SKYLIGHT PERFORMANCE MANAGEMENT

CUSTOMER USER GUIDE

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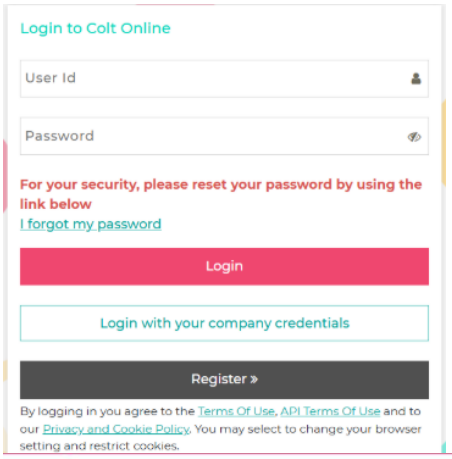
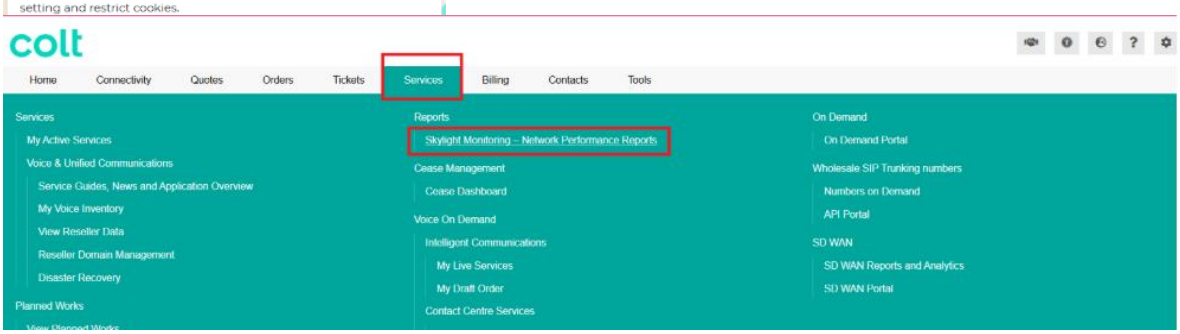
1. Introduction

Skylight is Colt's performance monitoring tool for network services, that offers real-time insights into data transmission, network latency, bandwidth usage, and overall network health. Its intuitive interface and comprehensive analytics empower network administrators to optimise performance, troubleshoot issues, and ensure seamless connectivity across your infrastructure.

1.1 Login

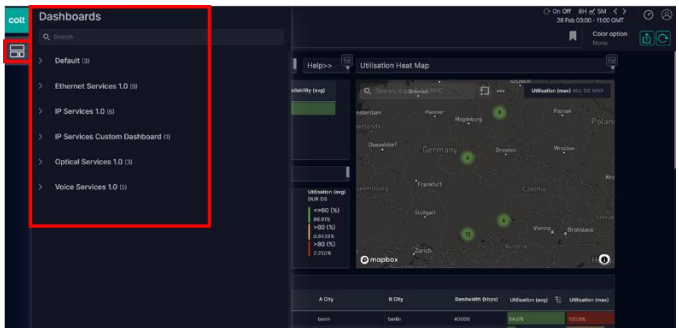
To login to the platform, sign into your Colt online account, select services and then click on "Reports - Services – Skylight Monitoring-Network Performance Reports" This must be enabled on your account. Once you have logged into your account, you will be presented with the Homepage Dashboard.



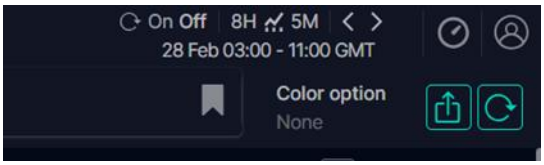


1.2 User Interface Overview

The panel on the left hand side of the Homepage Dashboard is the Monitoring Icon. You can access the Dashboards for all the services from this location



Top right-hand icons seen on each screen and shown below (Left to Right)



On/Off: Auto refresh page enabled or disabled – 5-minute refresh if on

Time Picker: Example: 8H / 5M / 28 Feb 03:00 – 11:00 GMT - Current Period / Data Granularity / Date and Time

Circle clock icon: Busy Hours option – not currently available

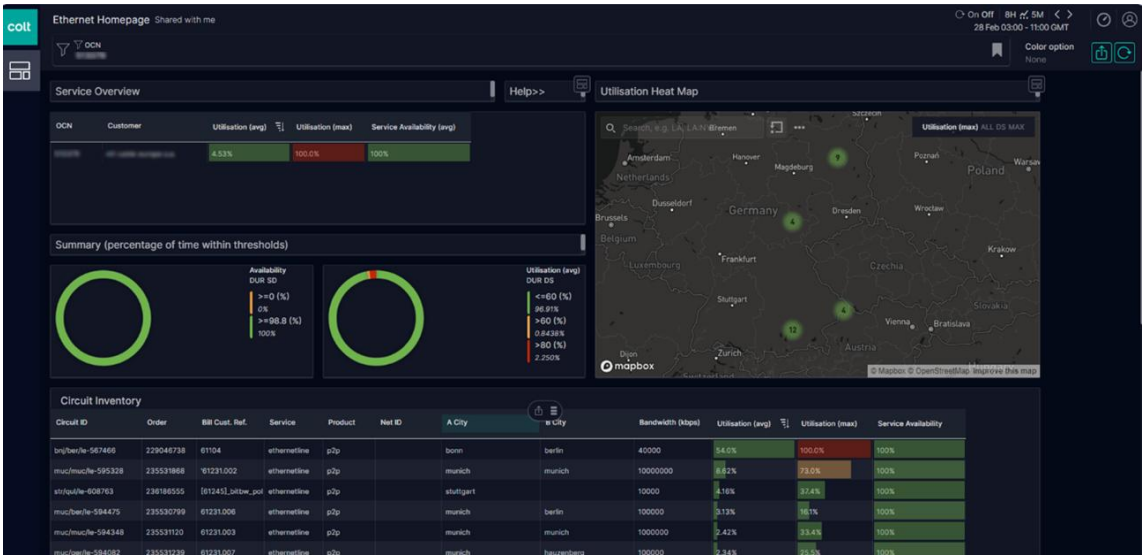
User Icon: User account settings: light mode/dark mode for the UI, language and time zone for the user.

Export dashboard icon: Saves a PDF of the current dashboard and Excel CSV of all data points

Reset dashboard icon: Clears any active filters and reloads data

1.3 Dashboard

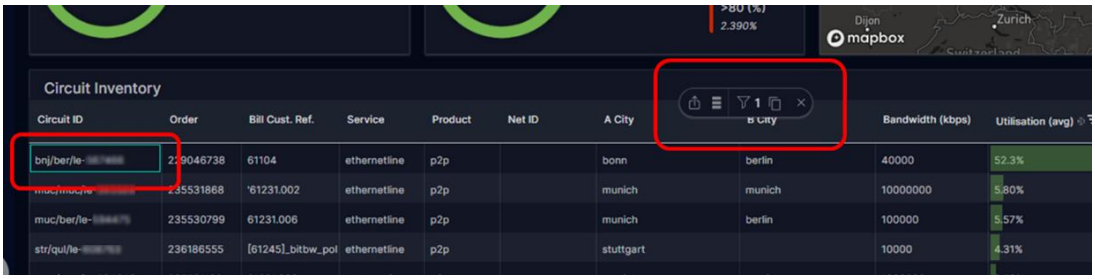
The Homepage dashboard is your homepage, and gives you an overview of your services on a single pane. In the example below, Ethernet services are shown.



The services overview and summary chart show the utilisation of your circuits. After clicking to select a specific circuit, you will be presented with the summary chart (below). This gives you more visual view of your circuit utilisation and availability.

Similarly, for multiple circuits, the circuit inventory table on the dashboard can be used to see all your circuits in a single table.

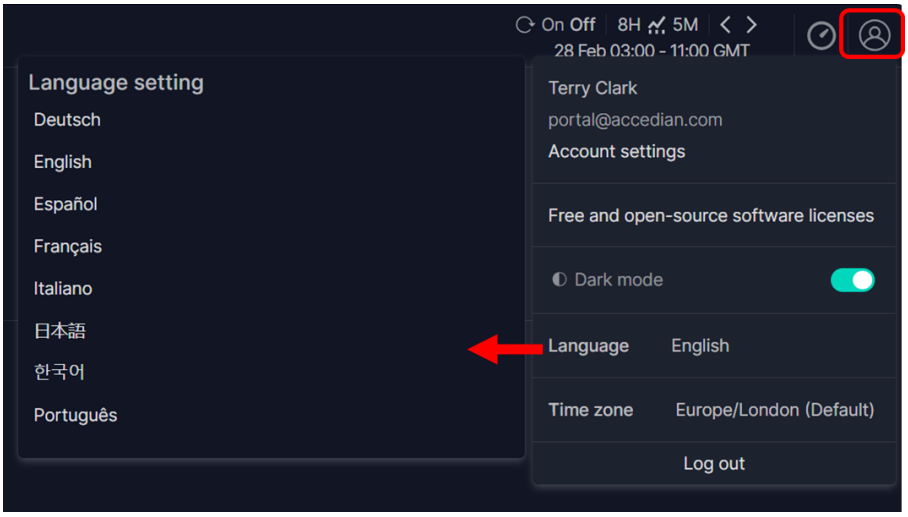
By clicking on one of the circuits in the inventory you will see a pop up for the table widget toolbar, the icons within this widget are as follows from left to right: Export data as csv; Set column order; Filter dashboard; Copy selected item to a clipboard for pasting; Close pop up widget bar.



1.4 User Setting

1.4.1 Language

At the right top, the Account settings are available, here the Language can be adjusted:

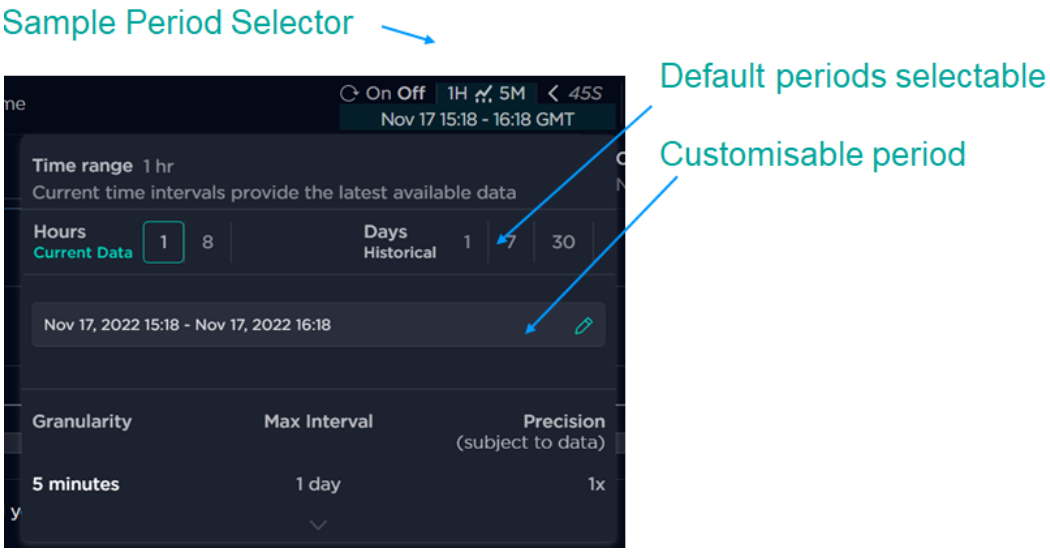


1.4.2 Time Zone setting

Under Account settings also the Time zone can be adjusted.

1.5 Measurement/Storage Periods

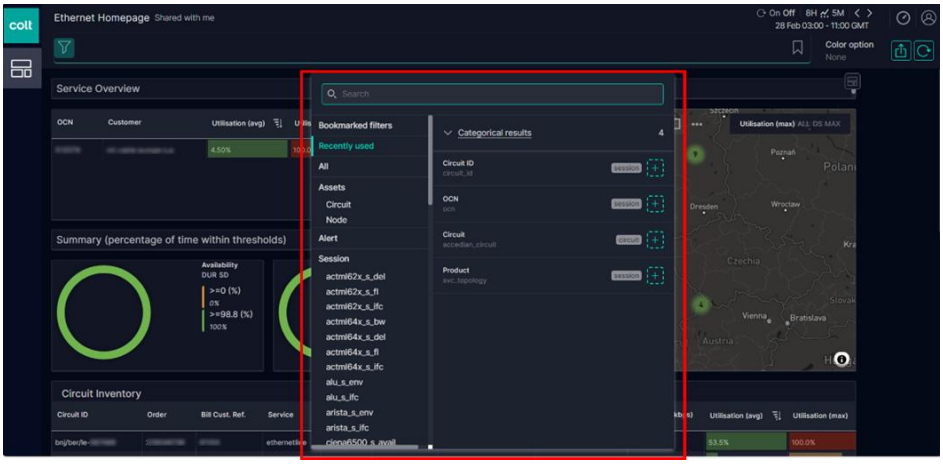
Service performance data is gathered from the network continuously and stored for display as required - this enables historical trends to be analysed. Data is fetched from devices every 5 mins (sampling rates within devices are shorter). Different display periods are selectable from the Reporting Tool Dashboard



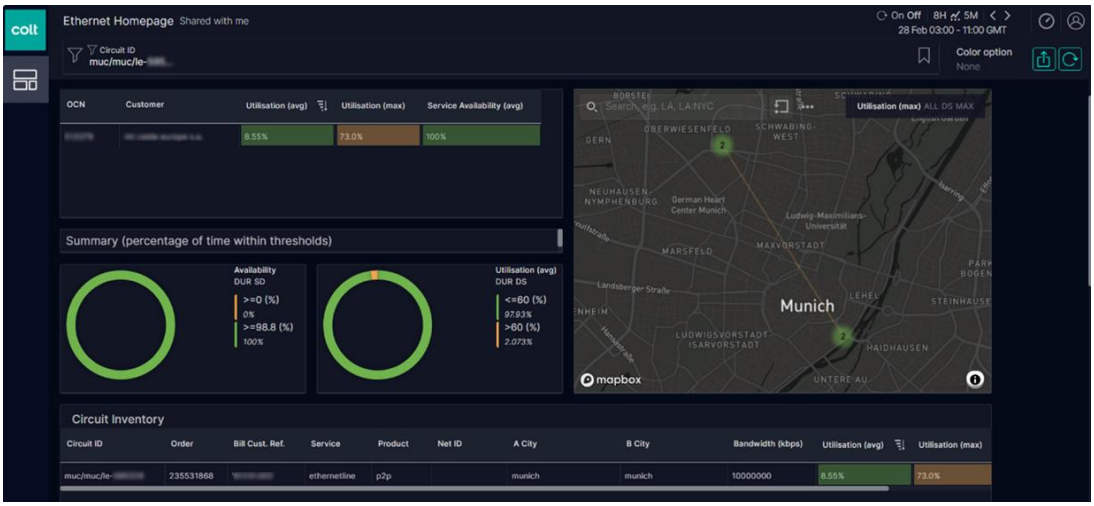
Display Period	Granularity
1 hour	5 mins
8 hours	5 mins
1 day	5 mins
7 days	1 hour
30 days	6 hours

1.6 Circuit Filtering

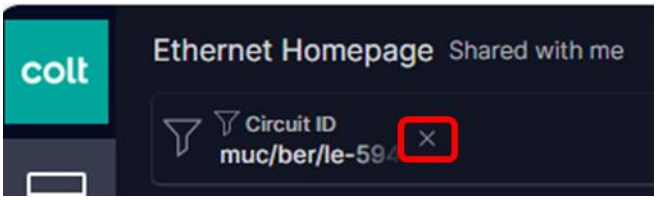
To search for a specific circuit, you can filter using the search bar below. Type in your desired circuit ID to pull up the circuit.



