Highlight Service Description

Last updated for version 24.5

Please Note: This document is updated frequently. For the latest version please go to https://support.highlight.net/ and click on the Service Description link in the top right of the page.

Version	Date	Comments
24.5	17/04/2024	Update Grid 2 new column inc image, calendar controls images
24.2	16/01/2024	Update Status Heat tiles images
23.11	13/10/2023	Update Cellular Clarity for Score & RSRP, new Insights tile image
23.10	19/09/2023	Updated Switch port summary image
23.9	18/08/2023	Updated WiFi details page info & image
23.7	10/07/2023	Add Reporting Insights
23.3	10/03/2023	Replace strip chart images, remove hosts
22.12	01/12/2022	Multiple image updates for UI changes, Users add Fed Auth
22.10	28/09/2022	Update Business Hours and Reporting API text
22.9	26/08/2022	Updated image for Grid view and performance test
22.8	10/08/2022	Updated image for performance test
22.7	08/07/2022	Updated images for Broadband & Cellular
22.5	06/05/2022	Add Reporting API in section 3.5
22.4	14/04/2022	Pg 12 Details page image shows Line Availability
22.3	01/03/2022	Updated Broadband chart image
21.11	28/10/2021	Addition of SD-WAN tunnels and Grid View
21.8	02/08/2021	Updated Cellular Clarity image

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1. Highlight Introduction & Architecture

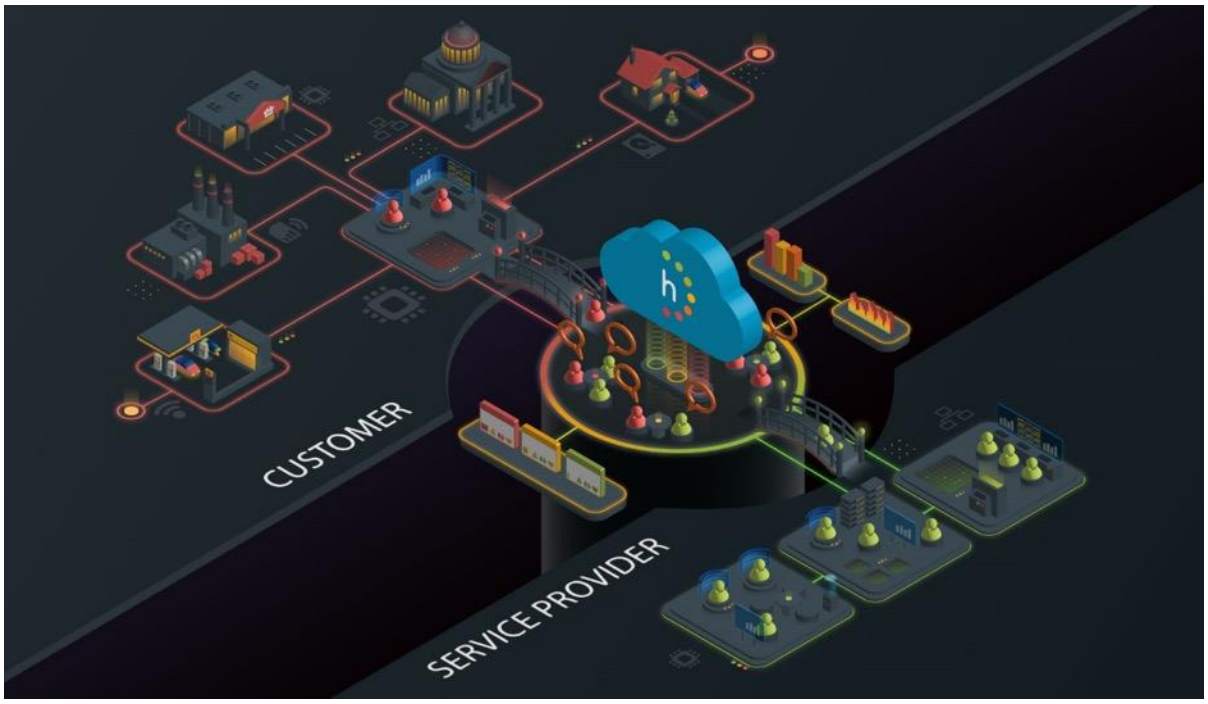
1.1. Introduction

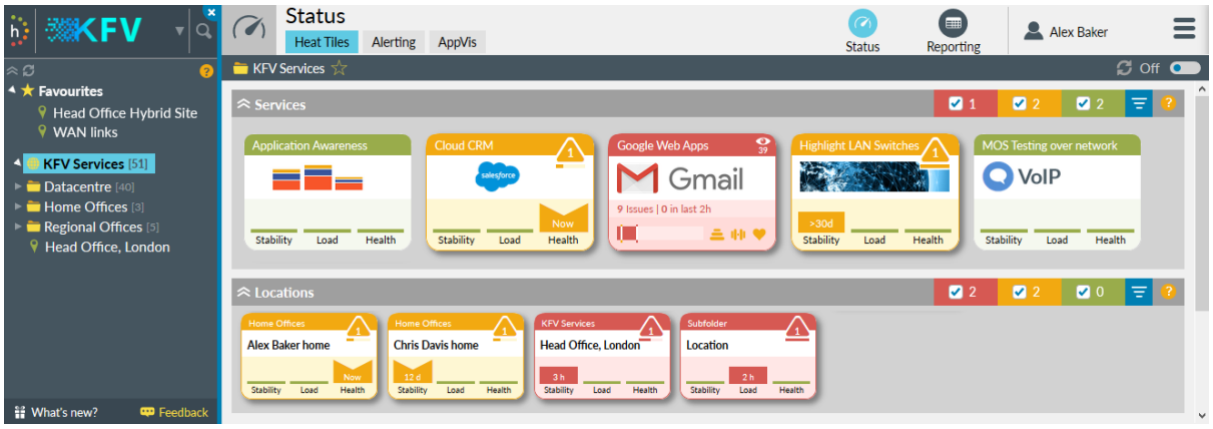
Highlight is a cross-technology, multi-vendor service assurance platform for network services designed specifically for service providers and their reseller or direct customers. The scalable cloud based multi-tenant platform currently supports thousands of businesses through 90 countries around the world.

Highlight is designed to deliver a fast and intuitive experience in visualising network services for first line support, service managers, enterprise IT managers, and to support exceptional delivery of network services.

1.2. What Highlight does

Highlight's cloud platform collects data from the network, analyses and adapts the data in the context of service provision, stores and visualises these data and presents it in a web portal which is simple and easy to understand.





2. Highlight Data Collection and Agents

Highlight combines SNMP, API and Flow technologies in retrieving key information about connectivity services.

Publicly addressed devices may be polled by Highlight's existing cloud agents to gather SNMP data without requiring the customer or partner to install and host any agents. Certain orchestrators, both public cloud (such as Meraki) or private, may be communicated with via APIs.

Where a network or orchestrator is private, Highlight bridges from the cloud into the private address range with a Highlight agent which would be installed to run on a Windows host. This agent (which is free of charge) secures a communication channel with the Highlight cloud over SSL and does this outbound from the private network, meaning no additional security firewall rules need be applied to the public internet. This enables communication with private IPVPN estates or into enterprise LAN environments which have non-unique 'private' IP address ranges.

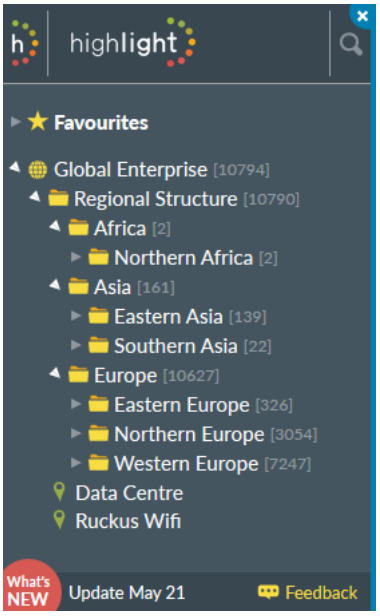
A Highlight agent is also required where Flow is to be used. Optimally, this agent would reside in the private address space of a provider or individual enterprise as Flow data is not recommended to be sent over the public internet.
For server specifications and architecture options in more detail, refer to https://support.highlight.net/help/functionality/server_specs and https://support.highlight.net/help/functionality/architecture.

3. Highlight SaaS Features

3.1. Network Explorer and Users

Network Explorer

The Highlight Network Explorer tree is completely customisable for any organisation's (provider or enterprise) needs.



User access is hierarchical allowing users to be granted visibility at the appropriate level seeing only locations and services within the folder or location at which they are created.

It's easy to add sites of interest to 'Favourites' which are then quick to access at the top of the tree. Favourites can then be used to filter Heat tiles, or as a filter for reporting and alerting.

Users

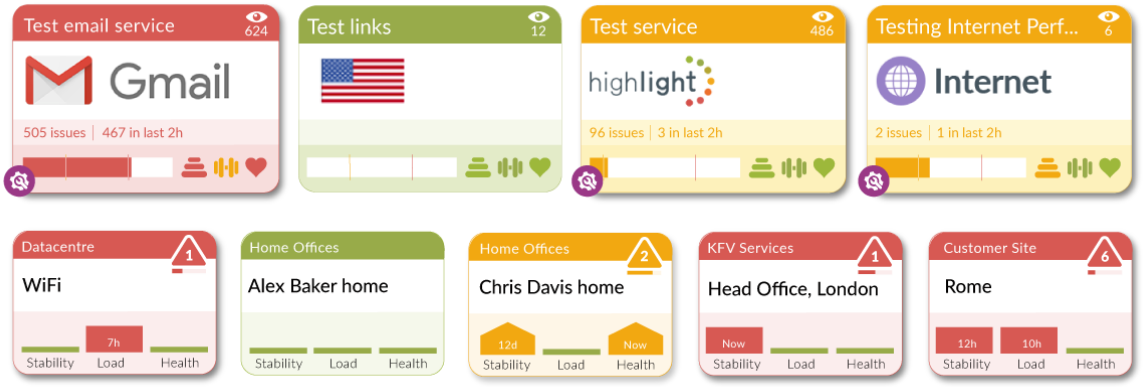
It's straight-forward and free to give users access to Highlight. Thus both service provider and enterprise users can log in to access the same data. For more information see https://support.highlight.net/help/getting_started/add_users . The provider will typically have visibility of their entire estate, while individual customers see only their own networks or links.

