Configure the Stats Export Engine

The Statistics Export engine runs once a day to produce .csv files containing statistics raw data. The .csv files are produced per realm, endpoint, label or range. The *content* of the .csv file is configurable thanks to Statistics Export Profiles (see [Statistics exports]). Use the menu illustrated below to set various *configuration* parameters:

- SMTP server: IP address of the SMTP server where Nemo will send the traps to.
- SMTP port: destination port of the SMTP server
- SMTP SSL: flag to enable/disable to usage of SSL
- SMTP StartTLS: flag allowing to use this ancient specification to switch to encrypted mode
- SMTP username: username for SMTP connection
- SMTP password: password for SMTP connection
- From email name: name that will be displayed for the e-mail sent by Nemo.
- From email address: e-mail address for the e-mail sent by Nemo.



- max log file size in bytes: maximum size, in bytes, for the log file. Once this limit is reached, the log file is rotated and a new log file is created.
- number of log files to keep: the number of log files to keep. This includes the current one and the rotated ones.
- log level: sets the logging severity level (2: data, 5: trace, 10: debug, 20: info, 30: warning, 40: error, 50: critical)

NetmatchSLECDRCollector VivoCDRCollector MetaswitchCDI	XMLCollector SRECDRCSVCollector StatsEngine AnomaliesEn	gine ReportingEngine StatsExportEngine
CDRExportEngine HealthMonitor CaptureEngine Capture	Drchestrator ItaltelCollector	
SMTP server	127.0.0.1	
SMTP port	25	
SMTP SSL		
SMTP STARTTLS		
SMTP username	admin	
SMTP password	•••••	
From email name	Nemo VoIP Reporting	
From email address	noreply@nemo.netaxis.be	
max log file size in bytes	1000000	
number of log files to keep	10	
log level	10	
	+ Save settings	

Figure 81: Statistics Export Engine Configuration

### 4.12.11.8 Configure the CDR Export Engine

The CDR Export engine runs once a day to produce .csv files containing CDRs. The .csv files are produced per realm, endpoint, label or range. The *content* of the .csv files is configurable thanks to CDR export profiles (see [CDR Exports]. Use the menu illustrated below to set various *configuration* parameters:

- max log file size in bytes: maximum size, in bytes, for the log file. Once this limit is reached, the log file is rotated and a new log file is created.
- number of log files to keep: this includes the current one and the rotated ones.
- log level: sets the logging severity level (2: data, 5: trace, 10: debug, 20: info, 30: warning, 40: error, 50: critical)



System Settings				
GUI QueueRunner SMXRCSCDRCollector	StatsEngine AnomaliesEngine ReportingEngine StatsExportEngine CDRExportEngine HealthMonitor			
max log file size in byte	is 1000000			
number of log files to kee	p 10			
log lev	el 10			
	+ Save settings			
module CDRExportEngine with id 10982 last monitored 8 secs ago on node ns387188.ovh.net				

Figure 82: CDR Export Engine Configuration

### 4.12.11.9 Configure the Health Monitor

The system is monitored at regular intervals to ensure the proper functioning of NEMO. Use the menu illustrated below to set various parameters:

- max log file size in bytes: maximum size, in bytes, for the log file. Once this limit is reached, the log file is rotated and a new log file is created.
- number of log files to keep: this includes the current one and the rotated ones.
- log level: sets the logging severity level (2: data, 5: trace, 10: debug, 20: info, 30: warning, 40: error, 50: critical)

Syste	m Settings						
GUI	QueueRunner	SMXRCSCDRCollector Stat	tsEngine AnomaliesEngine	ReportingEngine	StatsExportEngine	CDRExportEngine	HealthMonitor
		max log file size in bytes	1000000				
		number of log files to keep	10				
		log level	10				
			+ Save settings				

Figure 83: Health Monitoring Configuration

### 4.12.11.10 Configure the Capture Engine

This operation is reserved to Netaxis support at installation and deployment time.



# 4.12.11.11 Configure the Capture Orchestrator

This operation is reserved to Netaxis support at installation and deployment time.

# 4.12.12 Logs

The *Logs* menu allows viewing the log files produced by NEMO.

Click the *View* button to display the log file you want to inspect, then click the *Back* button of your browser to go back to the NEMO *Settings/Logs* window.

The following log files (sorted alphabetically) are available:

- anomalies\_engine.log: this file contains logs produced by the "Anomalies" Engine processes. The length and the number of those files is configurable in the Settings/System/Anomalies
   ⇒ Engine menu.
- audit.log: this file contains logs about HTTP requests to NEMO module. This file rotates every day.
- capture\_engine.log: this file contains logs produced by the Capture Engine processes, which manage the capture on probes and the transfer of probes traces to the central server. The length and the number of those files is configurable in the Settings/System/CaptureEngine menu.
- CaptureOrchestrator.log: this file contains the logs produced by the CaptureOrchestrator process, which synchronizes the probe servers and saves the traces' metadata. The length and the number of those files is configurable in the Settings/System/CaptureOrchestrator menu.
- cdr\_export\_engine.log: this file contains logs produced by the "CDR Export" Engine processes. The length and the number of those files is configurable in the Settings/System/CDR Export
   → Engine menu.
- gui.log: this file contains logs produced by the "GUI" processes. The length and the number of those files is configurable in the Settings/System/GUI menu.
- gui\_access.log: this file contains information about user access (successful/unsuccessful access). This file contains a limited amount of information. It aims to keep track of the user login attempts. This file rotates every day.
- gui\_server.log: this file contains the information about GUI crashes. The length and the number of those files is configurable in the Settings/System/GUI menu.
- health\_monitor.log: this file contains logs produced by the Health Monitor process, which purges the database and the file system. The length and the number of those files is configurable in the Settings/System/HealthMonitor menu.



- qr0.log and qr1.log: those files contain logs produced by QueueRunner processes. The length and the number of those files is configurable in the Settings/System/QueueRunner menu.
- reporting\_engine.log: this file contains logs produced by the "Reporting" Engine processes. The length and the number of those files is configurable in the Settings/System/Reporting
   ↔ Engine menu.
- stats\_engine.log: this file contains logs produced by the "Stats" Engine processes. The length and the number of those files is configurable in the Settings/System/Health Monitor menu.
- stats\_export\_engine.log: this file contains logs produced by the "Statistics Export" Engine processes. The length and the number of those files is configurable in the Settings/System/
   → Stats Export Engine menu.
- watchdog.log: this file contains logs produced by the watchdog processes. The length and the number of those files is configurable in the Settings/System/Health Monitor menu.

### Info

The absence of a log in the *System > Logs* browser window does not indicate a malfunction of the system. The most common reason for a log not being listed is that the corresponding engine is not active or the corresponding process has not been run yet.

# 4.13 Profile Module

The **Profile** module, accessible by clicking on the username in the menu bar, allows the currently logged-in user to:

- Change their password
- Set up MFA (Multi-Factor Authentication)
- Sign out

# 4.13.1 Change Password

To change the password, the user must enter their current password and provide a new one that meets the current password requirements.





To update your password, please fill out the fields below.

Current password	
New password	
Confirm password	
Submit	



### 4.13.2 MFA Set Up

MFA through TOTP (Time-Based One-Time Password) is a security method that requires users to enter a temporary code generated by an authenticator app (e.g., Google Authenticator) in addition to their password. The code changes periodically, enhancing account security by preventing unauthorized access.

To set up MFA, the user must scan the QR code using a supported authenticator app (e.g., Google Authenticator) and confirm the setup by entering the temporary code displayed in the app.

Once the setup is complete, the user will be prompted to enter a temporary code from their authenticator app on a second page during the login process.



We are about to set up Multi-Factor Authentication (MFA) for your account. To proceed, please scan the QR code displayed on the screen using your authenticator app (e.g., Google Authenticator, Microsoft Authenticator).



If you are unable to scan the QR code, you can manually enter this code in your authenticator app:

RADHRBNDTCTDF7C52XSJ36TTLOFZPL7F

Once configured, your app will generate one-time codes that you'll need to complete the login process.

Enter the code currently displayed in your authenticator app to verify the setup.

Code

Figure 85: MFA Set Up

#### Тір

If the role allows MFA reset via email, users will have the option to reset their TOTP through email, for example, if they lose their mobile device.

# **5** Plugins Features List

# **5.1 Netaxis Probes**

- Plugin name: capture
- Trace correlation support: yes
- DB collection name: sip
- Base configuration object: Probes
- Sub-groups:



– Trunks

### 5.1.1 GUI Search Calls

# 5.1.1.1 Search Criteria

Tab	Search Criteria
SIP	Method
SIP	SIP status
SIP	SIP headers
SIP	Post Dial Delay
Packet Loss	Calling RTP packets lost
Packet Loss	Called RTP packets lost
Packet Loss	Calling RTP packet loss
Packet Loss	Called RTP packet loss
Packet Jitter	Calling RTP Avg jitter
Packet Jitter	Called RTP Avg jitter
Packet Jitter	Calling RTP max jitter
Packet Jitter	Called RTP max jitter
Packet Latency	Calling RTCP Avg Latency
Packet Latency	Called RTCP Avg Latency
MOS	Calling MOS
MOS	Called MOS
Media streams	Media streams count
User agent	Calling user agent
User agent	Called user agent

# 5.1.1.2 Results Columns



Column
Probe
Calling Number (normalized)
Called Number (normalized)
Src IP
Dst IP
Src Hostname
Dst Hostname
VLAN
Call Id
SIP Method
SIP Status
Alerting Duration (secs)
Connection Duration (secs)
Total Duration (secs)
Calling RTP Packets
Called RTP Packets
Calling RTP Packets Lost
Called RTP Packets Lost
Calling RTP Packet Loss
Called RTP Packet Loss
Calling RTP Avg Jitter
Called RTP Avg Jitter
Calling RTCP Avg Latency
Called RTCP Avg Latency
Calling MOS
Called MOS
Media streams count



#### Column

Correlated calls count

- Correlated calls ids
- Correlation group id
- Record id
- Media codec
- Calling user agent
- Called user agent
- Post Dial Delay (secs)

# 5.1.2 REST API

# 5.1.2.1 Search Criteria

Search Criteria
probe
callingNormalized
calledNormalized
srclp
dstlp
srcHostname
dstHostname
VLAN
callId
sipMethod
sipStatus
alertingDuration
connectionDuration
totalDuration



Search Criteria

callingRTPPackets

calledRTPPackets

callingRTPPacketsLost

calledRTPPacketsLost

callingRTPPacketLoss

calledRTPPacketLoss

callingRTPAvgJitter

calledRTPAvgJitter

callingRTCPAvgLatency

 $called {\tt RTCPAvgLatency}$ 

callingMOS

calledMOS

mediaStreamsCount

correlatedCallsCount

correlatedCallsIds

correlationGroupId

mediaCodec

callingUserAgent

calledUserAgent

postDialDelay

# 5.1.2.2 Search Results Fields

All the fields available for the GUI search results columns are present in REST API responses.

# 5.1.3 Exportable CDR Fields



Tab	Field
Session	Setup Time (YYYY-MM-DD HH:MM:SS)
Session	Connect Time (YYYY-MM-DD HH:MM:SS)
Session	Disconnect time (YYYY-MM-DD HH:MM:SS)
Session	Calling Party Number
Session	Calling Party Number (normalized)
Session	Called Party Number
Session	Called Party Number (normalized)
Session	SIP Method
Session	SIP Status
Session	Call Id
Session	Probe
Session	Src IP
Session	Dst IP
Session	VLAN
Session	Post Dial Delay (secs)
Quality of Service	Calling RTP Packets
Quality of Service	Called RTP Packets
Quality of Service	Calling RTP Packets Lost
Quality of Service	Called RTP Packets Lost
Quality of Service	Calling RTP Packet Loss
Quality of Service	Called RTP Packet Loss
Quality of Service	Calling RTP Avg Jitter
Quality of Service	Called RTP Avg Jitter
Quality of Service	Calling RTCP Avg Latency
Quality of Service	Called RTCP Avg Latency
Quality of Service	Calling MOS
Quality of Service	Called MOS



# 5.1.4 Exportable Statistics

Tab	Field
Sessions	Ingress calls setup count
Sessions	Egress calls setup count
Sessions	Total calls setup count
Sessions	Ingress calls setup & answered count
Sessions	Egress calls setup & answered count
Sessions	Total calls setup & answered count
Sessions	Ingress calls disconnect count
Sessions	Egress calls disconnect count
Sessions	Total calls disconnect count
Sessions	Ingress traffic intensity (erlangs)
Sessions	Egress traffic intensity (erlangs)
Sessions	Total traffic intensity (erlangs)
Sessions	Ingress max simultaneous calls (channels)
Sessions	Egress max simultaneous calls (channels)
Sessions	Total max simultaneous calls (channels)
Sessions	Ingress call rate (calls/min)
Sessions	Egress call rate (calls/min)
Sessions	Total call rate (calls/min)
Sessions	Ingress calls ringing duration (secs)
Sessions	Egress calls ringing duration (secs)
Sessions	Ingress calls connection duration (secs)
Sessions	Egress calls connection duration (secs)
Sessions	Ingress calls post dial delay (PDD) (msecs)
Sessions	Egress calls post dial delay (PDD) (msecs)
Sessions	Ingress session establishment ratio (SER/ASR) (%)
Sessions	Egress session establishment ratio (SER/ASR) (%)



