User Guide

NEMO 5.1

Table of Contents

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 multi-plugin 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 multi-plugin mode (see NEMO 4.1 User Guide below).

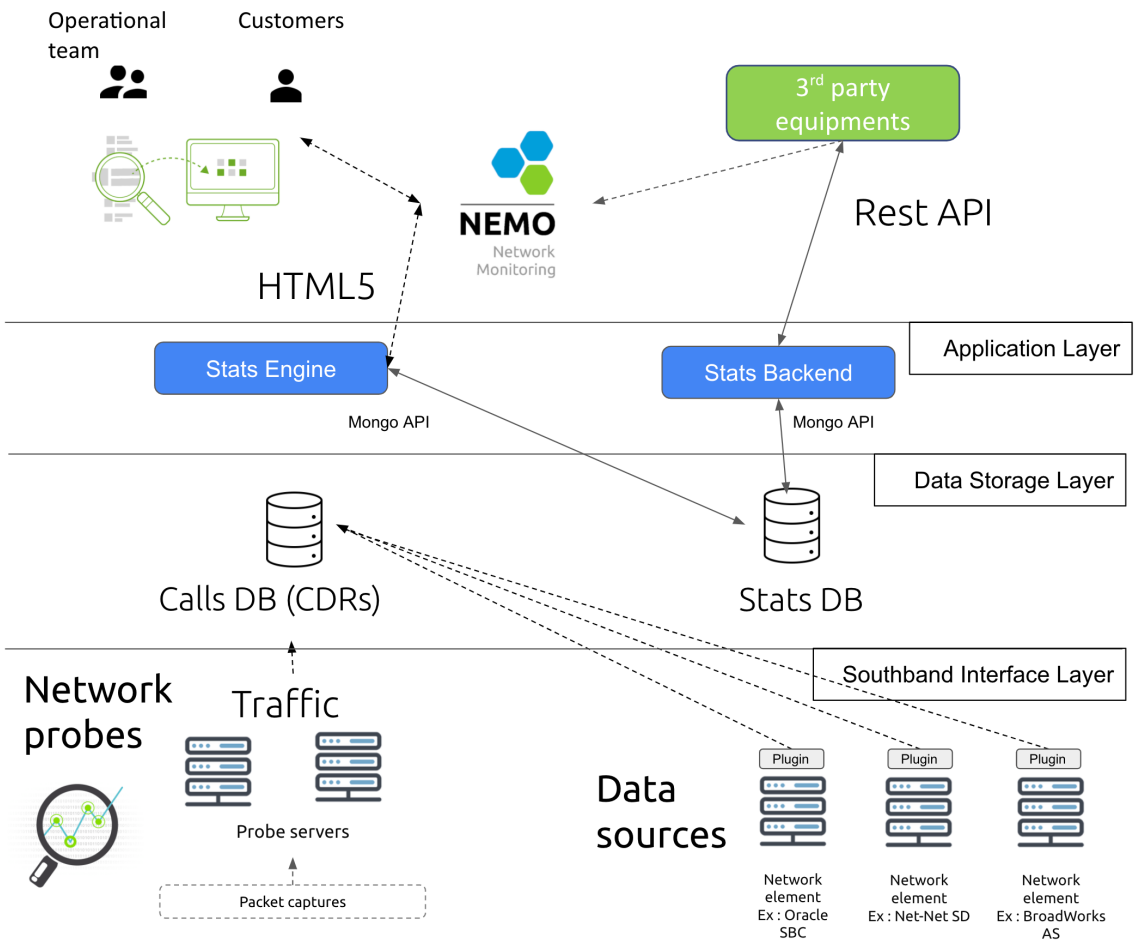


Figure 1: image

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#modules.

- 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:

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

Module	CDR mode	Probe mode	Hybrid mode	Multi-plugin 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):

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

- Actions logging:

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

3.2.4.3 Examples

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

```
2019-07-02 09:25:53,646-40278-INFO-[] ACCEPTED username: admin, name:
    ↪ Administrator, module: dashboard, request: POST /dashboard/jsonDataPanels
    ↪ ?refreshId=1562052353638 HTTP/1.1
2019-07-02 09:38:46,720-40278-INFO-[] FORBIDDEN username: admin, name:
    ↪ Administrator, module: dashboard, request: GET /dashboard/
    ↪ jsonDataDashboard HTTP/1.1
2019-07-02 09:42:47,873-40278-INFO-[] ACCEPTED username: admin, name:
    ↪ Administrator, module: calls->searchCalls, request: GET /calls/
    ↪ searchCalls HTTP/1.1
2019-07-02 09:45:23,684-40278-INFO-[] ACTION username: admin, name:
    ↪ Administrator, request: GET /calls/htmlDataCallDetails?cid=sonus-5
    ↪ d14c8f9fcdc7b176f783a24 HTTP/1.1, action: details of call id 5
    ↪ d14c8f9fcdc7b176f783a24 on device type sonus (calling=32000000001 called
    ↪ =32000000002 time=2019-06-27 14:09)
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,
    ↪ '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'})
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.

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.

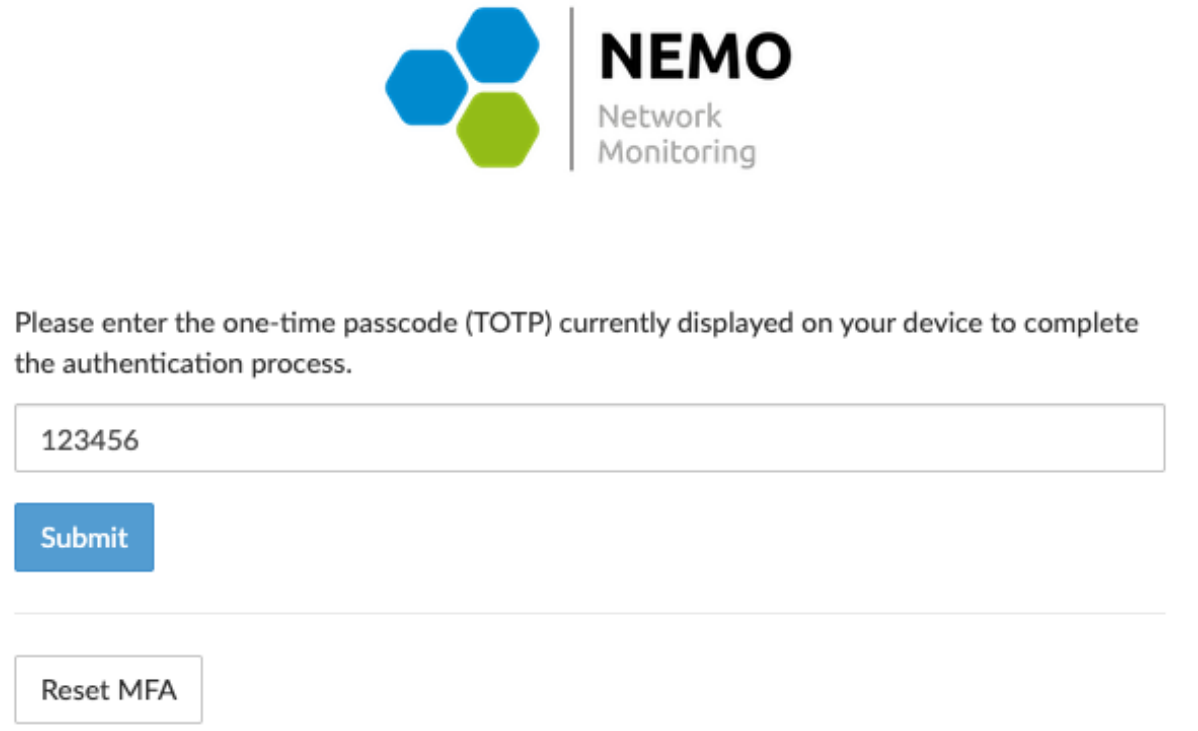


Figure 3: MFA Form

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.

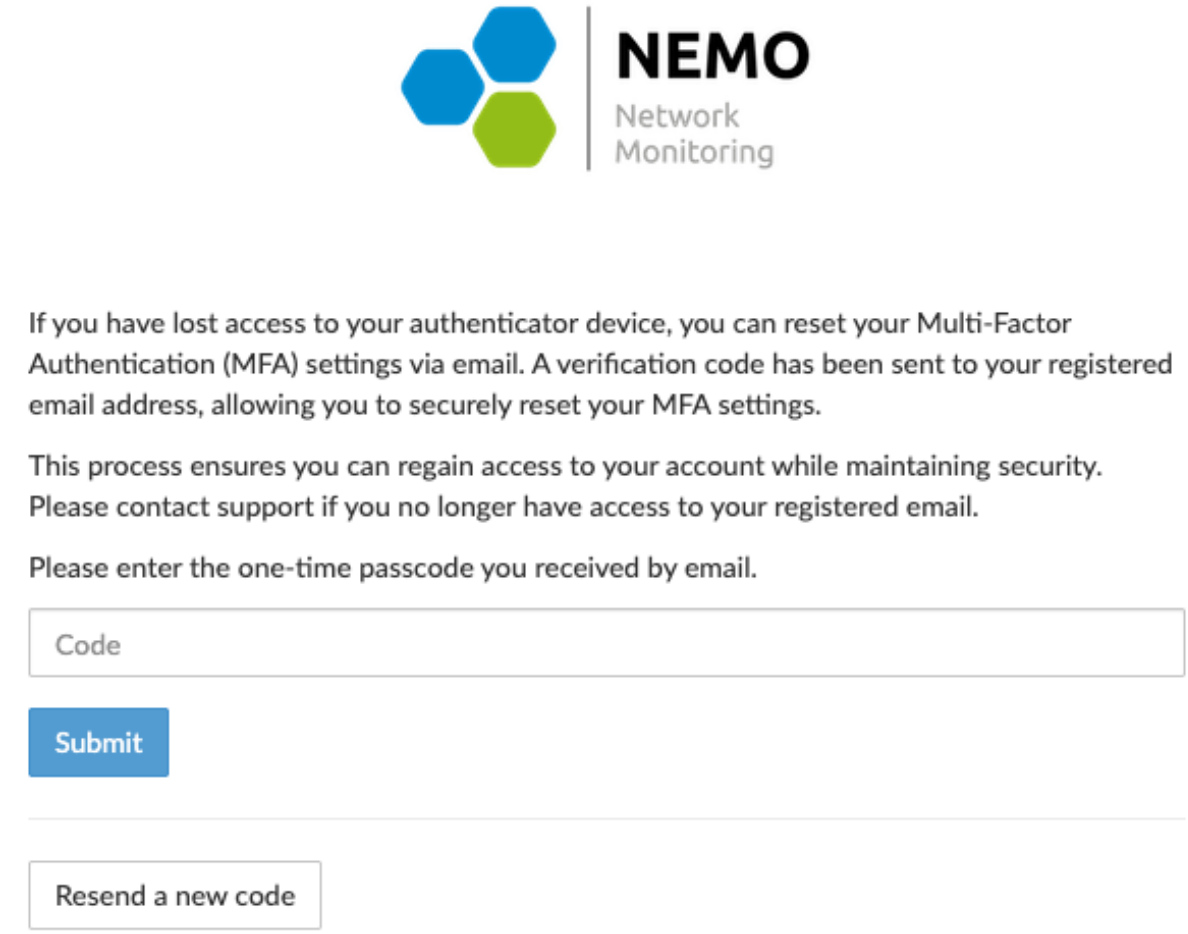
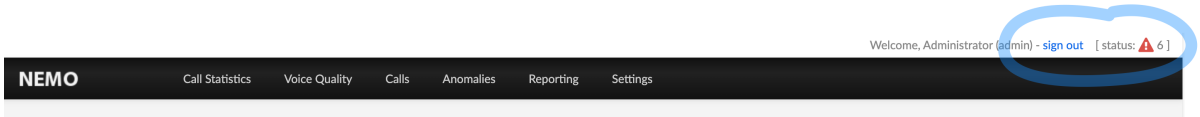


Figure 4: MFA Reset

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).



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.

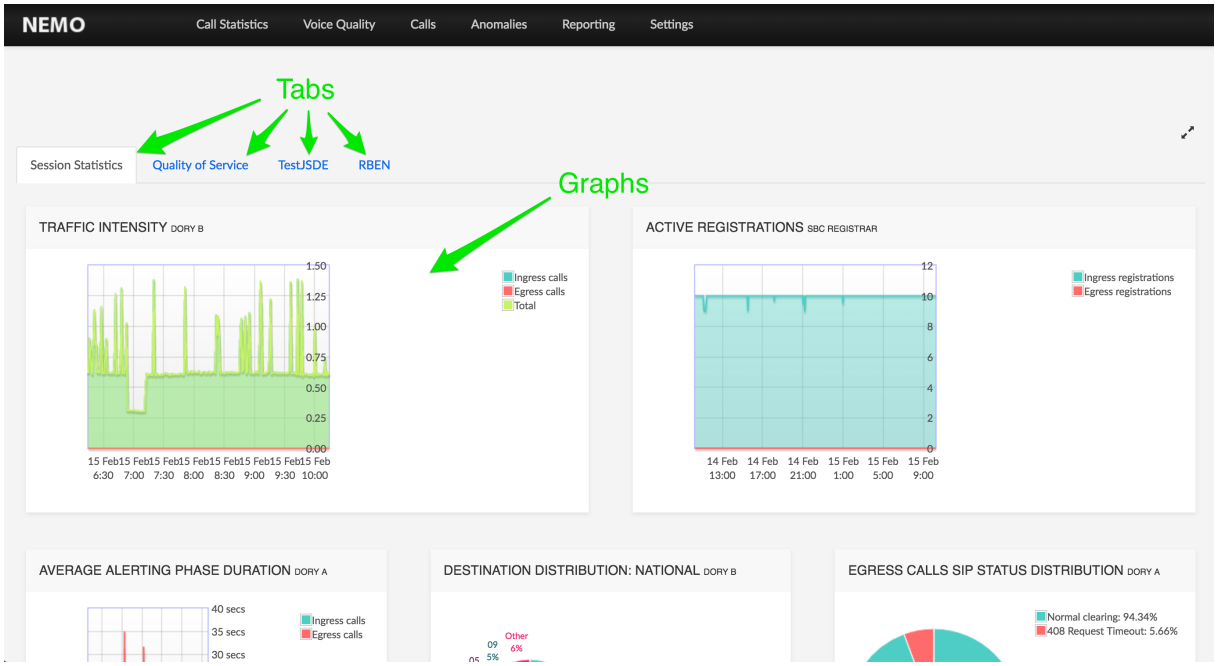
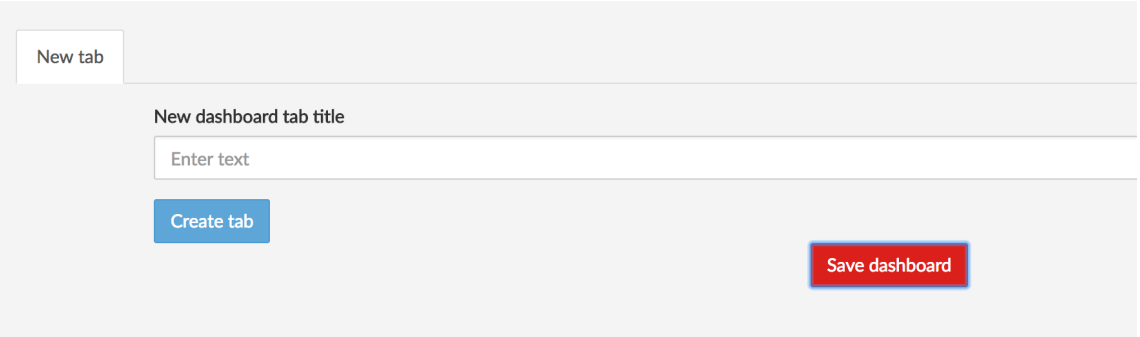


Figure 5: Dashboard

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

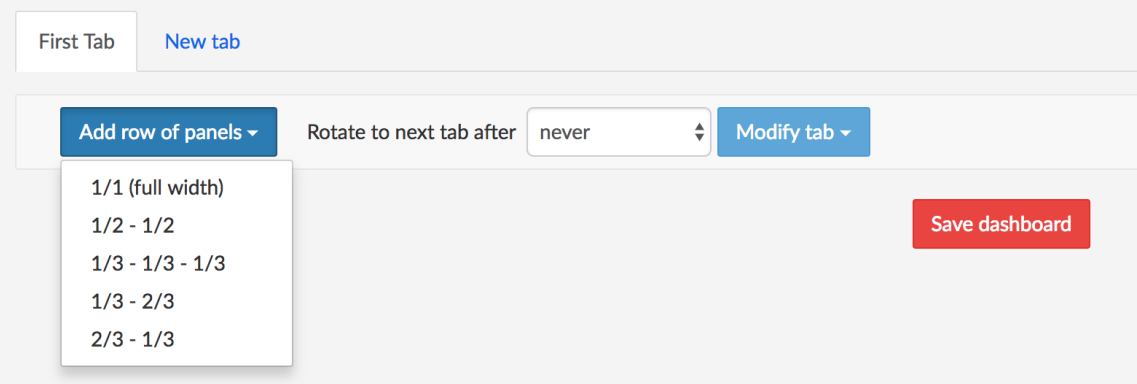
1. Click the **Configure Dashboard** button.
2. In the *New Tab* screen, fill in a name for the dashboard first tab then click **Create Tab**.



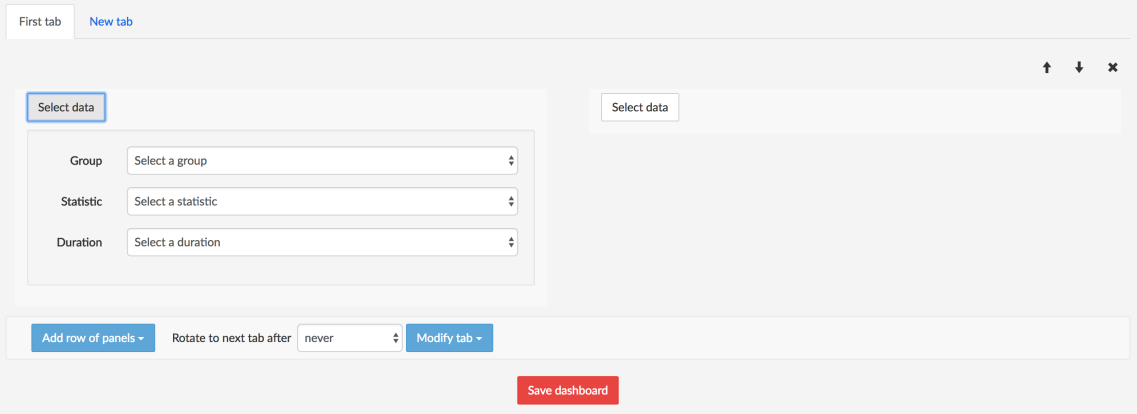
3. Using **Add row of panels**, select a layout (one graph in the tab or more).

   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).

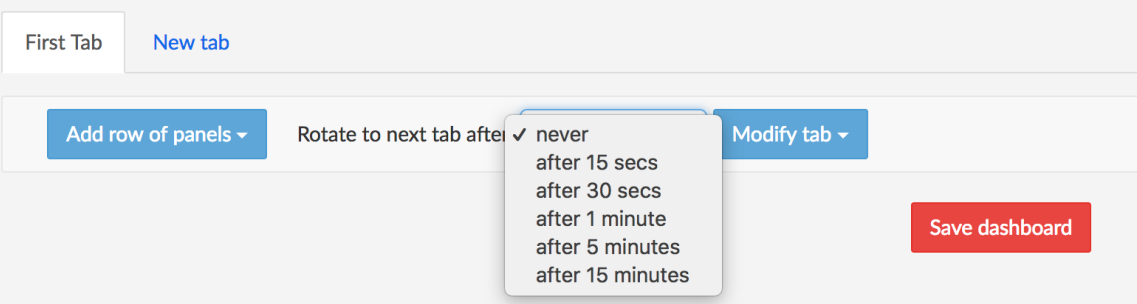
   In this example, a row with two panels 1:2/1:2 will be created.



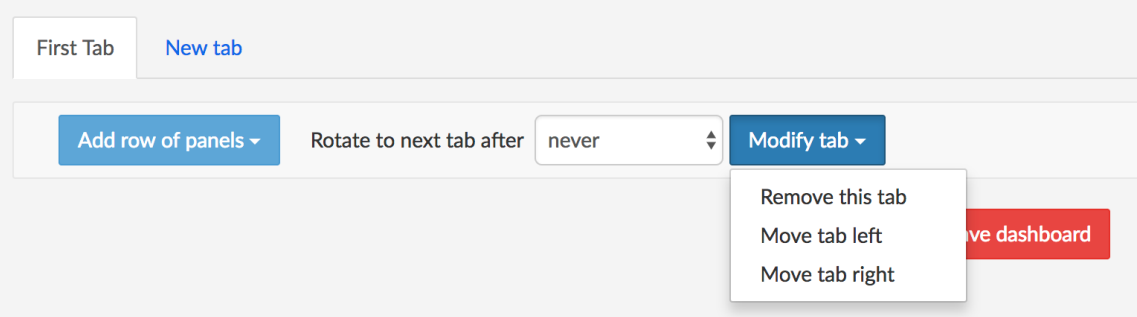
4. With each **Select Data**, select a group, a statistic and a duration for the graph. If data are available, the resulting graph is shown on screen.



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



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



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.

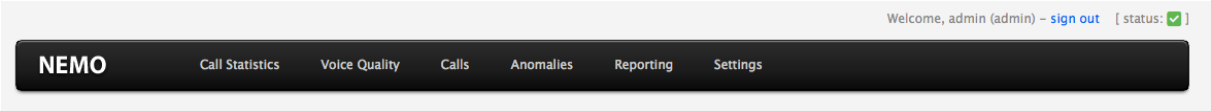


Figure 6: Menu Bar

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.

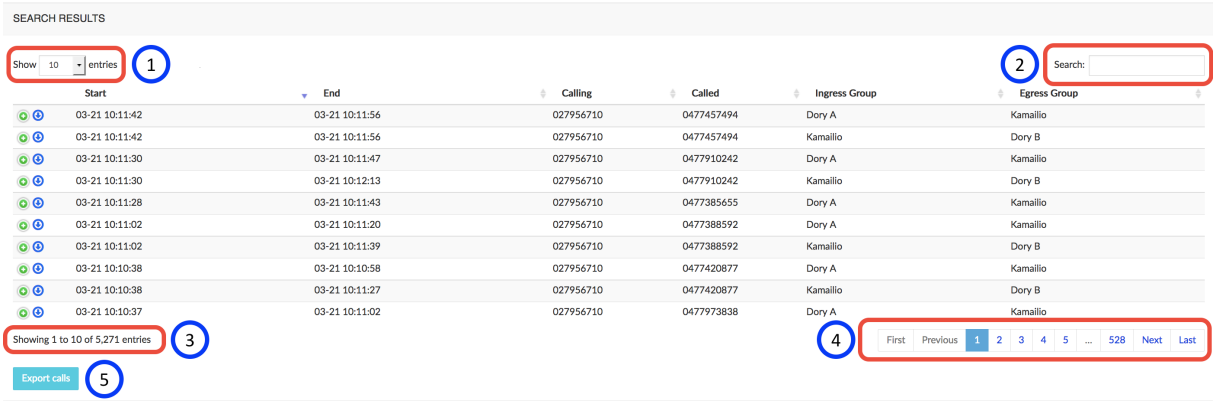


Figure 7: Common elements in Search Tools

#	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.

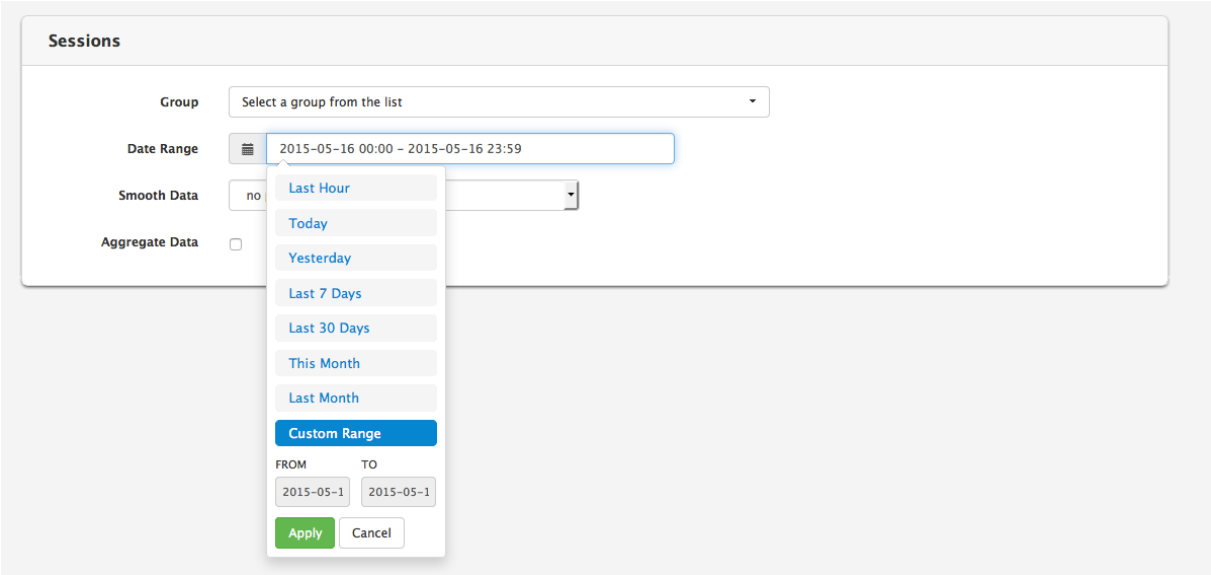


Figure 8: Data Selection form

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.

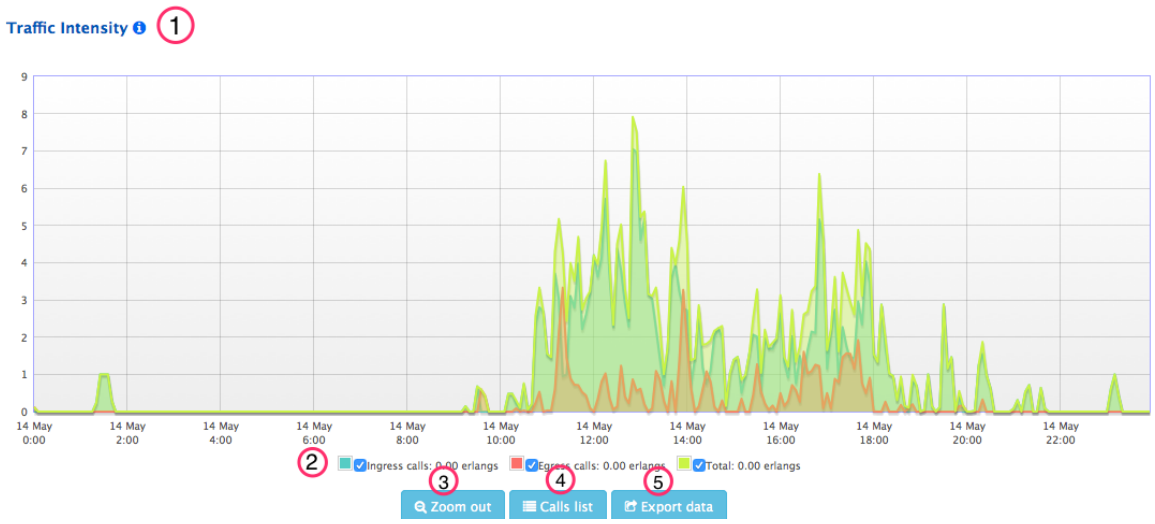


Figure 9: Charts Tools