Single Sign On

It's also possible to set up Single-Sign On with OAuth and log in to Highlight using the same credentials and multi-factor security as your corporate account.

3.2.Heat tiles and Wall boards

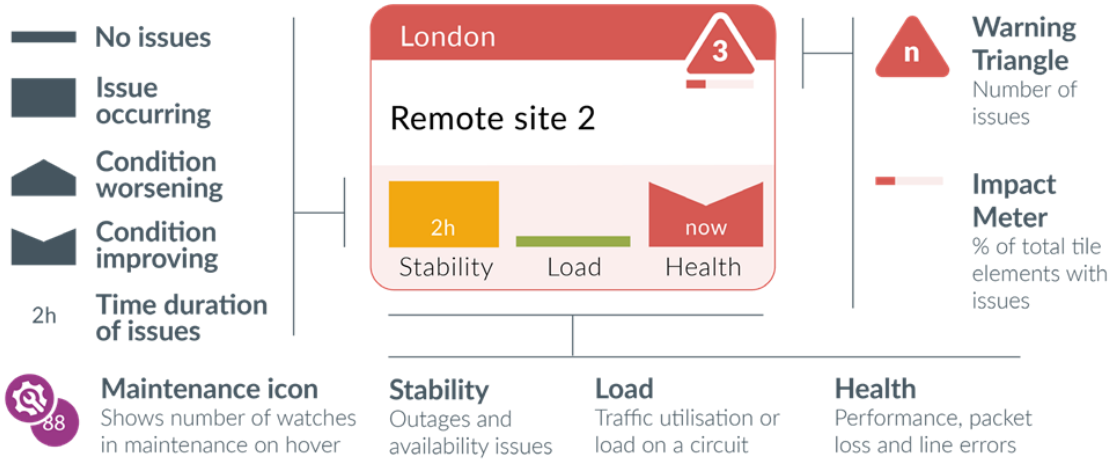
The main window provides the initial view of the status of monitored services, presenting unique and intuitive heat tiles which change to amber and eventually red to indicate issues.



Highlight displays two types of heat tile:

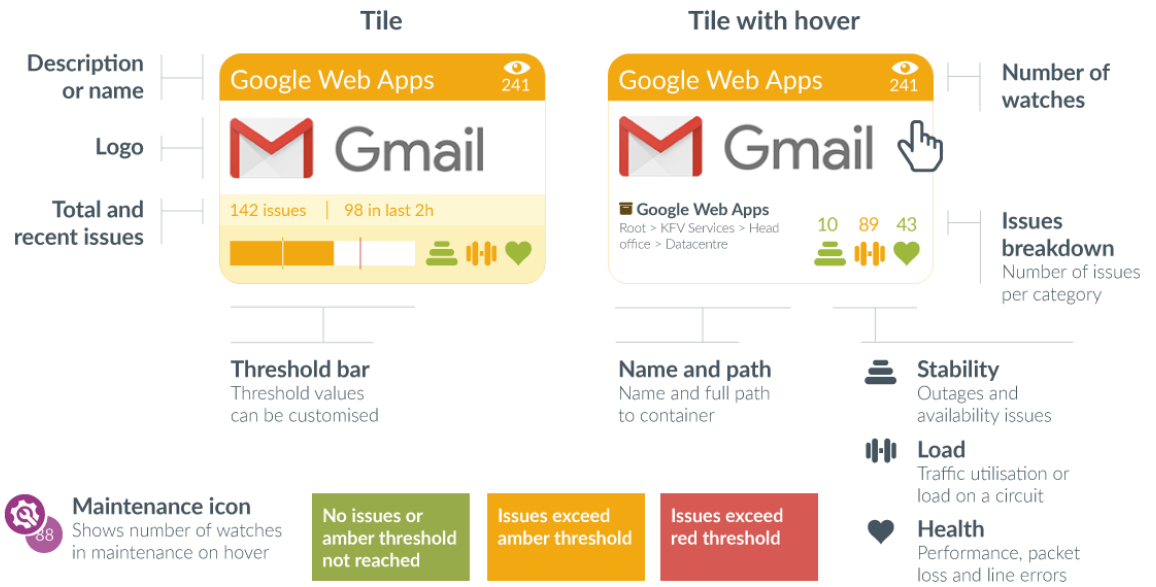
Location tiles

Every location within the network is shown as an individual, summarised tile with chevrons to indicate improving or deteriorating issues across stability, load and health metrics summarised over all elements at that location:



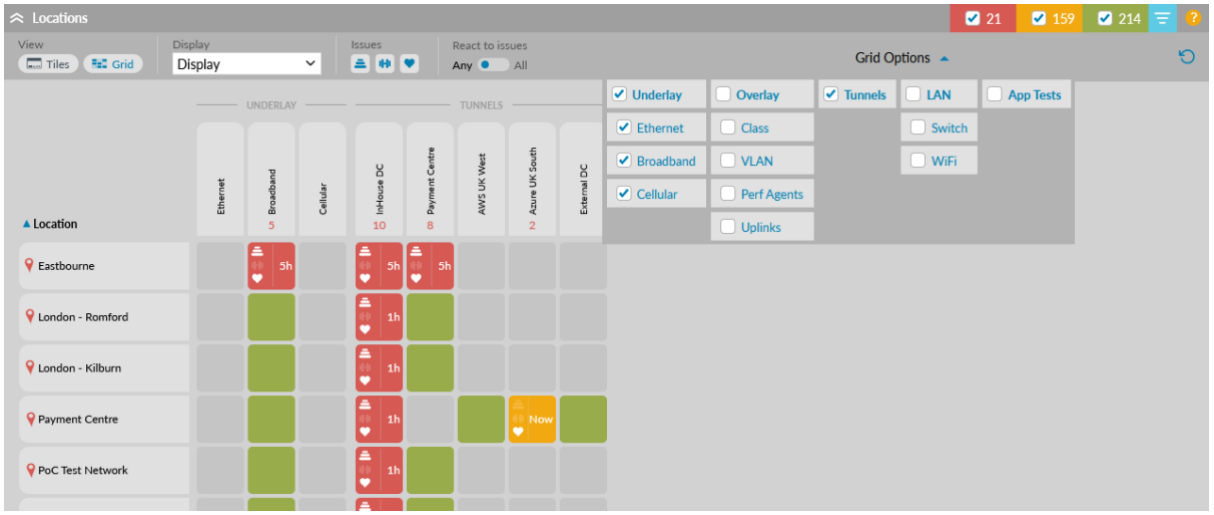
Service tiles

Group watched elements of any service (router circuit, WiFi Access Point, performance tests, etc.) from any location in the network into a single tile representing key applications, then custom define thresholds to change tile colour based on the total number of issues:



Service tiles are a unique feature of Highlight with different use cases. For example, an aggregator or service provider may benefit from grouping circuits from different wholesale providers or individual POPs together to quickly be aware of major service outages, or an enterprise can group key test data measuring voice performance into a single tile representing estate-wide VoIP performance.

Grid view



Highlight's Grid view is an extension of location tiles, designed to give quick and easy visibility of multiple categories of networking services within a location.

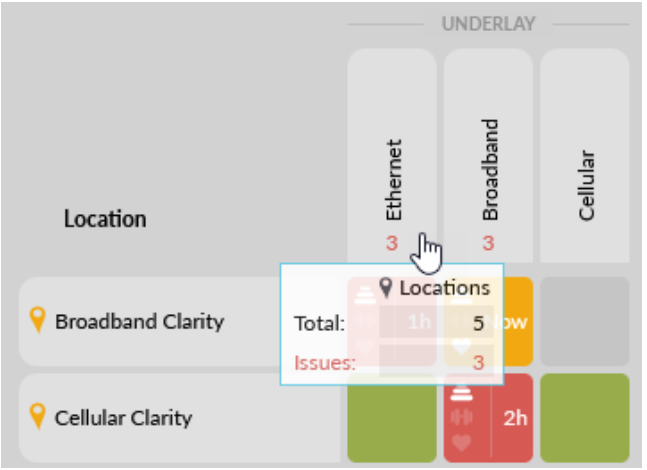
The Grid view unpacks one or many locations into their common constituent parts and displays them in Underlay, Overlay, SD-WAN Tunnels and LAN category column groups. These categories and services are arranged as follows:

- **Underlay** – Ethernet, Broadband and Cellular
- **Overlay** – Class of Service, VLAN, Performance Agents and Uplinks
- **Tunnels** – Destinations of tunnels
- **LAN** – Switch and WiFi
- **App Tests** – Performance tests included in a container set to appear as a Grid column

With the status of these components displayed as a grid, scan across a location row to see, at a glance, the status of a range of services at a location, or scan down a column to see the status of common services over many locations.

The Grid can be customised to show only columns of interest and to automatically hide empty columns. SD-WAN tunnel destinations are expanded to enable faster troubleshooting.