Tab	Field
Sessions	Ingress session establishment effectiveness ratio (SEER/NER) (%)
Sessions	Egress session establishment effectiveness ratio (SEER/NER) (%)
Sessions	Ingress ineffective session attempts ratio (ISA) (%)
Sessions	Egress ineffective session attempts ratio (ISA) (%)

# 5.1.5 Anomalies

Test	
ingress calls setup count	
egress calls setup count	
ingress calls setup & answered count	
egress calls setup & answered count	
ingress calls disconnect count	
egress calls disconnect count	
ingress traffic intensity	
egress traffic intensity	
ingress traffic intensity variation (%)	
egress traffic intensity variation (%)	
ingress max simultaneous calls	
egress max simultaneous calls	
total capacity usage	
ingress call rate	
egress call rate	
ingress calls ringing duration	
egress calls ringing duration	
ingress calls connection duration	
egress calls connection duration	



#### Test

ingress media packet loss (RTP) egress media packet loss (RTP) ingress media packet jitter (RTP) egress media packet jitter (RTP) ingress media MOS egress media MOS egress media MOS ingress registration messages count egress registrations messages count ingress session establishment ratio (SER/ASR) egress session establishment ratio (SER/ASR) ingress session establishment effectiveness ratio (SEER/NER) egress session establishment effectiveness ratio (SEER/NER) ingress post dial delay (PDD) egress post dial delay (PDD)

### 5.1.6 Custom Metrics Exposed Fields

Field	Туре
CLG_IP	string
CLD_IP	string
RELEASE_CAUSE_SIP	string
MEDIA_CODEC	integer
MEDIA_CODEC_LABEL	string
CLG_RTP_PACKETS	integer
CLG_RTP_PACKETS_LOST	integer
CLG_RTP_PACKET_LOSS	float
CLG_RTP_PACKETS_SENT	integer



Field	Туре
CLG_RTP_JITTER_SUM	integer
CLG_RTP_JITTER_MAX	integer
CLG_RTP_JITTER_AVG	float
CLG_RTP_JITTER_PACKETS	integer
CLG_RTCP_LATENCY	integer
CLG_RTP_MOS	float
CLG_USER_AGENT	string
CLG_RTP_FRAME_BYTES	integer
CLG_RTP_PAYLOAD_BYTES	integer
CLD_RTP_PAYLOAD_BYTES	integer
CLD_RTP_FRAME_BYTES	integer
CLD_RTP_PACKETS	integer
CLD_RTP_PACKETS_LOST	integer
CLD_RTP_PACKET_LOSS	float
CLD_RTP_PACKETS_SENT	integer
CLD_RTP_JITTER_SUM	integer
CLD_RTP_JITTER_MAX	integer
CLD_RTP_JITTER_AVG	float
CLD_RTP_JITTER_PACKETS	integer
CLD_RTCP_LATENCY	integer
CLD_RTP_MOS	float
CLD_USER_AGENT	string
POST_DIAL_DELAY	float

# 5.2 Netaxis SRE

- Plugin name: sre
- Trace correlation support: no



- DB collection name: srecdrs
- Base configuration object: Call Processors
- Sub-groups:
  - Trunks

# 5.2.1 GUI Search Calls

### 5.2.1.1 Search Criteria

# Info

This plugin does not support specific search criteria except the standard ones.

### 5.2.1.2 Results Columns

Column
Calling Number (normalized)
Called Number (normalized)
From URI
To URI
Request username
Request URI
Contact
Call Id
Counter
Alerting Duration (secs)
Connection Duration (secs)
Total Duration (secs)
Disconnect Cause
CDR type
Record Id



# 5.2.2 REST API

#### 5.2.2.1 Search Criteria

Search Criteria callingNormalized calledNormalized fromURI toURI requestUsername requestURI contact callId counter alertingDuration connectionDuration totalDuration disconnectCause cdrType

#### 5.2.2.2 Search Results Fields

All the fields available for the GUI search results columns are present in REST API responses.

#### 5.2.3 Exportable CDR Fields

Tab	Field
Details	Setup Time
Details	Hostname
Details	Connect Time



Tab	Field
Details	Connect Host
Details	Disconnect Time
Details	Disconnect Host
Details	Status Code
Details	Call Id
Details	Counter
Details	From
Details	Calling
Details	То
Details	Called
Details	Request URI
Details	Request Username
Details	Last Request URI
Details	Source Address
Details	Source Port
Details	Destination Address
Details	Destination Port
Details	Туре
Details	Contact

# 5.2.4 Exportable Statistics

Tab	Field
Sessions	Ingress calls setup count
Sessions	Egress calls setup count
Sessions	Total calls setup count
Sessions	Ingress calls setup & answered count



Tab	Field
Sessions	Egress calls setup & answered count
Sessions	Total calls setup & answered count
Sessions	Ingress calls disconnect count
Sessions	Egress calls disconnect count
Sessions	Total calls disconnect count
Sessions	Ingress traffic intensity (erlangs)
Sessions	Egress traffic intensity (erlangs)
Sessions	Total traffic intensity (erlangs)
Sessions	Ingress max simultaneous calls (channels)
Sessions	Egress max simultaneous calls (channels)
Sessions	Total max simultaneous calls (channels)
Sessions	Ingress call rate (calls/min)
Sessions	Egress call rate (calls/min)
Sessions	Total call rate (calls/min)
Sessions	Ingress calls ringing duration (secs)
Sessions	Egress calls ringing duration (secs)
Sessions	Ingress calls connection duration (secs)
Sessions	Egress calls connection duration (secs)

### 5.2.5 Anomalies

### Test

ingress calls setup count

egress calls setup count

ingress calls setup & answered count

egress calls setup & answered count

ingress calls disconnect count



#### Test

egress calls disconnect count ingress traffic intensity egress traffic intensity variation (%) egress traffic intensity variation (%) ingress max simultaneous calls egress max simultaneous calls total capacity usage ingress call rate egress call rate egress calls ringing duration egress calls ringing duration ingress calls connection duration

# 5.2.6 Custom Metrics Exposed Fields

### Info

This plugin does not support any specific CDR field for custom metrics, except the standard ones.

# 5.3 Oracle SBC

- Plugin name: netnetsd
- Trace correlation support: yes
- DB collection name: sbccdrs
- Base configuration object: Session Border Controllers
- Sub-groups:
  - Realms
  - Endpoints



- Source Ranges
- Destination Ranges

# 5.3.1 GUI Search Calls

# 5.3.1.1 Search Criteria

Tab	Search Criteria
Packet Loss	Calling RTP packets lost
Packet Loss	Called RTP packets lost
Packet Loss	Calling RTP packet loss
Packet Loss	Called RTP packet loss
Packet Loss	Calling RTCP packets lost
Packet Loss	Called RTCP packets lost
Packet Loss	Calling RTCP packet loss
Packet Loss	Called RTCP packet loss
Packet Jitter	Calling RTP Avg jitter
Packet Jitter	Called RTP Avg jitter
Packet Jitter	Calling RTCP Avg jitter
Packet Jitter	Called RTCP Avg jitter
Packet Jitter	Calling RTP max jitter
Packet Jitter	Called RTP max jitter
Packet Jitter	Calling RTCP max jitter
Packet Jitter	Called RTCP max jitter
Packet Latency	Calling RTCP Avg Latency
Packet Latency	Called RTCP Avg Latency
Packet Latency	Calling RTCP max Latency
Packet Latency	Called RTCP max Latency
MOS	Calling MOS
MOS	Called MOS



Tab	Search Criteria
SIP	SIP status
SIP	P-Asserted-Id
SIP	Primary Routing Number
SIP	Egress Final Routing Number
SIP	SIP Diversion

# 5.3.1.2 Results Columns

Column
Calling Number (normalized
Called Number (normalized
Ingress Remote Address
Egress Remote Address
Ingress Local Address
Egress Local Address
Alerting Duration (secs)
Connection Duration (secs)
Total Duration (secs)
Post Dial Delay (msecs)
Disconnect Cause
SIP Status
Codec (forward stream)
Codec (reverse stream)
Calling RTP Packets Lost
Called RTP Packets Lost
Calling RTP Packet Loss
Called RTP Packet Loss



#### Column

Calling RTCP Packets Lost Called RTCP Packets Lost Calling RTCP Packet Loss Called RTCP Packet Loss Calling RTP Avg Jitter (msecs) Called RTP Avg Jitter (msecs) Calling RTCP Avg Jitter (msecs) Called RTCP Avg Jitter (msecs) Calling RTP Max Jitter (msecs) Called RTP Max Jitter (msecs) Calling RTCP Max Jitter (msecs) Called RTCP Max Jitter (msecs) Calling RTCP Avg Latency (msecs) Called RTCP Avg Latency (msecs) Calling RTCP Max Latency (msecs) Called RTCP Max Latency (msecs) Calling MOS Called MOS P-Asserted-Id Primary Routing Number Egress Final Routing Number **SIP** Diversion

#### 5.3.2 REST API

5.3.2.1 Search Criteria



Search Criteria

callingNormalized

 ${\it calledNormalized}$ 

ingressRemoteAddress

egressRemoteAddress

ingressLocalAddress

egressLocalAddress

alertingDuration

 ${\it connection} \\ {\it Duration}$ 

totalDuration

postDialDelay

disconnectCause

sipStatus

codecForwardStream

codecReverseStream

callingRTPPacketsLost

 $called {\tt RTPPacketsLost}$ 

callingRTPPacketLoss

calledRTPPacketLoss

 $calling {\tt RTCPPacketsLost}$ 

calledRTCPPacketsLost

 $calling {\tt RTCPPacketLoss}$ 

calledRTCPPacketLoss

callingRTPAvgJitter

 $called {\tt RTPAvgJitter}$ 

callingRTCPAvgJitter

calledRTCPAvgJitter

callingRTPMaxJitter



Search Criteria calledRTPMaxJitter callingRTCPMaxJitter callingRTCPMaxJitter callingRTCPAvgLatency calledRTCPAvgLatency callingRTCPMaxLatency calledRTCPMaxLatency calledRTCPMaxLatency calledMOS pAssertedId primaryRoutingNumber egressFinalRoutingNumber sipDiversion

### 5.3.2.2 Search Results Fields

All the fields available for the GUI search results columns are present in REST API responses.

#### 5.3.3 Exportable CDR Fields

Tab	Field
Session	Setup Time (YYYY-MM-DD HH:MM:SS)
Session	Connect Time (YYYY-MM-DD HH:MM:SS)
Session	Disconnect time (YYYY-MM-DD HH:MM:SS)
Session	Post Dial Delay
Session	Session Protocol Type
Session	Calling Station Id
Session	Calling Party Number

#### User Guide



Tab	Field
Session	Called Station Id
Session	Called Party Number
Session	P-Asserted-Id
Session	Primary Routing Number
Session	Egress Final Routing Number
Session	SIP Diversion
Session	Disconnect Initiator
Session	Disconnect Cause
Session	SIP Status
Session	Originating Trunk Group
Session	Terminating Trunk Group
Session	Originating Trunk Context
Session	Terminating Trunk Context
Signaling	Session Ingress Realm
Signaling	Session Egress Realm
Signaling	Session Ingress Call Id
Signaling	Session Egress Call Id
Signaling	Ingress Local Address
Signaling	Ingress Remote Address
Signaling	Egress Local Address
Signaling	Egress Remote Address
Signaling	Ingress Network Interface Id
Signaling	Ingress Vlan Tag Value
Signaling	Egress Network Interface Id
Signaling	Egress Vlan Tag Value
Forward Media Stream	Flow Id
Forward Media Stream	Flow Type


#### Tab

Forward Media Stream Forward Media Stream Flow In Source Address Forward Media Stream Flow In Source Port Forward Media Stream Reverse Media Stream Flow Id Reverse Media Stream Reverse Media Stream Reverse Media Stream Reverse Media Stream

Field

Flow In Realm Flow In Destination Address Flow In Destination Port Flow Out Realm Flow Out Source Address Flow Out Source Port **Flow Out Destination Address** Flow Out Destination Port Calling Octets **Calling Packets** Calling RTCP Packets Lost Calling RTCP Avg Jitter Calling RTCP Avg Latency Calling RTCP MaxJitter Calling RTCP MaxLatency Calling RTP Packets Lost Calling RTP Avg Jitter Calling RTP MaxJitter Calling R Factor Calling MOS Flow Type Flow In Realm Flow In Source Address Flow In Source Port