Once you have selected your desired circuit, click to show its utilisation and heatmaps (below). You'll also see its termination points. You can also bookmark this to save the filter, meaning it does not need to be created again.

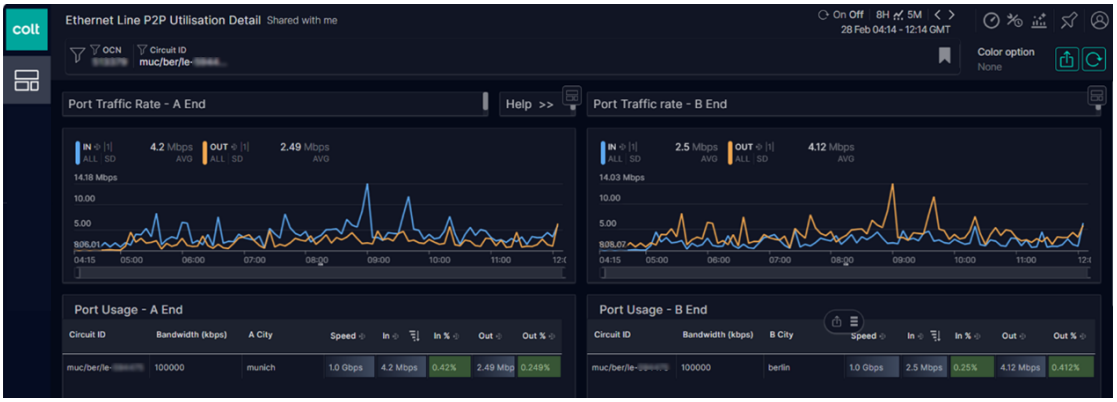


To clear the customer circuit id fliter applied to the dashboard, you can simply click on the X in the fliter bar at the top and this will revert the dashboard back to default view, removing the fliter that was applied.

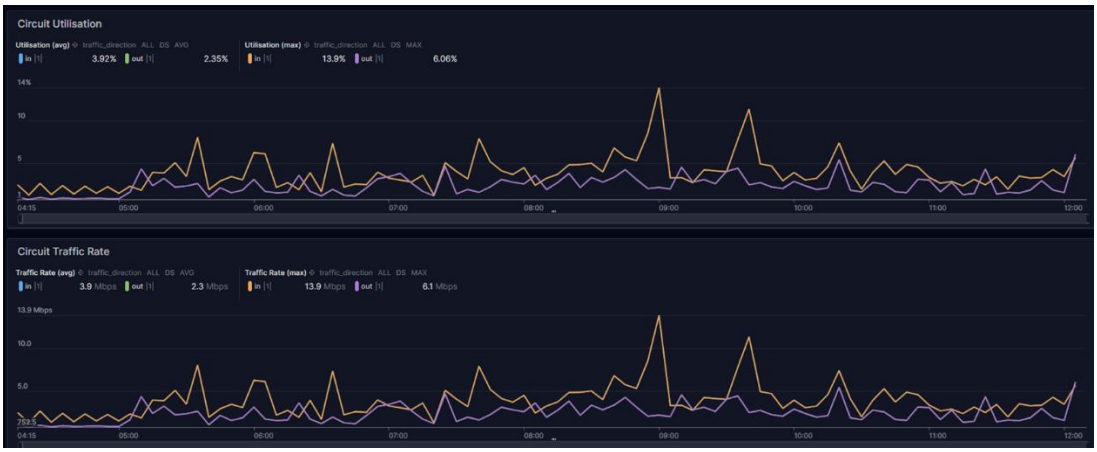


2. Circuit and Port Utilisation

The Utilisation Dashboard presents information on (1) Traffic flowing through individual ports and (2) Traffic flowing on individual circuits. The Port Usage section displays statistics derived from the physical interfaces - here we can look at the interface speed as well as the average amount of traffic in and out of the interfaces at each access site.



The Circuit Utilisation section shows the average traffic as well as the peak traffic that is flowing in both directions (In and Out) over the selected circuit.

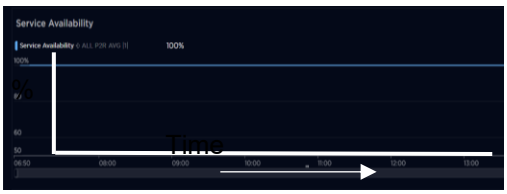


3. Key Performance Indicators

3.1 Summary

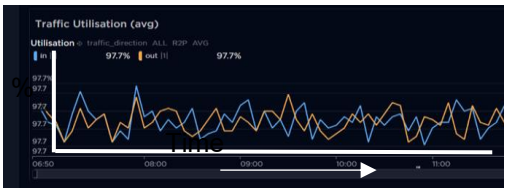
The Performance Detail Dashboards provide detail on the following indicators for Ethernet Services:

Service Availability



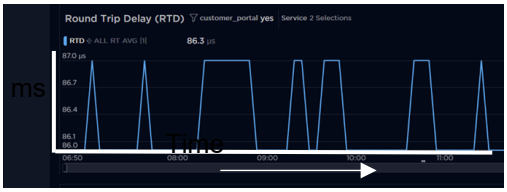
Measure of the availability of the selected service over a given time period.

Traffic utilisation



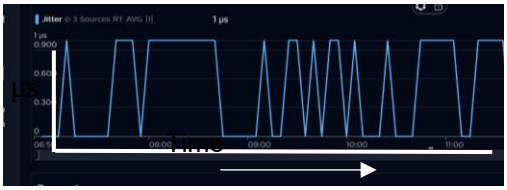
Measure of the traffic on the selected service over a given time period (in both directions)

Round Trip Delay



Measure of the Round Trip Delay (RTD) between the end points of the selected service

Jitter



Measure of the variation in the RTD (jitter) over time for the selected service

Frame Loss

Measure of the number of Ethernet frames dropped between the end points of the selected services (in both directions)

3.2 Service Availability

The Service Availability graphs provide information on the availability of a given service or group of services over the period defined in the time-picker. An example os shown below:

Information is presented on the average Service Availability over the period and also the minimum

3.3 Round Trip Delay (RTD) & Jitter

The Round Trip Delay is measure of the time taken (latency) for traffic to travel from A to B and back to A. Normally RTD is quoted in units of milliseconds (ms). Jitter is the variation in the RTD measurements over the given period and measurements are usually quoted in ms or microseconds (µs). Examples of the parameters as shown on the Ethernet Services Performance Detail Dashboard are shown below. Both graphs show the average values over a given period and also the maximum reached.

3.4 Frame Loss

Frame Loss indicates the number of Ethernet frames that are dropped between Source and Destination as well as the number of frames that are dropped from Destination to Source. The Source to Destination is identified as Far End (FE) Frame Loss and the Destination to Source is identified as Near End (NE) Frame Losss. The average and maximum values are quoted for both FE and NE.

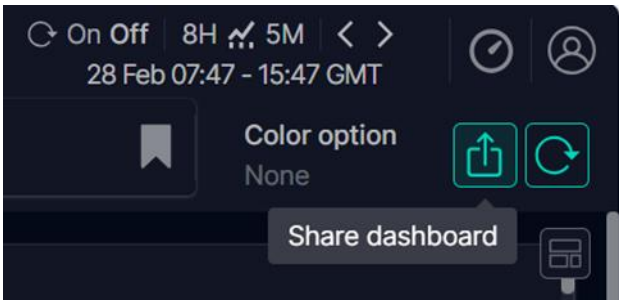
It is possible to narrow down the time period being studied by simply hovering the mouse cursor over the graph and dragging across the period required. This becomes shaded in grey as shown in the example below

Once executed this period is then shown in more detail as highlighted below with the exact period shown in the time-picker area in the top right hand corner

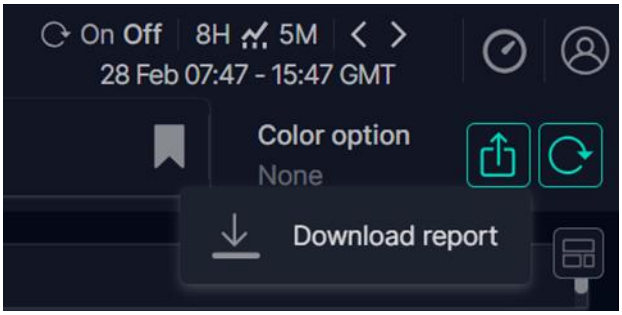
This simple feature is available on all graph related parameters

4. Generating Reports

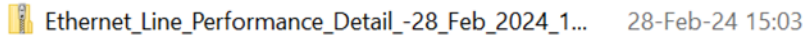
From any dashboard users can generate a report. This can be generated for the entire dashboard or just for specific graphs / tables within it. Reports are generated using the ‘Share dashboard’ icon in the top right-hand corner of the screen as shown.



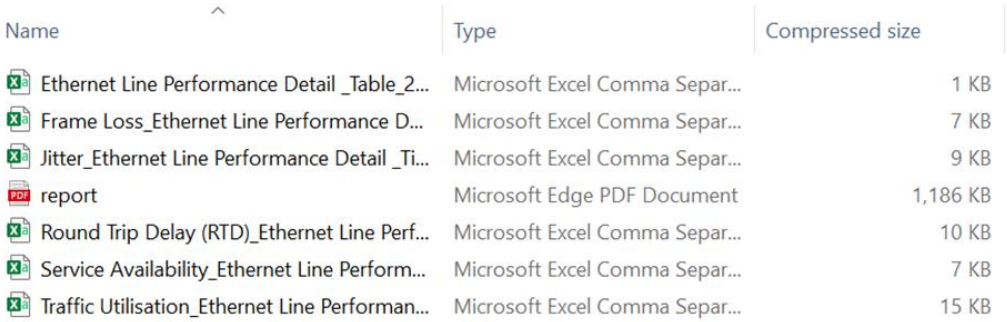
Selecting this option presents a ‘Download report’ option



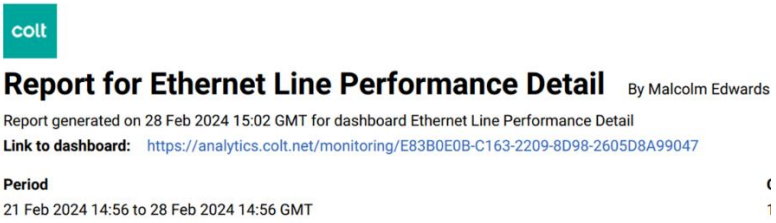
Once the report is downloaded a zipped file will appear in the download folder on your local machine



The Zip file contains Excel files with all the data for each of the parameters displayed on the screen as well as a PDF file showing a screen capture



Name	Type	Compressed size
Ethernet Line Performance Detail _Table_2...	Microsoft Excel Comma Separ...	1 KB
Frame Loss_Ethernet Line Performance D...	Microsoft Excel Comma Separ...	7 KB
Jitter_Ethernet Line Performance Detail _Ti...	Microsoft Excel Comma Separ...	9 KB
report	Microsoft Edge PDF Document	1,186 KB
Round Trip Delay (RTD)_Ethernet Line Perf...	Microsoft Excel Comma Separ...	10 KB
Service Availability_Ethernet Line Perform...	Microsoft Excel Comma Separ...	7 KB
Traffic Utilisation_Ethernet Line Performan...	Microsoft Excel Comma Separ...	15 KB



5. Services

5.1 Summary

This reporting is available for below services

Service	Description	Charge

Optical	➢ P2P Wave services – Ciena 6500 based for selected cards ➢ Service Availability; Traffic Utilisation	Orderable feature with associated charge
Ethernet	➢ All topologies – E-Line, H&S, E-VPN ➢ Service Availability; Utilisation; Performance KPIs	Bundled – No Charge
IP Access	➢ Services include Managed Router / Unmanaged Router / Wires Only ➢ IP Service KPIs including L3 devices	Bundled – No Charge
IPVPN	➢ Meshed networks – similar to E-VPN ➢ Performance KPIs, CoS plus L3 device	Bundled – No Charge
Voice	➢ SIP Trunking, Voice Line, Number Hosting ➢ CDR Data and underlying IP statistics	Orderable feature with associated charge

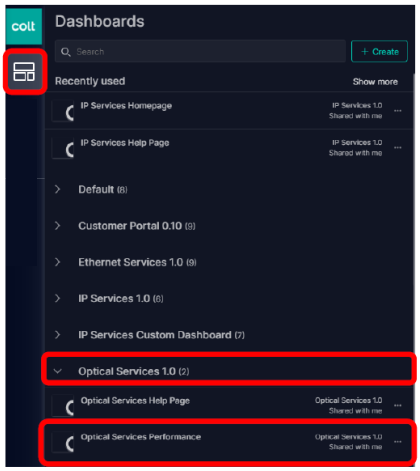
5.2 Optical Services

5.2.1 Optical Wave

For Wave, we have the following Metrics supported on selected Ciena hardware (for details check with Colt Optical Engineering team):

- Availability in % – for all supported services (Ethernet and Fibre Channel)
- Utilisation in Mbps/Gbps or % of Port speed – for Ethernet services only

Select the dashboard for Optical services:



From there, the metrics can be viewed, filtered and customised, as shown in previous sections of this document.

5.3 Ethernet Services

The following Ethernet services have associated Dashboards in the Skylight Tool..

