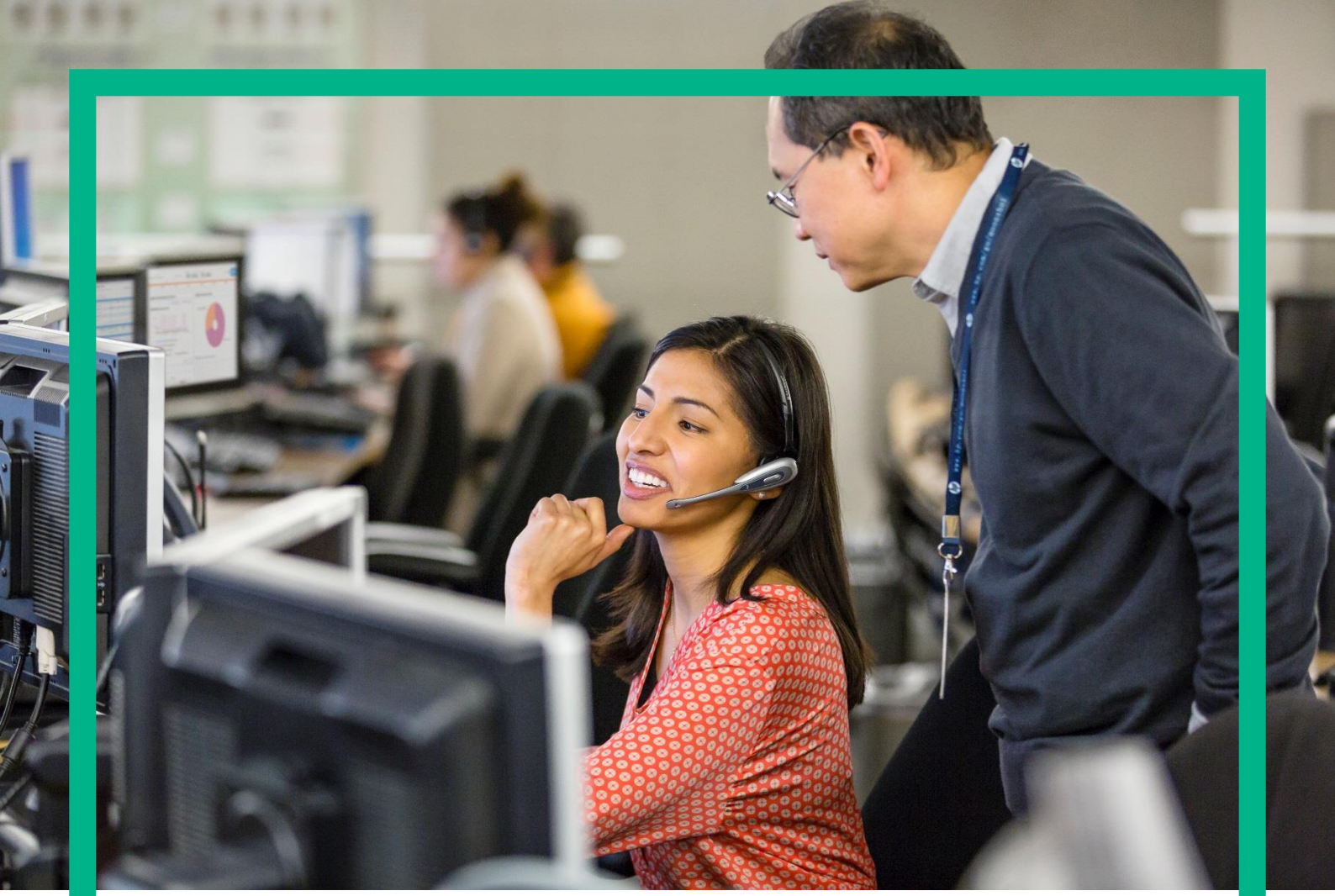

HPE OSS Customer Experience Assurance V5.3

Base Platform
User Guide

Hewlett Packard Enterprise

Notices

Legal notice

Printed in the US

Trademarks

Contents

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Preface
About this guide

This guide introduces the user to CEA R5.3 with a review of the different available features.

Intended Audience

This guide is intended for anyone who is interested in using CEA R5.3

Document history

Table 1: Document history

Edition	Date	Description
v1	19th July 2016	First revision

Document structure

The following table lists the chapters contained in this document:

Table 2: Document Structure

Chapter	Description
Chapter 1. Introduction	Provides an overview on CEA R5.3 the key aspects and the new features.
Chapter 2. Starting and Exiting	Describes how to login and logout the system.
Chapter 3. Navigation	Describes how menus are organized and the functionality provided.
Chapter 4. Aggregated data reports	Describes how to visualize and configure a report, explaining its functionalities
Chapter 5. Dashboards	Describes the available dashboards.
Chapter 6. Free Exploration of Data	Describes the CEA tools for creating new reports.
Chapter 7. Drilldown	Describes the Drilldown feature.
Chapter 8. Dashboard builder	Describes the scheduling and alarming features.
Chapter 9. Scheduling and Alarming	Describes how to scheduled reports in background and how to set alarms on the reports.
Appendixes	Displays the list of preconfigured KQI reports available in CEA.

Notation Styles

References to standard items are noted in Cursive

Section, Figures and Data table References are hyperlinks noted in Cursive

Information Statements are noted with an information icon

Warning Statements are noted with a warning icon

Sample notes look as follows. If you require a Danger or Warning alert, modify the caution alert label.

NOTE: Note alert.

NOTICE: Notice alert.

CAUTION: Caution alert.

TIP: Tip alert.

Chapter 1
Introduction

1.1 Overview

This document is the User Guide for Customer Experience Assurance (CEA) Release 5.3. The following subsections provide a high level overview of the solution and what's new in this version.

1.2 Key Aspects

CEA Release 5.3 allows the Operator to go from an Executive level view of the entire network and business impacting indicators to a deep dive of each Customer, down to each raw event and signaling packet. At the core Release 5.3 is processing data for 100% of the Customer base, with indicators covering all aspects:

- **Radio Access Technology:** 4G/3G/2G, as well as the key scenarios where Customers' handsets default to lower than expected RATs due to network conditions, with subsequent implication for Quality of Experience.
- **Location:** down to cell identifier and sector, and with the level of precision provided by the underlying interfaces.
- **Devices:** auto-discovered from the traffic and grouped into different dimensions such as brand or model.
- **QoE:** Quality of Experience is at the core of the system with the more advanced set of indicators in the industry.
- **Video:** as it is becoming the key service with more than 50% of the traffic.
- **Priceplans**: CEA provides the unique ability to correlate the usually separated domains on business and network, which enables the Operator to align network actuations with the business goals.

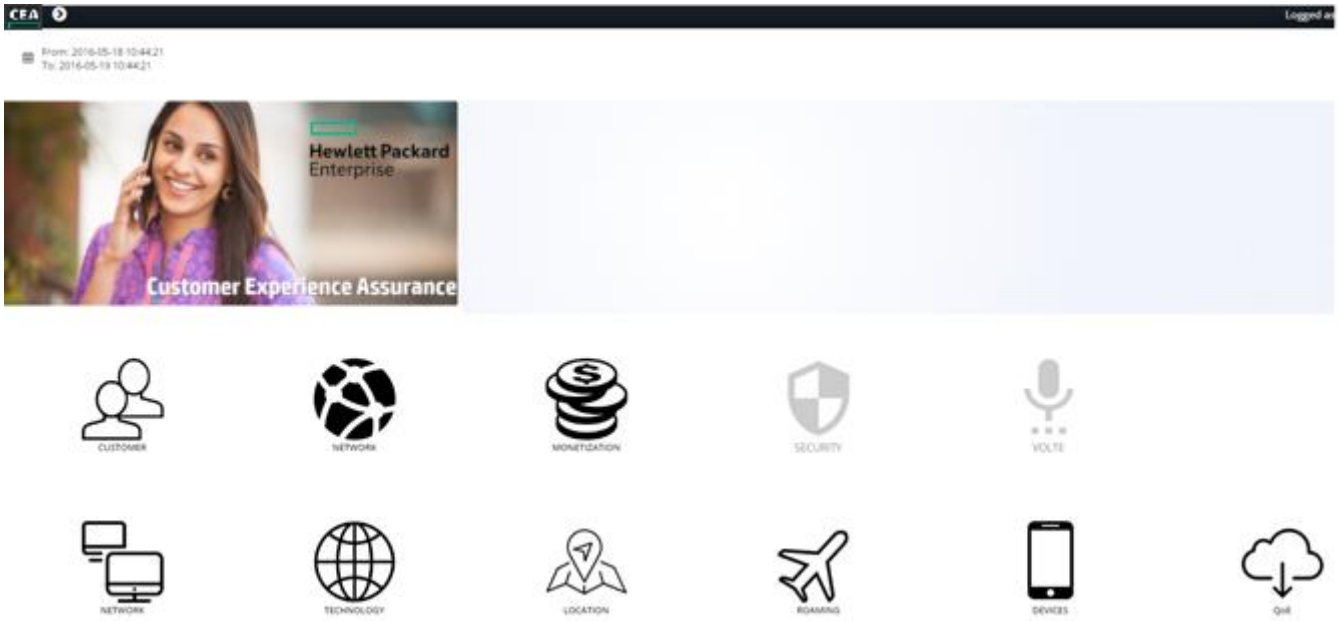


Figure 1. Executive Dashboards

1.3 Open platform

CEA is a holistic and open multi-vendor and multi-domain platform, which can integrate any data source and is future proof.

CEA is software solution running on COTS which covers:

- **Mediation:** real-time mediation layer which includes a large library of collectors and it is at the heart of the ability of CEA to act as an umbrella system.
- **Edge Processing and Storage**: This Real-Time Software Solution is distributed and can maintain data locality by processing the most massive nodes at the edge with Direct Attached Storage (DAS)

1.4 CEA Out-of-the box solution for Mobile Broadband

CEA in combination with **Zhilabs Next Generation AppLevel probe** constitutes an out-of-the box solution for the Mobile Broadband domain, ready to be deployed in very reduced timelines in telco-operators.

- **Zhilabs Next Generation AppLevel probe**: a highly scalable Quality of Experience probe which can be connected passively to monitor a variety of data interfaces including LTE core, interfaces with the radio nodes and pure IP interfaces.

1.5 What's new

- The CEA V5.3 platform is a new minor version of HPE CEA OEM product that is extending the current solution capabilities already available on V5.2, improving **solution performance**, allowing an increase of number of subscribers processed by each server
- **New charts**
- **New Pivot-Table feature, that improves the solution usability**

The new release is also adding new software packages (requiring separated licensing and explained in other documents):

- **Rest-API:** API for running data queries on individual elements (subscriber, cell, device model) from external systems.
- **Exporters:** interface for running bulk data queries from external systems.
  - Flow-level for Mobile Broadband User-plane (Web-browsing and Applications)
  - Aggregation for KQIs at subscriber level (Customer Experience Exporter)
  - Aggregation for Applications at subscriber level (Customer Intelligence Exporter)
- **Customer Care Dashboards,** advanced GUI that allows non-technical users to troubleshoot customer complaints in a very easy way
- **Troubleshooting,** advanced GUI that allows technical users to troubleshoot customer and network complaints in a very detailed way

Chapter 2
Starting and Existing

CEA Application is accessed via web by using the URL provided by your CEA administrator. This URL will redirect you to the login screen.

Before trying to access the application, please, ask your CEA administrator to provide you with:

- Access URL
- User name
- Password

Internet Connection is needed.
Supported browsers are:

- Chrome
- Firefox

2.1 Log into CEA R5.3

Once you enter the access URL in your web browser you will be redirected to CEA R5.3 Login screen as depicted in Figure 2.

It contains two main items:

1. **Background:** A welcome nature image different every single day.
2. **Login window:** It allows the user to log into the system by introducing a valid user name and password.

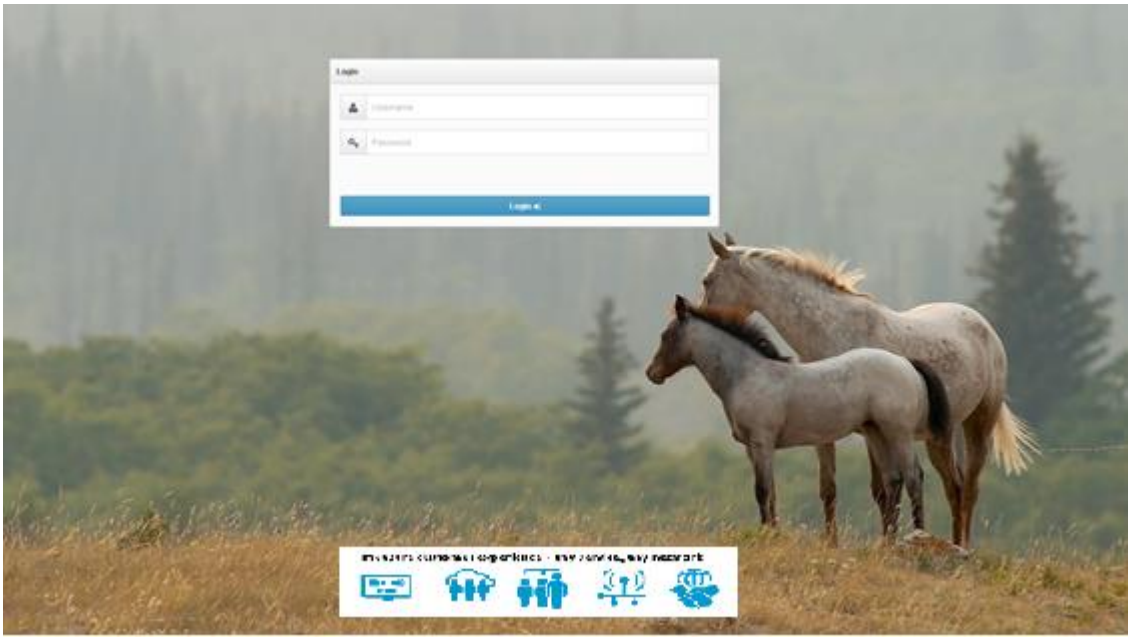


Figure 2. Login screen

Use your valid user name and password to access to the default initial screen as shown in Figure 3.

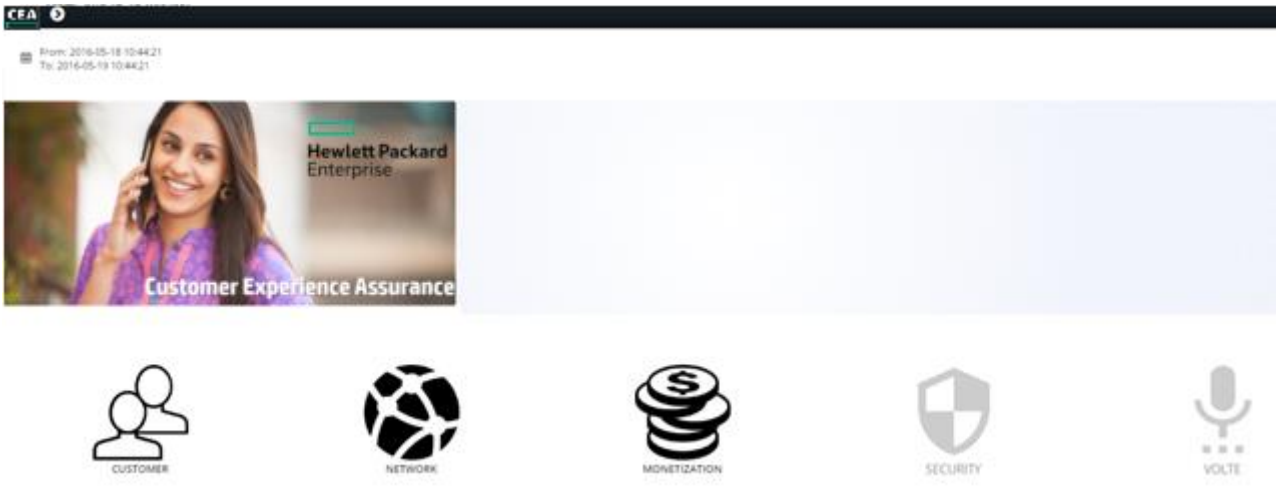


Figure 3. Initial screen

If PC Time Zone is different from the server Time Zone, a warning message will appear as it can be seen in the following image:

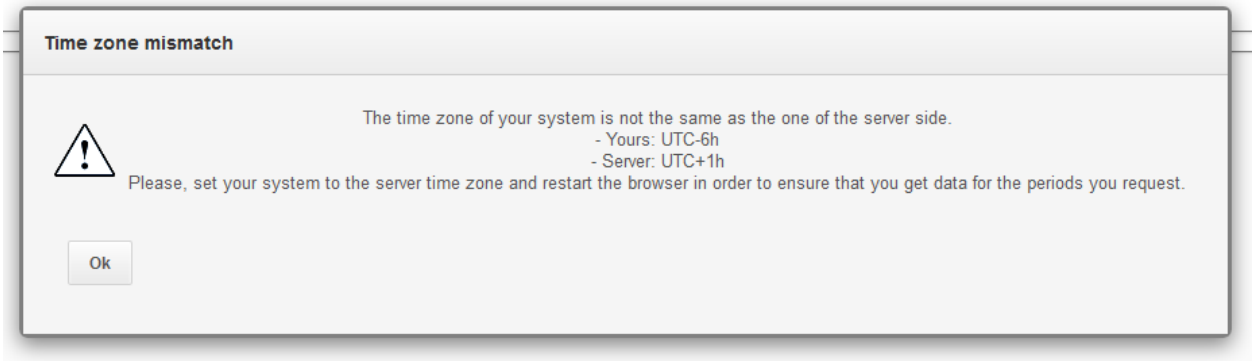


Figure 4. Time Zone mismatch message

If the mismatch message appears, please, align PC Time Zone with Server Time Zone. Remember to restart your browser once the Time Zone is changed

2.2 Log out CEA R5.3

Exiting CEA is done by means of clicking on the Log Out icon at the top right of the Main Bar as shown in Figure 5.

Figure 5. CEA logout

Chapter 3
Navigation

3.1 Main Bar

CEA application shows a Main Bar on the top of the screen. This bar has three main items:

- **Menu arrow.** By clicking this arrow, the *Main Menu* is displayed as depicted in Figure 6.
- **User button.** By clicking on user button you can change your password as depicted in Figure 7.
- **Log-out** button. Use this button to exit the application.

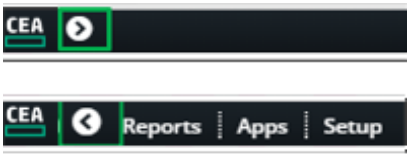


Figure 6. Menu arrow

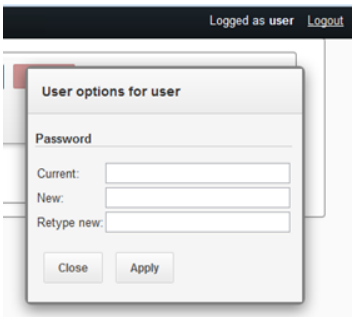


Figure 7. Changing password

3.2 Main Menu

Reports Menu provides the access to the reporting capabilities of the system that will be deeply described along this document. It contains the following submenus:

- **Dashboard:** Provides a set of first insights into the overall status of the Operation and a starting point to drill-down sessions.
- **Full Search Panel**: Allows the free exploration on the available data and the production of both: relevant KPIs/KQIs and non-predefined reports.
- **Wall Panel:** Provides access to the wall queries without the Full Search option
- **Reports:** Provides the access to the predefined reports.

Figure 8. Menu Reports

3.3 Report functionalities

3.3.1 Summarization options

The Summarization Option indicates the time interval for which you want to summarize the result. CEA Release 5.3 data base resolution is 15 minutes but sometimes it is interesting to get the Summarized value per:

- hour
- day
- week
- month
- year

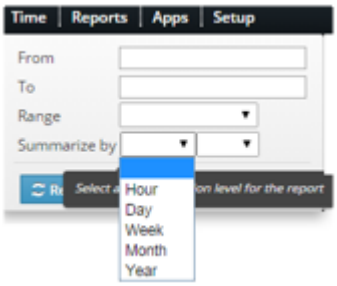


Figure 9. Summarization options

Depending on the time-range length some summarizations are not available. For example, the minimum summarization option for a one month report is an hour, and the minimum summarization option for a one year report is a day.

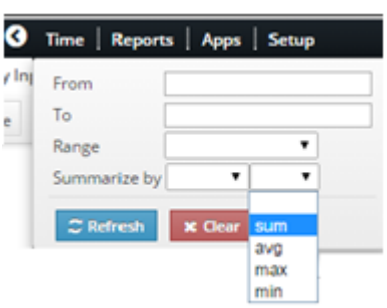
3.3.2 Aggregation options

The Aggregation Option indicates how the different values are computed for a given summarization.

CEA Release 5.3 data base resolution is 15 minutes but sometimes it is interesting to get the summarized values for a longer interval of time such as one hour or one day. In this case, you can choose to aggregate these values by:

- Sum
- Average
- Max
- Min

Aggregation option is selected in the Time Range Selector as depicted in the following figure:



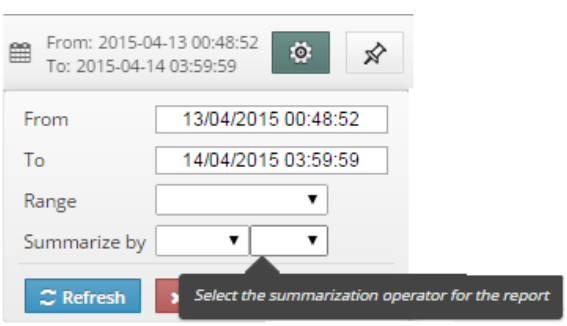


Figure 10. Aggregation options

All reports have a default summarization which is chosen by means of an empty aggregation option.

For example: Total Volume is summarized by sum as default and HTTP Mean Data Rate is summarized by average as default.

Regarding Ratio KQIs default aggregation is sum as default. For this kind of reports, this means that internally the systems recalculates the value for the aggregated period by means of summing up all numerators and denominators independently and then calculating the result again.

3.3.3 Top/Bottom Reports

CEA Release 5.3 provides top/bottom elements contained in a report. In this way it is possible to get a deeper knowledge of the Quality of Experience, especially when the report contains a lot of different keys and dimensions combinations.

The number of elements included in the top/bottom report can be configured in the SETUP option from the Main Menu by introducing a Top Categories value as depicted in the following figure. In this way you can obtain: Top-5, Top-10, Top-20, etc.

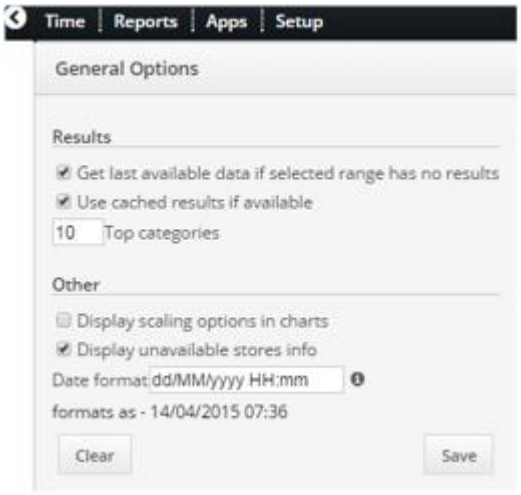


Figure 11. Top Categories Selection

Remember that once you have changed Setup Options you need to logout and login again for the changes to take effect.

This option allows to set the top value by default, but the user can modify this value in the report itself. This way of working is explained in the next sections.

3.3.4 Results Representation

The execution of a query provides a report result that is generally composed of a graphical representation of the result in and the possibility to export the result.

The graphical representation provides some features to help the user navigating the result. This section provides an overview on the different available charts and the available tools related to them.

3.3.4.1 Chart Tools

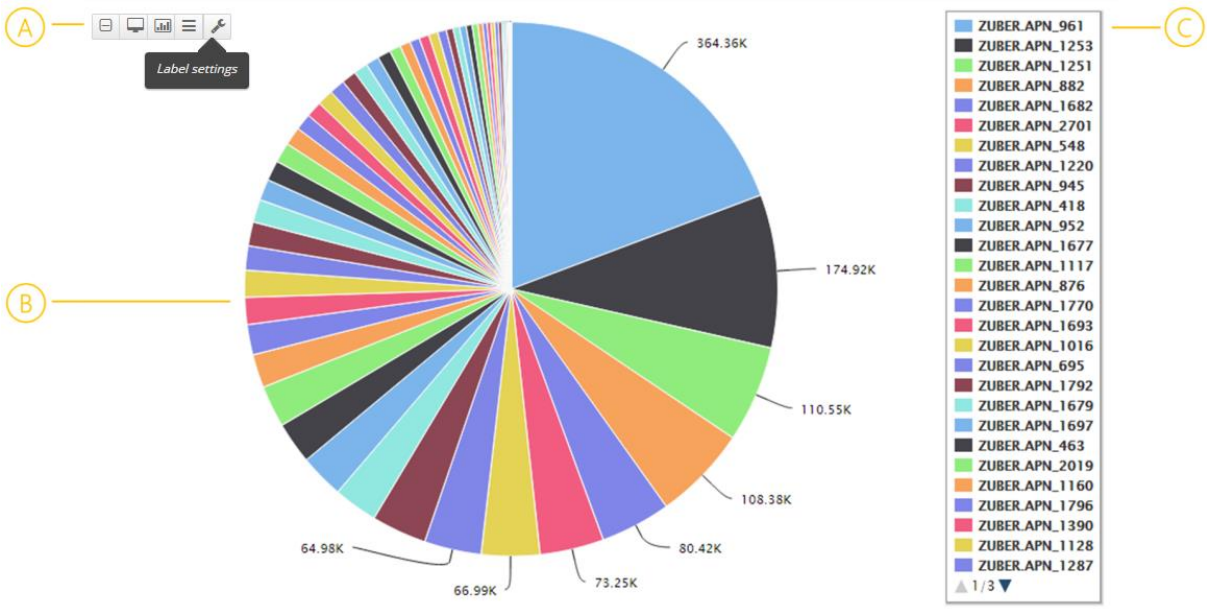


Figure 12. Chart Main Items

The *next figure* shows three main items of a report result:

A. **Chart Buttons**. These group of buttons allows to:

Show or hide all data series. Sometimes it is useful to remove all data series and add one by one just those of the interest for the user.

Show the chart in full screen.

Change the chart type.

Export the graph in different image options: png, jpeg, pdf or svg vector image.

Figure 13. Chart Buttons

B. **Chart Type**. Allows the selection of different graphical representation. A further description of the chart types is provided in the next section.

Figure 14. Chart types

C. **Legend:** By clicking them the corresponding data series are included/excluded from the graphical representation**.**

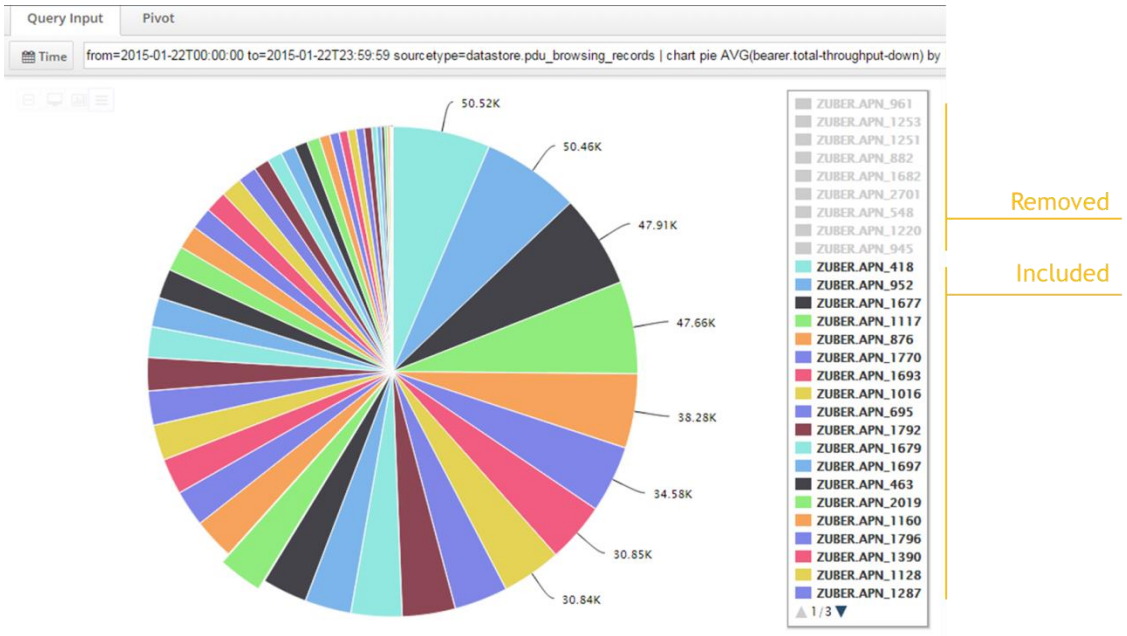


Figure 15. Disabling items in a dashboard

Drilldown is possible on these charts by means of clicking any piece of data in the chart. The drilldown feature is further explained in the section *Charts* drilldown.