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Tab	Field
Reverse Media Stream	Flow In Destination Address
Reverse Media Stream	Flow In Destination Port
Reverse Media Stream	Flow Out Realm
Reverse Media Stream	Flow Out Source Address
Reverse Media Stream	Flow Out Source Port
Reverse Media Stream	Flow Out Destination Address
Reverse Media Stream	Flow Out Destination Port
Reverse Media Stream	Called Octets
Reverse Media Stream	Called Packets
Reverse Media Stream	Called RTCP Packets Lost
Reverse Media Stream	Called RTCP Avg Jitter
Reverse Media Stream	Called RTCP Avg Latency
Reverse Media Stream	Called RTCP MaxJitter
Reverse Media Stream	Called RTCP MaxLatency
Reverse Media Stream	Called RTP Packets Lost
Reverse Media Stream	Called RTP Avg Jitter
Reverse Media Stream	Called RTP MaxJitter
Reverse Media Stream	Called R Factor
Reverse Media Stream	Called MOS

# 5.3.4 Exportable Statistics

Tab	Field
Sessions	Ingress calls setup count
Sessions	Egress calls setup count
Sessions	Total calls setup count
Sessions	Ingress calls setup & answered count



Tab	Field
Sessions	Egress calls setup & answered count
Sessions	Total calls setup & answered count
Sessions	Ingress calls disconnect count
Sessions	Egress calls disconnect count
Sessions	Total calls disconnect count
Sessions	Ingress traffic intensity (erlangs)
Sessions	Egress traffic intensity (erlangs)
Sessions	Total traffic intensity (erlangs)
Sessions	Ingress max simultaneous calls (channels)
Sessions	Egress max simultaneous calls (channels)
Sessions	Total max simultaneous calls (channels)
Sessions	Ingress call rate (calls/min)
Sessions	Egress call rate (calls/min)
Sessions	Total call rate (calls/min)
Sessions	Ingress calls ringing duration (secs)
Sessions	Egress calls ringing duration (secs)
Sessions	Ingress calls connection duration (secs)
Sessions	Egress calls connection duration (secs)
Sessions	Ingress session establishment ratio (SER/ASR) (%)
Sessions	Egress session establishment ratio (SER/ASR) (%)
Sessions	Ingress session establishment effectiveness ratio (SEER/NER) (%)
Sessions	Egress session establishment effectiveness ratio (SEER/NER) (%)
Sessions	Ingress ineffective session attempts ratio (ISA) (%)
Sessions	Egress ineffective session attempts ratio (ISA) (%)
Sessions	Ingress post dial delay (PDD) (msecs)
Sessions	Egress post dial delay (PDD) (msecs)
Voice quality	Ingress media packet loss (RTCP) (%)



Tab	Field
Voice quality	Egress media packet loss (RTCP) (%)
Voice quality	Ingress media packet loss (RTP) (%)
Voice quality	Egress media packet loss (RTP) (%)
Voice quality	Ingress media packet jitter (RTCP) (msecs)
Voice quality	Egress media packet jitter (RTCP) (msecs)
Voice quality	Ingress media packet jitter (RTP) (msecs)
Voice quality	Egress media packet jitter (RTP) (msecs)
Voice quality	Ingress media packet latency (RTCP) (msecs)
Voice quality	Egress media packet latency (RTCP) (msecs)
Voice quality	Ingress media MOS (score)
Voice quality	Egress media MOS (score)
Voice quality	Ingress media bandwidth (kbit/s)
Voice quality	Egress media bandwidth (kbit/s)

#### 5.3.5 Anomalies

Test
ingress calls setup count
egress calls setup count
ingress calls setup & answered count
egress calls setup & answered count
ingress calls disconnect count
egress calls disconnect count
ingress traffic intensity
egress traffic intensity
ingress traffic intensity variation (%)
egress traffic intensity variation (%)



#### Test

ingress max simultaneous calls egress max simultaneous calls total capacity usage ingress call rate egress call rate ingress calls ringing duration egress calls ringing duration ingress calls connection duration egress calls connection duration ingress media packet loss (RTCP) egress media packet loss (RTCP) ingress media packet loss (RTP) egress media packet loss (RTP) ingress media packet jitter (RTCP) egress media packet jitter (RTCP) ingress media packet jitter (RTP) egress media packet jitter (RTP) ingress media packet latency (RTCP) egress media packet latency (RTCP) ingress media MOS egress media MOS ingress media bandwidth egress media bandwidth ingress session establishment ratio (SER/ASR) egress session establishment ratio (SER/ASR) ingress session establishment effectiveness ratio (SEER/NER) egress session establishment effectiveness ratio (SEER/NER)



#### Test

ingress ineffective session attempts ratio (ISA) egress ineffective session attempts ratio (ISA) ingress post dial delay (PDD) egress post dial delay (PDD)

## 5.3.6 Custom Metrics Exposed Fields

Field	Туре
NAS_IP_ADDRESS	string
NAS_PORT	integer
NAS_IDENTIFIER	string
CALLED_STATION_ID	string
CALLING_STATION_ID	string
H323_SETUP_TIME	string
H323_CONNECT_TIME	string
H323_DISCONNECT_TIME	string
H323_DISCONNECT_CAUSE	string
FLOWID_FS1_F	string
FLOWTYPE_FS1_F	string
SESSION_INGRESS_CALLID	string
SESSION_EGRESS_CALLID	string
FLOW_IN_REALM_FS1_F	string
FLOW_IN_SRC_ADDR_FS1_F	string
FLOW_IN_SRC_PORT_FS1_F	integer
FLOW_IN_DST_ADDR_FS1_F	string
FLOW_IN_DST_PORT_FS1_F	integer
FLOW_OUT_REALM_FS1_F	string



Field	Туре
FLOW_OUT_SRC_ADDR_FS1_F	string
FLOW_OUT_SRC_PORT_FS1_F	integer
FLOW_OUT_DST_ADDR_FS1_F	string
FLOW_OUT_DST_PORT_FS1_F	integer
CALLING_OCTETS_FS1	integer
CALLING_PACKETS_FS1	integer
CALLING_RTCP_PACKETS_LOST_FS1	integer
CALLING_RTCP_AVG_JITTER_FS1	integer
CALLING_RTCP_AVG_LATENCY_FS1	integer
CALLING_RTCP_MAXJITTER_FS1	integer
CALLING_RTCP_MAXLATENCY_FS1	integer
CALLING_RTP_PACKETS_LOST_FS1	integer
CALLING_RTP_AVG_JITTER_FS1	integer
CALLING_RTP_MAXJITTER_FS1	integer
SESSION_GENERIC_ID	string
SESSION_INGRESS_REALM	string
SESSION_EGRESS_REALM	string
SESSION_PROTOCOL_TYPE	string
CALLED_OCTETS_FS1	integer
CALLED_PACKETS_FS1	integer
CALLED_RTCP_PACKETS_LOST_FS1	integer
CALLED_RTCP_AVG_JITTER_FS1	integer
CALLED_RTCP_AVG_LATENCY_FS1	integer
CALLED_RTCP_MAXJITTER_FS1	integer
CALLED_RTCP_MAXLATENCY_FS1	integer
CALLED_RTP_PACKETS_LOST_FS1	integer
CALLED_RTP_AVG_JITTER_FS1	integer



Field	Туре
CALLED_RTP_MAXJITTER_FS1	integer
SESSION_CHARGING_VECTOR	string
SESSION_CHARGING_FUNCTION_ADDRESS	string
FIRMWARE_VERSION	string
LOCAL_TIME_ZONE	string
POST_DIAL_DELAY	integer
CDR_SEQUENCE_NUMBER	integer
SESSION_DISPOSITION	integer
DISCONNECT_INITIATOR	integer
DISCONNECT_CAUSE	integer
INTERMEDIATE_TIME	string
PRIMARY_ROUTING_NUMBER	string
ORIGINATING_TRUNK_GROUP	string
TERMINATING_TRUNK_GROUP	string
ORIGINATING_TRUNK_CONTEXT	string
TERMINATING_TRUNK_CONTEXT	string
P_ASSERTED_ID	string
SIP_DIVERSION	string
SIP_STATUS	integer
INGRESS_LOCAL_ADDR	string
INGRESS_REMOTE_ADDR	string
EGRESS_LOCAL_ADDR	string
EGRESS_REMOTE_ADDR	string
FLOWID_FS1_R	string
FLOWTYPE_FS1_R	string
FLOW_IN_REALM_FS1_R	string
FLOW_IN_SRC_ADDR_FS1_R	string



Field	Туре
FLOW_IN_SRC_PORT_FS1_R	integer
FLOW_IN_DST_ADDR_FS1_R	string
FLOW_IN_DST_PORT_FS1_R	integer
FLOW_OUT_REALM_FS1_R	string
FLOW_OUT_SRC_ADDR_FS1_R	string
FLOW_OUT_SRC_PORT_FS1_R	integer
FLOW_OUT_DST_ADDR_FS1_R	string
FLOW_OUT_DST_PORT_FS1_R	integer
FLOWID_FS2_F	string
FLOWTYPE_FS2_F	string
FLOW_IN_REALM_FS2_F	string
FLOW_IN_SRC_ADDR_FS2_F	string
FLOW_IN_SRC_PORT_FS2_F	integer
FLOW_IN_DST_ADDR_FS2_F	string
FLOW_IN_DST_PORT_FS2_F	integer
FLOW_OUT_REALM_FS2_F	string
FLOW_OUT_SRC_ADDR_FS2_F	string
FLOW_OUT_SRC_PORT_FS2_F	integer
FLOW_OUT_DST_ADDR_FS2_F	string
FLOW_OUT_DST_PORT_FS2_F	integer
CALLING_OCTETS_FS2	integer
CALLING_PACKETS_FS2	integer
CALLING_RTCP_PACKETS_LOST_FS2	integer
CALLING_RTCP_AVG_JITTER_FS2	integer
CALLING_RTCP_AVG_LATENCY_FS2	integer
CALLING_RTCP_MAXJITTER_FS2	integer
CALLING_RTCP_MAXLATENCY_FS2	integer



Field	Туре
CALLING_RTP_PACKETS_LOST_FS2	integer
CALLING_RTP_AVG_JITTER_FS2	integer
CALLING_RTP_MAXJITTER_FS2	integer
FLOWID_FS2_R	string
FLOWTYPE_FS2_R	string
FLOW_IN_REALM_FS2_R	string
FLOW_IN_SRC_ADDR_FS2_R	string
FLOW_IN_SRC_PORT_FS2_R	integer
FLOW_IN_DST_ADDR_FS2_R	string
FLOW_IN_DST_PORT_FS2_R	integer
FLOW_OUT_REALM_FS2_R	string
FLOW_OUT_SRC_ADDR_FS2_R	string
FLOW_OUT_SRC_PORT_FS2_R	integer
FLOW_OUT_DST_ADDR_FS2_R	string
FLOW_OUT_DST_PORT_FS2_R	integer
CALLED_OCTETS_FS2	integer
CALLED_PACKETS_FS2	integer
CALLED_RTCP_PACKETS_LOST_FS2	integer
CALLED_RTCP_AVG_JITTER_FS2	integer
CALLED_RTCP_AVG_LATENCY_FS2	integer
CALLED_RTCP_MAXJITTER_FS2	integer
CALLED_RTCP_MAXLATENCY_FS2	integer
CALLED_RTP_PACKETS_LOST_FS2	integer
CALLED_RTP_AVG_JITTER_FS2	integer
CALLED_RTP_MAXJITTER_FS2	integer
EGRESS_FINAL_ROUTING_NUMBER	string
INGRESS_NETWORK_INTERFACE_ID	string



Field	Туре
INGRESS_VLAN_TAG_VALUE	integer
EGRESS_NETWORK_INTERFACE_ID	string
EGRESS_VLAN_TAG_VALUE	integer
CALLING_R_FACTOR	integer
CALLING_MOS	integer
CALLED_R_FACTOR	integer
CALLED_MOS	integer
CUSTOM_VSA_200	string
CUSTOM_VSA_201	string
CUSTOM_VSA_202	string
CUSTOM_VSA_203	string
CUSTOM_VSA_204	string
CUSTOM_VSA_205	string
CUSTOM_VSA_206	string
CUSTOM_VSA_207	string
CUSTOM_VSA_208	string
CUSTOM_VSA_209	string
CUSTOM_VSA_210	string
CUSTOM_VSA_211	string
CUSTOM_VSA_212	string
CUSTOM_VSA_213	string
CUSTOM_VSA_214	string
CUSTOM_VSA_215	string
CUSTOM_VSA_216	string
CUSTOM_VSA_217	string
CUSTOM_VSA_218	string
CUSTOM_VSA_219	string



Field	Туре
CUSTOM_VSA_220	string
CUSTOM_VSA_221	string
CUSTOM_VSA_222	string
CUSTOM_VSA_223	string
CUSTOM_VSA_224	string
CUSTOM_VSA_225	string
CUSTOM_VSA_226	string
CUSTOM_VSA_227	string
CUSTOM_VSA_228	string
CUSTOM_VSA_229	string
CUSTOM_VSA_230	string

## 5.4 Cisco Broadworks

- Plugin name: broadsoft
- Trace correlation support: yes
- DB collection name: bwcdrs
- Base configuration object: Application Servers
- Sub-groups:
  - Service Providers
  - Groups

## 5.4.1 GUI Search Calls

## 5.4.1.1 Search Criteria

Tab	Search Criteria
Session	Direction



Tab	Search Criteria
Session	AS call type
Session	Termination cause
Session	Answer indicator
Session	Releasing party
Session	User id
Session	User number
Session	Redirecting number
Session	Redirecting reason
Additional	Line type

## 5.4.1.2 Results Columns

Column
Calling Number (normalized)
Called Number (normalized)
Direction
Alerting Duration (secs)
Connection Duration (secs)
Total Duration (secs)
User id
User number
Other party name
Dialed digits
Termination cause
Releasing party
Answer indicator
Redirecting number



Column

**Redirecting reason** 

Transfer type

Network type

Network call type

Type of network

Network call-id

Access call-id

Local call-id

Remote call-id

Related call-id

Transfer related call-id

Route

AS call type

Line type

Record id

Calling Number (original)

Called Number (original)

Calling presence indicator

5.4.2 REST API

## 5.4.2.1 Search Criteria

Search Criteria

calling

called

callingNormalized

calledNormalized



Search Criteria

direction

alertingDuration

connectionDuration

totalDuration

userID

userNumber

otherPartyName

dialedDigits

releaseCause

releaseParty

answerIndicator

redirectingNumber

redirectingReason

transferType

networkType

networkCallType

type Of Network

networkCallId

accessCallId

localCallId

remoteCallId

relatedCallId

transferRelatedCallId

route

ASCallType

lineType

ingressGroup.group-code.systemName



Search Criteria

egressGroup.group-code.systemName

#### 5.4.2.2 Search Results Fields

All the fields available for the GUI search results columns are present in REST API responses.

