



# Ruckus Wireless™ SmartCell Insight (SCI™) Release 2.3

## User Guide

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[www.ruckuswireless.com](http://www.ruckuswireless.com)

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## About This Guide

This *SmartCell Insight 2.3 User Guide* provides instructions about how the Ruckus Wireless™ SmartCell Insight (SCI) application works, the reports that it generates, and what they are used for.

This guide is written for service operators and system administrators who are responsible for managing, configuring, and troubleshooting Wi-Fi networks. It assumes basic working knowledge of local area networks, wireless networking, and wireless devices.

**NOTE:** Refer to the release notes shipped with your product to be aware of certain challenges when upgrading to this release.

Most user guides and release notes are available in Adobe Acrobat Reader Portable Document Format (PDF) or HTML on the Ruckus Wireless Support Web site at <https://support.ruckuswireless.com/contact-us>.

## Document Conventions

[Table 1: Text conventions](#) on page 6 and [Table 2: Notice conventions](#) on page 7 list the text and notice conventions that are used throughout this guide.

**Table 1: Text conventions**

Convention	Description	Example
message phrase	Represents messages displayed in response to a command or a status	[Device Name] >
user input	Represents information that you enter	[Device Name] > set ipaddr 10.0.0.12
<b>user interface controls</b>	Keyboard keys, software buttons, and field names	Click <b>Create New</b>
<b>Start &gt; All Programs</b>	Represents a series of commands, or menus and submenus	Select <b>Start &gt; All Programs</b>
<b>ctrl+V</b>	Represents keyboard keys pressed in combination	Press <b>ctrl+V</b> to paste the text from the clipboard.
<b>screen or page names</b>		Click <b>Advanced Settings</b> . The <b>Advanced Settings</b> page appears.
command name	Represents CLI commands	

Convention	Description	Example
parameter name	Represents a parameter in a CLI command or UI feature	
<i>variable name</i>	Represents variable data	<i>{ZoneDirectorID}</i>
filepath	Represents file names or URI strings	http://ruckuswireless.com

Table 2: Notice conventions

Notice type	Description
<b>NOTE:</b>	Information that describes important features or instructions
<b>CAUTION:</b>	Information that alerts you to potential loss of data or potential damage to an application, system, or device
<b>WARNING:</b>	Information that alerts you to potential personal injury

## Related Documentation

For a complete list of documents that accompany this release, refer to the Release Notes.

## Documentation Feedback

Ruckus Wireless is interested in improving its documentation and welcomes your comments and suggestions.

You can email your comments to Ruckus Wireless at: [docs@ruckuswireless.com](mailto:docs@ruckuswireless.com)

When contacting us, please include the following information:

- Document title
- Document part number (on the cover page)
- Page number (if appropriate)

# SmartCell Insight Overview

SmartCell Insight (SCI) is a Big Data analytics and reporting engine that provides deep visibility into the performance and operational statistics of your Ruckus Wireless WiFi infrastructure.

SmartCell Insight (SCI) is designed to collect data from Ruckus network equipment, analyze that data, and then present it using a wide variety of standard and custom reports. SCI provides visibility, analytics and reports about network transmission statistics, equipment status and user traffic. It also provides details about the devices and applications that are used on the network, so that decision-makers can make better informed decisions about what types of devices and content their customers are using - and will be using more of - in the future.

To facilitate immediate value, SmartCell Insight ships with pre-built reports that solve the most common use cases faced by Engineering, Operations, and Planning organizations. These reports cover themes such as traffic usage, airtime utilization, client measurement, and application usage trends.

SmartCell Insight can collect data from the entire line of Ruckus Access Points (APs) along with ZoneDirector (ZD) and/or SmartZone (SZ) controllers. SCI uses scale-out architecture to collect data from up to 100,000 Access Points (AP). SCI can scale out horizontally, as required.

## Definition of Terms

The following are terms used in SCI.