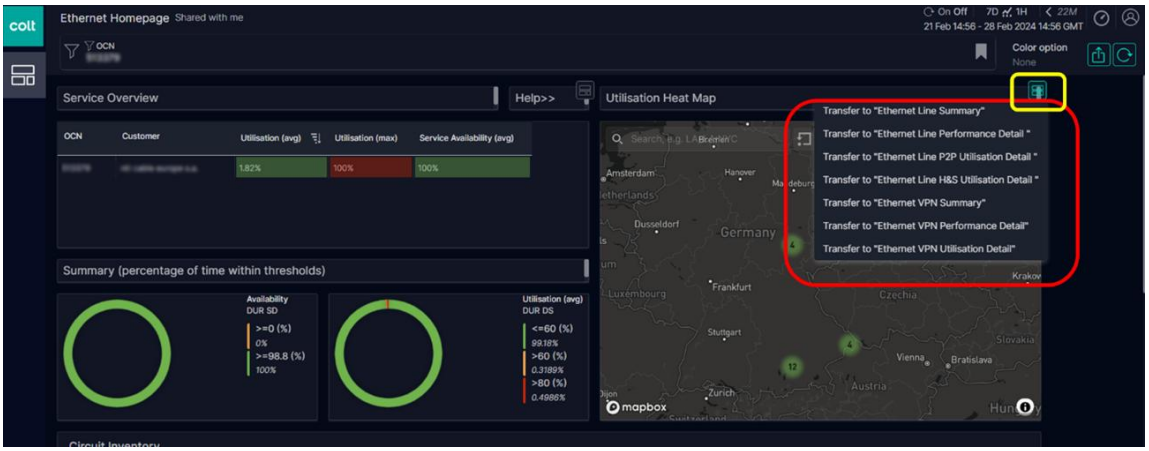
Ethernet Line P2P

Ethernet Line H&S

Ethernet VPN (E-VPN)

with individual dashboards for Summary, Performance Detail & Utilisation as shown below. The user can move between dashboards by using the *Transfer to* icon highlighted in yellow.

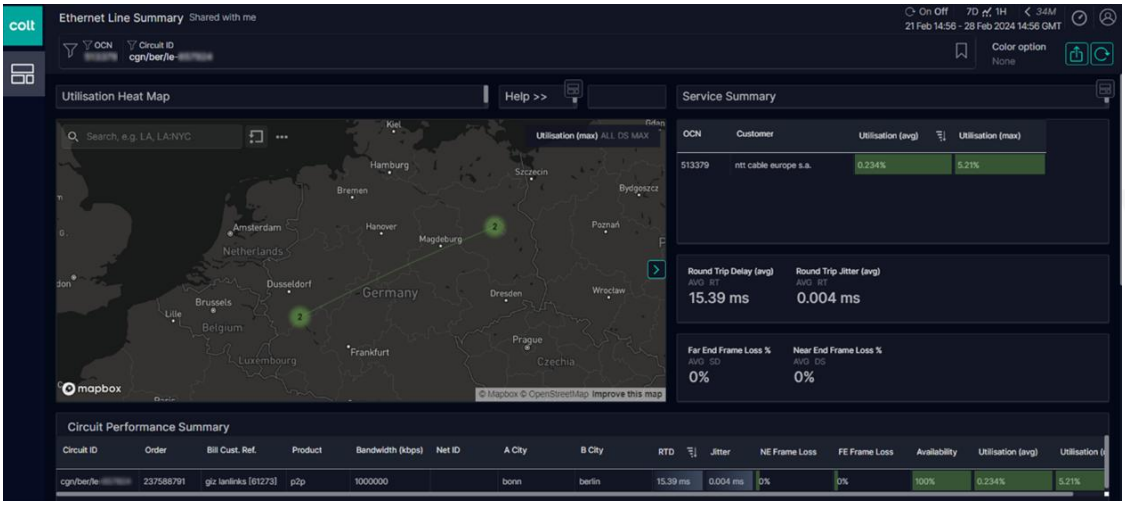
Please note that the appropriate dashboard must be selected based on the service topology e.g. in order to show Utilisation for an E-VPN service then the Ethernet VPN Utilisation Detail Dashboard must be selected



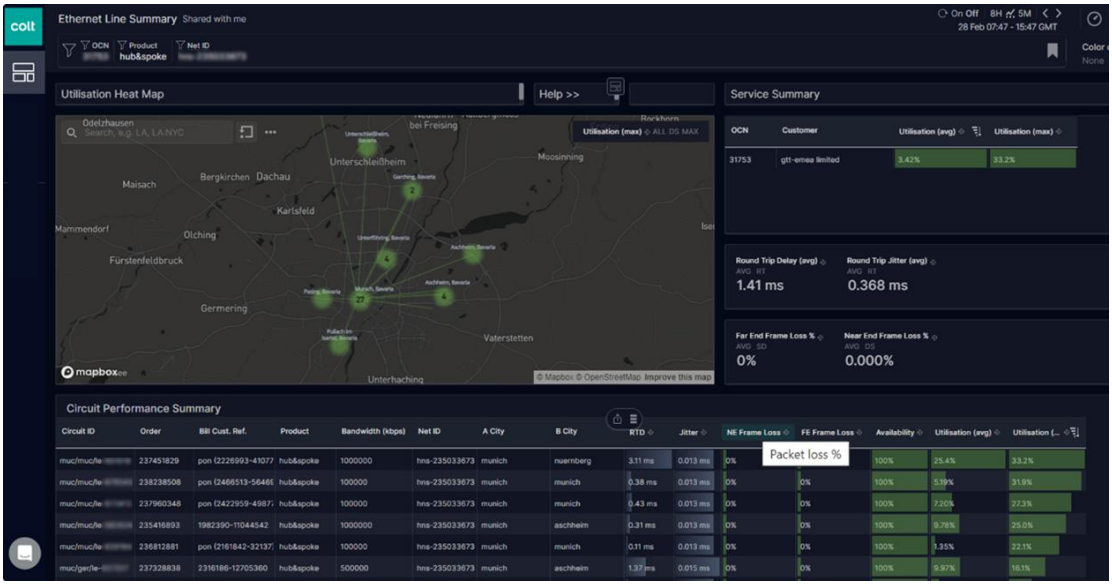
5.3.1 Ethernet Line Summary Dashboard

The Ethernet Line Summary Dashboard is applicable for both P2P and H&S services. It shows the following:

- Utilisation Heat Map with the maximum utilisation for all circuits selected over the given period. The circuits themselves can be displayed as (i) Source (ii) Destination or (iii) Individual Links. If only 1 circuit is filtered then the information will be shown for that single circuit (this is often very useful)
- The Key Ethernet Performance metrics
  - Round Trip Delay (RTD) (average)
  - Jitter (average)
  - Far End Frame Loss (%)
  - Near End Frame Loss (%)
- Other circuit information in the inventory list e.g. Service Availability, A-End City, B-End City, Service Bandwidth etc.



The same dashboard for a H&S service would show the entire Hub & Spoke network with all connections and also the average values of the Ethernet KPIs



General Note: The columns in the tables can be ordered top down based on the values. The example above shows the table ordered based on the Utilisation (max) parameter. This 'Top N' ordering is achieved by simply selecting the relevant parameter in the top row.

5.3.2 Ethernet Line Performance Detail Dashboard

The Performance Detail dashboard gives detailed graphical representation of the Ethernet KPIs showing both average and maximum values of the following parameters

- Service Availability – this parameter is shown as average and minimum
- Round Trip Delay (RTD)
- Jitter
- Far End Frame Loss (%)
- Near End Frame Loss (%)
- Traffic Utilisation

Details are described in Sections 2 & 3 above

5.3.3 Ethernet Line P2P and Ethernet Line H&S Utilisation Dashboard

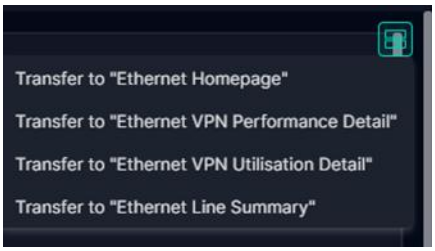
The Utilisation Dashboards present information on…

- Port Traffic – traffic entering and leaving individual ports
- Circuit Traffic (Circuit Utilisation) – traffic flowing in both directions for any given circuit

In the case of Ethernet P2P services this information will be shown for the A-End and B-End of the circuits. There is a separate Utilisation Dashboard for Ethernet H&S services where the utilisation is shown for the Hub at the A-End and the individual Spokes at the B-End. An example of a H&S Utilisation Dashboard is shown here.

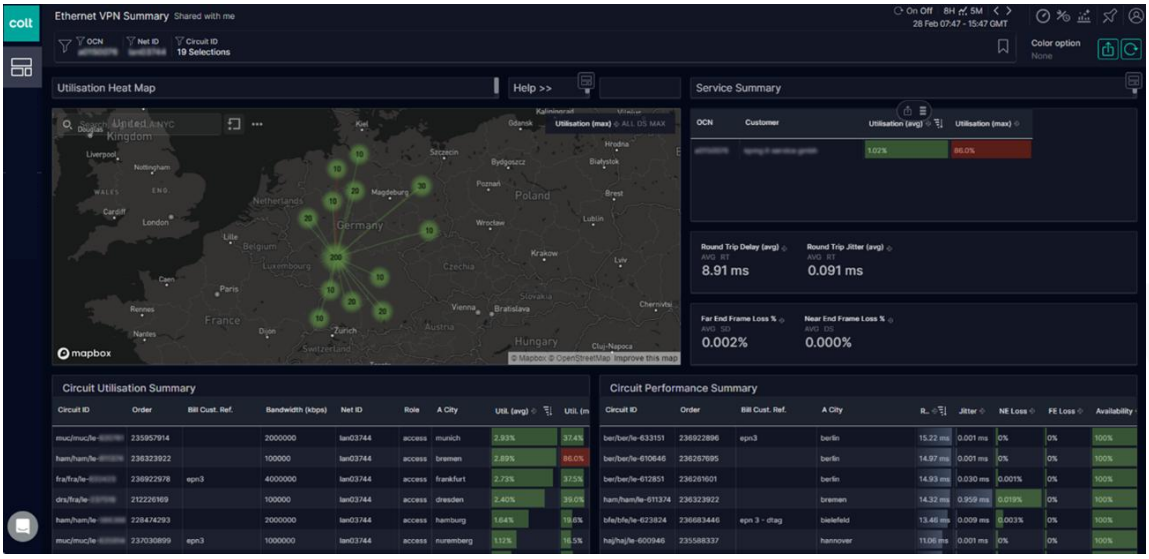
5.3.4 Ethernet VPN

Ethernet VPN has a dedicated set of Dashboards for Summary, Performance Detail and Utilisation.



The data presented for the KPIs (RTD, Jitter, Frame Loss) represents the performance between individual Access Site end points and the Primary Site of the Ethernet VPN network. The Utilisation information is based on traffic flowing at each Access Site – this includes the port traffic at the access site and the IN/OUT traffic on individual circuits. An example of both the Summary Dashboard and the Utilisation Dashboard is shown below

Ethernet VPN Summary Dashboard

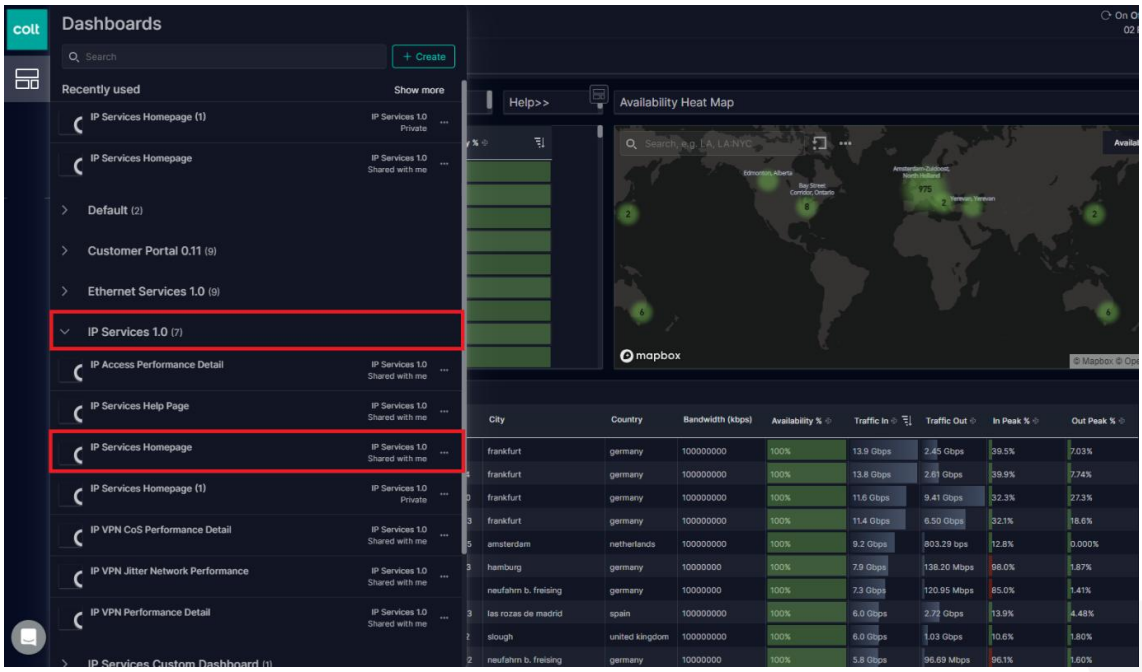


Ethernet VPN Utilisation Dashboard

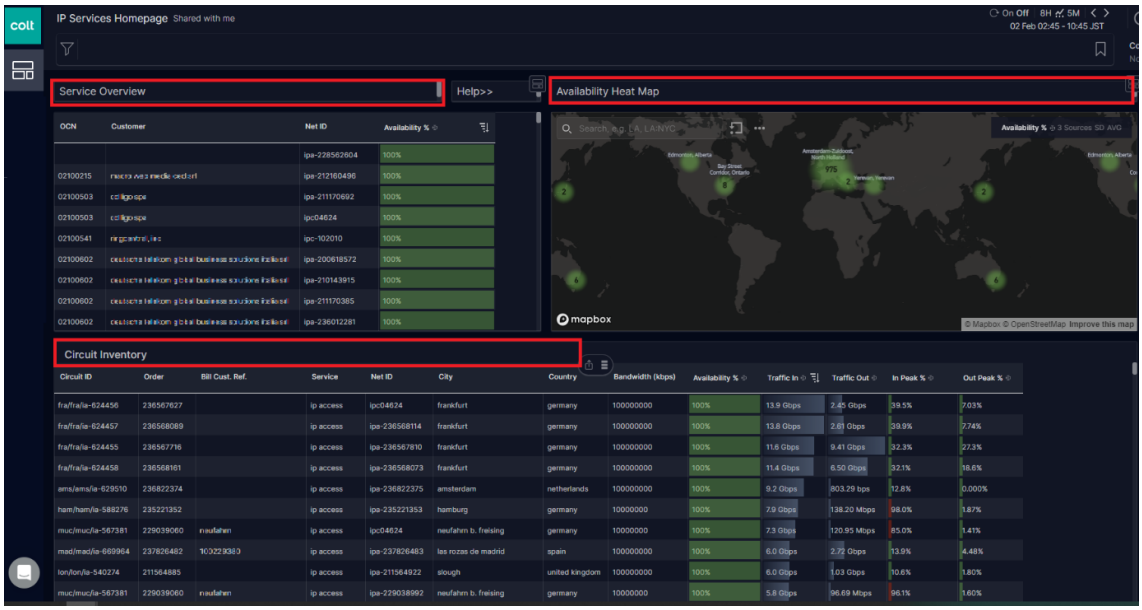
5.4 IP Services

5.4.1 IP Services Homepage Dashboard

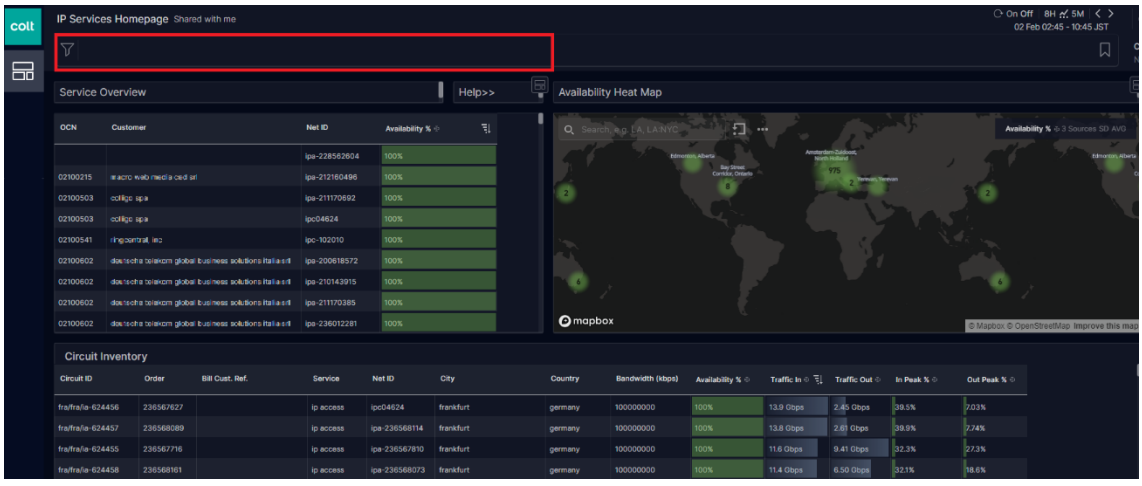
1. Login into the Skylight tool via https://performance.colt.net/ and go to the Monitoring Icon and under the IP Services 1.0 Section select the IP Services Homepage, this will display all your IP services.