## 5.4.3 Exportable CDR Fields

Tab	Field
Session	Setup Time (YYYY-MM-DD HH:MM:SS)
Session	Connect Time (YYYY-MM-DD HH:MM:SS)
Session	Disconnect time (YYYY-MM-DD HH:MM:SS)
Session	Direction
Session	Service provider
Session	Group
Session	Group number
Session	User id
Session	User number
Session	Calling number
Session	Dialed digits
Session	Called number
Session	Calling presentation Indicator
Session	Calling party category
Session	Call category
Session	Network translated group
Session	Network translated number
Session	Record id
Session	Local call id



Tab	Field
Session	Access call id
Session	Network call id
Session	Access device address
Session	Route
Session	Network type
Session	Network call type
Session	Type of network
Session	Termination cause
Session	Releasing party
Session	Line type

# 5.4.4 Exportable Statistics

Tab	Field
Sessions	Ingress calls setup count
Sessions	Egress calls setup count
Sessions	Total calls setup count
Sessions	Ingress calls setup & answered count
Sessions	Egress calls setup & answered count
Sessions	Total calls setup & answered count
Sessions	Ingress calls disconnect count
Sessions	Egress calls disconnect count
Sessions	Total calls disconnect count
Sessions	Ingress traffic intensity (erlangs)
Sessions	Egress traffic intensity (erlangs)
Sessions	Total traffic intensity (erlangs)
Sessions	Ingress max simultaneous calls (channels)



Tab	Field
Sessions	Egress max simultaneous calls (channels)
Sessions	Total max simultaneous calls (channels)
Sessions	Ingress call rate (calls/min)
Sessions	Egress call rate (calls/min)
Sessions	Total call rate (calls/min)
Sessions	Ingress calls ringing duration (secs)
Sessions	Egress calls ringing duration (secs)
Sessions	Ingress calls connection duration (secs)
Sessions	Egress calls connection duration (secs)

## 5.4.5 Anomalies

#### Test

ingress calls setup count
egress calls setup count
ingress calls setup & answered count
egress calls setup & answered count
ingress calls disconnect count
egress calls disconnect count
ingress traffic intensity
egress traffic intensity variation (%)
egress traffic intensity variation (%)
ingress max simultaneous calls
egress max simultaneous calls
total capacity usage
ingress call rate



Test

egress call rate

ingress calls ringing duration

egress calls ringing duration

ingress calls connection duration

egress calls connection duration

## 5.4.6 Custom Metrics Exposed Fields

Field	Туре
BWXML_DIRECTION	string
BWXML_USERID	string
BWXML_USERNUMBER	string
BWXML_OTHERPARTYNAME	string
BWXML_DIALEDDIGITS	string
BWXML_TERMINATIONCAUSE	string
BWXML_RELEASINGPARTY	string
BWXML_ANSWERINDICATOR	string
BWXML_REDIRECTINGNUMBER	string
BWXML_REDIRECTINGREASON	string
BWXML_NETWORKTYPE	string
BWXML_NETWORKCALLTYPE	string
BWXML_TYPEOFNETWORK	string
BWXML_NETWORKCALLID	string
BWXML_ACCESSCALLID	string
BWXML_LOCALCALLID	string
BWXML_REMOTECALLID	string
BWXML_RELATEDCALLID	string



Field	Туре
BWXML_ROUTE	string
BWXML_ASCALLTYPE	string
BW_E_REDIRECTED	string
BW_LINE_TYPE	string

## 5.5 Audiocodes Mediant

- Plugin name: mediant
- Trace correlation support: no
- DB collection name: mediantcdrs
- Base configuration object: Session Border Controllers
- Sub-groups:
  - SRDs
  - IP Groups
  - IP Addresses

## 5.5.1 GUI Search Calls

#### 5.5.1.1 Search Criteria

#### Info

This plugin does not support specific search criteria except the standard ones.

## 5.5.1.2 Results Columns

Column

SIP Status

Ingress IP Group

Egress IP Group



#### Column

Ingress Remote Address Egress Remote Address Ingress SBC Address Egress SBC Address

Calling Ingress RTP Packets

Calling Egress RTP Packets

Called Ingress RTP Packets

Called Egress RTP Packets

Calling Ingress RTP Packets Lost

Calling Egress RTP Packets Lost

Called Ingress RTP Packets Lost

Called Egress RTP Packets Lost

Calling RTP Avg Jitter

Called RTP Avg Jitter

Calling RTCP Avg Latency

Called RTCP Avg Latency

Calling Ingress MOS

Calling Egress MOS

Called Ingress MOS

Called Egress MOS

## 5.5.2 REST API

#### 5.5.2.1 Search Criteria

#### Info

This plugin does not support specific search results columns except the standard ones.

## 5.5.2.2 Search Results Fields



All the fields available for the GUI search results columns are present in REST API responses.

#### 5.5.3 Exportable CDR Fields

Tab	Field
Session	Setup Time (YYYY-MM-DD HH:MM:SS)
Session	Connect Time (YYYY-MM-DD HH:MM:SS)
Session	Disconnect time (YYYY-MM-DD HH:MM:SS)
Session	SIP Method
Session	SIP Status
Session	Calling Number (normalized)
Session	Called Number (normalized)
Session	SIP Call-Id Calling
Session	SIP Call-Id Called
Session	Session Id
Session	Calling URI
Session	Calling URI before manipulation
Session	Called URI
Session	Called URI before manipulation
Session	Redirecting URI
Session	Redirecting URI before manipulation
Session	Ingress IP Group
Session	Egress IP Group
Session	Ingress Remote Address
Session	Egress Remote Address
Session	Ingress SBC Address
Session	Egress SBC Address
Voice Quality	Calling Ingress RTP Packets
Voice Quality	Calling Egress RTP Packets



Tab	Field
Voice Quality	Called Ingress RTP Packets
Voice Quality	Called Egress RTP Packets
Voice Quality	Calling Ingress RTP Packets Lost
Voice Quality	Calling Egress RTP Packets Lost
Voice Quality	Called Ingress RTP Packets Lost
Voice Quality	Called Egress RTP Packets Lost
Voice Quality	Calling RTP Avg Jitter
Voice Quality	Called RTP Avg Jitter
Voice Quality	Calling RTCP Avg Latency
Voice Quality	Called RTCP Avg Latency
Voice Quality	Calling Ingress MOS
Voice Quality	Calling Egress MOS
Voice Quality	Called Ingress MOS
Voice Quality	Called Egress MOS

## 5.5.4 Exportable Statistics

Tab	Field
Sessions	Ingress calls setup count
Sessions	Egress calls setup count
Sessions	Total calls setup count
Sessions	Ingress calls setup & answered count
Sessions	Egress calls setup & answered count
Sessions	Total calls setup & answered count
Sessions	Ingress calls disconnect count
Sessions	Egress calls disconnect count
Sessions	Total calls disconnect count



Tab	Field
Sessions	Ingress traffic intensity (erlangs)
Sessions	Egress traffic intensity (erlangs)
Sessions	Total traffic intensity (erlangs)
Sessions	Ingress max simultaneous calls (channels)
Sessions	Egress max simultaneous calls (channels)
Sessions	Total max simultaneous calls (channels)
Sessions	Ingress call rate (calls/min)
Sessions	Egress call rate (calls/min)
Sessions	Total call rate (calls/min)
Sessions	Ingress calls ringing duration (secs)
Sessions	Egress calls ringing duration (secs)
Sessions	Ingress calls connection duration (secs)
Sessions	Egress calls connection duration (secs)

#### 5.5.5 Anomalies

Test

ingress calls setup count egress calls setup count ingress calls setup & answered count egress calls setup & answered count ingress calls disconnect count egress calls disconnect count ingress traffic intensity egress traffic intensity ingress traffic intensity variation (%) egress traffic intensity variation (%)



#### Test

ingress max simultaneous calls egress max simultaneous calls total capacity usage ingress call rate egress call rate ingress calls ringing duration egress calls ringing duration ingress calls connection duration egress calls connection duration ingress media packet loss (RTCP) egress media packet loss (RTCP) ingress media packet loss (RTP) egress media packet loss (RTP) ingress media packet jitter egress media packet jitter ingress media packet latency (RTCP) egress media packet latency (RTCP) ingress media MOS egress media MOS ingress media bandwidth egress media bandwidth

## 5.5.6 Custom Metrics Exposed Fields

### Info

This plugin does not support any specific CDR field for custom metrics, except the standard ones.



## 5.6 Metaswitch

- Plugin name: metaswitch
- Trace correlation support: yes
- DB collection name: metaswitchcdrs
- Base configuration object: Equipments
- Sub-groups:
  - Trunks
  - Source Ranges

#### 5.6.1 GUI Search Calls

#### 5.6.1.1 Search Criteria

Tab	Search Criteria
Session	Call type
Session	Connection duration

#### 5.6.1.2 Results Columns

#### Column

Calling Number (normalized)

Called Number (normalized)

Release code

Releasing party

Alerting Duration (secs)

Connection Duration (secs)

Total Duration (secs)

OrigParty Trunk Accounting

OrigParty Trunk GroupId



#### Column

OrigParty Trunk Type TermParty Trunk Accounting

TermParty Trunk GroupId

TermParty Trunk Type

Call Type

OrigParty Type

OrigParty Trunk Id

OrigParty Trunk Name

OrigParty Call Id

OrigParty CallingParty Type

**OrigParty Privacy** 

Long Call

Signaling Media Capability Requested

TermParty Type

TermParty Trunk Id

TermParty Trunk Name

TermParty Call Id

Correlator

Connected

Operator

Test call

Carrier Network Id

Carrier Id

Carrier Operator Involved

Carrier Selection Method

Error

**Releasing Party** 



## Column

Routing Requested Address Routing Requested Address Type Routing Calling Orig Address Routing Calling Orig Address Type Routing Destination Address Type Routing Routed Address Routing Routed Address Type Routing CallingParty Routed Address Routing CallingParty Routed Address Type Redirect Count Redirect Reason P-Charging-Vector ICID P-Charging-Vector Orig IOI P-Charging-Vector Term IOI

## 5.6.2 REST API

#### 5.6.2.1 Search Criteria

#### Info

This plugin does not support specific search results columns except the standard ones.

#### 5.6.2.2 Search Results Fields

All the fields available for the GUI search results columns are present in REST API responses.