**Table 3: Definition of Terms**

Term	Definition
<b>User Traffic</b>	
User Traffic	Traffic volume, which is transmitted and received in IEEE 802.11 MAC Service Data Unit (MSDU) data frames. This includes all unicast, multicast and broadcast traffic. User Traffic = Rx User + Tx User
Rx User	Traffic volume, which is received by AP (Access Point) in IEEE 802.11 MAC Service Data Unit (MSDU) data frames. This includes all unicast, multicast and broadcast traffic.
Tx User	Traffic volume, which is transmitted by AP (Access Point) in IEEE 802.11 MAC Service Data Unit (MSDU) data frames. This includes all unicast, multicast and broadcast traffic
<b>Management Traffic</b>	
Management Traffic	Traffic volume, which is transmitted and received in IEEE 802.11 control and management frames. This includes all unicast, multicast and broadcast traffic. Abbreviations <i>Mgmt</i> or <i>Mgt</i> are frequently used in the user interface. Mgmt Traffic = Rx Mgmt + Tx Mgmt



Term	Definition
Rx Mgmt	Traffic volume, which is received by AP (Access Point) in IEEE 802.11 control and management frames. This includes all unicast, multicast and broadcast traffic.
Tx Mgmt	Traffic volume, which is transmitted by AP (Access Point) in IEEE 802.11 control and management frames. This includes all unicast, multicast and broadcast traffic
<b>Total Traffic</b>	
Total Traffic	Is the sum of the user traffic and management traffic.
Rx Total	Is the sum of the Rx user traffic and management traffic.
Tx Total	Is the sum of the Tx user traffic and management traffic.
<b>Relationship between various traffic metrics</b>	
<ul style="list-style-type: none"> <li>• Total Traffic = User Traffic + Management Traffic = Rx Total + Tx Total</li> <li>• Rx Total = Rx User + Rx Management</li> <li>• Tx Total = Tx User + Tx Management</li> <li>• User Traffic = Rx User + Tx User</li> <li>• Management Traffic = Rx Management + Tx Management</li> </ul>	
Average Traffic Rate	Traffic volume divided by the selected time period, displayed in bits per second. For example, if the traffic volume for a 15 minutes period is 100GB, the average traffic rate is 889Mbps.
Unique Client	A Wi-Fi client, uniquely identified by its MAC address.  <b>NOTE:</b> <i>All Radios</i> unique count will not be larger than the sum of the 2.4GHz and 5GHz radios. This is because a Wi-Fi client could connect to both radios within the selected time granularity, and <i>All Radios</i> unique count will consider this client as a single count.
Session	In SCI, session refers to IEEE 802.11 session. This is an OSI Layer 2 session that is established when a Wi-Fi client associates to an access point and it ends when the client disassociates from the access point.  <b>NOTE:</b> This is <b>NOT</b> the same as OSI Layer 7 application layer sessions, like a HTTP session, telnet session, etc. More often than not, a single IEEE 802.11 session cannot support multiple application layer sessions, and the creation and termination of IEEE 802 sessions are often transparent to the user at the application layer.

## Navigating the SCI User Interface

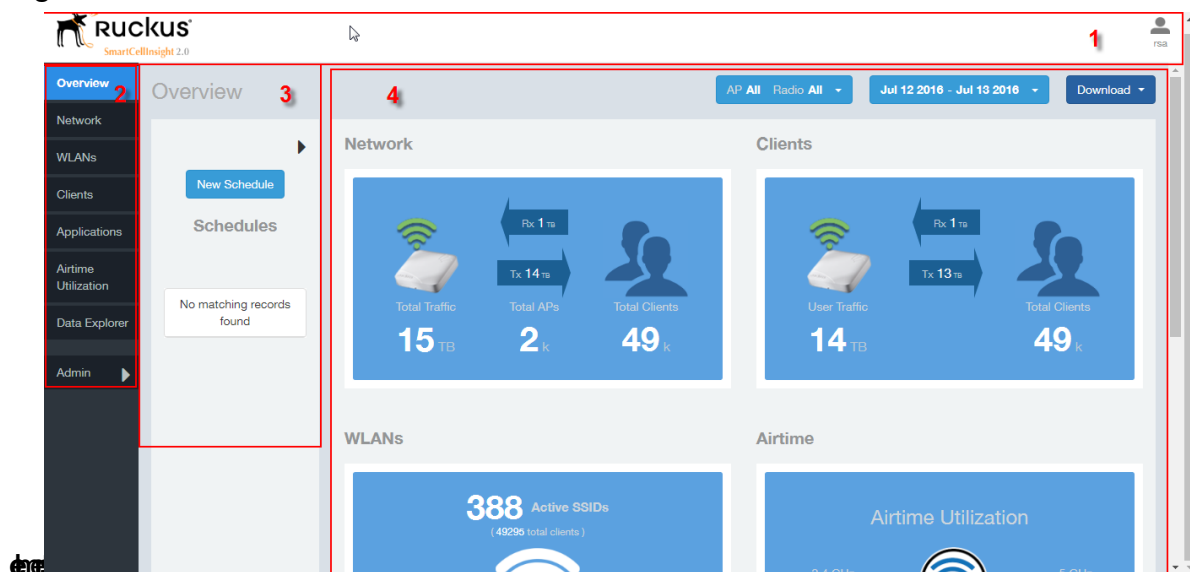
The SCI user interface consists of four major sections: a header panel at the top, a navigation bar to the left of the screen, an expandable Schedules panel, and the main content panel.