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.

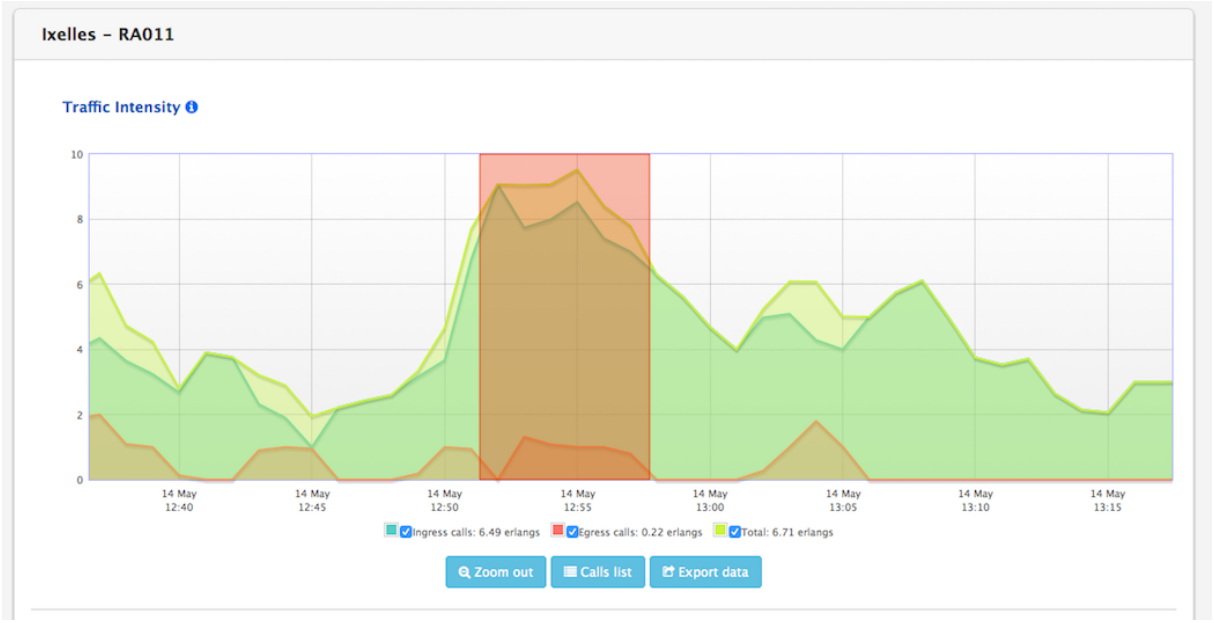


Figure 10: Zoom

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.

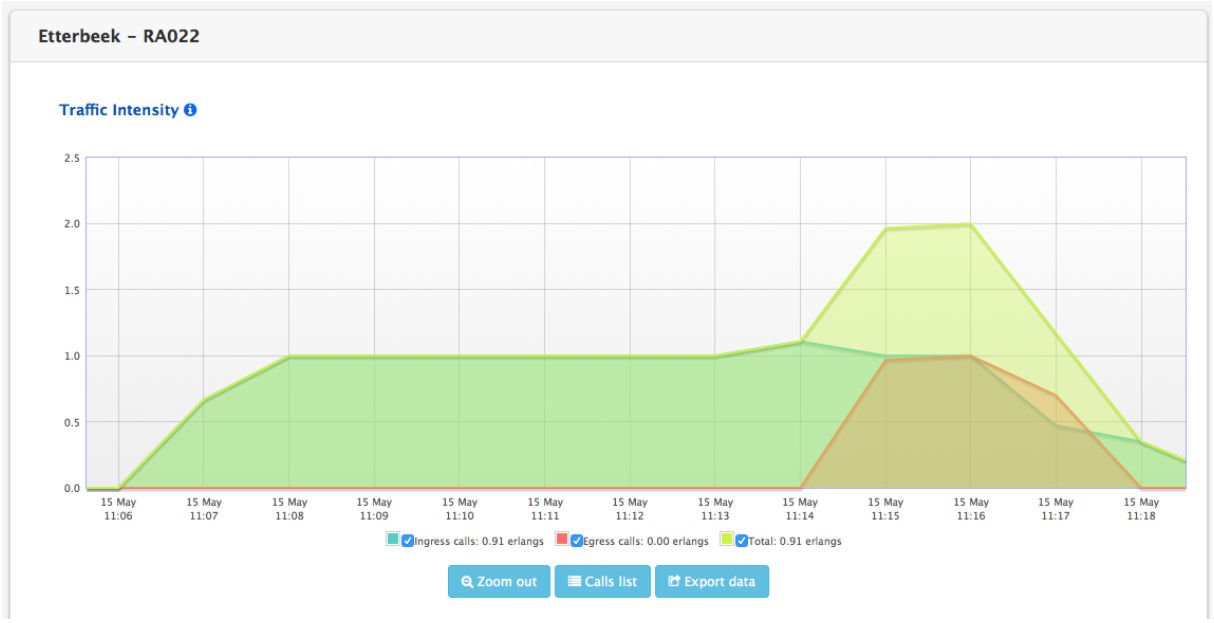


Figure 11: Chart Precision Auto Adjust

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 Search Calls 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.

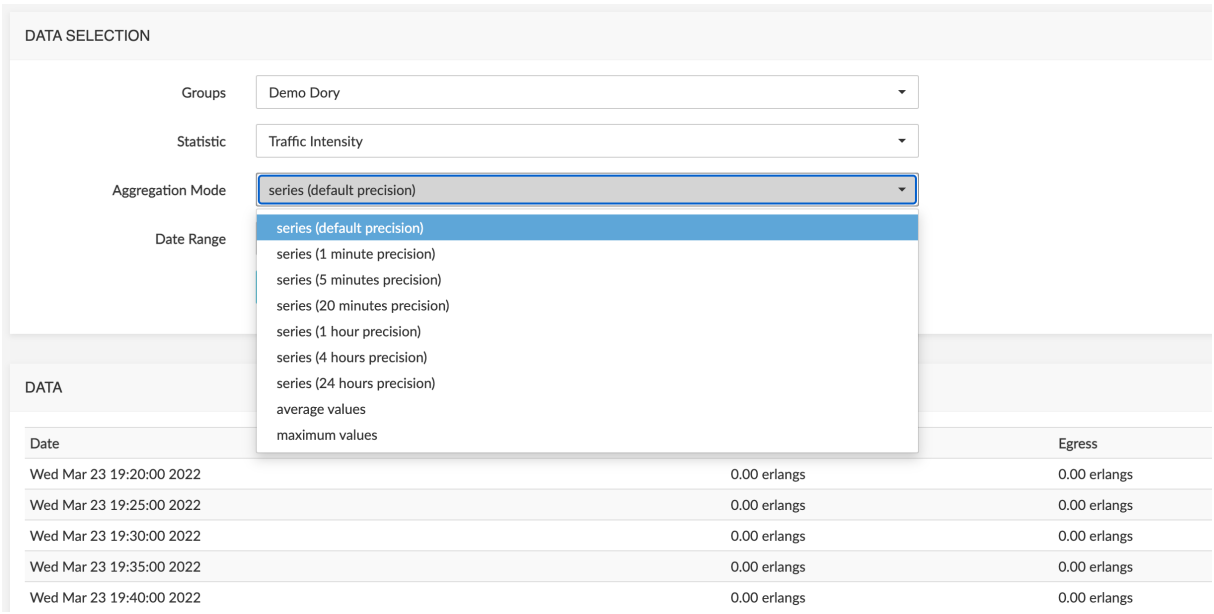


Figure 12: Export Data Tool

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	Type	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	Type	Unit
Active Registrations	This chart shows the number of successfully registered subscribers over time.	Time-based	Ingress/Egress Registrations
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	Type	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	Type	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	Type	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	Type	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	Type	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

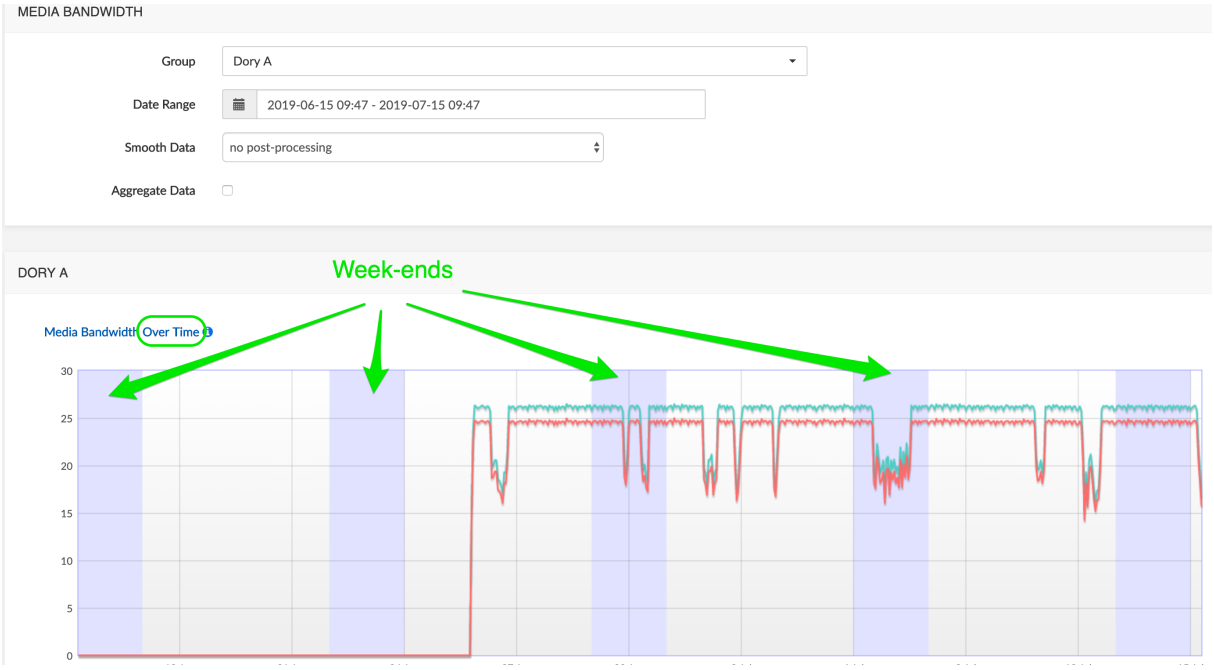
Title	Description	Type	Unit
Ingress/Egress Calls Disconnect Causes Distribution	The charts illustrate the distribution of individual SIP error codes *.	Pie	Proportion (%)
Ingress/Egress Calls ISDN Causes Distribution	The charts illustrate the distribution of ISDN disconnect causes. The possible ISDN 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).	Histogram	Proportion (%)
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.	Histogram	Proportion (%)
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).	Histogram	Proportion (%)

* 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:



4.8.1 Packet Loss

Title	Description	Type	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	Type	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	Type	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	Type	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 recommendation G.107.	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	Type	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	Type	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	Type	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.

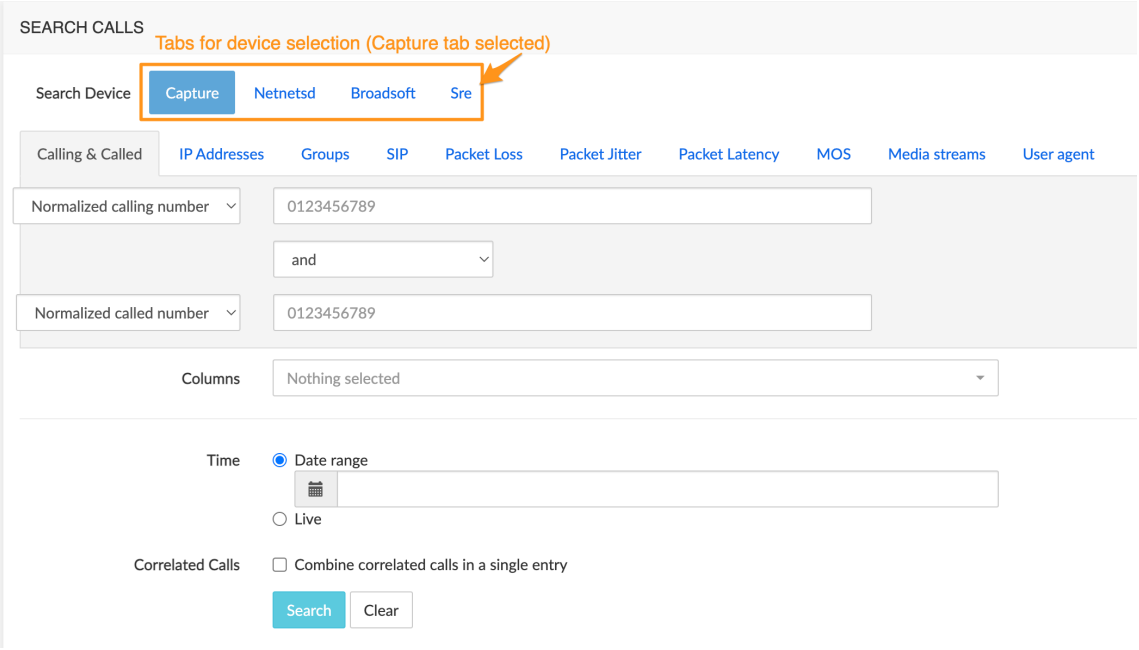
Call details in *Search Calls* display:

- 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.

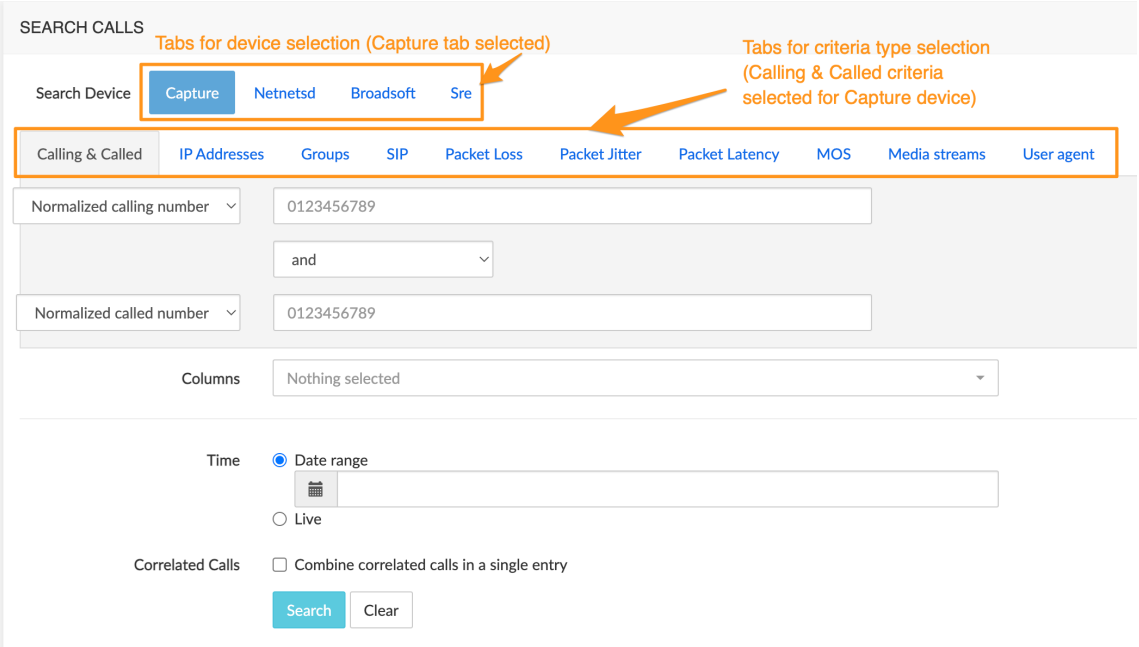
4.9.2 Search Calls

The *Search Calls* command allows selecting:

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



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



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)

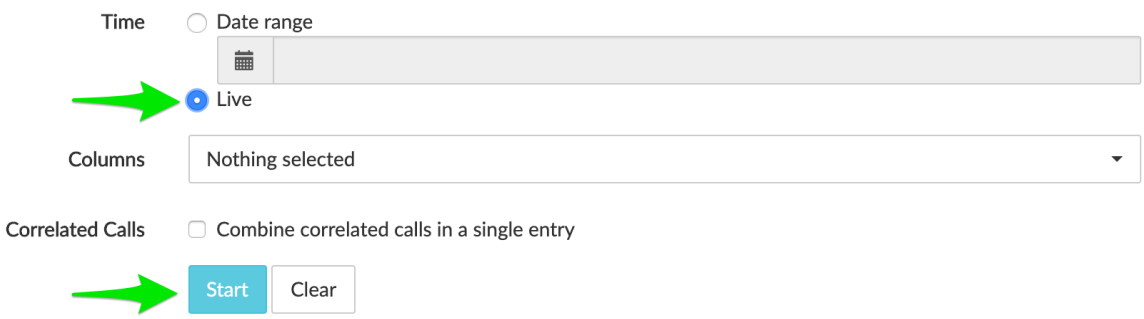


Figure 13: Time / Live

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.

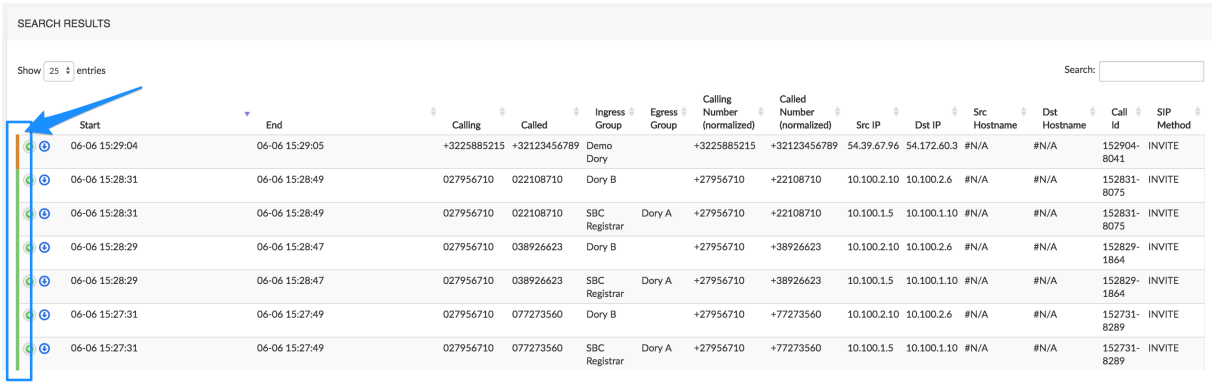


Figure 14: Search Results browser (Calls)

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.

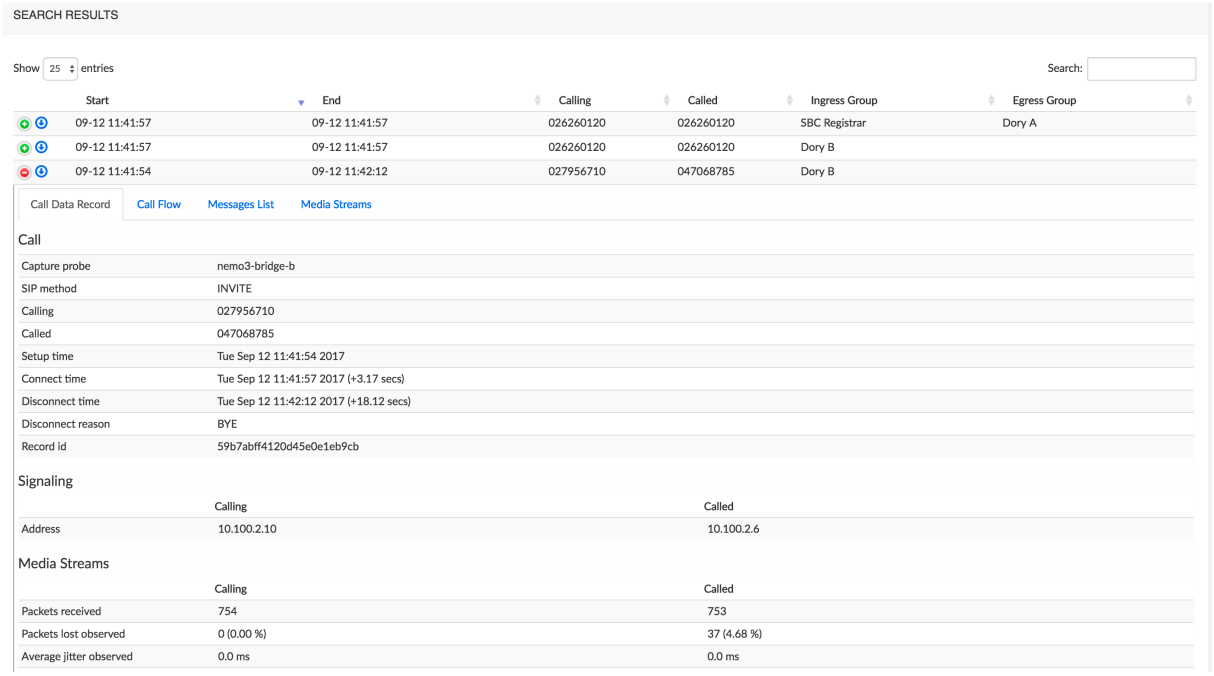
4.9.2.2.1 Display Call Details

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