## 5.6.3 Exportable CDR Fields



Tab	Field
Session	Connect Time (YYYY-MM-DD HH:MM:SS)
Session	Disconnect time (YYYY-MM-DD HH:MM:SS)
Session	Release reason
Session	Calling Party Number
Session	Calling Party Number (normalized)
Session	Called Party Number
Session	Called Party Number (normalized)

# 5.6.4 Exportable Statistics

Tab	Field
Sessions	Ingress calls setup count
Sessions	Egress calls setup count
Sessions	Total calls setup count
Sessions	Ingress calls setup & answered count
Sessions	Egress calls setup & answered count
Sessions	Total calls setup & answered count
Sessions	Ingress calls disconnect count
Sessions	Egress calls disconnect count
Sessions	Total calls disconnect count
Sessions	Ingress call rate (calls/min)
Sessions	Egress call rate (calls/min)
Sessions	Total call rate (calls/min)
Sessions	Ingress calls ringing duration (secs)
Sessions	Egress calls ringing duration (secs)
Sessions	Ingress calls connection duration (secs)
Sessions	Egress calls connection duration (secs)



## 5.6.5 Anomalies

Test
ingress calls setup count
egress calls setup count
ingress calls setup & answered count
egress calls setup & answered count
ingress calls disconnect count
egress calls disconnect count
ingress call rate
egress call rate
ingress calls ringing duration
egress calls ringing duration
ingress calls connection duration
egress calls connection duration

## 5.6.6 Custom Metrics Exposed Fields

Field	Туре
CLASS	integer
CONNECTED	string
CORRELATOR	string
ERROR	string
LONGCALL	string
OPERATOR	string
REESTABLISHED	string
SEQNUM	integer
TESTCALL	string





Field	Туре
ACCOUNTCODEINFO	string
CALLFORWARDINFO_PRIVACY	string
CALLFORWARDINFO_LASTREDIRECTINGADDR	string
CALLFORWARDINFO_LASTREDIRECTINGADDR_CALLINGPARTYSCREE	NtN6g
CALLFORWARDINFO_LASTREDIRECTINGADDR_TYPE	string
CALLFORWARDINFO_ORIGINALCALLEDADDR	string
CALLFORWARDINFO_ORIGINALCALLEDADDR_CALLINGPARTYSCREEM	\ <b>b\G</b> ng
CALLFORWARDINFO_ORIGINALCALLEDADDR_TYPE	string
CALLFORWARDINFO_ORIGINALCALLINGADDR	string
CALLFORWARDINFO_ORIGINALCALLINGADDR_CALLINGPARTYSCREE	NsttNiGig
CALLFORWARDINFO_ORIGINALCALLINGADDR_TYPE	string
CALLFORWARDINFO_ORIGINALREDIRECTREASON	string
CALLFORWARDINFO_REDIRECTCOUNT	integer
CALLFORWARDINFO_REDIRECTREASON	string
CALLTYPE	string
CARRIERSELECTINFO_CARRIERID	integer
CARRIERSELECTINFO_CARRIEROPERATORINVOLVED	string
CARRIERSELECTINFO_NETWORKID	integer
CARRIERSELECTINFO_SELECTIONMETHOD	string
COMPLETETIME	integer
CONNECTTIME	integer
CUSTOMERINFO	string
CUSTOMERINFO_QUALIFIER	integer
CUSTOMERINFO_SERVICE	integer
CUSTOMERINFO_TYPE	string
DISCONNECTTIME	integer
FEATURES_FEATURE	string





Field	Туре
ICSEIZETIME	integer
INCOMINGGATEWAY	string
INTELLIGENTNETWORKINFO_BCSM	string
INTELLIGENTNETWORKINFO_CHARGEADDR	string
INTELLIGENTNETWORKINFO_CHARGEADDR_CALLINGPARTYSCREEN	libuteing
INTELLIGENTNETWORKINFO_CHARGEADDR_TYPE	string
INTELLIGENTNETWORKINFO_SERVICELOGICID	integer
INTERNALINDEX	integer
LONGDURATIONINFO_COUNT	integer
LONGDURATIONINFO_CURRENTTIME	integer
LONGDURATIONINFO_PREVIOUSTIME	integer
LONGDURATIONINFO_STATUS	string
MESSAGEBILLINGINDEX	integer
NPINFO_PARTYIDENTIFIER	string
NPINFO_NPROUTINGNUMBER	string
NPINFO_NPROUTINGNUMBER_TYPE	string
NPINFO_NPSOURCE	string
OGSEIZETIME	integer
ORIGPARTY_ANI-II	string
ORIGPARTY_BILLINGTYPE	string
ORIGPARTY_CPC	string
ORIGPARTY_PRIVACY	string
ORIGPARTY_SUBSCRIBERGROUP	string
ORIGPARTY_TYPE	string
ORIGPARTY_APPSERVERADDR	string
ORIGPARTY_APPSERVERADDR_CALLINGPARTYSCREENING	string
ORIGPARTY_APPSERVERADDR_TYPE	string





Field	Туре
ORIGPARTY_BUSINESSGROUPNAME	string
ORIGPARTY_CALLINGPARTYADDR	string
ORIGPARTY_CALLINGPARTYADDR_CALLINGPARTYSCREENING	string
ORIGPARTY_CALLINGPARTYADDR_TYPE	string
ORIGPARTY_CHARGEADDR	string
ORIGPARTY_CHARGEADDR_CALLINGPARTYSCREENING	string
ORIGPARTY_CHARGEADDR_TYPE	string
ORIGPARTY_CONTACT	string
ORIGPARTY_DESTADDRESSES_MEDIAIPADDR	string
ORIGPARTY_DESTADDRESSES_MEDIAPORT	integer
ORIGPARTY_DESTADDRESSES_SIGADDRESS	string
ORIGPARTY_FROM	string
ORIGPARTY_GATEWAY	string
ORIGPARTY_PACCESSNETWORKINFO	string
ORIGPARTY_PASSERTEDIDENTITY	string
ORIGPARTY_REASON	string
ORIGPARTY_REMOTEPARTYID	string
ORIGPARTY_REQUESTURI	string
ORIGPARTY_SIPCALLID	string
ORIGPARTY_SERVEDPARTY_ANI-II	string
ORIGPARTY_SERVEDPARTY_BILLINGTYPE	string
ORIGPARTY_SERVEDPARTY_CPC	string
ORIGPARTY_SERVEDPARTY_PRIVACY	string
ORIGPARTY_SERVEDPARTY_SUBSCRIBERGROUP	string
ORIGPARTY_SERVEDPARTY_TYPE	string
ORIGPARTY_SERVEDPARTY_BUSINESSGROUPNAME	string
ORIGPARTY_SERVEDPARTY_CALLINGPARTYADDR	string





Field	Туре
ORIGPARTY_SERVEDPARTY_CALLINGPARTYADDR_CALLINGPARTYSCREEMINGG	
ORIGPARTY_SERVEDPARTY_CALLINGPARTYADDR_TYPE	string
ORIGPARTY_SERVEDPARTY_CHARGEADDR	string
ORIGPARTY_SERVEDPARTY_CHARGEADDR_CALLINGPARTYSCREENIN	VGtring
ORIGPARTY_SERVEDPARTY_CHARGEADDR_TYPE	string
ORIGPARTY_SERVEDPARTY_CONTACT	string
ORIGPARTY_SERVEDPARTY_DESTADDRESSES_MEDIAIPADDR	string
ORIGPARTY_SERVEDPARTY_DESTADDRESSES_MEDIAPORT	integer
ORIGPARTY_SERVEDPARTY_DESTADDRESSES_SIGADDRESS	string
ORIGPARTY_SERVEDPARTY_EXTENSION	integer
ORIGPARTY_SERVEDPARTY_FROM	string
ORIGPARTY_SERVEDPARTY_GATEWAY	string
ORIGPARTY_SERVEDPARTY_PACCESSNETWORKINFO	string
ORIGPARTY_SERVEDPARTY_PASSERTEDIDENTITY	string
ORIGPARTY_SERVEDPARTY_REASON	string
ORIGPARTY_SERVEDPARTY_REMOTEPARTYID	string
ORIGPARTY_SERVEDPARTY_REQUESTURI	string
ORIGPARTY_SERVEDPARTY_SIPCALLID	string
ORIGPARTY_SERVEDPARTY_SIGNALINGTYPE	string
ORIGPARTY_SERVEDPARTY_SIGNALINGTYPE_VARIANT	string
ORIGPARTY_SERVEDPARTY_SOURCEADDRESSES_MEDIAIPADDR	string
ORIGPARTY_SERVEDPARTY_SOURCEADDRESSES_MEDIAPORT	integer
ORIGPARTY_SERVEDPARTY_SOURCEADDRESSES_SIGADDRESS	string
ORIGPARTY_SERVEDPARTY_SUBSCRIBERADDR	string
ORIGPARTY_SERVEDPARTY_SUBSCRIBERADDR_CALLINGPARTYSCRE	Estiting
ORIGPARTY_SERVEDPARTY_SUBSCRIBERADDR_TYPE	string
ORIGPARTY_SERVEDPARTY_TO	string





Field	Туре	
ORIGPARTY_SERVEDPARTY_TRUNKGROUP_DUP	string	
ORIGPARTY_SERVEDPARTY_TRUNKGROUP_TRUNKACCOUNTING	string	
ORIGPARTY_SERVEDPARTY_TRUNKGROUP_TRUNKNAME	string	
ORIGPARTY_SERVEDPARTY_TRUNKGROUP_TYPE	string	
ORIGPARTY_SERVEDPARTY_TRUNKGROUP_DESTTRUNKCONTEXT	string	
ORIGPARTY_SERVEDPARTY_TRUNKGROUP_DESTTRUNKGROUPLABE	Elstring	
ORIGPARTY_SERVEDPARTY_TRUNKGROUP_ORIGTRUNKCONTEXT	string	
ORIGPARTY_SERVEDPARTY_TRUNKGROUP_ORIGTRUNKGROUPLABE	Istring	
ORIGPARTY_SERVEDPARTY_TRUNKGROUP_TRUNKGROUPID	integer	
ORIGPARTY_SERVEDPARTY_TRUNKGROUP_TRUNKMEMBERID	integer	
ORIGPARTY_SERVEDPARTY_USERAGENT	string	
ORIGPARTY_SERVEDPARTY_VQM_CODEC	string	
ORIGPARTY_SERVEDPARTY_VQM_CODECS_CODEC	string	
ORIGPARTY_SERVEDPARTY_VQM_DETECTEDFAXTONE	string	
ORIGPARTY_SERVEDPARTY_VQM_ENDPOINT_CALLQUALITY_CQMOS	integer	
ORIGPARTY_SERVEDPARTY_VQM_ENDPOINT_CALLQUALITY_EXTERN	ALLEFEETOR	
ORIGPARTY_SERVEDPARTY_VQM_ENDPOINT_CALLQUALITY_LQMOS	integer	
ORIGPARTY_SERVEDPARTY_VQM_ENDPOINT_CALLQUALITY_OVERAL	Lirtegetor	
ORIGPARTY_SERVEDPARTY_VQM_ENDPOINT_CALLQUALITY_RFACTO	Rnteger	
ORIGPARTY_SERVEDPARTY_VQM_ENDPOINT_DELAY_ENDSYSTEMDELstying		
ORIGPARTY_SERVEDPARTY_VQM_ENDPOINT_JITTER	string	
ORIGPARTY_SERVEDPARTY_VQM_ENDPOINT_OCTETS_RECEIVED	integer	
ORIGPARTY_SERVEDPARTY_VQM_ENDPOINT_OCTETS_SENT	integer	
ORIGPARTY_SERVEDPARTY_VQM_ENDPOINT_PACKETS_DISCARDED	integer	
ORIGPARTY_SERVEDPARTY_VQM_ENDPOINT_PACKETS_LOSSRATE	integer	
ORIGPARTY_SERVEDPARTY_VQM_ENDPOINT_PACKETS_RECEIVED	integer	
ORIGPARTY_SERVEDPARTY_VQM_ENDPOINT_PACKETS_SENT	integer	



Field	Туре
ORIGPARTY_SERVEDPARTY_VQM_ROUNDTRIPDELAY	string
ORIGPARTY_SERVEDPARTY_VQM_TAG_CALLQUALITY_CQMOS	integer
ORIGPARTY_SERVEDPARTY_VQM_TAG_CALLQUALITY_EXTERNALRFA	\Cintleger
ORIGPARTY_SERVEDPARTY_VQM_TAG_CALLQUALITY_LQMOS	integer
ORIGPARTY_SERVEDPARTY_VQM_TAG_CALLQUALITY_OVERALLRFAC	T <b>íðiR</b> eger
ORIGPARTY_SERVEDPARTY_VQM_TAG_CALLQUALITY_RFACTOR	integer
ORIGPARTY_SERVEDPARTY_VQM_TAG_DELAY_ENDSYSTEMDELAY	string
ORIGPARTY_SERVEDPARTY_VQM_TAG_JITTER	string
ORIGPARTY_SERVEDPARTY_VQM_TAG_OCTETS_RECEIVED	integer
ORIGPARTY_SERVEDPARTY_VQM_TAG_OCTETS_SENT	integer
ORIGPARTY_SERVEDPARTY_VQM_TAG_PACKETS_DISCARDED	integer
ORIGPARTY_SERVEDPARTY_VQM_TAG_PACKETS_LOSSRATE	integer
ORIGPARTY_SERVEDPARTY_VQM_TAG_PACKETS_RECEIVED	integer
ORIGPARTY_SERVEDPARTY_VQM_TAG_PACKETS_SENT	integer
ORIGPARTY_SERVEDPARTY_VIA	string
ORIGPARTY_SIGNALINGTYPE	string
ORIGPARTY_SIGNALINGTYPE_VARIANT	string
ORIGPARTY_SOURCEADDRESSES_MEDIAIPADDR	string
ORIGPARTY_SOURCEADDRESSES_MEDIAPORT	integer
ORIGPARTY_SOURCEADDRESSES_SIGADDRESS	string
ORIGPARTY_SUBSCRIBERADDR	string
ORIGPARTY_SUBSCRIBERADDR_CALLINGPARTYSCREENING	string
ORIGPARTY_SUBSCRIBERADDR_TYPE	string
ORIGPARTY_TO	string
ORIGPARTY_TRUNKGROUP_DUP	string
ORIGPARTY_TRUNKGROUP_TRUNKACCOUNTING	string
ORIGPARTY_TRUNKGROUP_TRUNKNAME	string