### Elements of the SCI User Interface


Use the navigation bar on the left side of the screen to access any of the built-in reports, customize the way you view your data using the Data Explorer, or configure administrator settings.

The following image illustrates the four main sections of the SCI user interface. Refer to the table below for descriptions of each web interface element.

**Figure 1: SCI web interface**



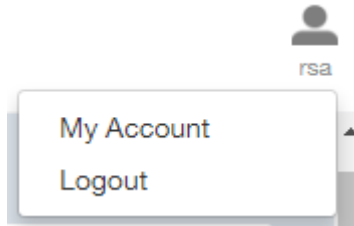
**Table 4: SCI web interface elements**

No.	Name	Description
1	Header Panel	Displays the currently logged in user profile. Click the user icon  to update the profile or change the password as required.
2	Navigation Bar	Contains links that take you to the Overview, Network, WLANs, Clients, Applications, and Airtime Utilization dashboards. It also contains links to Data Explorer, and the Admin console.
3	Schedules Panel	Allows you to create schedules for generating and delivering reports.
4	Content Panel	This large section contains the content of the page you are currently viewing.

## User Information

Describes the My Account screen where the user information is stored.

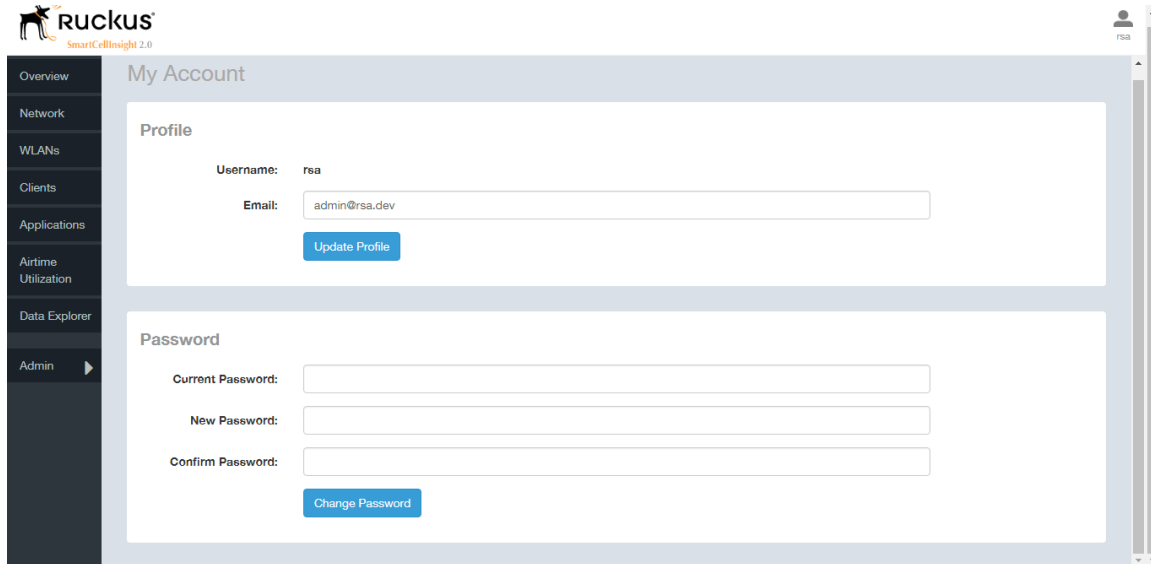
When you click the user icon  a pop-up appears with two options.