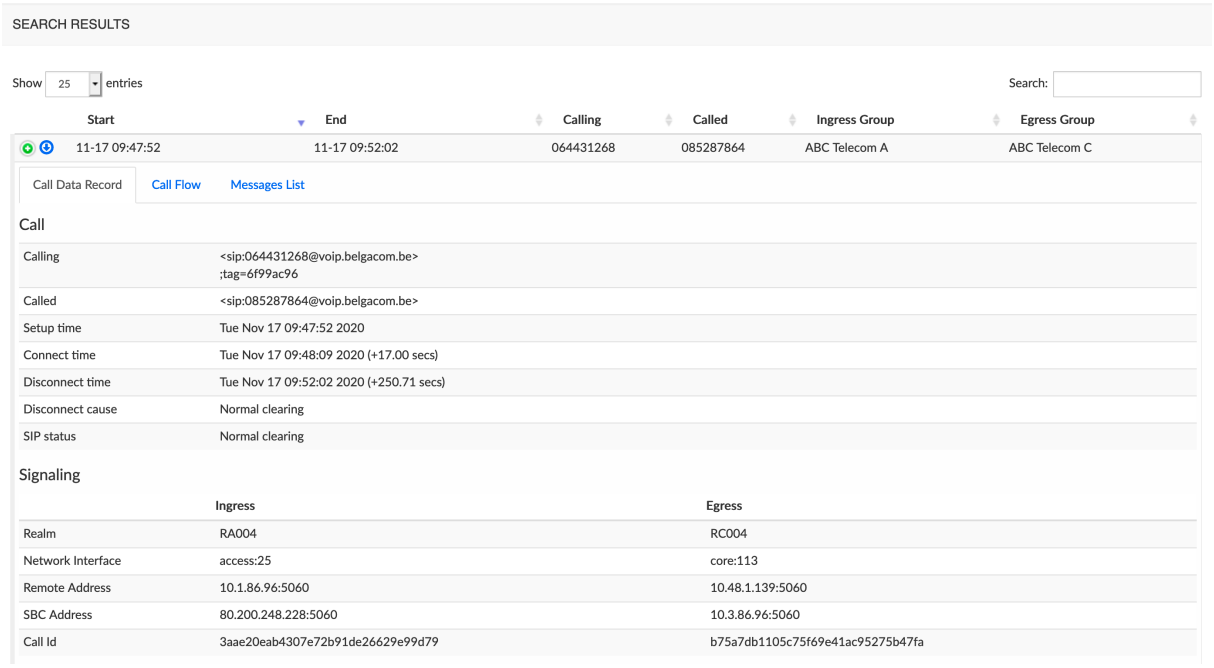
More than one call can be inspected at the same time: clicking another icon does not close the first opened one.

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:



The picture below shows a Call Details page for NetnetSD:



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.

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.

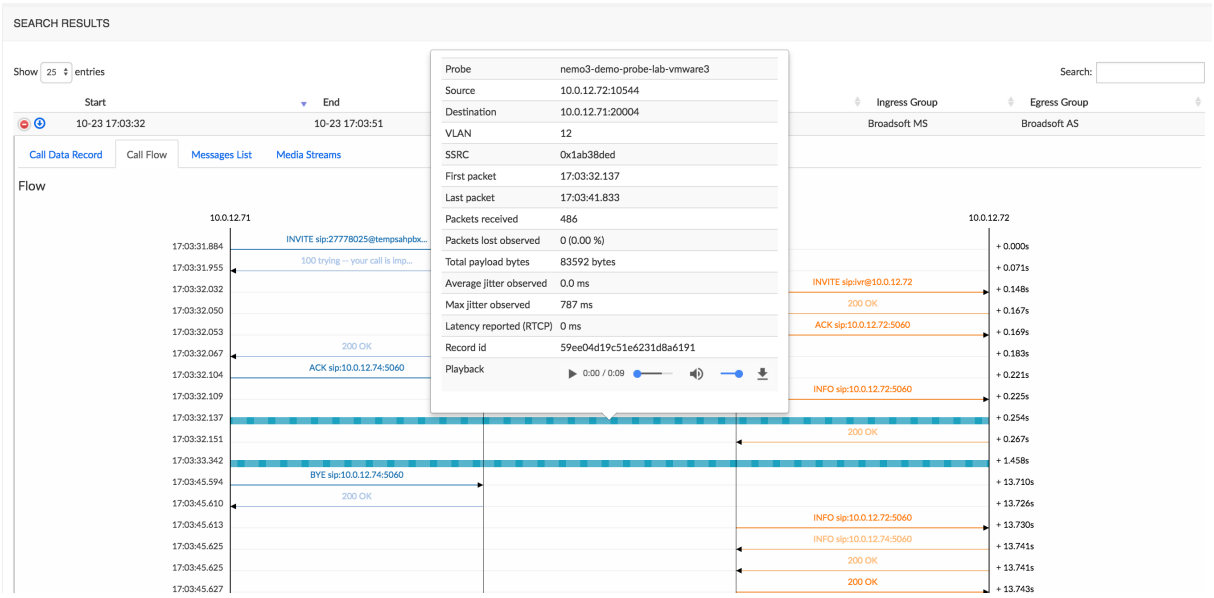


Figure 16: One RTP capture

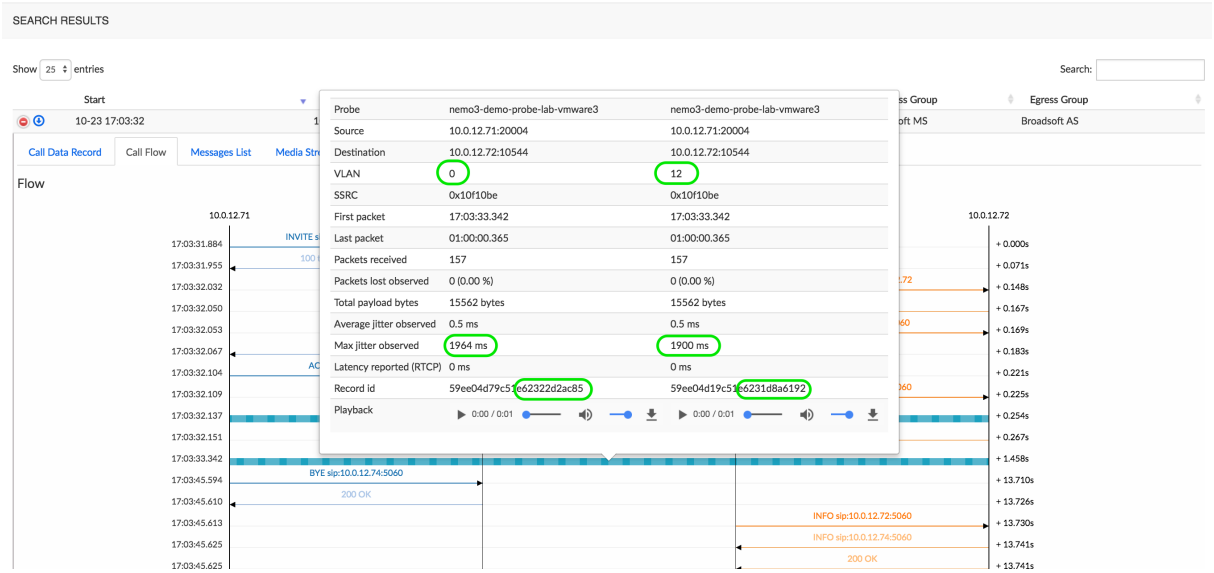


Figure 17: Two RTP captures within the same segment

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.

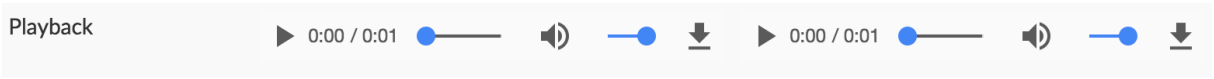
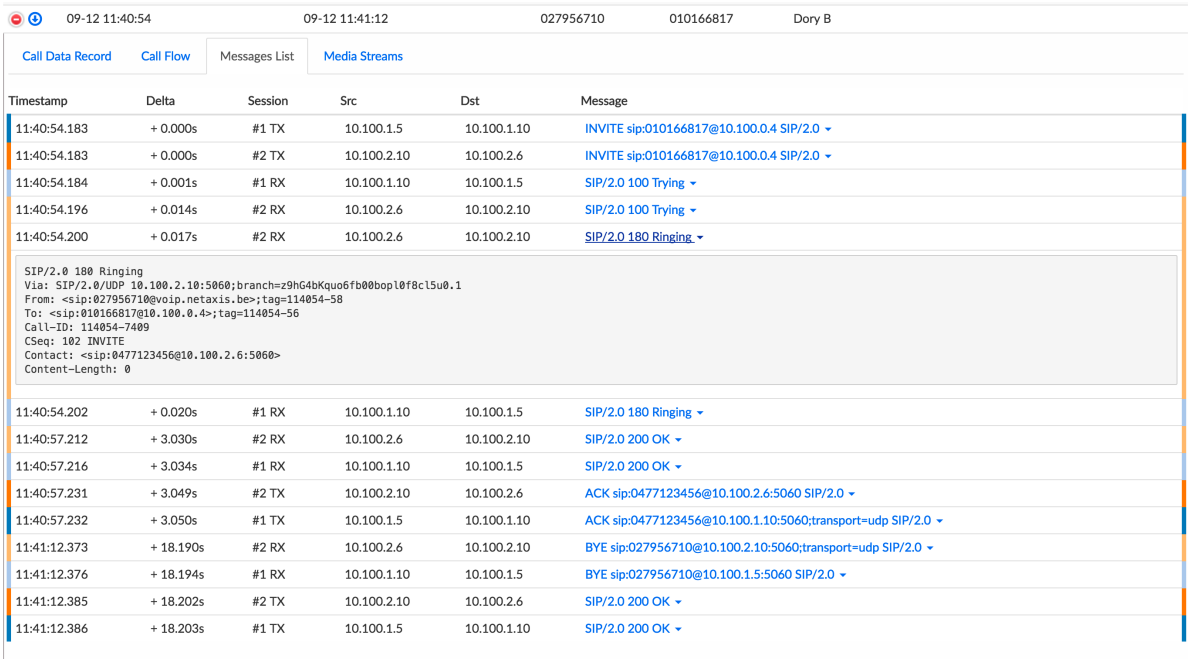


Figure 18: Audio Player Controls for multi-RTP capture

Messages Lists Tab (with Capture)

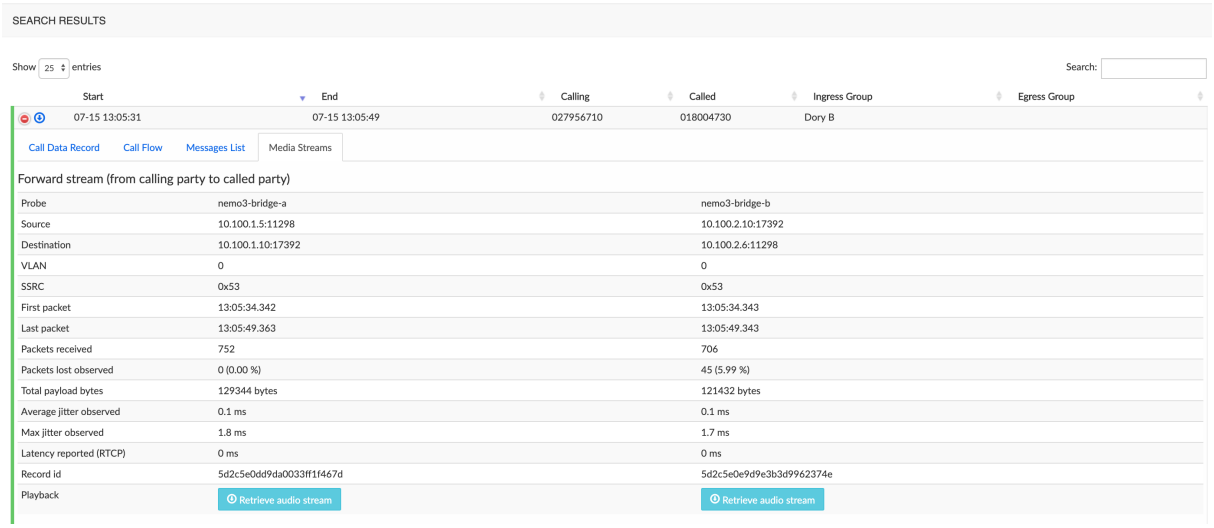
This tab displays the list of SIP messages exchanged for the selected call. Click a message to display (and copy if needed) its SIP details, as illustrated below.

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



Media Streams Tab (with Capture)

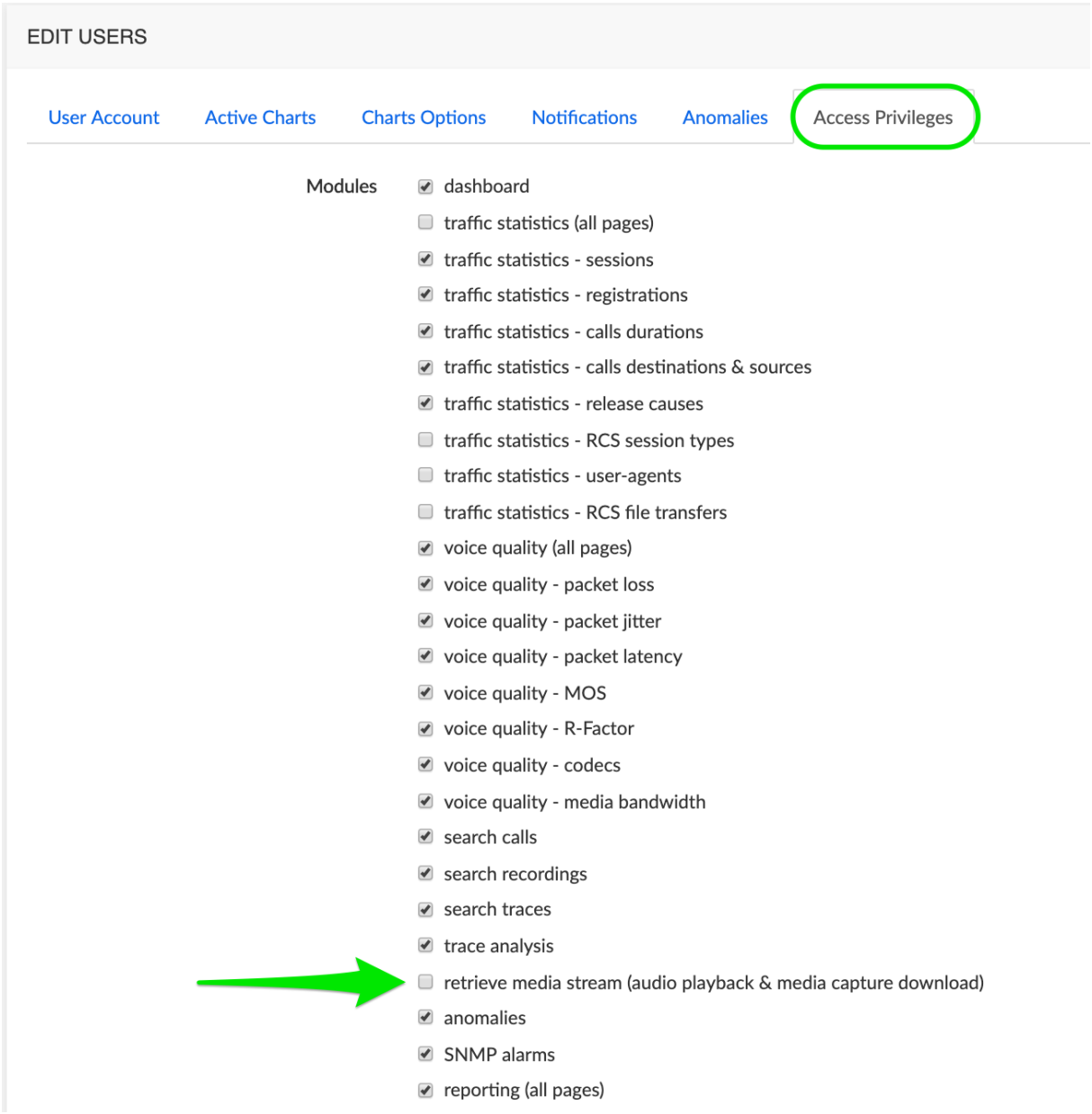
This tab displays the forward and reverse media streams for the selected call, with all details and a playback player. The media file(s) can be downloaded locally (mp3 format). The picture below shows the Forward stream of the expanded call (the Reverse stream, not shown, appears below).



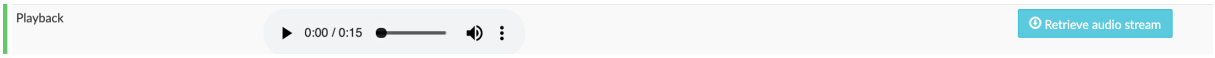
Warning

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.



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



Info

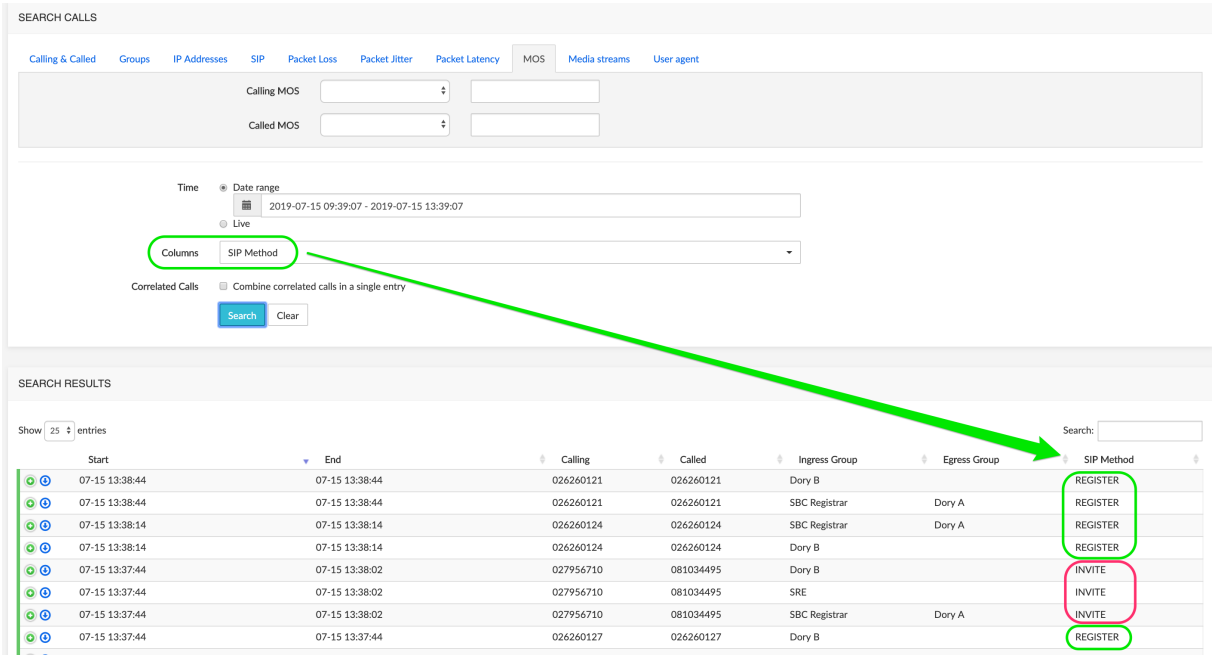
Some browsers allow downloading the media as MP3.

Registrations Tab

This tab is only shown for calls of REGISTER type.

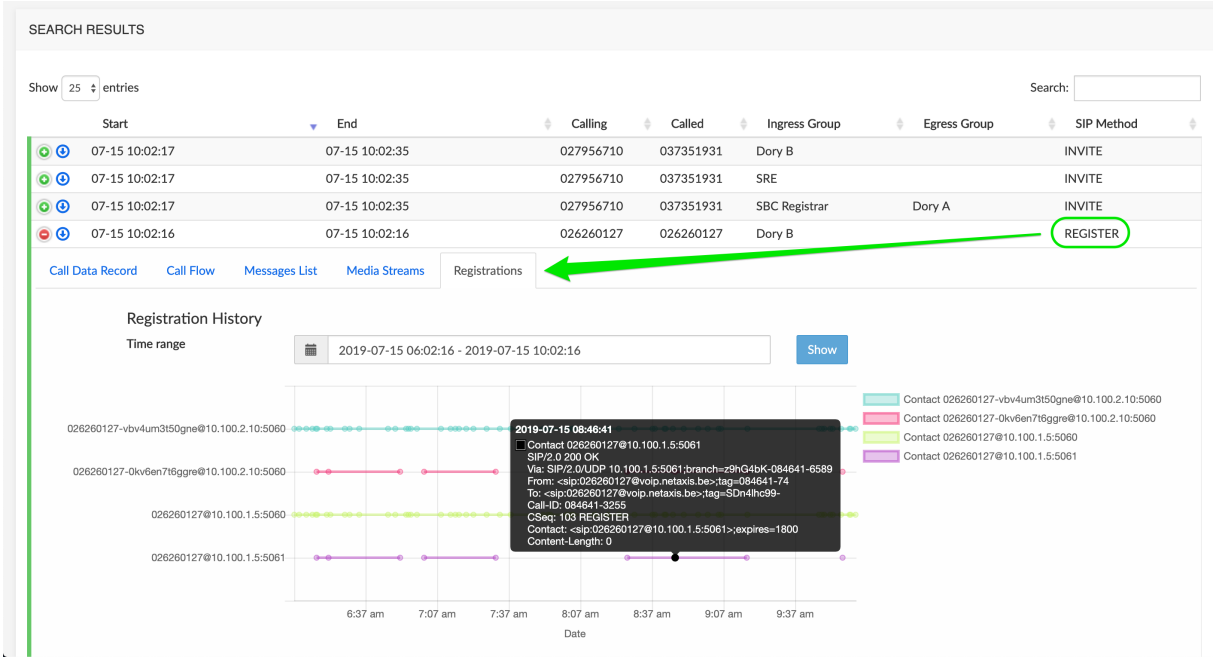
In the *Search Calls* screen, select from the *Columns* drop-down list the value « SIP Method », set a time range and click **Search**.

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).



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 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.

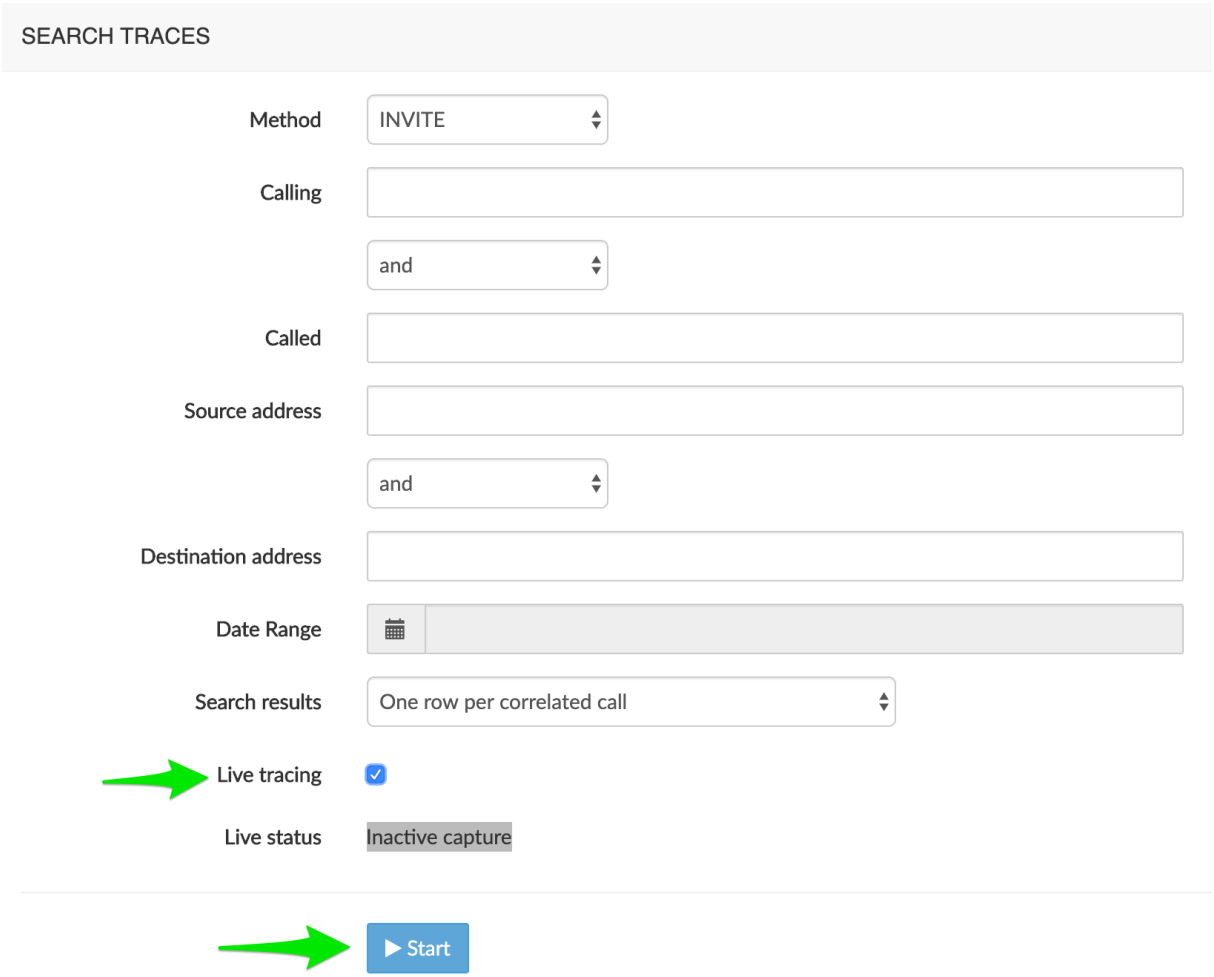


Figure 19: Search Traces selection tool

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.

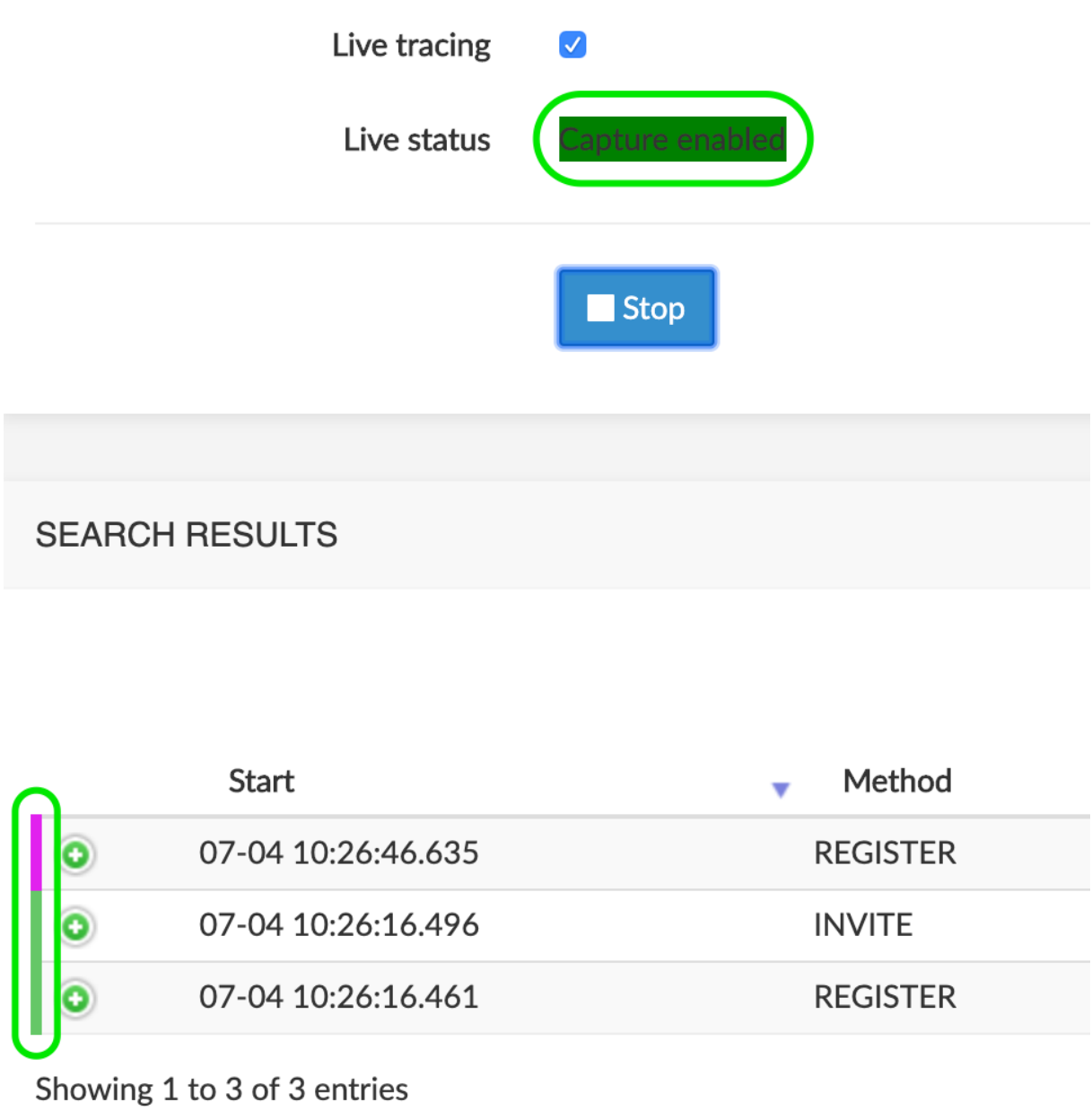
- Yellow: "Updating captured calls only"

  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).



4.9.3.1 Search Results Browser (Traces)

In the *Search Results* browser window, click ⊕ 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.

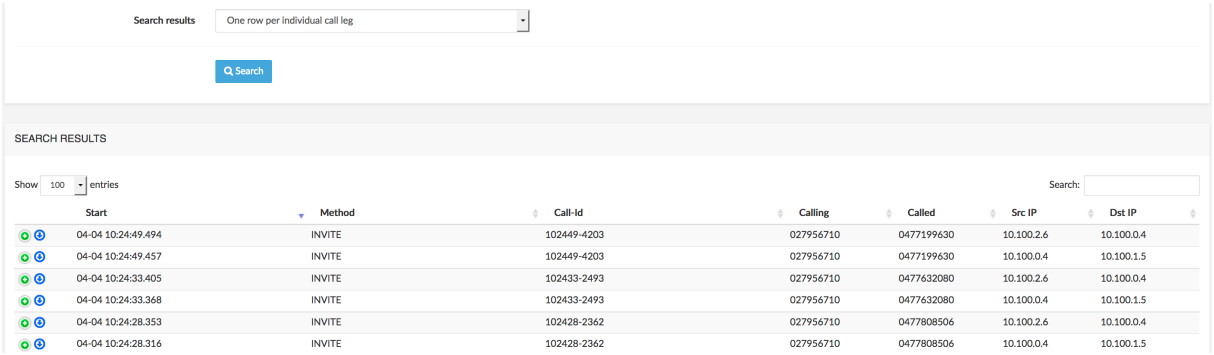


Figure 20: Trace details - Call flow for individual legs

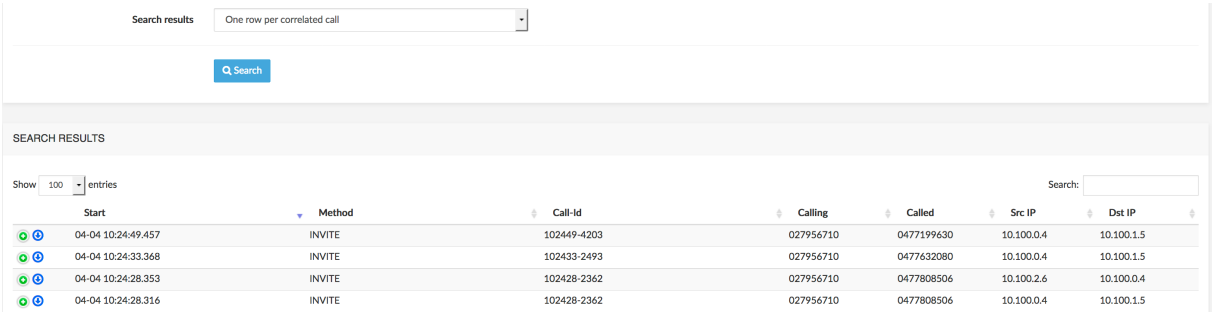


Figure 21: Trace details - Call flow for correlated call

Info

In some cases, NEMO cannot correlate legs into one row. When this situation happens, the two legs are listed with the same Call-Id, as illustrated below (orange rectangle).

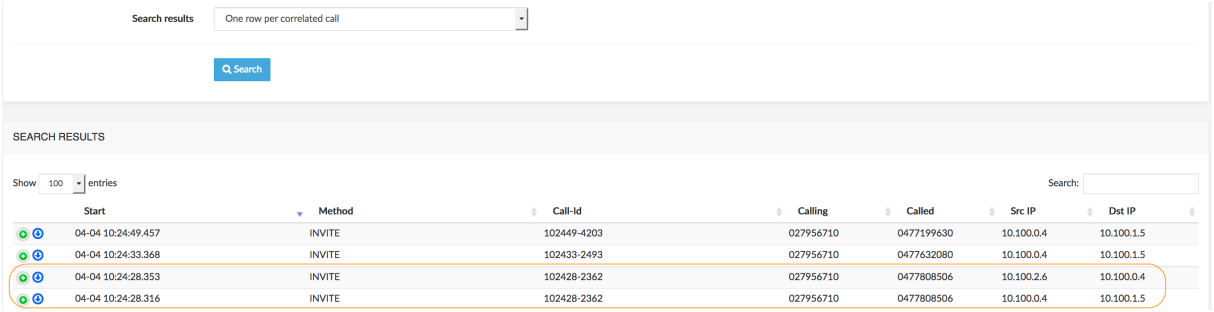


Figure 22: Call flow for correlated call - No correlation