3.3.4.2 Chart Types

The following aggregation charts that are available in CEA. Examples of the most common ones are displayed in this section:

Table 3: Aggregation charts

Aggregations	Timelines	Tables	Other
Pie Chart	Grouped timebar	Table	Kiviat Chart
Pie Chart 3D	Stacked timebar	Summary table	Polar Chart
Donut	Timeline		
Donut 3D	Stacked Timeline		
Stacked Donuts	Filled Area Timeline		
Bubble Chart	Stacked Area Timeline		
Treemap Chart	Dygraph		
Column Chart	Trend		
Column Chart 3D			
Bar Chart			
Bar Chart 3D			
Stacked column chart			
Stacked bar chart			
Speedometer			
Gauge			
Label			

Pie Chart

Displays the diagram as a pie chart.

title="chart description" from=2015-01-22T00:00:00 to=2015-01-22T23:59:59 sourcetype=datastore.pdu_browsing_records | chart pie AVG(bearer.total-throughput-down) by apn

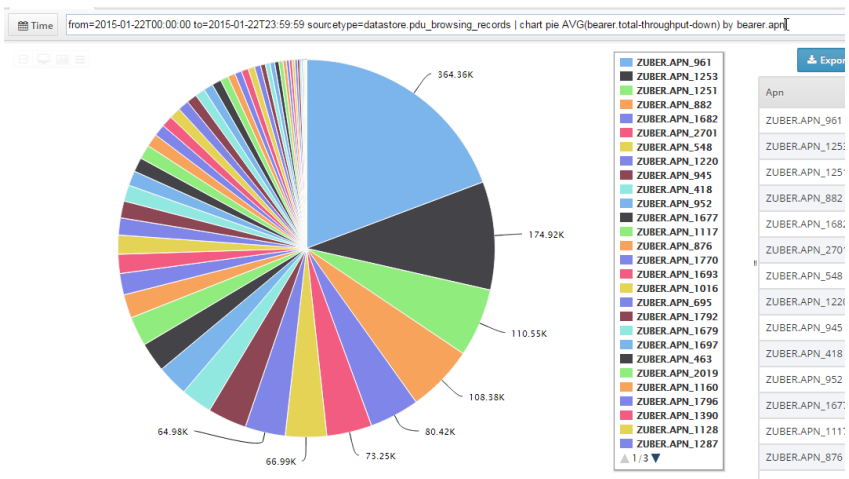


Figure 16. Pie chart

Pie3d Chart

title="chart description" from=2015-01-22T00:00:00 to=2015-01-22T23:59:59 sourcetype=datastore.pdu_browsing_records | chart pie3d AVG(bearer.total-throughput-down) by apn

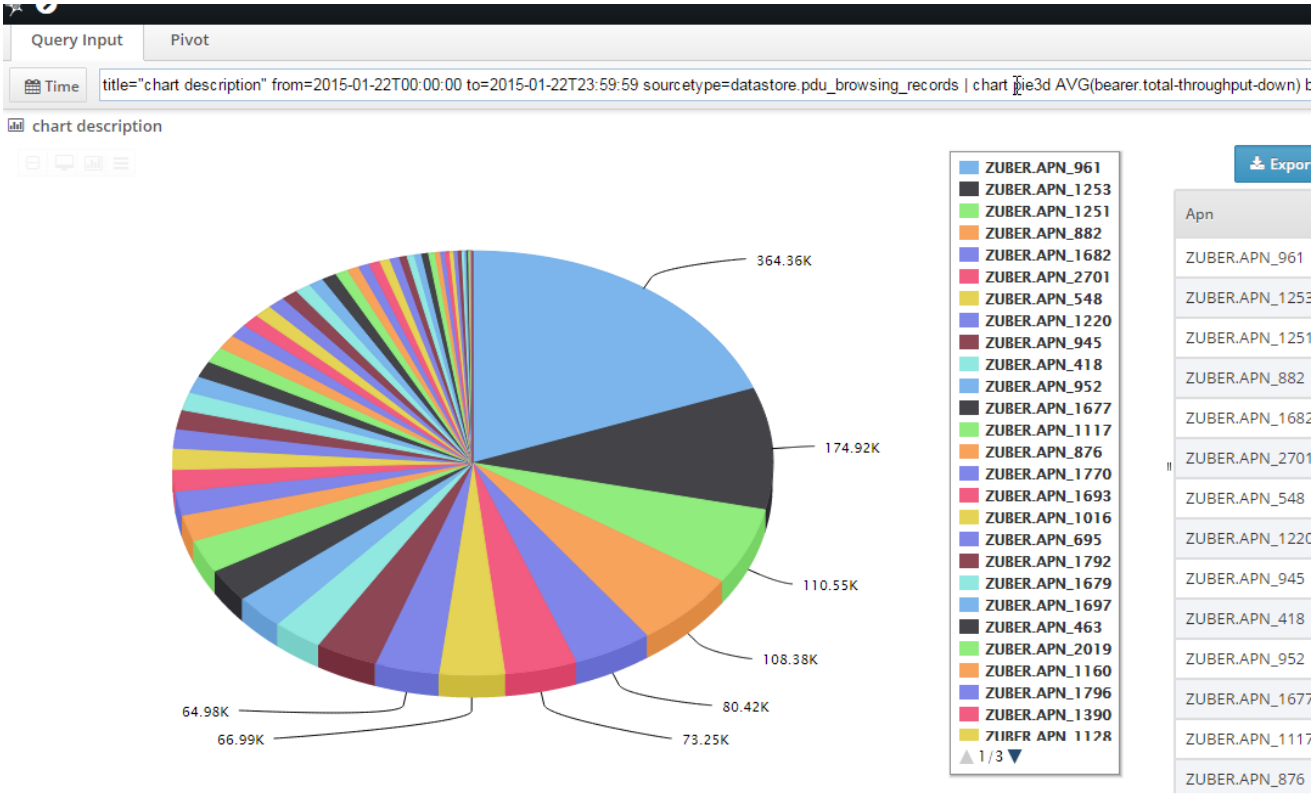


Figure 17. Pie3d Chart

Stackedpie Chart

Displays the diagram as a stacked donut chart.

title="chart description" from=2015-01-22T00:00:00 to=2015-01-22T23:59:59 sourcetype=datastore.pdu_browsing_records | chart stackedpie AVG(bearer.total-throughput-down) by gtp.rat-type apn

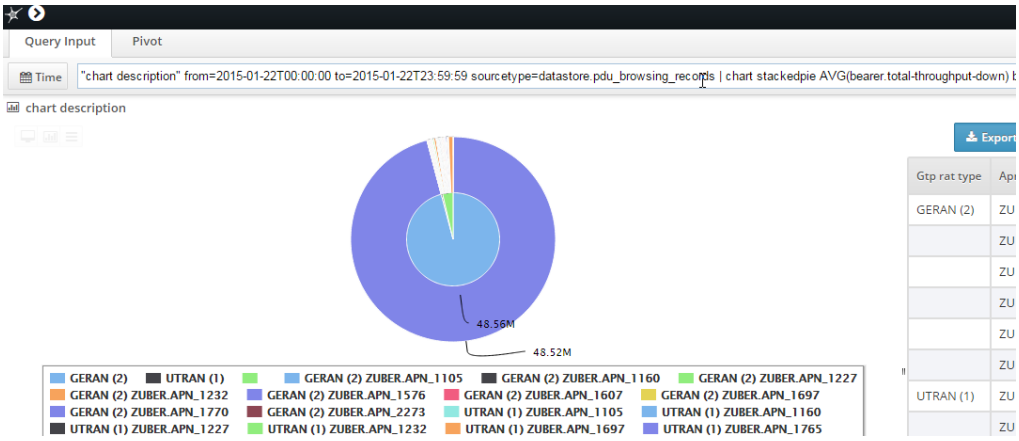


Figure 18. Stacked Pie Chart

Donut Chart

Displays the diagram as a donut chart.

title="chart description" from=2015-01-22T00:00:00 to=2015-01-22T23:59:59 sourcetype=datastore.pdu_browsing_records | chart donut AVG(bearer.total-throughput-down) by apn

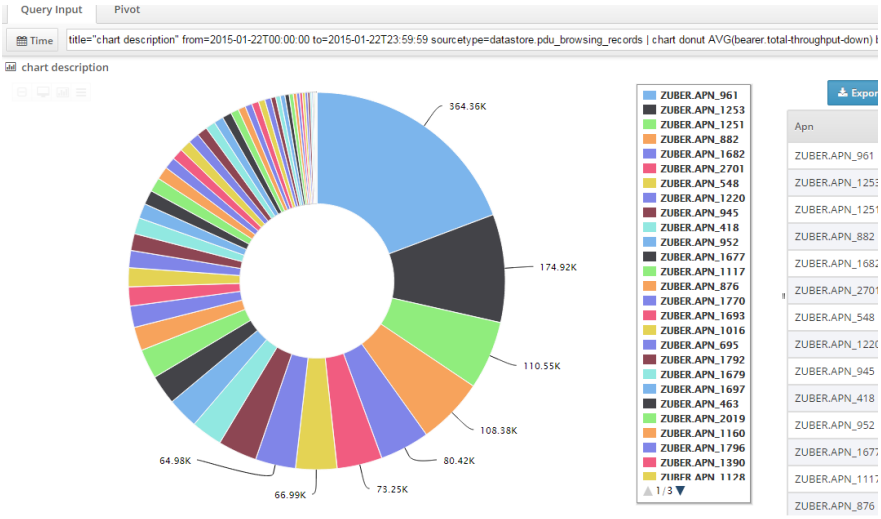


Figure 19. Donut Chart

Donut3d Chart

Displays the diagram as a 3D donut chart.

title="chart description" from=2015-01-22T00:00:00 to=2015-01-22T23:59:59 sourcetype=datastore.pdu_browsing_records | chart donut3d AVG(bearer.total-throughput-down) by apn

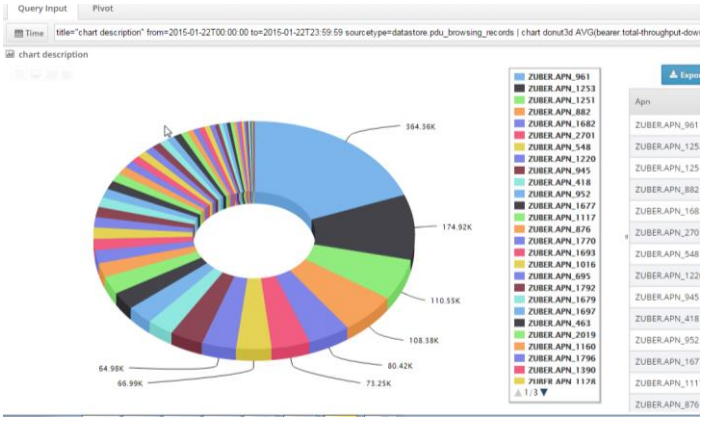


Figure 20. Donut3d Chart

Bubble Chart

Displays the diagram as a bubble chart.

title="chart description" from=2015-01-22T00:00:00 to=2015-01-22T23:59:59 sourcetype=datastore.pdu_browsing_records | chart bubble AVG(bearer.total-throughput-down) by apn | head 10

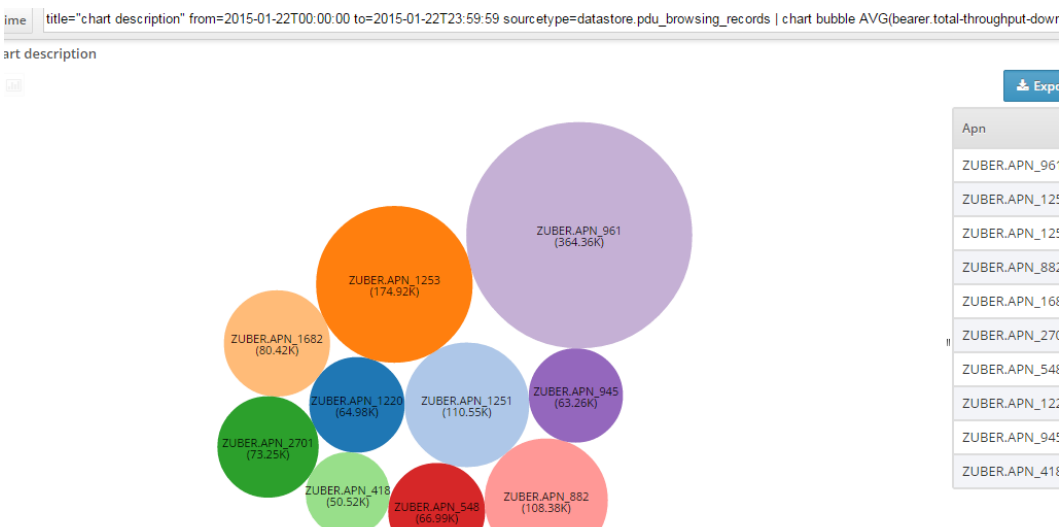


Figure 21. Buble chart

Treemap Chart

Displays the diagram as a treemap chart. The size of each area is proportional to the value compared to the total value.

title="chart description" from=2015-01-22T00:00:00 to=2015-01-22T23:59:59 sourcetype=datastore.pdu_browsing_records | chart treemap AVG(bearer.total-throughput-down) by rat-type apn | head 10

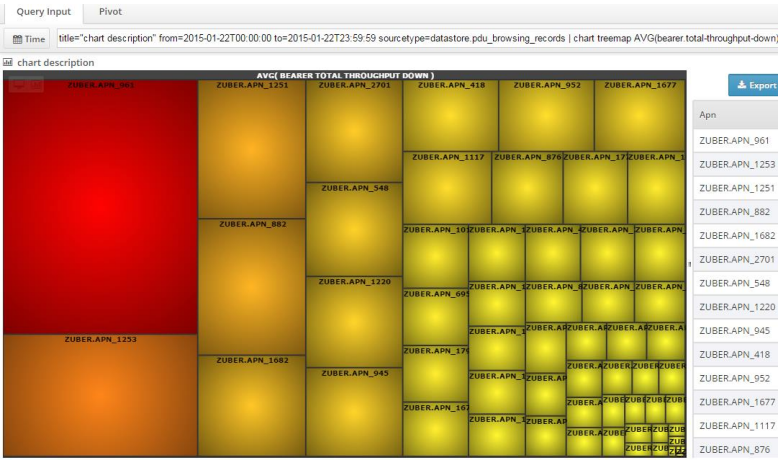


Figure 22. Treemap Chart

Column Chart

Displays the diagram as a column chart.

title="chart description" from=2015-01-22T00:00:00 to=2015-01-22T23:59:59 sourcetype=datastore.pdu_browsing_records | chart column AVG(bearer.total-throughput-down) by apn

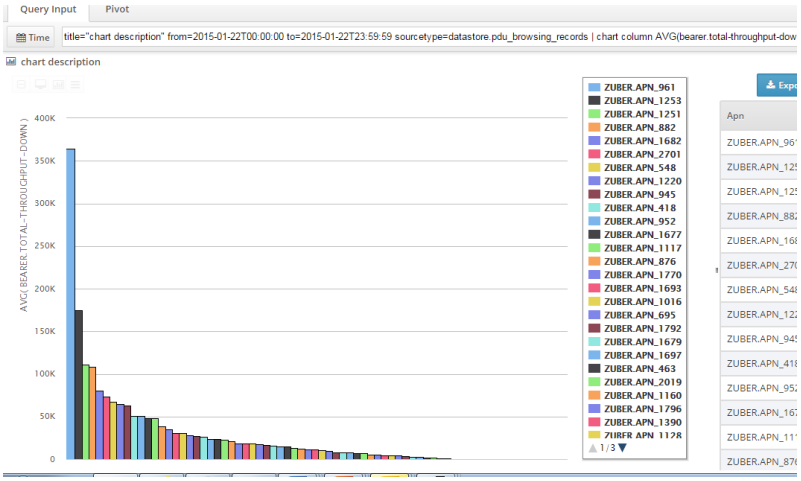


Figure 23. Column Chart

Column3d Chart

Displays the diagram as a 3D column chart.

title="chart description" from=2015-01-22T00:00:00 to=2015-01-22T23:59:59 sourcetype=datastore.pdu_browsing_records | chart column3d AVG(bearer.total-throughput-down) by apn

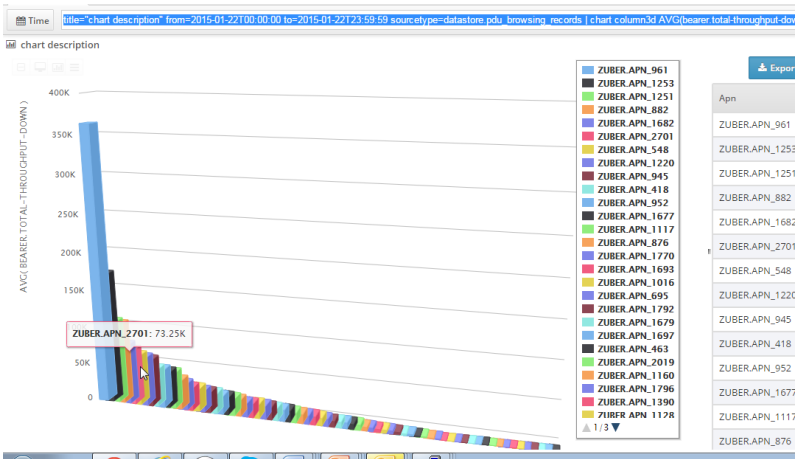


Figure 24. 3D-Column Chart

Bar Chart

Displays the diagram as a bar chart.

title="chart description" from=2015-01-22T00:00:00 to=2015-01-22T23:59:59 sourcetype=datastore.pdu_browsing_records | chart bar AVG(bearer.total-throughput-down) by apn | head 10

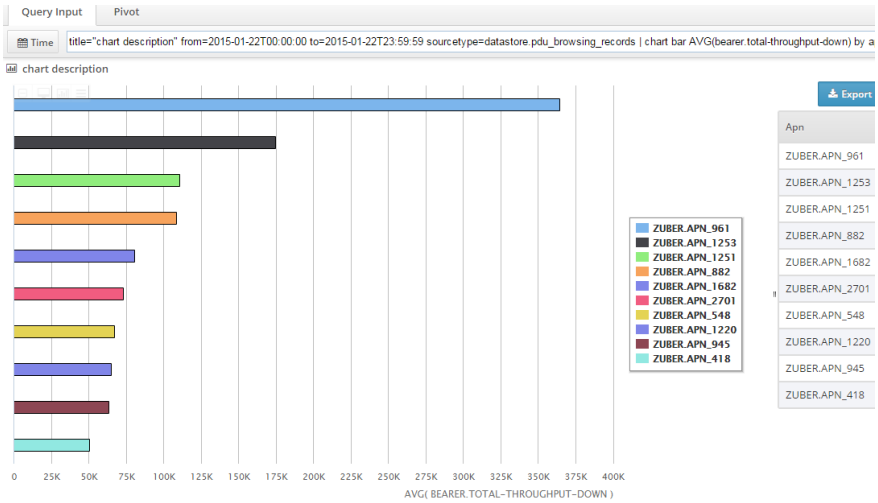


Figure 25. Bar Chart

3D-Bar Chart

Displays the diagram as a 3D bar chart.

title="chart description" from=2015-01-22T00:00:00 to=2015-01-22T23:59:59 sourcetype=datastore.pdu_browsing_records | chart bar3d AVG(bearer.total-throughput-down) by apn | head 10

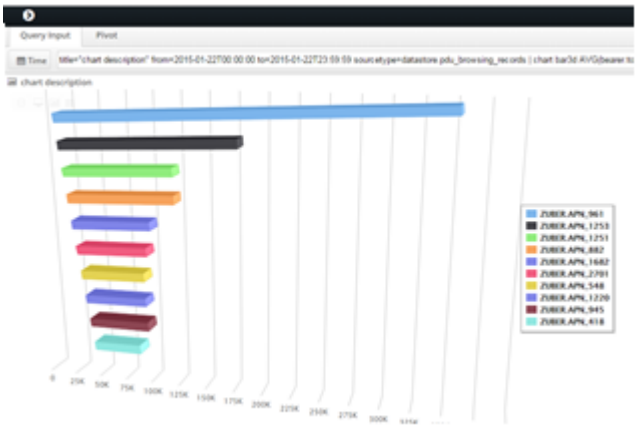


Figure 26. 3D-Bar Chart

Stackedcol Chart

Displays the diagram as a stacked column chart.

title="chart description" from=2015-01-22T00:00:00 to=2015-01-22T23:59:59 sourcetype=datastore.pdu_browsing_records | chart stackedcol AVG(bearer.total-throughput-up) by gtp.rat-type apn

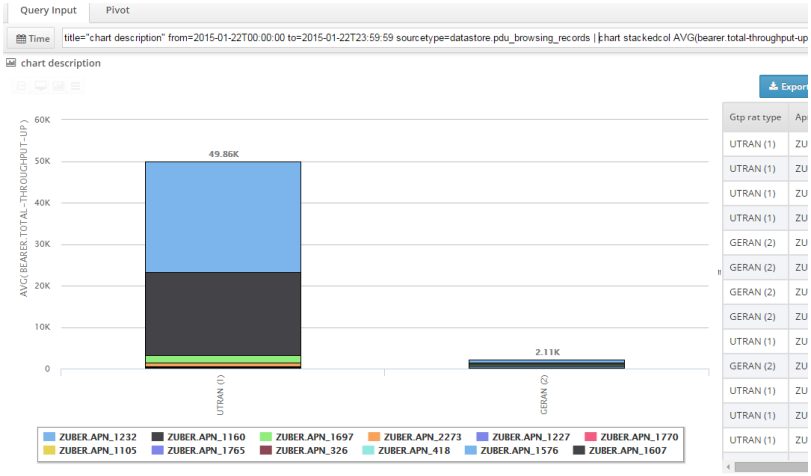


Figure 27. Stacked Column Chart

Stackedbar Chart

Displays the diagram as a stacked bar chart.

title="chart description" from=2015-01-22T00:00:00 to=2015-01-22T23:59:59 sourcetype=datastore.pdu_browsing_records | chart stackedbar AVG(bearer.total-throughput-up) by gtp.rat-type apn

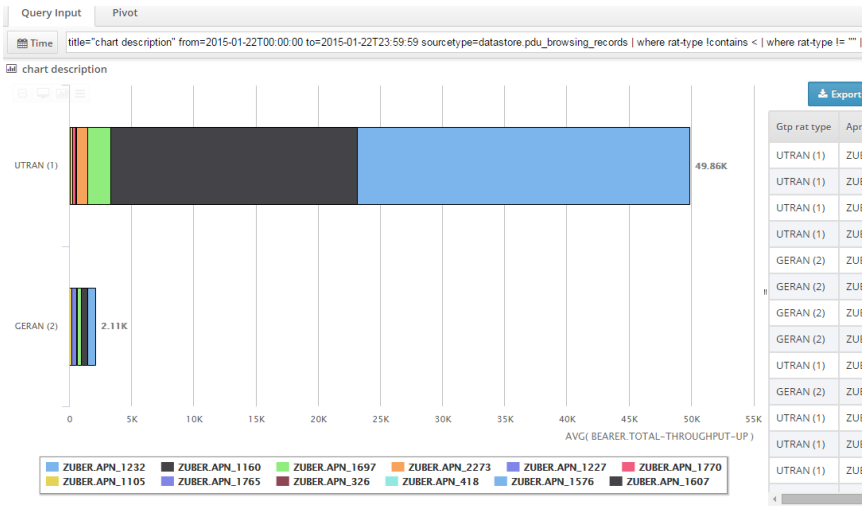


Figure 28 Stacked Bar Chart

Timelines

Timelines display the information in chronological order. All timelines provides supports zoom by selecting the area of interest.

TimeLine Chart

It displays the diagram as a timeline with the values in chronological order.

title="chart description" from=2015-01-22T00:00:00 to=2015-01-22T23:59:59 sourcetype=datastore.pdu_browsing_records | chart timeline AVG(bearer.total-throughput-down) by bearer.apn

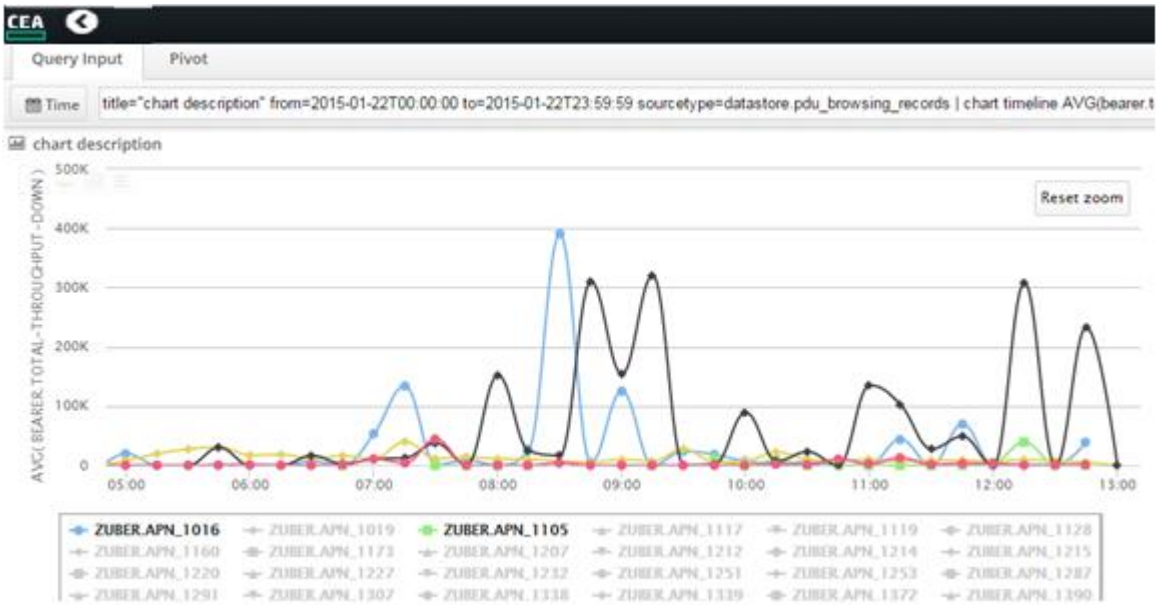


Figure 29. Timeline Chart

All timelines support zoom by selecting the area to zoom:

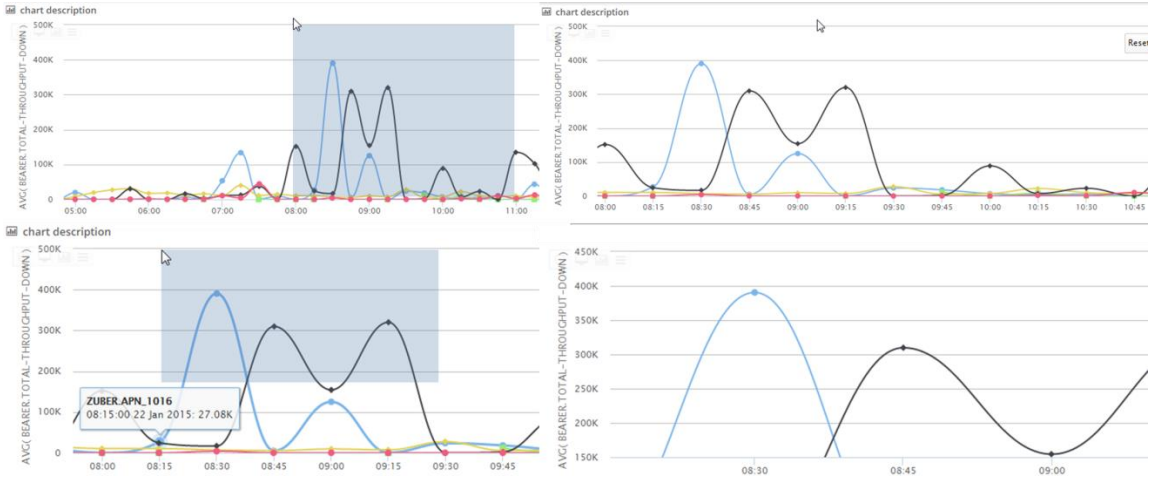


Figure 30. Zoom in Timeline Chart

Stacked Timeline Chart

Displays the diagram as a timeline with the values in chronological order with stacked values.

title="chart description" from=2015-01-22T00:00:00 to=2015-01-22T23:59:59 sourcetype=datastore.pdu_browsing_records | chart stackedtimeline AVG(bearer.total-throughput-down) by bearer.apn

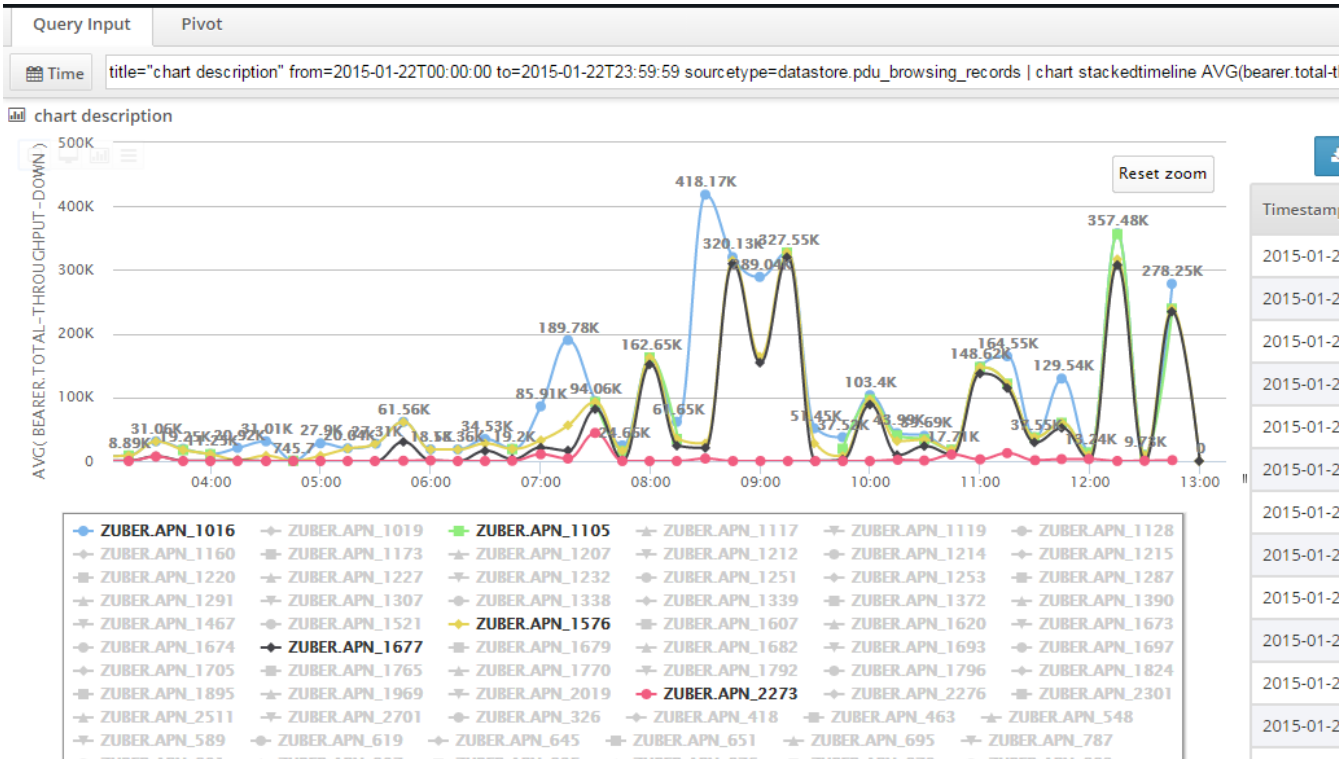


Figure 31. Zoom in Timeline Chart

Filled Area Timeline Chart

Displays the diagram as a timeline with the values in chronological order with filled area.

title="chart description" from=2015-01-22T00:00:00 to=2015-01-22T23:59:59 sourcetype=datastore.pdu_browsing_records | chart filledareatimeline AVG(bearer.total-throughput-down) by bearer.apn

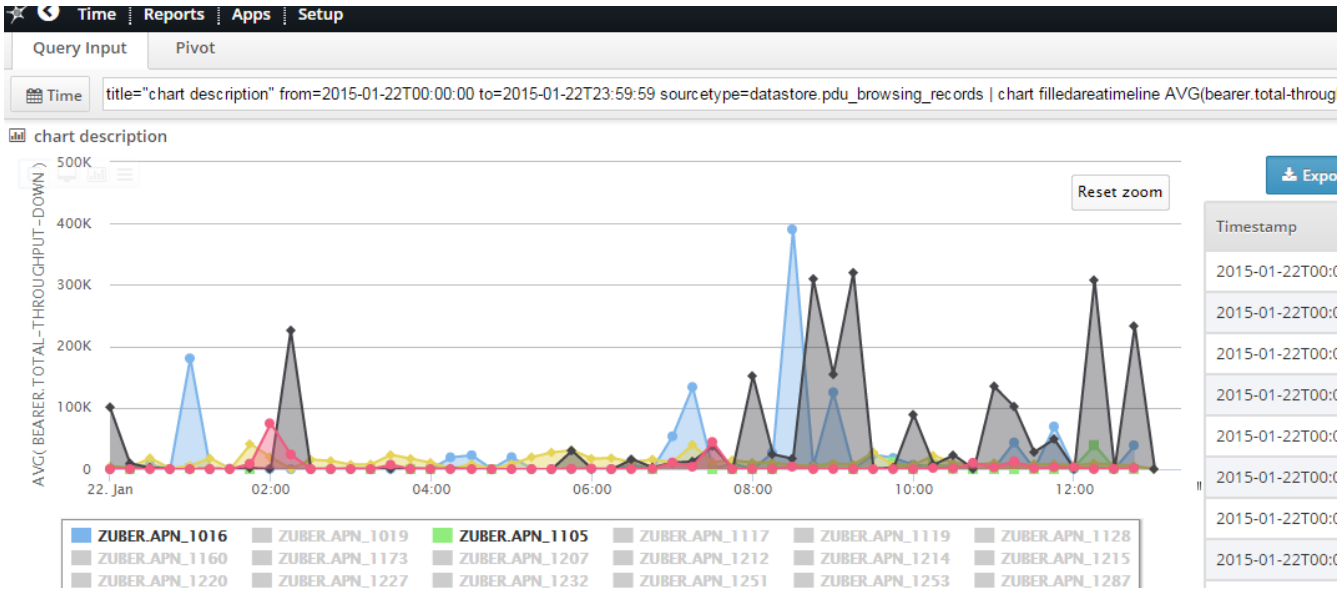


Figure 32. Filled are timeline Chart

Stacked Area Timeline Chart

Displays the diagram as a timeline with the values in chronological order with stacked values and filled area.

title="chart description" from=2015-01-22T00:00:00 to=2015-01-22T23:59:59 sourcetype=datastore.pdu_browsing_records | chart stackedareatimeline AVG(bearer.total-throughput-down) by bearer