**Figure 2: User Information pop-up**

Click the:

- **My Account** link to launch the My Account screen and enter user information.
- **Logout** link to log out of SCI.



**Figure 3: My Account**

You can add profile information such as email ID for the user, and click the **Update Profile** button to save the change. You can also enter, change and confirm your password, and click the **Change Password** button to save the changes.

## 2

# Using the Overview Page

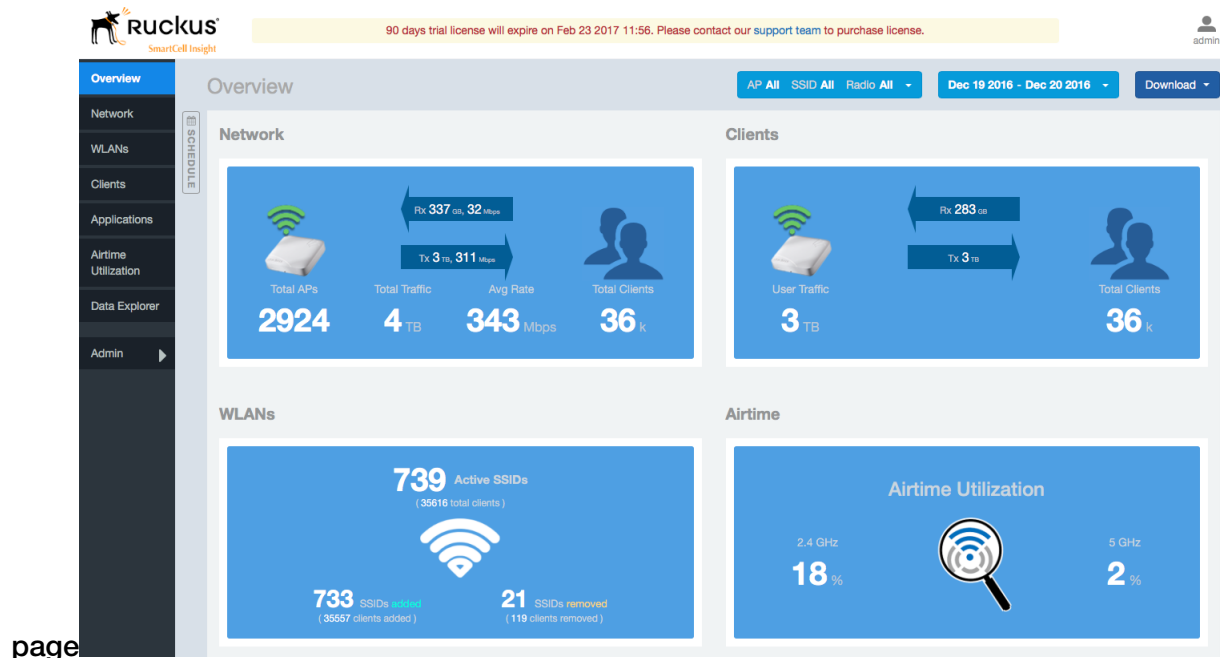
In this chapter:

- [Overview - Network](#)
- [Overview - Clients](#)
- [Overview - WLAN](#)
- [Overview - Airtime](#)
- [Overview - Applications](#)
- [Filters to Generate Dashboard](#)
- [Overview - Data Explorer](#)
- [Overview - Admin](#)

The Overview screen is the main dashboard that is displayed when you log into SCI. It provides a general overview of the key statistics of your WiFi network, such as total traffic, total clients, active WLANs, airtime utilization and applications identified.

To view more detailed information, click any of the other headings on the left navigation bar, or click the section in the content panel to redirect to the same page.