4.9.3.2 Download Trace

In the *Search Results* window, click the 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.

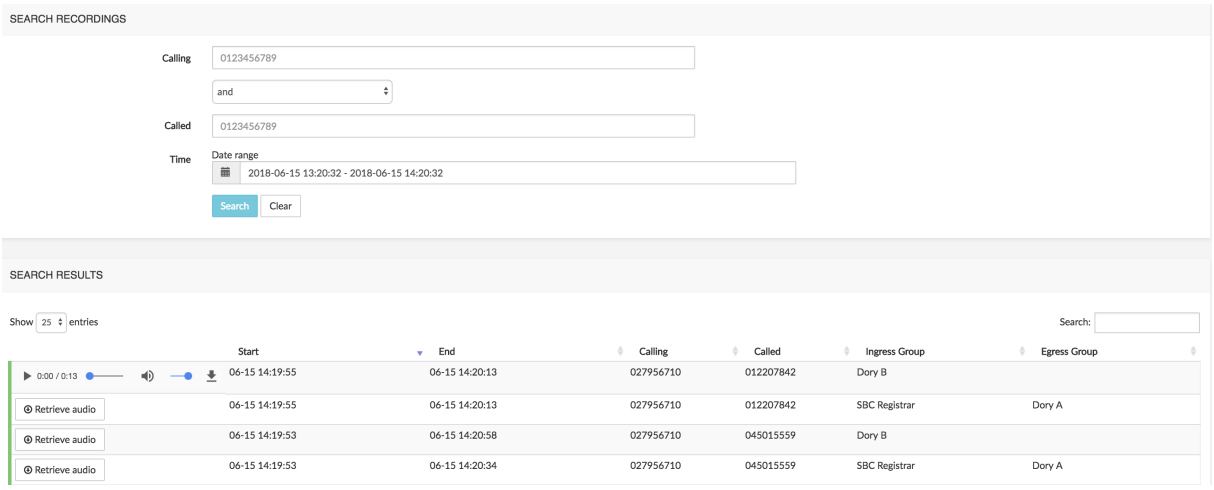


Figure 23: Search Recordings browser

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.

Figure 24: RTP Analysis tab

The figure below describes the components in the graphical representation.

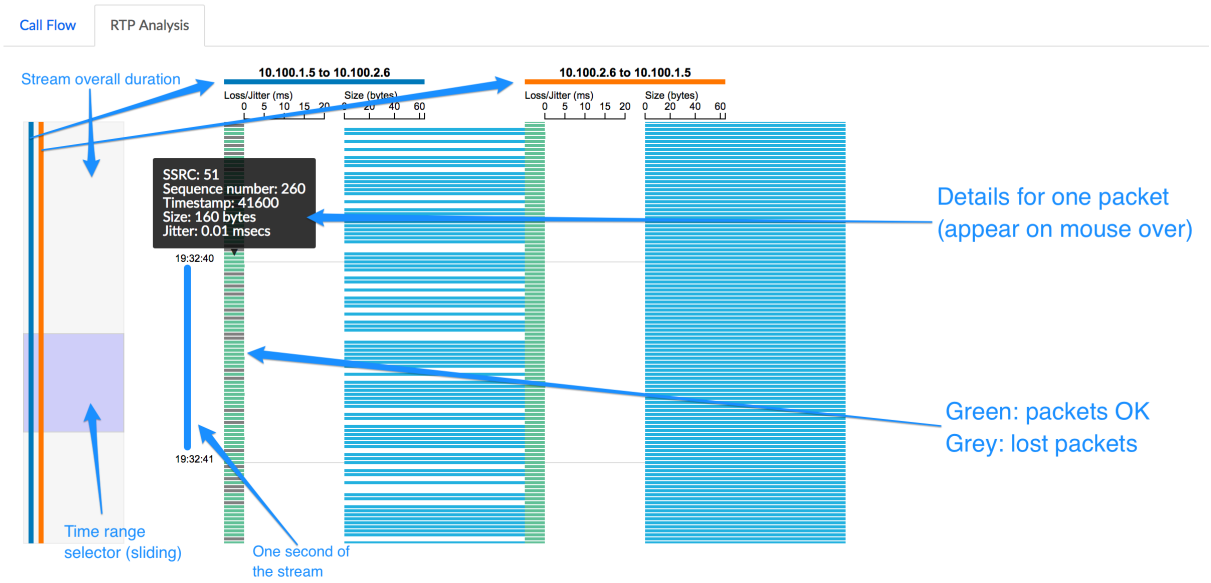


Figure 25: RTP Analysis components

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.

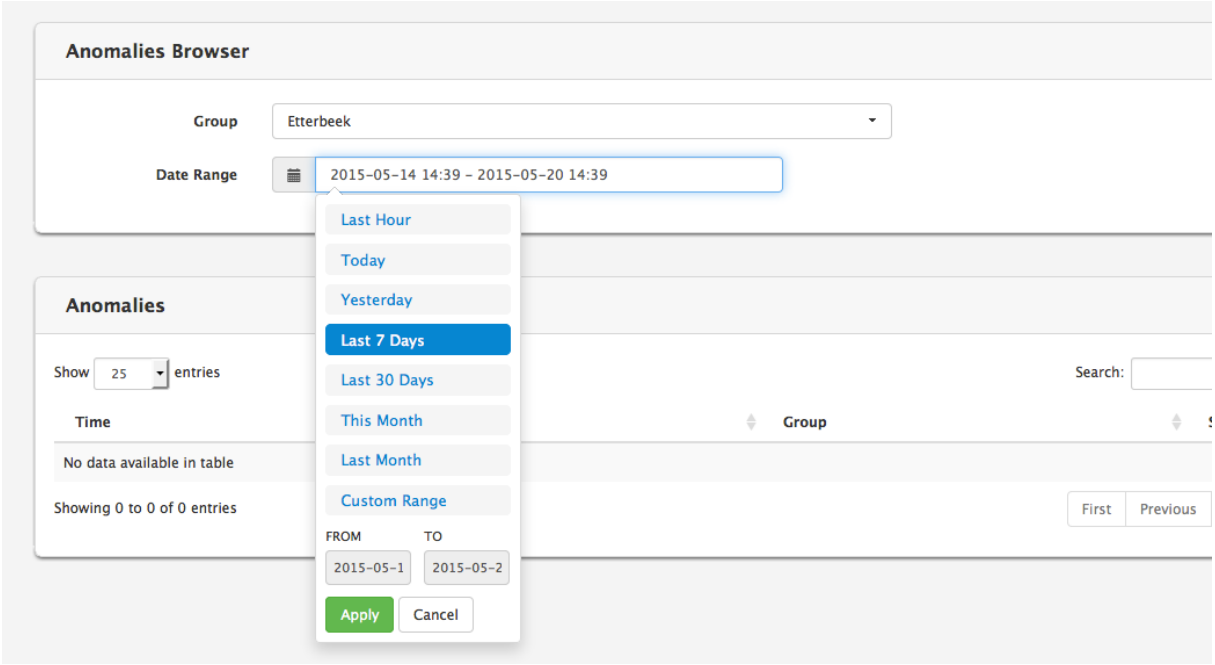


Figure 26: Anomalies Selection

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

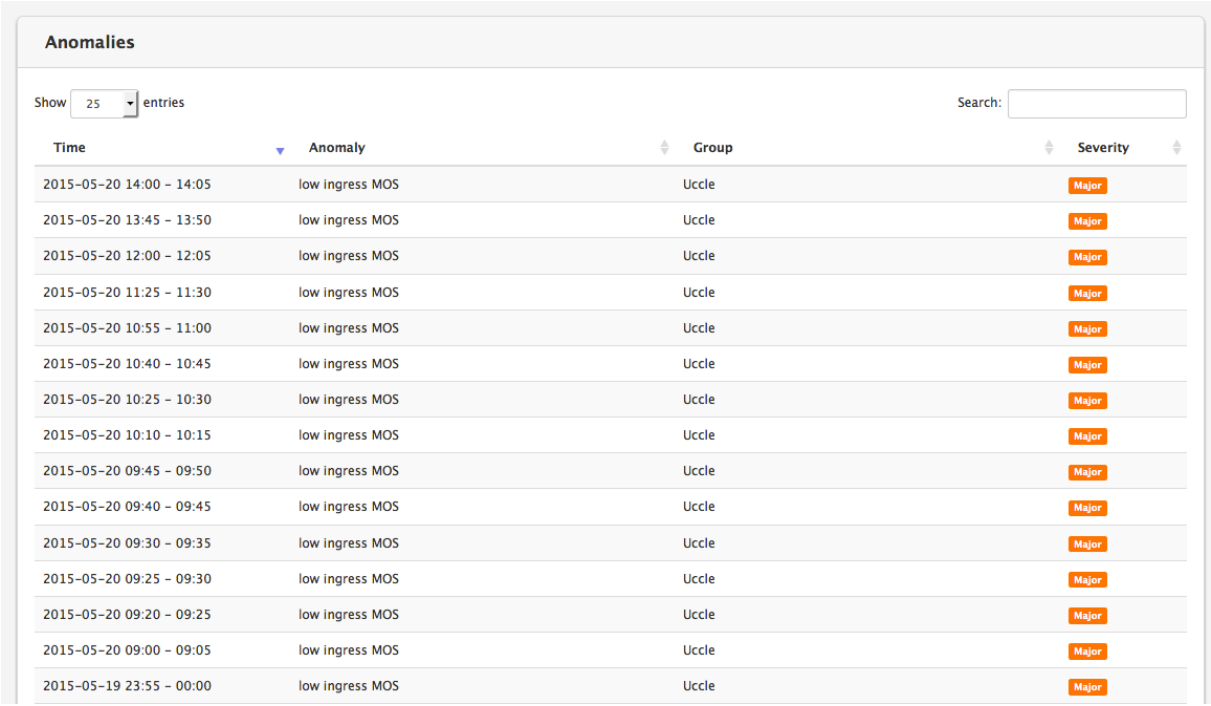


Figure 27: Anomalies results list

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].

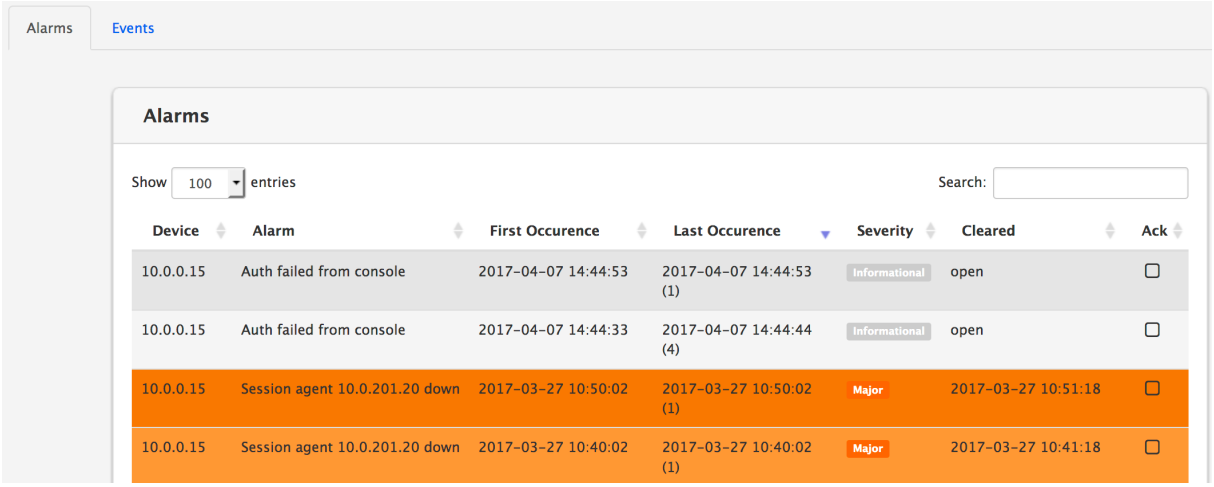


Figure 28: SNMP Alarms Browser

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.

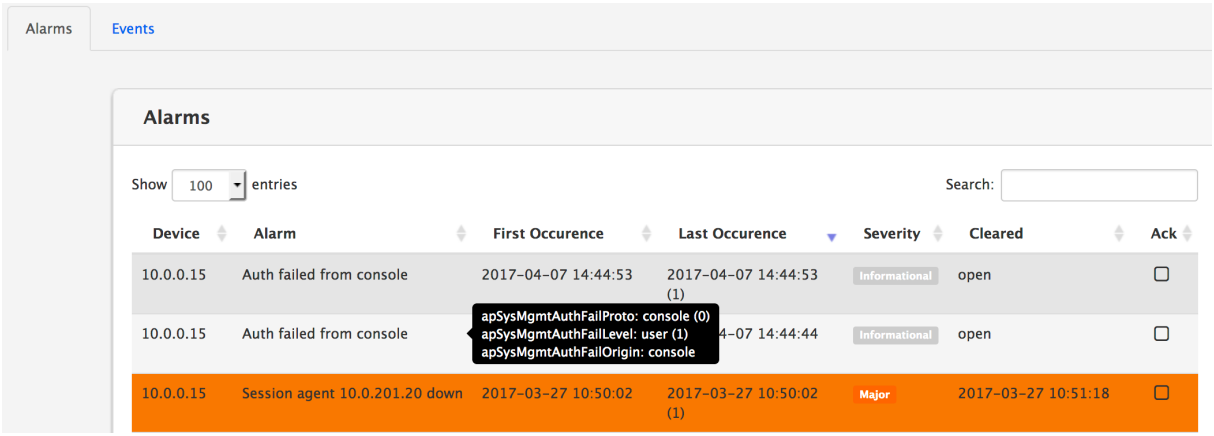


Figure 29: SNMP Alarms Browser - Variables

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.

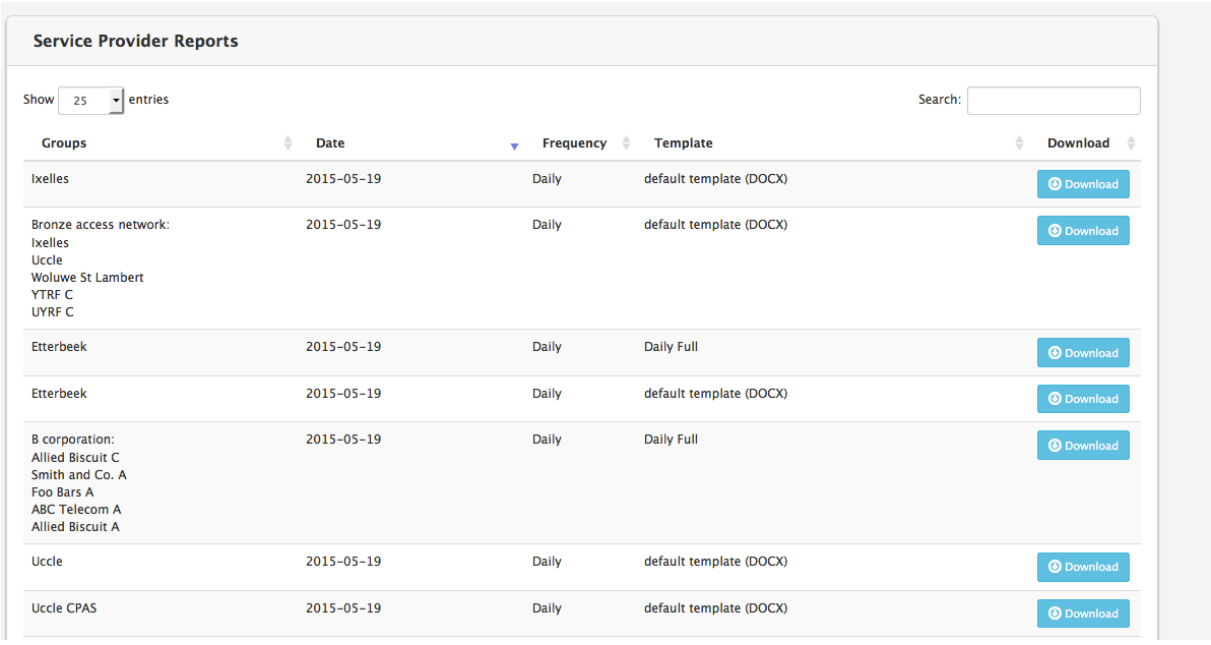


Figure 30: [Audience] Reports Browser

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.

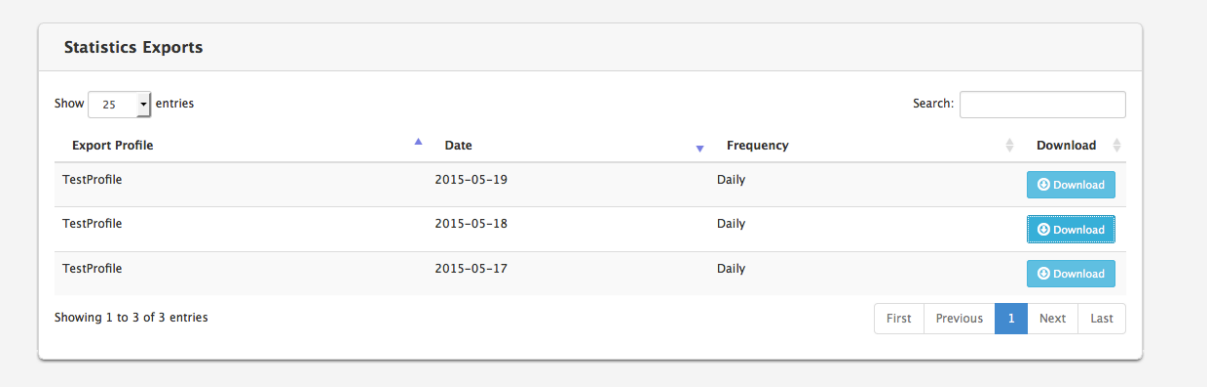


Figure 31: Statistics Exports Browser

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.

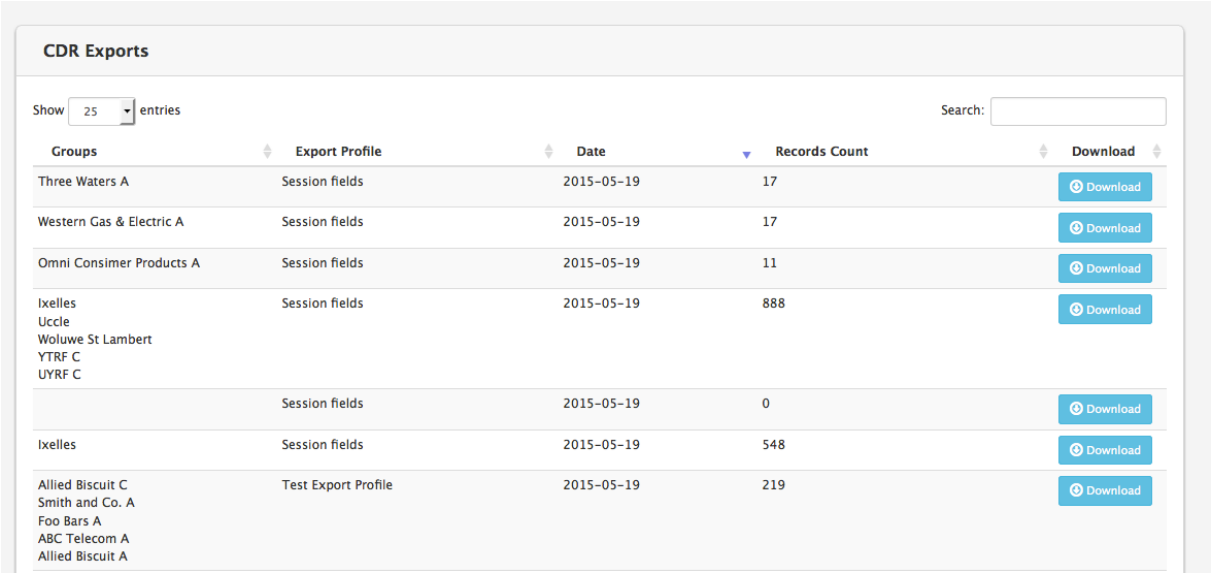


Figure 32: CDR Exports Browser

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.

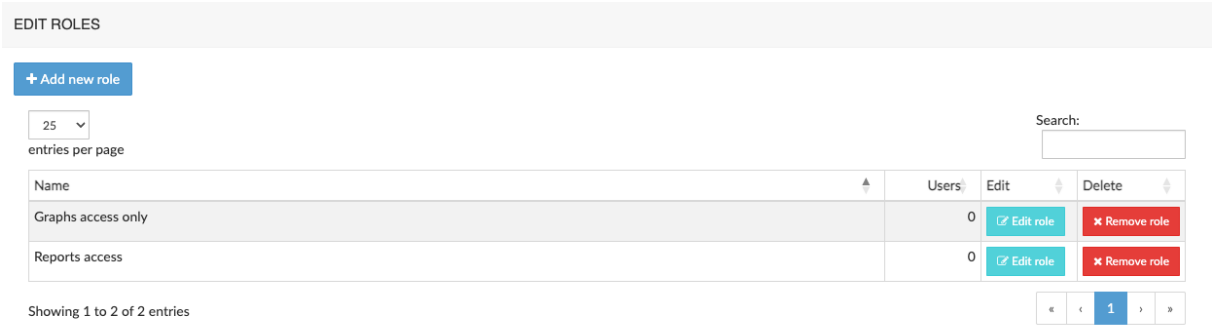


Figure 33: Roles List

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.

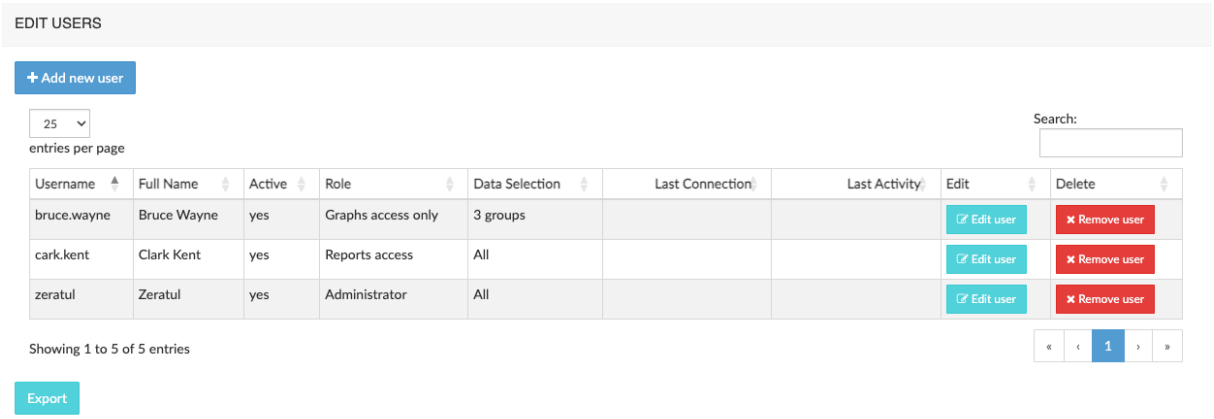


Figure 34: Users List

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.

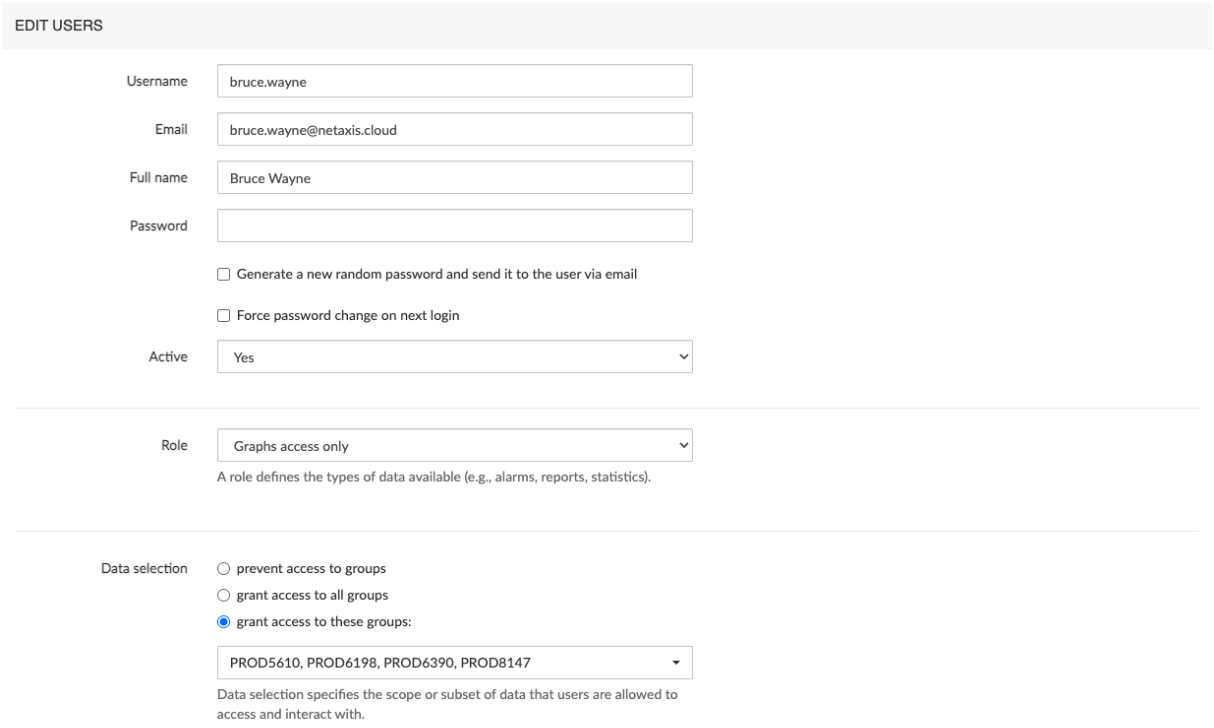


Figure 35: User Creation Form

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).

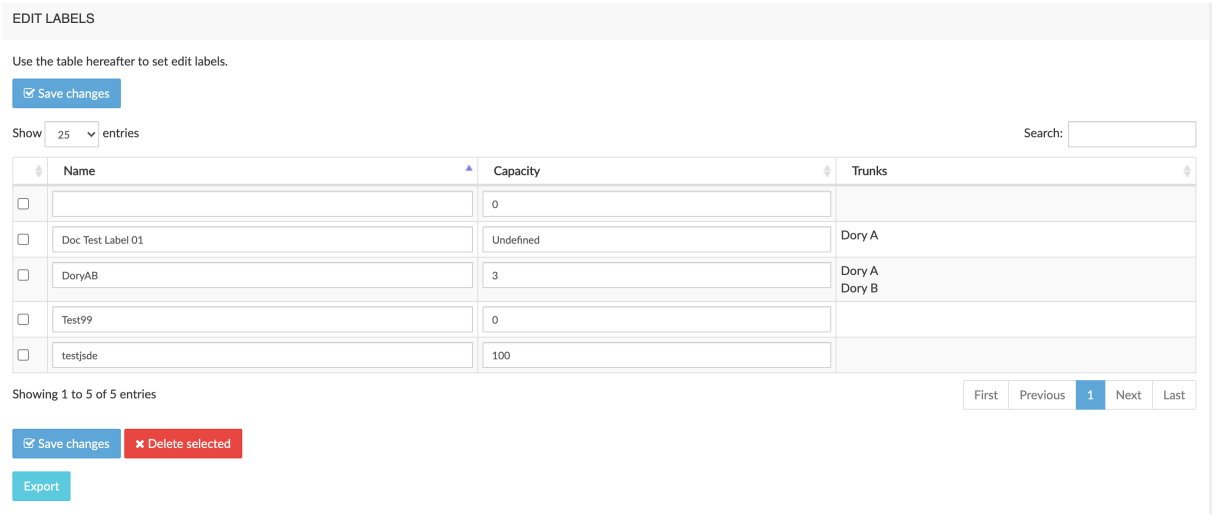


Figure 36: Labels List

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.

Figure 37: Create Label

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.

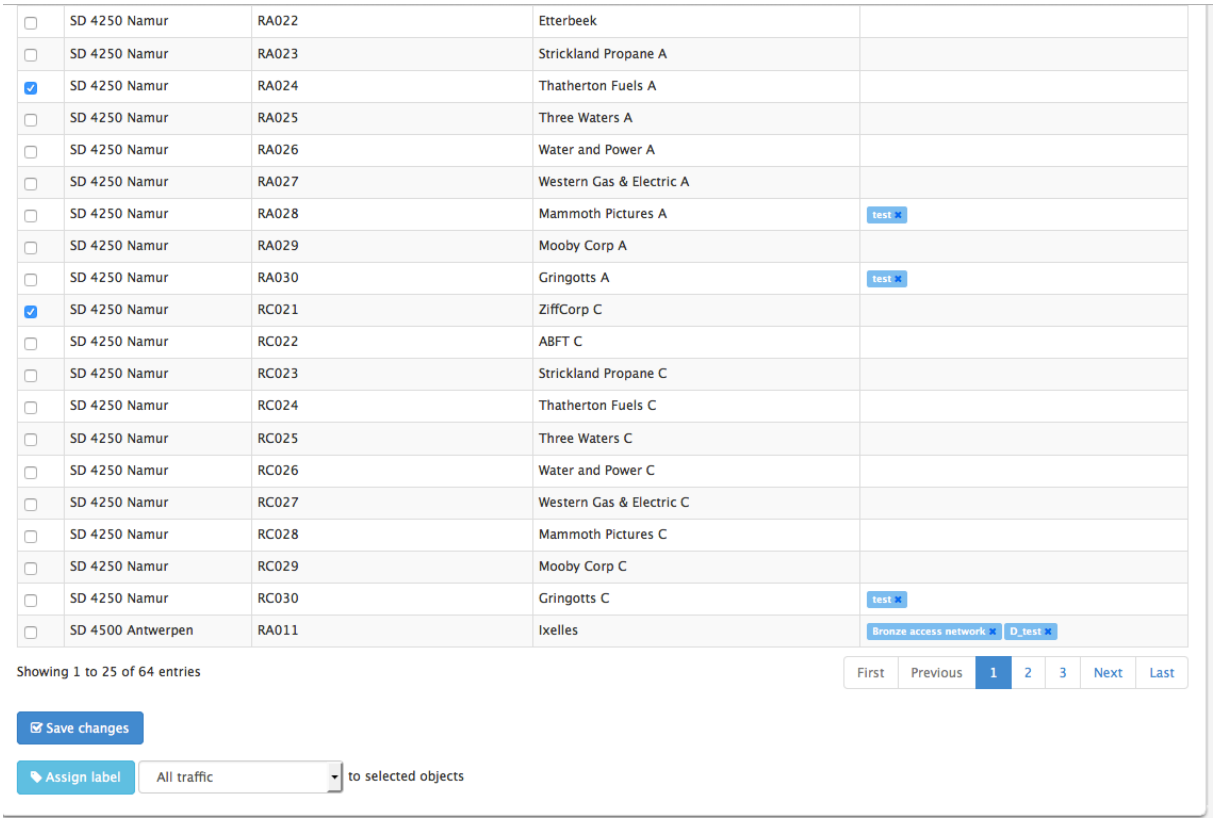


Figure 38: Labels Assignment

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.

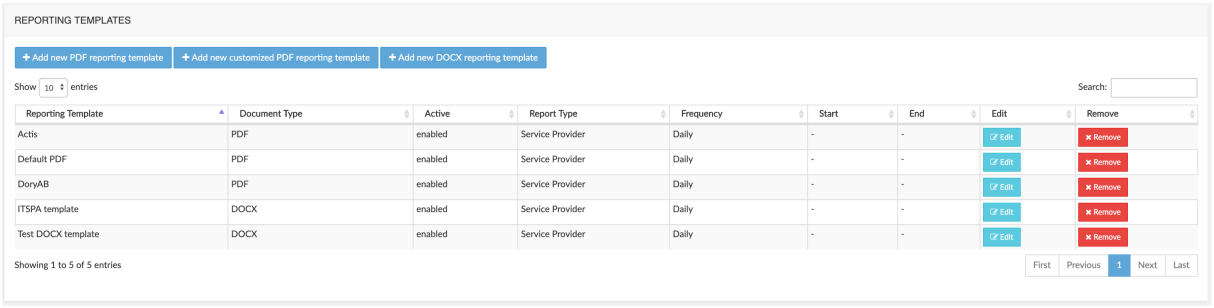


Figure 39: Reporting Templates List

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.

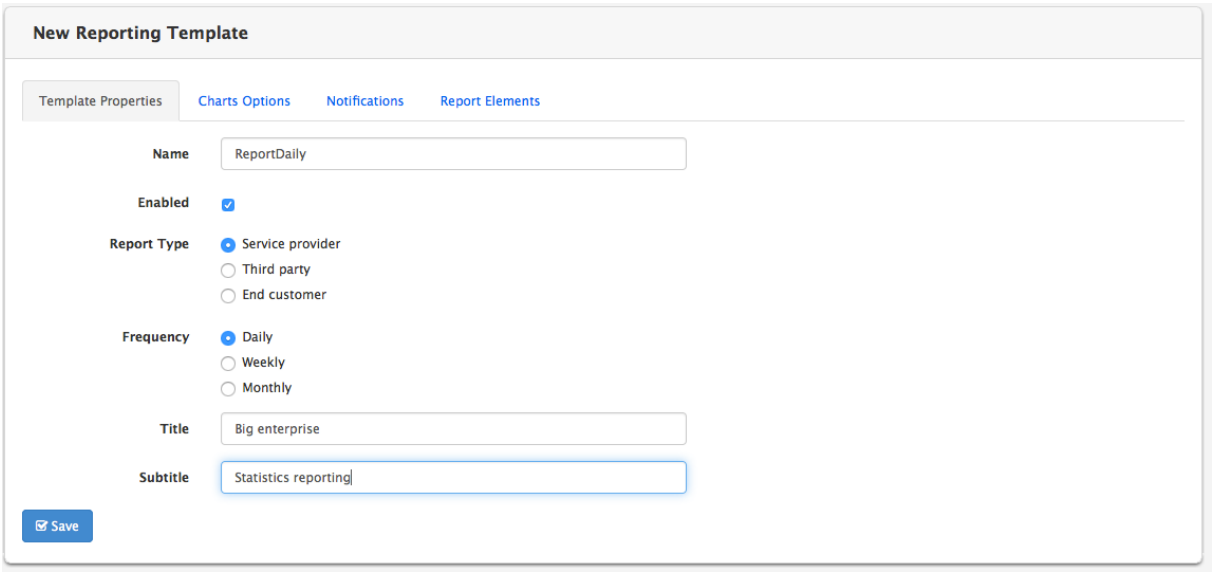


Figure 40: PDF Reporting Template → Template Properties

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

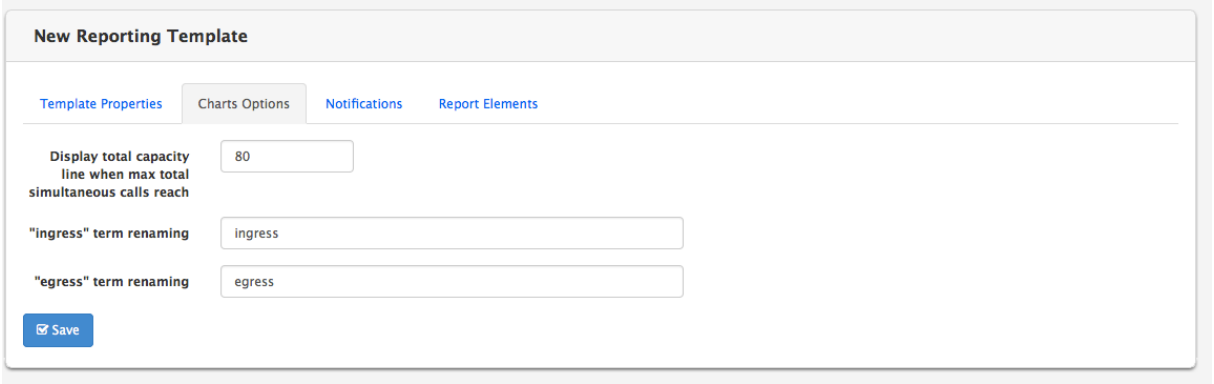


Figure 41: PDF Reporting Template → Charts Options

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.

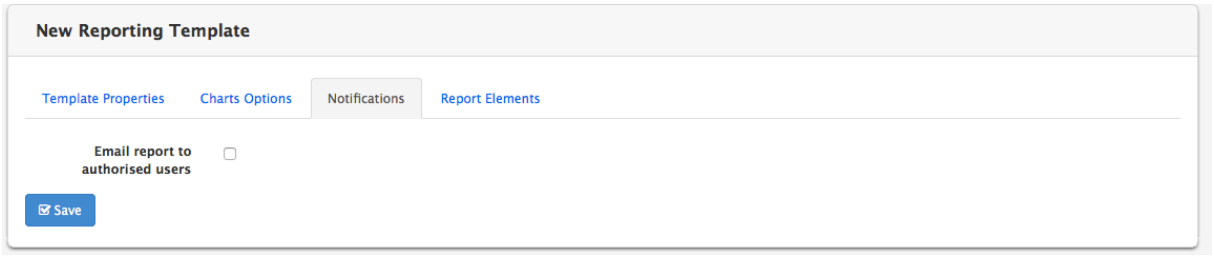


Figure 42: PDF Reporting Template → Notification

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.

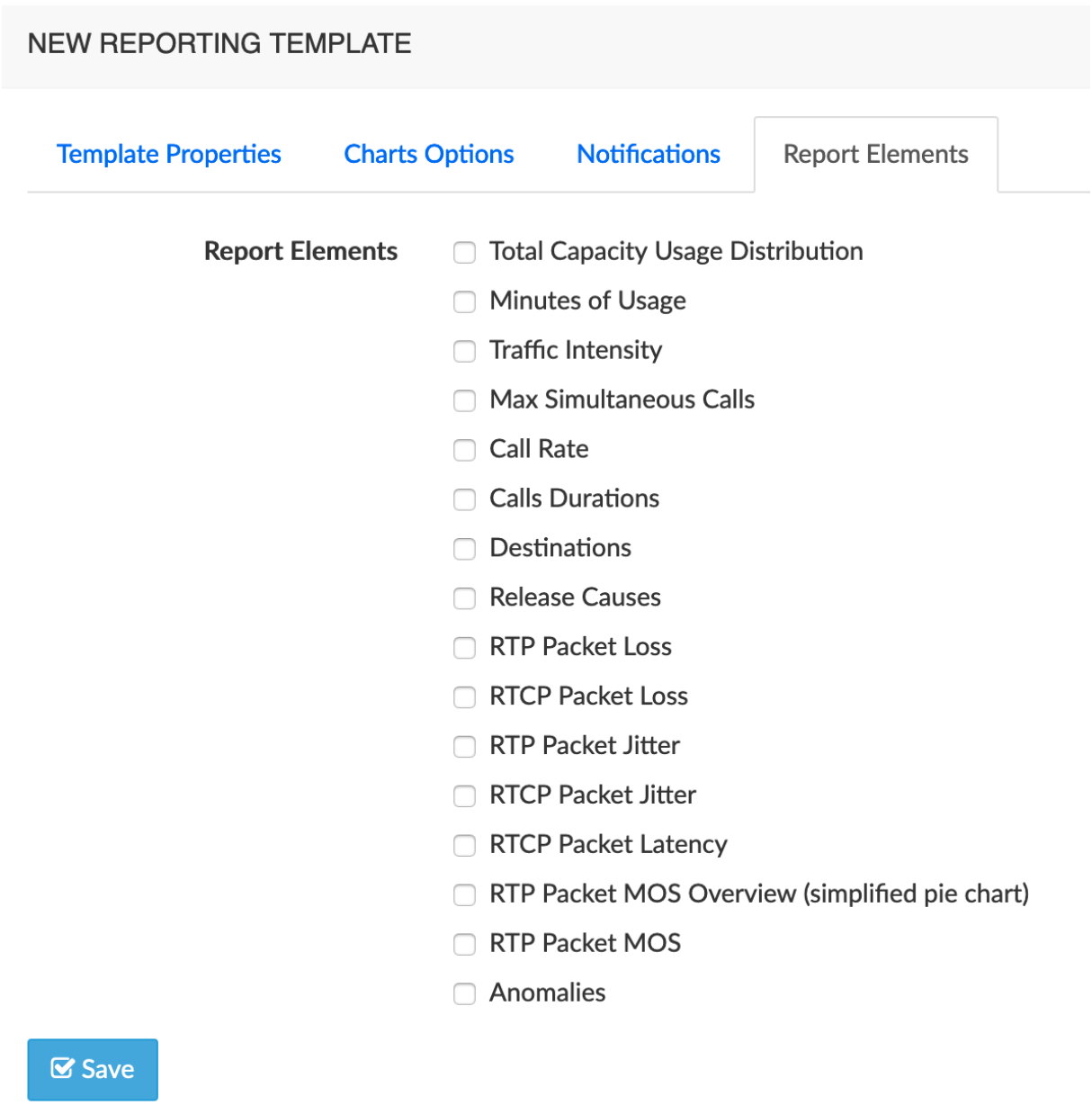


Figure 43: PDF Reporting Template → Report Elements

Table 15: PDF Report Elements - Types

Element	Type
Total Capacity Usage Distribution	pie chart

Element	Type
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.