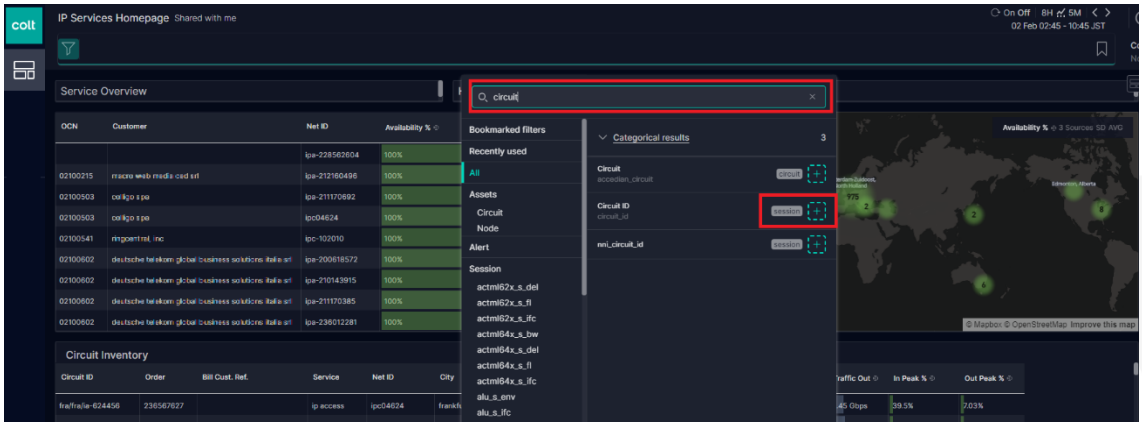
2. Once the IP Services Homepage is presented, we can see under the Service Overview table associated Customer name with the Net ID and the Availability %. You can also see an Availability Heat Map with the associated services. Lastly you can see the Circuit Inventory table that displays a subset of the IP services that gives you associated statistics (Availability, Traffic In/Out - AVG and Peak % In/Out - MAX) based on date/time period selected.



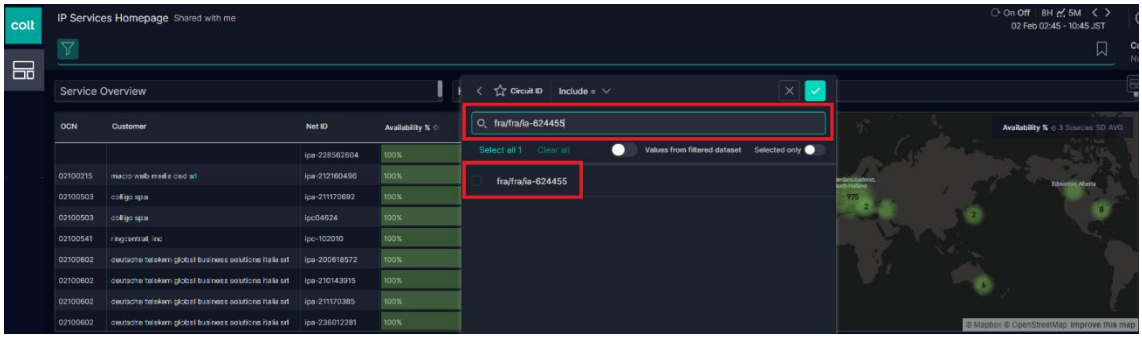
3. Click on the filter bar at the top of the screen, this will open a new pop up screen with multiple options that can be selected for filtering e.g Circuit ID, OCN, Net ID, Customer etc:



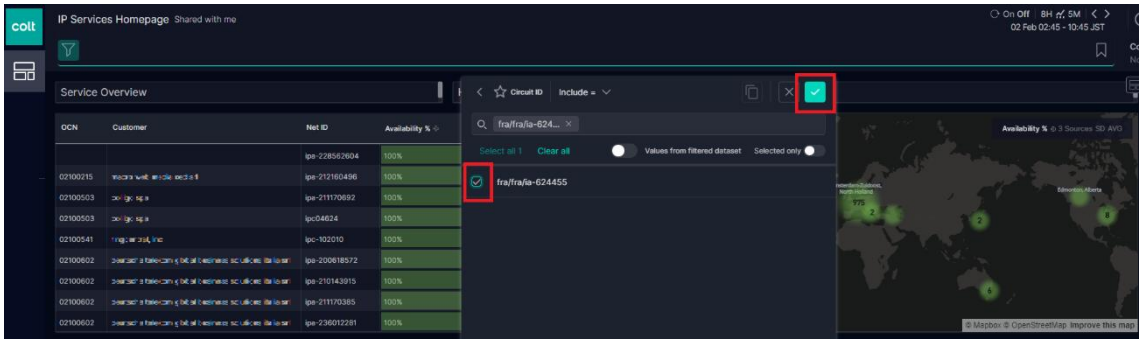
4. For this example, we will use a customer Circuit ID to display the IP Access service for that customer in a single view, we can type Circuit ID and add the circuit ID into the search:



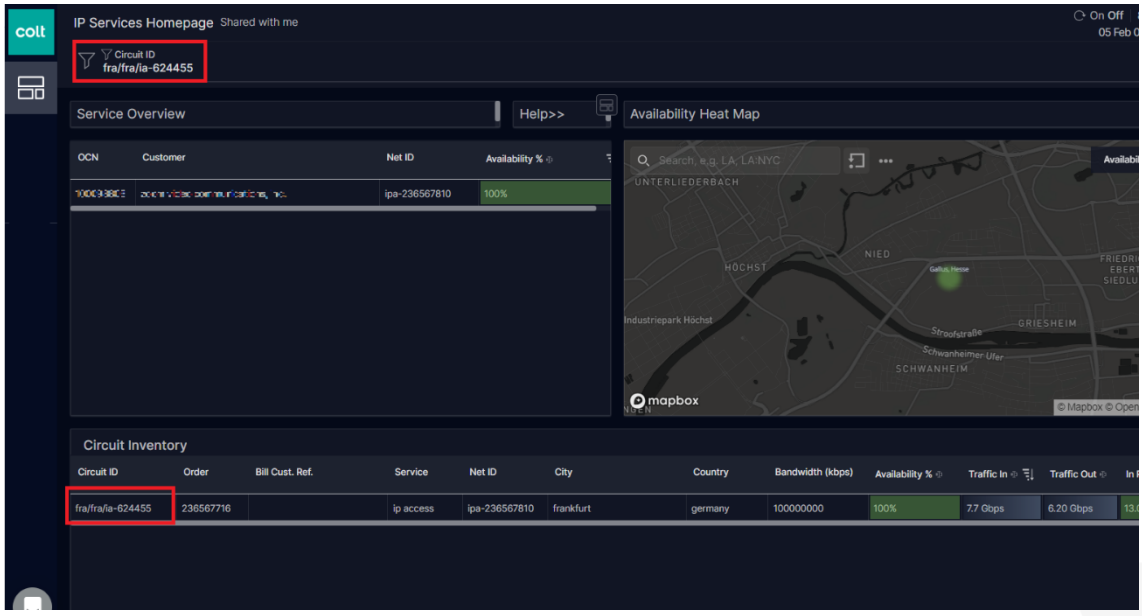
5. Once this has been done, we can now add our Circuit ID into the search bar:



6. You now need to select the check box next to the circuit id and click the tick icon to apply the filter changes to the IP Services dashboard:



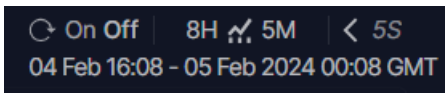
7. As you can see below the dashboard has now been updated to only show this IP Access circuit:



8. You can bookmark if required so this is always available without creating a new search every time.

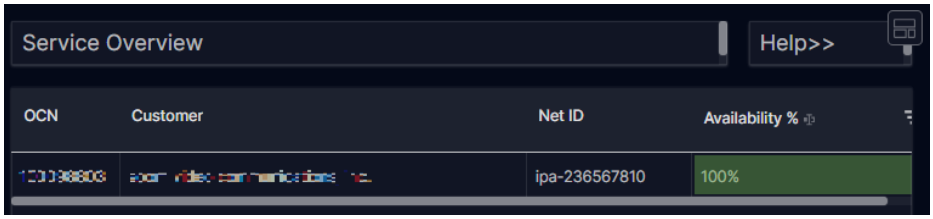
9. Once this has been saved this will be in your bookmarks permanently until removed and can be used by selecting the bookmark and clicking on the saved filter:

10. You can look at the initial information presented on the screen based on the default date/time period last 8 hours with 5 minute granularity:



11. In the **Service Overview** table, you can see some associated metadata and Availability % taken from the network.

- OCN Unique Identifier of Customer
- Customer Customer Name
- Net ID VPN Identifier
- Availability Port availability

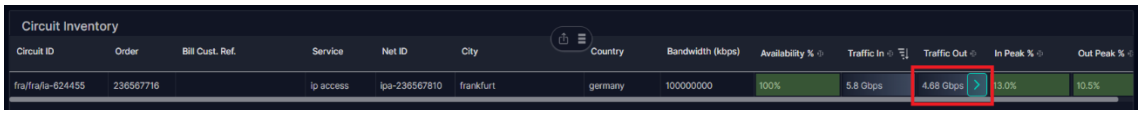


12. In the **Circuit Inventory** table, you can see the below information including Metadata and Network data:

- Circuit ID Unique Identifier of Circuit
- Order Order number
- Bill Cust. Ref. Reference number of customer billing

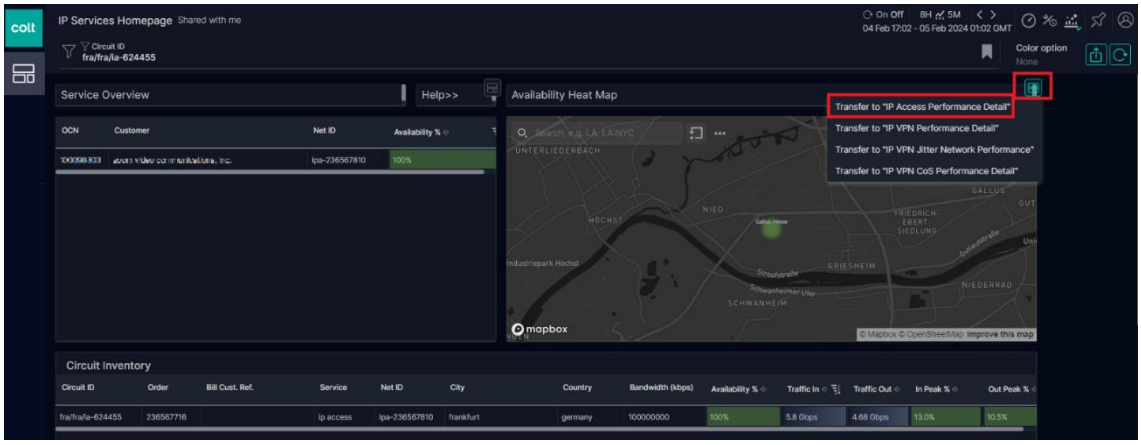
- Service Name of Service (Product)
- Net ID VPN Identifier
- City Name of city where circuit is provisioned
- Country Name of country where circuit is provisioned
- Bandwidth Contracted Service Bandwidth
- Availability Port availability
- Traffic In Average traffic (Network to Customer)
- Traffic Out Average traffic (Customer to Network)
- In Peak Maximum % of service bandwidth (Network to Customer)
- Out Peak Maximum % of service bandwidth (Customer to Network)

13. The statistics you see in the Circuit Inventory table for this IPA service are all pulled from the same source, to understand the source data, hover over one of the metrics and click on the green arrow that you see.



14. As you can see in this example our source monitoring point is the interface of the L3 CPE, we are using port Te0/0/3. (We also monitor other types of interfaces for other services e.g Unmanaged IP Service source monitoring point may use SR PW-ether interface, this would impact the In and Out directions so please be aware of the source you are looking at

15. You can now go into the **IP Access Performance Detail** Dashboard to see the information presented in a graph format. You can transfer to this Dashboard directly by using the transfer dashboard icon as per below:

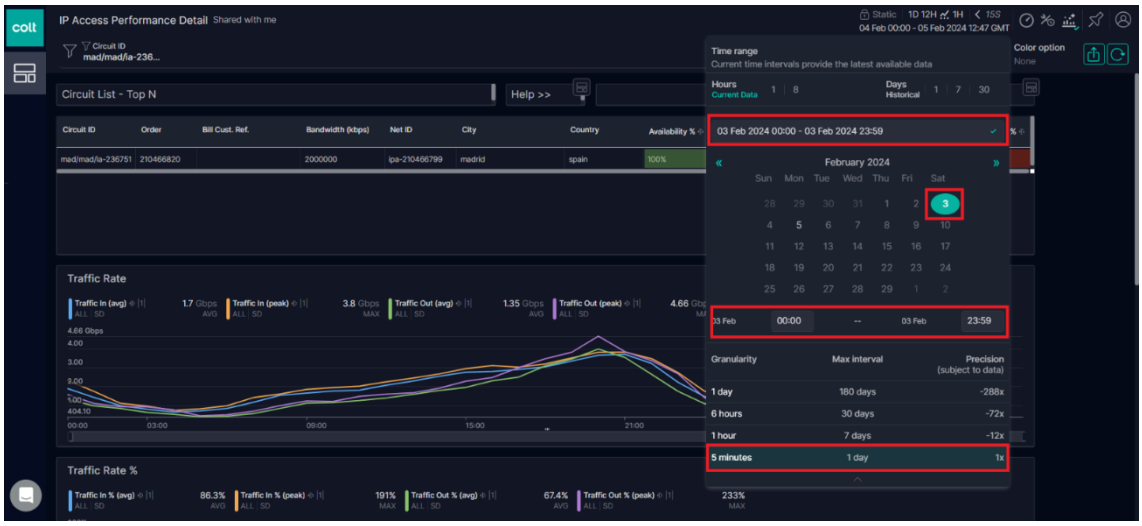


5.4.2 IP Access Performance Detail Dashboard

1. The **IP Access Performance Detail** Dashboard is shown below, scroll down through the graphs to see the different metrics displayed in a graph format. The graphs are displaying some of the information based on the table above the graphs with the exception of the Traffic errors graph (Not seen in the table), also we do not see a graph for In/Out Peak %.