**Figure 4: The Overview**



The Overview page contains the following reports:

- [Overview - Network](#) on page 13
- [Overview - Clients](#) on page 13
- [Overview - WLAN](#) on page 14
- [Overview - Airtime](#) on page 14

- [Overview - Applications](#) on page 14

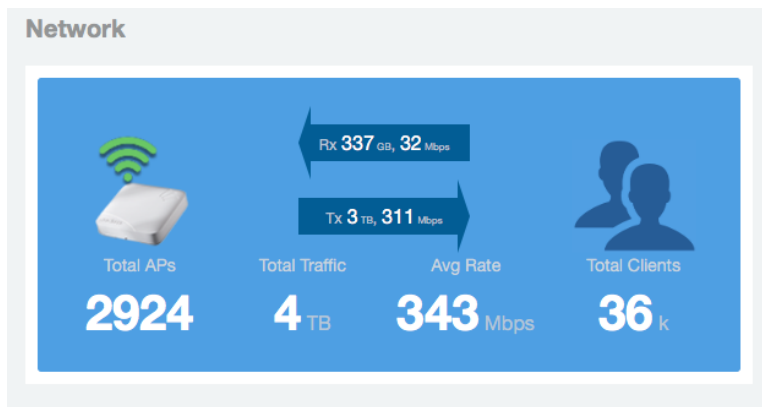
To filter the content displayed, click either the **AP - Radio** filter or the **Time Period** filter. For more information, see [Working With Filters](#) on page 20.

To download a copy of the content currently displayed on the screen, click **Download**, and select **CSV** or **PDF** as the file type.

## Overview - Network

The Overview - Network report gives an average traffic rate, overview of the data from the network perspective, and displays the total traffic, number of APs and clients.

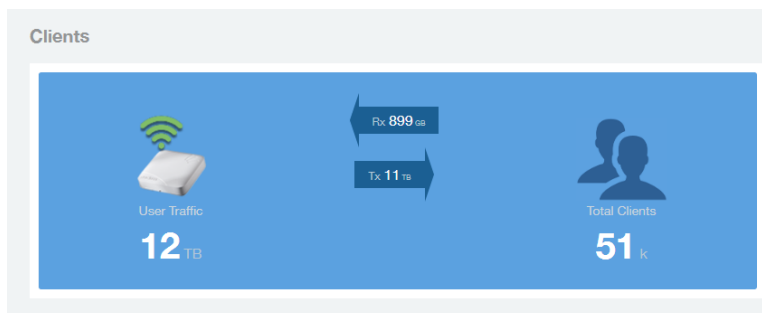
**Figure 5: Network Overview report**



## Overview - Clients

The Overview - Clients report displays the total user traffic and total clients.

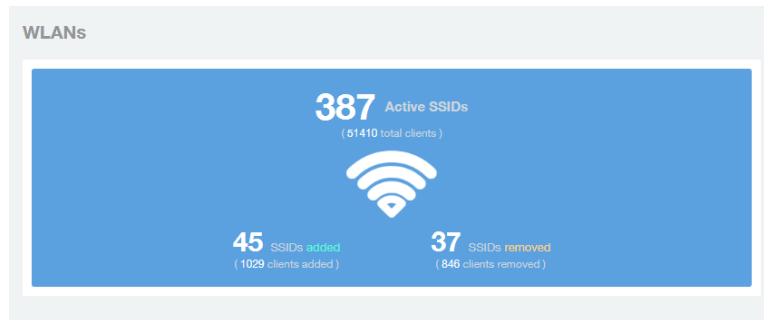
**Figure 6: Clients**



## Overview - WLAN

The Overview - WLAN report displays an overview of the total number of SSIDs deployed, as well as the number of SSIDs added and removed over the selected period.

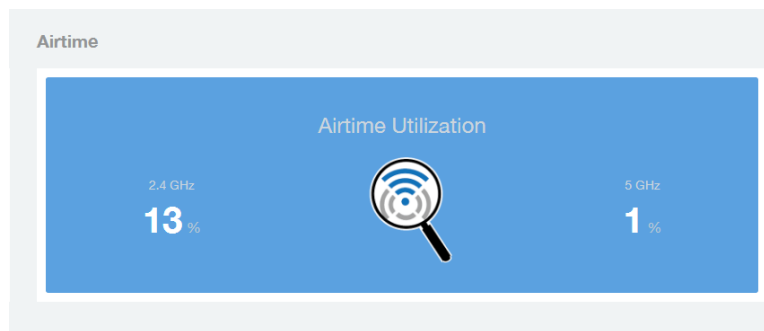
**Figure 7: WLANs**



## Overview - Airtime

The Overview - Airtime report provides an overview of the airtime utilization statistics on the 2.4 and 5 GHz AP radios.