As corporate networking becomes increasingly complex with multiple dependant components, the grid provides a quick and easy to understand view of the status of a network or to easily categorise and communicate the source of problems for service optimisation.



Wall Boards

It's possible to collapse the Network Explorer tree and top navigation bar. Combine with the F11 key for a full screen view of Highlight, especially useful for continually displaying heat tiles on a Network Operations Centre (NOC) screen.

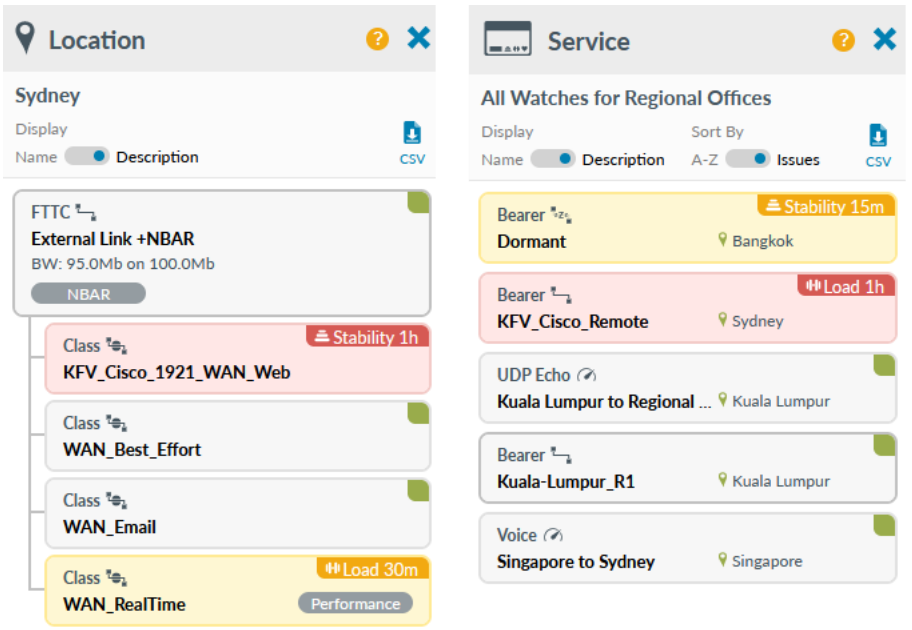
See https://support.highlight.net/help/getting_started/user_menu#wallboard_view

3.3.Watch Details

Highlight refers to a monitored and reported element as a 'watch'; a 'watched element'. A Watch can track the performance and health of an Ethernet or Broadband circuit, a Server, a WiFi Access Point, and other technologies, in each case collecting metrics relevant to that service. A watch surfaces the critical real-time information for that service in heat tiles as described above, with more details available within two mouse clicks.

Watch Status panel and Details page

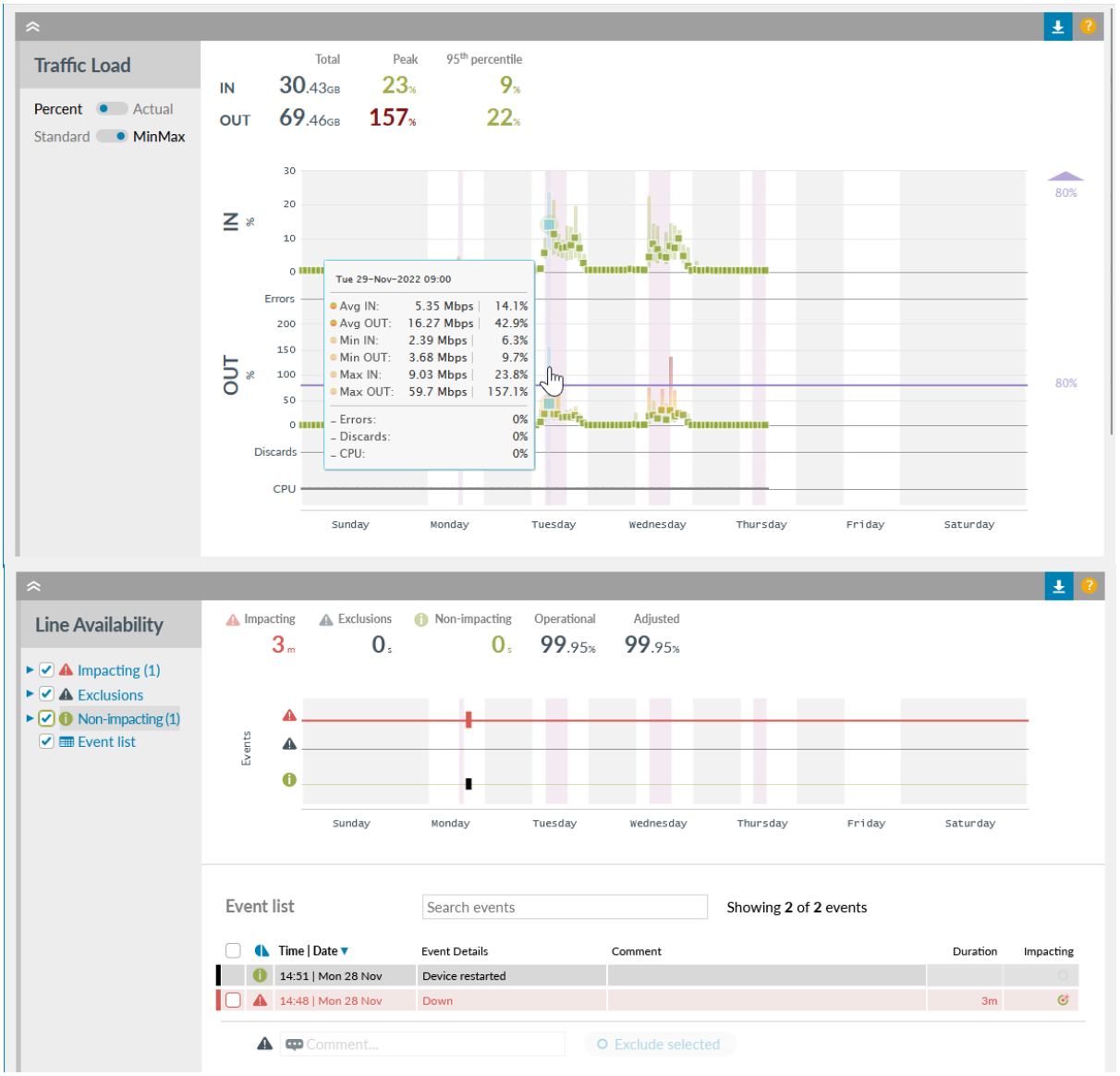
A first click on a heat tile will show Watch Status cards which present a snapshot of the current state of each of the watches contained under the tile. Current problems show an amber background (for new issues) or red background (for issues which have been ongoing):



Then clicking on one of the cards opens the details page with the problem area indicated by a coloured side bar on the today view.

The details page on a circuit watch contains unsmoothed data for any day, week or month going back 366 days showing

- Traffic Load: inbound and outbound utilisation, errors, discards, and device CPU load
- Line Availability: critical information on soft, hard and brief outages, and device restarts

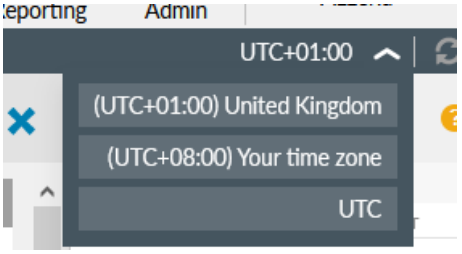


The details page differs for wireless Aps, switches and hosts - for these, please refer to later sections.

Time Zones

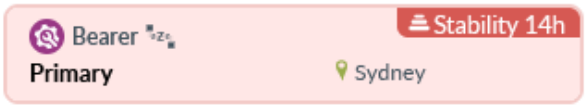
All information on the details page can be displayed in one of three different time zone options with a drop-down to switch between them

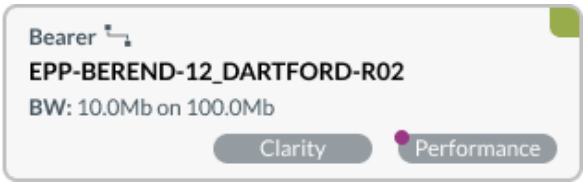
- Location time zone (defined during setup)
- User's time zone (as detected from their browser)
- UTC (Universal Time Coordinated, the time standard commonly used across the world, usually the same time as GMT)



Maintenance Windows

It's possible to put Highlight watches into "maintenance mode" when periods of downtime are known in advance, for example due to planned maintenance.





This is beneficial because watches in maintenance mode :

- do not send alerts
- do not change the colour of heat tiles
- do not decrement availability figures in reports

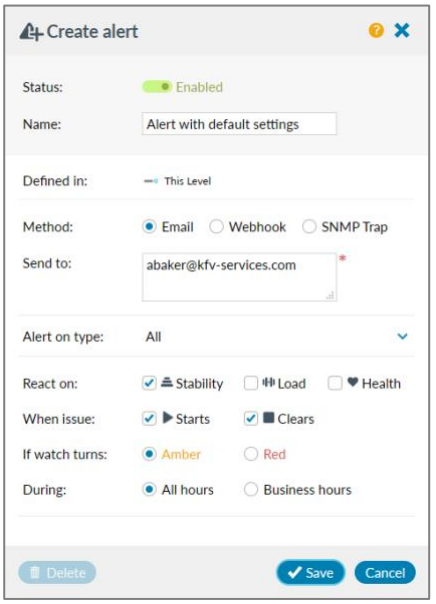
Highlight indicates if watches are in maintenance. A maintenance window can be set as a one-off or recurring event.