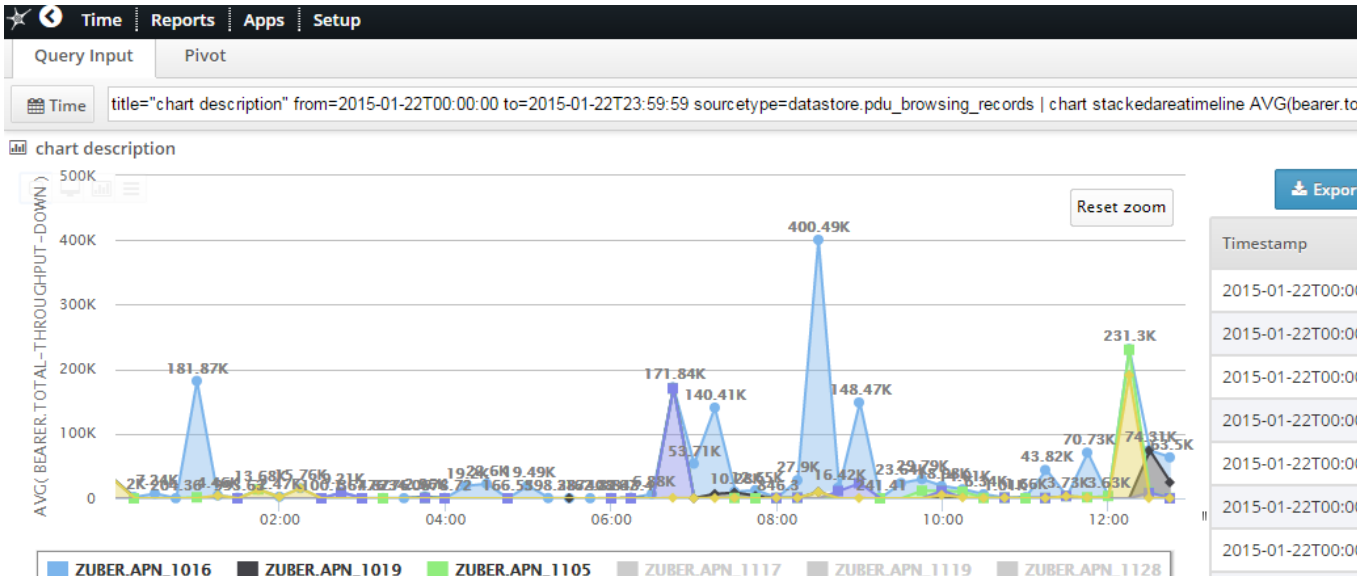


Figure 33. Stacked area timeline Chart

Stacked Time Bar Chart – Time Bar Chart

Displays the diagram as stacked bars in chronological order.

title="chart description" from=2015-01-22T00:00:00 to=2015-01-22T23:59:59 sourcetype=datastore.pdu_browsing_records | chart stackedtimebar AVG(bearer.total-throughput-down) by bearer.apn

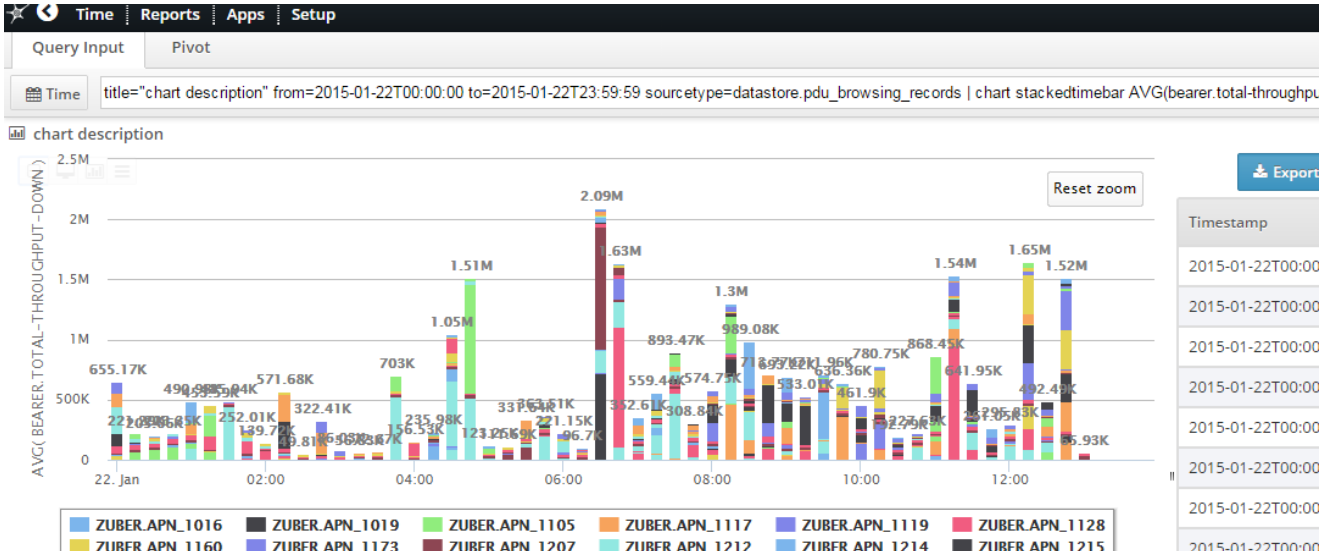


Figure 34. Stacked timebar chart

Grouped Time Bar Chart

Displays the diagram as grouped bars with the values in chronological order.

title="chart description" from=2015-01-22T00:00:00 to=2015-01-22T23:59:59 sourcetype=datastore.pdu_browsing_records | chart groupedtimebar AVG(throughput) by apn

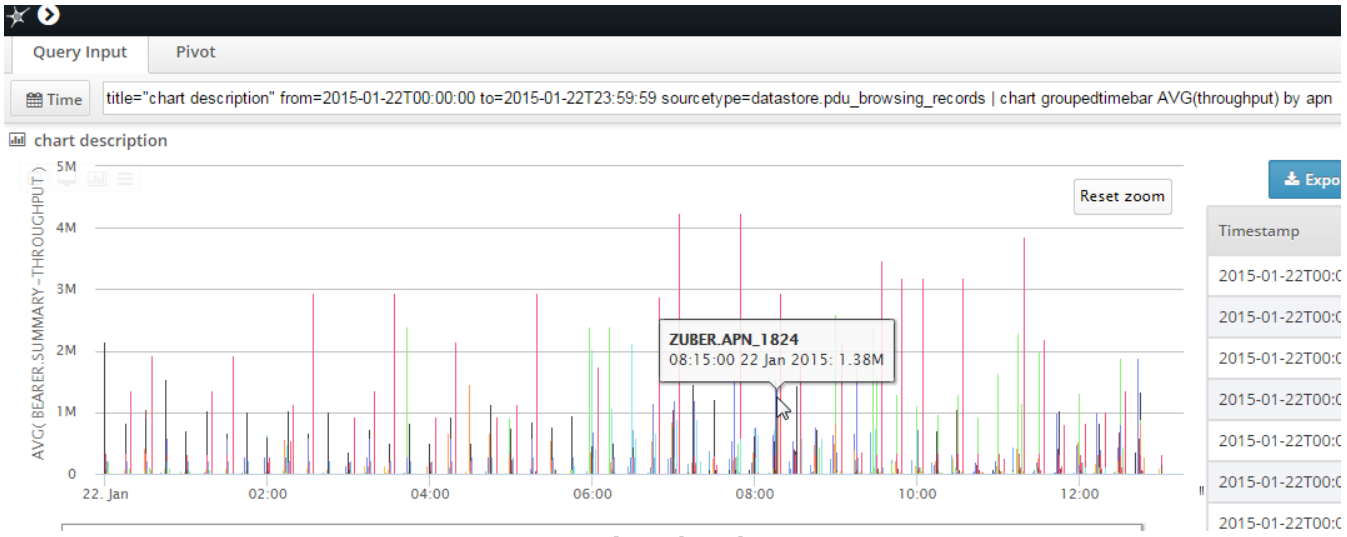


Figure 35. Grouped timebar chart

Dygraph Chart

Displays the diagram as timeline with the values in chronological order.

title="chart description" from=2015-01-22T00:00:00 to=2015-01-22T23:59:59 sourcetype=datastore.pdu_browsing_records | chart dygraph AVG(bearer.total-throughput-down)

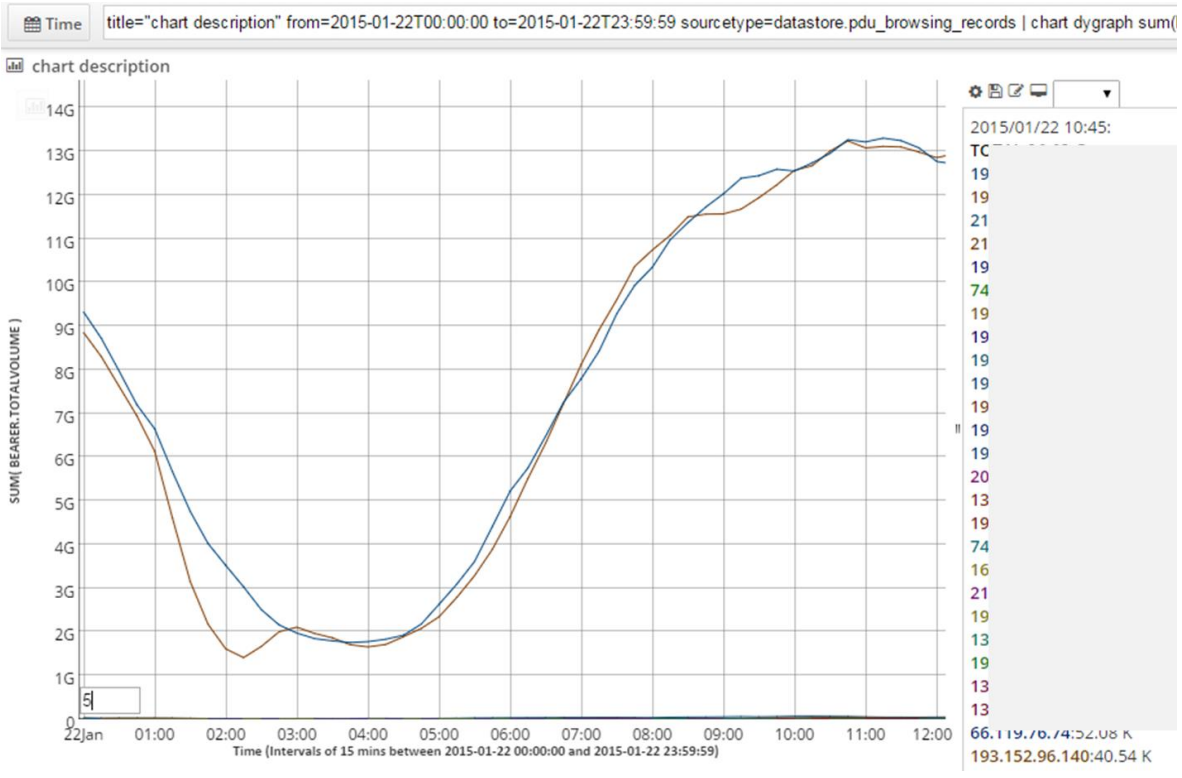


Figure 36. Dygraph Chart

Map Chart

Displays the diagram as a geographical representation of the location information in the records.

from=2015-01-22T00:00:00 to=2015-01-22T23:59:59 sourcetype=datastore.pdu_streaming_records | chart map volumeup volumedown by uli-cell

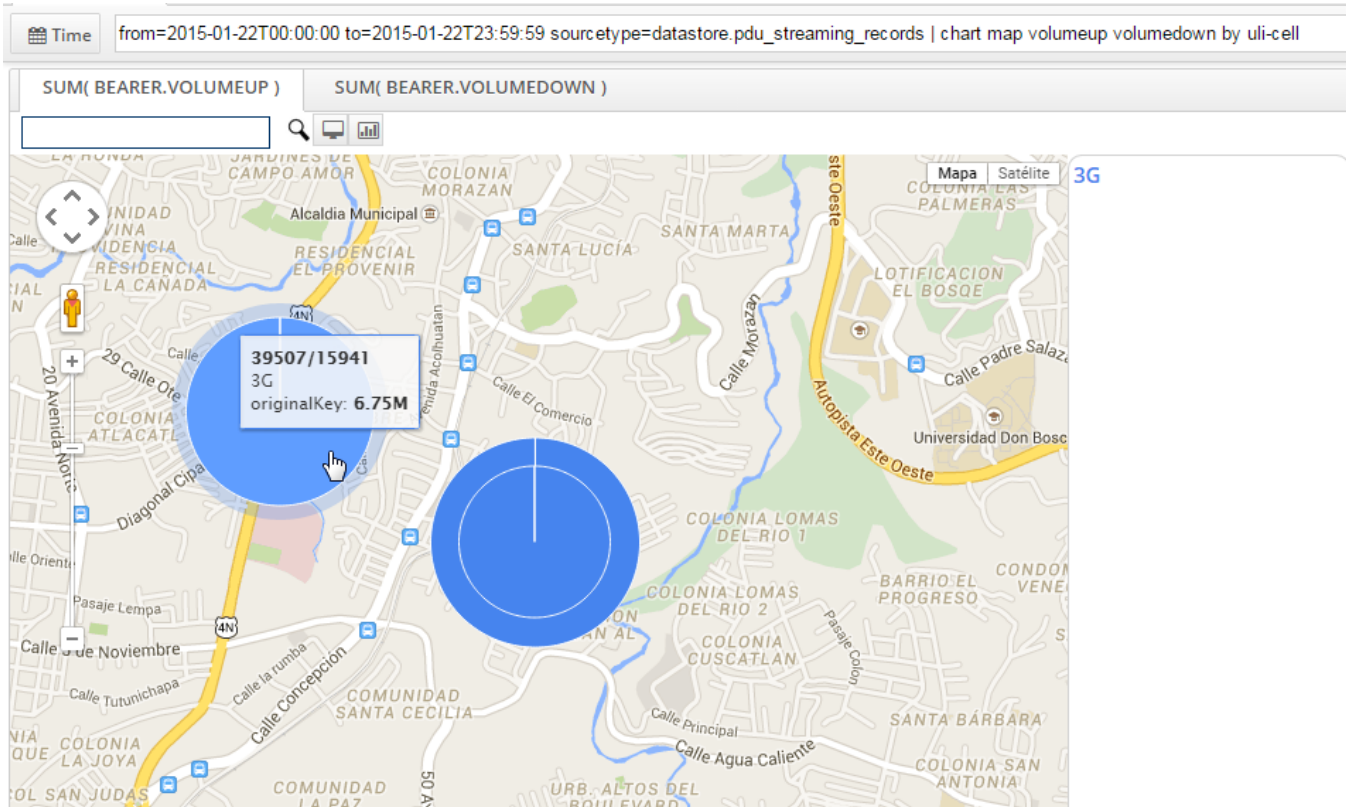


Figure 37. Map Chart

Speedometer Chart

Speedometer displays the diagram as a speedometer. It needs to define max limit value("-max-limit="), and high("-medium-high=") and low("-medium-low=") values for the medium range.

For indicators which high values are ok and low values are not ok, configure the speedometer using: max limit value > medium-high value > medium-low. In this case:

- the range from 0 to medium-low is painted in red.
- the range from medium-low to medium-high is painted in yellow.
- the range from medium-high to max limit value is painted in green.

For indicators which high values are nok and low values are ok configure the speedometer using: max limit value > medium-low >medium-high value:

- the range from 0 to medium-high is painted in green.
- the range from medium-high to medium-low is painted in yellow
- the range from medium-low to max limit value is painted in green.

from=2015-01-22T00:00:00 to=2015-01-22T23:59:59 sourcetype=datastore.pdu_streaming_records | chart speedometer avg(rebuffering-time) -max-limit=70000 -medium-high=50000 -medium-low=20000

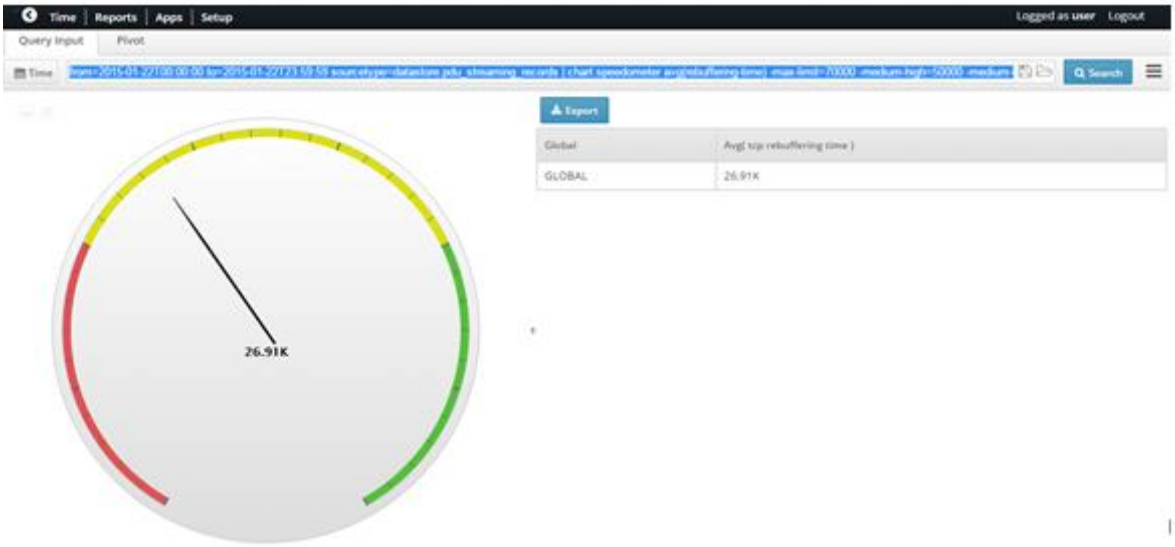


Figure 38. Speedometer Chart

from=<date> to=<date> sourcetype=datastore.radius | speedometer [avg(acct-ssession-time)] as sessiontime –medium-low=5000 –medium-high=2000 –max-limit=10000

Table Chart

Displays the diagram as an exportable table.

title="chart description" from=2015-01-22T00:00:00 to=2015-01-22T23:59:59 sourcetype=datastore.pdu_browsing_records | chart table AVG(throughput) by apn

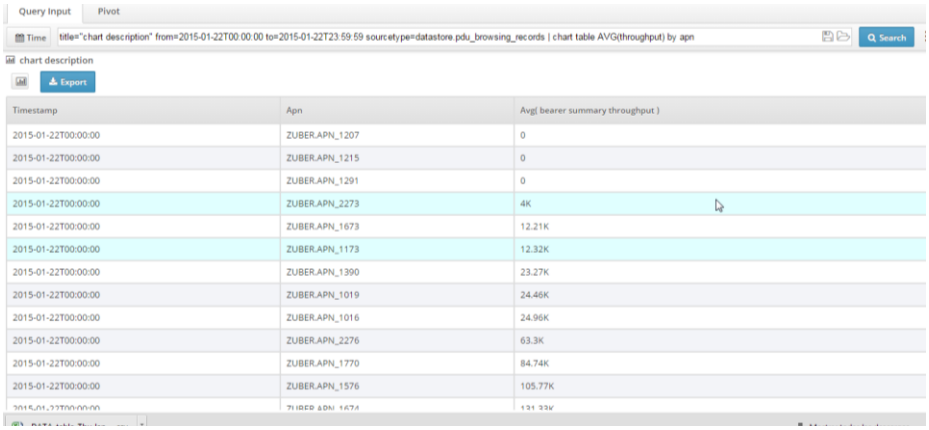


Figure 39. Table Chart

Summary Table Chart

Displays the diagram as an exportable summarized table

title="chart description" from=2015-01-22T00:00:00 to=2015-01-22T23:59:59 sourcetype=datastore.pdu_browsing_records | chart summarized table AVG(throughput) by apn

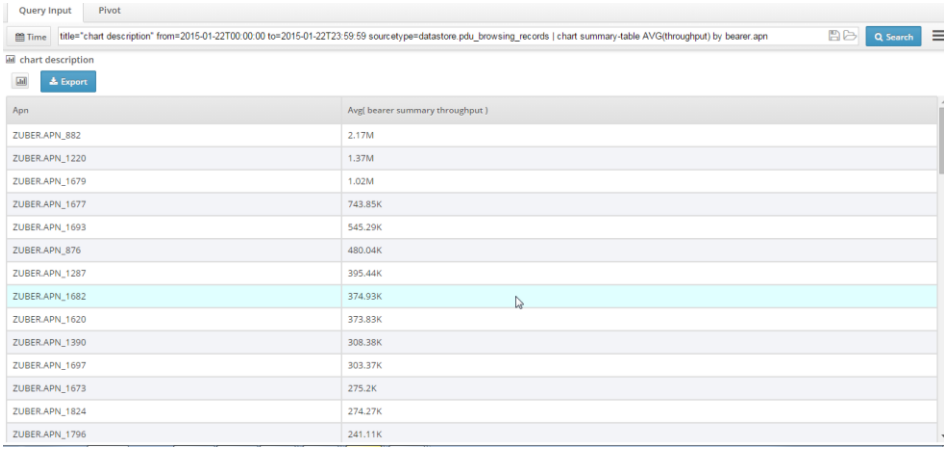


Figure 40. Summary Table Chart

3.3.4.3 Event Timeline

A simple query including data range and a data source provides as a result an event timeline that is the temporal evolution of all the events contained in the datasource for the selected time range.

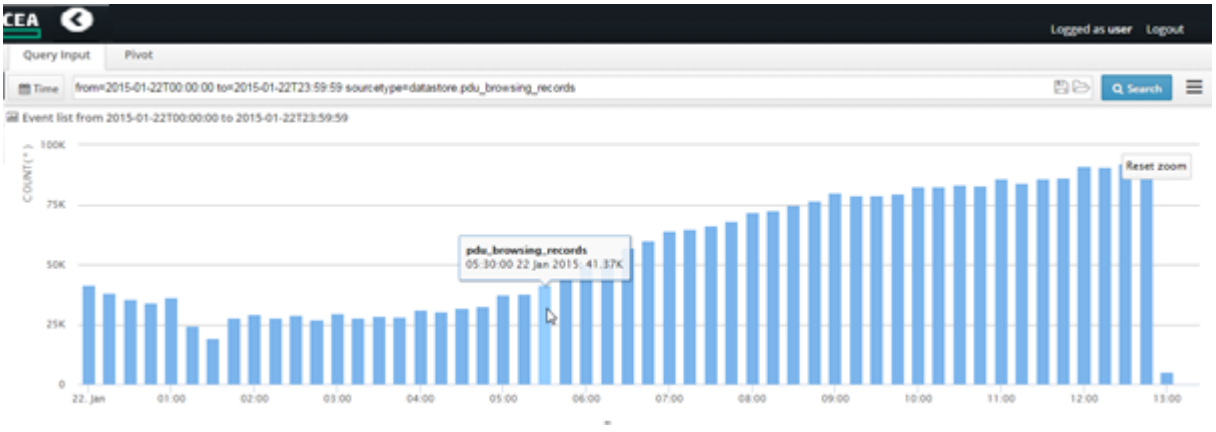


Figure 41. Event Timeline

You can over hover on every time slice to get information on the number of events contained in it. By clicking every slice, all the events in the slice will be displayed in the *Table of Events* below the timeslice and the *Field Statistics Table* at the left side of it.

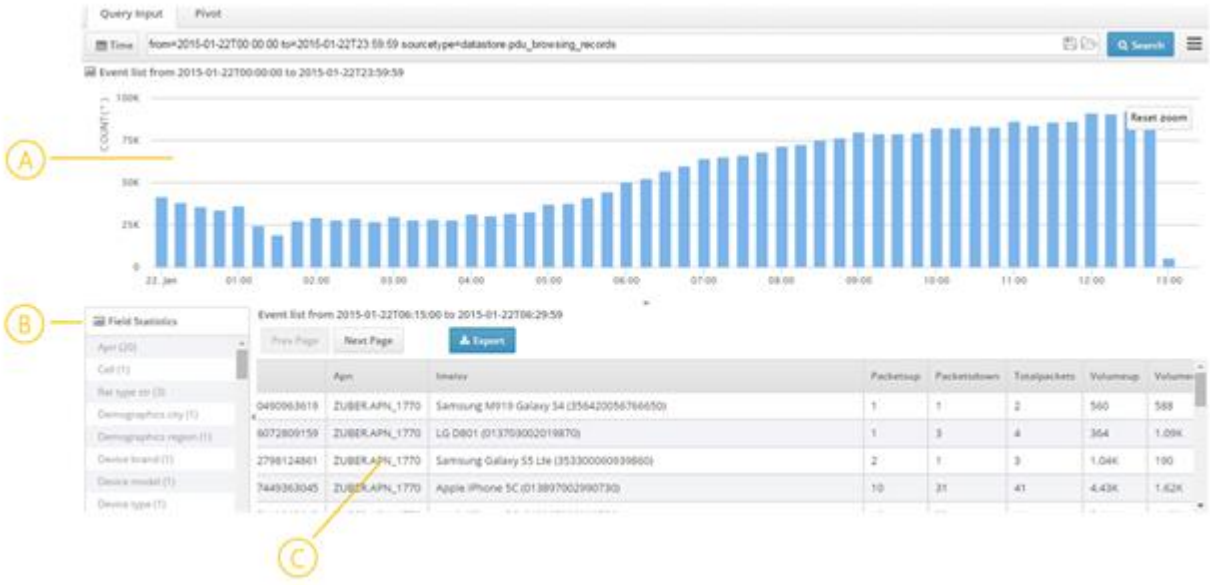


Figure 42. Event Timeline Details

A. **Timeline of Events**: This graph is the temporal evolution of events in each timeslice.
B. Field Statistics: This table provides a statistical summary of the most relevant fields from the selected datasource. Click on any of the fields to get detailed information of them.

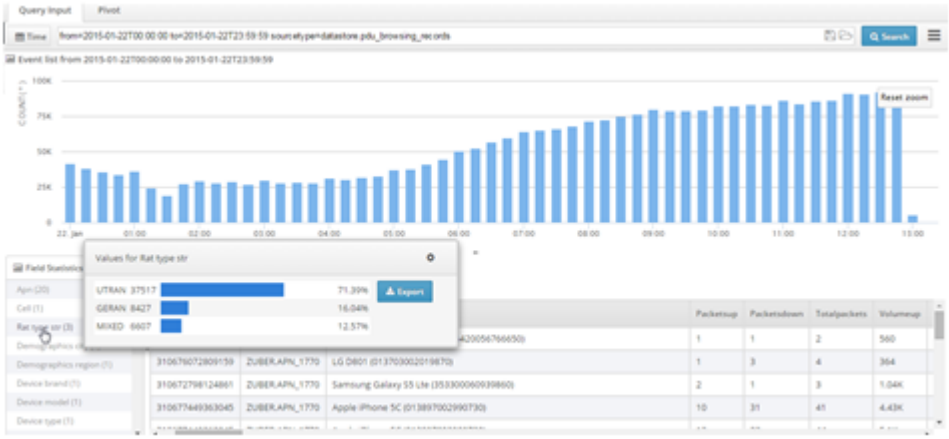


Figure 43. Field Statistics

C. **Table of Events:** Contains the most relevant fields of each event such as MSISDN, location, device, message type, mnc or mcc. The specific fields depend naturally on the source type. You can drilldown on the table of events by clicking on a specific field. For a further description of the table drilldown please refer to the section *Tables* drilldown.

Chapter 4 Aggregated data reports

CEA Release 5.3 reporting is organized in the following main groups:

- **Network Accessibility Reports:** This is the basic requirement for all QoS aspects and parameters as it measures if the network is accessible for the end-user. This group contains KQI reports related to Signaling, TCP, DNS and Session volumes.
- **Web Browsing Service Reports:** Providing a set of reports related to Web Browsing Service such as: Session Failure Ratio, Mean Data Rate, Session Time or Cut-off Ratio.
- **Streaming Service Reports:** Providing a set of reports related to Streaming Services such as: Streaming reproduction cut-of ratio, Time to Start, Rebuffering Time or Rebuffering Time Percentage among others.
- **File Sharing Service Reports:** Providing a set of reports related to File Sharing Service such as Service Non-Accessibility, Upload/Download Effective Data Rate, Session Failure Ratio or Cut-Off Ratio among others.

Preconfigured Reports are accessible by means of Reports>Reports Menu as shown in the next figure

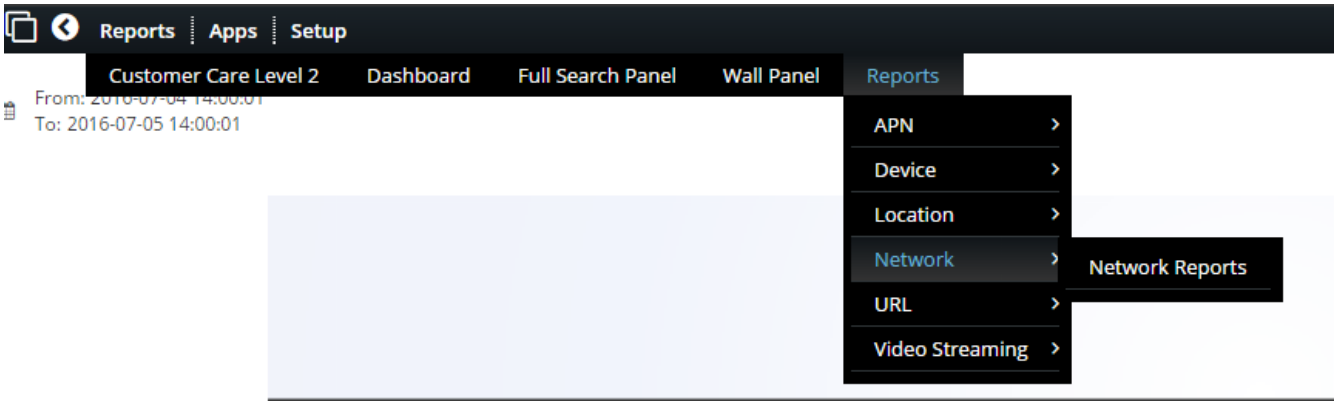


Figure 44. Preconfigured Reports

The available preconfigured KQI reports in CEA Release 5.3, as well as the dimensions for which they are available, are displayed on the Chapter 10**Error! Reference source not found.**.

4.1 Reports management

Reports menu allows the user to find any preconfigured report by means of a menu grouping different areas such as: Device, Customer, Network, etc.

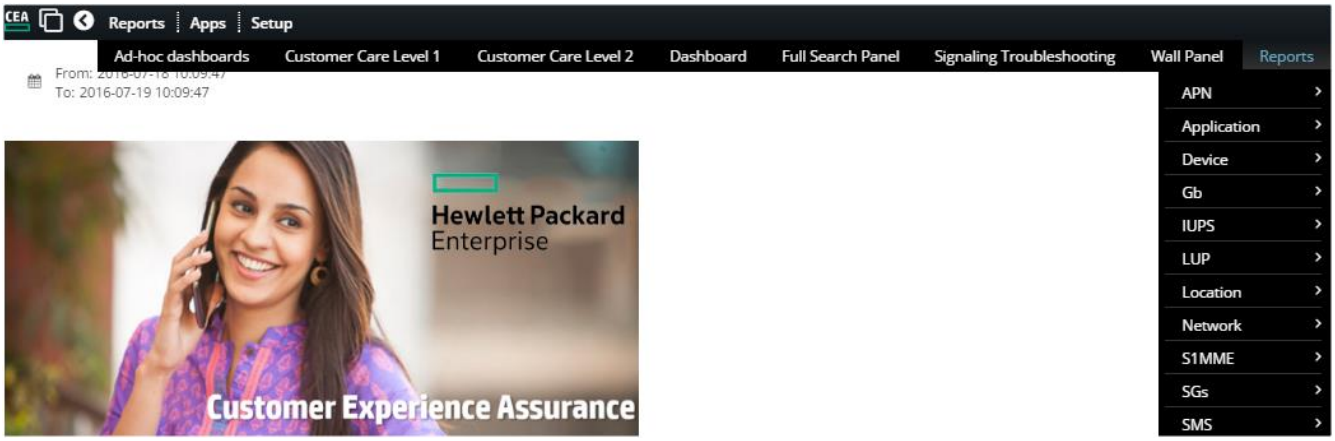


Figure 45. Searching for online reports I

The Preconfigured Reports Panel contains the following elements:

- **A.** Chart Selector and Display Table Option: Use them to select the chart to present the result and to include or exclude the summary table in the report result.
- **B.** Related Reports Selector: This box contains the list of available reports. Use it to select the report in which you want to drilldown. You can select more than one if they are in the same branch.
- **C.** Initial Dimensions: This box contains the available dimensions the report has been calculated for. They are the same as the available ones in the Dimension Brower View.
- **D.** Display Top Elements: Use it to calculate the top elements in the result.
- **E.** Search Button: Use it to execute the drill down.