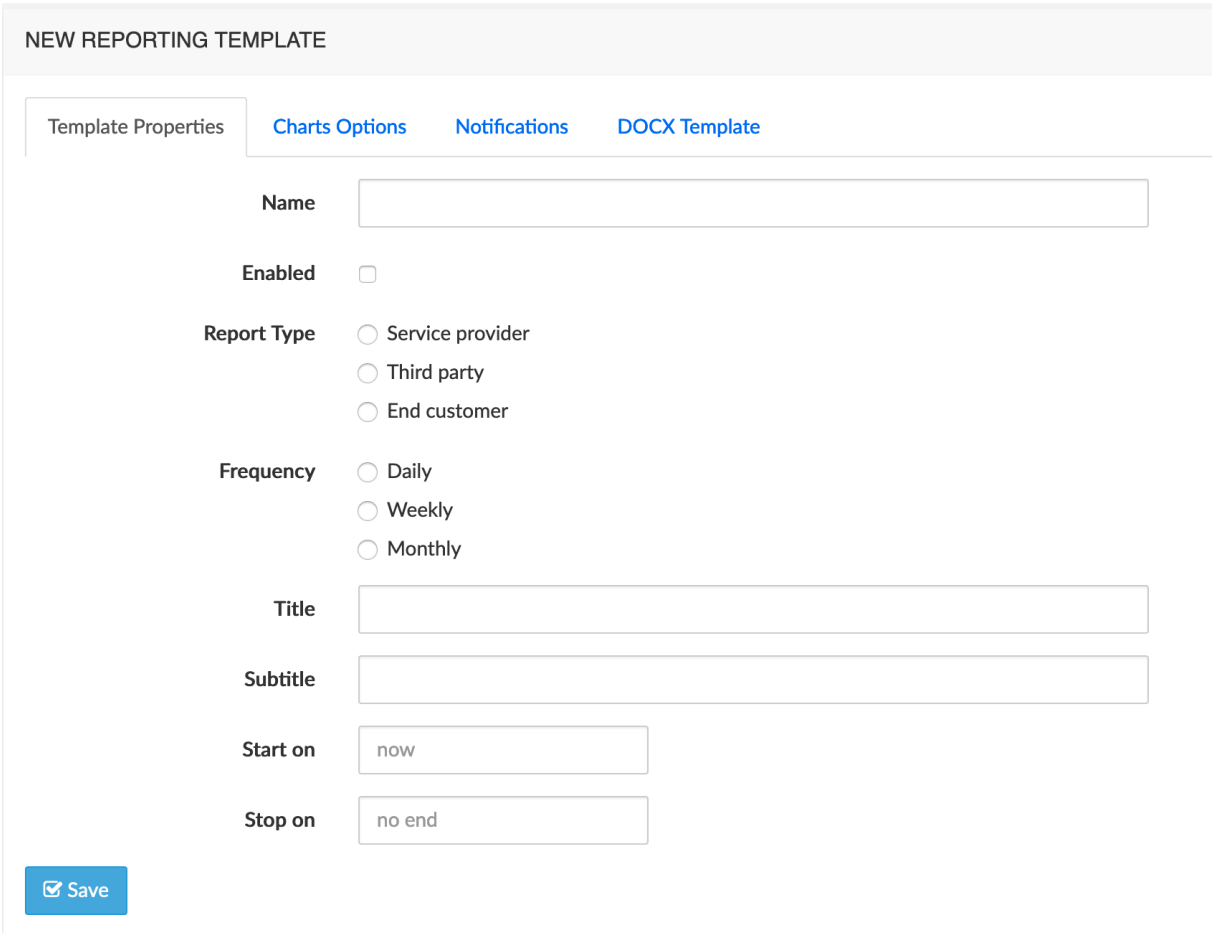


Figure 44: DOCX Reporting Template → Template Properties tab

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

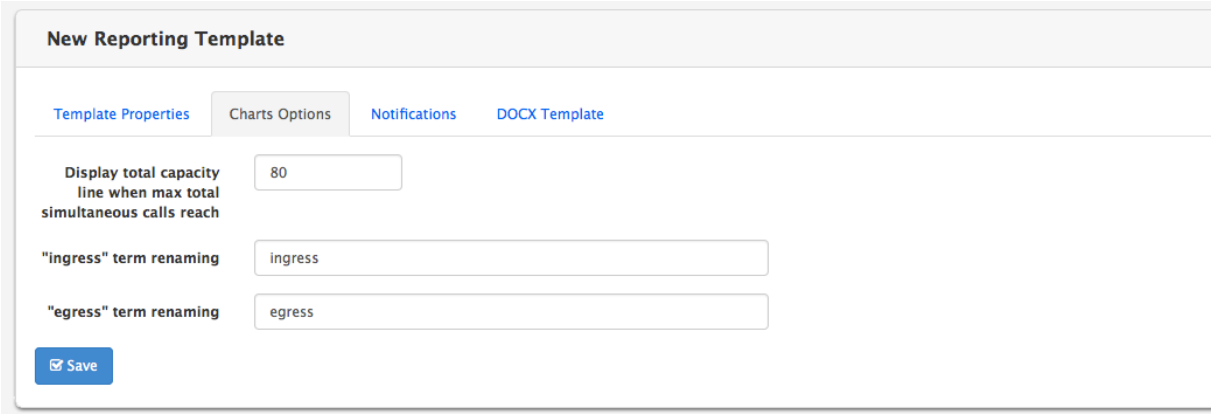


Figure 45: DOCX Reporting Template → Charts Options tab

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.

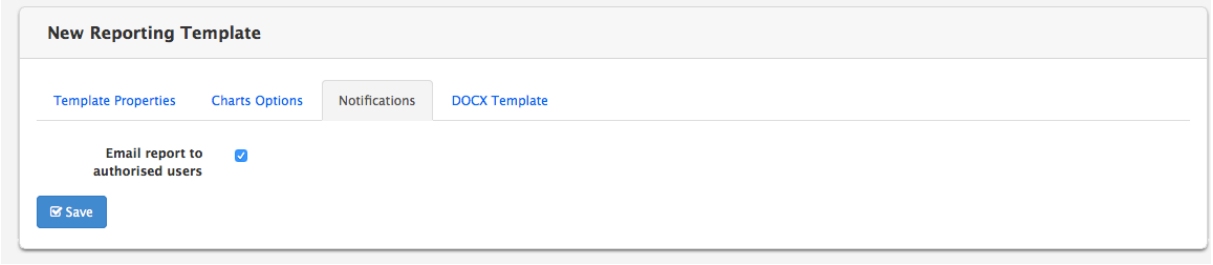


Figure 46: DOCX Reporting Template → Notifications tab

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.

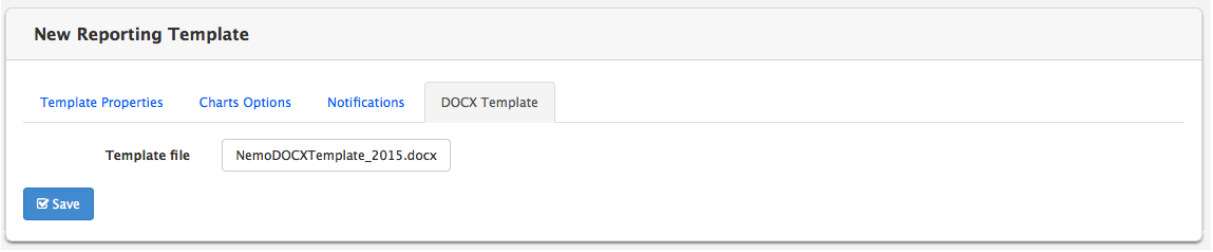


Figure 47: DOCX Reporting Template → DOCX Template tab

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

Placeholder	Replacement Type	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
$totalCallsCount	value	total calls
$ingressCallsDuration	value	ingress calls total duration
$egressCallsDuration	value	ingress calls total duration
$totalCallsDuration	value	calls total duration
$ingressCallsAvgDuration	value	average ingress call duration
$egressCallsAvgDuration	value	average egress call duration
$totalCallsAvgDuration	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
$totalCapacityWarning	value	warning message if 80% of the configured realm capacity is reached

Placeholder	Replacement Type	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)
$egressAvgRTCPPacketLatency	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

Placeholder	Replacement Type	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.

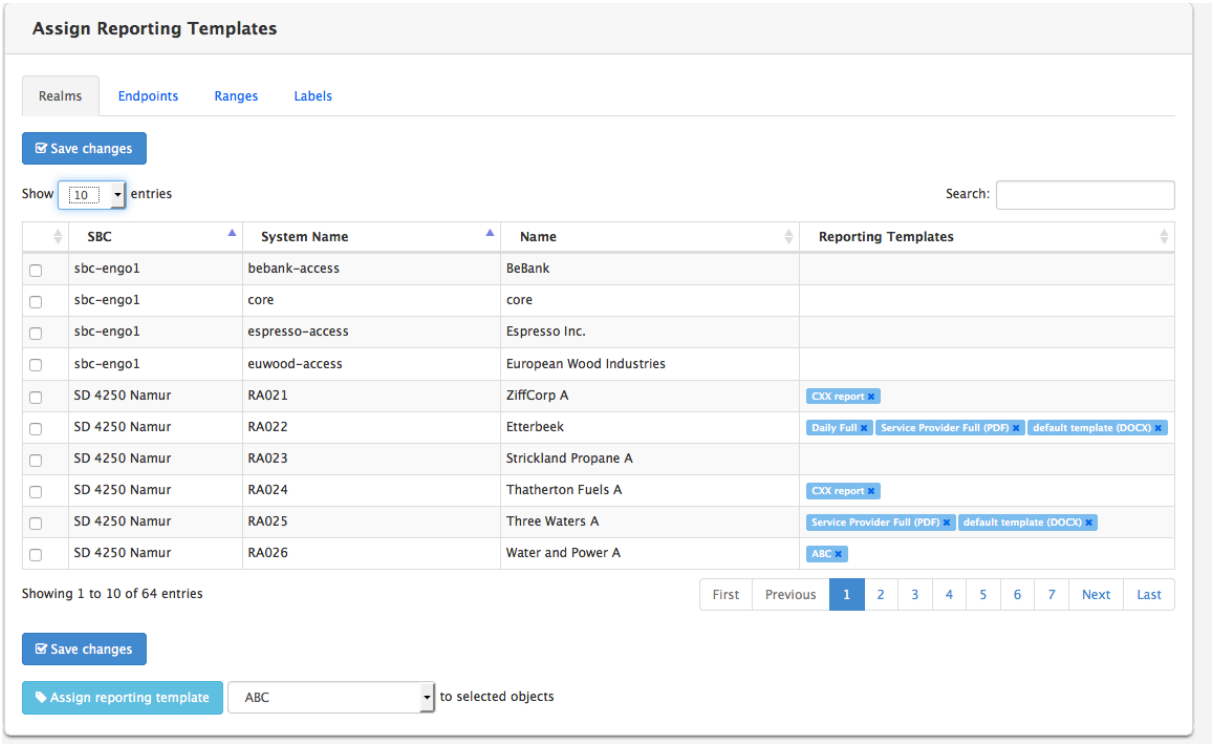


Figure 48: Realms - Reporting Templates Assignment Matrix

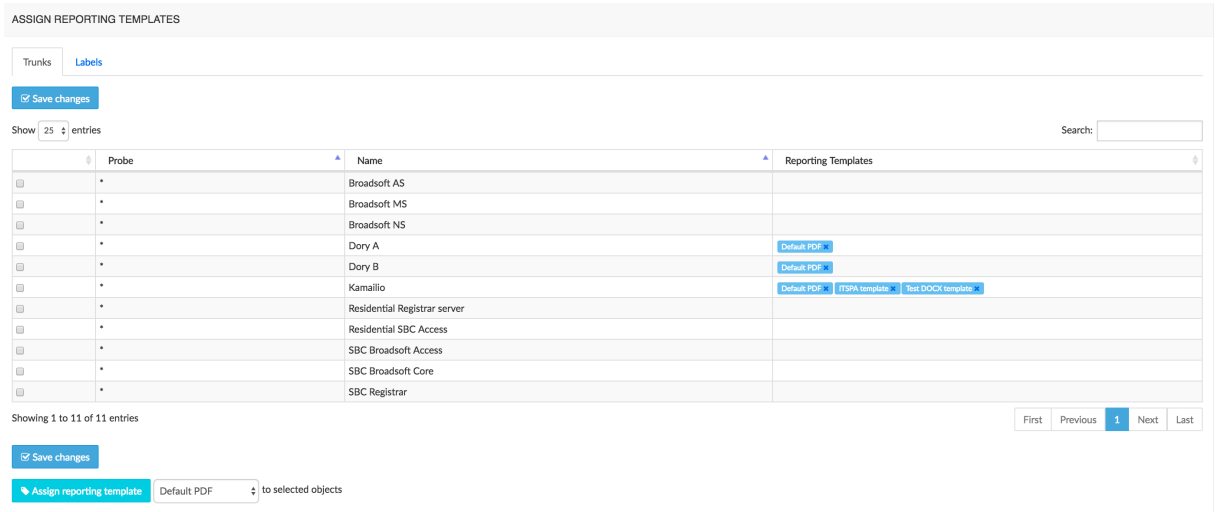


Figure 49: Trunks - Reporting Templates Assignment Matrix

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.

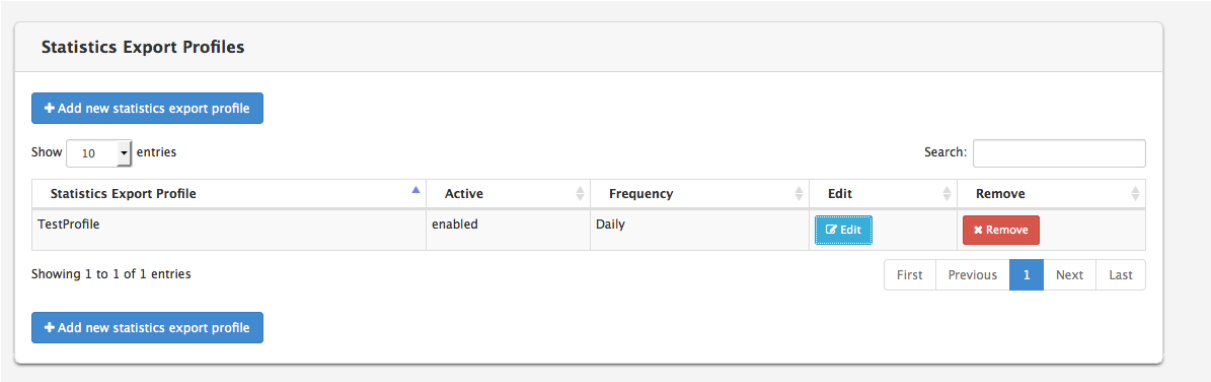


Figure 50: Statistics export profiles List

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.

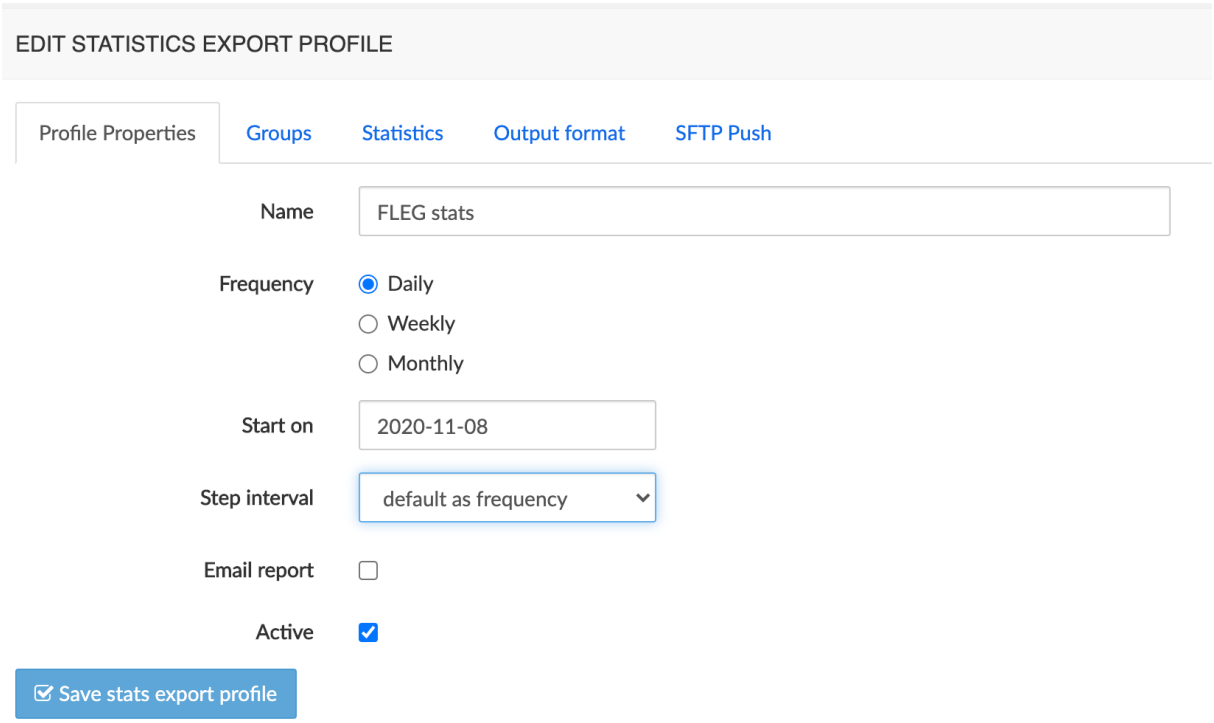


Figure 51: New Statistics export profile → Profile Properties tab

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.

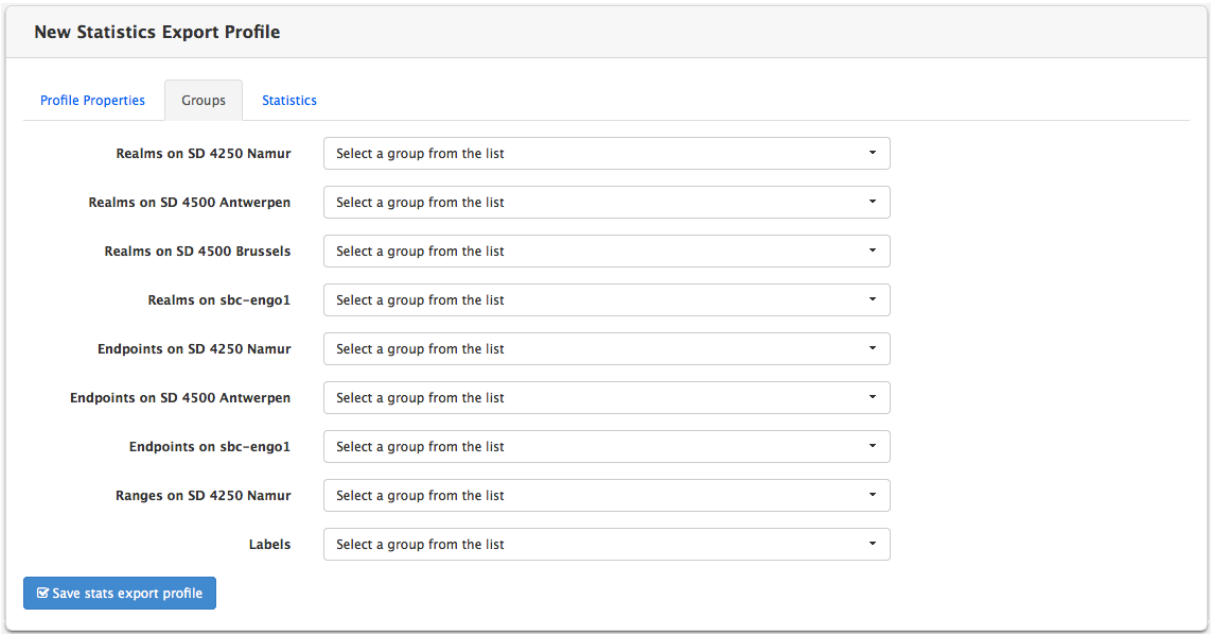


Figure 52: Statistics export profile → Groups tab

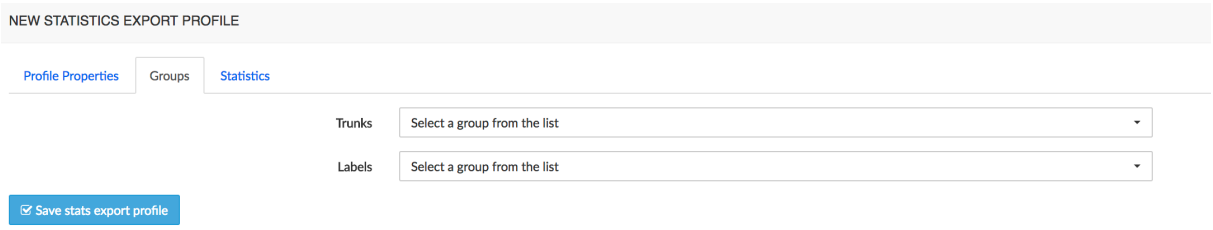


Figure 53: Statistics export profile (Probes) → Groups tab

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

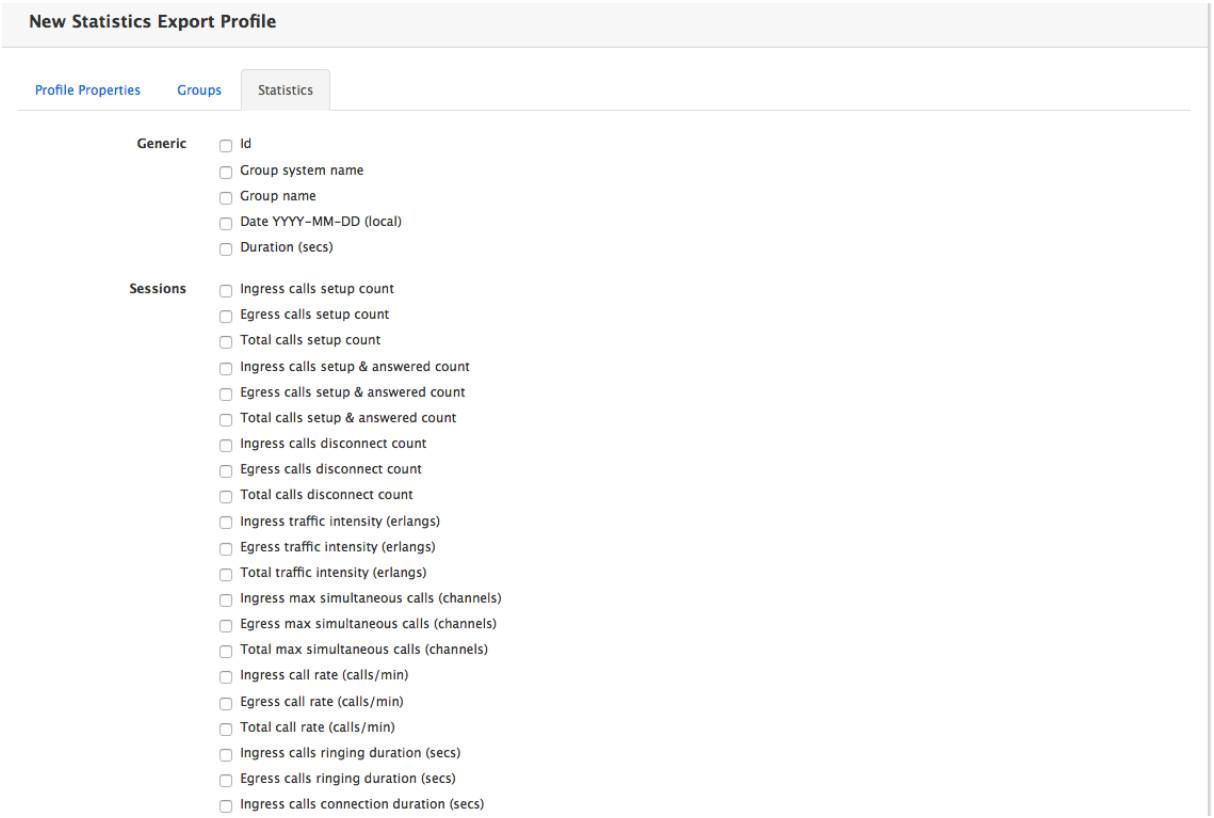


Figure 54: Statistics export profile → Statistics tab

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.

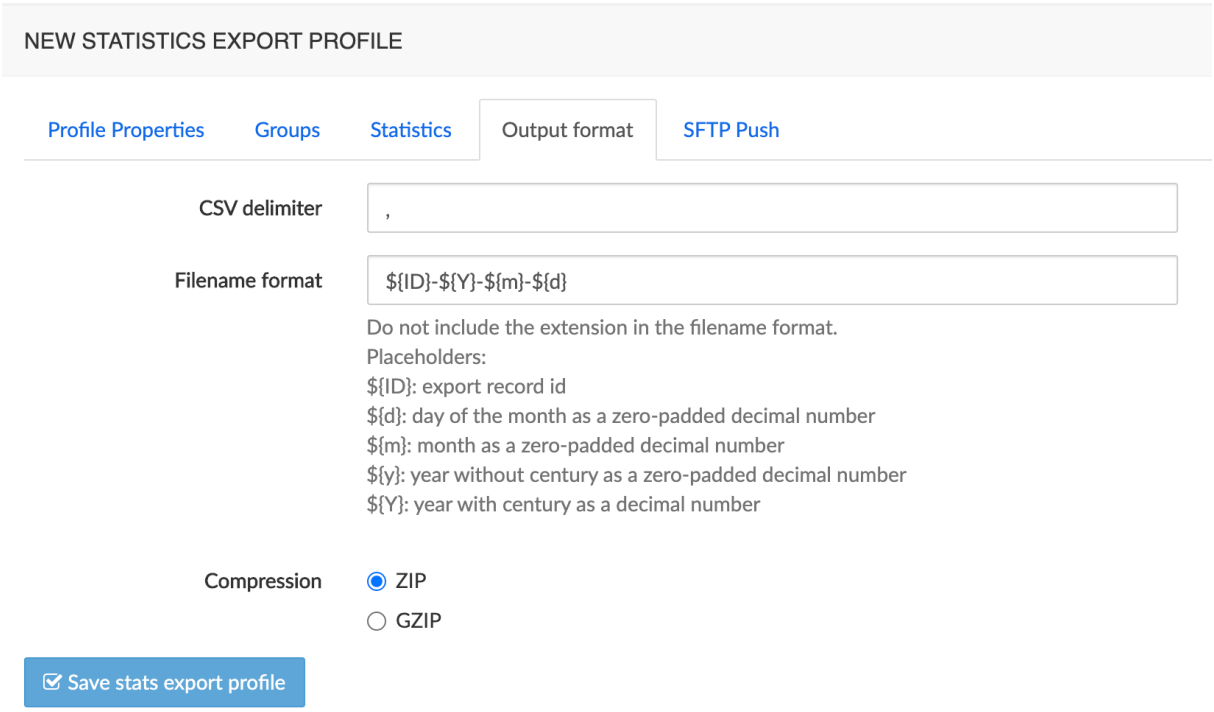


Figure 55: Statistics export profile → Output format

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

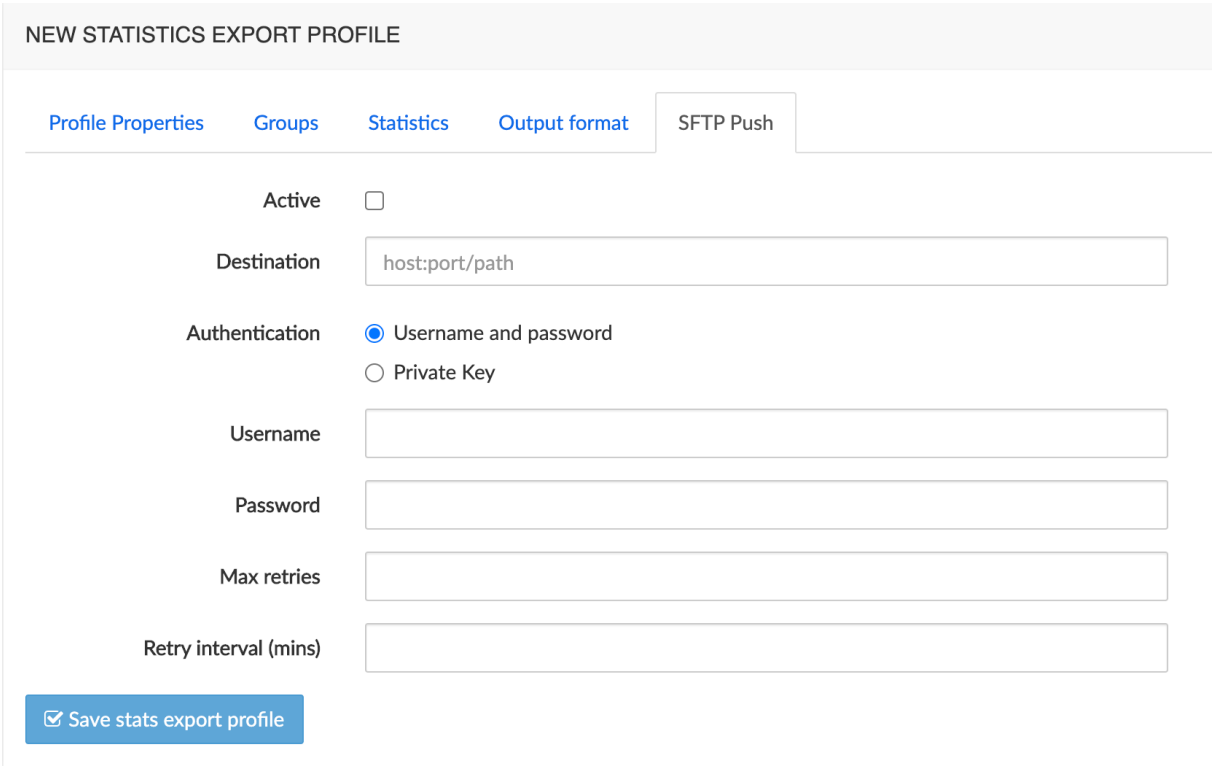


Figure 56: Statistics export profile → Push SFTP tab

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.

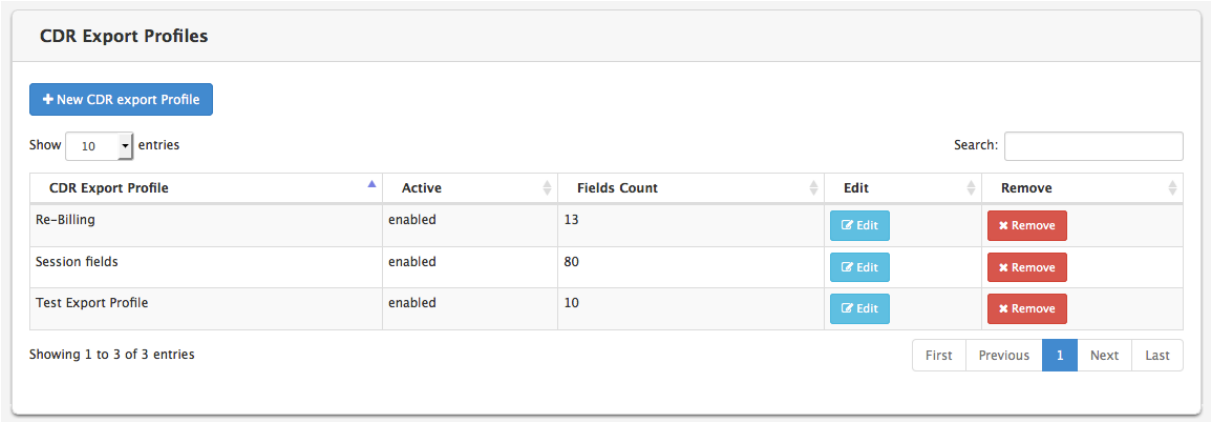


Figure 57: CDR export profiles List

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).

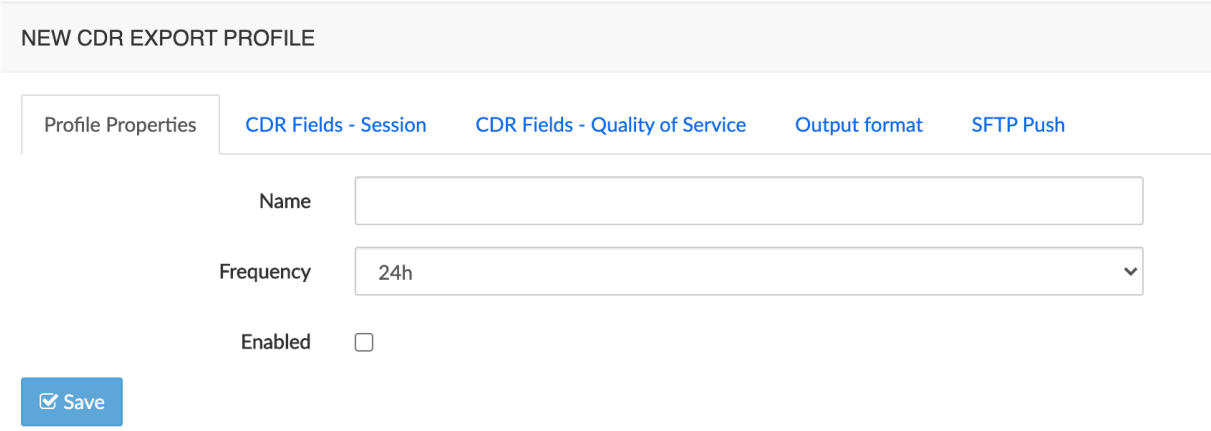


Figure 58: CDR export profile → Profile Properties tab

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

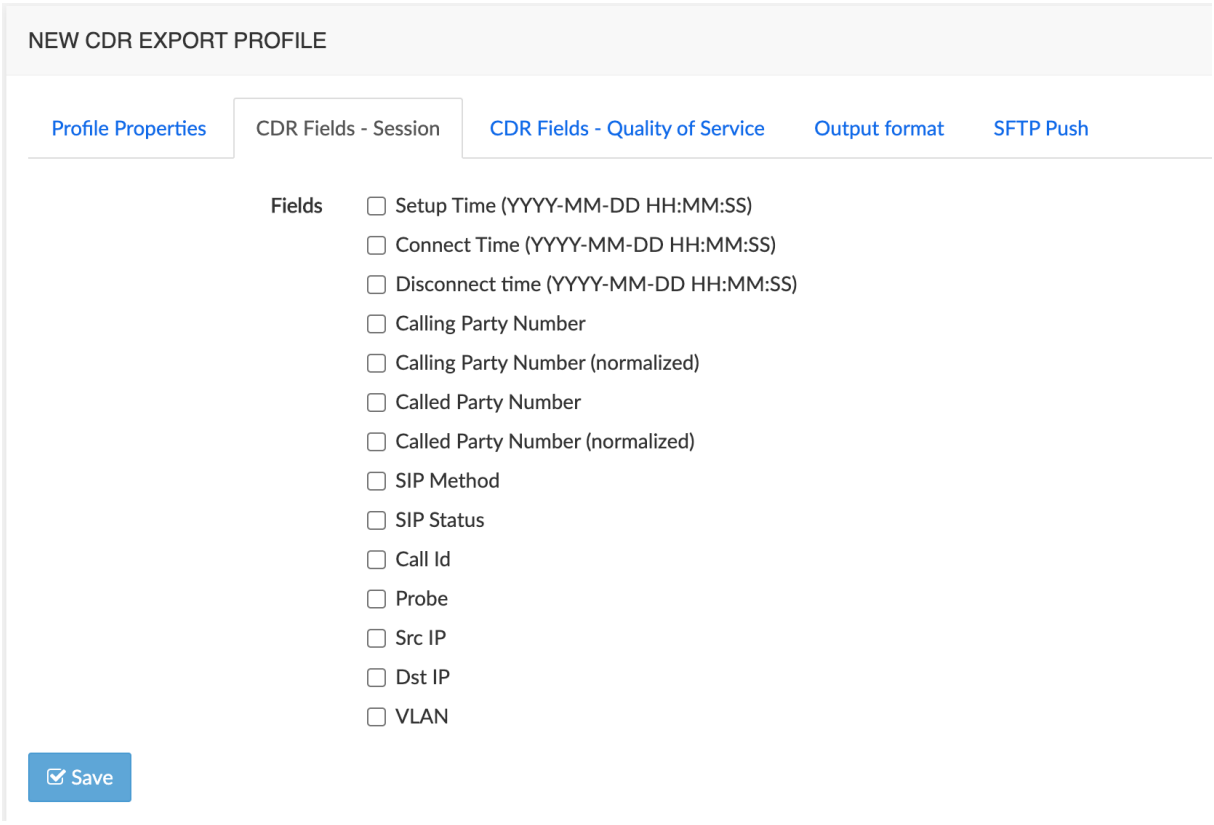