2. You can filter this view for historical data by using the date and time picker in the top right of the screen, this can be up to 60 days for data in 5min intervals and up to 1 year for hourly intervals. If you try to go back to far, you will see no data for that service for the period you are looking at:

3. Click on the time picker as per above. We will set this to 3th February 2024 all day and set for 5 min intervals as per below, click on pencil icon where the date is seen and select start date and end date and 5 min granularity, click out of the menu to apply this:



4. We can now look at the information presented based on the date/time and granularity selected in the time picker. Below shows the table/graph detail for the relevant metrics for the date and time period selected

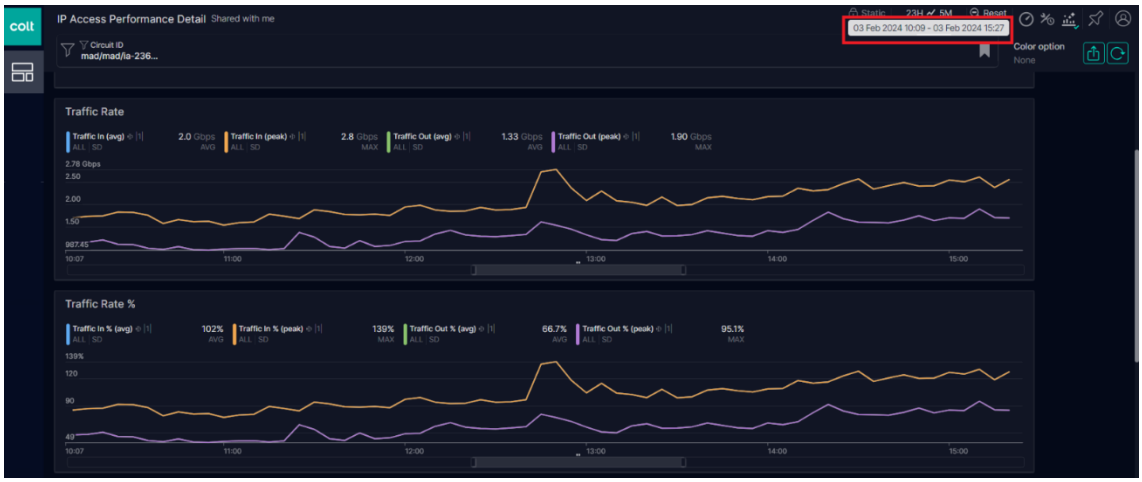
5. We can then see the Traffic Rate Speed (In and Out) AVG and MAX and Traffic Rate % (In and Out) AVG and MAX graphs for the date/time period selected, hovering over Traffic In and Out rate or % will show you the peak and low for the date/time period.

6. If we scroll down, we can see the Availability % and Traffic errors graphs In and Out / % for the date and time period selected, we can see that this service has 100% Availability and no Traffic errors seen.

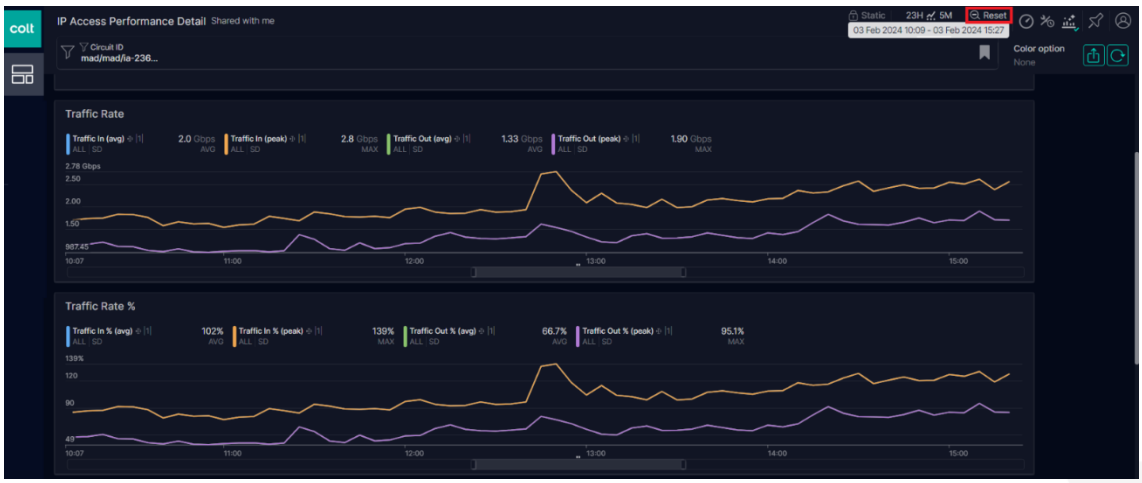
7. If we go back to the Traffic Rate graph. You can hover your mouse over any of the graph lines to see the data updated under the metric output as well as the date and time displayed on the line graph:

8. Alternatively, you can click and drag over a period to zoom in more to that period:

9. Once done the date and time will be updated based on the highlighted area and all the graphs will be updated to reflect that period:



10. To reset the zoom in you can simply click the reset icon next to the date and time period picker, this will reset back to your original query of 3rd February all day 5 min intervals:



11. Once this has been reset you will see the time picker reset as per below.

5.4.3 IPVPN

After you log in to Colt Portal, click the **Monitoring icon,** then IP Custom Dashboard and IP Services Homepage, as shown on the below Figure.

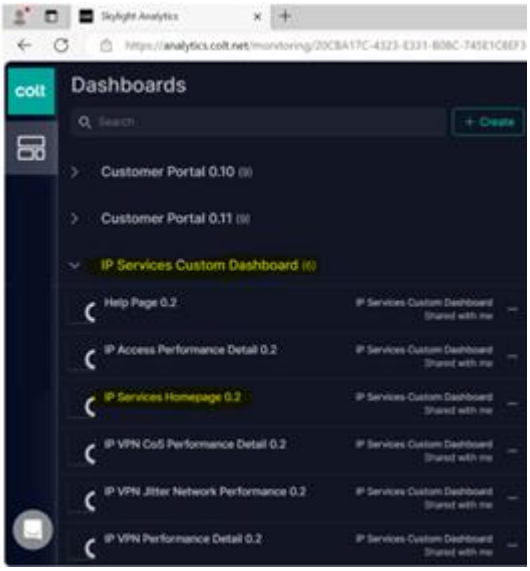
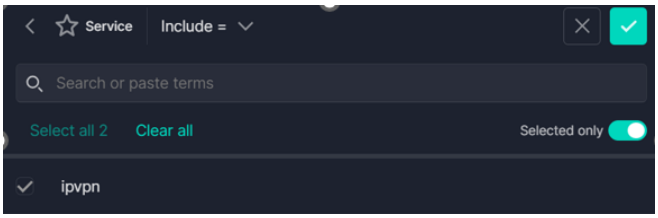


Figure x: IPVPN Services Homepage

After selecting the time interval, data will be updated showing the main indicators for the sites contracted.

If we manage different services but are only interested on some of those, we can filter the service type using the funnel icon on the top:



On the Circuit Inventory dashboard you have the most useful information about the different services, including:

- Circuit ID
- Service type
- Network ID (IPC)
- City
- Country
- Bandwidth (Kbps)
- Availability (percentage)
- Traffic In
- Traffic Out
- Traffic In (Peak %)
- Traffic Out (Peak %)

Figure x: Circuit Inventory

5.4.4 IPVPN Performance detail dashboard

There are three different Performance Dashboards besides apart from the Services Homepage, that indicates specific KPS regarding Traffic, Jitter, Packet Loss, Latency, CoS, etc.

5.4.5 IPVPN Performance details

The Performance Details dashboard is accessed through the Monitoring link (as first step in section 3), or through the Dashboard quick link on Help Page:

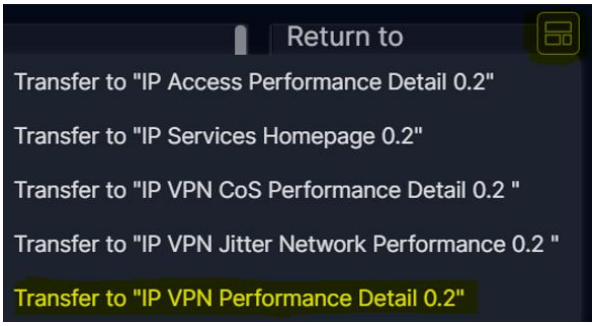


Figure x: IP VPN Performance Detail link

5.4.6 IPVPN Network Performance

5.4.6.1 Jitter

To access the Jitter Network Performance dashboard go to top right link “Return to Dashboards” and click on the selected one:

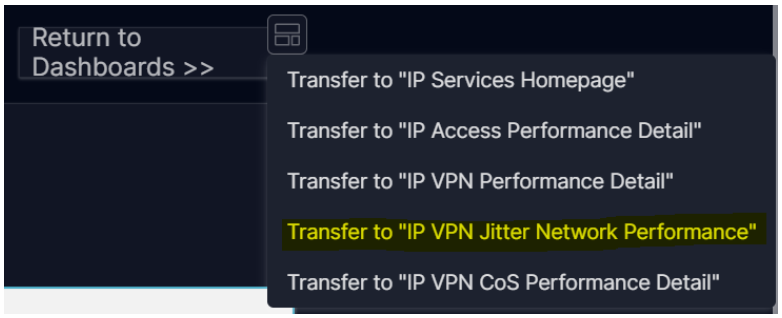


Figure x: Jitter Network Performance link

Within this dashboard there is useful information about Jitter details and summary, together with the measured Availability and Packet Loss figures.

It is important to stress that Packet Jitter can be guaranteed if class of service (CoS) with full delay guarantees is enabled. Packet jitter is guaranteed only for conforming Premium CoS traffic.

Jitter is measured from any CPE to the hub site CPE. In case there is no hub site, the first site is considered as the hub site. At the moment we can measure and report jitter on all Cisco CPEs (Huaweis if existing are not supported).

By default, for any new customer (i.e. a new installation) delivered on a Cisco CPE, Jitter reporting is enabled. For current customers (i.e. already installed) jitter reporting will only be enabled if the customer/sales request it explicitly via the Change Order form, if not requested before.

Jitter is the variance in one-way latency and is calculated based on sending and receiving time stamps of consecutive packets sent out. E.g.:

Time Stamp	Sender Responder
T1 (0ms)	Send packet1
T2 (20ms)	Receive packet1
T3 (40ms)	Send back reply forpacket1
T4 (60ms)	Receive reply for packet1
T5 (60ms)	Send packet2
T6 (82ms)	Receive packet2
T7 (104ms)	Send back reply forpacket2
T8 (126ms)	Receive reply for packet2

For packet 1 and packet 2 above, jitter is calculated as follows:

Jitter from source to destination (JitterSD) = (T6-T2) – (T5-T1)

Jitter from destination to source (JitterDS) = (T8-T4) – (T7-T3)

Jitter is calculated using time stamps of every two consecutive packets. For example:

Router1 send packet1 T1 = 0

Router2 receives packet1 T2 = 20 ms

Router2 sends back packet1 T3 = 40 ms

Router1 receives packet1 response T4 = 60 ms

Router1 sends packet2 T5 = 60 ms

Router2 receives packet2 T6 = 82 ms Router2 sends back packet2 T7 = 104 ms

Router1 receives packet2 response T8 = 126 ms

Jitter from source to destination (JitterSD) = (T6-T2) – (T5-T1) = (82 ms – 20 ms) – (60 ms – 0 ms) = 2 ms positive jitter SD

Jitter from destination to source (JitterDS) = (T8-T4) – (T7-T3) = (126 ms – 60 ms) – (10 4ms – 40 ms) = 2 ms positive jitter DS

Circuit ID	Band...	Net ID	City	Reachability %	Packet Loss %	Negative DS	Negative SD	Positive ...	Positive SD	Response Time	Transit Time	MOS
lon/lon/ia-622241	12000	ipc05343	london	100%	0%	1.04 ms	1.05 ms	1.03 ms	1.06 ms	3.16 ms	1.71 ms	0
bou/bou/ia-586018	16000	ipc-102720	bourges	100.0%	0%	1.04 ms	1.01 ms	1.05 ms	1.02 ms	6.30 ms	3.89 ms	0
nue/nue/ia-595354-a	60000	ipc-101982	nuremberg	100%	0%	1.04 ms	1.06 ms	1.05 ms	1.07 ms	8.71 ms	4.05 ms	0
par/par/ia-652222	10000	ipc05457	paris	100.0%	0%	1.03 ms	1.00 ms	1.04 ms	1.00 ms	22.0 ms	9.77 ms	0
dus/dus/ia-609521	20000	ipc-101473	dusseldorf	100%	0%	1.03 ms	0.997 ms	1.03 ms	0.996 ms	11.0 ms	3.23 ms	0

Figure x: Jitter KPI

Jitter details include the following values:

- Circuit ID
- Bandwidth (Kbps)
- Network ID (IPC)
- City
- Availability
- Packet Loss
- Negative DS
- Negative SD
- Positive DS
- Positive SD
- Response time (ms)
- Transit time (ms)
- MOS

On the next dashboard we can find the Jitter summary (including DS (destination to source) and SD (source to destination) values for Jitter calculation).

jitter-ds: Specifies destination-to-source delay jitter of each probe packet as the monitored element.
jitter-sd: Specifies source-to-destination delay jitter of each probe packet as the monitored element.
jitter response time: Specifies the time in miliseconds for one-way delay jitter in each test.