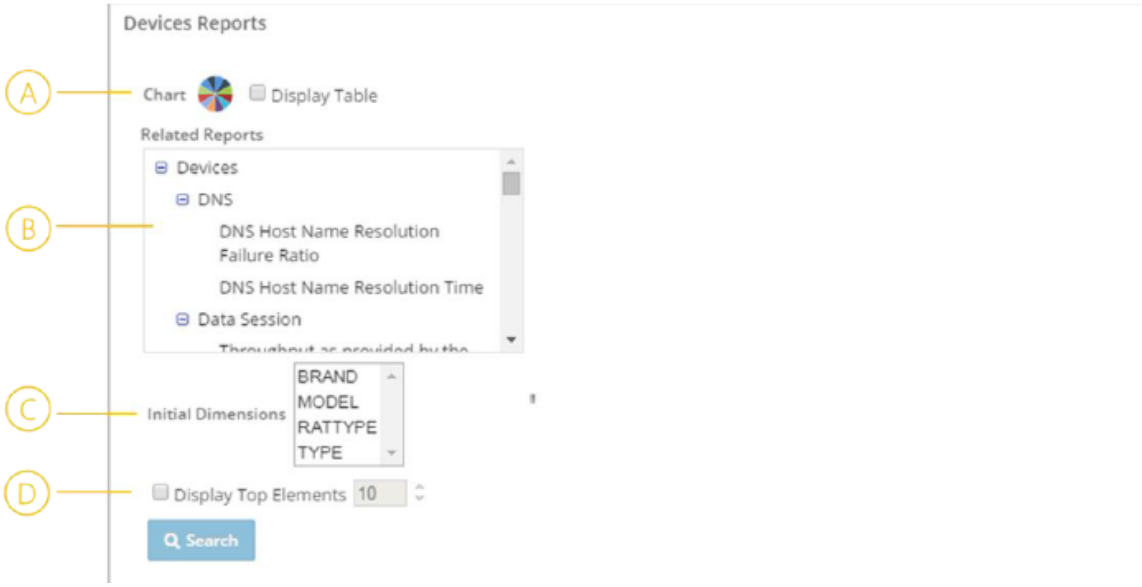


Figure 46. Elements drilldown panel for preconfigured reports

Let's get a further understanding of the drilldown for preconfigured reports by means of an example.

STEP 1. Let's start with the device preconfigured reports Reports>Devices>Devices Report

STEP 2. The first thing we are going to do is to select different reports and show them in the dashboard area. In this example we are going to select: Mean Throughput, Max Throughput, Total Throughput and total Volume.

STEP 3. Then we will select the dimension Model just considering Top 10 elements. In this way we are looking for the top device models in each of these metrics.

STEP 4. By clicking on Search Button, all the metrics will be presented as depicted in the next figure. As it can be seen the report contains a tab for every individual metric.

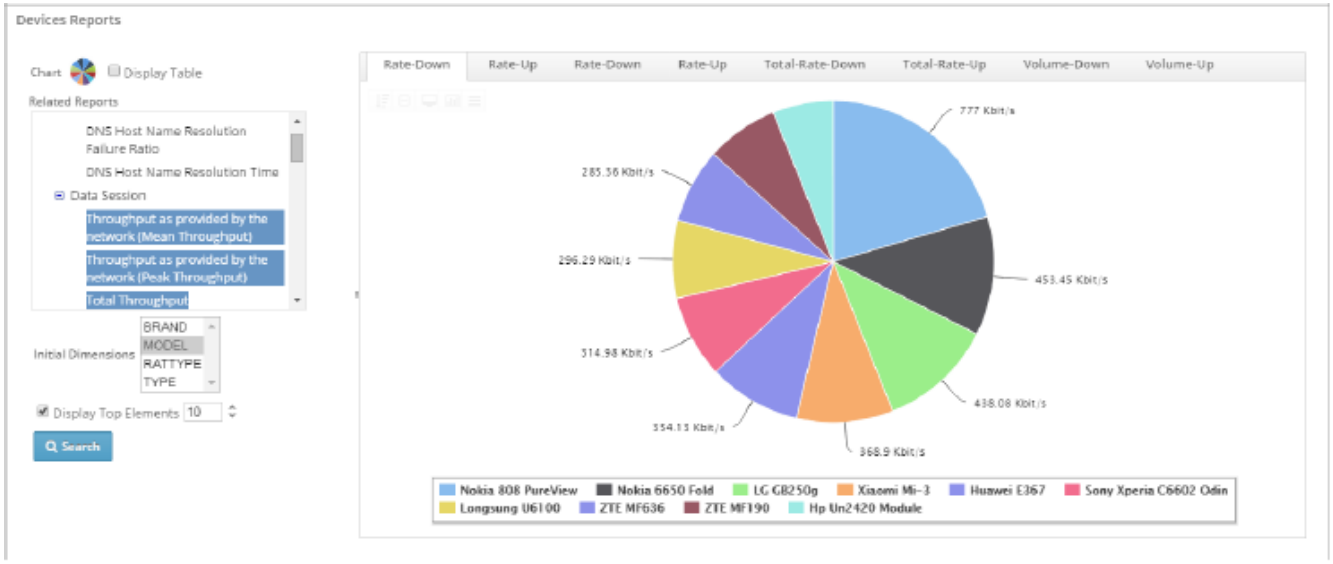


Figure 47. Drilldown for preconfigured reports I

Now let's drilldown in the device with the highest rate-down, that is Nokia 808 Pure View. The Drilldown Configuration Panel is shown. The drilldown possibilities are the rest of the available dimensions the report had and, very important, it is also possible to drilldown by individual contributors. In this step we have selected the drilldown by RAT Type.

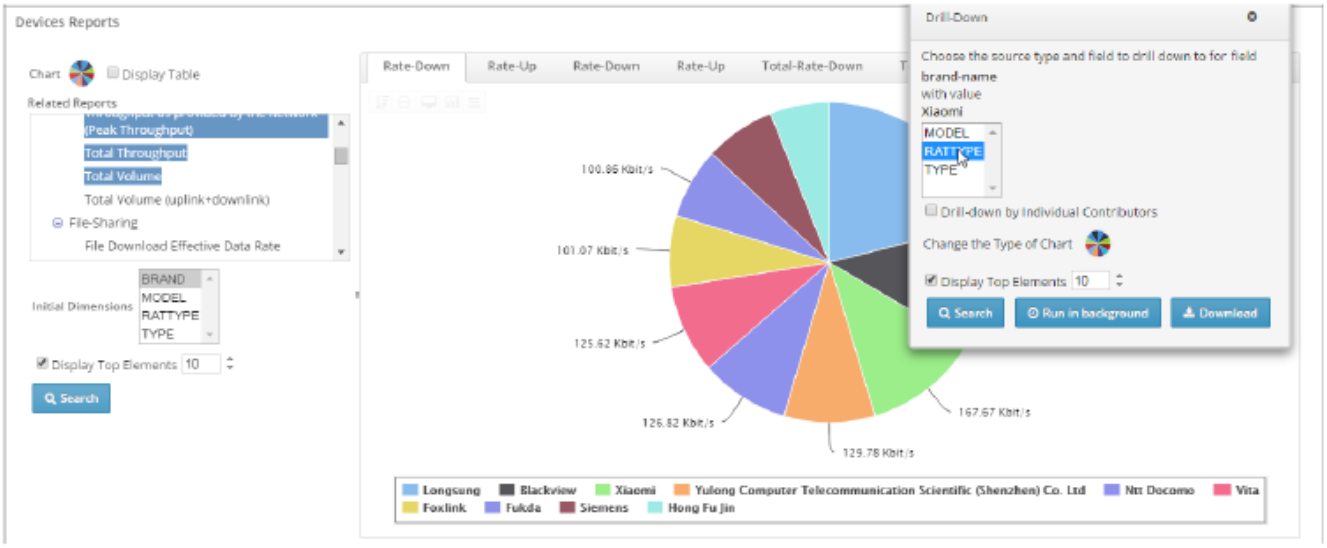


Figure 48. Drilldown for preconfigured reports II

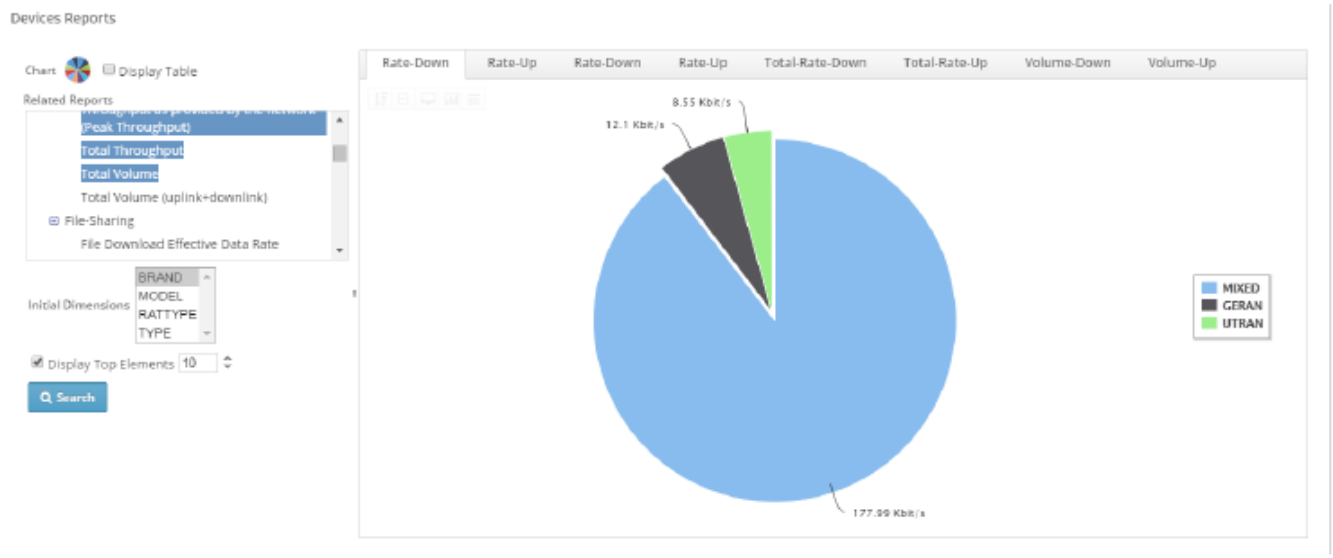


Figure 49. Drilldown for preconfigured reports III

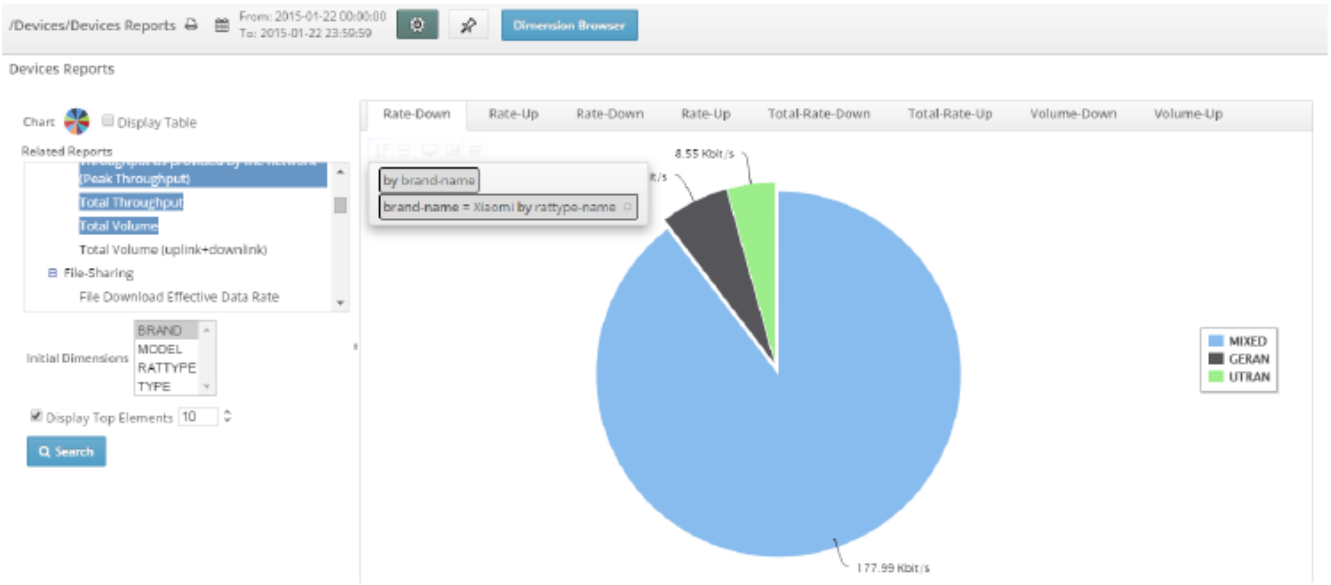


Figure 50. Drilldown for preconfigured reports IV

Chapter 5
Dashboards

CEA Release 5.3 includes a set of powerful out-of-the-box Executive Dashboards intended to provide a set of first insights into the overall status of the Operation and a starting point to drill-down sessions.

The following figure showcases the high level hierarchy of the Executive Dashboards.

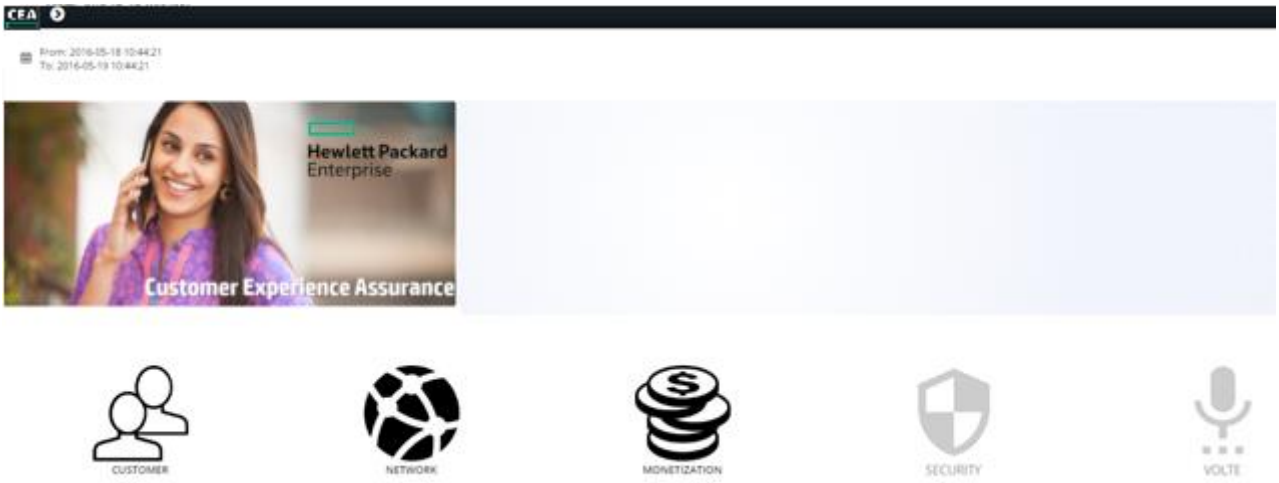


Figure 51. Executive Dashboards

The next subsections describe the content of each area and its purpose. Each User can also create her own Dashboards in case customized views are required for her intended user of the platform.

Please note that depending on the Commercial Packages available in your system, some of the Dashboards might not be enabled in which case they will present grayed out; clicking on them will provide further instructions on how to make them available.

5.1 Network

This area groups together dashboards that relate to network engineering and quality of experience aspects, including views of the most critical services like video, or the key dimensions like devices or radio access technology.

The next figure shows the dashboards available when one clicks on the Network icon.

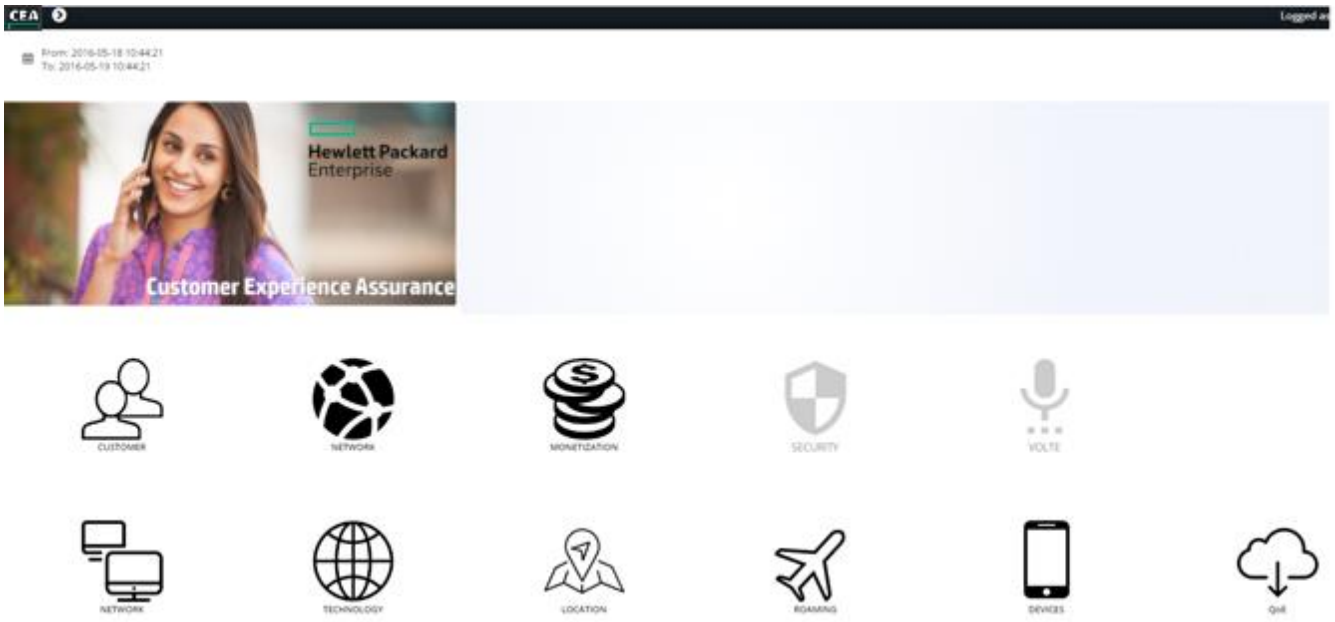


Figure 52. Network dashboards

The following sections describe in detail the content of each of the Network Dashboards, namely:

- Network
- Technology
- Location
- Devices
- Quality of Experience (QoE)

5.1.1 Network

The Network Dashboard provides a view on the Total Volume going through the network from a couple of key dimensions:

- APN: the access point network is used in a lot of Operators to delineate different services and therefore it's an important dimension to understand how traffic is being processed.
- P/GW or GGSN: the LTE Packet Gateway or GGSN in 3G/2G network acts as the anchor point towards the IP/Internet network.

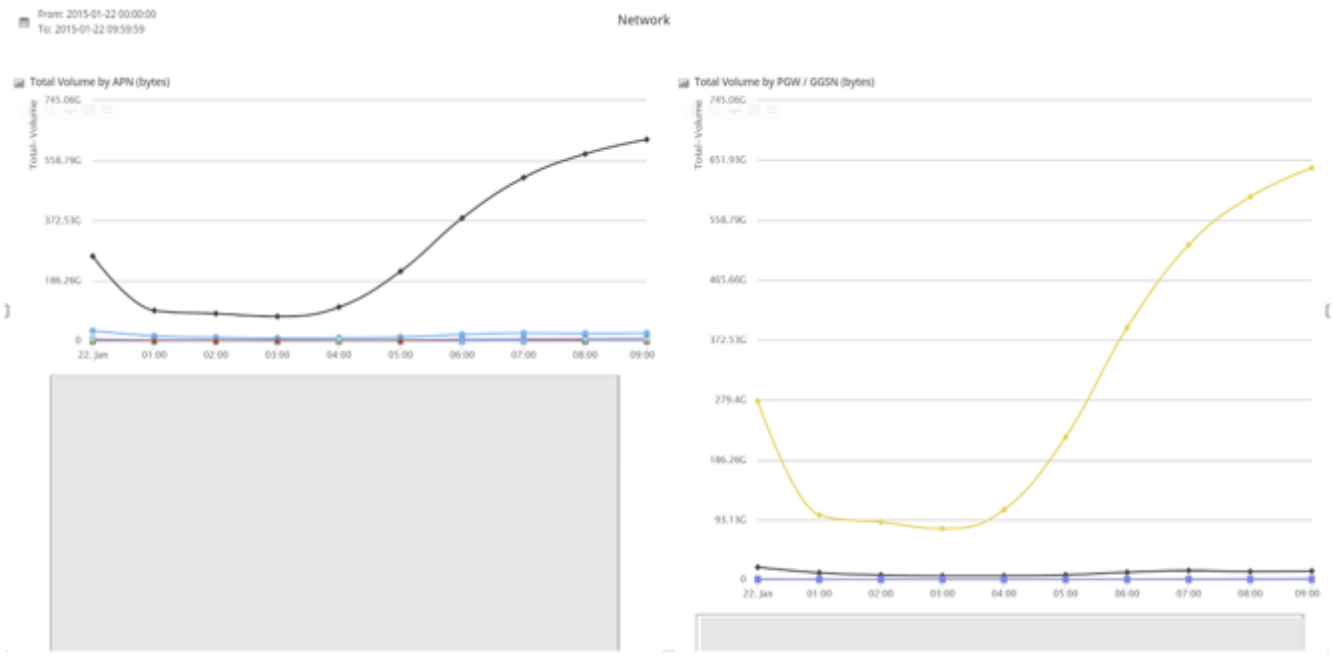


Figure 53. Network Dashboard for APN and GGSN/PGW

The APN dashboard provides drill-down into the Radio Access Technology, so that the proper relationship between APN and RAT can be easily visualized.

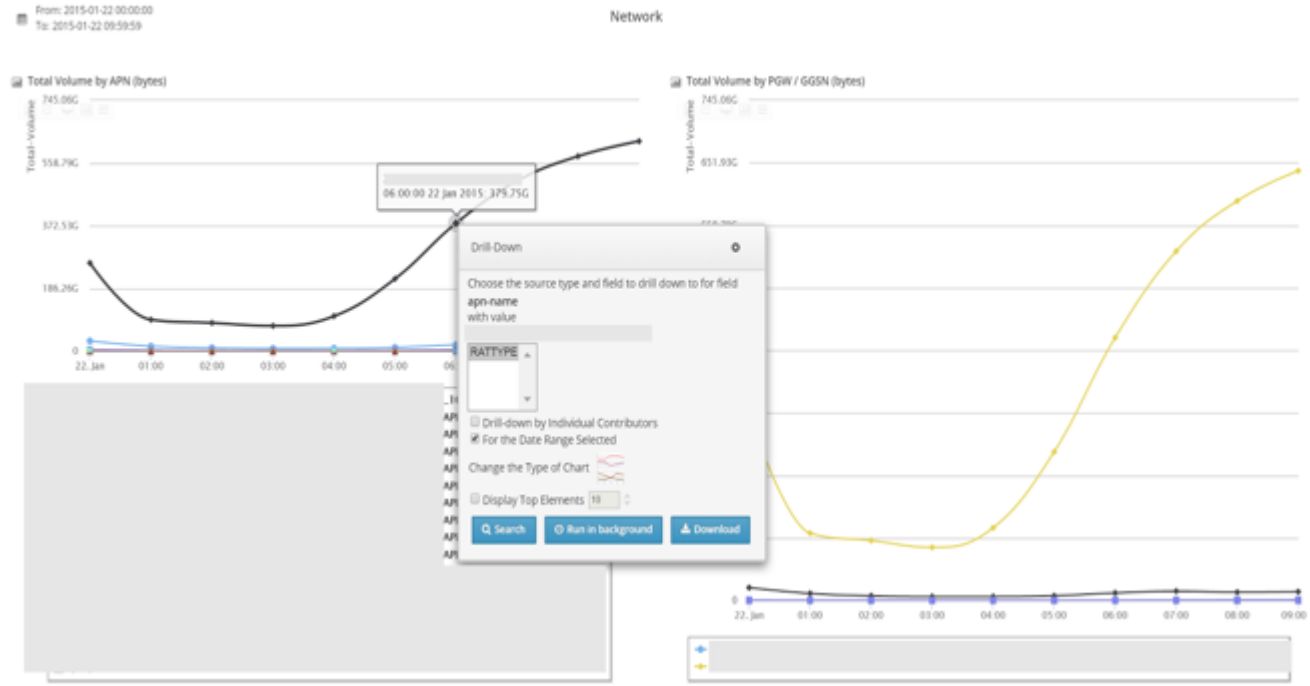


Figure 54. Drill-down options from APN view

The P/GW-GGSN dashboard provides several drill-down options to the adjacent network nodes at the service path both from the packet core and in the radio access:

- Radio Access Technology
- eNodeB/RNC/BSC
- MME-SGSN

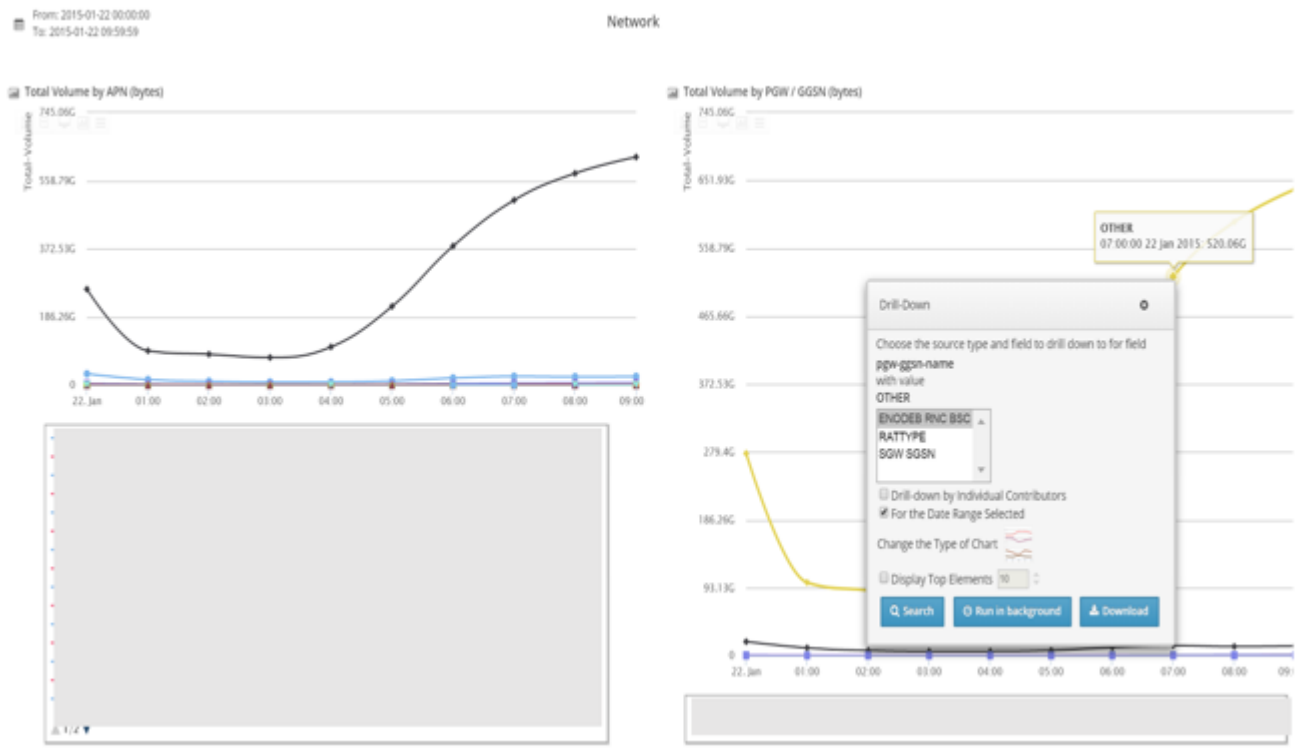


Figure 55. Drill-down options from PGW-GGSN view

5.1.2 Technology

The Technology Dashboard focuses on the different types of Radio Access Technologies. It is composed of several views as it can be seen in the following figure:

- Total Volume by Technology
- Peak Throughput by Technology
- Session Creation Failure Ratio by Technology

Besides the ETSI/3GPP standard RATs, CEA introduces a MIXED technology type which is used to easily visualize sessions that have switched between RATs intra-session. Specific reports exist in the system to further drill-down into this concept as well as the possibility to visualize those RAT switches on a per session basis.

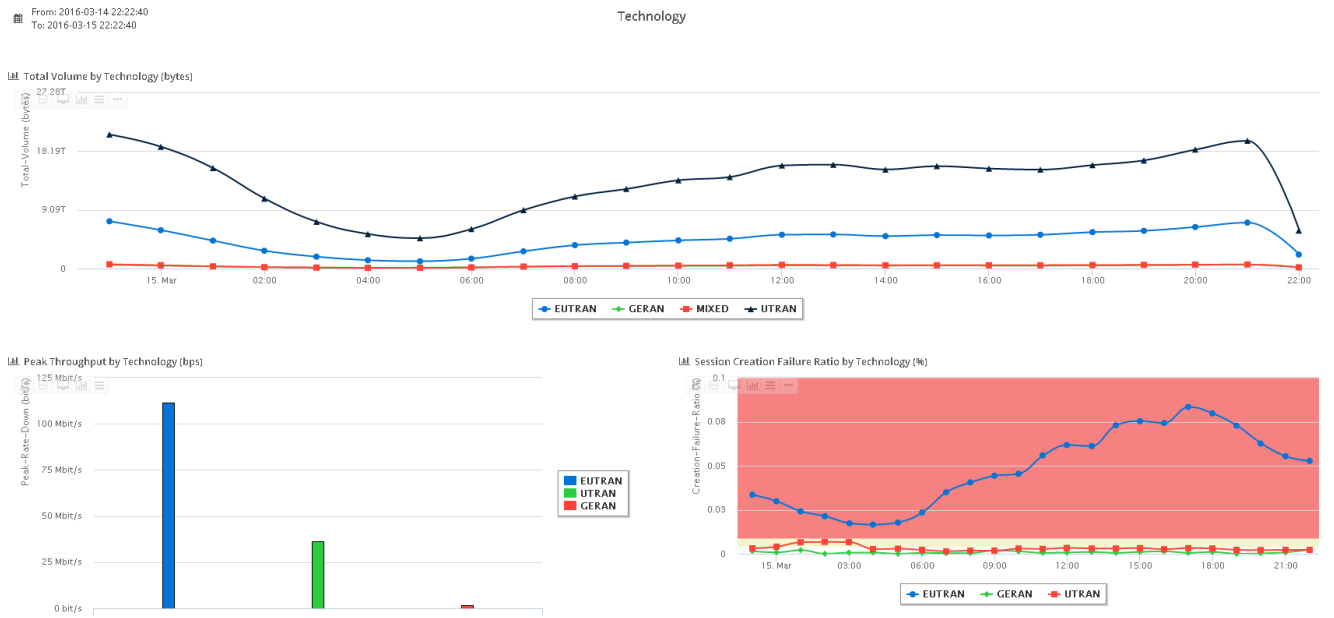


Figure 56. Technology dashboard

5.1.3 Location

The Location Dashboard has been designed to rapidly provide insights to the Operator about the performance of the locations (cells) with highest volume in his network.

The reports provide focus on different aspects that are key to Customer Experience and correlate to network conditions considering the top Cells by Volume:

- Top Cells by volume.
- Coverage performance for the top cells: is provided thanks to the direct correlation that exists with that situation and TCP percentage of retransmissions.
- Load performance of the top cells: measured in terms of RTT values.

The following figure shows the Location Dashboard.