For more information see https://support.highlight.net/help/Status/maintenance

3.4.Alerting

Email, Webhook and SNMP trap alerts

With every poll (at typically between one and five minute intervals depending on factors including watch type) Highlight updates internal status levels for the various metrics making up each watch. If a status level drops below a configurable threshold, an 'exception' condition is triggered which results in the GUI showing an amber or red status for those watches, and alerts can be sent via email, webhook or SNMP trap.

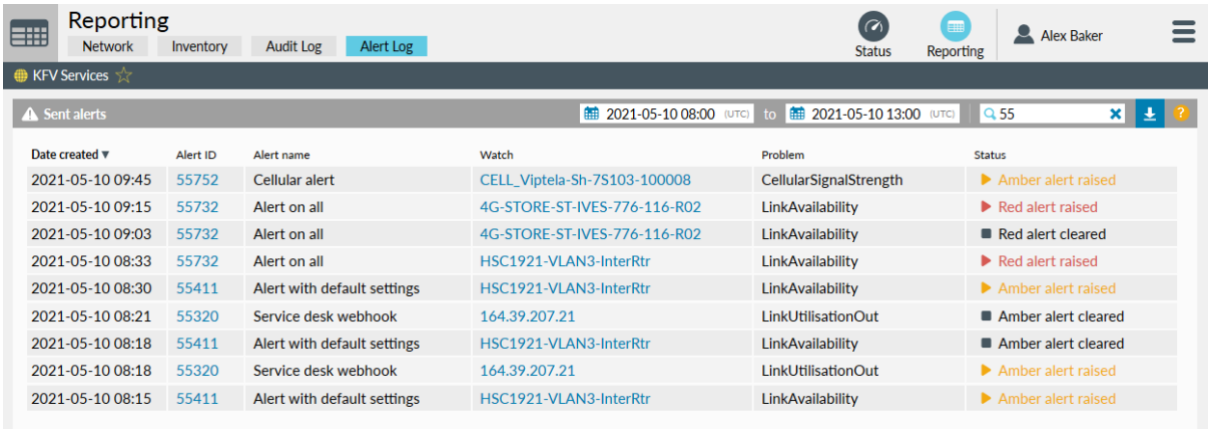


Alerts can be configured to trigger when issues start, clear or both. Alerts can also be set up for specific watch types only – for example alert on wireless access points

For more information, see https://support.highlight.net/help/status/alert_management

Alert Log

This page shows details of all sent alerts in or beneath the selection in the Network Explorer tree. The log can be filtered to locate specific alerts sent at a particular time.

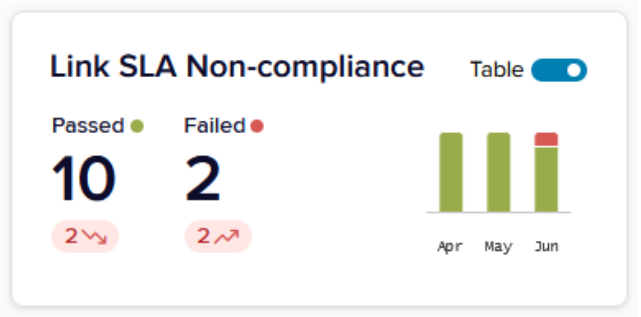


Date created	Alert ID	Alert name	Watch	Problem	Status
2021-05-10 09:45	55752	Cellular alert	CELL_Viptela-Sh-7S103-100008	CellularSignalStrength	Amber alert raised
2021-05-10 09:15	55732	Alert on all	4G-STORE-ST-IVES-776-116-R02	LinkAvailability	Red alert raised
2021-05-10 09:03	55732	Alert on all	4G-STORE-ST-IVES-776-116-R02	LinkAvailability	Red alert cleared
2021-05-10 08:33	55732	Alert on all	HSC1921-VLAN3-InterRtr	LinkAvailability	Red alert raised
2021-05-10 08:30	55411	Alert with default settings	HSC1921-VLAN3-InterRtr	LinkAvailability	Amber alert raised
2021-05-10 08:21	55320	Service desk webhook	164.39.207.21	LinkUtilisationOut	Amber alert cleared
2021-05-10 08:18	55411	Alert with default settings	HSC1921-VLAN3-InterRtr	LinkAvailability	Amber alert cleared
2021-05-10 08:18	55320	Service desk webhook	164.39.207.21	LinkUtilisationOut	Amber alert raised
2021-05-10 08:15	55411	Alert with default settings	HSC1921-VLAN3-InterRtr	LinkAvailability	Amber alert raised

3.5. Reporting

Reporting Insights

- View reporting data graphically
- Compare to previous months
- Display a table for additional details

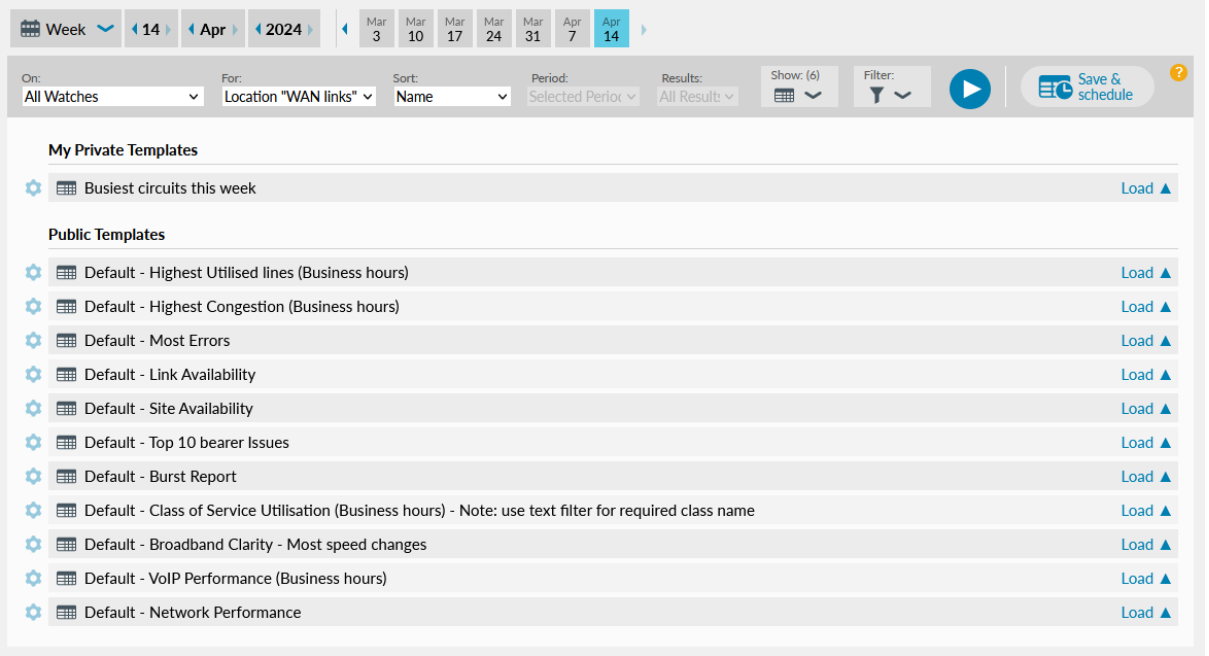


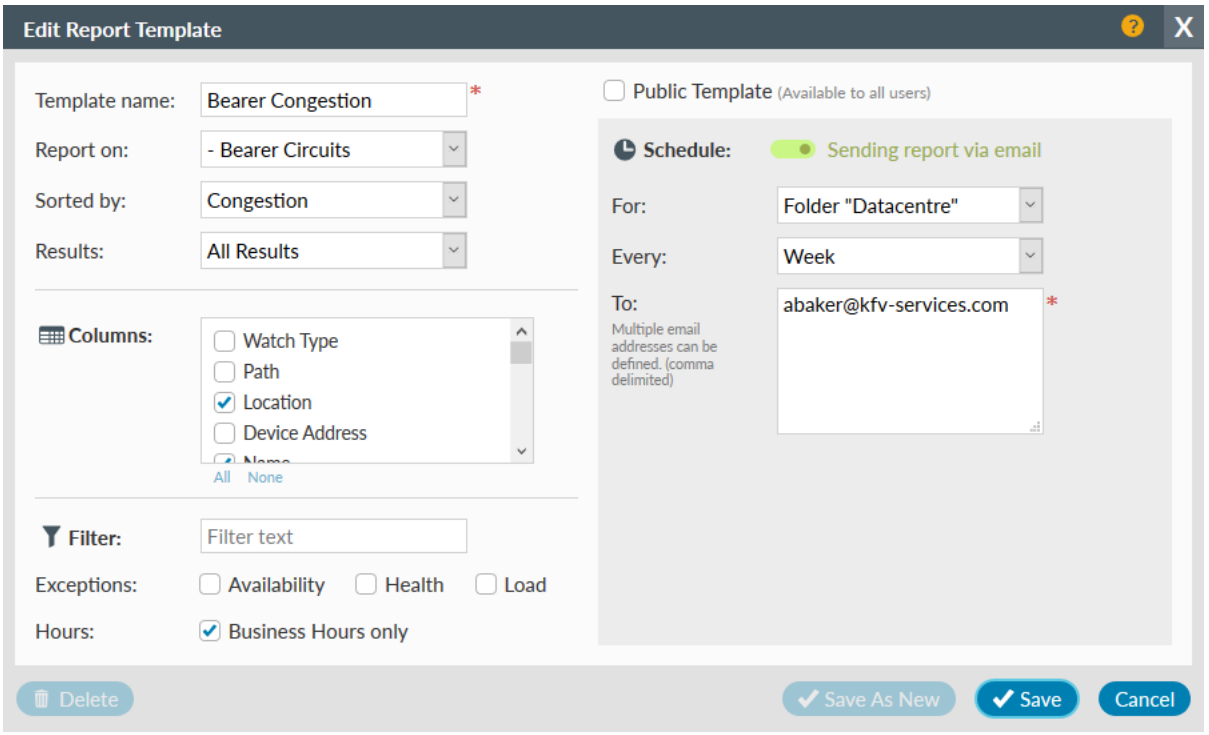
There are 7 different tiles available with **Link SLA Non-compliance** as an example.