Field	Туре
ORIGPARTY_TRUNKGROUP_TYPE	string
ORIGPARTY_TRUNKGROUP_DESTTRUNKCONTEXT	string
ORIGPARTY_TRUNKGROUP_DESTTRUNKGROUPLABEL	string
ORIGPARTY_TRUNKGROUP_ORIGTRUNKCONTEXT	string
ORIGPARTY_TRUNKGROUP_ORIGTRUNKGROUPLABEL	string
ORIGPARTY_TRUNKGROUP_TRUNKGROUPID	integer
ORIGPARTY_TRUNKGROUP_TRUNKMEMBERID	integer
ORIGPARTY_USERAGENT	string
ORIGPARTY_VQM_CODEC	string
ORIGPARTY_VQM_CODECS_CODEC	string
ORIGPARTY_VQM_DETECTEDFAXTONE	string
ORIGPARTY_VQM_ENDPOINT_CALLQUALITY_CQMOS	integer
ORIGPARTY_VQM_ENDPOINT_CALLQUALITY_EXTERNALRFACTOR	integer
ORIGPARTY_VQM_ENDPOINT_CALLQUALITY_LQMOS	integer
ORIGPARTY_VQM_ENDPOINT_CALLQUALITY_OVERALLRFACTOR	integer
ORIGPARTY_VQM_ENDPOINT_CALLQUALITY_RFACTOR	integer
ORIGPARTY_VQM_ENDPOINT_DELAY_ENDSYSTEMDELAY	string
ORIGPARTY_VQM_ENDPOINT_JITTER	string
ORIGPARTY_VQM_ENDPOINT_OCTETS_RECEIVED	integer
ORIGPARTY_VQM_ENDPOINT_OCTETS_SENT	integer
ORIGPARTY_VQM_ENDPOINT_PACKETS_DISCARDED	integer
ORIGPARTY_VQM_ENDPOINT_PACKETS_LOSSRATE	integer
ORIGPARTY_VQM_ENDPOINT_PACKETS_RECEIVED	integer
ORIGPARTY_VQM_ENDPOINT_PACKETS_SENT	integer
ORIGPARTY_VQM_ROUNDTRIPDELAY	string
ORIGPARTY_VQM_TAG_CALLQUALITY_CQMOS	integer
ORIGPARTY_VQM_TAG_CALLQUALITY_EXTERNALRFACTOR	integer





Field	Туре
ORIGPARTY_VQM_TAG_CALLQUALITY_LQMOS	integer
ORIGPARTY_VQM_TAG_CALLQUALITY_OVERALLRFACTOR	integer
ORIGPARTY_VQM_TAG_CALLQUALITY_RFACTOR	integer
ORIGPARTY_VQM_TAG_DELAY_ENDSYSTEMDELAY	string
ORIGPARTY_VQM_TAG_JITTER	string
ORIGPARTY_VQM_TAG_OCTETS_RECEIVED	integer
ORIGPARTY_VQM_TAG_OCTETS_SENT	integer
ORIGPARTY_VQM_TAG_PACKETS_DISCARDED	integer
ORIGPARTY_VQM_TAG_PACKETS_LOSSRATE	integer
ORIGPARTY_VQM_TAG_PACKETS_RECEIVED	integer
ORIGPARTY_VQM_TAG_PACKETS_SENT	integer
ORIGPARTY_VIA	string
OUTGOINGGATEWAY	string
PGAD	integer
PGRD	integer
POSTDIALDELAY	integer
RELEASECAUSE	integer
RELEASEREASON	string
RELEASETIME	integer
RELEASINGPARTY	string
RINGINGTIME	integer
ROUTINGINFO_CALLINGPARTYORIGADDR	string
ROUTINGINFO_CALLINGPARTYORIGADDR_CALLINGPARTYSCREENIN	Gstring
ROUTINGINFO_CALLINGPARTYORIGADDR_TYPE	string
ROUTINGINFO_CALLINGPARTYROUTEDADDR	string
ROUTINGINFO_CALLINGPARTYROUTEDADDR_CALLINGPARTYSCREE	Nskieng
ROUTINGINFO_CALLINGPARTYROUTEDADDR_TYPE	string





Field	Туре
ROUTINGINFO_DESTADDR	string
ROUTINGINFO_DESTADDR_CALLINGPARTYSCREENING	string
ROUTINGINFO_DESTADDR_TYPE	string
ROUTINGINFO_FAILEDTRUNKGROUPS_FAILEDTRUNKGROUP_TRU	NKALCICOGUNTING
ROUTINGINFO_FAILEDTRUNKGROUPS_FAILEDTRUNKGROUP_REAS	SOstring
ROUTINGINFO_FAILEDTRUNKGROUPS_FAILEDTRUNKGROUP_REAS	SO <b>st<u>r</u>ing</b> E
ROUTINGINFO_FAILEDTRUNKGROUPS_FAILEDTRUNKGROUP_TRU	NKGREEJePID
ROUTINGINFO_REQUESTEDADDR	string
ROUTINGINFO_REQUESTEDADDR_CALLINGPARTYSCREENING	string
ROUTINGINFO_REQUESTEDADDR_TYPE	string
ROUTINGINFO_ROUTEDADDR	string
ROUTINGINFO_ROUTEDADDR_CALLINGPARTYSCREENING	string
ROUTINGINFO_ROUTEDADDR_TYPE	string
SIPIBODYRELEASECAUSE	integer
SIGNALINGINFO_ANNOUNCEMENT_GROUP	integer
SIGNALINGINFO_ANNOUNCEMENT_ID	integer
SIGNALINGINFO_BEARERCAPABILITY	string
SIGNALINGINFO_CALLREFERENCE_CALLIDENTITY	integer
SIGNALINGINFO_CALLREFERENCE_POINTCODE	string
SIGNALINGINFO_CALLEDPARTYNUMCAT_RECV	string
SIGNALINGINFO_CALLEDPARTYNUMCAT_SENT	string
SIGNALINGINFO_CHARGEINDICATOR	string
SIGNALINGINFO_DESTINATIONPOINTCODE	string
SIGNALINGINFO_ECHOCONTROLINFO_RECV	string
SIGNALINGINFO_ECHOCONTROLINFO_SENT	string
SIGNALINGINFO_FALLBACKUSERSERVICE_INFORMATIONTRANSFEI	RCARABELITY
IGNALINGINFO_FALLBACKUSERSERVICE_INFORMATIONTRANSFERC <b>ARAB</b> LITY_TYPE	



eld Type	
SIGNALINGINFO_ISUPPREFERENCE	integer
SIGNALINGINFO_ISUPUSED	string
SIGNALINGINFO_MEDIACAPABILITYREQUESTED	string
SIGNALINGINFO_MEDIACAPABILITYUSED	string
SIGNALINGINFO_PCHARGINGFUNCTIONADDRESSES_CCFADDRESSE	Sstring
SIGNALINGINFO_PCHARGINGFUNCTIONADDRESSES_ECFADDRESSE	Sstring
SIGNALINGINFO_PCHARGINGVECTOR_ICIDGENERATEDAT	string
SIGNALINGINFO_PCHARGINGVECTOR_ICIDVALUE	string
SIGNALINGINFO_PCHARGINGVECTOR_ORIGIOI	string
SIGNALINGINFO_PCHARGINGVECTOR_TERMIOI	string
SIGNALINGINFO_PVISITEDNETWORKID	string
SIGNALINGINFO_PEER	string
SIGNALINGINFO_PEER_ROLE	string
SIGNALINGINFO_PEER_TYPE	string
SIGNALINGINFO_SATELLITEINDICATOR_RECV	integer
SIGNALINGINFO_SATELLITEINDICATOR_SENT	integer
SIGNALINGINFO_UUIMESSAGES_UUI1_BACKWARDS	integer
SIGNALINGINFO_UUIMESSAGES_UUI1_FORWARDS	integer
SIGNALINGINFO_UUIMESSAGES_UUI2_BACKWARDS	integer
SIGNALINGINFO_UUIMESSAGES_UUI2_FORWARDS	integer
SIGNALINGINFO_UUIMESSAGES_UUI3_BACKWARDS	integer
SIGNALINGINFO_UUIMESSAGES_UUI3_FORWARDS	integer
SIGNALINGINFO_USERSERVICE_INFORMATIONTRANSFERCAPABILIT	Yinteger
SIGNALINGINFO_USERSERVICE_INFORMATIONTRANSFERCAPABILIT	Y <u>i</u> nīteger
TERMPARTY_ANI-II	string
TERMPARTY_BILLINGTYPE	string
TERMPARTY_CPC	string



Field	Туре
TERMPARTY_PRIVACY	string
TERMPARTY_SUBSCRIBERGROUP	string
TERMPARTY_TYPE	string
TERMPARTY_APPSERVERADDR	string
TERMPARTY_APPSERVERADDR_CALLINGPARTYSCREENING	string
TERMPARTY_APPSERVERADDR_TYPE	string
TERMPARTY_BUSINESSGROUPNAME	string
TERMPARTY_CALLINGPARTYADDR	string
TERMPARTY_CALLINGPARTYADDR_CALLINGPARTYSCREENING	string
TERMPARTY_CALLINGPARTYADDR_TYPE	string
TERMPARTY_CHARGEADDR	string
TERMPARTY_CHARGEADDR_CALLINGPARTYSCREENING	string
TERMPARTY_CHARGEADDR_TYPE	string
TERMPARTY_CONTACT	string
TERMPARTY_DESTADDRESSES_MEDIAIPADDR	string
TERMPARTY_DESTADDRESSES_MEDIAPORT	integer
TERMPARTY_DESTADDRESSES_SIGADDRESS	string
TERMPARTY_FROM	string
TERMPARTY_GATEWAY	string
TERMPARTY_PACCESSNETWORKINFO	string
TERMPARTY_PASSERTEDIDENTITY	string
TERMPARTY_REASON	string
TERMPARTY_REASON_TYPE	string
TERMPARTY_REMOTEPARTYID	string
TERMPARTY_REQUESTURI	string
TERMPARTY_SIPCALLID	string
TERMPARTY_SERVEDPARTY_ANI-II	string



Field	Туре
TERMPARTY_SERVEDPARTY_BILLINGTYPE	string
TERMPARTY_SERVEDPARTY_CPC	string
TERMPARTY_SERVEDPARTY_PRIVACY	string
TERMPARTY_SERVEDPARTY_SUBSCRIBERGROUP	string
TERMPARTY_SERVEDPARTY_TYPE	string
TERMPARTY_SERVEDPARTY_BUSINESSGROUPNAME	string
TERMPARTY_SERVEDPARTY_CALLINGPARTYADDR	string
TERMPARTY_SERVEDPARTY_CALLINGPARTYADDR_CALLINGPARTYSC	Reteinigng
TERMPARTY_SERVEDPARTY_CALLINGPARTYADDR_TYPE	string
TERMPARTY_SERVEDPARTY_CHARGEADDR	string
TERMPARTY_SERVEDPARTY_CHARGEADDR_CALLINGPARTYSCREENIN	Natring
TERMPARTY_SERVEDPARTY_CHARGEADDR_TYPE	string
TERMPARTY_SERVEDPARTY_CONTACT	string
TERMPARTY_SERVEDPARTY_DESTADDRESSES_MEDIAIPADDR	string
TERMPARTY_SERVEDPARTY_DESTADDRESSES_MEDIAPORT	integer
TERMPARTY_SERVEDPARTY_DESTADDRESSES_SIGADDRESS	string
TERMPARTY_SERVEDPARTY_EXTENSION	integer
TERMPARTY_SERVEDPARTY_FROM	string
TERMPARTY_SERVEDPARTY_GATEWAY	string
TERMPARTY_SERVEDPARTY_PACCESSNETWORKINFO	string
TERMPARTY_SERVEDPARTY_PASSERTEDIDENTITY	string
TERMPARTY_SERVEDPARTY_REASON	string
TERMPARTY_SERVEDPARTY_REASON_TYPE	string
TERMPARTY_SERVEDPARTY_REMOTEPARTYID	string
TERMPARTY_SERVEDPARTY_REQUESTURI	string
TERMPARTY_SERVEDPARTY_SIPCALLID	string
TERMPARTY_SERVEDPARTY_SIGNALINGTYPE	string