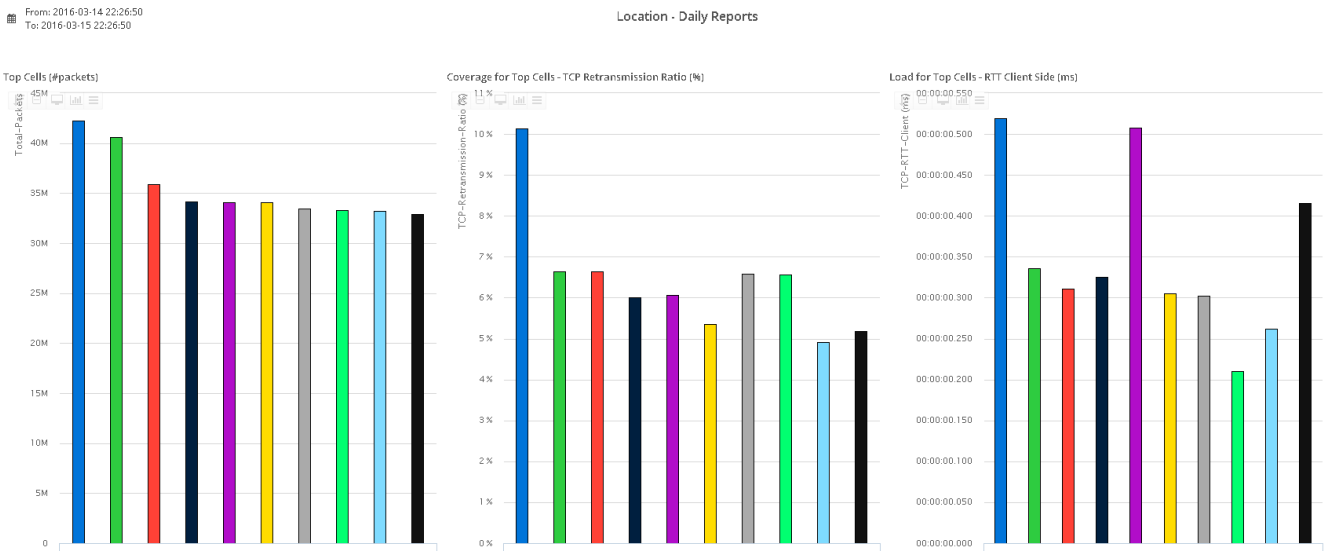


Figure 57. Location dashboard

In terms of drill-down this dashboard focuses on location-related dimensions like:

- City: decorated from cell inventory.
- Region: decorated from cell inventory.
- RAT: this dimension should allow the User to check the technology of the cell, sometimes this is apparent from the naming chosen by the Operator (decorated from cell inventory).

Depending on the Operator naming policy for ULI/ECGI, it might be possible to provide information down to sector level.

Please note that CEA will get location information through several signaling messages; the frequency and precision of the information depends therefore on what interfaces or nodes CEA is getting its information from.

5.1.4 Devices

The Devices Dashboard focuses on the UE terminal. Three reports are provided which allow the Operator to easily see the evolution and top devices in his network:

- Total Volume by Device Type

- Daily Unique Users by Brand
- Top Brands by Volume

All three reports have the possibility to further drill-down into Type, Brand, Model and RAT.

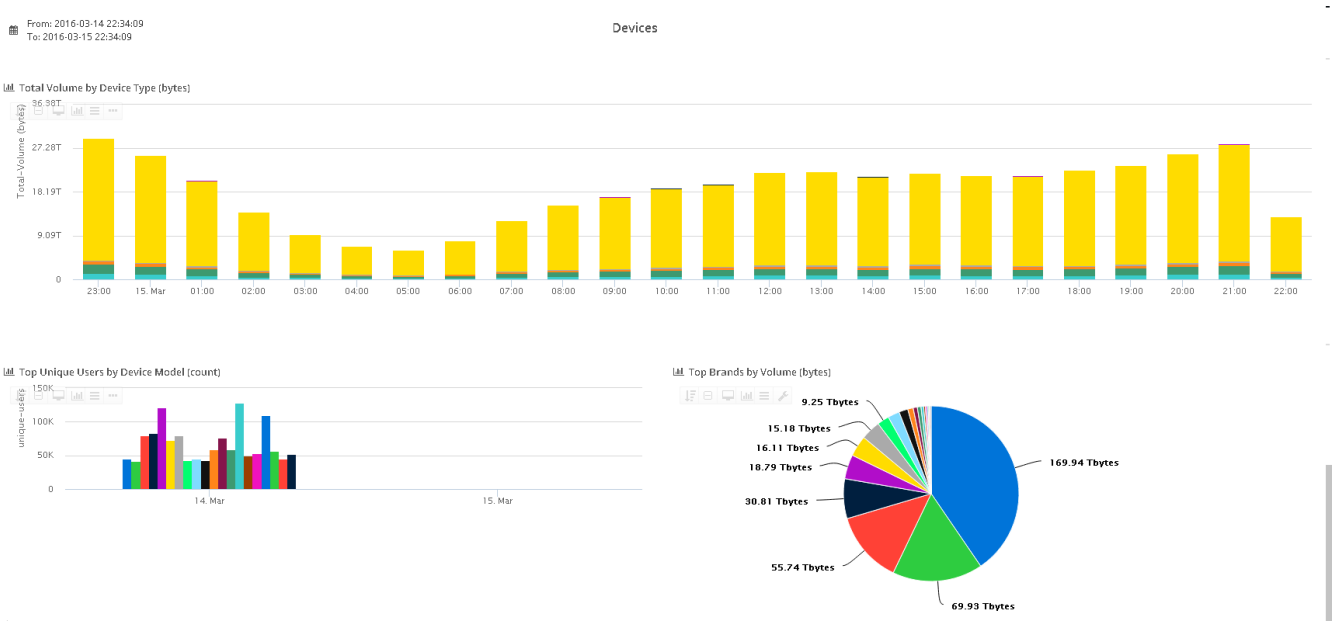


Figure 58. Device Dashboard

An example of drill-down into Total Volume by Type selecting Mobile Handsets by Brand, shows the distribution of those devices in terms of Brand.

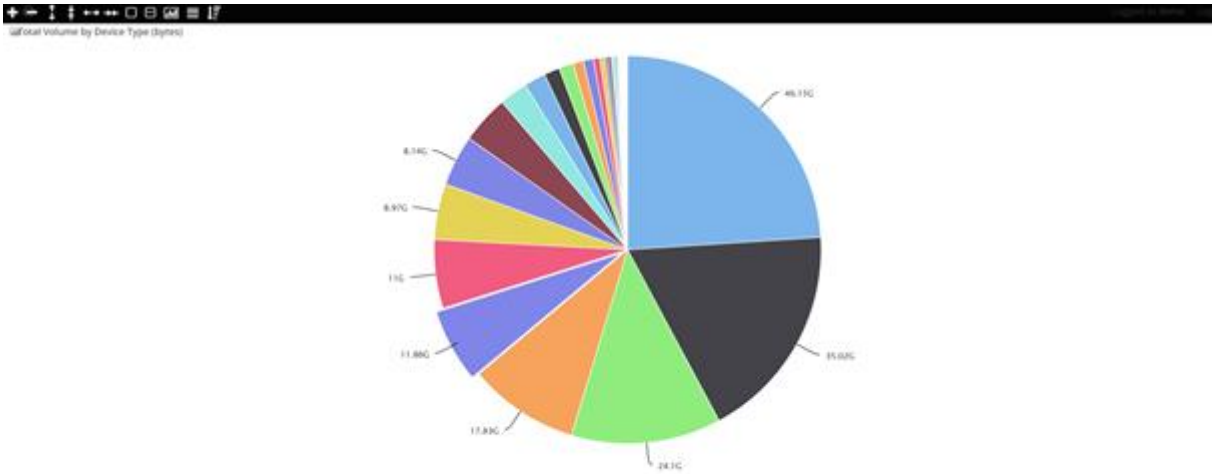


Figure 59. Total Volume of Mobile Handsets by Brand

5.1.5 QoE

One of the key aspects of the CEA solution is its number of Quality of Experience indicators. The QoE dashboard summarizes four key metrics:

- DNS Failure Ratio by P-GW/GGSN
- DNS Resolution Time by P-GW/GGSN

- RTT by P-GW/GGSN
- HTTP Session Time by P-GW/GGSN
- HTTP Failure Ratio

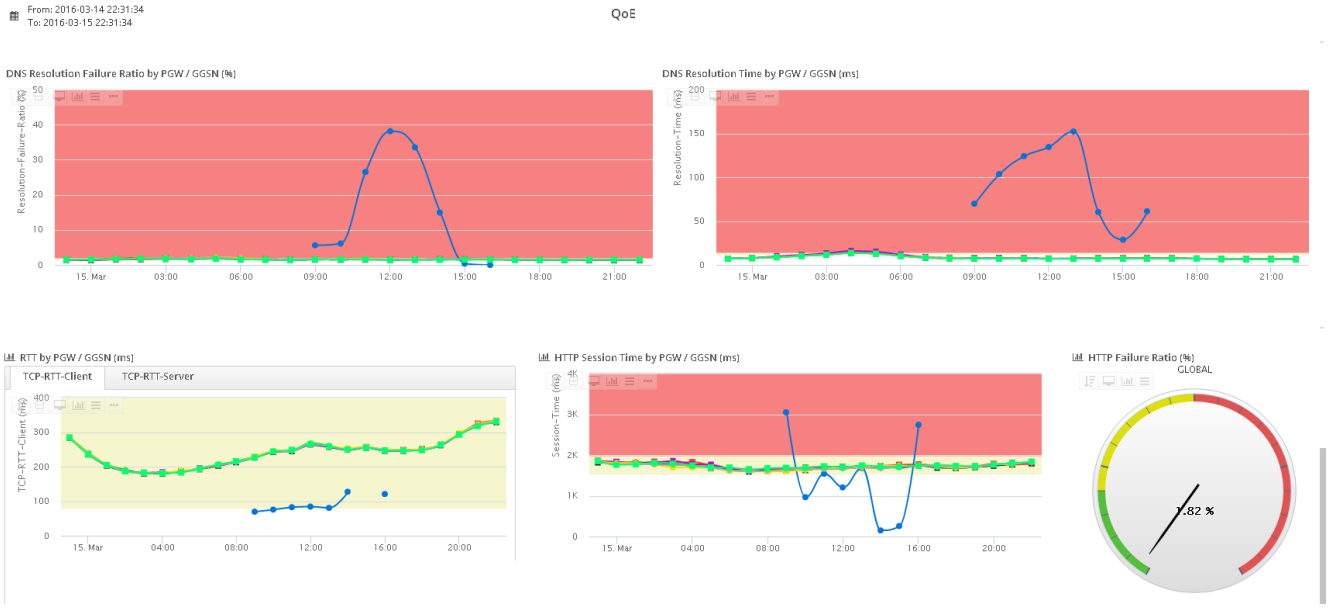


Figure 60. QoE Dashboards

5.1.6 Video

Video is one of the key services for Operators and CEA provides some of the most advanced indicators in the market. The Video Dashboard compiles some of them into a single view which provides an understanding of how video is being delivered by looking at:

- Top devices type by number of videos
- Time to start videos
- Rebuffering Time
- Stalls per video
- Top Resolutions by Number of videos

And in order to make the results relevant, these reports are calculated for the top devices type by number of videos.

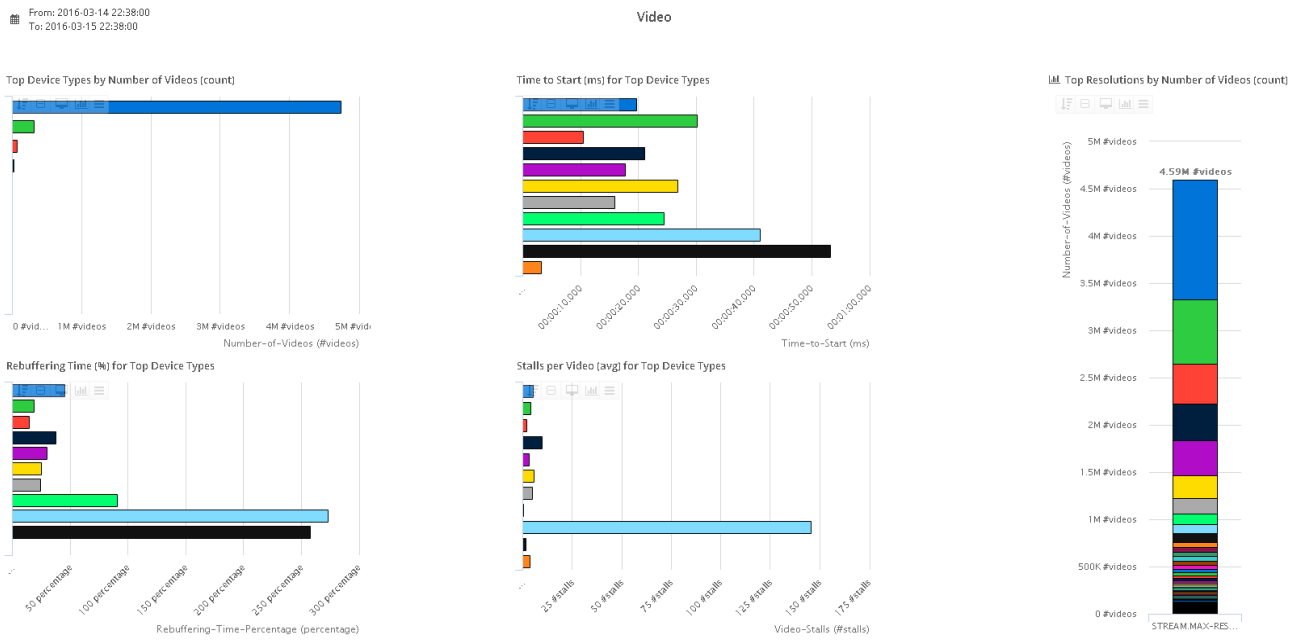


Figure 61. Video dashboard

Chapter 6
Free Exploration of Data

The CEA 5.3 release supports advanced users for a free exploration on the available data and the production of relevant non-predefined reports.

Such a great flexibility is possible thanks to the *Free Exploration Feature* accessible via the *Menu>Report>Full Search Panel Option* in the Main Menu.

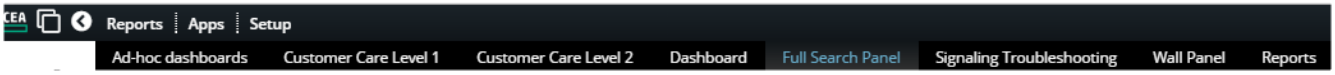


Figure 62. Full Search Panel Menu

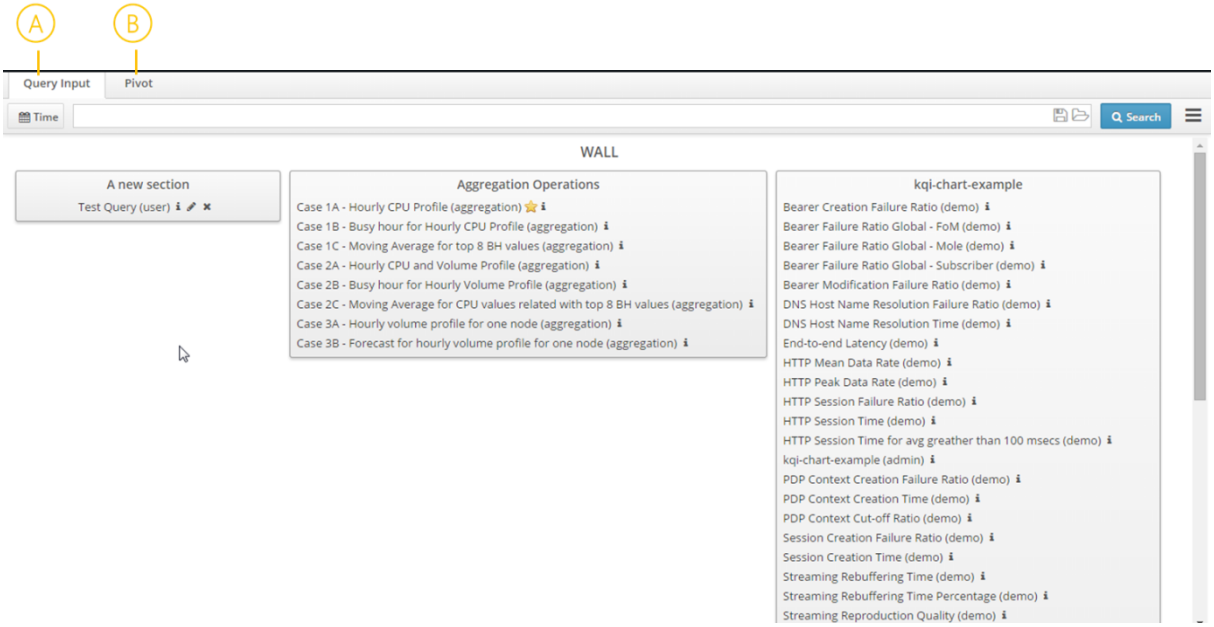


Figure 63. Full Search Panel

The Full Search Panel provides two *Free Exploration Modes*:

- **The Query Console Exploration Mode** requires the understanding of the CEA Query Language which is a simple SQL-like Language explained in the document CEA 5.3 User-Guide – Data Sources and Functions. The Query Console Exploration Mode is accessible by means of the Query Input Tab from the Full Search Panel. A further explanation of Query Console Exploration Mode can be found in the Section *Query Console*.
- **The Pivot Table Exploration Mode** is ideal when starting using the tool. This is because the user can start making queries from day one as the query is automatically composed just selecting its components graphically. A further explanation of the Pivot Table can be found in next section.

Some of the outputs after the free exploration are worth to be shared with the rest of users. For this reason, the CEA 5.3 release promotes the knowledge sharing by means of a Sharing Wall. The *Knowledge Sharing Feature* is described in the *Sharing Knowledge* section.

Let's further explain all these features and how to take the most of them.

6.1 Query Console

The *Query Console* is an advanced tool providing free exploration of data. It requires the understanding of the CEA Query Language which is a simple SQL-like Language. Further details are explained in the document *of DataSources and Functions on CEA.*

The Query Console is accessed by means of the *Menu>Report>Full Search Panel* Option and the selection of the *Query Input* Tab. By selecting this tab, the *CEA Query Console Panel* is shown.

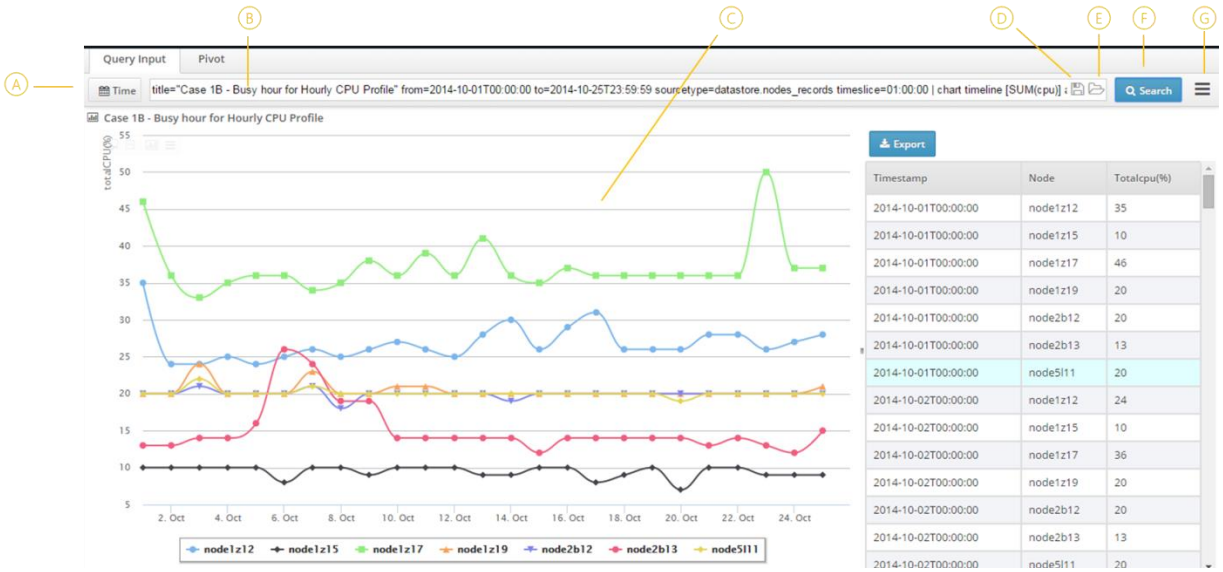


Figure 64. Query Console Panel

The *Query Console Panel* contains the following main items:

- **A. Data Range Selector:** Use it to configure the Query Data Range and the temporal aggregation.
- **B. Command Line**: Use this box to write your query using the CEA Query Language written in CEA query syntax.
- **C. Whiteboard**: Depending on the option selected with the navigation button (G), this area is used to present the Query Result after the execution of a query, the Tip Panel or the Wall Panel. The Wall Panel contains all the Shared Queries which are further described in section Sharing Knowledge.
- **D. Save Button:** Use it to save the query and, optionally, to share it in the Wall Panel.
- **E. Saved Queries Button:** Use it to find your saved queries and editing them.
- **F. Search/Cancel Button**: Use it to execute/cancel the query in the Query Box.
- **G.** Navigation Button: This Button contains three options:
    a. Tips: The Whiteboard shows a list of latest tips to use CEA application.
    b. Wall: The Whiteboard shows the Wall Panel containing the Shared Queries further described in section Sharing Knowledge.
    c. Export: Use this option to export the query result without showing it in the whiteboard (C).

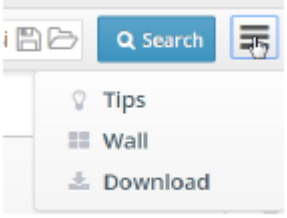


Figure 65. Navigation Button

6.2 Pivot Table

The Pivot Table is accessible by means of the *Menu>Report>Full Search Panel* Option and the selection of the *Pivot Tab*.

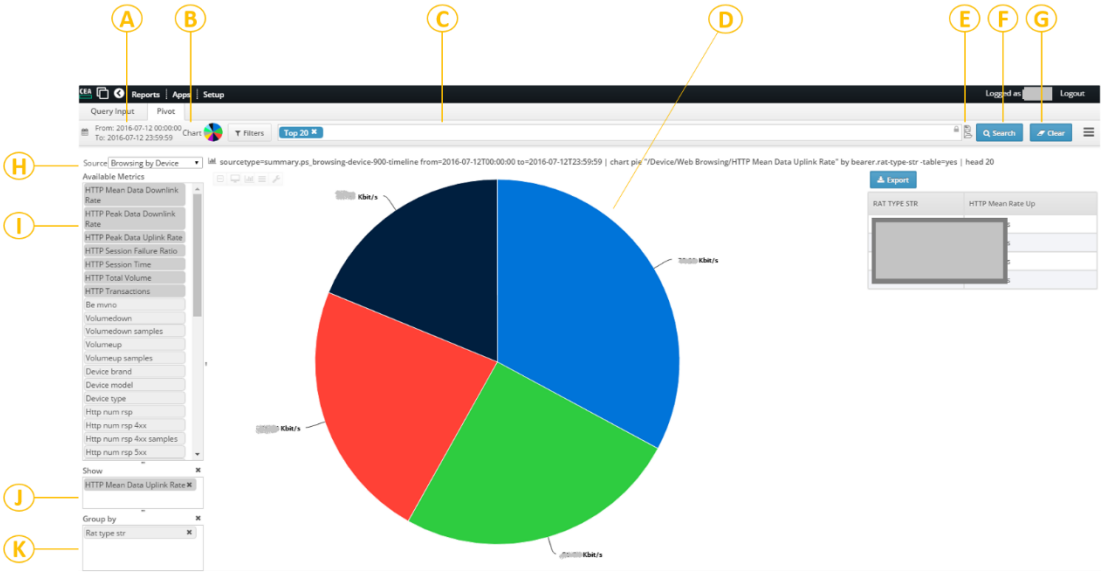


Figure 66. Pivot Table Panel

The *Pivot Table Panel* contains the following main items:

A. **Data Range Selector**: Use it to configure the query data range and the temporal aggregation.
B. **Chart Selector:** Use it to select the chart type in which the report will be shown. A further description of the available charts and options can be found in Chart Types section
C. **Filter Configurator:** Use it to include, optionally, some filters in your query. A further description of the available filters and the way to write them can be found in *CEA 5.3 User-Guide – Data Sources and Functions* document.
D. **Whiteboard**: It is the area where the Query Result is shown.
E. **Save Query Button:** Use it to save your query for a later consultation and optionally share it with the rest of users.
F. **Search Button:** Use it to launch the query.
G. **Clear Button:** Use it to clear the query configuration.
H. **Source Selector:** Use it to select the data source.

i	**Please, notice that the list of available datasources depends on the acquired licence.**

I. **Available Metrics Selector:** Use it to drag every available metrics you would like to include in the query and drop it in the next **Show Selector.** The available metrics depends on the selected datasource.
J. **Show Selector:** Use it to include the available metrics you would like to include in the query and configure the temporal aggregation.
K. **Group by Selector:** Use it to include different dimensions to the result.

6.2.1 How to execute a query with the Pivot Free Exploration Mode Step by Step

Step 1. Select a Data Range and optionally a Timeslice with the Data Range Selector (A).

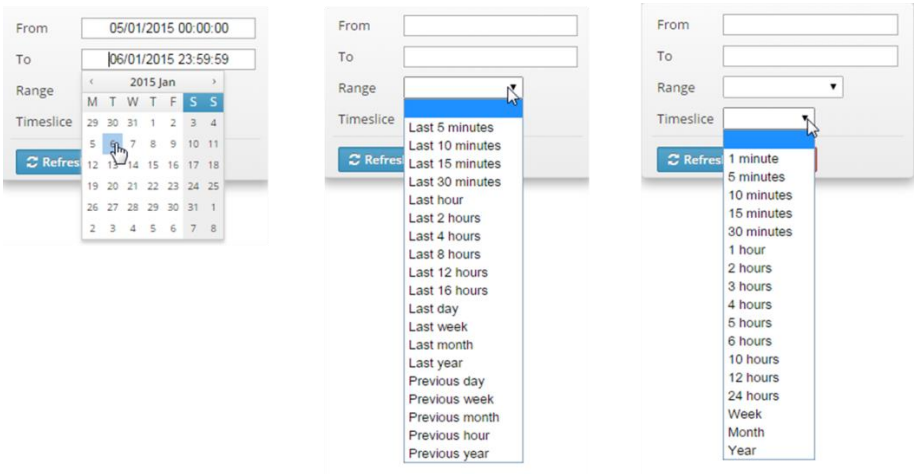


Figure 67. Step 1 – Select Data Range and Timeslice

The **Data Range** can be a fixed from – to date in the format *YYYY-mm-ddTHH:MM:SS* that you can directly pick and edit in the Data Range Selector, but it can also be a relative range as for example last day or last week.

The **Timeslice** is an optional parameter indicating the temporal aggregation of data for the query calculation.

Step 2. Select the Datasource with the Source Selector (H)

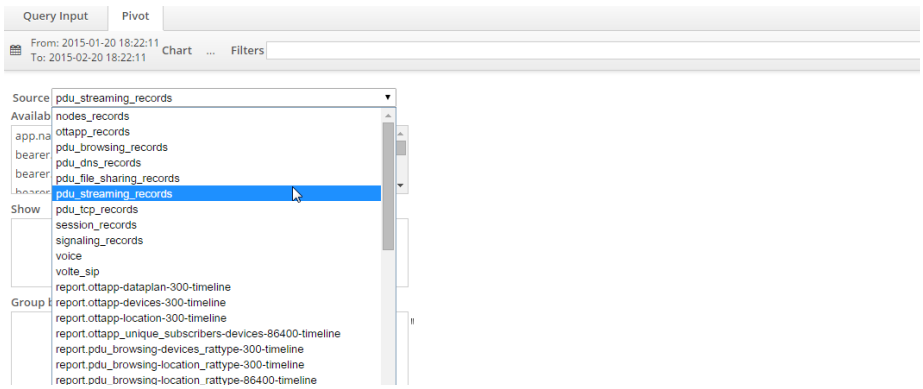


Figure 68. Step 2 – Select Datasource

Step 3. Drag and drop the different metrics you would like to show from the Available Metrics Selector (I) to the Show Selector (J).

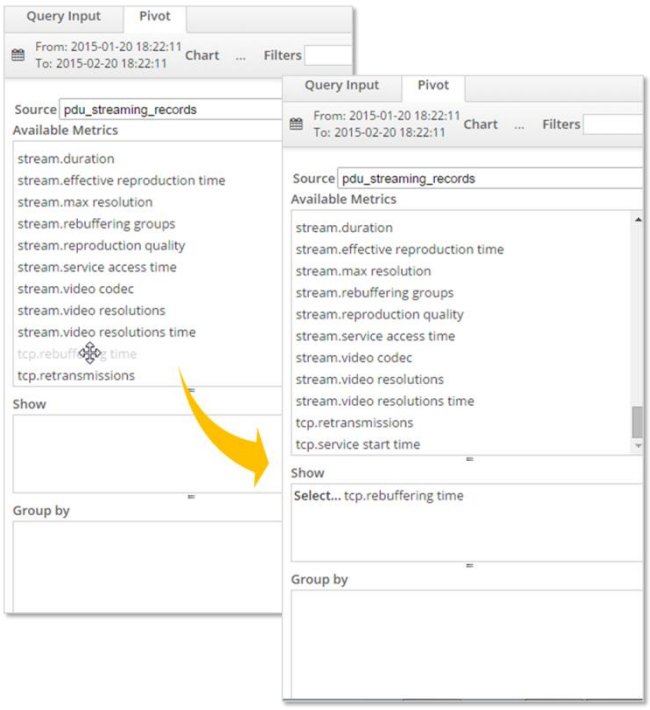


Figure 69. Step 3 – Drag and Drop the metric(s)

Step 4. Select the aggregation for each metric (otherwise default aggregation will be applied).

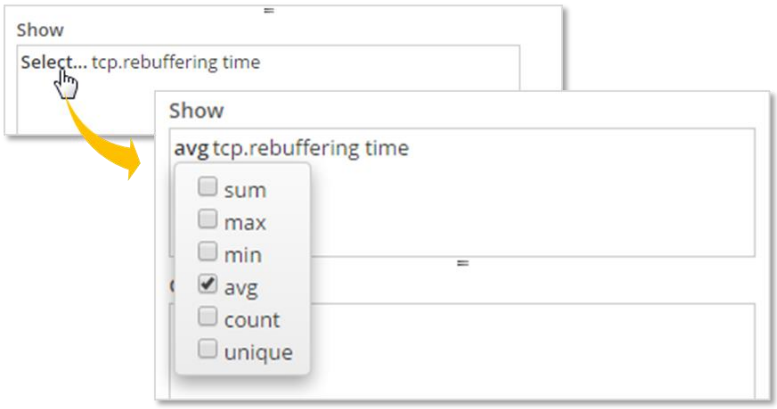


Figure 70. Step 4 – Select the Aggregation

Step 5. Drag and Drop the dimension(s) from the *Available Metrics Selector* to the *Group By Selector* (K).

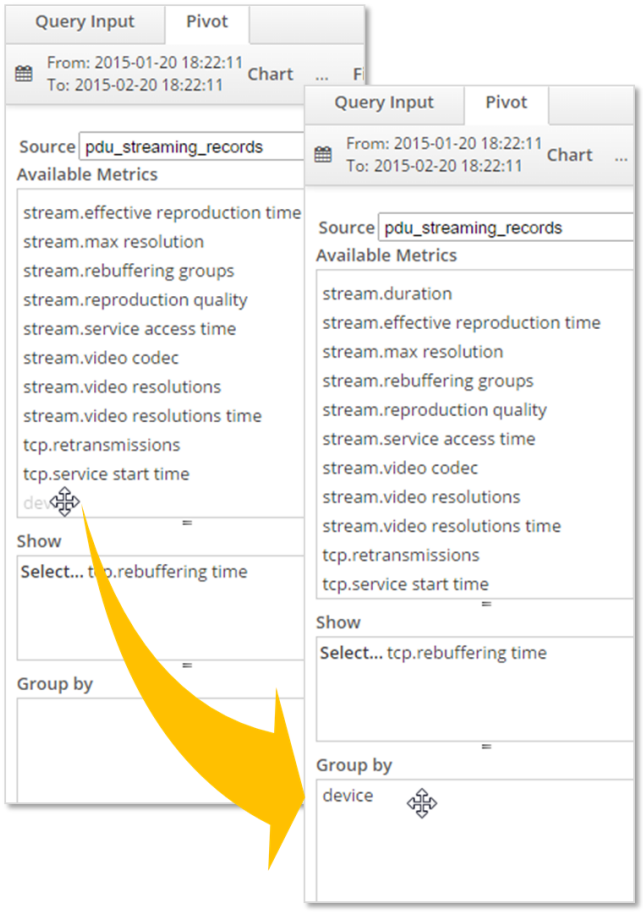


Figure 71. Step 5 – Select the Dimension(s)

Step 6. Select the result chart with the Chart Selector (B).