For more information, see: https://support.highlight.net/help/reporting/insights

Watch Reports

On-demand and scheduled reports are a core feature of Highlight covering summarised data going back a minimum of 500 days. On-demand reporting, available to all users, is fast and on-screen in seconds regardless of the size of network, or alternatively scheduled reports can be emailed to any number of recipients on a daily, weekly, or monthly basis.
Public Templates provide for most needs:





A public template can be adjusted to suit requirements and saved as a private template and then run on a schedule.

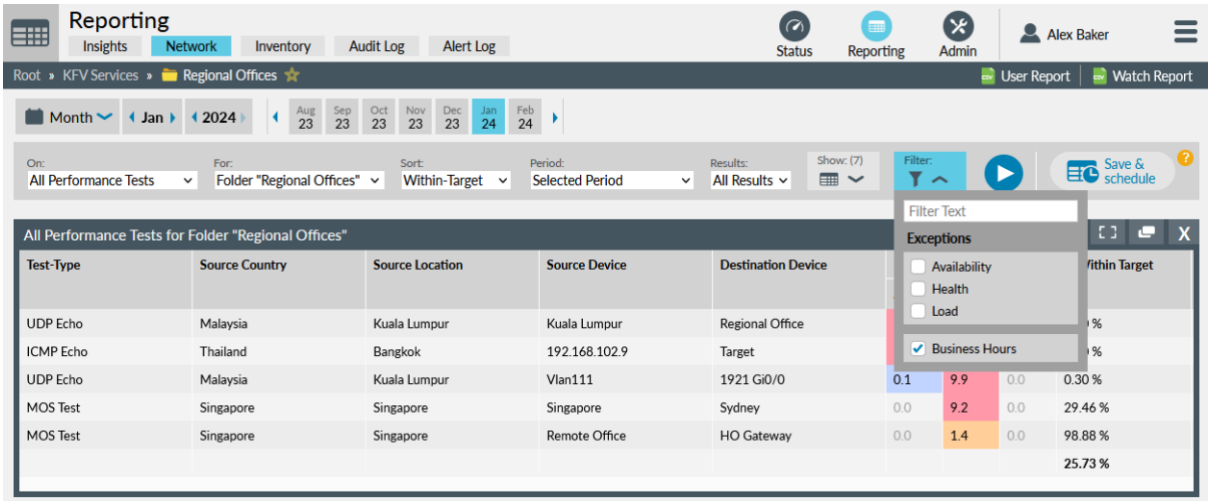
Highlight reports can include automated analysis, making preparation for service reviews between provider and enterprise faster and more accurate. Availability figures show how each watch performed against the Service Level Agreement (SLA) with maintenance periods already excluded.

An issue score is a number from 0 (good, no issues) to 10 (bad, several issues) which provides a simple way to see how good or bad a watch was during the selected time period and to compare it with other watches. Issue scores are an aggregation of several metrics.

Additional analysis is provided by exception reporting. When any metric Highlight is monitoring (for example load or response time) exceeds its target threshold for a certain length of time, it generates an **Exception** and causes the watch and its associated location tile to change colour (green to amber and then red). The watch stays in the exception state

until the metric returns to normal. The exceptions report counts the total number of times a watch went into an exception state and the total time it spent in that state.

For more information, see: https://support.highlight.net/help/reporting/report_suggestions



Reporting API

The Reporting API makes it possible to view Highlight's historic, summarised data outside the Highlight Service Assurance Platform. After the initial set-up involving an API key on a specific folder, download monthly or daily data for all circuits including Broadband and Cellular watches, Tunnels and Performance tests. This will show, for example, the total availability of a line for a given period. The data can be shown in Excel, Power BI or another tool. If needed, Highlight data can be combined with data from other sources like an IT service management system.

Highlight can provide templates for interactive reports in Excel and Power BI. We also offer professional services to assist in using the Reporting API initially. Contact us for details about using the Highlight Reporting API.

Business hours

Business hours are the time periods of regular operation for a given location, for example Monday – Friday 9am to 5pm. Highlight provides the option to use business hours when displaying charts on the Details page, filtering report results and generating alerts. This is a powerful way to control Highlight reporting so that calculations and values are based on times when the location is actually working and reliant on the network, rather than being skewed by overnight behaviour.

	Sun	Mon	Tue	Wed	Thu	Fri	Sat
From:	00:00	06:00	06:00	06:00	06:00	06:00	00:00
To:	00:00	18:00	18:00	18:00	18:00	18:00	00:00

For more information, see: https://support.highlight.net/help/admin/business_hours

Inventory

The Inventory page in Highlight is a table listing device details gathered directly from the device and updated every four hours. This contains accurate data across an entire estate including, IP address, vendor, type, licence, serial number, last restarted date/time and more. This data can be used for reconciliation in Finance teams or to check software versions by Operations teams.

Audit Log

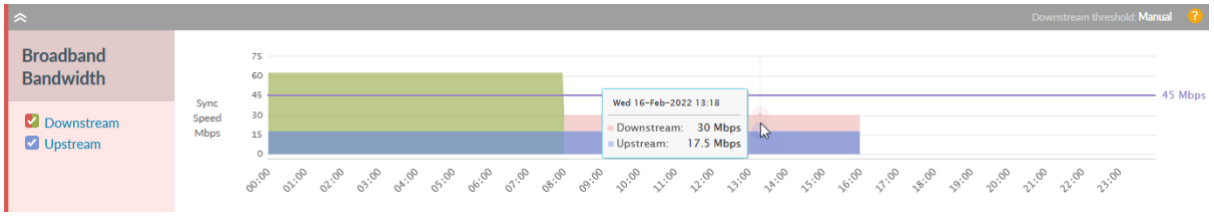
The Audit Log lists changes made in Highlight showing which user altered a setting and when. It also shows system changes like auto discovered bandwidths.

3.6. Underlay connectivity – Broadband and Cellular Clarity

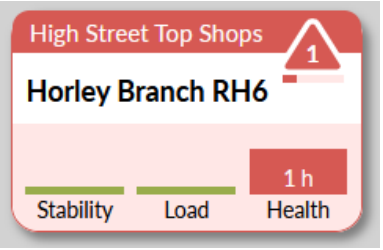
Broadband Clarity

Unstable and poor performing DSL and FTTC connections cause disruption to user experience and, as many SD-WAN solutions utilise DSL connectivity, they can create problems in application delivery through the SD Overlay.

Highlight visualises the dynamic sync speed of variable-rate DSL services and will establish alerting thresholds following a learning period to understand the circuit's 'stable rate':



Once established, sync speed changes reflect in the health metric presented in heat tiles and are visualised in the details page as below:



Data is retained for 366 days, and summarised information features in the available reports and templates supporting proactive service management.

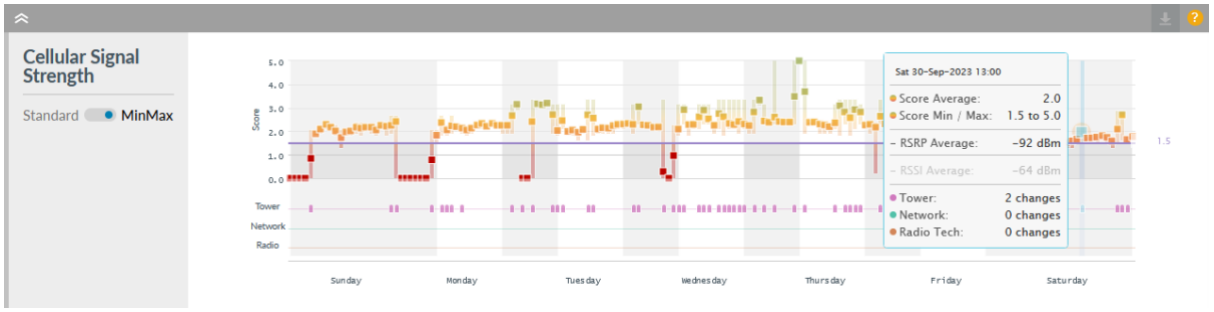
Refer to: https://support.highlight.net/help/details/broadband_bandwidth for more detail.
See a list of supported vendors for Broadband Clarity:
https://support.highlight.net/help/functionality/vendors_by_feature#other_features

Cellular Clarity

Cellular LTE and 3G/4G/5G circuits are increasing used for a component of connectivity solutions either as tertiary backup lines, or active data carrying connections. All lines may be added as watch in Highlight, and Cellular Clarity adds deeper insight through ongoing assessment of Signal Strength values.

Cellular interfaces may be marked as Dormant, indicating that the normal operative state of the interface is down and on standby for when needed. Signal Strength measurement is ongoing and gives assurance that the cellular interface will work effectively when called upon. Highlight uses RSRP to generate a Signal Strength Score and reverts to RSSI only if RSRP is not available. This enables Highlight to easily handle a cellular connection which is swapping between 4G (RSRP) and 3G (RSSI).

Signal Strength Score falling below a definable threshold affects the health indicator in Highlight's heat tiles and an alert may be configured to trigger if crossed. Data is graphed in the details page as below and summarised reports are also available. Changes in cell tower ID, network and radio technology are also recorded in addition to RSRP and RSSI.