Figure x: Jitter Summary

Availability (reachability): Percentage of time or total time when source or destination device was down, during the monitored timeframe:

Figure x: Availability

Packet Loss: Percentage of data transmitted from an originating device not arriving at the intended destination

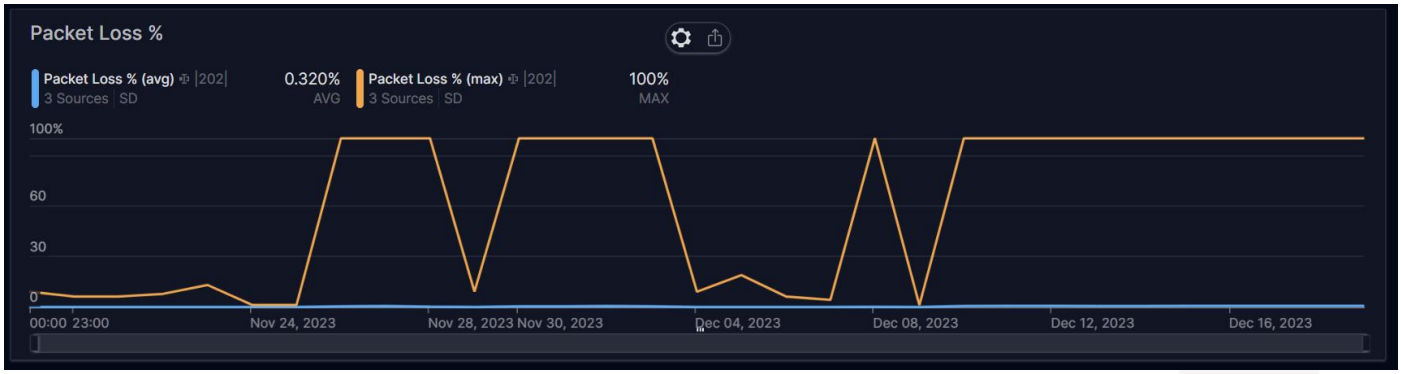


Figure x: Packet Loss

5.4.6.2 Class of Service

KPIs are measured against Cisco Committed Access Rate (CAR) configuration.

The displayed data is traffic travelling in and out of each interface. Outbound traffic is further defined for each class available with the IP VPN service. The available classes are:

- Standard - All traffic that is not specifically assigned to a higher class and therefore designated as non-critical such as web-browsing or email
- Business 1, 2 and 3 - Prioritised business-critical or delay-sensitive traffic such as SAP and Citrix
- Premium - Used specifically for voice and video applications that are particularly delay-sensitive

Circuit ID	Order	Bill Cust. Ref.	Bandwidth (kbps)	Submitted Traffic	Net ID	City	Class	Transmitted Traffic	Dropped Traffic	Transmitted %	Submitted %	Dropped %
bcn/bcn/ia-585128	235489316		100000	671.4 Gbps	ipc04590	cerdanyola del valles	standard	664.9 Gbps	6.5 Gbps	2438%	2460%	5079%
bru/bru/ia-580898	235316321	100100761	80000	332.9 Gbps	ipc05258	heverlee	premium	332.9 Gbps	0	984%	984%	0%
par/par/ia-580107-a	235288637	ts vocalcom paris	100000	322.7 Gbps	ipc-102368	paris	standard	322.7 Gbps	1.8 Mbps	676%	676%	165%
bru/bru/ia-580898	235316321	100100761	80000	166.5 Gbps	ipc05258	heverlee	standard	166.5 Gbps	0	492%	492%	0%
xbg/xbg/ia-577762	235230302		40000	156.9 Gbps	ipc-102348	aubervilliers	standard	156.7 Gbps	210.4 Mbps	656%	656%	11869%

Figure x: Class of Service summary

For further information, user can distinguish between Transmitted, Submitted and Dropped traffic for each corresponding Class:

Figure x: Class of Service Traffic Transmitted

Figure x: Class of Service Dropped traffic

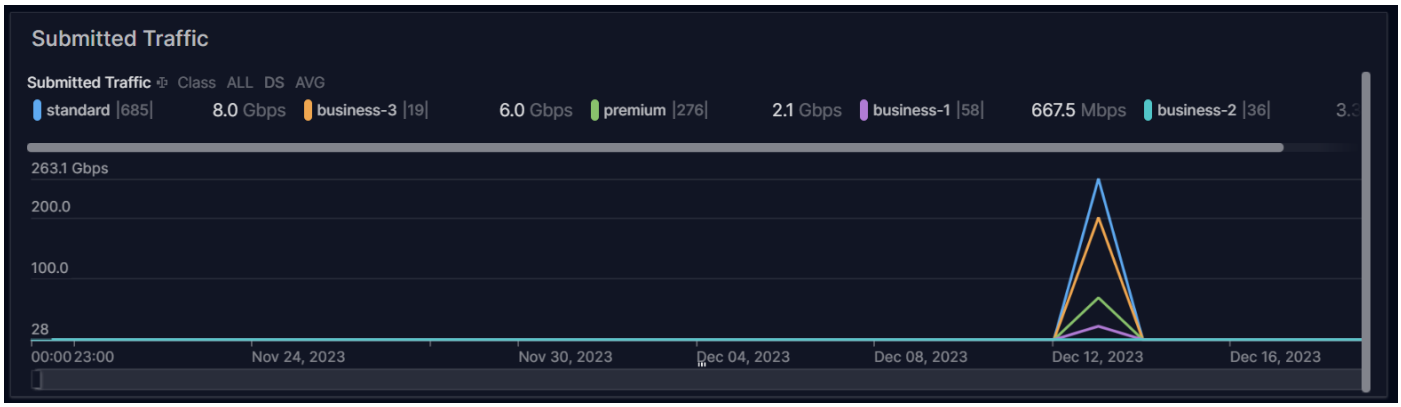


Figure x: Class of Service Submitted traffic

6. Voice Service Analysis

6.1 IP Services

Please note: For Voice/VoIP services, Performance Monitoring is a billable feature and must be ordered explicitly for the Voice service. In case you are missing the reporting functions and dashboards described below, it is most likely that this feature is not enabled for your service. In this case, please ask your Colt account executive to place an order to enable VoIP Performance Reporting for your VoIP service.

Please also note: Dashboards are subject to changes, however the underlying information around tool navigation and data sources remain as described in the sections below and can be applied to any updated dashboards

6.2 Voice Service Homepage

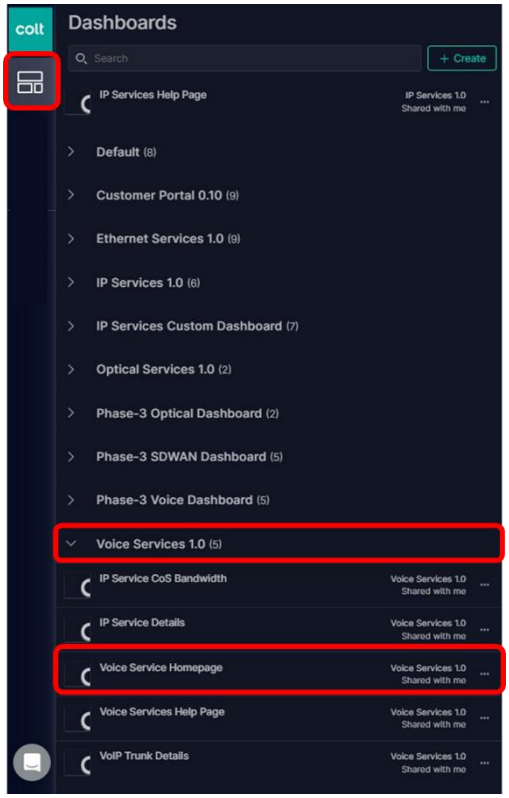
In the Skylight tool, access to the VoIP dashboards is through the monitoring icon, there are 4 dashboards to pick from relating to the two parts of a SIP service. The first set of dashboards are based on Call Detail Records (CDR's) and cover SIP Trunking and Wholesale SIP Trunking only, they consist of the following.

- Voice Service Homepage – Summary of services covering a variety of voice statistics taken from CDR's.
- VoIP Trunk Details – Subset of performance data providing more detail mainly in a graphical format

- The second set of dashboards cover IP statistics for customers with Colt provided connectivity and consist of the below.
  - IP service details dashboard
  - IP service CoS bandwidth dashboard.

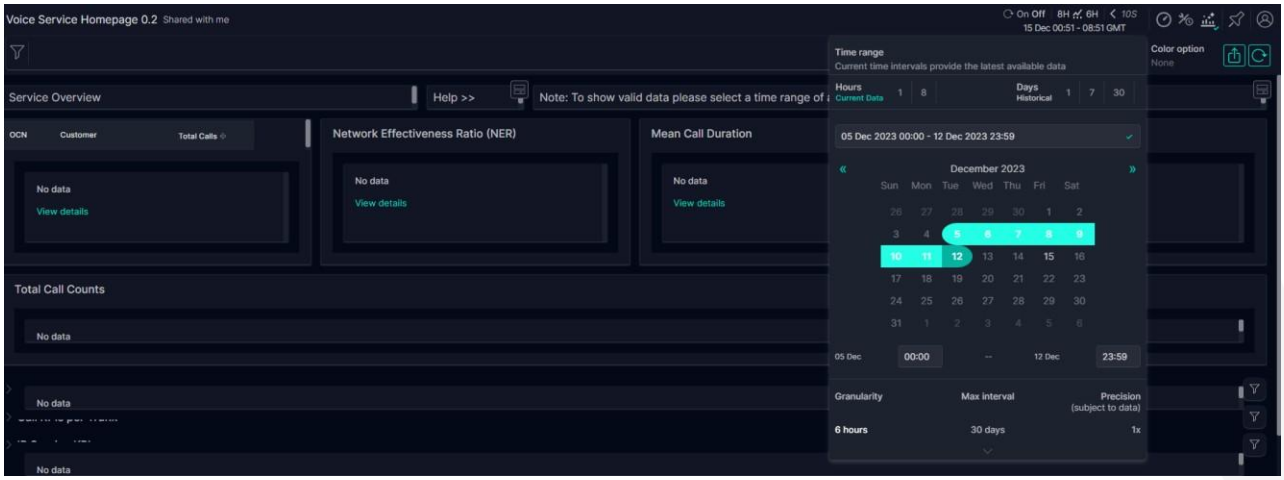
These contain details around packet loss, latency, jitter, round trip delay for the underlying IP service. However, these dashboards are not used yet and will not be covered here. Please refer to the separate IP dashboards in the Performance Monitoring tool to obtain further information around the health of any Colt provided underlying IP service for VoIP products.

1. Login to the Skylight tool via https://performance.colt.net/ and click on the Voice Service homepage, you'll find it under the section Voice Services 1.0 via the monitoring icon.



Depending on any filters set when you first login to the voice dashboard you'll see that no data is displayed as statistics are derived from call detail records (CDRs), which are only available after 24 hours.

Using the time picker select the previous 24-hour period and you will see the data displayed for the previous day. You can look at any historical data in the same manner by selecting the date and time that you're interested in, as long as it's at least 24 hours old. The recommendation in order to show valid data is to select a time range of at least 7 days (some CDRs can take up to 30 days to appear) but as long as it's not in the current 24-hour period you can find the data you're interested in.



Once a valid time has been selected, the Voice Service homepage will be populated with data from that period. Anything less than 24 hours will not be displayed and any date ranges that include the current 24-hour period will have gaps.

(note dates > 60 days @ 5 mins intervals will not be displayed as historical data so pick another date <60 days or a longer period e.g., 1 hour - to view valid data up to 1 year in the past).

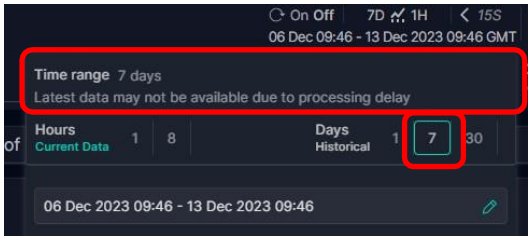
From the top left of the screen the **Service overview table** contains details surrounding your Colt customer number (OCN), your company name and the total calls over the time period selected. In case you own multiple OCNs, e.g. due to multiple services in different countries, these will all be shown on the left, if the Voice/VoIP services are enabled for the Performance Monitoring feature. Initially the list will show your 'top 25' services (or the bottom 25 if you alter the total calls column direction). It is however possible to search and filter for a specific customer / OCN / trunk.

The three histograms to the right contain information around the Network Effectiveness Ratio (NER), the mean call duration and the mean holding time, which is most useful when filtered for a specific OCN or trunk. The data here is an average of a subset of the overall information displayed on the dashboard.

Below that, you can see a **total call counts table**, which includes details around the total number of calls currently displayed on the dashboard, this is a subset of data and is taken from the top 1000 sessions. It provides information on how many calls were answered and unanswered and how many failed along with other CDR information.

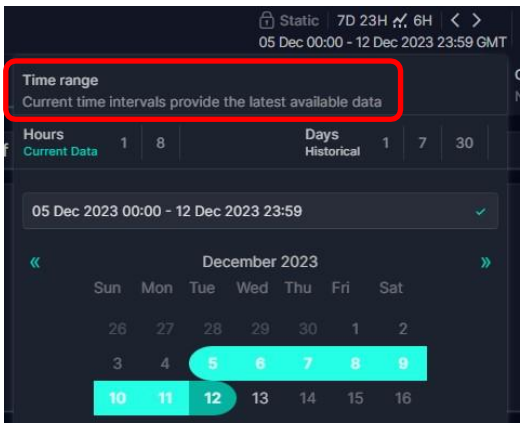
Below the total call counts table, we have call **KPI's per country, call KPI's per trunk and IP service KPI's** for underlying Colt Connected IP links. To better make sense of the data lets filter out an individual OCN.

2. Click on time picker at the top of the screen and then select the edit icon (pencil), the calendar will appear. It takes at least 24 hours for data to appear so if you select a range which has 'todays' date within it (i.e., select the last 7 days as shown) you'll see the message *'Latest data may not be available due to processing delay'* displayed.