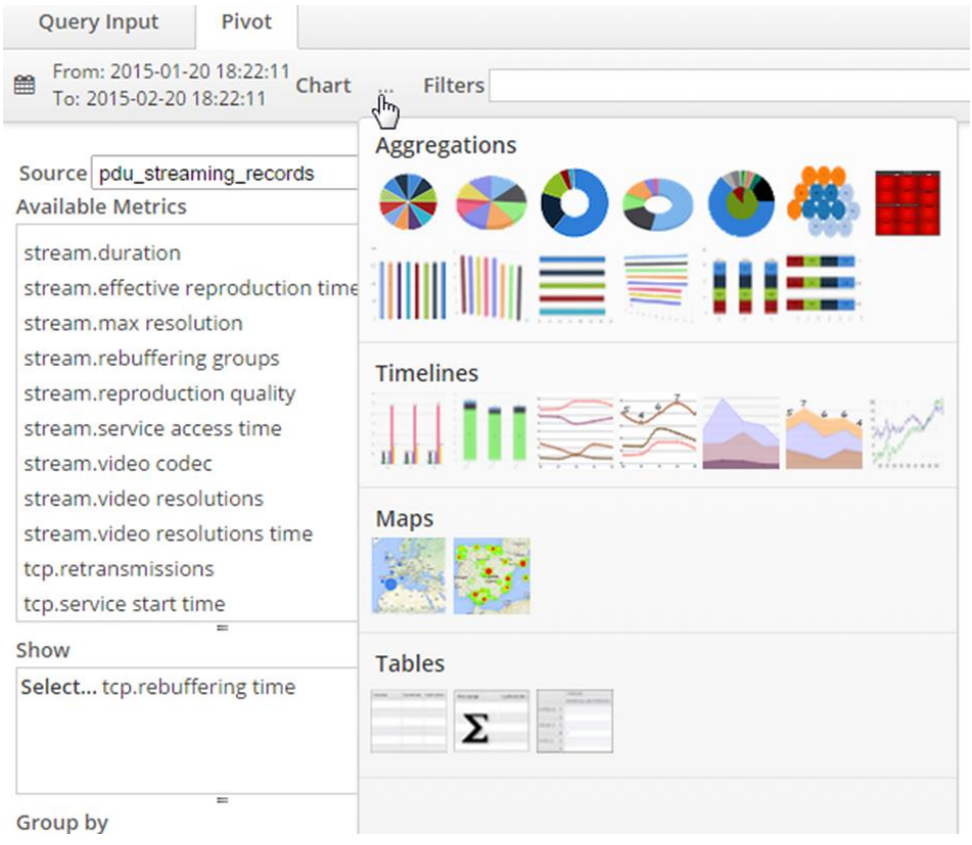


Figure 72. Step 6 – Select the Chart type

Step 7. (Optionally) Type any applicable filter with the Filter Configuration (C). A further description of the available filters and the way to write them can be found in *CEA 5.3 User-Guide – Data Sources and Functions*

Step 8. Filters

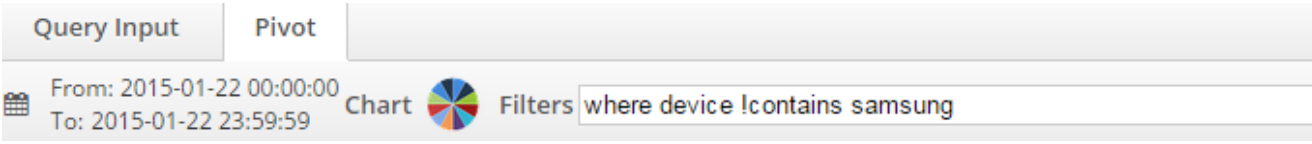


Figure 73. Step 8 – (optionally) Add filters

Step 9. Click on Query Button

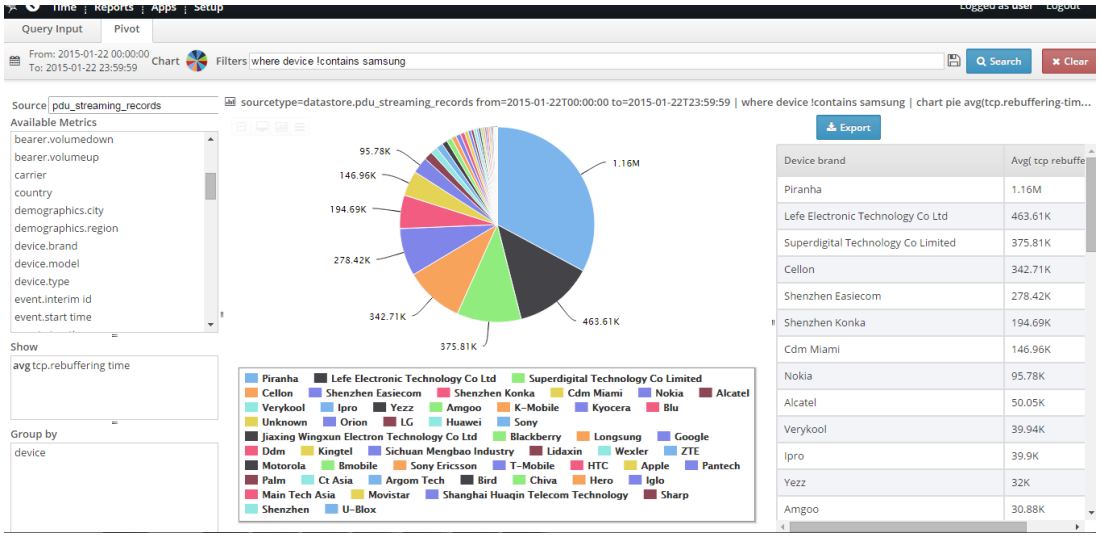


Figure 74. Query Result

At this stage you should have a Query Result in the Whiteboard. Remember that if the query is of your interest you can save it by means of the Saving Button. And optionally share it with the rest of users. Saving a Query and Sharing Knowledge sections describe how to do it. You can also drilldown on the Query Result as described in the Drill down section.

6.2.2 How to execute a query with the Query Console Exploration Mode Step by Step

The execution of a query in the Query Console is as simple as writing the Query in the *Query Command Line* and click on the Search Button.

The secret is then to learn how to write a CEA queries. The section Query Console describes in depth the elements composing the query and all the available options but, in a summarized way, it is always composed of:

- (M) Data Range
- (M) Data Source (Source Type)
- (O) Aggregation Period
- (O) Summarization Function
- (O) Filters
- (O) Functions

Where (M) means that they are mandatory and (O) that they are optional.

6.2.3 Auto completion feature

For helping the user creating the query, the CEA R5.3 provides an on-line help with auto completion function related to the section of the query you are writing.

Figure 75. Auto-completion & on-line help

6.3 Saving a Query

CEA R5.3 supports you saving your most interesting queries. You can save them by means of the Saving Button.

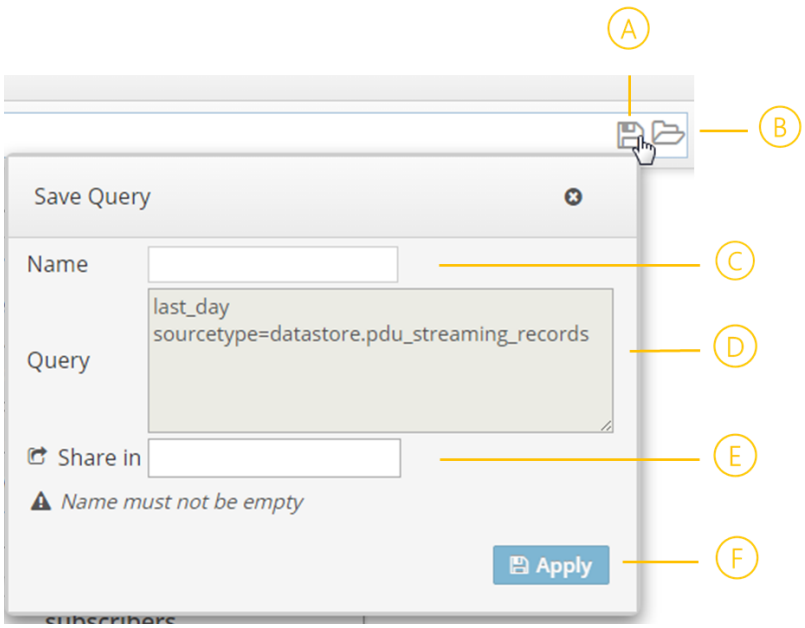


Figure 76. Saving Query Panel

The main elements for saving a query are:

A. **Saving Query Button:** By clicking it the *Saving Query Panel* is shown.

B. **Saved Queries Button**: By clicking it the list of saved queries is shown as depicted in the next figure.
C. **Name Editor:** Use it to name your query.
D. **Query Description:** It is the complete Query. When saving the query you cannot modify it.
E. **Share in Editor**: Use it to publish your query in the Wall Panel. A further description of the Wall Panel is described in the section Sharing Knowledge
F. **Apply Button**: Use it to save the query with the name you have configured.

6.3.1 How to save a query step by step

STEP 1. Write your query in the *Command Line* or configure it with the *Pivot Table*.
STEP 2. Click *Save Button*.
STEP 3. Fill in the *Name Editor* (C) in the *Saving Query Panel* and optionally the *Share in Editor* (E).
STEP 4. Click on Apply Button (F)
STEP 5. If you want to check that the query has been properly saved click on the *Saved Queries Button*. Your new saved query should be part of the list.

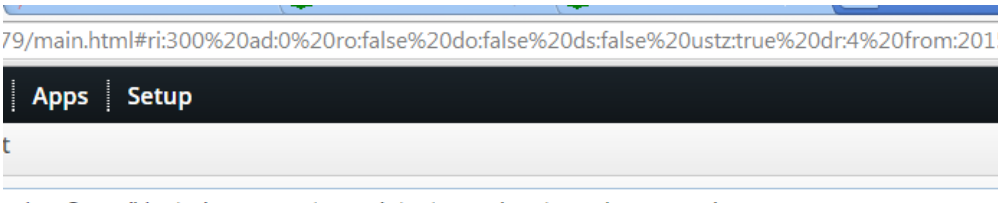


Figure 77. List of Saved Queries

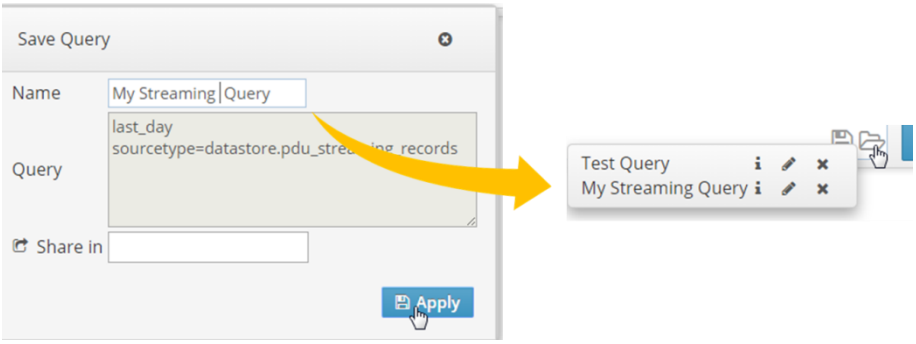


Figure 78. Saving a Query Step by Step

6.3.2 How to modify a saved query step by step

You can modify or delete your queries following these steps:

STEP 1. List your saved queries by clicking the *Saved Queries Button* (B). Every query has the three following icons:

- **Information Icon:** shows the complete query.

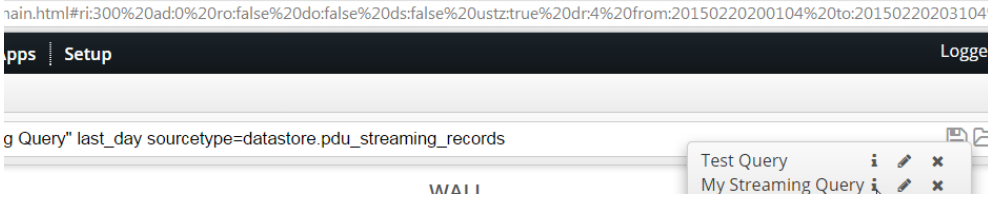


Figure 79. Query Information icon

- **Edition Icon:** Use it to edit the query.
- **Deletion Icon:** Use it to delete the query.

For the edition of the query:

STEP 2. Click on the Edition Icon. By doing this, the *Saved Query Edition* Panel will appear.

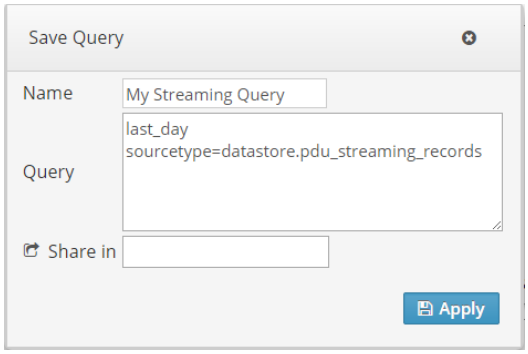


Figure 80. Saved Query Edition Panel

STEP 3. Edit the name of the query, the query or the Wall Panel group and click the Apply Button.

For the deletion of the query:

STEP 4. Click on the Deletion Icon. By doing this, the *Saved Query Deletion* Panel will appear.

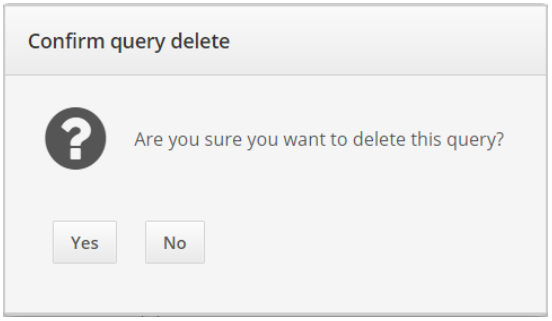


Figure 81. Saved Query Deletion Panel

STEP 5. Confirm the deletion by clicking in *Yes Button*.

6.4 Sharing Knowledge

The CEA 5.3 release promotes the knowledge sharing by means of a Wall Panel. In CEA 5.3 the users can save their queries and publish the most interesting ones. The most used queries will be awarded with stars and there is a recognition space for the Top Contributors.

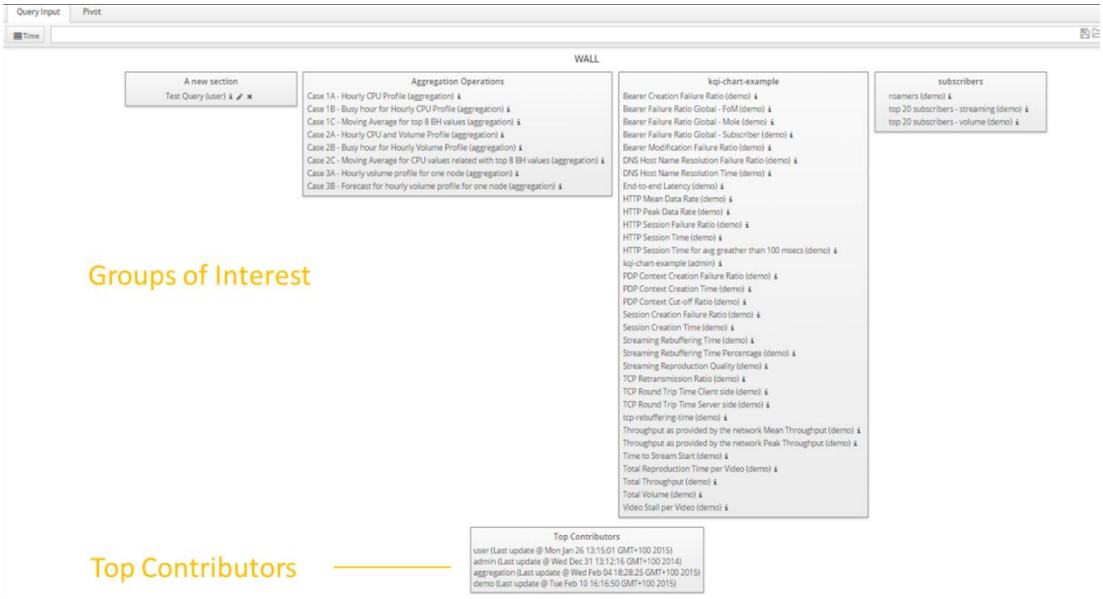


Figure 82. Wall Panel

The *Wall Panel* is part of the *Full Search Panel* containing different queries organized in groups of interest. It is visible by default when selecting the Full Search Panel Option and by means of the Wall Option in the Query Console.

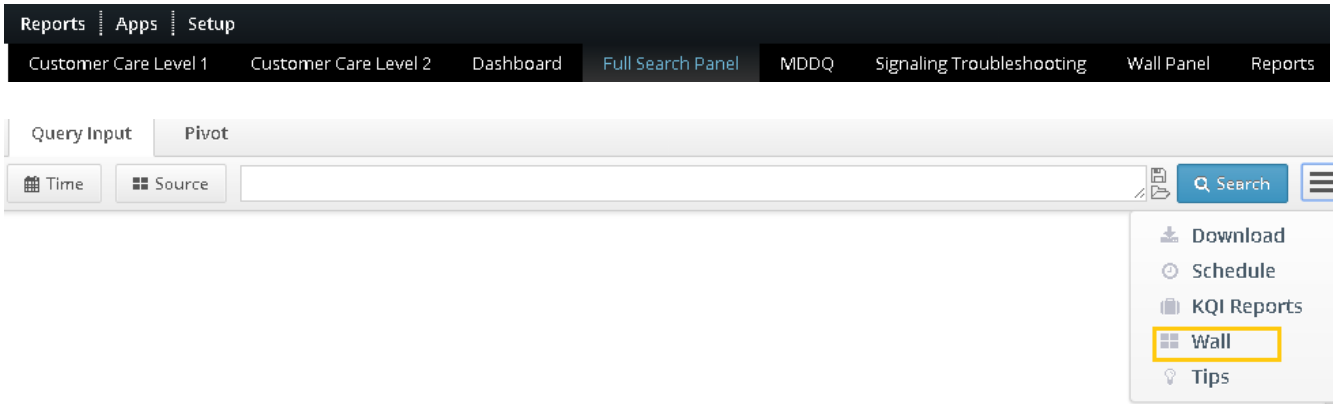


Figure 83. Accessing the Wall Panel

6.4.1 Sharing a Query

The publication of a query is as simple as including the name of the *Group of Interest* in the *Share In* Option when saving the query. If the group does not exist previously, a new group will be created. In the example bellow the query has been published in the Subscribers Queries *Group of Interest*.

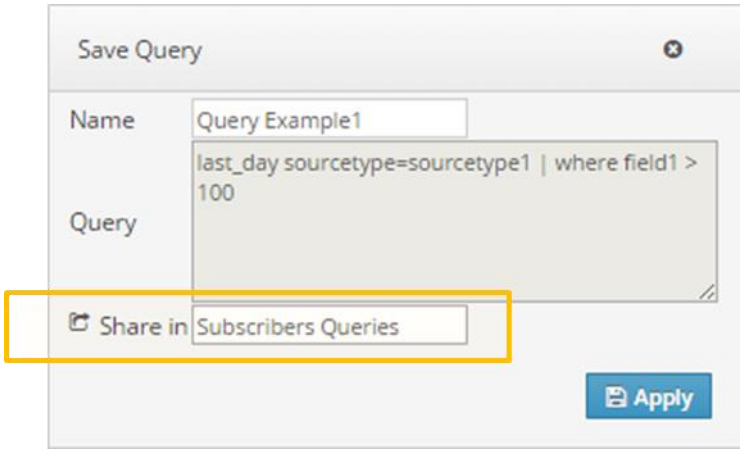


Figure 84. Sharing a Query

6.4.2 Un-sharing a Query

The removal of a query from the Wall Panel is possible by means of clicking the unshared button of the Query in the Wall. This action will remove the query from the *Wall Panel*, but the query will still be part of the saved user's queries.

The edition, deletion, sharing and un-sharing of queries are only authorised to the user that created the Query.

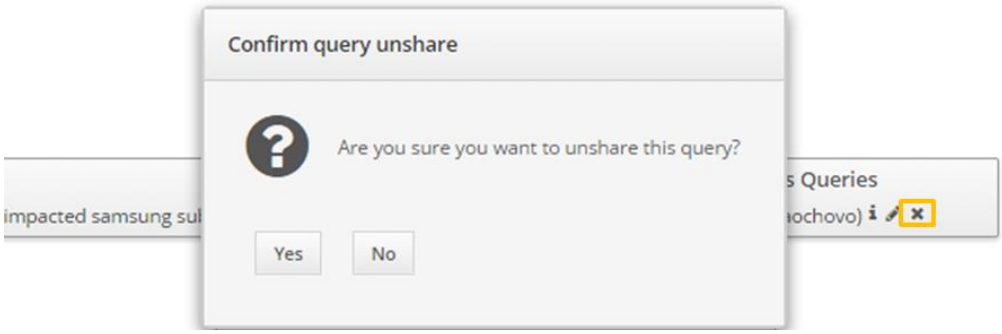


Figure 85. Unsharing a Query

6.4.3 Rating the Queries

The queries increase their rate every time a different user from the creator uses a shared query. The more a query is used, the more stars the query will be awarded.

i	**For further information about the Datasources and Funtions in CEA r5.3, please review *Data Sources and Functions document.***

Chapter 7
Drill down

The CEA R5.3 Drilldown Feature is a strong support for the user in her free exploration of data allowing her to move from one level of detail to the next by focusing in some specific information and getting a more detailed view.

Drilldown possibilities may include light differences depending on the exploration mode and the graphical representation of data over which the drilldown is done. For this reason this section shows the drilldown for different charts and exploration modes.

7.1 Charts drilldown

The aggregation charts that are available in CEA are listed on section Chart Types.

Note that the following charts do not support drilldown function: bubble, dypgrah, treemap and speedometer

The drilldown can be applied by clicking in any of the slices represented in the chart. By doing so, the *Drilldown Panel* pops-up as depicted in the following image:

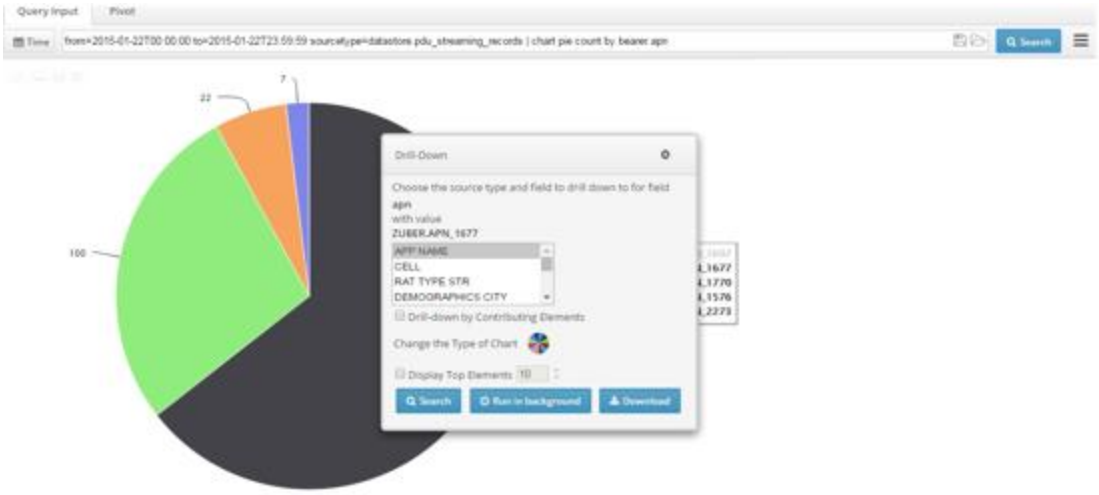


Figure 86. Pie chart drilldown

The *Drilldown Panel* contains the following items:

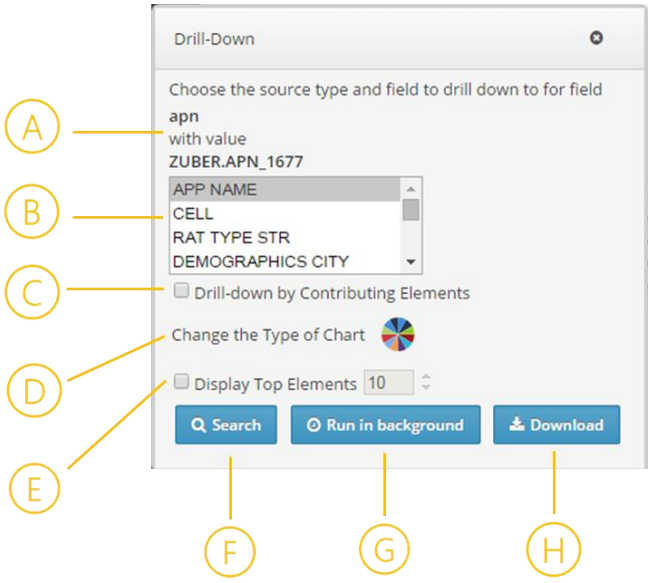


Figure 87. Drill-down Panel

A. **Applicable Filters:** They are automatically generated based on the piece of the graph you have clicked on. For example in Figure 86, the initial query shows a chart pie with the number of streaming records grouped by APN. By clicking on the APN ZUBER.APN_1677 slice the drilldown panel includes this value as a filter.
B. **Dimensions Configurator:** Use it to select the dimensions you would like the result to be grouped by. One or more can be selected.
C. **Contributing Elements**: Use it to list the users contributing to the result. When you select this option. The *Type of Chart* (D) is changed to summary table.
D. **Change the Type of Chart:** Use it to change the graphical representation. In case of maps, don't forget to include location information for the representation in the *Dimension Configurator*.
E. **Search Button:** Use it to execute the drilldown.
F. **Run in Background Button:** Use it to let the drilldown running in background. It behaves as a scheduled report configured as run once now. When the report finishes it is accessible on the Report Browser Menu. As commented previously, the only difference when using the *Run in Background Option* is that the report is immediately launched as run once now.
G. **Download Button:** Use it to export the query result to an external file.

7.2 Tables drilldown

Drilldown in tables provides additional functionality as getting information from different datasources with a common field value.

The table drilldown starts by clicking in any of the fields of a table.

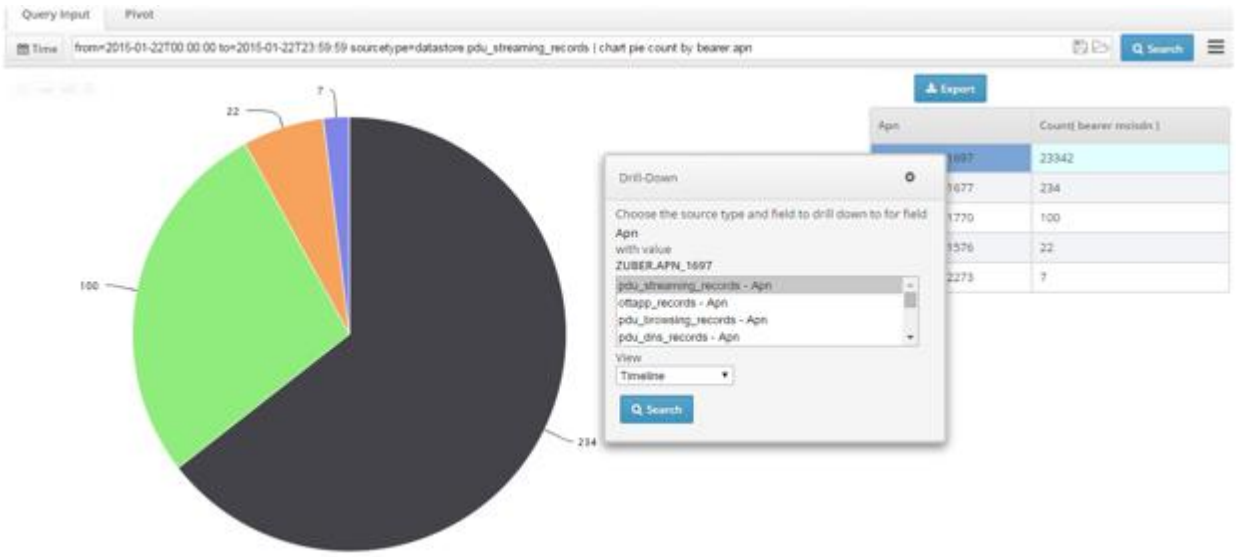


Figure 88. Table Drill-down (1)

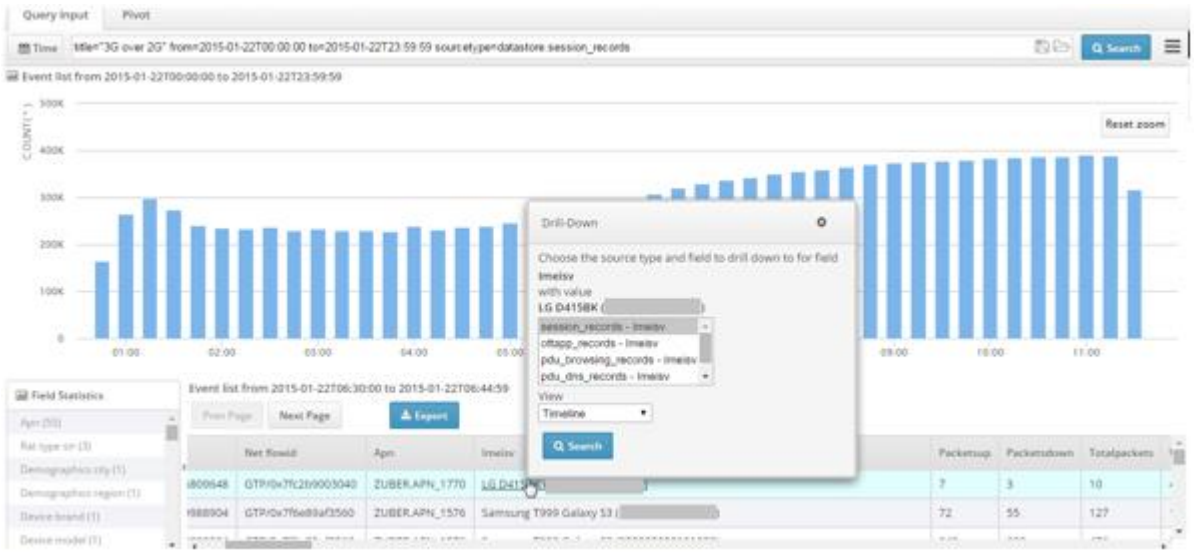


Figure 89. Table Drill-down (2)

By clicking on any of the table fields, the *Table Drilldown Panel* pops up including the following elements:

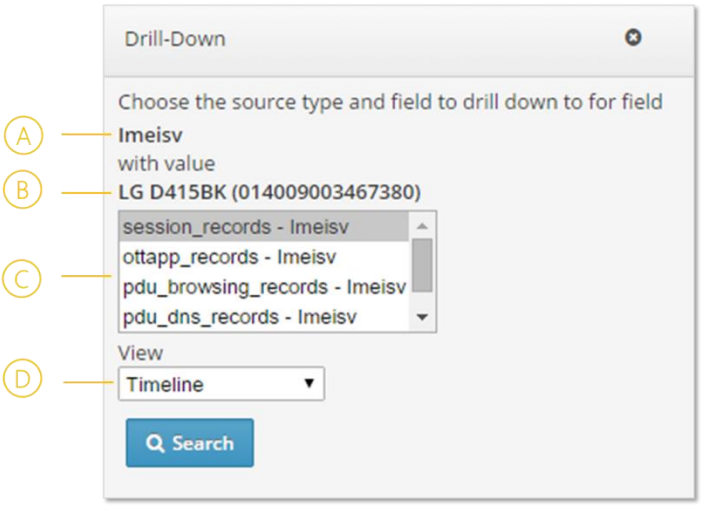


Figure 90. Table Drill-down Panel

A. Selected field for drill down.
B. Selected value for the field selected for drilldown.
C. List of datasources containing the selected field for drill down. Use it to drilldown on the desired one.
D. View. Use it to select the graphical representation for the drill down.