Field	Туре
TERMPARTY_SERVEDPARTY_SIGNALINGTYPE_VARIANT	string
TERMPARTY_SERVEDPARTY_SOURCEADDRESSES_MEDIAIPADDR	string
TERMPARTY_SERVEDPARTY_SOURCEADDRESSES_MEDIAPORT	integer
TERMPARTY_SERVEDPARTY_SOURCEADDRESSES_SIGADDRESS	string
TERMPARTY_SERVEDPARTY_SUBSCRIBERADDR	string
TERMPARTY_SERVEDPARTY_SUBSCRIBERADDR_CALLINGPARTYSCRE	ening
TERMPARTY_SERVEDPARTY_SUBSCRIBERADDR_TYPE	string
TERMPARTY_SERVEDPARTY_TO	string
TERMPARTY_SERVEDPARTY_TRUNKGROUP_DUP	string
TERMPARTY_SERVEDPARTY_TRUNKGROUP_TRUNKACCOUNTING	string
TERMPARTY_SERVEDPARTY_TRUNKGROUP_TRUNKNAME	string
TERMPARTY_SERVEDPARTY_TRUNKGROUP_TYPE	string
TERMPARTY_SERVEDPARTY_TRUNKGROUP_DESTTRUNKCONTEXT	string
TERMPARTY_SERVEDPARTY_TRUNKGROUP_DESTTRUNKGROUPLAB	Estring
TERMPARTY_SERVEDPARTY_TRUNKGROUP_ORIGTRUNKCONTEXT	string
TERMPARTY_SERVEDPARTY_TRUNKGROUP_ORIGTRUNKGROUPLAB	Ettring
TERMPARTY_SERVEDPARTY_TRUNKGROUP_TRUNKGROUPID	integer
TERMPARTY_SERVEDPARTY_TRUNKGROUP_TRUNKMEMBERID	integer
TERMPARTY_SERVEDPARTY_USERAGENT	string
TERMPARTY_SERVEDPARTY_VQM_CODEC	string
TERMPARTY_SERVEDPARTY_VQM_CODECS_CODEC	string
TERMPARTY_SERVEDPARTY_VQM_DETECTEDFAXTONE	string
TERMPARTY_SERVEDPARTY_VQM_ENDPOINT_CALLQUALITY_CQMOS	Sinteger
TERMPARTY_SERVEDPARTY_VQM_ENDPOINT_CALLQUALITY_EXTER	NALLABORCTOR
TERMPARTY_SERVEDPARTY_VQM_ENDPOINT_CALLQUALITY_LQMOS	integer
TERMPARTY_SERVEDPARTY_VQM_ENDPOINT_CALLQUALITY_OVERA	Linegetor
TERMPARTY_SERVEDPARTY_VQM_ENDPOINT_CALLQUALITY_RFACTO	DRiteger



Field	Туре
TERMPARTY_SERVEDPARTY_VQM_ENDPOINT_DELAY_ENDSYSTEMD	Eb <b>ž</b> rýng
TERMPARTY_SERVEDPARTY_VQM_ENDPOINT_JITTER	string
TERMPARTY_SERVEDPARTY_VQM_ENDPOINT_OCTETS_RECEIVED	integer
TERMPARTY_SERVEDPARTY_VQM_ENDPOINT_OCTETS_SENT	integer
TERMPARTY_SERVEDPARTY_VQM_ENDPOINT_PACKETS_DISCARDED	integer
TERMPARTY_SERVEDPARTY_VQM_ENDPOINT_PACKETS_LOSSRATE	integer
TERMPARTY_SERVEDPARTY_VQM_ENDPOINT_PACKETS_RECEIVED	integer
TERMPARTY_SERVEDPARTY_VQM_ENDPOINT_PACKETS_SENT	integer
TERMPARTY_SERVEDPARTY_VQM_ROUNDTRIPDELAY	string
TERMPARTY_SERVEDPARTY_VQM_TAG_CALLQUALITY_CQMOS	integer
TERMPARTY_SERVEDPARTY_VQM_TAG_CALLQUALITY_EXTERNALRFA	\û <b>ft@g</b> er
TERMPARTY_SERVEDPARTY_VQM_TAG_CALLQUALITY_LQMOS	integer
TERMPARTY_SERVEDPARTY_VQM_TAG_CALLQUALITY_OVERALLRFAC	Totleger
TERMPARTY_SERVEDPARTY_VQM_TAG_CALLQUALITY_RFACTOR	integer
TERMPARTY_SERVEDPARTY_VQM_TAG_DELAY_ENDSYSTEMDELAY	string
TERMPARTY_SERVEDPARTY_VQM_TAG_JITTER	string
TERMPARTY_SERVEDPARTY_VQM_TAG_OCTETS_RECEIVED	integer
TERMPARTY_SERVEDPARTY_VQM_TAG_OCTETS_SENT	integer
TERMPARTY_SERVEDPARTY_VQM_TAG_PACKETS_DISCARDED	integer
TERMPARTY_SERVEDPARTY_VQM_TAG_PACKETS_LOSSRATE	integer
TERMPARTY_SERVEDPARTY_VQM_TAG_PACKETS_RECEIVED	integer
TERMPARTY_SERVEDPARTY_VQM_TAG_PACKETS_SENT	integer
TERMPARTY_SERVEDPARTY_VIA	string
TERMPARTY_SIGNALINGTYPE	string
TERMPARTY_SIGNALINGTYPE_VARIANT	string
TERMPARTY_SOURCEADDRESSES_MEDIAIPADDR	string
TERMPARTY_SOURCEADDRESSES_MEDIAPORT	integer





Field	Туре
TERMPARTY_SOURCEADDRESSES_SIGADDRESS	string
TERMPARTY_SUBSCRIBERADDR	string
TERMPARTY_SUBSCRIBERADDR_CALLINGPARTYSCREENING	string
TERMPARTY_SUBSCRIBERADDR_TYPE	string
TERMPARTY_TO	string
TERMPARTY_TRUNKGROUP_DUP	string
TERMPARTY_TRUNKGROUP_TRUNKACCOUNTING	string
TERMPARTY_TRUNKGROUP_TRUNKNAME	string
TERMPARTY_TRUNKGROUP_TYPE	string
TERMPARTY_TRUNKGROUP_DESTTRUNKCONTEXT	string
TERMPARTY_TRUNKGROUP_DESTTRUNKGROUPLABEL	string
TERMPARTY_TRUNKGROUP_ORIGTRUNKCONTEXT	string
TERMPARTY_TRUNKGROUP_ORIGTRUNKGROUPLABEL	string
TERMPARTY_TRUNKGROUP_TRUNKGROUPID	integer
TERMPARTY_TRUNKGROUP_TRUNKMEMBERID	integer
TERMPARTY_USERAGENT	string
TERMPARTY_VQM_CODEC	string
TERMPARTY_VQM_CODECS_CODEC	string
TERMPARTY_VQM_DETECTEDFAXTONE	string
TERMPARTY_VQM_ENDPOINT_CALLQUALITY_CQMOS	integer
TERMPARTY_VQM_ENDPOINT_CALLQUALITY_EXTERNALRFACTOR	integer
TERMPARTY_VQM_ENDPOINT_CALLQUALITY_LQMOS	integer
TERMPARTY_VQM_ENDPOINT_CALLQUALITY_OVERALLRFACTOR	integer
TERMPARTY_VQM_ENDPOINT_CALLQUALITY_RFACTOR	integer
TERMPARTY_VQM_ENDPOINT_DELAY_ENDSYSTEMDELAY	string
TERMPARTY_VQM_ENDPOINT_JITTER	string
TERMPARTY_VQM_ENDPOINT_OCTETS_RECEIVED	integer





Field	Туре
TERMPARTY_VQM_ENDPOINT_OCTETS_SENT	integer
TERMPARTY_VQM_ENDPOINT_PACKETS_DISCARDED	integer
TERMPARTY_VQM_ENDPOINT_PACKETS_LOSSRATE	integer
TERMPARTY_VQM_ENDPOINT_PACKETS_RECEIVED	integer
TERMPARTY_VQM_ENDPOINT_PACKETS_SENT	integer
TERMPARTY_VQM_ROUNDTRIPDELAY	string
TERMPARTY_VQM_TAG_CALLQUALITY_CQMOS	integer
TERMPARTY_VQM_TAG_CALLQUALITY_EXTERNALRFACTOR	integer
TERMPARTY_VQM_TAG_CALLQUALITY_LQMOS	integer
TERMPARTY_VQM_TAG_CALLQUALITY_OVERALLRFACTOR	integer
TERMPARTY_VQM_TAG_CALLQUALITY_RFACTOR	integer
TERMPARTY_VQM_TAG_DELAY_ENDSYSTEMDELAY	string
TERMPARTY_VQM_TAG_JITTER	string
TERMPARTY_VQM_TAG_OCTETS_RECEIVED	integer
TERMPARTY_VQM_TAG_OCTETS_SENT	integer
TERMPARTY_VQM_TAG_PACKETS_DISCARDED	integer
TERMPARTY_VQM_TAG_PACKETS_LOSSRATE	integer
TERMPARTY_VQM_TAG_PACKETS_RECEIVED	integer
TERMPARTY_VQM_TAG_PACKETS_SENT	integer
TERMPARTY_VIA	string
UDAS_UDA	integer
UDAS_UDA_ID	integer

# 5.7 Italtel Softswitch

- Plugin name: italtel
- Trace correlation support: no
- DB collection name: italtelcdrs



- Base configuration object: Exchange codes
- Sub-groups:
  - Trunks

## 5.7.1 GUI Search Calls

#### 5.7.1.1 Search Criteria

#### Info

This plugin does not support specific search criteria except the standard ones.

#### 5.7.1.2 Results Columns

С	olumn
С	alling NAI
С	alled NAI
С	alling Number (normalized)
С	alled Number (normalized)
С	alled (4)
С	alled NAI (4)
R	outed called (203)
R	outed called NAI (203)
D	elivered CLI (50)
D	elivered CLI NAI (50)
A	lerting Duration (secs)
С	onnection Duration (secs)
T	otal Duration (secs)
S	tart Time
С	all Duration (secs)
D	isconnect Cause (10)
С	all id



Column
Final Status
Interactive Phase Duration (secs)
Call type
Bearer service (6)
Source Port (7)
Destination Port (7)
Source IP (8)
Destination IP (8)

# 5.7.2 REST API

# 5.7.2.1 Search Criteria

# Info

This plugin does not support specific search results columns except the standard ones.

#### 5.7.2.2 Search Results Fields

All the fields available for the GUI search results columns are present in REST API responses.

## 5.7.3 Exportable CDR Fields

Tab	Field
Details	Setup Time
Details	Connect Time
Details	Disconnect Time
Details	Release cause
Details	Call Id
Details	Calling



Tab	Field
Details	Called
Details	Source port
Details	Destination port
Details	Source IP
Details	Destination IP

# 5.7.4 Exportable Statistics

Tab	Field
Sessions	Ingress calls setup count
Sessions	Egress calls setup count
Sessions	Total calls setup count
Sessions	Ingress calls setup & answered count
Sessions	Egress calls setup & answered count
Sessions	Total calls setup & answered count
Sessions	Ingress calls disconnect count
Sessions	Egress calls disconnect count
Sessions	Total calls disconnect count
Sessions	Ingress traffic intensity (erlangs)
Sessions	Egress traffic intensity (erlangs)
Sessions	Total traffic intensity (erlangs)
Sessions	Ingress max simultaneous calls (channels)
Sessions	Egress max simultaneous calls (channels)
Sessions	Total max simultaneous calls (channels)
Sessions	Ingress call rate (calls/min)
Sessions	Egress call rate (calls/min)
Sessions	Total call rate (calls/min)



Tab	Field
Sessions	Ingress calls average connection duration (secs)
Sessions	Egress calls average connection duration (secs)
Sessions	Ingress calls total connection duration (secs)
Sessions	Egress calls total connection duration (secs)

# 5.7.5 Anomalies

Т	est
ir	ngress calls setup count
e	gress calls setup count
ir	ngress calls setup & answered count
e	gress calls setup & answered count
ir	ngress calls disconnect count
e	gress calls disconnect count
ir	ngress traffic intensity
e	gress traffic intensity
ir	ngress traffic intensity variation (%)
e	gress traffic intensity variation (%)
ir	ngress max simultaneous calls
e	gress max simultaneous calls
to	otal capacity usage
ir	ngress call rate
e	gress call rate
ir	ngress calls ringing duration
e	gress calls ringing duration
ir	ngress calls connection duration
e	gress calls connection duration



## 5.7.6 Custom Metrics Exposed Fields

Field	Туре
CDR_EXCHANGE_CODE	string
CALL_DURATION	float
CALL_TYPE	integer
CALL_ID	string
CALLING_NAI	integer
ROUTED_CALLED	string
ROUTED_CALLED_NAI	integer
CALLED_NAI	integer
DELIVERED_CLI	string
DELIVERED_CLI_NAI	integer
RELEASE_CAUSE	integer
FINAL_STATUS	integer
INTERACTIVE_PHASE_DURATION	integer
BEARER_SERVICE	integer
QOS_SENT_PACKETS	integer
QOS_RECEIVED_PACKETS	integer
QOS_SENT_BYTES	integer
QOS_RECEIVED_BYTES	integer