Figure 59: CDR export profile → CDR Fields-Session tab

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.

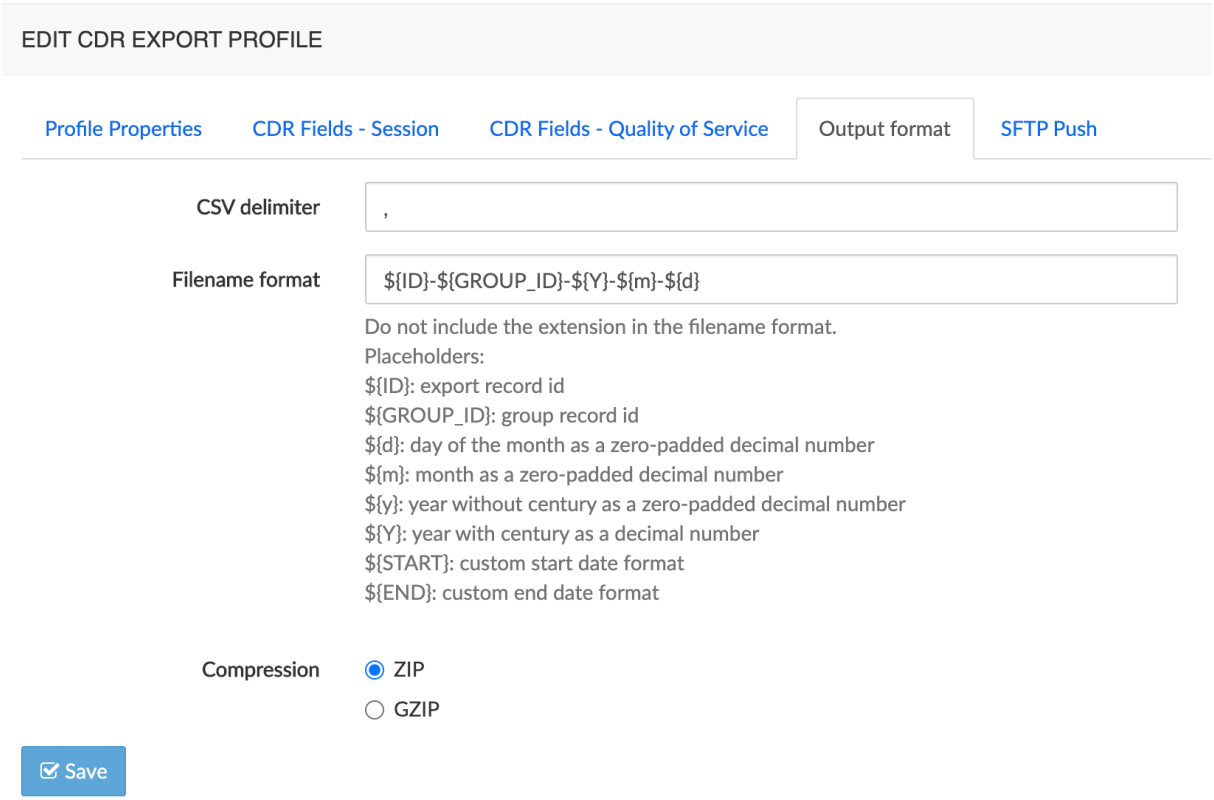


Figure 60: CDR export profile → Output format

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

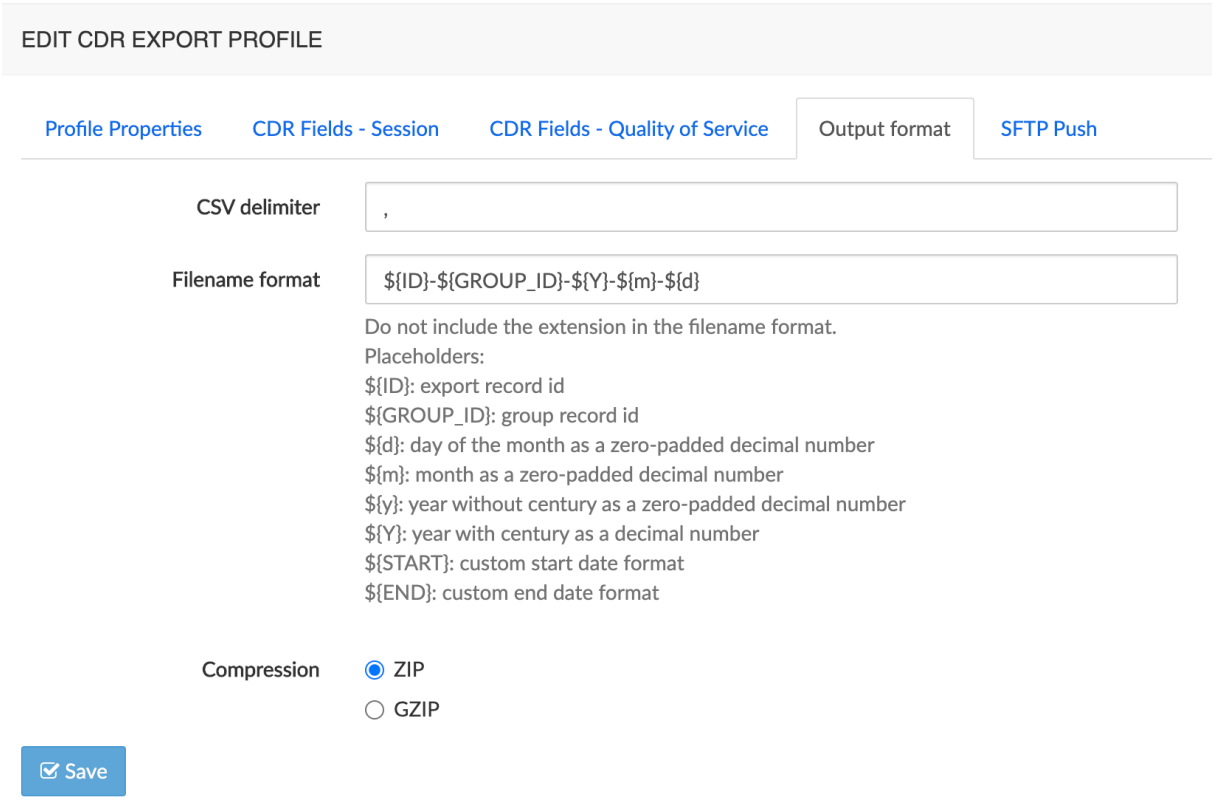


Figure 61: CDR export profile → Push SFTP tab

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.

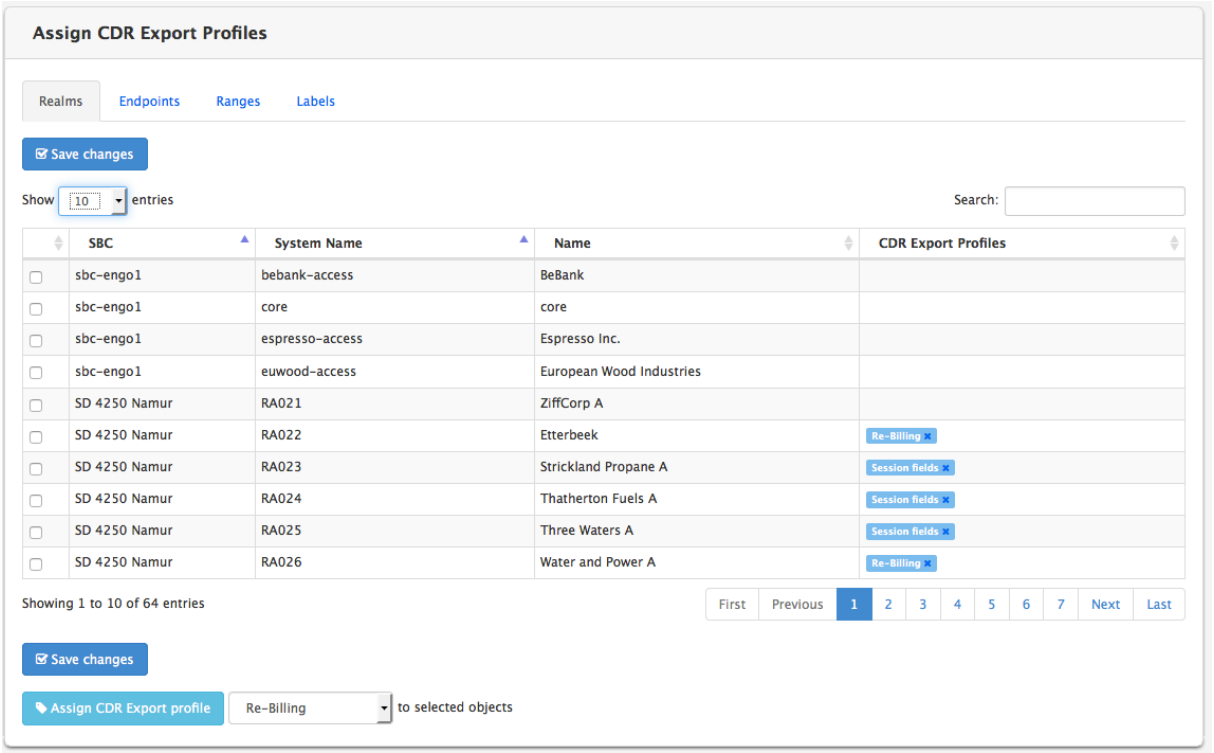


Figure 62: Realms - CDR export profile Assignment Matrix (Oracle)

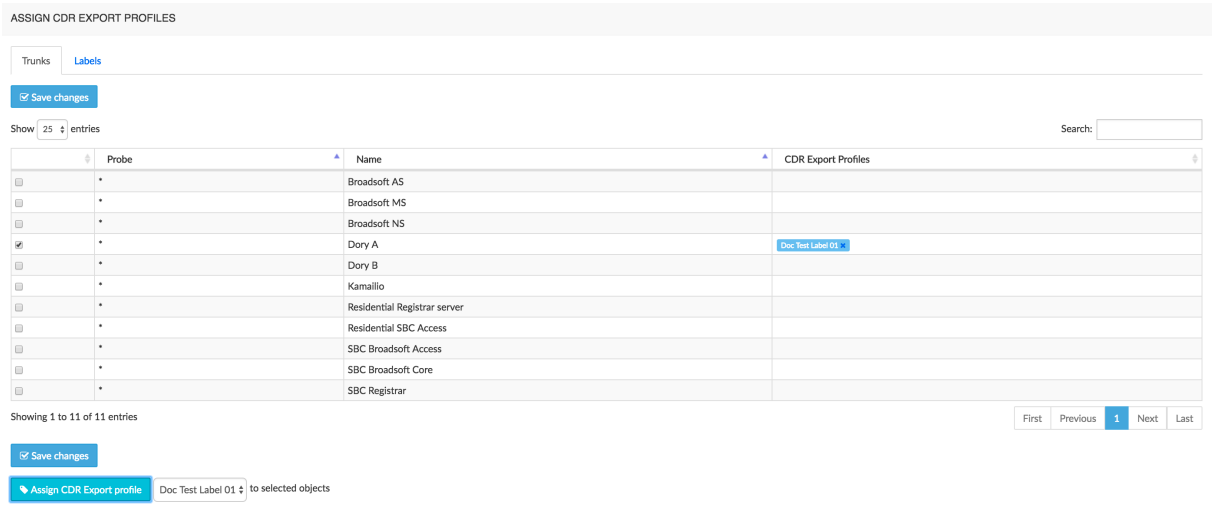


Figure 63: Trunks - CDR export profile Assignment Matrix (Probes)

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.

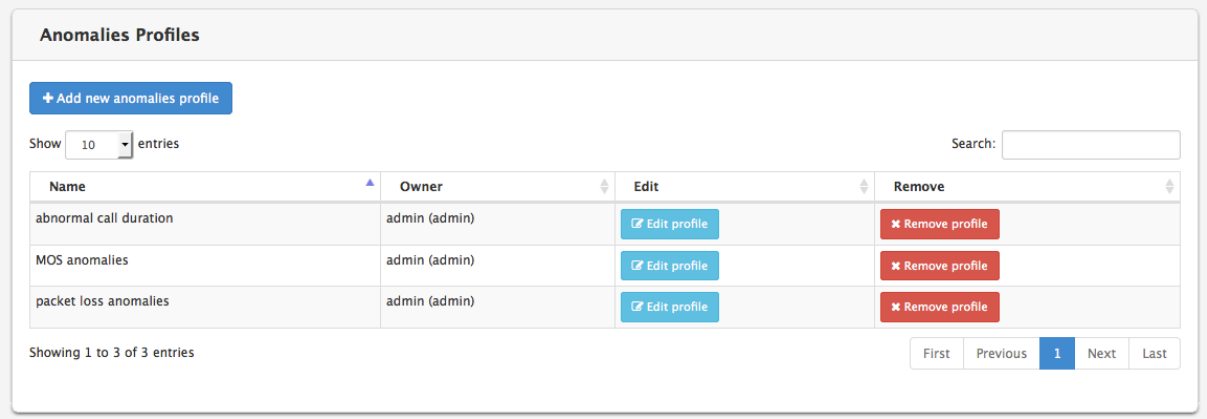


Figure 64: Anomalies Profiles List

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.

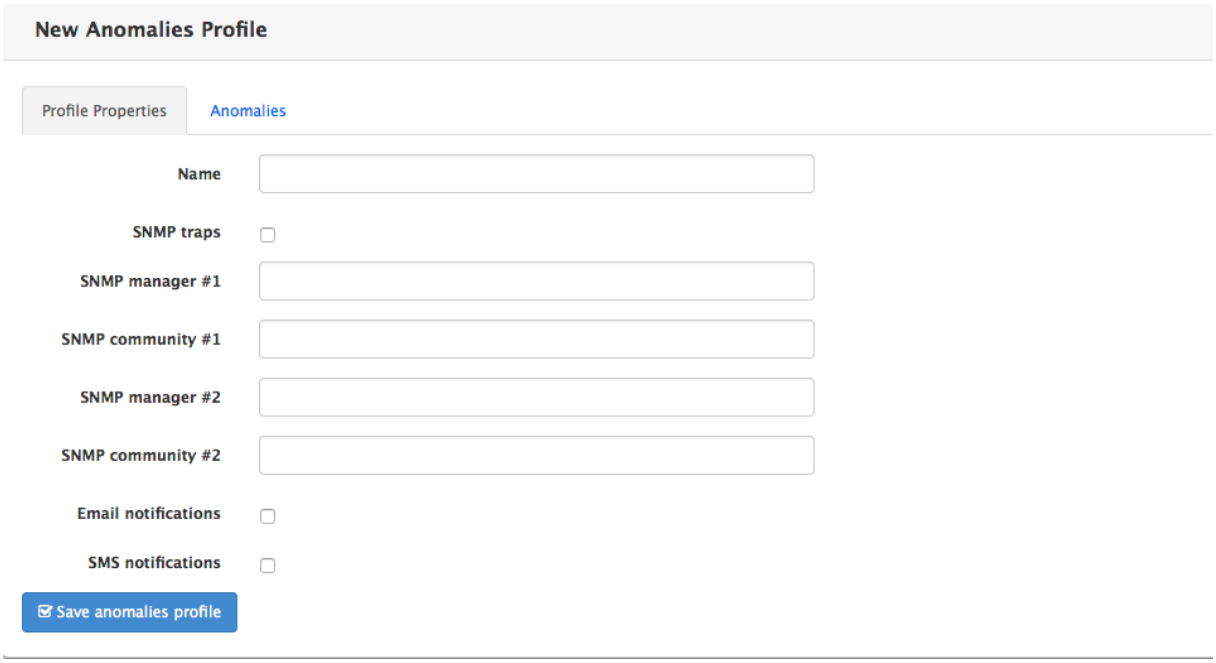


Figure 65: Anomalies Profile → Profile Properties tab

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.

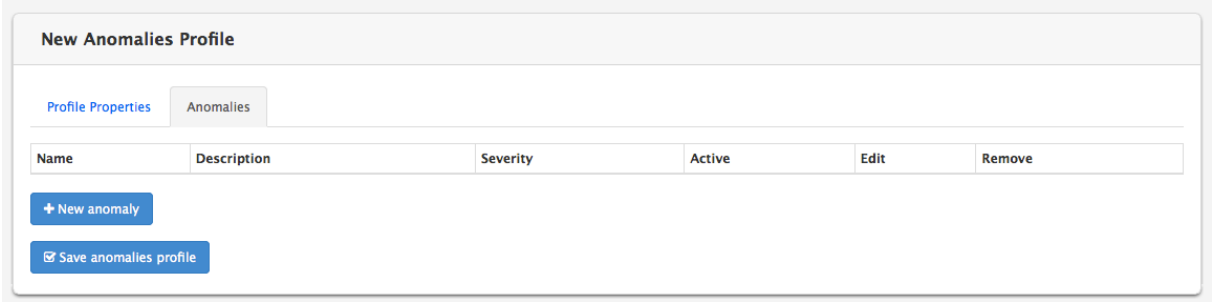


Figure 66: Anomalies Profile → Anomalies tab

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)

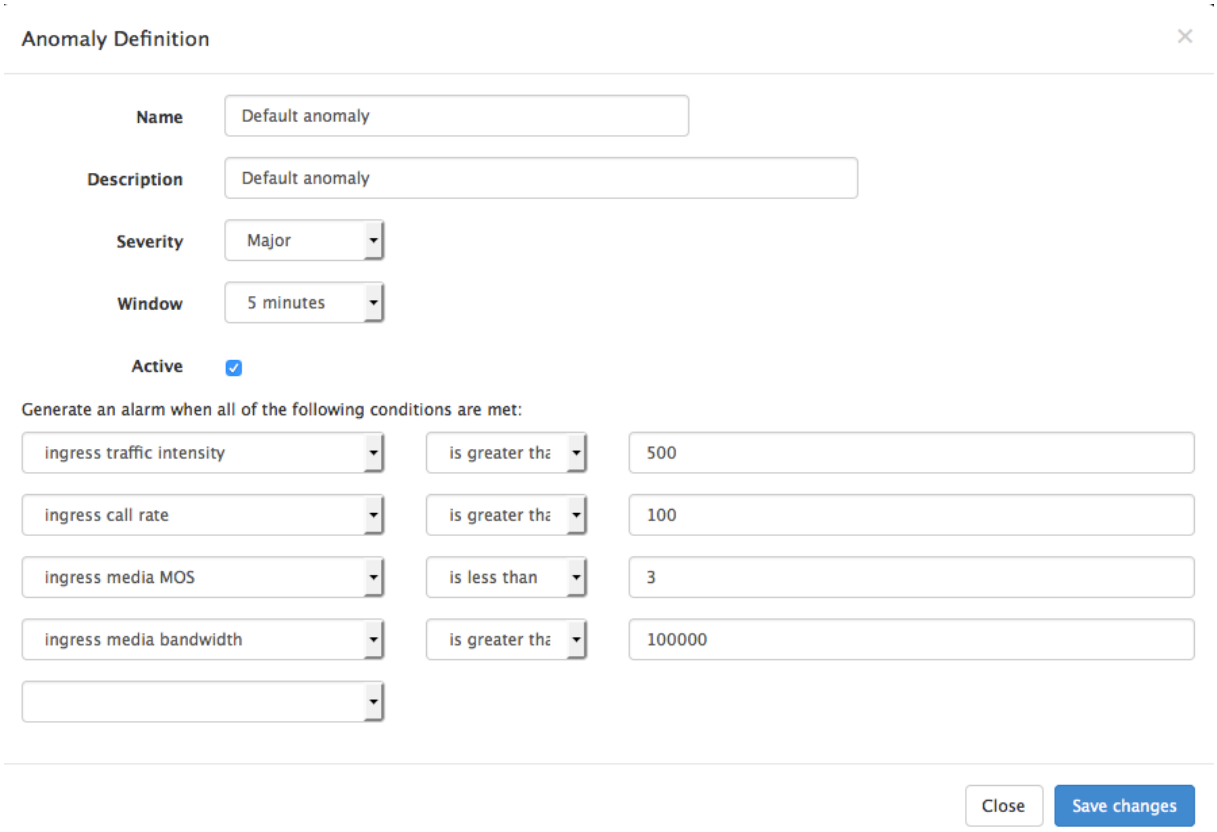


Figure 67: Anomalies Profile → Anomaly Definition

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.

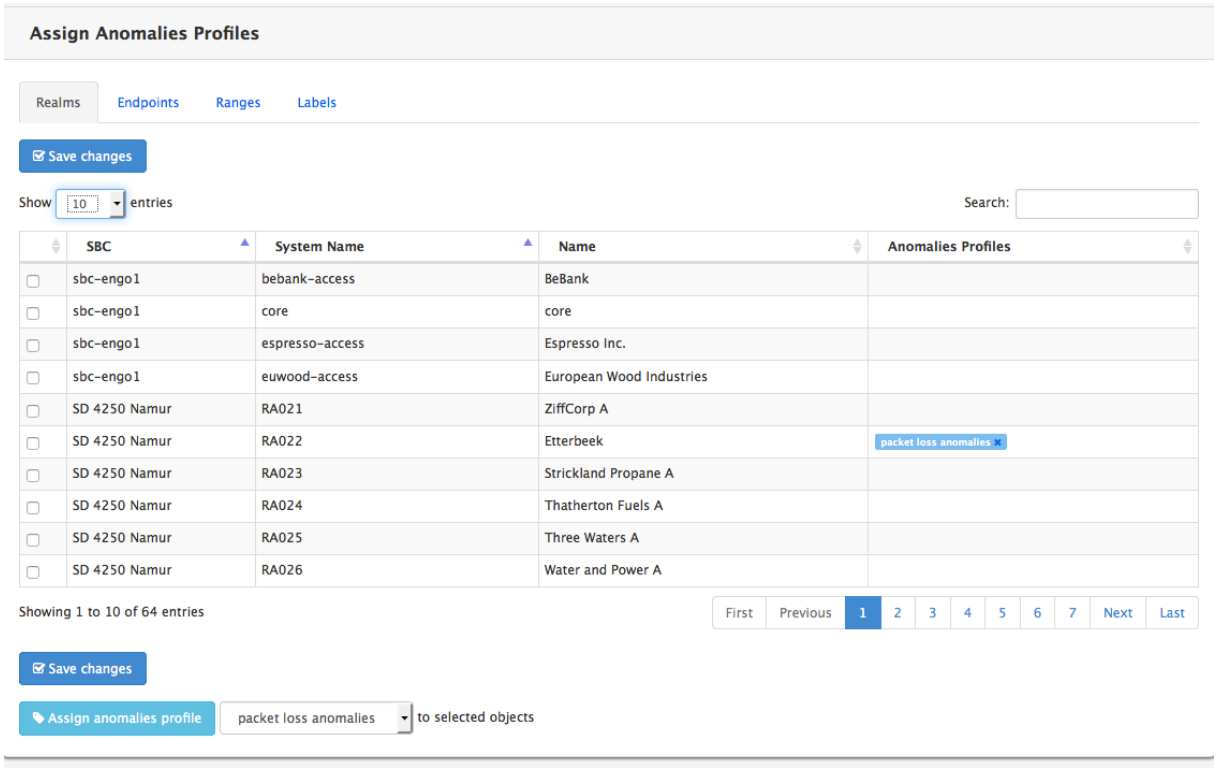


Figure 68: Anomalies Profile Assignment Matrix (Oracle)

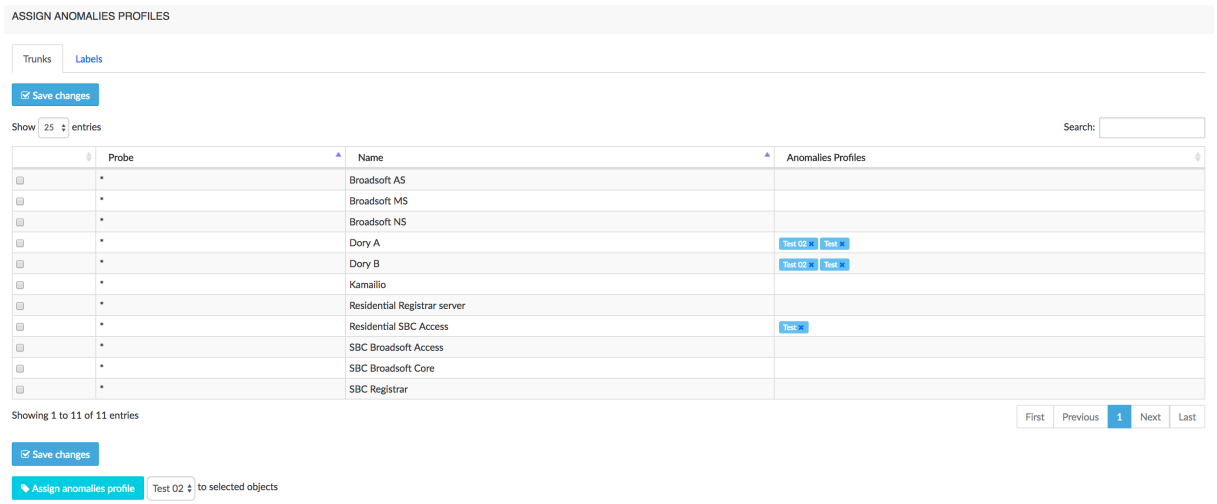


Figure 69: Anomalies Profile Assignment Matrix (Probes)

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.

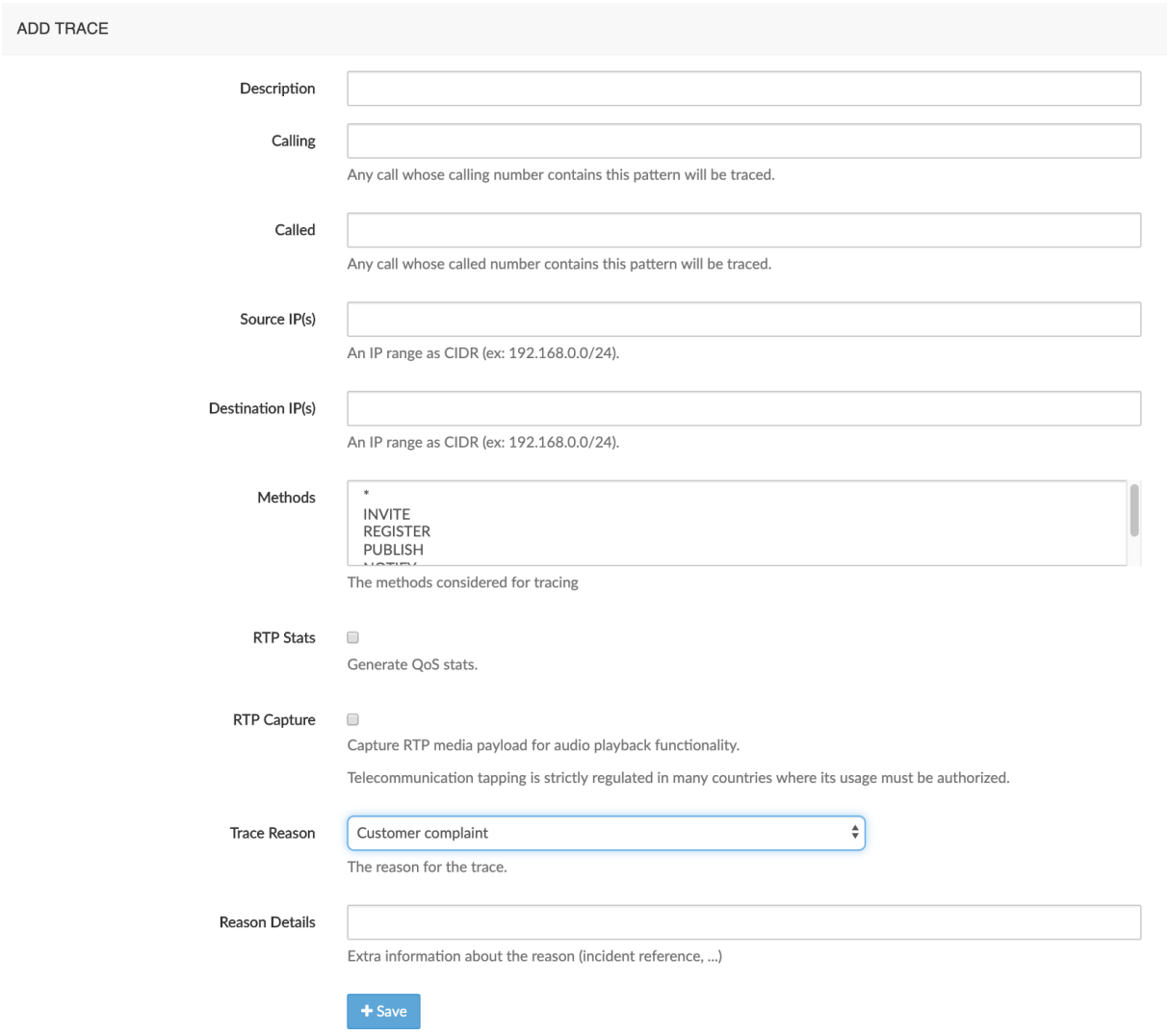


Figure 70: Tracing - Add Trace tool

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.

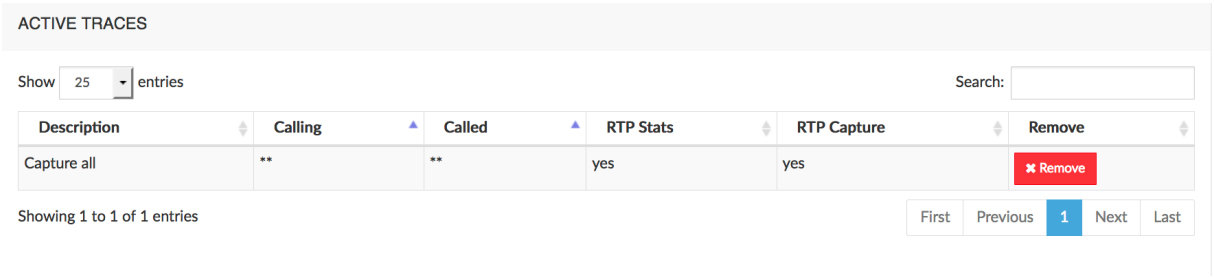


Figure 71: Tracing - Active Traces browser

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.

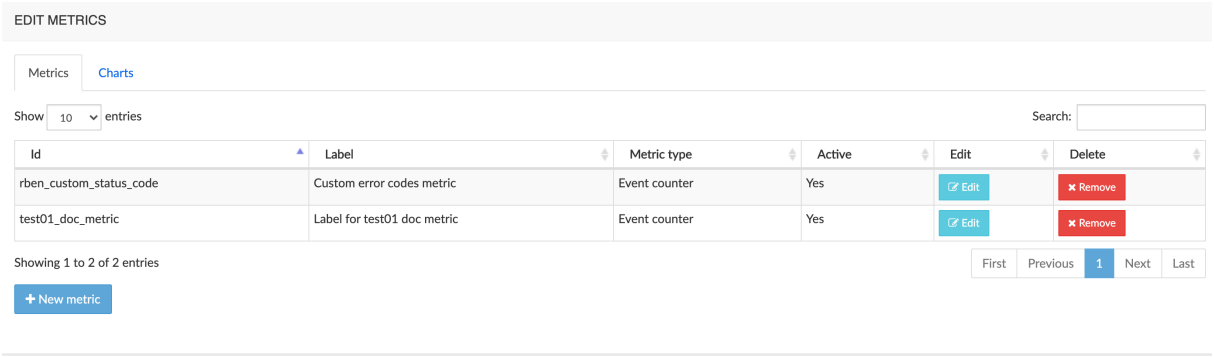


Figure 72: Edit Metrics list

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 → Anomaly Definition above).

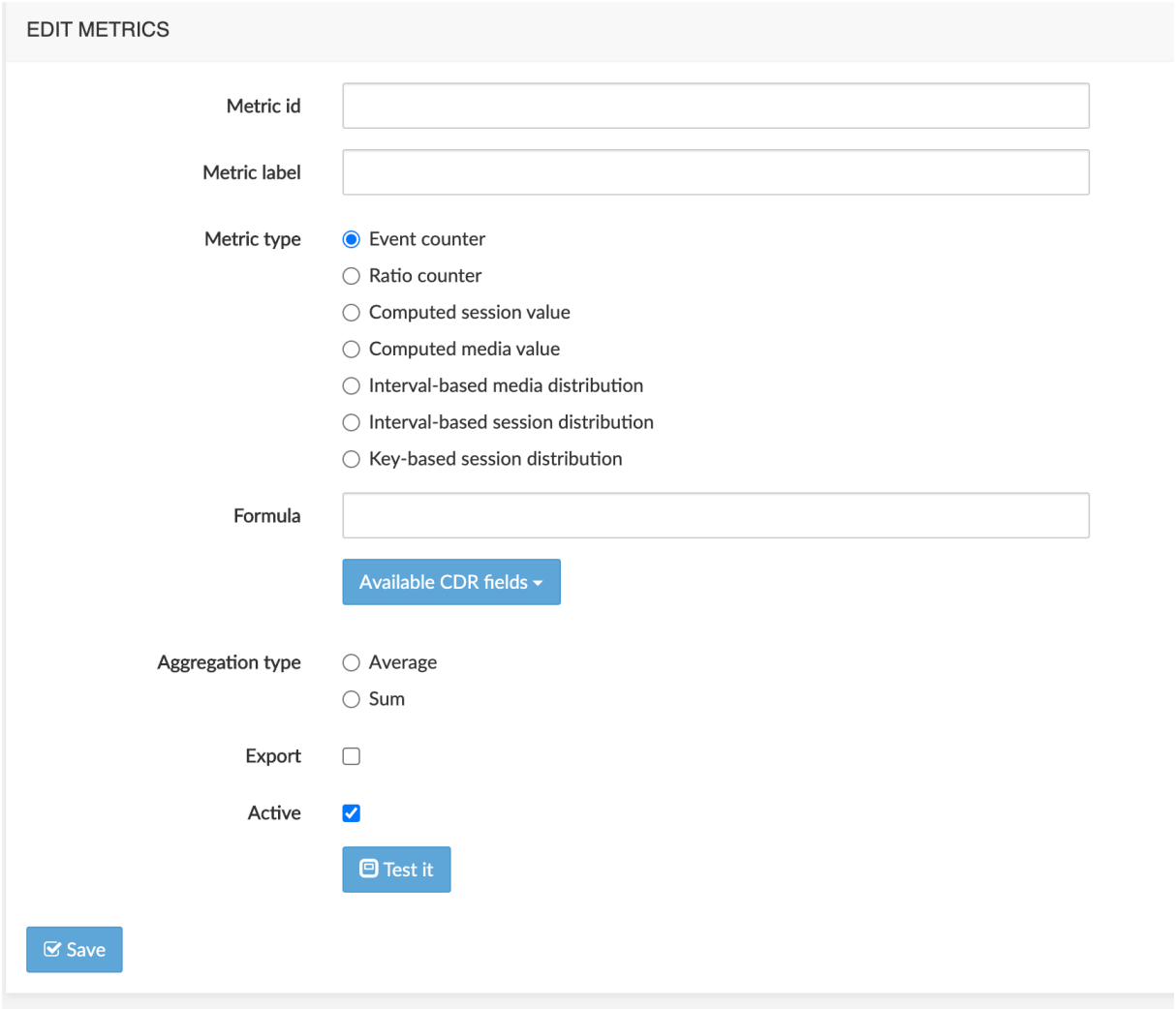


Figure 73: + New Metric → Edit Metrics → Metrics

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**

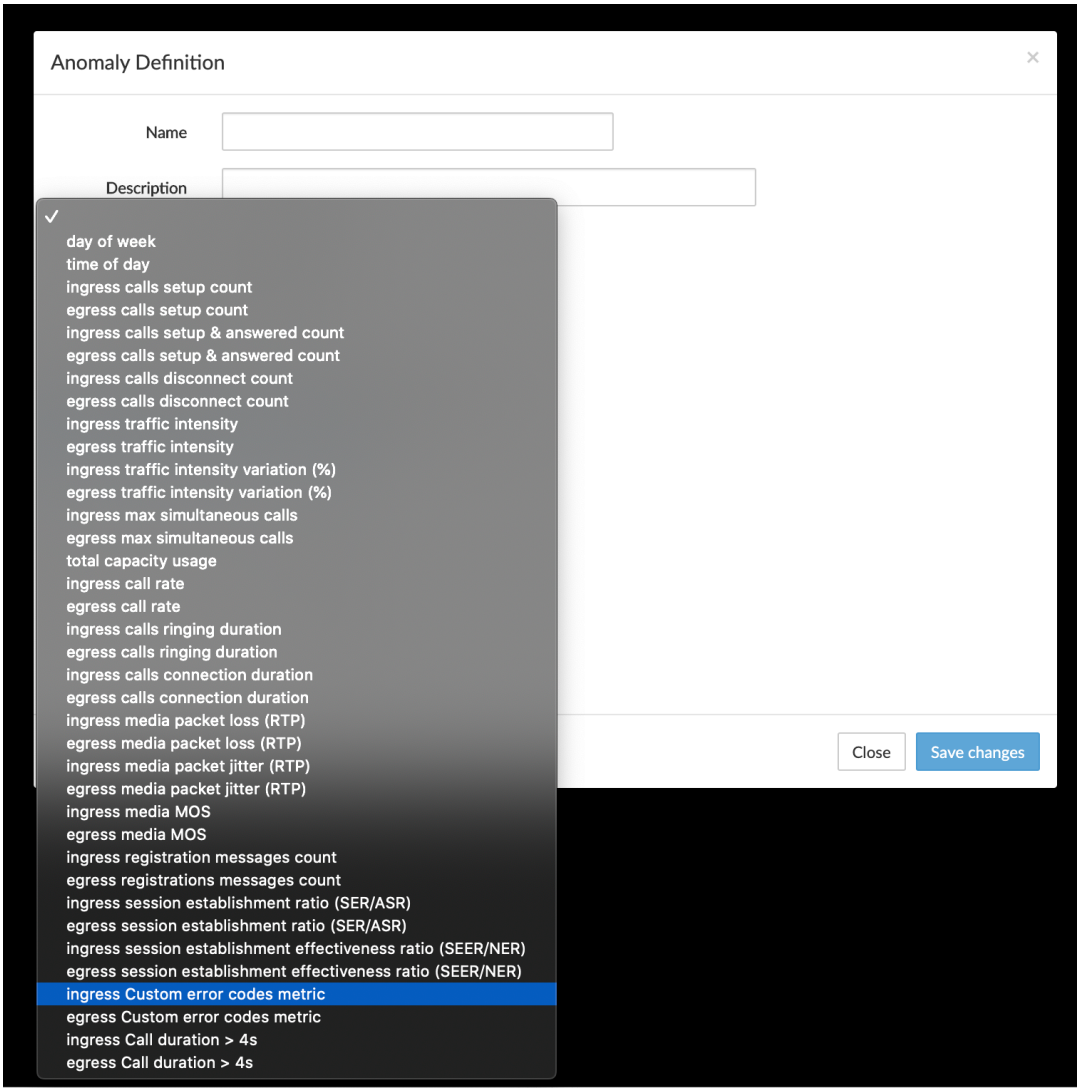
  > **Warning**
  >
  > The text string of the formula must be compliant with Python syntax. Some examples have been provided in **Metric types** above.

  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...).

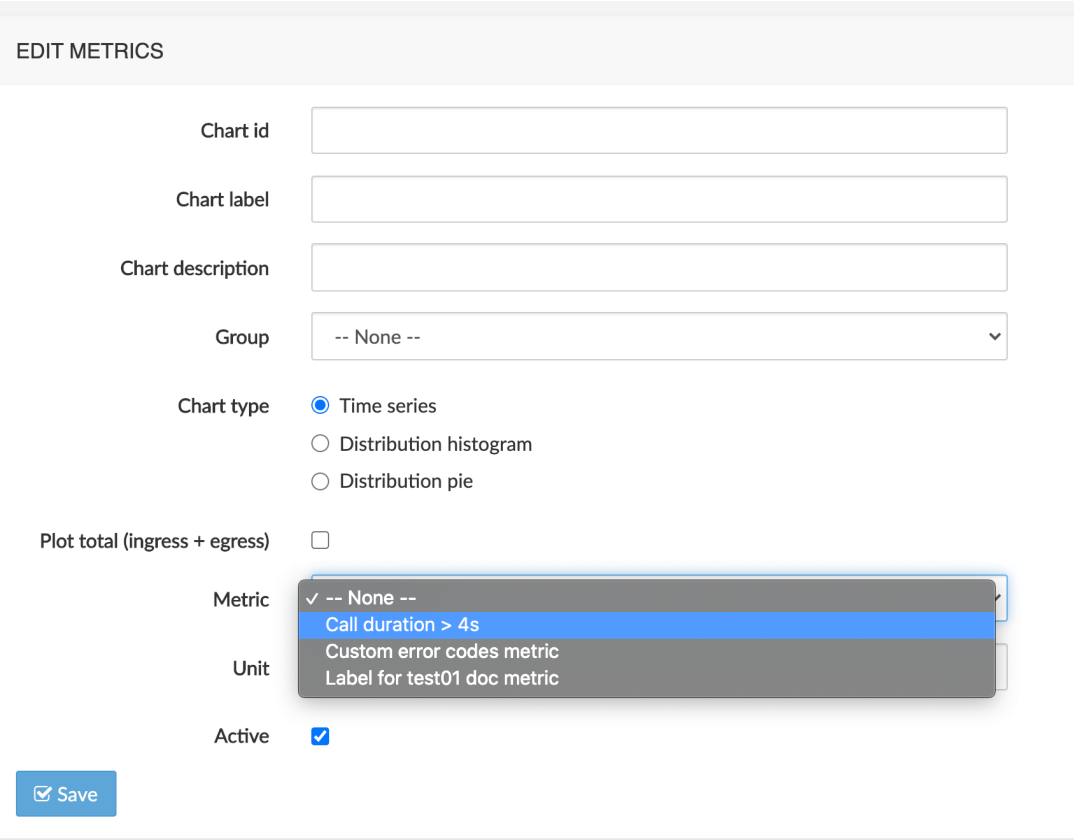
  The CDRs and their fields are equipment- and plugin-dependent (*NEMO Capture* or *Net-NetSD*).

- **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*



- and in selectable metrics list in *Settings → Metrics → Edit Metrics → Charts*



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.

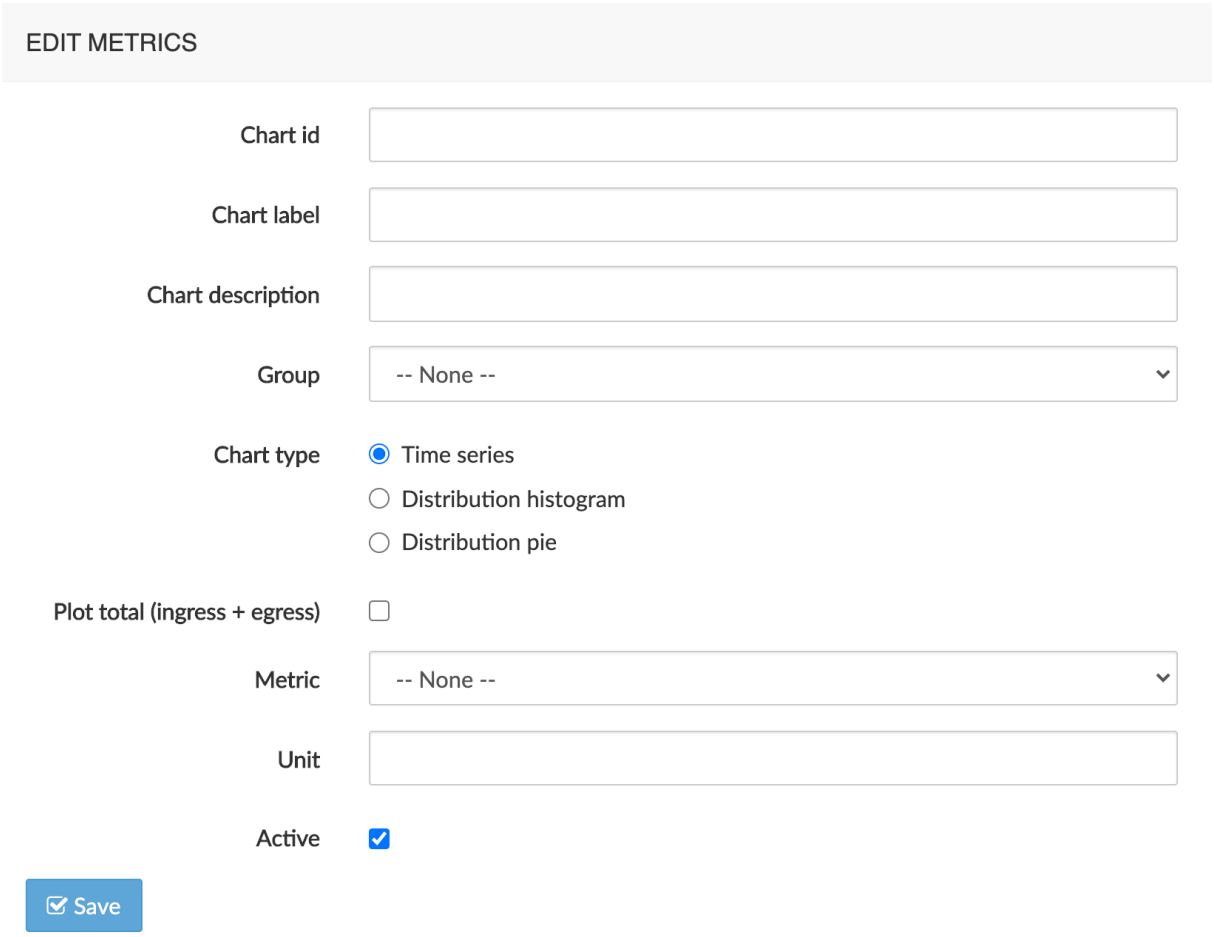


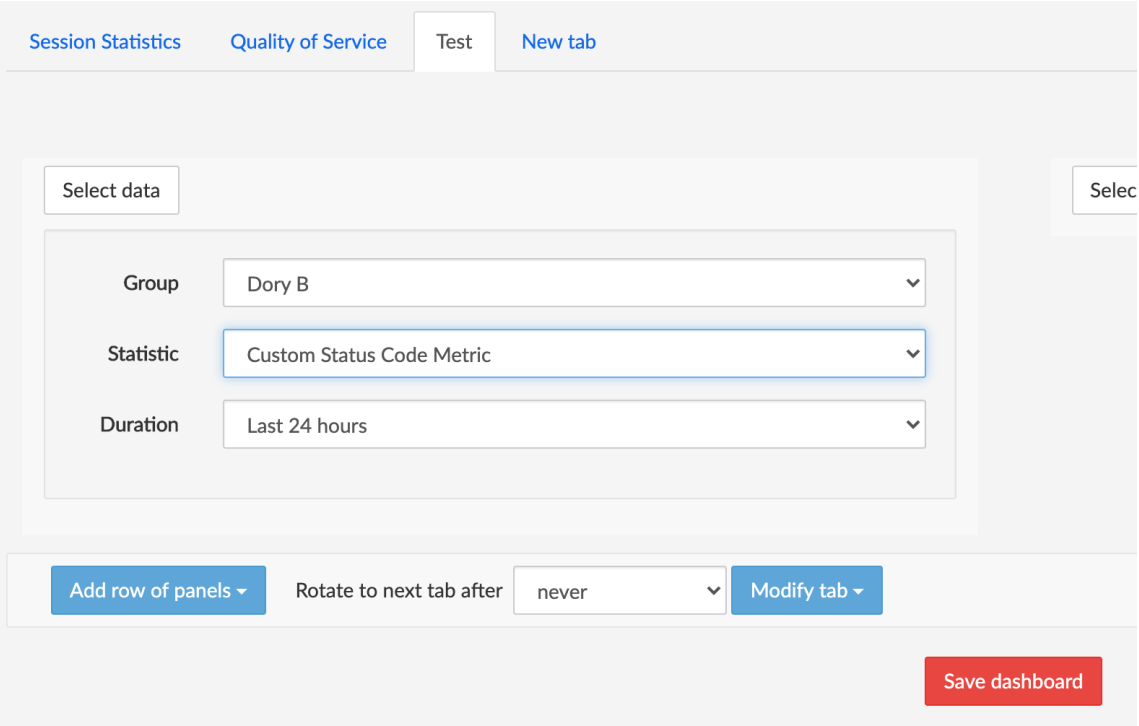
Figure 74: + New Chart → Edit Metrics → Chart

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 key-based 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.



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