Refer to https://support.highlight.net/help/details/cellular_clarity for further detail.
See a list of supported vendors for Cellular Clarity:
https://support.highlight.net/help/functionality/vendors_by_feature#other_features

Nb. Dormant interface state may be applied to any interface type, not exclusively on LTE.

3.7. Performance tests

Highlight performance tests provide visibility of key measurements such as round-trip time (RTT/delay), packet loss and jitter between two points on the network. These metrics give a great overview of how healthy a connection is and are often the basis of Service Level Agreements (SLA) between service provider and customer.

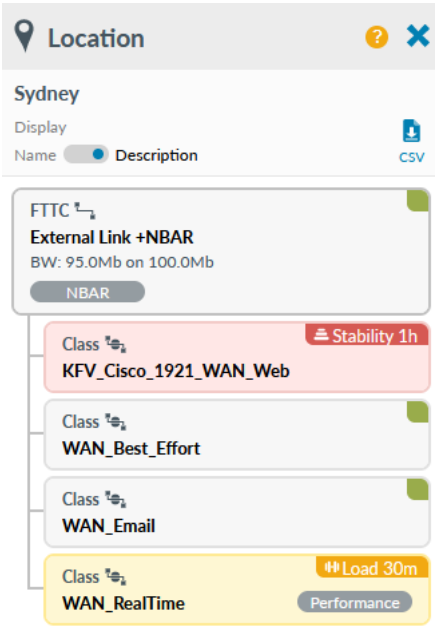
Performance tests are managed by Highlight and are pushed out to run from either the Highlight software agent or directly from supporting network devices. Thresholds may be set against the results which, when breached, affect the health indicator on heat tiles. Failure to complete the test will affect stability, with alerts configurable for either condition.

Different performance test types are graphed differently in the details page, for example, a Mean Opinion Score test for Voice over IP, would display

- Source, target and test type
- Percent of tests within threshold
- The threshold for each metric with blips indicating issues
- On hover, details for each period on: delay, jitter, loss and MOS as shown below

Performance data is available in scheduled and on-demand reports.
Refer to https://support.highlight.net/help/details/performance_charts for further detail on available tests, metrics and presentation.

3.8. Class of Service and VLANs



WAN and LAN circuits often carry multiple virtual overlays such as VLANs and Quality of Service classes. Highlight provides visibility into how overlay elements are running and being utilised. Visually, where QoS classes (or other overlay elements are detected) clicking a heat tile from the Status page will show Watch Status cards giving the first snapshot of overlay element status:

One further click takes the user into the details page for the specific QoS class where, as with Link-Health, Highlight graphs the inbound and outbound utilisation, the trend, and indicators of health issues.

VLANs and tunnels overlaying a circuit are presented in the same way and may be linked into service tiles potentially creating a single tile representing the traffic paths for critical application groups.

Performance test data (see section 2.4) may be focused further into measurement of performance within the overlay class, VLAN or tunnel. Several template reports exist for overlay elements for performance assessment, capacity planning and ongoing service management and improvement.
See https://support.highlight.net/help/functionality/discover_classes and https://support.highlight.net/help/functionality/discover_vlan for greater detail.

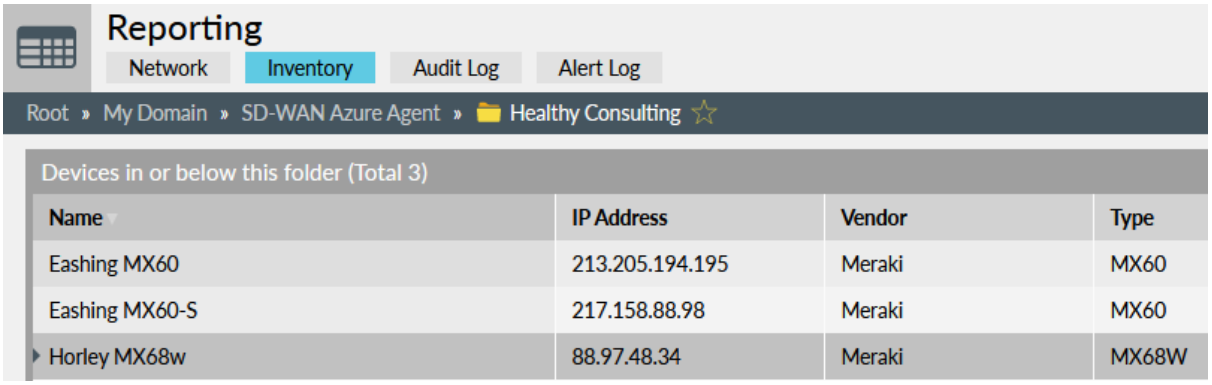
3.9. SD-WAN Overlay networks

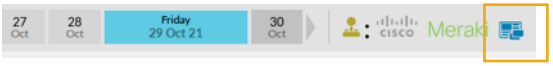
Highlight's SD-WAN functionality integrates seamlessly with SD-WAN controller APIs to provide visibility of SD-WAN devices, uplink and overlay VPN tunnels, presented as part of the wider network. Highlight focuses on a service orientated view of SD-WAN by visualising the key information needed to manage the service and support users.

Device and uplink

Highlight automatically discovers SD-WAN devices and uplink interfaces and shows the stability, load and health of these elements. When shown alongside the Underlay connections (typically Ethernet, Broadband and Cellular) and LAN elements (Switch and WiFi access points) via Grid View, users can see a complete view of the network infrastructure in a location using Highlight's single-pane-of-glass.

Highlight also holds a complete inventory on the SD-WAN estate including licence information, which can be particularly useful as SD-WAN devices are typically licenced with non-perpetual licences.





Highlight is designed to be used in conjunction with the SD-WAN portal, with Highlight providing the service orientated view across the whole network and the SD-WAN portal providing the technology orientated view of the SD-WAN element. To facilitate easy transition between the two portals, Highlight has included a 'dashboard link' from the details page to link directly to the SD-WAN portal for further investigation if an issue is detected.

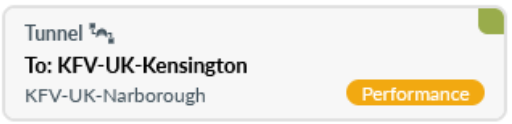
SD-WAN VPN Tunnels

SD-WAN Tunnels are virtual private network (VPN) connections between one SD-WAN device and another. The SD-WAN central controller makes building complex VPN networks quick and easy, but it can be difficult to understand the status of the wider network and how the SD-WAN VPN tunnels relate to it without a combined and unified view of the whole network.

Highlight automatically discovers SD-WAN VPN tunnels and visualises Stability, Load and Health information on the tunnels, in conjunction with the Underlay connectivity and LAN elements at the same location.

Tunnel outages can be alerted on and change location tile colour red. Tunnel availability can also be reported against, in conjunction with the underlay connectivity.

SD-WAN VPN Tunnel Performance Tests



Highlight autodiscovers performance tests on tunnels and displays these. Refer to the section on performance tests for more details. It's possible to set thresholds on these tests and receive alerts when thresholds are breached. You can also run reports on performance tests to track performance over time.

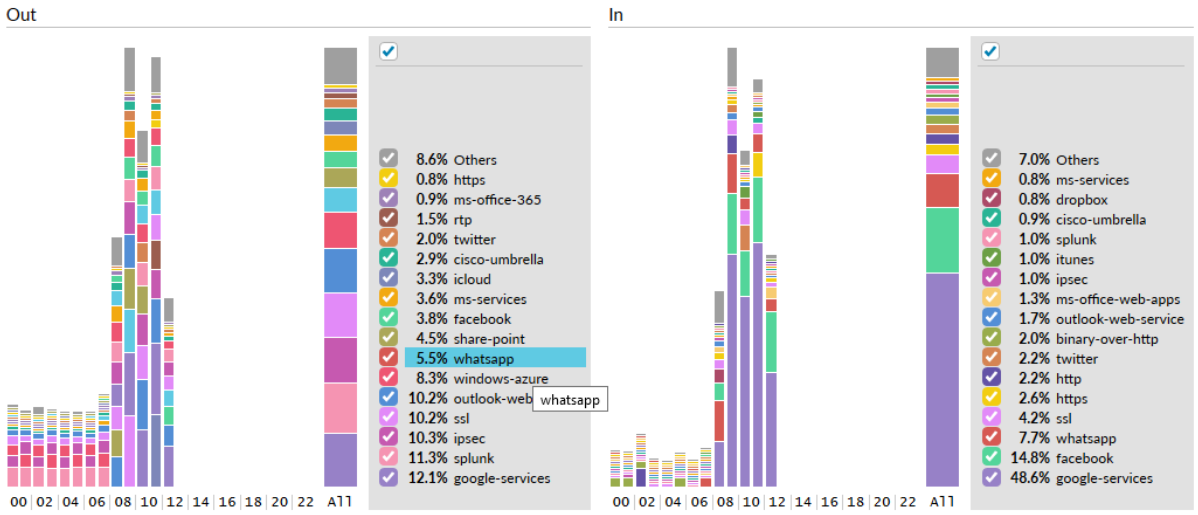
3.10. Traffic Analysis – NBAR and Flow

NBAR

Network Based Application Recognition (NBAR) is a Cisco proprietary product which uses Deep Packet Inspection (DPI) to identify >3000 applications, including public cloud apps in latest versions and protocol libraries.