- Timeline view
- Multisource view

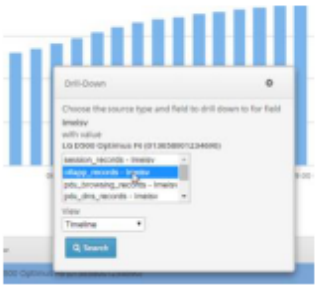
Table Drilldown - Timeline View

The Timeline view generates a timeline query filtering the datasource just for the records with the field value selected for the drilldown.

The next figure show a drilldown for the datasource session_records with field imseisv Apple Iphone 6. This drilldown generates the following query:

```
from=2015-01-22T00:00:00 to=2015-01-22T23:59:59
sourcetype=datastore.session_records| where
bearer.imeisv = "Apple Iphone 6
(354403065915890)"
```

Once you get the timeline view, you could click in any of the fields of the table and do another drilldown. This time, you could change the datasource and select timeline view. In this case, the drilldown would generate a query for the new datasource filtering the records with the field value selected for the drilldown (imseisv Apple Iphone 6 in the example).



```
from=2015-01-22T00:00:00 to=2015-01-22T23:59:59
sourcetype=datastore.ottapp_records | where
bearer.imeisv = "LG D500 Optimus F6
(013658001234690)"
```

Table Drilldown - Multisource View

By selecting an additional different datasource and multisource view, the drilldown generates a multisource query for the selected field and datasources. A further description of the multisource chart is described in *CEA 5.3 User-Guide – Data Sources and Functions* document. In summary it provides the possibility to combine information from different datasources for a shared key value.

Let's see how *Datasource Drill Down View* works by means of an example. And let's start with the following query:

from=2015-03-05T00:00:00 to=2015-03-05T00:59:59 sourcetype=datastore.session_records

This query provides as a result an event timeline. As you already know, by clicking on one of the slices you get a summary table. And you already know that to start the drilldown, you can click on any of the fields. This time we will click on the APN field, and the Drilldown Panel will be shown.

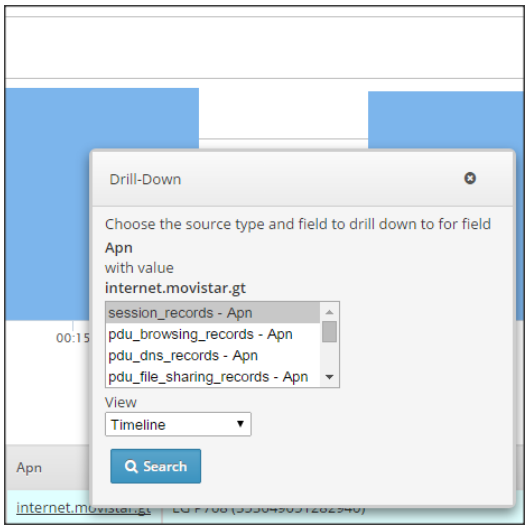


Figure 91. Drill-down Multisource View

Let's select the following datasources:

- datastore.pdu_browsing_records
- datastore.pdu_dns_records

And let's select *Multi-Source-Table* for the *View Option*.

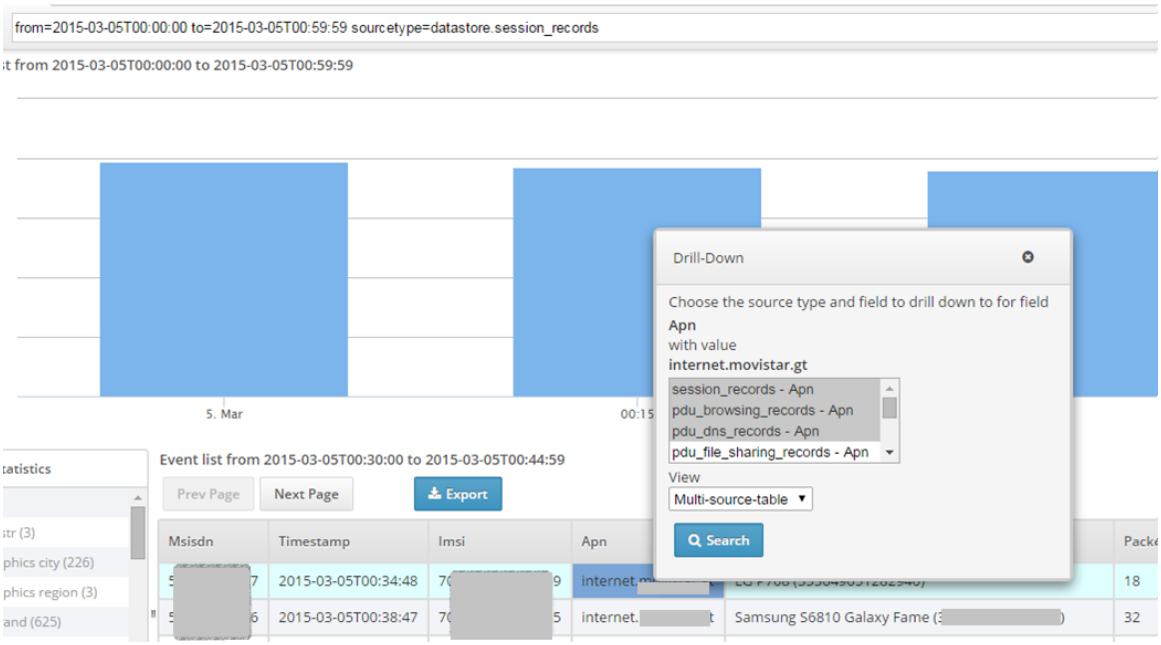


Figure 92. Drill-down Multisource view configuration

By clicking on the Search Button in the *Drilldown Configuration Panel*, the query below will be automatically executed providing the multisource table result.

from=2015-03-05T00:00:00 to=2015-03-05T00:59:59 sourcetype=datastore.session_records | multi-source datastore.pdu_browsing_records datastore.pdu_dns_records -fielCEAme=bearer.apn,bearer.apn,bearer.apn -fieldvalue=internet.movistar.gt -charttype=table

Figure 93. Drill-down Multisource view results

Table Drilldown - Subscriber Drill Down

If the drilldown field is MSISDN (this is subscriber identification) the *Drilldown Configuration Panel* contains shortcuts to different subscriber features

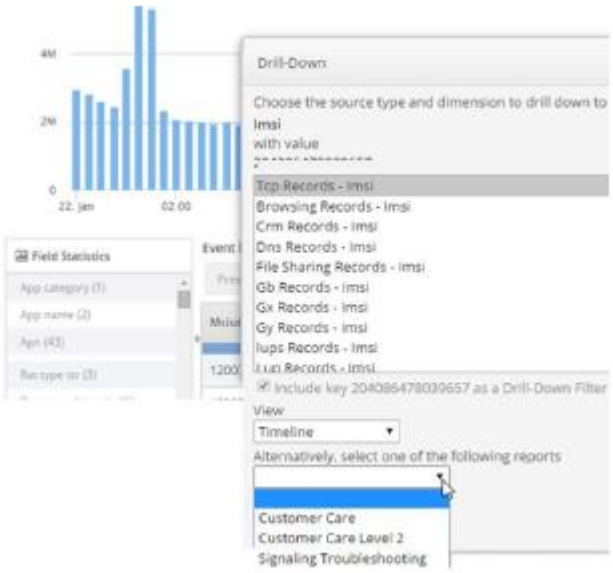


Figure 94. Subscriber Drill Down from Event Time Line

By selecting any of them you will be redirected to the applicable panel for the configured data range and selected user.

7.3 Timelines drilldown

The timeline drilldown has an additional support related to the data range to take in consideration for the drilldown. You can select either to maintain the complete data range or limit it to the data range the point in the graph you are doing drilldown.

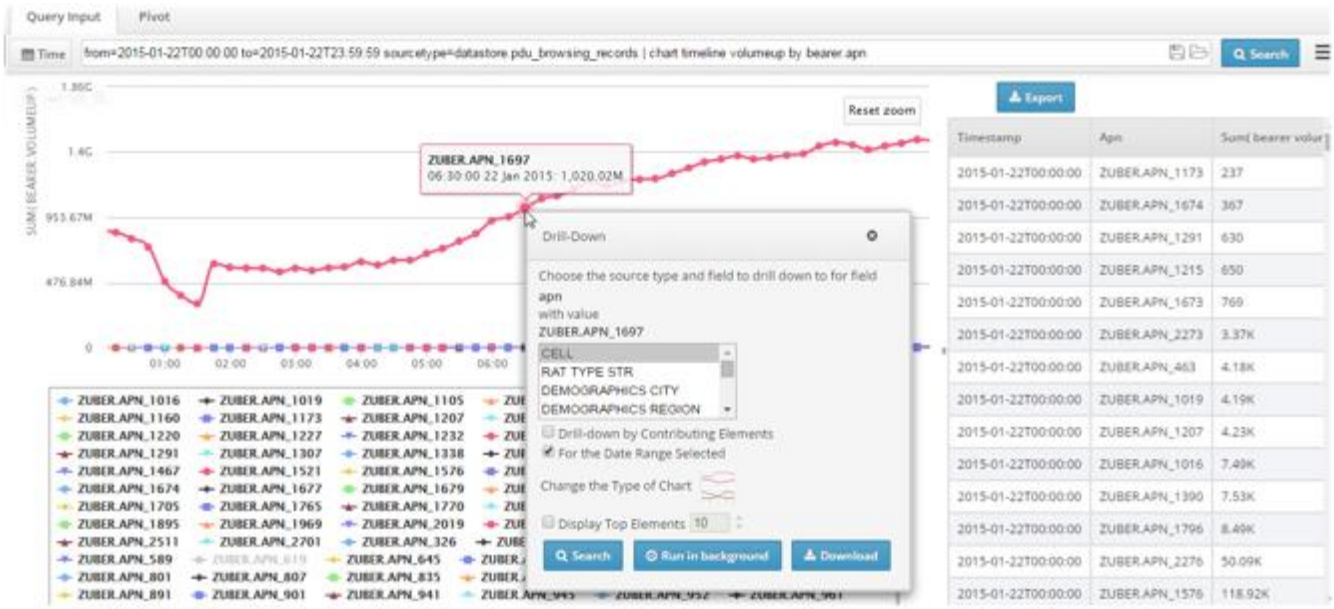


Figure 95. Timeline Drill-down

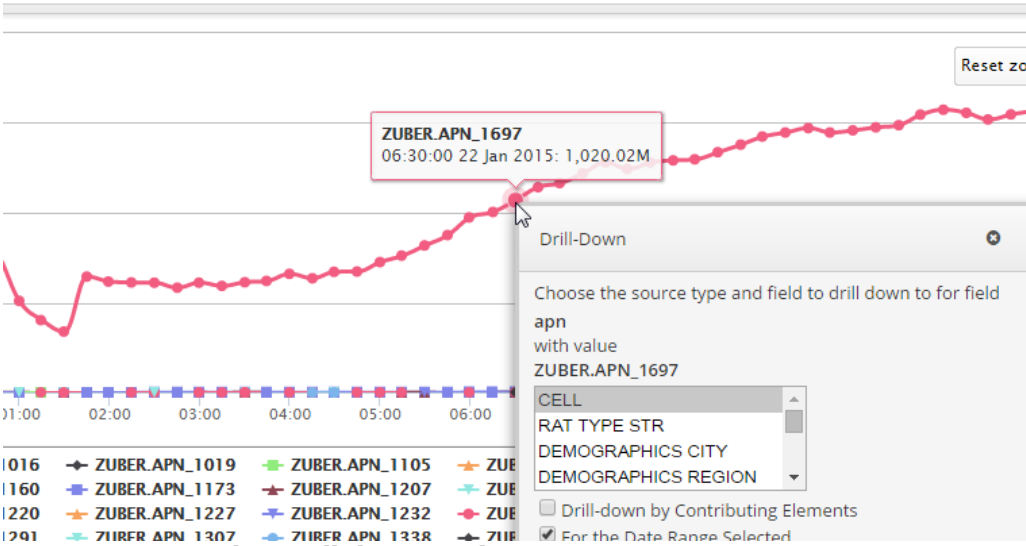


Figure 96. Timeline Drill-down Panel

- *For the Data Range Selected On* means to limit the drilldown to the data range of the selected point.
- *For the Data Range Selected Off* means to consider in the drilldown the original data range of the timeline query.

7.4 Drilldown Full Search Panel Mode

Drilldown in the Query Console and Pivot Table is possible by means of clicking on the result charts. The drilldown behaviour may vary from one chart to another as explained in section *Charts* drilldown.

In these modes of exploration it is possible to do back and forth of drilldown by means of the browser back and forth feature.

7.5 Dashboards drilldown

The dashboard drilldown provides the same functionality as the *Full Search Panel*. The only difference is that for every chart there is a drilldown stack listing the drilldown the user has done on the chart. The Figure 97 shows the drilldown stack and how every drilldown adds a new line in the stack.

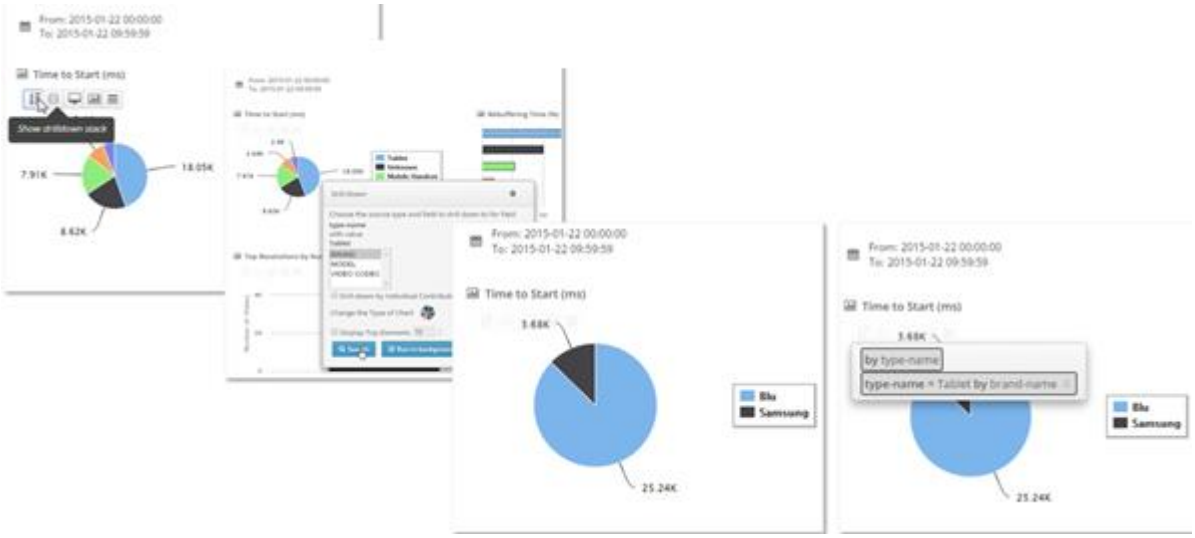


Figure 97. Drill-down Stack

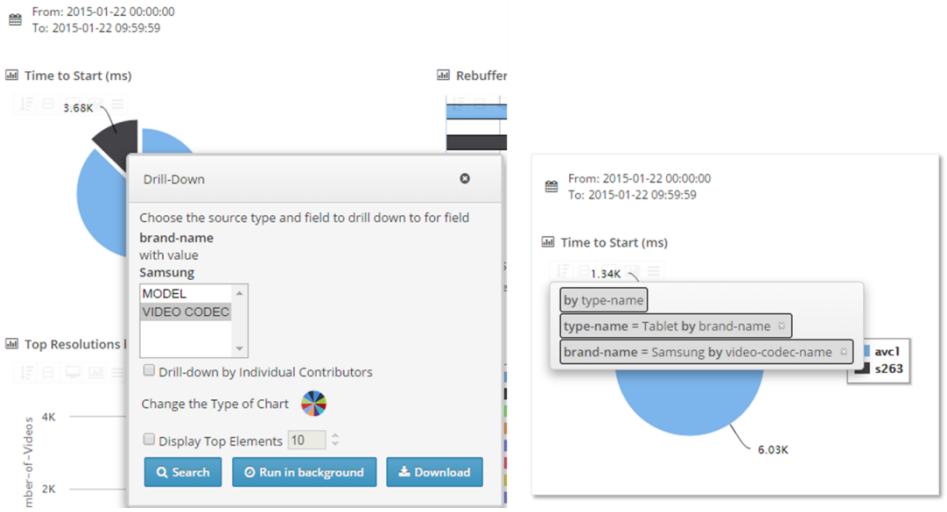


Figure 98. Adding Drill-down

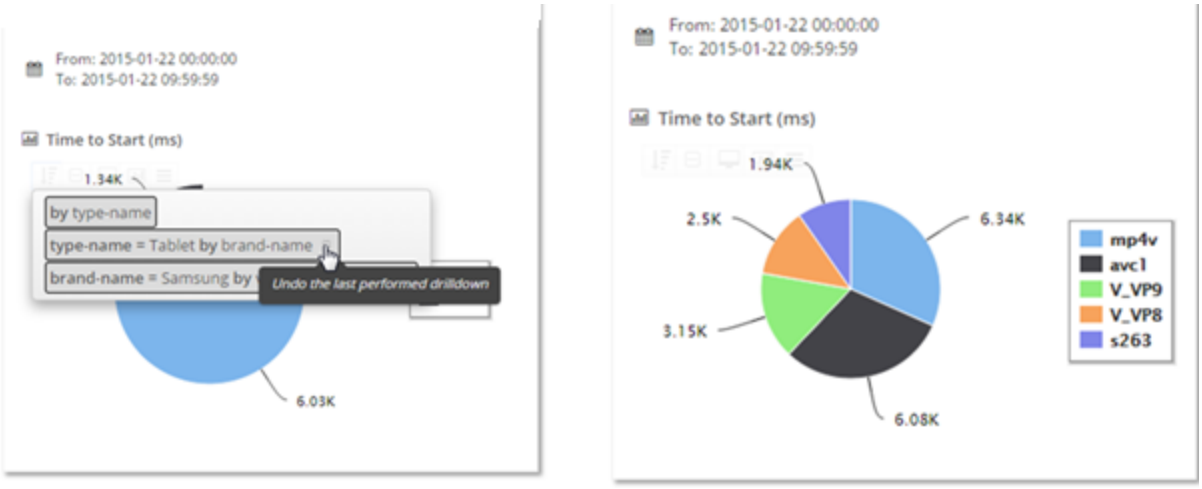


Figure 99. Removing Drill-down

In case you would like to remove one of the drilldowns you just need to click on the delete button at the right of the drilldown description from the drilldown stack. This will remove that drilldown level.

It is important to note that you can remove any drilldown without following any order. In the example shown the drilldown stack had the following items:

1. By type-name (original)
2. Type=Tablet by Bran
3. Brand=Samsung by video-codec

By removing the second one, you will have the drilldown:

1. By type-name (original)
2. Brand=Samsung by video-codec.

Chapter 8 Dashboard Builder

The CEA R5.3 Dashboard Builder Application let the users to easily create personalized dashboards. It is an intuitive and user-friendly tool accessible through the Apps Menu:

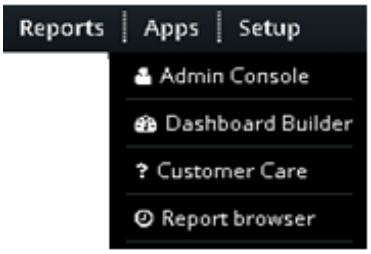


Figure 100. Dashboard Builder access

Dashboard builder enables users to create customized dashboards with any combination of reports. It has the following options:

- **New Dashboard Button:** Use it to create a new dashboard.
- **Load report Button:** It loads a saved dashboard to reconfigure it.
- **Add Inputs:** Allows adding the Time Selector and the Query/Refresh Button to the dashboard.
- **Add Container Button:** It adds a new dock layout to the dashboard.
- **Save Button:** It saves the dashboard.
- **Preview Button:** It allows the preview of the dashboard result.
- **Add Title Button:** It adds a tittle to the dashboard.
- **ID Report Label:** It shows the name of the dashboard.

Figure 101. Dashboard builder options

By means of adding inputs and containers, the Dashboard Builder layout will show the dashboard configuration.

For creating a new dashboard, please follow the following steps:

STEP 1. Click on New Dashboard Button
STEP 2. Save it in the path you will later access the dashboard

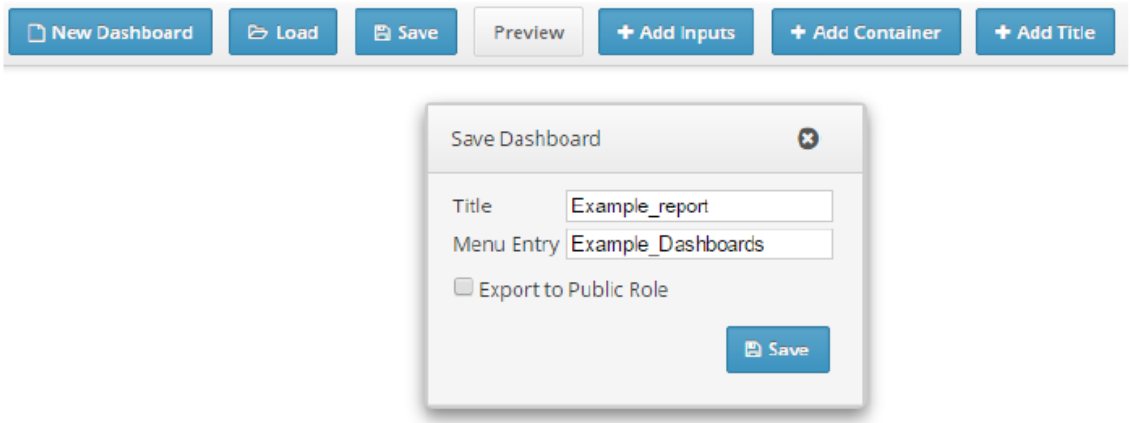


Figure 102. Saving a Dashboard

STEP 3. Click on *Add Inputs* button. This enables the user to choose what input fields will be included.

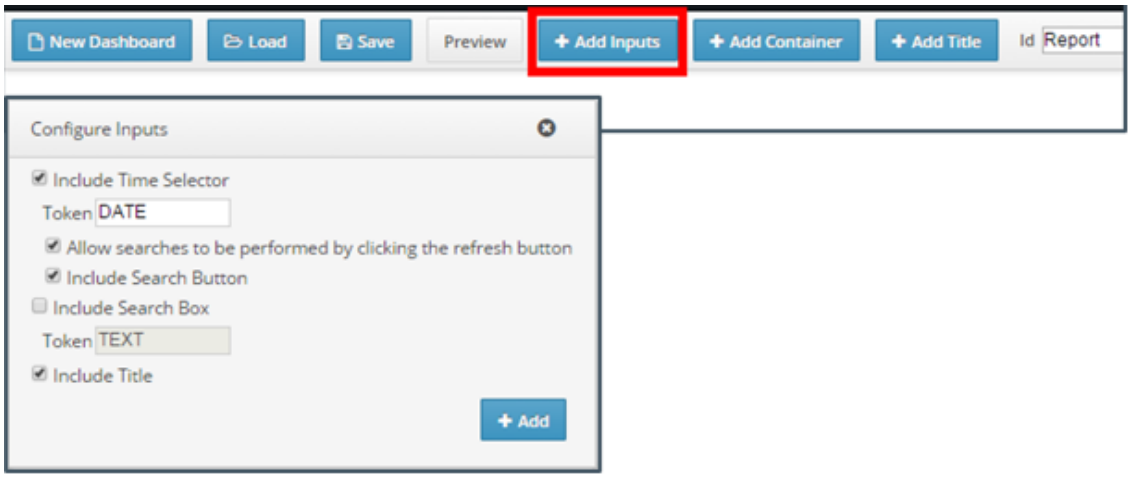


Figure 103. Adding Inputs to a Dashboard

- *Include Time Selector*: checking this box will
- *Allow searches (…):* checking this box will allow reports' timestamp to be changed.
- *Include Search button*: checking this box will provide a *Search* button in the dashboard.
- *Include Search Box*: checking this will provide a search box for MSISDNs in dashboard.
- *Include Title*: checking this box will show a title for the dashboard.
- *Add*: this will create input box with selected characteristics.

STEP 4. In order to create the container where the reports will be displayed, click on *Add Container*, and a configuration form will appear:

- *Height* field: To change the size of the container.
- *Relate to the following action* field: Check this option to link the container to the *Timestamp* function (changing timestamp will not work if this option is not selected).

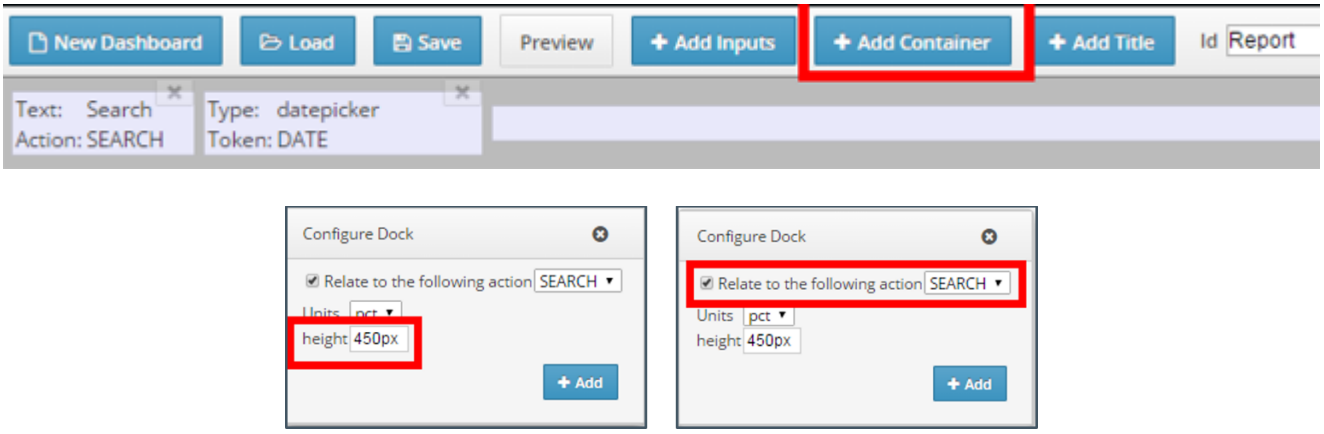


Figure 104. Adding and Configuring a Container

STEP 5. Now the container is available so the next step is to add elements to the container.

- The + displays the configuration to add reports
- The x button removes the container

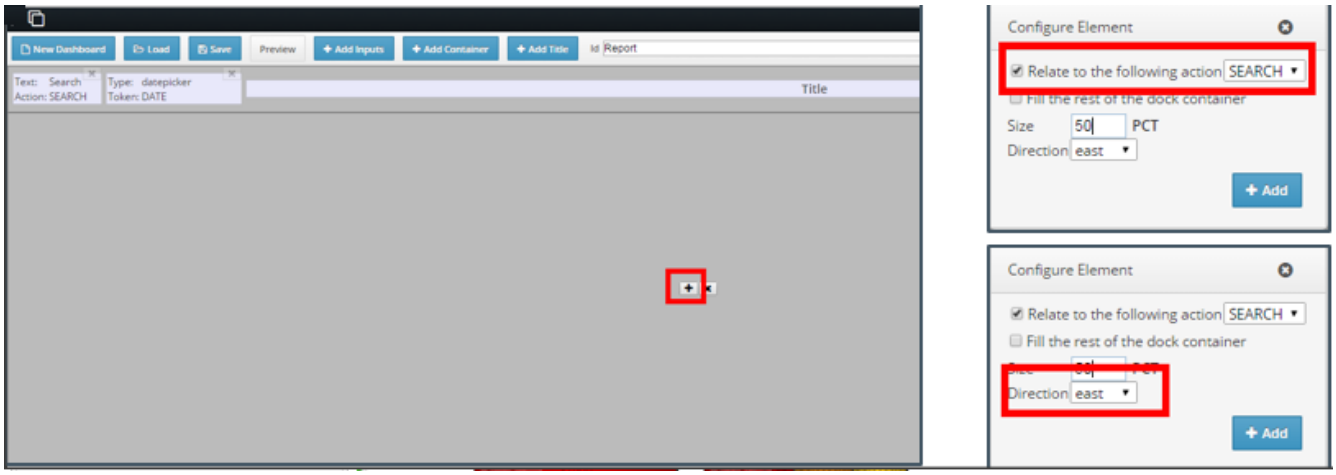


Figure 105. Adding Elements to the Container

The configuration form has the following relevant fields:

- *Relate to the following action*: Make sure you link the report to timestamp.
- *Direction*: Choose position of the report within the container

In the following example, the report is to the right within the container. By clicking the "+" button, a 2nd report would be included. Since north option is selected, this 2nd report would occupy the upper part of the remaining space

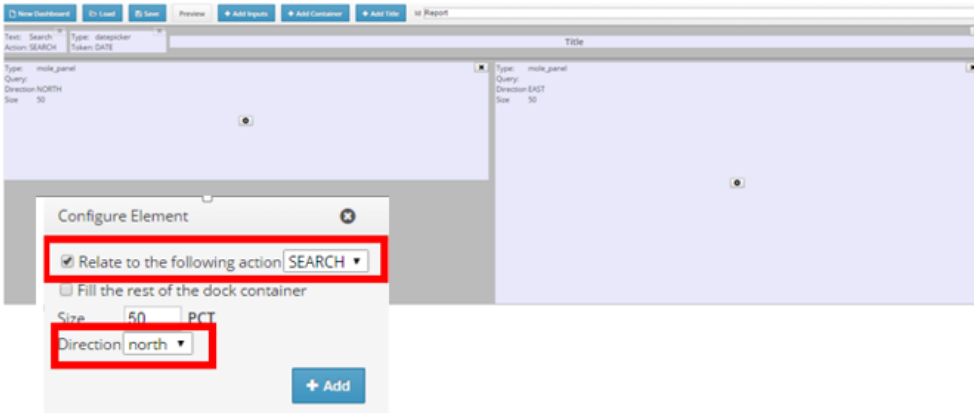


Figure 106. Dashboard builder example

Selecting *Fill the rest of the dock container* a 3rd report would occupy the rest of the container.

STEP 6. Add and configure the queries. Enter queries that will fill the reports by clicking on the symbols within each of the reports. Select *New* to enter a query.

It is possible to choose from a new custom query, saved queries or queries available on the wall.

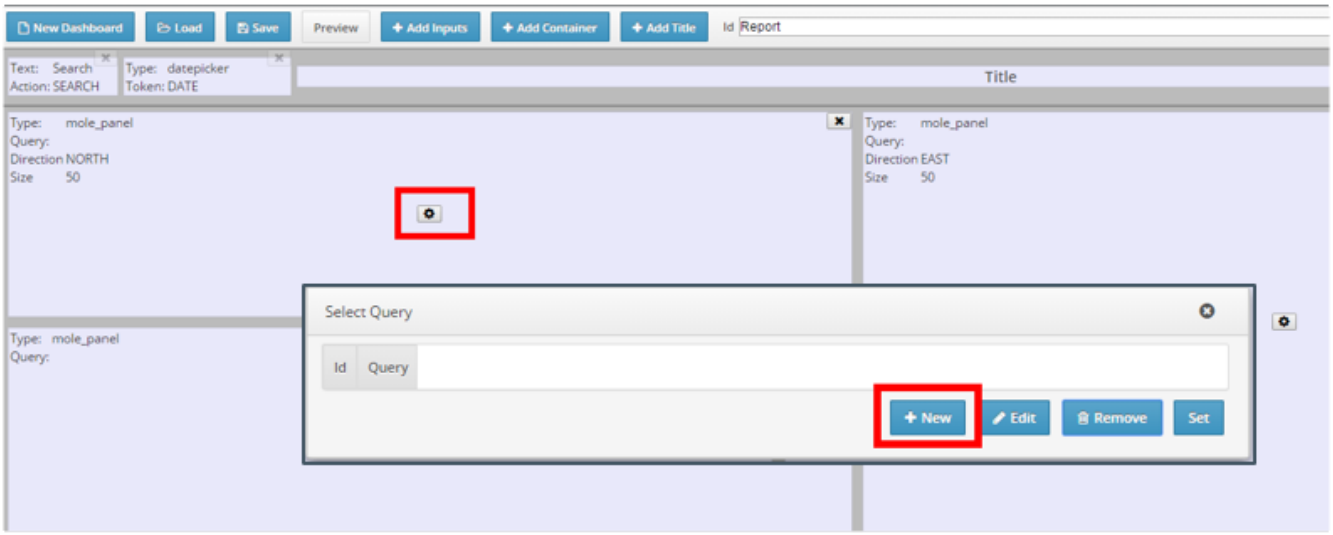


Figure 107. Adding a Query

Then select graphical display and use the following options as desired to configure the query:

- *Use date tokens instead* option will create a dynamic timestamp that will change when the timestamp is modified in the dashboard
- *Custom*: write query manually, as in Full Search.
- *Saved*: access saved queries.
- *Wall*: use queries saved in The Wall.
- *KQI*: use standard queries to get specific KPIs.