```
IP-address,hostname
[redacted].117.46,test.netaxis.be
[redacted].70.70,answer.netaxis.be
```

- 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

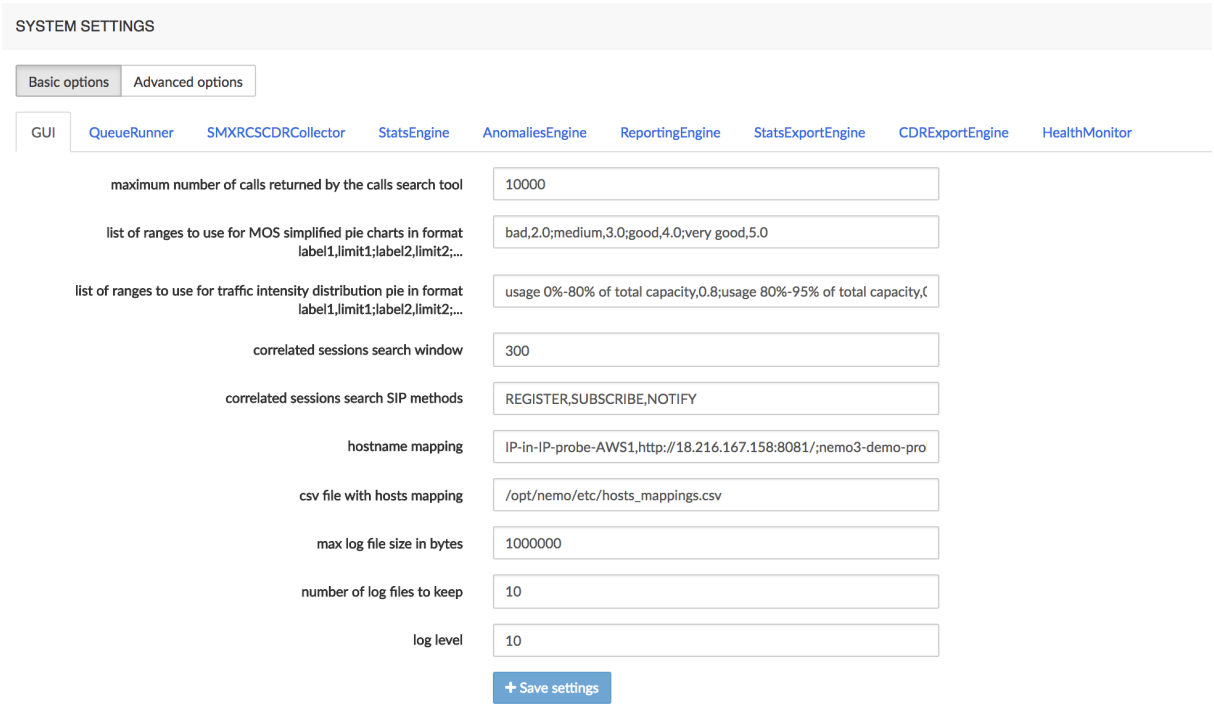


Figure 75: GUI Configuration

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)

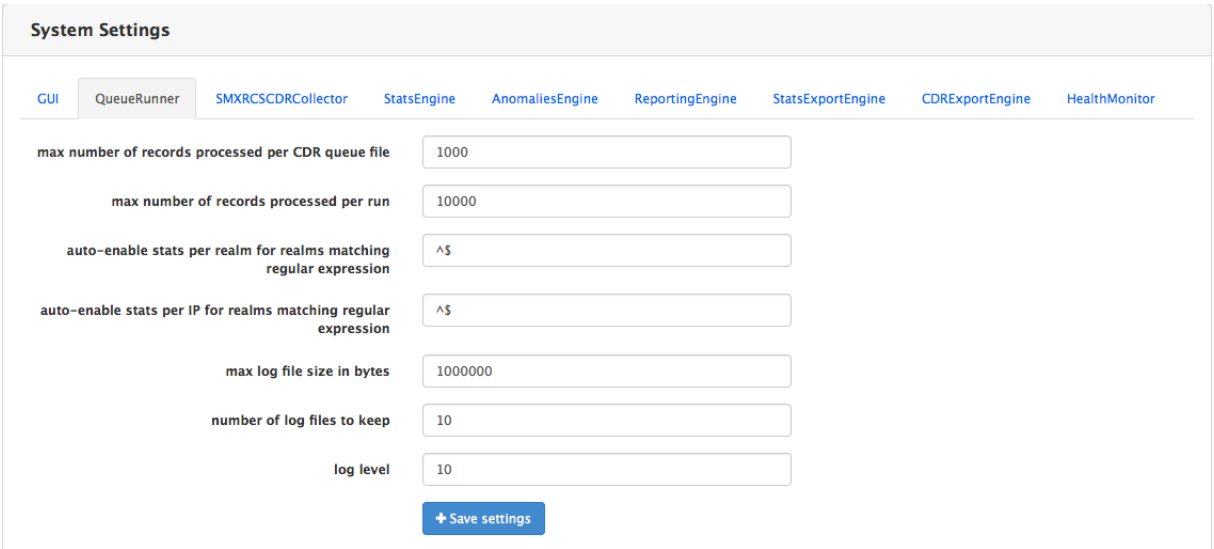


Figure 76: Queue Runners Configuration

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.

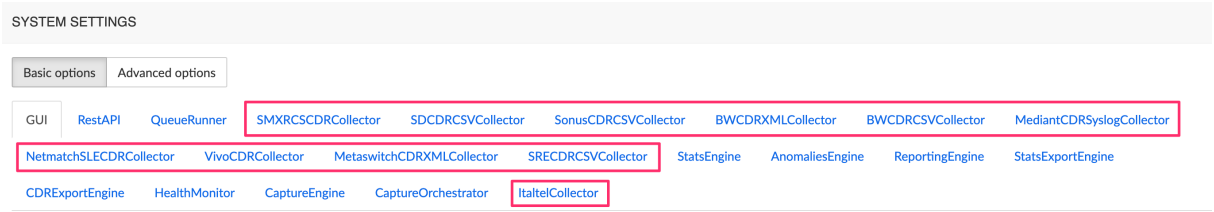


Figure 77: Collectors Configuration

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)

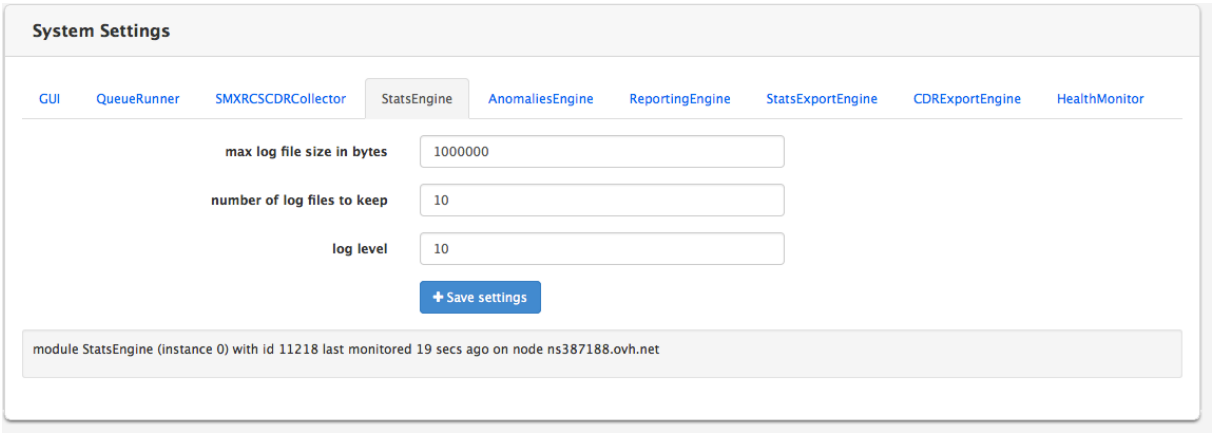


Figure 78: Stats Engine Configuration

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)

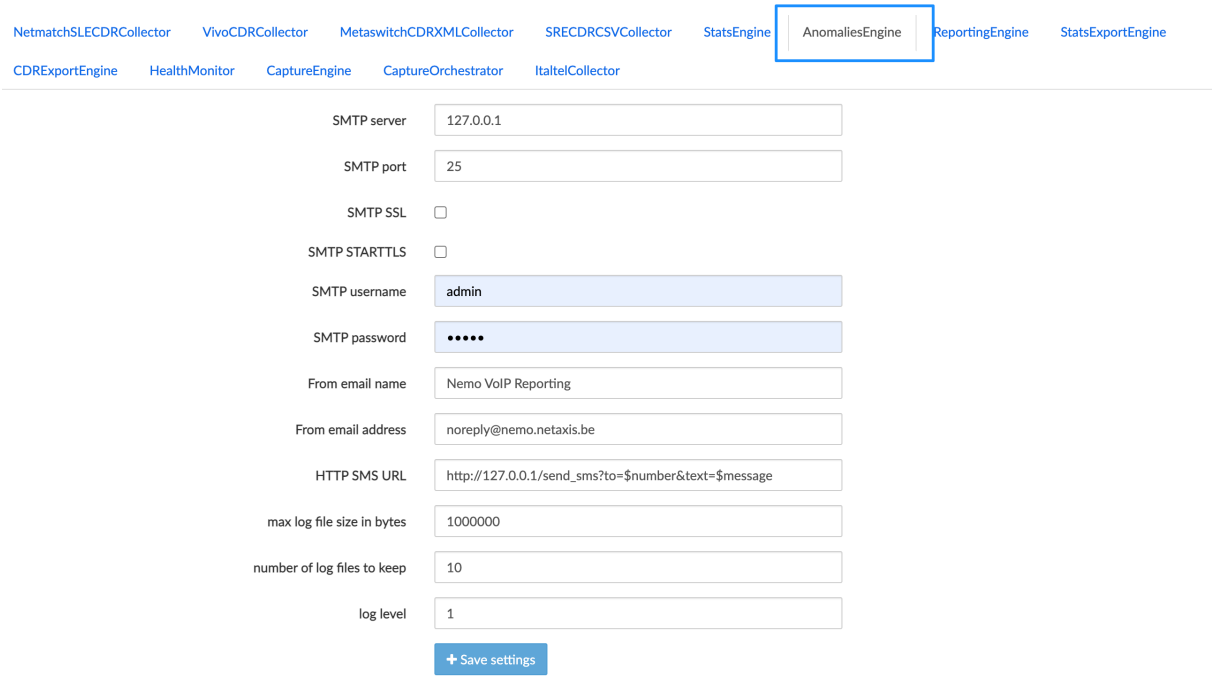


Figure 79: Anomalies Engine Configuration

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)

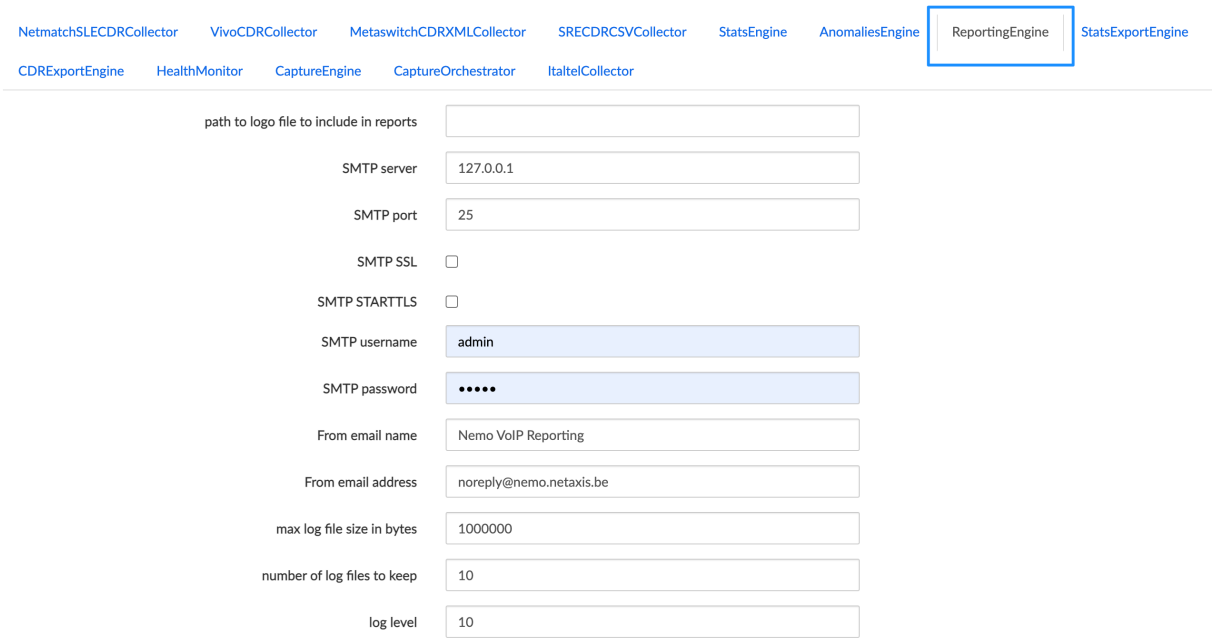


Figure 80: Reporting Engine Configuration

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)

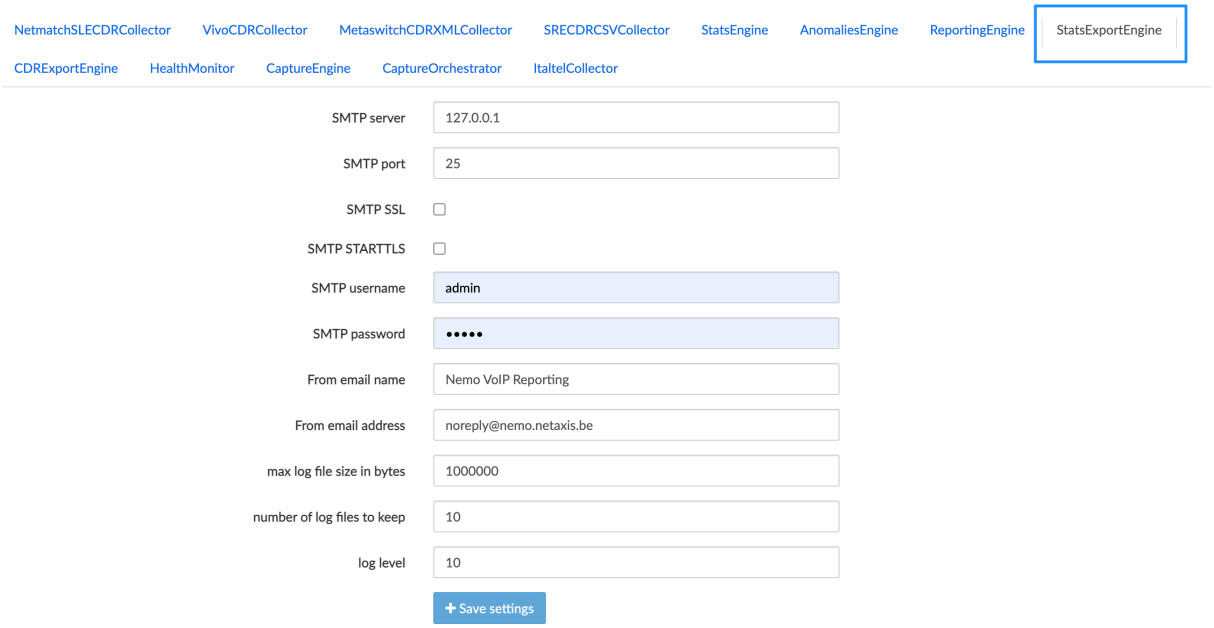


Figure 81: Statistics Export Engine Configuration

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)

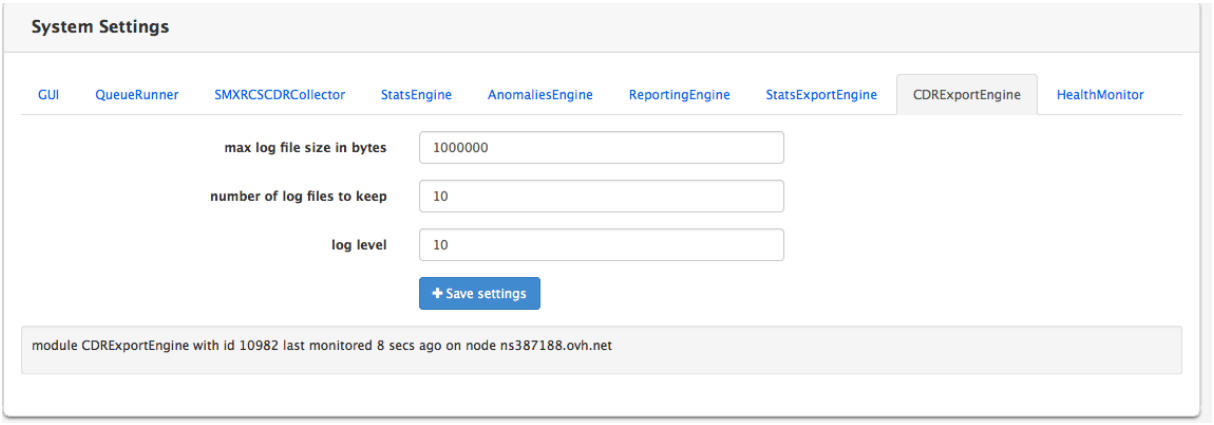


Figure 82: CDR Export Engine Configuration

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)

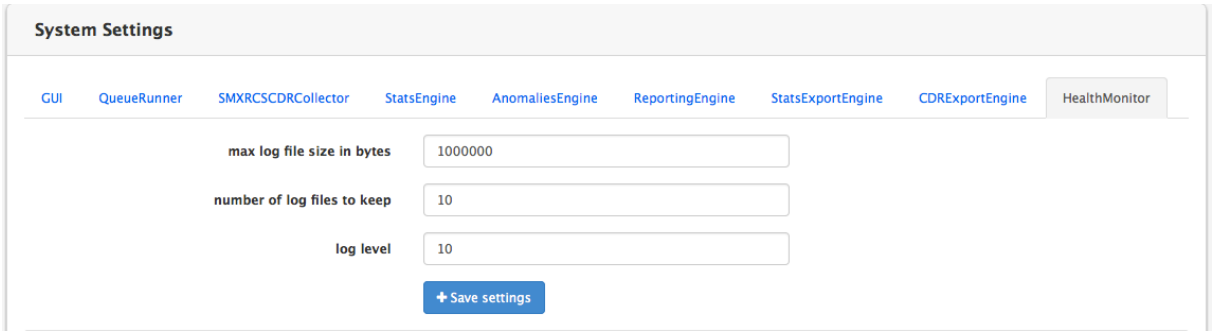


Figure 83: Health Monitoring Configuration

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.

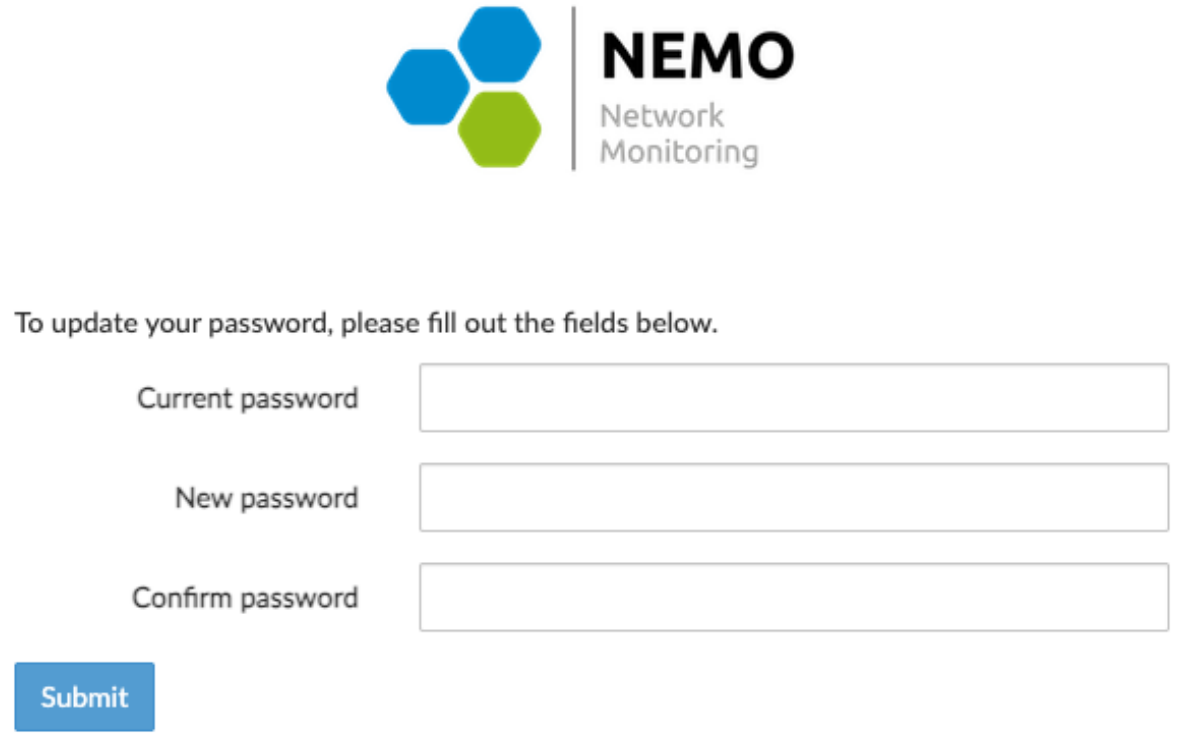


Figure 84: Password Change Form

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.

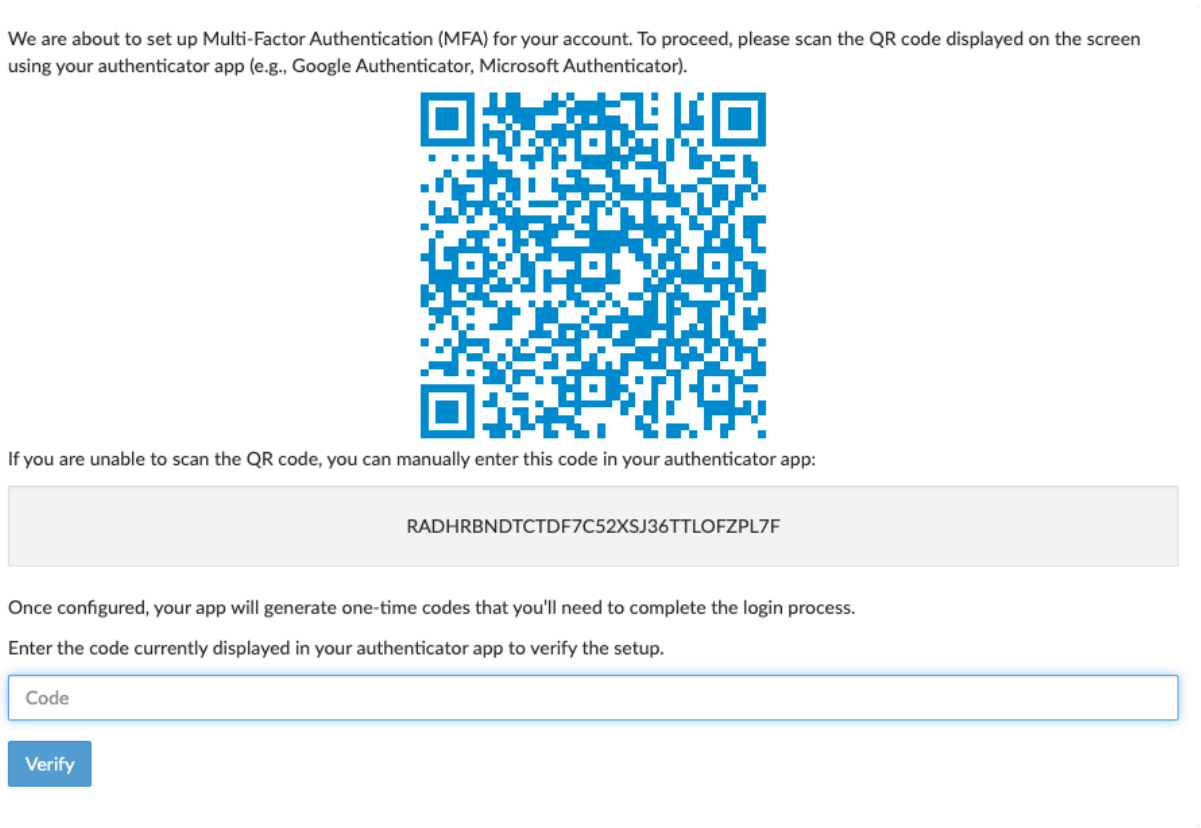


Figure 85: MFA Set Up

Tip

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
srcIp
dstIp
srcHostname
dstHostname
VLAN
callId
sipMethod
sipStatus
alertingDuration
connectionDuration
totalDuration

Search Criteria
callingRTPPackets
calledRTPPackets
callingRTPPacketsLost
calledRTPPacketsLost
callingRTPPacketLoss
calledRTPPacketLoss
callingRTPAvgJitter
calledRTPAvgJitter
callingRTCPAvgLatency
calledRTCPAvgLatency
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
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	Type
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	Type
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	To
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	Type
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
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

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
calledNormalized
ingressRemoteAddress
egressRemoteAddress
ingressLocalAddress
egressLocalAddress
alertingDuration
connectionDuration
totalDuration
postDialDelay
disconnectCause
sipStatus
codecForwardStream
codecReverseStream
callingRTPPacketsLost
calledRTPPacketsLost
callingRTPPacketLoss
calledRTPPacketLoss
callingRTCPPacketsLost
calledRTCPPacketsLost
callingRTCPPacketLoss
calledRTCPPacketLoss
callingRTPAvgJitter
calledRTPAvgJitter
callingRTCPAvgJitter
calledRTCPAvgJitter
callingRTPMaxJitter

Search Criteria
calledRTPMaxJitter
callingRTCPMaxJitter
calledRTCPMaxJitter
callingRTCPAvgLatency
calledRTCPAvgLatency
callingRTCPMaxLatency
calledRTCPMaxLatency
callingMOS
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

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

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	Type
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	Type
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	Type
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	Type
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	Type
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	Type
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	Type
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
typeOfNetwork
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
ingress 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	Type
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	Type
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	Type
CLASS	integer
CONNECTED	string
CORRELATOR	string
ERROR	string
LONGCALL	string
OPERATOR	string
REESTABLISHED	string
SEQNUM	integer
TESTCALL	string

Field	Type
ACCOUNTCODEINFO	string
CALLFORWARDINFO_PRIVACY	string
CALLFORWARDINFO_LASTREDIRECTINGADDR	string
CALLFORWARDINFO_LASTREDIRECTINGADDR_CALLINGPARTYSCREENING	string
CALLFORWARDINFO_LASTREDIRECTINGADDR_TYPE	string
CALLFORWARDINFO_ORIGINALCALLEDADDR	string
CALLFORWARDINFO_ORIGINALCALLEDADDR_CALLINGPARTYSCREENING	string
CALLFORWARDINFO_ORIGINALCALLEDADDR_TYPE	string
CALLFORWARDINFO_ORIGINALCALLINGADDR	string
CALLFORWARDINFO_ORIGINALCALLINGADDR_CALLINGPARTYSCREENING	string
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	Type
ICSEIZETIME	integer
INCOMINGGATEWAY	string
INTELLIGENTNETWORKINFO_BCSM	string
INTELLIGENTNETWORKINFO_CHARGEADDR	string
INTELLIGENTNETWORKINFO_CHARGEADDR_CALLINGPARTYSCREENING	string
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	Type
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	Type
ORIGPARTY_SERVEDPARTY_CALLINGPARTYADDR_CALLINGPARTYSCREENING	string
ORIGPARTY_SERVEDPARTY_CALLINGPARTYADDR_TYPE	string
ORIGPARTY_SERVEDPARTY_CHARGEADDR	string
ORIGPARTY_SERVEDPARTY_CHARGEADDR_CALLINGPARTYSCREENING	string
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_CALLINGPARTYSCREENING	string
ORIGPARTY_SERVEDPARTY_SUBSCRIBERADDR_TYPE	string
ORIGPARTY_SERVEDPARTY_TO	string

Field	Type
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_DESTTRUNKGROUPLABEL	string
ORIGPARTY_SERVEDPARTY_TRUNKGROUP_ORIGTRUNKCONTEXT	string
ORIGPARTY_SERVEDPARTY_TRUNKGROUP_ORIGTRUNKGROUPLABEL	string
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_EXTERNALREFACTOR	integer
ORIGPARTY_SERVEDPARTY_VQM_ENDPOINT_CALLQUALITY_LQMOS	integer
ORIGPARTY_SERVEDPARTY_VQM_ENDPOINT_CALLQUALITY_OVERALLREFACTOR	integer
ORIGPARTY_SERVEDPARTY_VQM_ENDPOINT_CALLQUALITY_RFACTOR	integer
ORIGPARTY_SERVEDPARTY_VQM_ENDPOINT_DELAY_ENDSYSTEMDELAY	string
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	Type
ORIGPARTY_SERVEDPARTY_VQM_ROUNDTRIPDELAY	string
ORIGPARTY_SERVEDPARTY_VQM_TAG_CALLQUALITY_CQMOS	integer
ORIGPARTY_SERVEDPARTY_VQM_TAG_CALLQUALITY_EXTERNALRFACTOR	integer
ORIGPARTY_SERVEDPARTY_VQM_TAG_CALLQUALITY_LQMOS	integer
ORIGPARTY_SERVEDPARTY_VQM_TAG_CALLQUALITY_OVERALLRFACTOR	integer
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	Type
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	Type
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_CALLINGPARTYSCREENING	string
ROUTINGINFO_CALLINGPARTYORIGADDR_TYPE	string
ROUTINGINFO_CALLINGPARTYROUTEDADDR	string
ROUTINGINFO_CALLINGPARTYROUTEDADDR_CALLINGPARTYSCREENING	string
ROUTINGINFO_CALLINGPARTYROUTEDADDR_TYPE	string

Field	Type
ROUTINGINFO_DESTADDR	string
ROUTINGINFO_DESTADDR_CALLINGPARTYSCREENING	string
ROUTINGINFO_DESTADDR_TYPE	string
ROUTINGINFO_FAILEDTRUNKGROUPS_FAILEDTRUNKGROUP_TRUNKACCOUNTING	string
ROUTINGINFO_FAILEDTRUNKGROUPS_FAILEDTRUNKGROUP_REASON	string
ROUTINGINFO_FAILEDTRUNKGROUPS_FAILEDTRUNKGROUP_REASON_TYPE	string
ROUTINGINFO_FAILEDTRUNKGROUPS_FAILEDTRUNKGROUP_TRUNKGROUPID	integer
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_INFORMATIONTRANSFERCAPABILITY	string
SIGNALINGINFO_FALLBACKUSERSERVICE_INFORMATIONTRANSFERCAPABILITY_TYPE	string

Field	Type
SIGNALINGINFO_ISUPPREFERENCE	integer
SIGNALINGINFO_ISUPUSED	string
SIGNALINGINFO_MEDIACAPABILITYREQUESTED	string
SIGNALINGINFO_MEDIACAPABILITYUSED	string
SIGNALINGINFO_PCHARGINGFUNCTIONADDRESSES_CCFADDRESSES	string
SIGNALINGINFO_PCHARGINGFUNCTIONADDRESSES_ECFADDRESSES	string
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_INFORMATIONTRANSFERCAPABILITY	integer
SIGNALINGINFO_USERSERVICE_INFORMATIONTRANSFERCAPABILITY_TYPE	integer
TERMPARTY_ANI-II	string
TERMPARTY_BILLINGTYPE	string
TERMPARTY_CPC	string

Field	Type
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	Type
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_CALLINGPARTYSCREENING	string
TERMPARTY_SERVEDPARTY_CALLINGPARTYADDR_TYPE	string
TERMPARTY_SERVEDPARTY_CHARGEADDR	string
TERMPARTY_SERVEDPARTY_CHARGEADDR_CALLINGPARTYSCREENING	string
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	Type
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_CALLINGPARTYSCREENING	string
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_DESTTRUNKGROUPLABEL	string
TERMPARTY_SERVEDPARTY_TRUNKGROUP_ORIGTRUNKCONTEXT	string
TERMPARTY_SERVEDPARTY_TRUNKGROUP_ORIGTRUNKGROUPLABEL	string
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	integer
TERMPARTY_SERVEDPARTY_VQM_ENDPOINT_CALLQUALITY_EXTERNALREACTOR	integer
TERMPARTY_SERVEDPARTY_VQM_ENDPOINT_CALLQUALITY_LQMOS	integer
TERMPARTY_SERVEDPARTY_VQM_ENDPOINT_CALLQUALITY_OVERALLREACTOR	integer
TERMPARTY_SERVEDPARTY_VQM_ENDPOINT_CALLQUALITY_RFACTOR	integer

Field	Type
TERMPARTY_SERVEDPARTY_VQM_ENDPOINT_DELAY_ENDSYSTEMDELAY	string
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_EXTERNALRFACTOR	integer
TERMPARTY_SERVEDPARTY_VQM_TAG_CALLQUALITY_LQMOS	integer
TERMPARTY_SERVEDPARTY_VQM_TAG_CALLQUALITY_OVERALLRFACTOR	integer
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	Type
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	Type
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

Column
Calling NAI
Called NAI
Calling Number (normalized)
Called Number (normalized)
Called (4)
Called NAI (4)
Routed called (203)
Routed called NAI (203)
Delivered CLI (50)
Delivered CLI NAI (50)
Alerting Duration (secs)
Connection Duration (secs)
Total Duration (secs)
Start Time
Call Duration (secs)
Disconnect Cause (10)
Call 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

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

5.7.6 Custom Metrics Exposed Fields

Field	Type
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.