## 5.8 Ribbon SBC

- Plugin name: sonus
- Trace correlation support: yes
- DB collection name: sonuscdrs
- Base configuration object: Gateways
- Sub-groups:



– Trunks

#### 5.8.1 GUI Search Calls

## 5.8.1.1 Search Criteria

Tab	Search Criteria
SIP	From Field
SIP	To Field
SIP	Status Code
SIP	Call ID
SIP	Transport
Record	Record Type
Record	Final Attempt Indicator
Record	Accounting Id
Record	Call Direction
Session	Disconnect Reason
Session	Disconnect Initiator

#### 5.8.1.2 Results Columns

Column

Record Type

Final Attempt Indicator

Accounting Id

**Call Direction** 

Calling Number (normalized)

Called Number (normalized)

Ingress SIP From Field

Egress SIP From Field



#### Column

Ingress SIP To Field

**Egress SIP To Field** 

Alerting Duration (secs)

Connection Duration (secs)

Total Duration (secs)

**Disconnect Reason** 

Disconnect Initiator

Service Provider

Route Label

Route Attempt Number

**Route Selected** 

Egress Local Gateway Signaling IP Address

Egress Remote Gateway Signaling IP Address

Ingress PSTN Circuit Endpoint

Ingress IP Circuit Endpoint

Egress PSTN Circuit Endpoint

Egress IP Circuit Endpoint

Ingress SIP Call ID

Egress SIP Call ID

Ingress SIP Status Code

Egress SIP Status Code

Ingress SIP Transport

Egress SIP Transport

Ingress Codec Type

Egress Codec Type

Ingress RTP Packetization Time

Egress RTP Packetization Time



## Column

Calling Ingress RTP Packets Calling Egress RTP Packets Called Ingress RTP Packets Called Egress RTP Packets Calling Ingress RTP Packets Lost Calling Egress RTP Packets Lost Calling RTP Avg Jitter Calling RTCP Avg Latency

#### 5.8.2 REST API

#### 5.8.2.1 Search Criteria

# Info

This plugin does not support specific search results columns except the standard ones.

## 5.8.2.2 Search Results Fields

All the fields available for the GUI search results columns are present in REST API responses.

## 5.8.3 Exportable CDR Fields

Tab	Field
Details	record type
Details	gateway name
Details	accounting id
Details	start time in system tick
Details	node time zone
Details	start date



Tab	Field
Details	start time
Details	Time Elapsed from Receipt of Setup Message to Policy Server Sonus SoftSwitch Response
Details	Time Elapsed from Receipt of Setup Message to Receipt of AlertingProcProg
Details	Time Elapsed from Receipt of Setup Message to Service Established
Details	Disconnect Date
Details	Disconnect Time
Details	Time Elapsed from Receipt of Disconnect to Completion of Call
Details	Call Service Duration
Details	Call Disconnect Reason
Details	Service Delivered
Details	Call Direction
Details	Service Provider
Details	Transit Network Selection Code
Details	Calling Number
Details	Called Number
Details	Extra Called Address Digits
Details	Number of Called Num Translations Done by This Node
Details	Called Number Before Translation 1
Details	Translation Type 1
Details	Called Number Before Translation 2
Details	Translation Type 2
Details	Billing Number
Details	Route Label
Details	Route Attempt Number
Details	Route Selected
Details	Egress Local Gateway Signaling IP Address



Tab	Field
Details	Egress Remote Gateway Signaling IP Address
Details	Ingress Trunk Group Name
Details	Ingress PSTN Circuit End Point
Details	Ingress IP Circuit End Point
Details	Egress PSTN Circuit End Point
Details	Egress IP Circuit End Point
Details	Ingress Number of Audio Bytes Sent
Details	Ingress Number of Audio Packets Sent
Details	Ingress Number of Audio Bytes Received
Details	Ingress Number of Audio Packets Received
Details	Originating Line Information OLIP
Details	Jurisdiction Information Parameter
Details	Carrier Code
Details	Call Group ID
Details	Script Log Data
Details	Time Elapsed from Receipt of Setup Message to Receipt of Exit Message
Details	Time Elapsed from Receipt of Setup Message to Generation of Exit Message
Details	Calling Party Nature of Address Field
Details	Called Party Nature of Address
Details	Ingress Protocol Variant Specific Data
Details	Ingress Signaling Type
Details	Egress Signaling Type
Details	Ingress Far End Switch Type
Details	Egress Far End Switch Type
Details	Carrier Code of the Carrier That Owns the Far End of the Ingress Trunk Group





Tab	Field
Details	Carrier Code of the Carrier That Owns the Far End of the Egress Trunk Group
Details	Calling Party Category
Details	Dialed Number
Details	Carrier Selection Information
Details	Called Number Numbering Plan
Details	Generic Address Parameter
Details	Disconnect Initiator
Details	Ingress Number of Packets Recorded as Lost
Details	Ingress Interarrival Packet Jitter
Details	Ingress Last Measurement for Latency
Details	Egress Trunk Group Name
Details	Egress Protocol Variant Specific Data
Details	Incoming Calling Number
Details	AMA Call Type
Details	Message Billing Index MBI
Details	Originating LATA
Details	Route Index Used
Details	Calling Party Number Presentation Restriction
Details	Incoming ISUP Charge Number
Details	Incoming ISUP Charge Number NOA
Details	Dialed Number NOA
Details	Ingress Codec Type
Details	Egress Codec Type
Details	Ingress RTP Packetization Time
Details	GSX Call ID
Details	Originator Echo Cancellation
Details	Terminator Echo Cancellation





Tab	Field
Details	Charge Flag
Details	AMA Service Logic Identification
Details	AMA BAF Module
Details	AMA Set Hex AB Indication
Details	Service Feature ID
Details	FE Parameter
Details	Satellite Indicator
Details	PSX Billing Information
Details	Originating TDM Trunk Group Type
Details	Terminating TDM Trunk Group Type
Details	Ingress Trunk Member Number
Details	Egress Trunk Group ID
Details	Egress Switch ID
Details	Active Call Ingress Local ATM Address
Details	Active Call Ingress Remote ATM Address
Details	Active Call Egress Local ATM Address
Details	Active Call Egress Remote ATM Address
Details	Policy Response Call Type
Details	Outgoing Route Identification
Details	Outgoing Message Identification
Details	Incoming Route Identification
Details	Calling Name
Details	Calling Name Type
Details	Incoming Calling Party Numbering Plan
Details	Outgoing Calling Party Numbering Plan
Details	Calling Party Business Group ID
Details	Called Party Business Group ID



Tab	Field
Details	Calling Party Public Presence Directory Number
Details	Elapsed Time from Receipt of Setup Message to Last Call Routing Attempt
Details	Billing Number NOA
Details	Incoming Calling Number NOA
Details	Egress Trunk Member Number
Details	Selected Route Type
Details	Telcordia Long Duration Record Type
Details	Time Elapsed from Previous Record
Details	Cumulative Route Index
Details	Call Disconnect Reason Transmitted to Ingress
Details	Call Disconnect Reason Transmitted to Egress
Details	ISDN PRI Calling Party Subaddress
Details	Outgoing Trunk Group Number in EXM
Details	Ingress Local Gateway Signaling IP Address
Details	Ingress Remote Gateway Signaling IP Address
Details	Record Sequence Number
Details	Transmission Medium Requirement TMR
Details	Information Transfer Rate ITR
Details	User Service Information USI User Information Layer 1
Details	Unrecognized Raw ISUP Calling Party Category
Details	Egress Release Link Trunking RLT Feature Specific Data
Details	Two B Channel Transfer Feature Specific Data
Details	Calling Party Business Unit
Details	Called Party Business Unit
Details	Redirect Feature Specific Data
Details	Ingress Release Link Trunking RLT Feature Specific Data
Details	PSX Index





Tab	Field
Details	PSX Congestion Level
Details	PSX Processing Time
Details	Script Name
Details	Ingress External Accounting Data
Details	Egress External Accounting Data
Details	Egress RTP Packetization Time
Details	Egress Number of Audio Bytes Sent
Details	Egress Number of Audio Packets Sent
Details	Egress Number of Audio Bytes Received
Details	Egress Number of Audio Packets Received
Details	Egress Number of Packets Recorded as Lost
Details	Egress Interarrival Packet Jitter
Details	Egress Last Measurement for Latency
Details	Ingress Maximum Packet Outage
Details	Egress Maximum Packet Outage
Details	Ingress Packet Playout Buffer Quality
Details	Egress Packet Playout Buffer Quality
Details	Call Supervision Type
Details	Ingress SIP Refer Replaces Feature Specific Data
Details	Egress SIP Refer Replaces Feature Specific Data
Details	Network Transfer Feature Specific Data
Details	Call Condition
Details	Toll Indicator
Details	Generic Number Number
Details	Generic Number Presentation Restriction Indicator
Details	Generic Number Numbering Plan
Details	Generic Number Nature of Address





Tab	Field
Details	Generic Number Type
Details	Originating Trunk Type
Details	Terminating Trunk Type
Details	Remote GSX Billing Indicator
Details	VPN Calling Private Presence Number
Details	VPN Calling Public Presence Number
Details	External Furnish Charging Info
Details	Ingress Policing Discards
Details	Egress Policing Discards
Details	Announcement ID
Details	Source Information
Details	Partition ID
Details	Network ID
Details	NCOS
Details	Ingress SRTP
Details	Egress SRTP
Details	ISDN Access Indicator from the Forward Call Indicator
Details	Call Disconnect Location
Details	Call Disconnect Location Transmitted to Ingress
Details	Call Disconnect Location Transmitted to Egress
Details	Network Call Reference Call Identity
Details	Network Call Reference Signaling Point Code
Details	Ingress ISUP MIME Protocol Variant Specific Data
Details	Egress ISUP MIME Protocol Variant Specific Data
Details	Modem Tone Type
Details	Modem Tone Signal Level
Details	Video Codec Data





Tab	Field
Details	Video Codec Statistics
Details	Customer
Details	null field
Details	Call to Test PSX
Details	PSX Overlap Route Requests
Details	Call Setup Delay
Details	Overload Status
Details	Ingress BICC Info
Details	Egress BICC Info
Details	Ingress DSP Data
Details	Egress DSP Data
Details	Call Recorded Indicator
Details	Call Recorded RTP Tx IP Address
Details	Call Recorded RTP Tx Port Number
Details	Call Recorded RTP Rv IP Address
Details	Call Recorded RTP Rv Port Number
Details	MLPP Precedence Level
Details	MSRP Service Type
Details	NPUKK Special Routing Information
Details	NPUKK Customer Or Carrier Identification
Details	NPUKK Service Type Identifier
Details	NPSSP Special Handling Information
Details	NPSSP Service Type Identifier
Details	Total ITX Charge Units
Details	Global Charge Reference
Details	IP Call Limit at ingress SIP Peer
Details	IP Call Limit at ingress IPTG



Tab	Field
Details	IP BW Limit at ingress IPTG
Details	IP Call Limit at egress SIP Peer
Details	IP Call Limit at egress IPTG
Details	IP BW Limit at egress IPTG

# 5.8.4 Exportable Statistics

Tab	Field
Sessions	Ingress calls setup count
Sessions	Egress calls setup count
Sessions	Total calls setup count
Sessions	Ingress calls setup & answered count
Sessions	Egress calls setup & answered count
Sessions	Total calls setup & answered count
Sessions	Ingress calls disconnect count
Sessions	Egress calls disconnect count
Sessions	Total calls disconnect count
Sessions	Ingress traffic intensity (erlangs)
Sessions	Egress traffic intensity (erlangs)
Sessions	Total traffic intensity (erlangs)
Sessions	Ingress max simultaneous calls (channels)
Sessions	Egress max simultaneous calls (channels)
Sessions	Total max simultaneous calls (channels)
Sessions	Ingress call rate (calls/min)
Sessions	Egress call rate (calls/min)
Sessions	Total call rate (calls/min)
Sessions	Ingress calls ringing duration (secs)



Tab	Field
Sessions	Egress calls ringing duration (secs)
Sessions	Ingress calls connection duration (secs)
Sessions	Egress calls connection duration (secs)

#### 5.8.5 Anomalies

#### Test

ingress calls setup count egress calls setup count ingress calls setup & answered count egress calls setup & answered count ingress calls disconnect count egress calls disconnect count ingress traffic intensity egress traffic intensity ingress traffic intensity variation (%) egress traffic intensity variation (%) ingress max simultaneous calls egress max simultaneous calls total capacity usage ingress call rate egress call rate ingress calls ringing duration egress calls ringing duration ingress calls connection duration egress calls connection duration ingress media packet latency (RTCP)



Test

egress media packet latency (RTCP)

# 5.8.6 Custom Metrics Exposed Fields

Info

This plugin does not support any specific CDR field for custom metrics, except the standard ones.