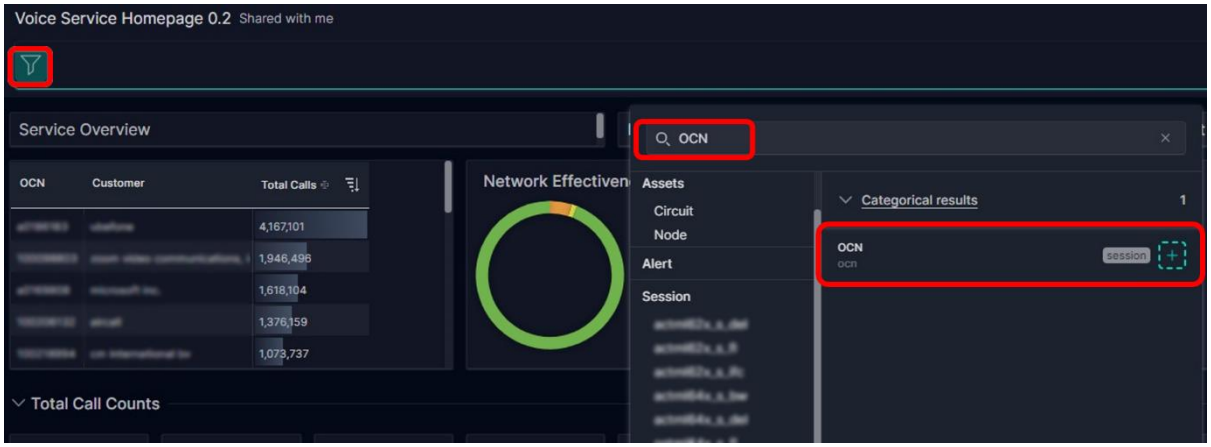


3. In the example, we look at data from period 5th – 12th December. **(note dates > 60 days @ 5 mins intervals will not be displayed as historical data so pick another date <60 days or a longer period**

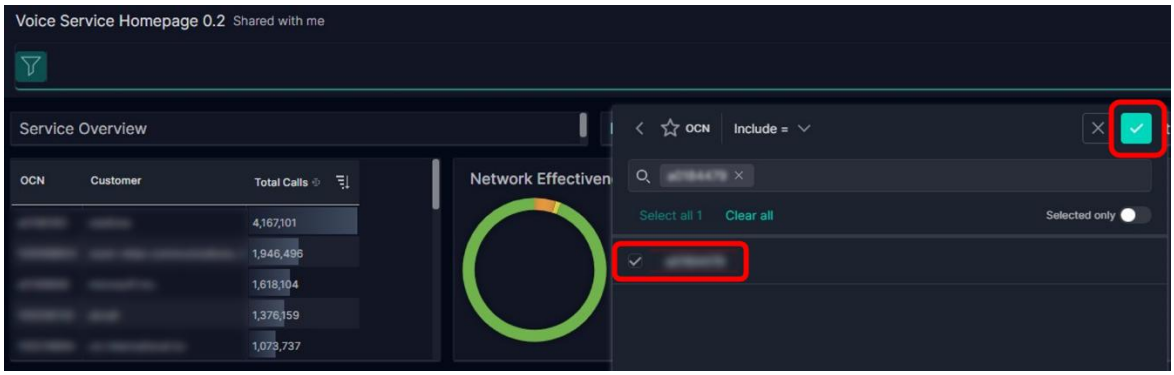
e.g., 1 hour - to view valid data up to 1 year in the past). Click once to select your start date and click again to select your end date, this time the message reflects this is a valid selection as shown in the screenshot.



4. Filter on one of your OCNs and save it as a bookmark. To do this select the Filter icon at the top of the page, search for ‘OCN’ and then click on it, you can also search for trunk groups if required in a similar manner.

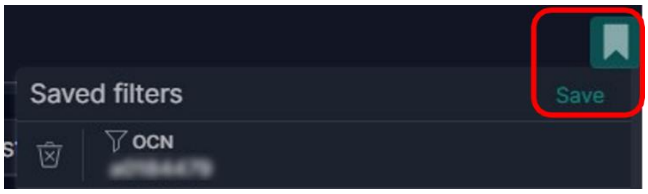


5. Type in the OCN number, select the check box next to the OCN number displayed and click the tick icon to apply the filter changes.

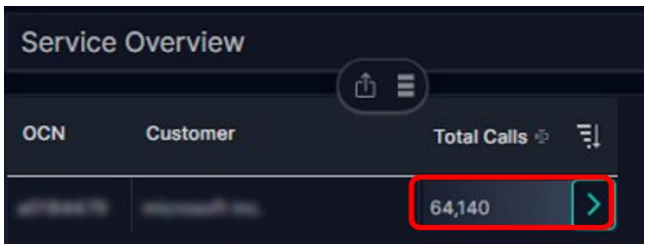


6. The page will update displaying this OCN only on the dates selected.

7. You can bookmark this page by clicking the bookmark icon and then ‘save’, it will remain here until you wish to remove it but will come in handy when navigating through the system. You can save multiple filters in this manner.



8. Under the Service Overview table, we can see this OCN’s total calls amounted to 64,140. By hovering over the total number of calls a green arrow will appear.

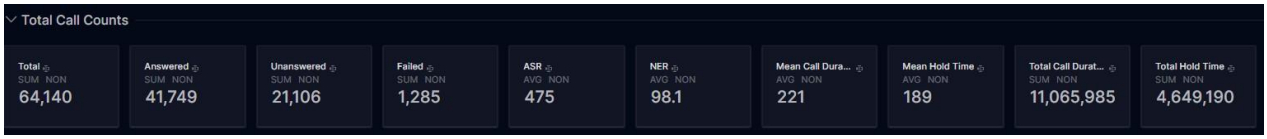


9. Click on the arrow, another window will pop out displaying where that OCN's total calls data were sourced from. We can see here it displays 76.9% of the total of sessions (776 of 1009 sessions). The remaining sessions either collected no data or the CDR's were not yet available at the time they were selected (they could take up to 30 days to appear), therefore depending on the time chosen the value you see here may change.

10. The session column in the screen above lists the country code, the trunk and destination prefix in the trunk group and a suffix of either IC (incoming calls) or OG (outgoing calls), e.g., IE_ABCDEFGHI1234_IRL-_IC

11. Scrolling along the bottom bar of this window enables you to see a selection of the meta data, for example you can see things like destination name, provider, OCN and order numbers, origin country, service type, switch ID, tier, trunk group and net ID. You can select any of the sessions and open up an inventory view to look at the data in more detail, something we'll do later. Close the window using the X at the top right-hand corner.

12. Under the total call counts you can see various statistics in a single snapshot, but these are also reflected on a separate dashboard in a little more detail.



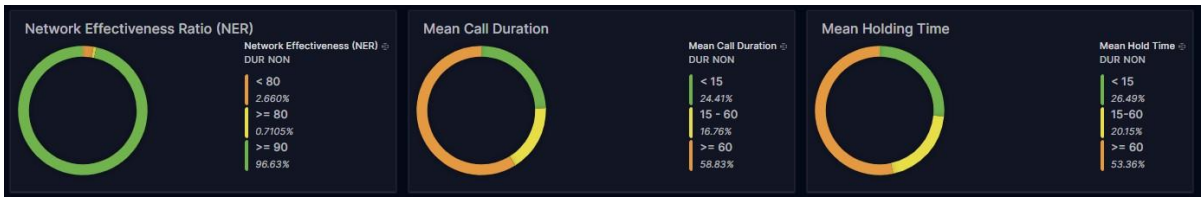
- **Total** – Total calls attempted including answered calls, unanswered calls and failed calls over the time period specified.
- **Answered** – Number of calls with a conversation time > 0.
- **Unanswered** – Number of calls with a Conversation Time = 0
- **Failed** – Number of calls which failed due to the inability of a network to deliver calls to the far-end terminal. There is a list of reasons as to why the call failed which will not be covered here.
- **ASR** – Answer Seizure Ratio – calculated by taking the number of successfully answered calls and dividing by the total number of calls attempted (seizures) – shown here as an average across all trunk groups for this specific customer.
- **NER** – Network Effectiveness Ratio is a measure of the quality of the network, its designed to express the ability of networks to deliver calls to the far-end terminal. It is calculated by the number of seizures compared to the total number of successful call deliveries (answered calls, user busy, ring no answer and terminal rejections) combined. Unlike ASR, NER excludes the effects of customer behaviour and terminal behaviour.
- **Mean Call Duration** – Defined as the Time/Number of Answered Calls displayed in seconds.
- **Mean Hold time** – The Holding Time of a call is defined as the Call Set-up Time + Ringing Time + Conversation Time + Release Time, i.e., it is the total time a call "holds the circuit". It is calculated per

call as the sum of the CDR DURATION (in 0.1s) and UNANSWERED_TIME_DR (in s). The Mean Holding Time per Seizure calculation only considers calls with a Holding Time > 0. For the reported period it is defined as sum (Holding Time) / (Number of calls with a Holding Time >0) displayed in seconds

- **Total Call Duration** – Defined as the sum of the duration of all calls within the time interval reported. The result is displayed in seconds.
- **Total Hold Time** – sum of the holding time of all calls.

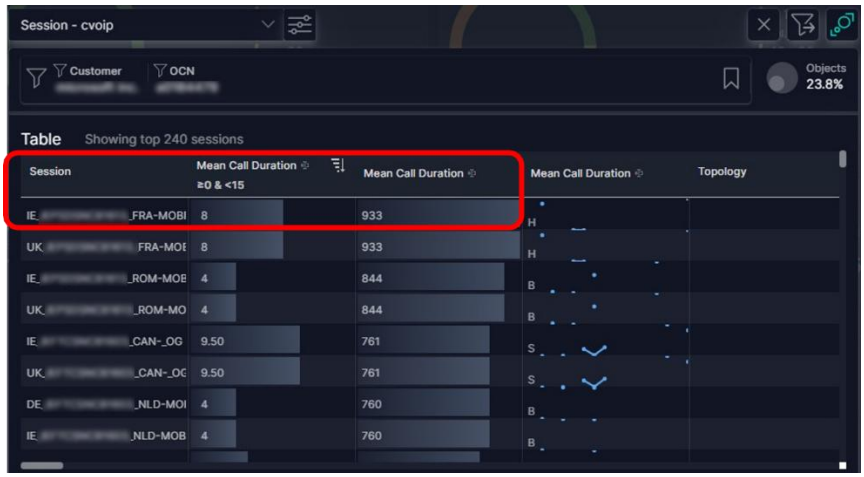
It is possible to see where the data for each value was derived from, by hovering over the value and clicking the green arrow to open the data set as per step 9.

13. Looking at the Histograms to the right of the page, we can see that the histogram for NER tells us that for 96.63% of the time NER was >= 90%, it was >80% for 0.7105% of the time and network effectiveness was <80% for 2.660% over the time period. We can see the majority of mean or average call duration was >=60 mins and <15 mins duration accounted for 24.41% of all calls. Mean holding time was <15 mins for 26.49% of the time, but it averaged over 60 mins for 53.36% of the time.



14. As with the total calls data you can hover over any of the figures on these histograms, click the green arrow and see how that value was calculated.

15. In the example of mean call duration, we can see that 8 calls fell within the 0-15 min area for the first session, with the overall mean call duration for that session displayed in the next column in seconds, the figure in the histogram is taken from the average of all sessions combined, click the X at the top right to exit this screen.

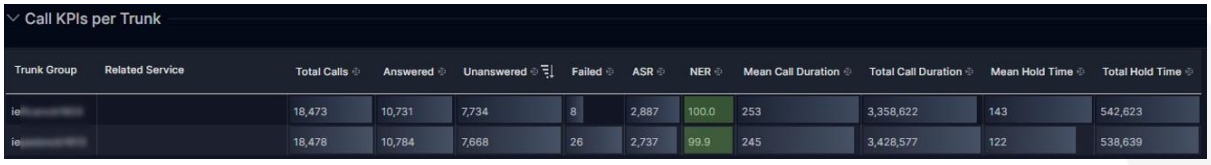


16. There are three collapsed columns below the total call counts table, two relating to the KPI's for Voice and another for the underlying IP service. Presently there is no automatic correlation between the two sets of data, but there are ways to find out how one relates to the other manually.

17. The Call KPI's per country shows the Key Performance Indicators gathered from each country. It's possible to filter for specific destinations, trunk groups or direction from here. In example, if you filter for the destination of Ireland and direction IC, note all the data on the page will be updated to reflect the filters in place. You can filter by selecting the values of interest in the Call KPI's per Country table and clicking the filter icon which appears as a pop up in the window, as shown below.

Note - the selected filters will be displayed at the top of the page.

18. The second dropdown menu contains Call KPI's per Trunk. This has similar data to the call KPI's per country, but this time consolidated over each trunk group itself rather than a country split. Instead of Destination and Direction (incoming or outgoing) columns we have a 'related Service column', which, when populated, contains information relating to the underlying IP transport service. Note this is not always populated as it's based on the underlying customer connectivity.
One thing to note for former Infovista users is that in Infovista the Trunk Group will be visible even if no reports are available, however in Skylight **the trunk group will not be visible if there are no call records**.

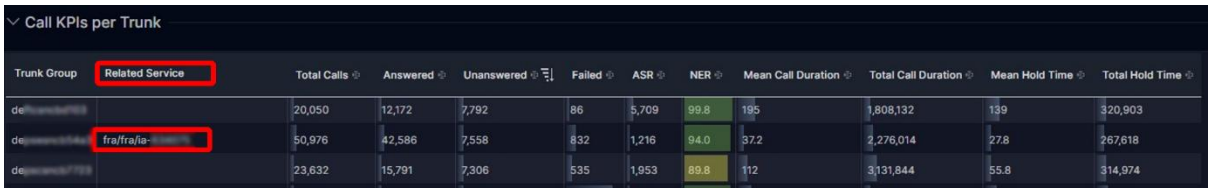


(This table also now includes additional metadata – Order and Bill Cust Ref)

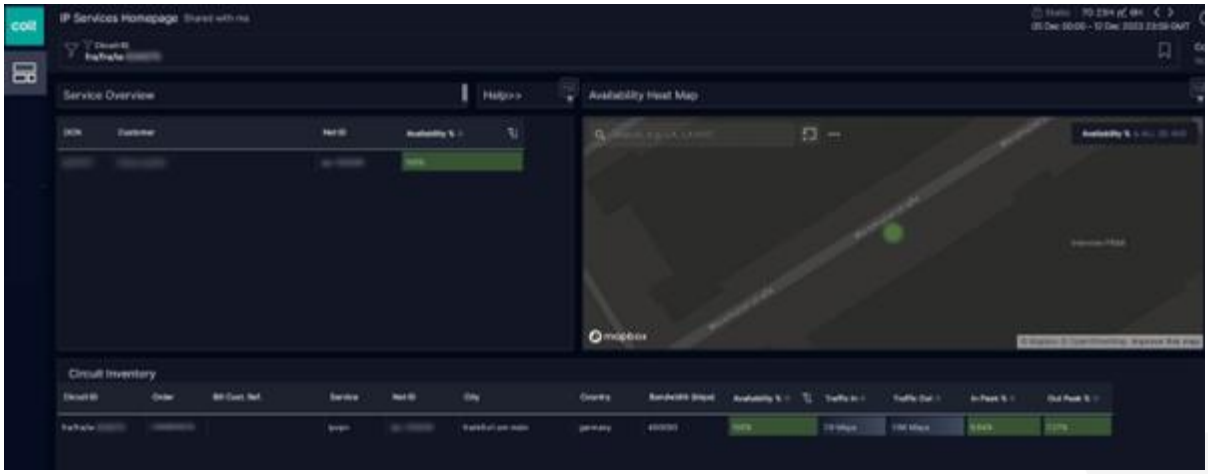
19. The last menu on the homepage is the IP Service KPI's, the intention being users can view the KPI's of the associated IP services. However, there is **no automatic correlation to the associated voice service** as the IP service objects do not contain metadata from the OSS Wrapper to identify that traffic as being voice traffic. As a result, the table shows **all IP services belonging to customers on the dashboard and does not relate specifically to any underlying IP voice connection itself**.

Furthermore, we only see data under this menu if there is no filter in place, once we filter anything out we don't see any data here as there is no correlation to the voice service. So, we have to remove all the filters before opening up the IP Service KPI's. Then, we can manually correlate these IP services to Voice services.