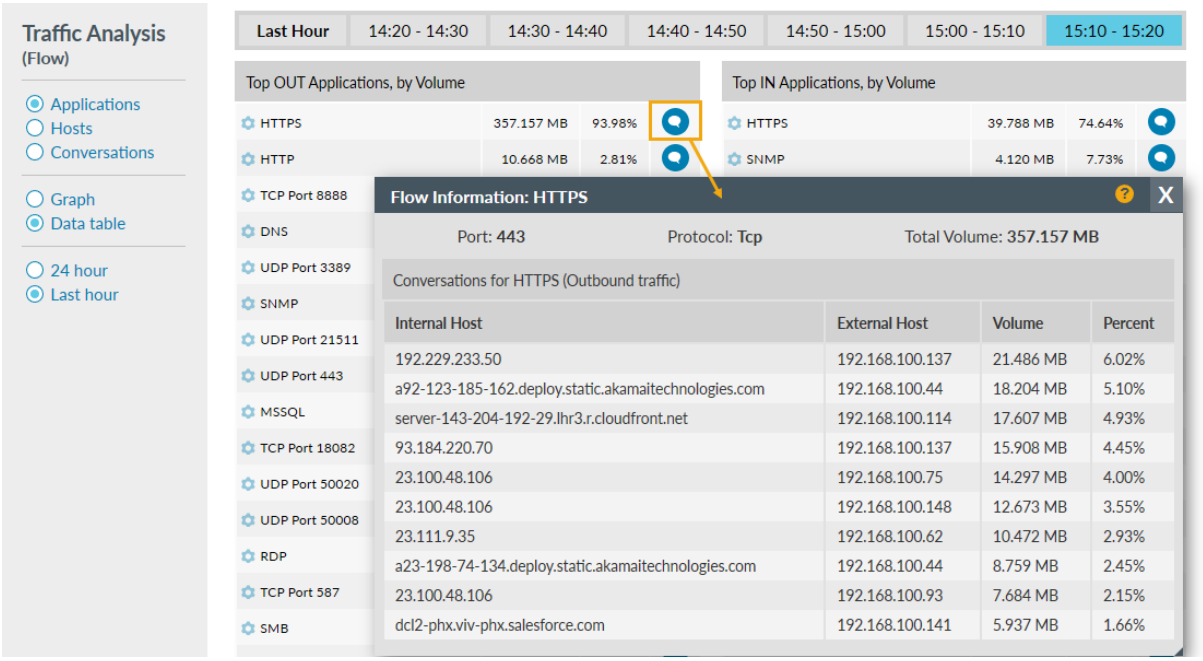
Highlight gathers NBAR insight via SNMP, so requiring no additional agent to activate. NBAR adds insight into the specific applications which are using bandwidth on a circuit delivering greater understanding of how a network is used and aiding ongoing management and service improvement.

NBAR information is presented on the details page making correlation to bandwidth utilisation straightforward:



NBAR in Highlight will present the top 20 applications, by volume from 30-minute to 1 week granularity.

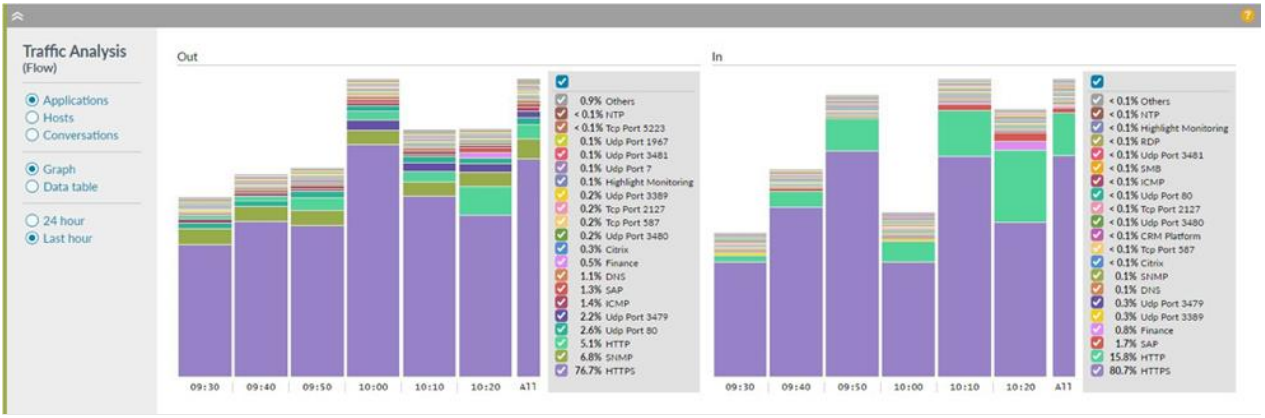
Flow



Flow technology monitors TCP/IP sessions taking place across a Layer 3 network. Flow provides visibility of applications running on the network, showing top sources and

destinations, plus top conversations for each. Flow data is pushed from a network device to a target flow collector which forms a part of a Highlight agent's capabilities.

Flow information is presented in the details page and shows the top 20 applications, top 20 IP endpoints, and the top 10 cross conversations for application or endpoint in either graphical or tabular form.

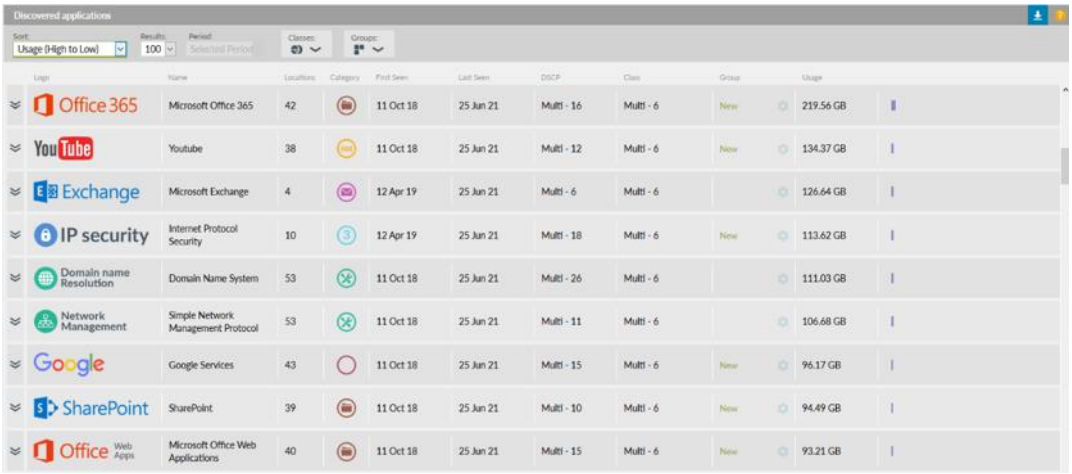


For fast identification of the causes of high utilisation, Flow in Highlight presents 10 minute granularity for the past hour, then smoothing data into hourly, daily and weekly summaries.

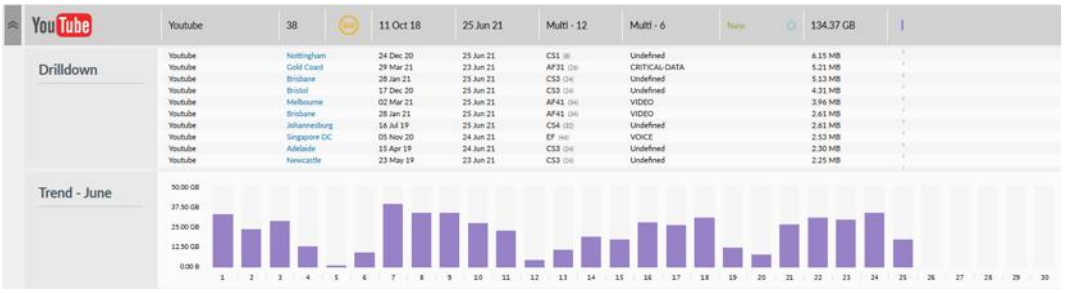
AppVis™

AppVis utilises Cisco's advanced Flexible NetFlow (FNF) and the open standard IPFIX protocol. These are evolutions of NetFlow containing more data fields and hence able to deliver enhanced insight. Highlight uses AppVis to combine individual circuit usage at a logo level into an aggregated view potentially across an entire WAN estate.

AppVis has a standalone page in Highlight showing applications, number of locations, category, Class of Service, DSCP Markers, data volume and dates at which the application was first discovered or last seen on the network.



This data insight helps discover shadow IT applications and ensure that the right applications are receiving the correct prioritisation across the network:



Currently, due to vendor limitations, only Cisco devices support this level of visibility.

Refer to https://support.highlight.net/help/functionality/application_awareness for more information across NBAR, Flow, or AppVis™.