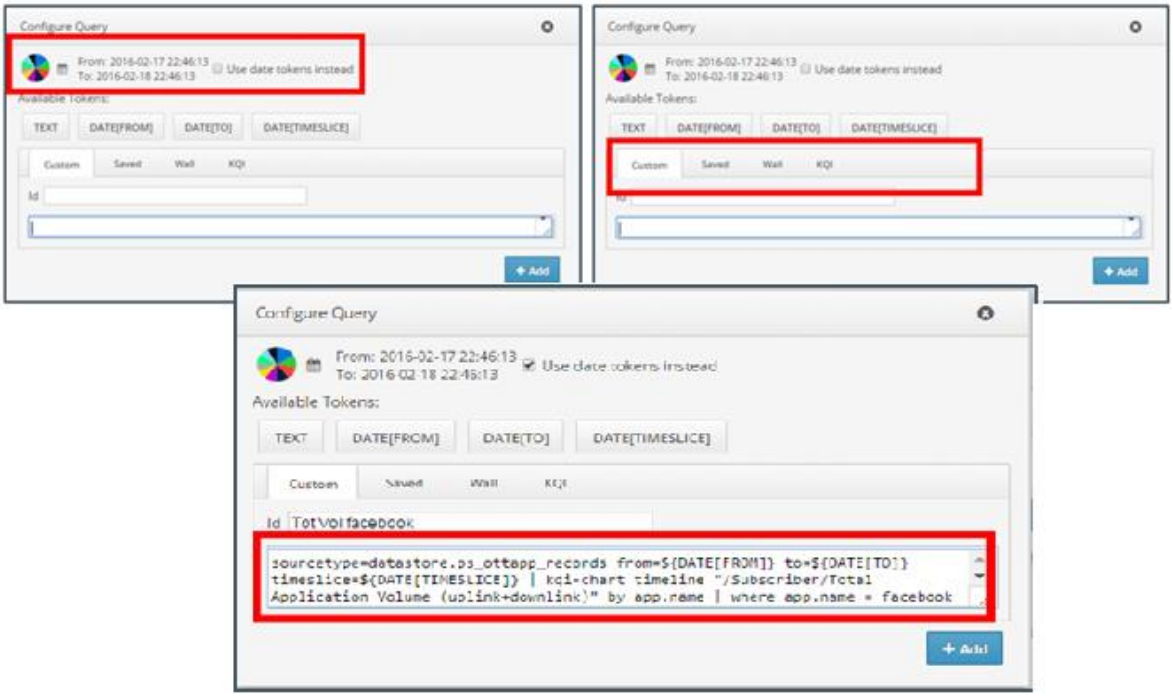


Figure 108.Configuring the query

STEP 7. After clicking on *Add*, click on the query you just built and click on *Set* to associate the query to a dashboard element

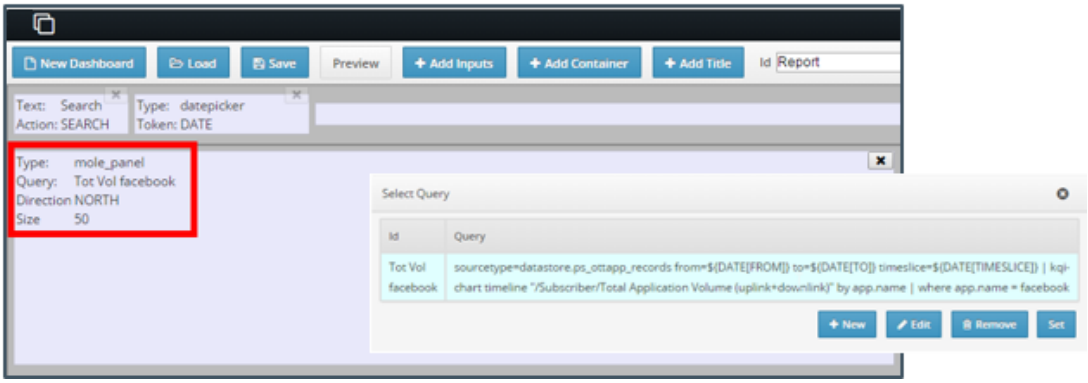


Figure 109.Associating a Query to a Dashboard Element

STEP 8. Preview the dashboard: Click on *Preview* to see how the dashboard will look like. You will have to click on *Search* to get results

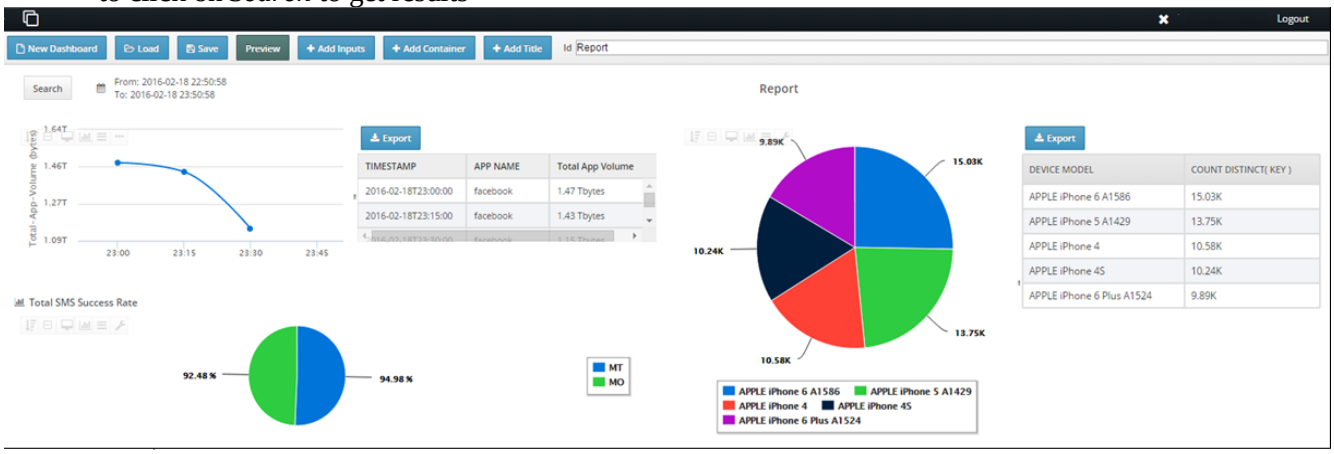


Figure 110.Previewing a Dashboard

STEP 9. Finish the configuration by adding containers and queries.
STEP 10. Save your work: Click on *Save* to save the query and choose any name as a title.

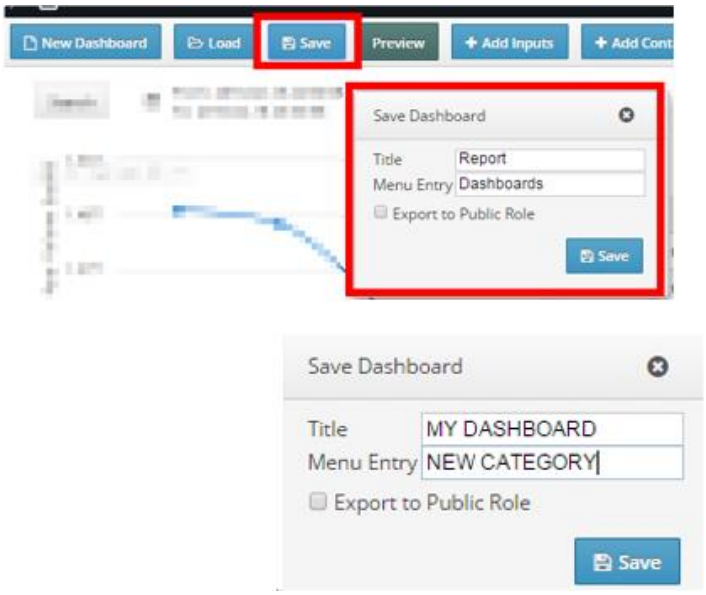


Figure 111.Previewing a Dashboard

If you write the name of an existing report category in *Menu Entry*, the dashboard will be saved I that category. If you write the name of a non-existing category, the category will be created.

You can make it publicly accessible by checking *Export to Public Role* box.

STEP 11. The dashboard is accessible in the Menu Report in the path the user saved it.

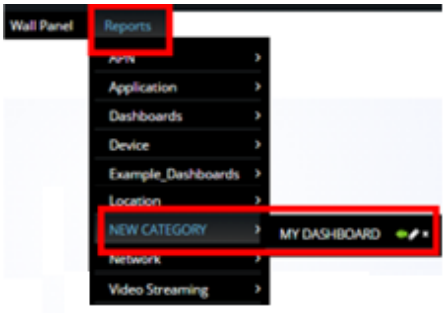


Figure 112.Accesing the Dashboard

Chapter 9 Scheduling and Alarming

Sometimes the user is interested in the temporal evolution of certain reports and wants to be informed of the changes in the last hour, day, week or month.

Scheduled Report feature helps the user to save time and increase effectiveness by programming in advance this kind of repetitive reports and being informed proactively and punctually by the system by means of an email with the link to the specific report result.

This feature can be completed with the Alarming feature, which provides the ability of assigning a threshold value for a specific scheduled report and keep the end-user informed in case the threshold is reached.

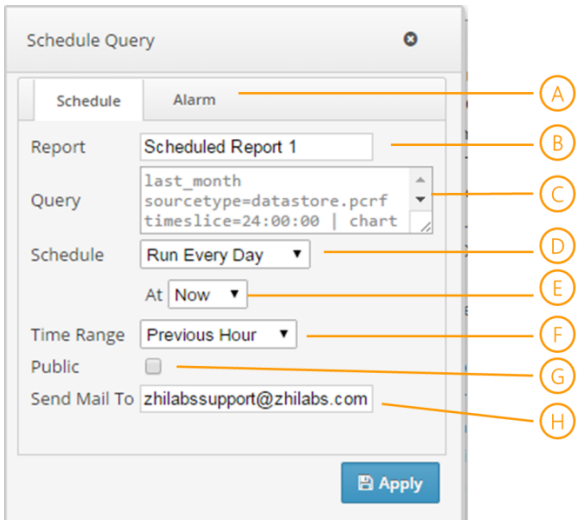


Figure 113. Scheduled Report Panel

A. Alarm Tab
B. Schedule Report Name
C. Schedule Query Syntax
D. Schedule Schema
E. Hour in which the schedule report should be launched
F. Time Range
G. Public Option
H. Mail information

9.1.1 Main concepts in report scheduling

- **Query:** It is the query the user would like to schedule.
- **Schedule Schema:** It is the periodicity the report should be calculated. The available schedules are:
- Once
- Every 5 Minutes
- Every 10 Minutes
- Every 30 Minutes
- Every Hour
- Every 2 Hours
- Every 4 Hours
- Every 8 Hours
- Every 12 Hours
- Every Day

- Every Week
- Every Month
- Every Year

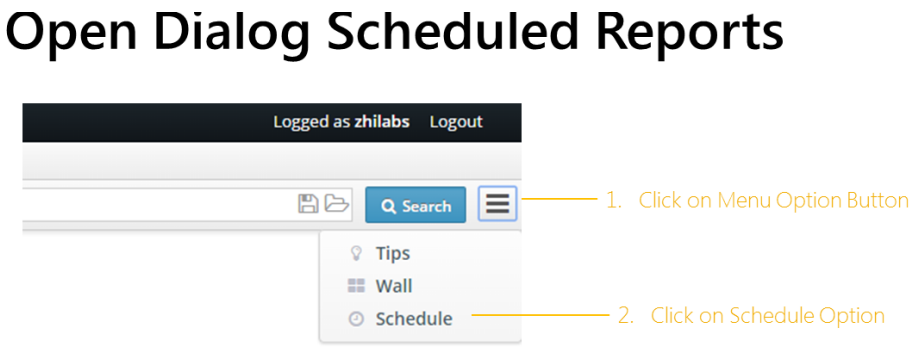
Hour in which the schedule report should be launched. The available options are:

- Now
- XX:00 hour
- XX:30 hour
- **Time Range:** It is the time Range of the scheduled report. Available Time Ranges depends on the selected schedule option.
- If schedule is ***once***, the following options are available:
- Specific Time Range selected by the user
- Last 5 minutes
- Last 10 minutes
- Last 15 minutes
- Last 30 minutes
- Last hour
- Last 2 hours
- Last 4 hours
- Last 8 hours
- Last 12 hours
- Last 16 hours
- Last day
- Last week
- Last month
- Last year
- Previous day
- Previous week
- Previous month
- If schedule is different from once, the following Time Range are available.
- Last 5 Minutes
- Last10 Minutes
- Last 30 Minutes
- Last Hour
- Last 2 Hours
- Last 4 Hours
- Last 8 Hours
- Last 12 Hours
- Last Day
- Last Week
- Last Month
- Last Year
- Previous hour
- Previous day
- Previous week
- Previous Month
- Previous Year
- **Public:** If you want the scheduled report to be visible for the rest of users.
- **Mail:** List of mails the report result should be sent to when finishing its calculation.
- **Alarm:** A threshold value can be associated to a scheduled report in case the alarming module is activated.
- All these concepts are configurable by means of the Schedule Query Panel

9.1.2 How to Create a Scheduled Report Step by Step

STEP1. Report scheduling starts with the creation of the query to be scheduled in the query box

Figure 114. Step1 - Query Creation



STEP2. Click c electing the Schedule optio

STEP 3. Fill in ction, the following fields.

- Scheduled Report Name
- Schedule Query Syntax
- Schedule Schema
- Hour in which the schedule report should be launched
- Time Range
- Public Option
- Mail information
- Optionally you can add an alarm if alarm module is activated.

Schedule Query Syntax is copied directly from the Query Tab and it is not changeable. Please notice that even when the query may include time-range, this time-range included in the query is not the one applied in the schedule but the one selected in time range from *Scheduled Report Panel*. By default, for scheduled reports as *once*, the Time Range will be the one contained in the original query.

STEP 4. Click on Apply Button.

9.1.3 How to see scheduled report results

The scheduled report results are accessible by means of the *Report Menu*. By clicking the *Report Browser* option you will access to the *Report Browser Panel*. This panel is organized in three tabs, as depicted in the following image:

- Schedules
- Report
- Alarms (in case alarms module is activated)

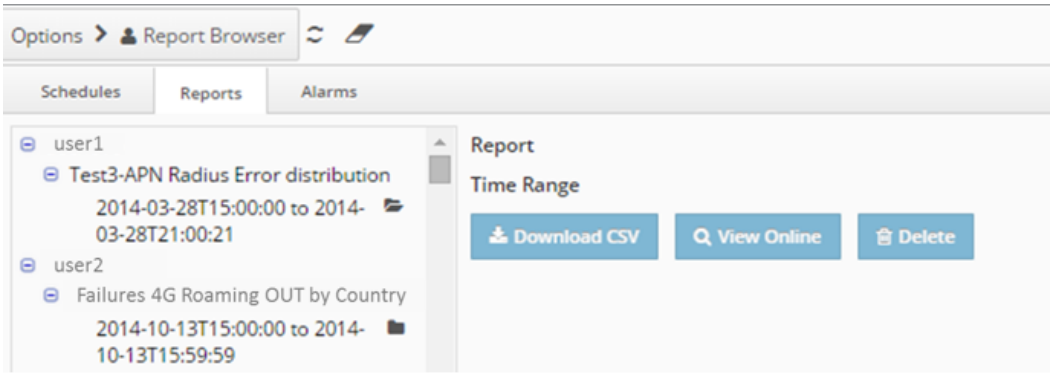


Figure 116. Report Browser Panel

The report results are available in the *Report Tab*. They are listed under the user that created them. By selecting the specific report and using the buttons at the right side of the panel, you can download the csv, view the graphical report or delete it.

Whenever the system finishes the report calculation it keeps the user informed in several ways:

- In case you may have configured the email option, the system will send an email including a direct link to the calculated report.
- In case you have not configured the email option, the system keeps the user informed by means of a highlighted number at the right of the user name as depicted in the next figure:

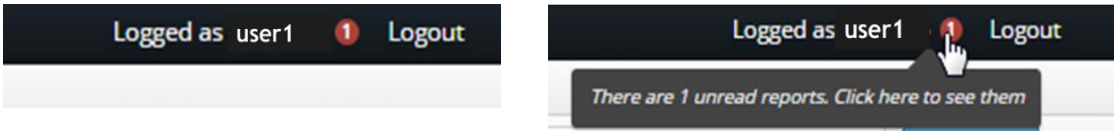


Figure 117. Reports already available

Unread Reports!

The number of reports will increase every time a new report is calculated and it will be decreased every time the report has been accessed.

By clicking this number, you will directly access to the Report Browser Menu

9.1.4 How to Modify and Delete Scheduled Reports

The scheduled reports are accessible by means of the *Report Menu* as depicted on the following image.

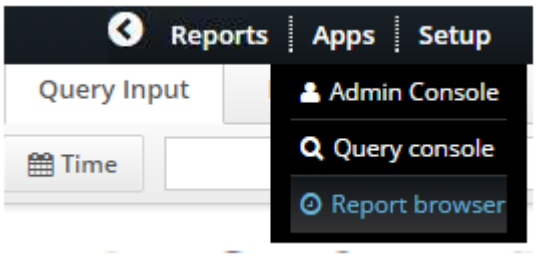


Figure 118. Report Browser Menu

By clicking the *Report Browser* option you will access to the *Report Browser Panel*. This panel is organized in three tabs, as depicted in the following image:

- Schedules
- Report
- Alarms (in case alarms module is activated)

The scheduled reports are available in the *Report Schedule*.

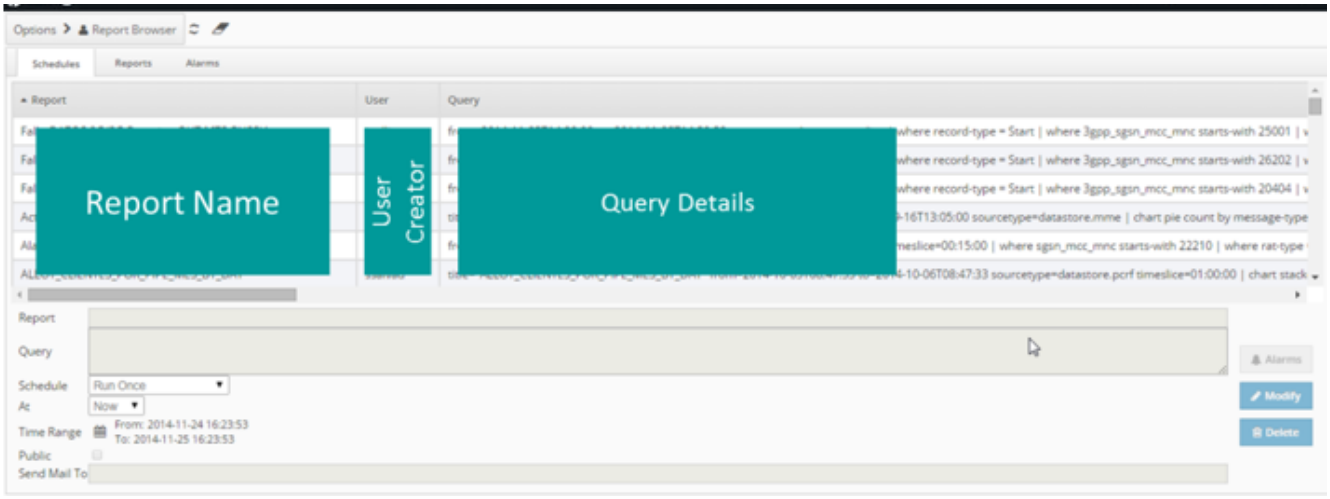


Figure 119. Report Schedule Panel

Scheduled Reports are listed in a table including the following relevant information:

- Report Name
- User
- Query
- Schedule
- At
- Time Range
- Public
- Send Mail To
- State:
- Waiting
- Running
- Finished

By selecting one of the scheduled reports, the scheduled report configuration will be available at the bottom of the screen. You can modify its characteristics by changing the values presented in the corresponding boxes and then clicking the Modify Button.

It is also possible to delete the scheduled report by clicking the Delete Button.

9.1.5 How to Define Threshold Alarms Step by Step

The first thing to do for the definition of a threshold alarm is to create a scheduled report. For this reason, you need to follow the steps from one to three described previously.

Then you need to go to the *Alarm Tab* and fill in all the following parameters:

- Operator: Can be:

- equal
- greater-than
- greater-or-equal-than
- less-than
- less-or-equal-than
- empty
- Threshold: It is a numerical value
- Alarm Category: can be Minor, Major or Critical.
- Empty reports: defines an alarm for reports with no results.
- Gap detect: defines an alarm for reports containing no result in some of the temporal values.
- Send Mail To: Use it to include a mail or a list of mails to be informed in case the alarm is raised.

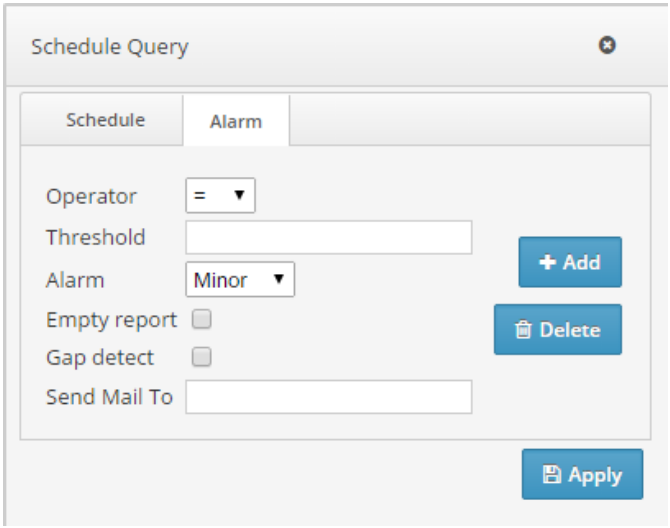


Figure 120. Threshold Alarm Definition Panel

More than one threshold can be defined with different levels of alarm category by means of the Add Button.

Notice that if there are two alarms where the threshold of one is contained in the threshold of the other one, the alarm more critical will prevail over the other one. For instance, if you set a major alarm for those values higher than 400, and a critical alarm for values higher than 800, just critical alarm will be triggered.

It is highly recommended not set thresholds with the same signal and the same category for the same alarm.

By means of clicking the Apply Button, the alarm is configured.

Whenever the threshold is raised an email will be sent to configured emails. The email contains the csv result and a hyperlink to reach the alarm report result.

Alarm reports are also accessible in the system by means of the Apps>Report Browser and Alarm Tab.

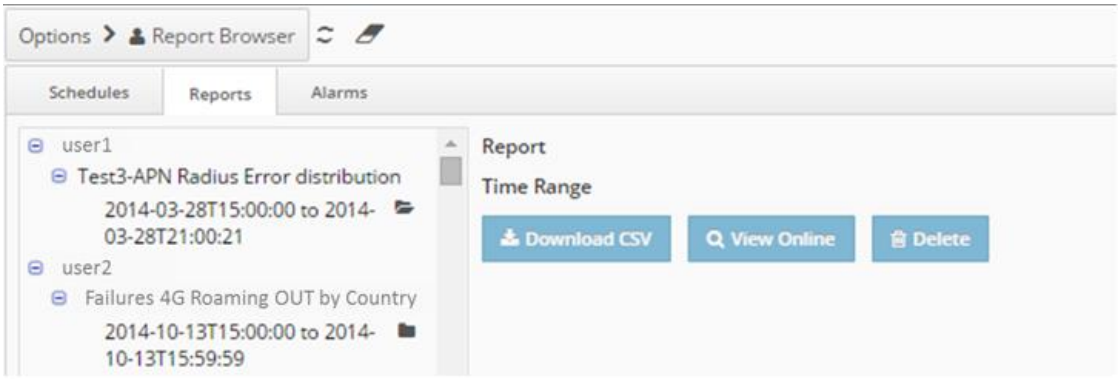


Figure 121. Report Schedule Panel

When creating an alarm for a multi-column indicator, only the first column will be accounted for the generation of the correspondent alarm.

The list of indicators with multi-column is:

Table 4: Multicolumn KQIs

Report name	**Indicator used by thresholds**
HTTP Mean Data Rate	rate-down
HTTP Peak Data Rate	rate-down
HTTP Total Volume	volumeDown
RAT type distribution	UTRAN
Throughput as provided by the network (Mean Throughput)	rate-down
Throughput as provided by the network (Peak Throughput)	rate-down
Total Throughput	total-rate-down
Total Volume	volumeDown

Chapter 10 Appendixes

10.1 KQI reporting

The following table displays the list of preconfigured KQI reports in CEA Release 5.3, as well as the dimensions for which they are available.

Please, notice that the list of available preconfigured reports depends on the acquired license.

Table 5: Document history

Preconfigured Reports		
Category	**Related Reports**	**KQI**
APN	**APN> Data Session**	Mean Downlink Throughput as provided by the network
		Mean Uplink Throughput as provided by the network
		Peak Downlink Throughput as provided by the network
		Peak Uplink Throughput as provided by the network
		Total Downlink Volume
		Total Throughput
		Total Uplink Volume
		Total Volume (uplink+downlink)
	APN> Signaling	Bearer Creation Failure Ratio
		Bearer Modification Failure Ratio
		Creation Failure Ratio
		PDP Context Creation Failure Ratio (Gn)
		PDP Context Creation Time (Gn)
		PDP Context Cut-off Ratio
		Session Creation Failure Ratio
		Session Creation Time
Device	**Device> DNS**	DNS Host Name Resolution Failure Ratio
		DNS Host Name Resolution Time
	Device> Data Session	Mean Downlink Throughput as provided by the network
		Mean Uplink Throughput as provided by the network
		Peak Downlink Throughput as provided by the network

		Peak Uplink Throughput as provided by the network
		Total Downlink Volume
		Total Throughput
		Total Uplink Volume
		Total Volume (uplink+downlink)
	Device> File-Sharing	File Download Effective Data Rate
		File Download Mean Data Rate
		File Download Session Time
		File Download and Upload Data Transfer Cut-off
		File Download and Upload Failure Ratio
		File Download and Upload IP Service Access Failure Ratio
		File Download and Upload IP Service Setup Time
		File Download and Upload Service Non-Accessibility
		File Download and Upload Setup Time
		File Upload Effective Data Rate
		File Upload Mean Data Rate
		File Upload Session Time
	Device> Signaling	Bearer Creation Failure Ratio
		Bearer Modification Failure Ratio
		Creation Failure Ratio
		PDP Context Creation Failure Ratio (Gn)
		PDP Context Creation Time (Gn)
		PDP Context Cut-off Ratio
		Session Creation Failure Ratio
		Session Creation Time
	Device> TCP	End-to-end Latency
		TCP Retransmission Ratio
		TCP Round Trip Time (Client side)
		TCP Round Trip Time (Server side)
	Device> Web Browsing	HTTP Mean Data Downlink Rate
		HTTP Mean Data Uplink Rate
		HTTP Peak Data Downlink Rate
		HTTP Peak Data Uplink Rate
		HTTP Session Failure Ratio
		HTTP Session Time
		HTTP Total Volume
		HTTP Transactions
Location	**Location> DNS**	DNS Host Name Resolution Failure Ratio
		DNS Host Name Resolution Time

	Location> Data Session	Mean Downlink Throughput as provided by the network
		Mean Uplink Throughput as provided by the network
		Peak Downlink Throughput as provided by the network
		Peak Uplink Throughput as provided by the network
		Total Downlink Volume
		Total Throughput
		Total Uplink Volume
		Total Volume (uplink+downlink)
	Location> File-Sharing	File Download Effective Data Rate
		File Download Mean Data Rate
		File Download Session Time
		File Download and Upload Data Transfer Cut-off
		File Download and Upload Failure Ratio
		File Download and Upload IP Service Access Failure Ratio
		File Download and Upload IP Service Setup Time
		File Download and Upload Service Non-Accessibility
		File Download and Upload Setup Time
		File Upload Effective Data Rate
		File Upload Mean Data Rate
		File Upload Session Time
	Location> Signaling	Bearer Creation Failure Ratio
		Bearer Modification Failure Ratio
		Creation Failure Ratio
		PDP Context Creation Failure Ratio (Gn)
		PDP Context Creation Time (Gn)
		PDP Context Cut-off Ratio
		Session Creation Failure Ratio
		Session Creation Time
	Location> TCP	End-to-end Latency
		TCP Retransmission Ratio
		TCP Round Trip Time (Client side)
		TCP Round Trip Time (Server side)
	Location> Web Browsing	HTTP Mean Data Downlink Rate
		HTTP Mean Data Uplink Rate
		HTTP Peak Data Downlink Rate
		HTTP Peak Data Uplink Rate
		HTTP Session Failure Ratio
		HTTP Session Time
		HTTP Total Volume

		HTTP Transactions
Network	**Network> DNS**	DNS Host Name Resolution Failure Ratio
		DNS Host Name Resolution Time
	Network> Data Session	Mean Downlink Throughput as provided by the network
		Mean Uplink Throughput as provided by the network
		Peak Downlink Throughput as provided by the network
		Peak Uplink Throughput as provided by the network
		Total Downlink Volume
		Total Throughput
		Total Uplink Volume
		Total Volume (uplink+downlink)
	Network> File-Sharing	File Download Effective Data Rate
		File Download Mean Data Rate
		File Download Session Time
		File Download and Upload Data Transfer Cut-off
		File Download and Upload Failure Ratio
		File Download and Upload IP Service Access Failure Ratio
		File Download and Upload IP Service Setup Time
		File Download and Upload Service Non-Accessibility
		File Download and Upload Setup Time
		File Upload Effective Data Rate
		File Upload Mean Data Rate
		File Upload Session Time
	Network> Signaling	Bearer Creation Failure Ratio
		Bearer Modification Failure Ratio
		Creation Failure Ratio
		PDP Context Creation Failure Ratio (Gn)
		PDP Context Creation Time (Gn)
		PDP Context Cut-off Ratio
		Session Creation Failure Ratio
		Session Creation Time
	Network> TCP	End-to-end Latency
		TCP Retransmission Ratio
		TCP Round Trip Time (Client side)
		TCP Round Trip Time (Server side)
	Network> Web Browsing	HTTP Mean Data Downlink Rate
		HTTP Mean Data Uplink Rate
		HTTP Peak Data Downlink Rate
		HTTP Peak Data Uplink Rate

		HTTP Session Failure Ratio
		HTTP Session Time
		HTTP Total Volume
		HTTP Transactions
URL		
	URL> Web Browsing	HTTP Session Time
		HTTP Total Volume
		HTTP Transactions
Video Streaming	**Video Streaming> Device**	Number of Videos
		Streaming Rebuffering Time
		Streaming Rebuffering Time Percentage
		Streaming Reproduction Quality
		Time to Stream Start
		Total Reproduction Time per Video
		Video Stall per Video
	Video Streaming> Network	Number of Videos
		Streaming Rebuffering Time
		Streaming Rebuffering Time Percentage
		Streaming Reproduction Quality
		Time to Stream Start
		Total Reproduction Time per Video
		Video Stall per Video