20. To identify the underlying IP service, you could look at the related service column under the KPIs per Trunk section and compare with the IP service KPI's table. However, please note this column is not always populated, e.g. if the transport link is offnet through other providers. Furthermore, this needs the users to look through the data manually and compare the related services in the call KPI's per trunk with those in the IP Service KPI's table. However, as the dashboard only displays the top 25 sessions its more than likely that none of these are related to an underlying IP connection for Voice.



21. Therefore, in order to find out more detail around an underlying IP service we need to copy the related service under the call KPI's per trunk menu, if displayed, to the IP service homepage as shown below. The IP service, even if captured here, may not always be present on the IP dashboard i.e. if it is an offnet connection. Please refer to the IP section in the guide for more information around how to navigate through these dashboards. As an example, we have used a Trunk Group in the filter under the voice service homepage, using related service ID, identified by its typical format, e.g. **fra/fra/ia-123456**.



6.3 Voice Trunk Details Dashboard

1. Go back to the Voice Service Homepage. Filter once more for one of your customer numbers (OCN) or use your saved bookmark. Use the 'transfer to dashboard' icon on the right-hand corner of the screen, then select **'Transfer to "VoIP Trunk Details"'**. Note that transferring to either of the IP dashboards will result in no data. You can return to homepage at any time by clicking the icon once again and select transfer to Voice Service Homepage.

6.3.1 Summary KPI's

1. Once in the VoIP Trunk Details dashboard, you'll be greeted with the Summary KPI's table along with a number of graphs using the extrapolated data from the table. The summary KPI's display the same data as that from the Voice homepage's total call counts table, but this time they are represented graphically through various charts on the dashboard. Once again, we can filter any of the metadata displayed on the chart i.e., trunk group, destination, or direction, which will then be reflected on the dashboard.

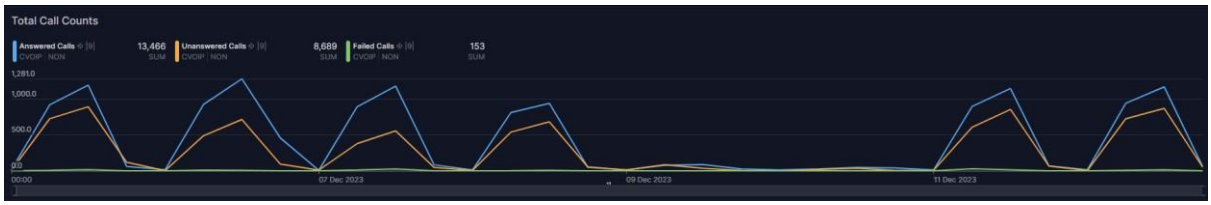
(This table also now includes additional metadata – Order and Bill Cust Ref)

22. In the example, we filter for the country Ireland and one of the listed trunk groups, we're now only viewing incoming and outgoing calls for that destination on a specific trunk over the time period specified.

(This table also now includes additional metadata – Order and Bill Cust Ref)

6.3.2 Total Call Counts

1. The total call count graph displays data relating to answered, unanswered and failed calls. The data displayed at the top changes, based on where you hover your mouse on the graph. It's possible to zoom into any area to look into it in more detail based on the granularity in the time picker, but a warning at the top of the page states the granularity should be at least 7 days. Also note **this data could change as more CDR's are captured over time.**



2. In this example, **at the period of time the dashboard was accessed**, we see a peak of unanswered calls around midday on the 5th of December (we can see this if we hover the mouse over the unanswered calls figure at the top of the graph). we can **zoom** into that area on the graph or **use the time picker to select a specific period**. Note the graph details may show gaps or even disappear completely but the table under summary KPI's will still be updated with the specific data.

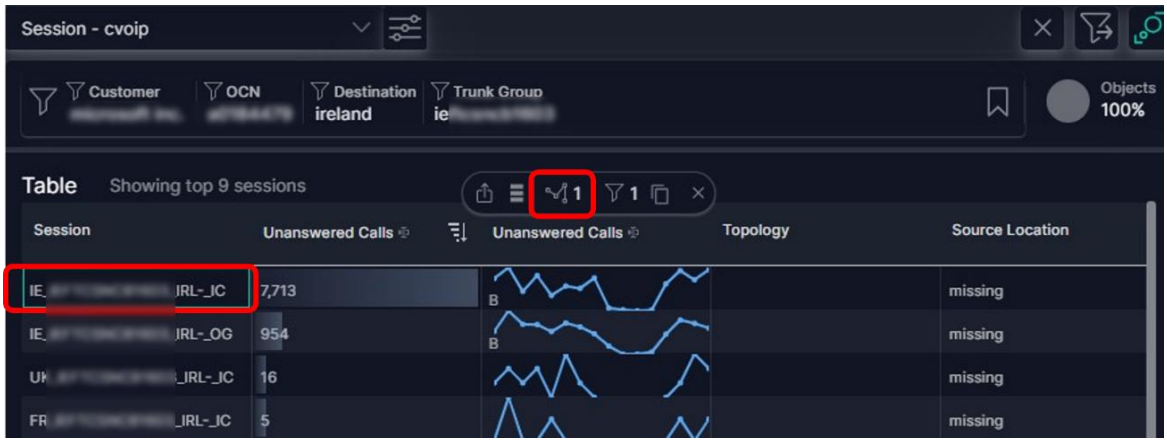
3. Here we have used the time picker and filtered for the following time period of 11:50am – 13:21pm. We can see that over that period we saw 609 calls incoming, of which 301 were answered and 308 were unanswered.

(This table also now includes additional metadata – Order and Bill Cust Ref)

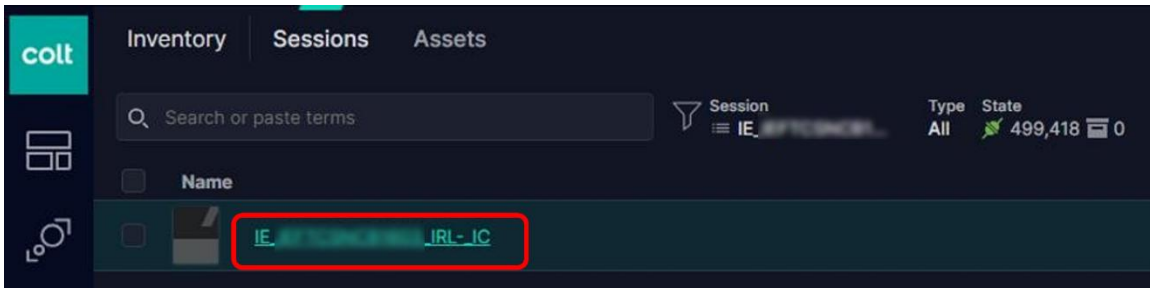
4. We can gather a little more information if we navigate to the source data. Firstly, reset the filter at the top of the screen as we need to look at a bigger period to in order to display data in the inventory menu

we are going to access, i.e., we won't initially see a graph displayed in the next screen if the period we're viewing is too small.

5. Hover over any of the data fields, e.g., unanswered calls, the green arrow will appear, click on that to see the dataset table. Select the top session where we see the vast majority of incoming unanswered calls and click the inventory icon.



6. You'll be taken to the inventory screen, click on the session.



7. You'll be taken to the 'sessions' screen, once here select the 'performance' tab.

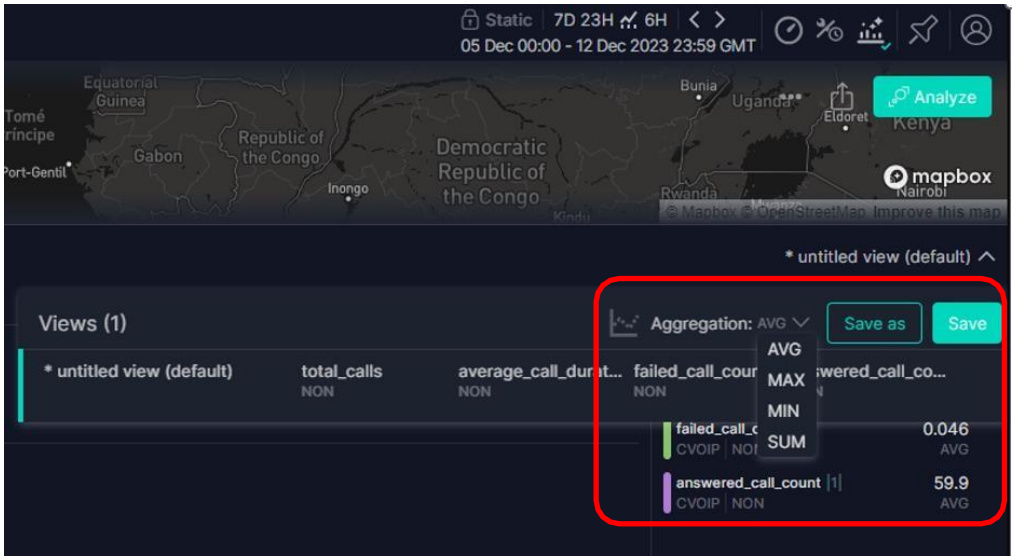
8. Once here we can view all the source data for the trunk by selecting the variable on the left-hand side of the screen, the graph will be updated based on the selection made.

The following parameters can be selected on the graph which will be displayed as different lines, these consist of basic Metrics from CDRs and Custom Metrics

- **Average Call Duration**
- **Total Call Duration (averaged over time period)**
- **Holding time of Call** – this is the total time a call "holds the circuit" (= call set-up + ringing + conversation+ release time), displayed in seconds
- **Answered Call Count**
- **Unanswered Call Count**

- **Failed Call Count**
- **Number of Calls with non-zero duration**
- **Total number of calls** = SUM (Answered, Unanswered, Failed)
- **Total number of Seizures** = SUM (Answered, Unanswered)
- **Mean Holding Time** = Holding Time/Number of Calls with non-zero duration
- **Answer Bid Ratio** = (Answered/Total number of calls) *100
- **Answer Seizure Ratio** = (Answered/SUM (Answered, Unanswered, Failed))*100
- **Answered Call Holding Time** = Answered Time/ Answered calls
- **Network Effectiveness Ratio** = (SUM (Answered, Unanswered) /SUM(Answered, Unanswered, Failed))*100

9. We can affect the information seen by clicking on the "**untitled view**" dropdown on the right-hand corner of the screen and selecting from AVG, MAX, MIN or SUM. Once selected the data on the graph will change to reflect the selection made.

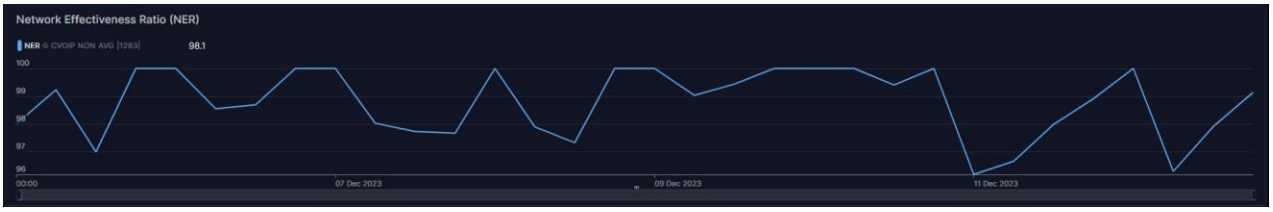


6.3.3 Answer Seizure Ratio

Through the monitoring icon return the VoIP Trunk Details dashboard. Note that any filters which were set will be lost, which is why it's a good idea to have bookmarked them initially. Set the filters as desired and scroll down to the answer seizure ratio graph. This shows the average ASR figure over the time period and once again hovering over the ASR value shows us the peak figure over the period, which is also reflected by the top line figure on the graph itself.

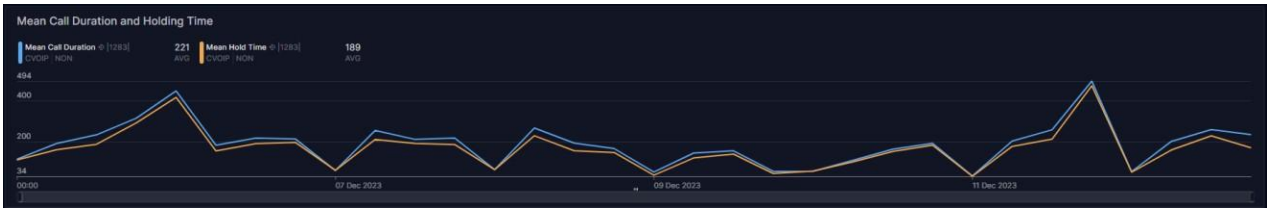
6.3.4 Network Effectiveness Ratio

In the example, we can see the NER figure dropped to around 96.2 (bottom line of graph) but averaged out at 98.1.



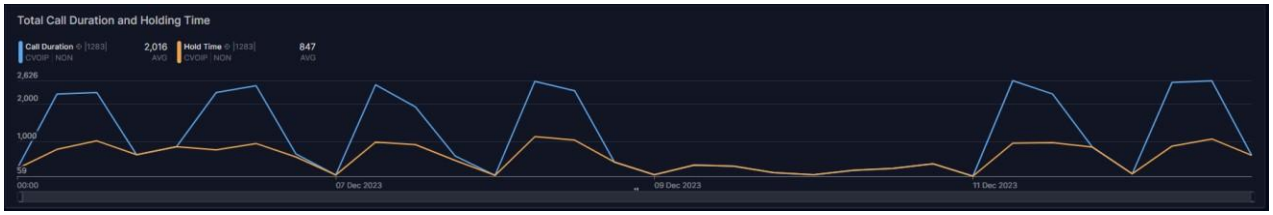
6.3.5 Mean Call Duration and Holding Time

The Mean Call Duration in this example averaged out at 221 seconds, with the longest call being 494 seconds long. The average hold time was 189 seconds.

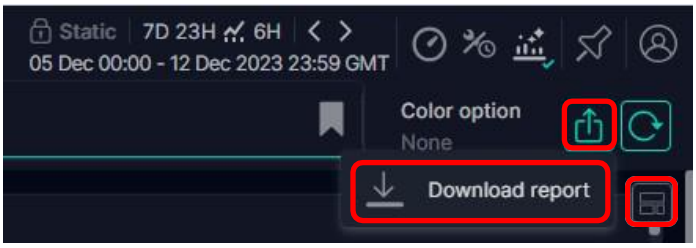


6.3.6 Total Call Duration and Holding Time

The total call duration relates to the average time of all calls combined, made over the period, in the example working out at 2016 seconds. The average hold time for the same period was 847 seconds.



It's possible to generate reports by hovering over any of the graphs and selecting the icon that appears next to the cog, this will **download an excel sheet** you can view. Alternatively, you can report on the entire dashboard by clicking the icon shown below and selecting download report, which provides both **excel sheets and a PDF** of the data shown in a zipped file. We can return to the voice homepage through the transfer dashboard icon seen below next to **'download report'**.



6.3.7 Reporting

For reports, please refer to Section 4.