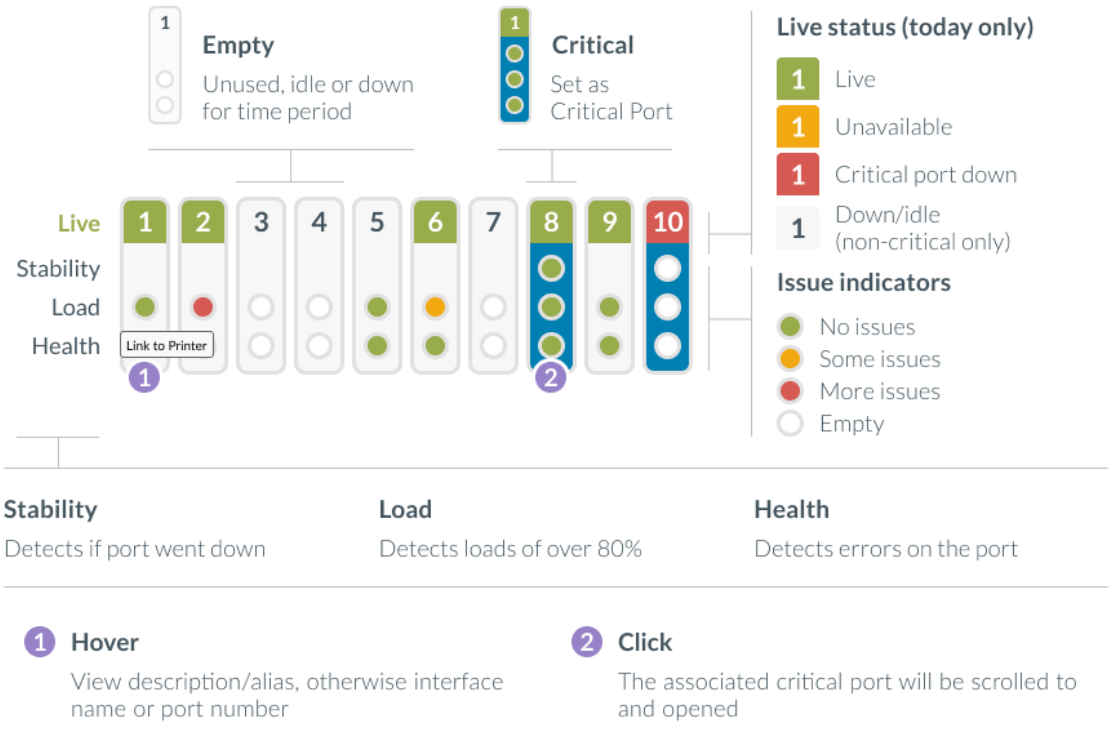
3.11. Ethernet Switches

Enable LAN switch monitoring to get a fast, detailed picture of how switches are performing. Highlight shows traffic levels, health issues and outages on every port, all presented in a simple clear format. It's possible to designate specific ports as 'critical' (for example, server connections, wired cameras or access points). Critical ports trigger exceptions and send alerts if there's a problem.

Each switch will have a minimum of one Link-Health watch, typically an uplink, which may be a logical bonded Etherchannel or Port-Channel interface, where Highlight will monitor and alert on component ports as well as the logical uplink port.

For layer 2 ports, using a similar 'traffic-light' scheme, Highlight displays detected issues visually as below:

For more detail, see: https://support.highlight.net/help/details/switches.



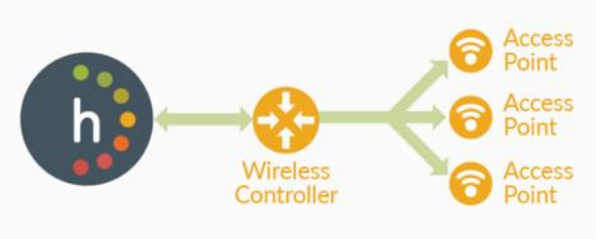
Tech Info

Tech Info displays key port information on each port: speed, name, status and uptime, as well as the chassis model, serial number, operating system and license:

	1	31	GigabitEthernet1/0/31	Link to Desks	10Mb	Unused 38 Days
	1	32	GigabitEthernet1/0/32	Link to Desks	100Mb	Down
	1	33	GigabitEthernet1/0/33	Link to Desks	100Mb	Down
	1	34	GigabitEthernet1/0/34	Link to Desks	1Gb	Idle 2 Days
	1	35	GigabitEthernet1/0/35	Link to Desks	100Mb	Up 2 Days
	1	36	GigabitEthernet1/0/36	Temp link to Aruba WiFi (vlan4)	1Gb	Up
	1	37	GigabitEthernet1/0/37	Link to Printer	100Mb	Up 2 Days
☑	1	38	GigabitEthernet1/0/38	Link to Cisco 2504 WLAN controller	1Gb	Up 15 Days

3.12. Wireless Access Points

Wireless networks are critical infrastructure for many. Where dedicated WiFi monitoring and management interfaces are complex, Highlight surfaces the 'need to know' information across multiple vendors including Cisco, Aruba, Extreme/Aerohive, Meraki, Ruckus and Ubiquiti.



The metrics gathered at every sample interval contribute to heat tiles and are presented in the details page for each AP. Metrics gathered are shown below:

Affects	Information	Details
	AP Traffic In/Out	Total volume of Wireless traffic flowing in and out of the Access Point (AP)
	AP Utilisation	The percentage utilisation of the two radio channels, 2.4GHz and 5GHz, on that AP
	AP Status	Whether a AP is up or down. This considers (a) connectivity to the AP is up and running, and (b) each radio on the AP is up and working. If any of these report down from an operational perspective, Highlight reports a problem with the AP. 'Administrative' down status (where the AP or an interface has been deliberately shut down by the administrator) will not show as an outage or trigger an alert. Highlight also detects reboots of the AP and shows them as events / blips.
	Client Count	The number of client devices connected to the AP
	Congestion	Highlight derives a metric to indicate congestion level on the AP radio networks. For consistency with other types of link, the metric used is the percentage of send attempts that require retransmissions. Since a certain level of retries is entirely normal, Highlight looks for retry levels above a certain threshold which Admin users can configure to avoid spurious alerts. Congestion is not calculated unless traffic volumes are more than 1 frame per second.
	Signal Problems	Highlight gives an indicative picture of how well clients are connecting by monitoring the percentage of connected client devices which are reporting poor signal strength (poor signal means SNR (Signal-to-Noise Ratio) of 1 or 2 bars (under 20 decibels).
	AP CPU Load	The CPU Utilisation / Load on that AP, as a percentage

Wireless Client information

The wireless controller details page provides client count and utilisation for each Access Point. For each client Highlight shows

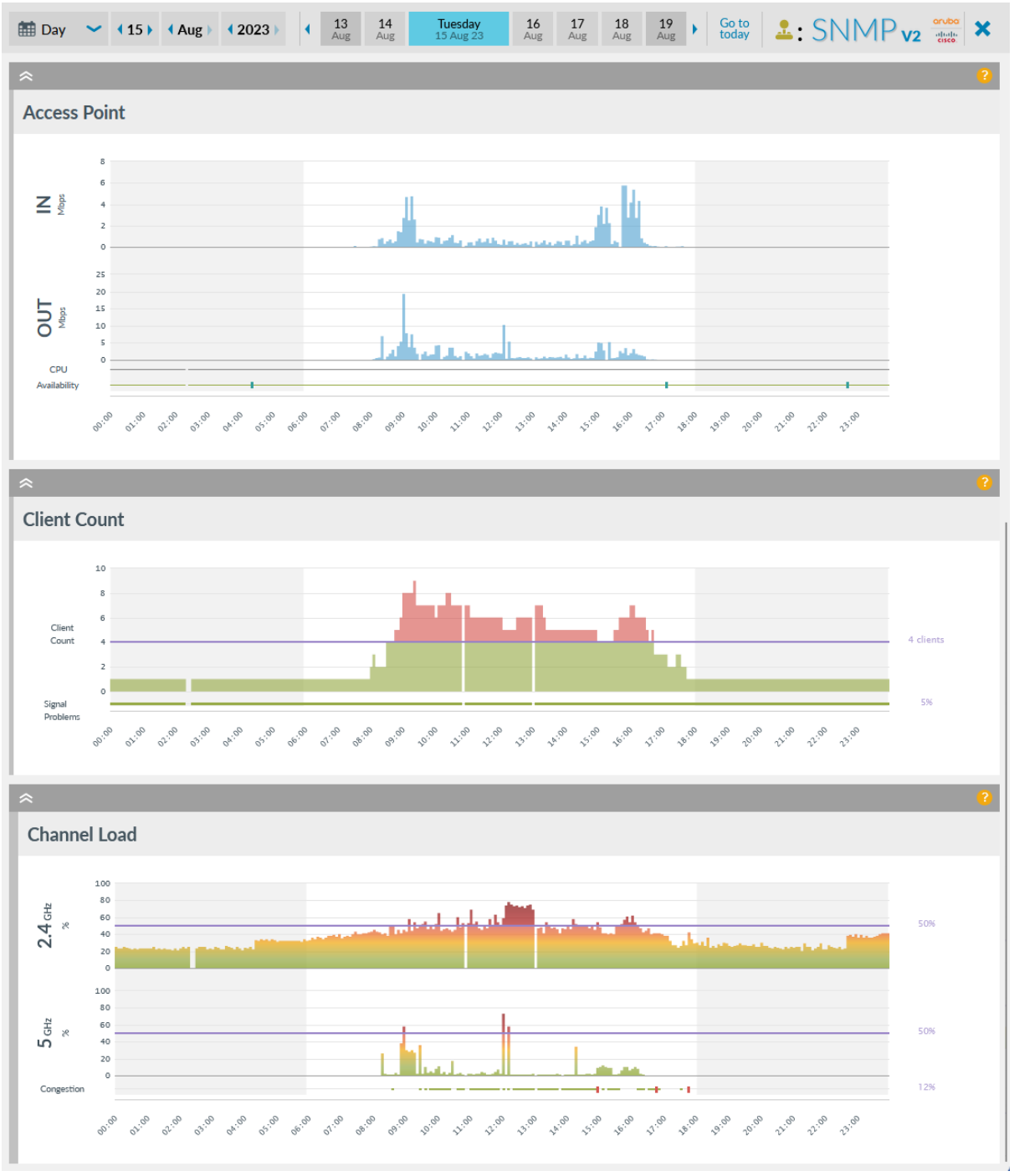
- Signal strength
- Client name
- Device type
- Associated AP
- AP location
- Wireless channel
- SSID
- Client IP address
- Data usage
- Connection duration

Note that all wireless vendors provide different levels of detail.
Refer to https://support.highlight.net/help/details/wifi_by_vendors

Wireless Access Point details

The wireless AP details page presents

- Access Point chart showing volume, CPU and Availability
- Client Count with Signal Problems
- Channel Load with Congestion



Refer to https://support.highlight.net/help/status/wifi for information in greater depth.