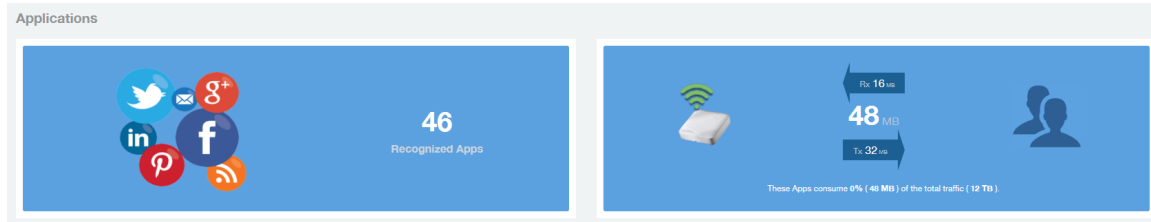
**Figure 8: Airtime**



## Overview - Applications

The Overview - Applications report displays an overview of the applications identified by the application visibility engine.

**Figure 9: Applications**



## Filters to Generate Dashboard

The dashboard can be updated based on the selection of filters.

Each of the dashboards can be updated based the selection of filters:

- **AP and or SSID and Radio**
- **Date**
- **Download option**

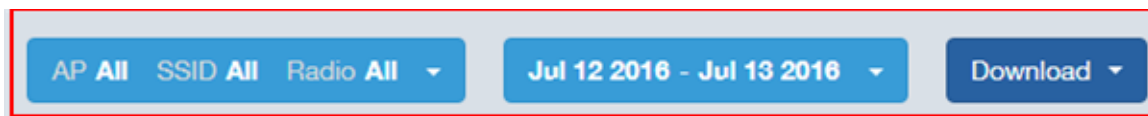


Figure 10: AP, Radio, Date and Download filter

NOTE: Refer to [AP, SSID and Radio filter](#) on page 20, [Date Filter](#) on page 21 and [Download](#) on page 22.

- **Rx+Tx filter**

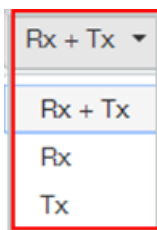
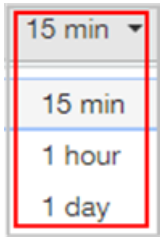


Figure 11: Rx+Tx filter

NOTE: Refer to [Working With Filters](#) on page 20.

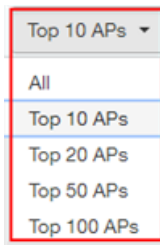
- **Time filter**



**Figure 12: Time filter**

NOTE: Refer to [Time Filter](#) on page 22.

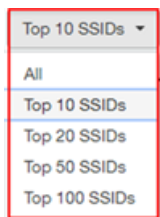
- **Top APs filter**



**Figure 13: Top APs**

NOTE: Refer to [AP Filter](#) on page 23

- **Top SSID filter**



**Figure 14: Top SSIDs**

NOTE: Refer to [SSID Filter](#) on page 23

- **Top Client filter**

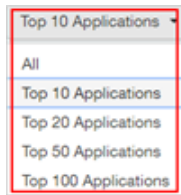


**Figure 15: Top Clients**



NOTE: Refer to [Client Filter](#) on page 23.

- **Top Application filter**



**Figure 16: Top Applications**

NOTE: Refer to [Application Filter](#) on page 24.

## Overview - Data Explorer

Data Explorer provides a customizable way of extracting analytics using OLAP cubes.

**Data Explorer** This is a custom reporting tool that allows you to slice and dice an OLAP (Online Analytical Processing) cube. In addition to the default reports and analytics, SCI also provides OLAP ([https://en.wikipedia.org/wiki/OLAP\\_cube](https://en.wikipedia.org/wiki/OLAP_cube)) cubes to slice-and-dice the data, as per the needs of wide variety of users. Data in the OLAP cube can be accessed using the Data Explorer interface. Data Explorer provides a customizable way of extracting analytics using OLAP cubes and also provides rich data.

NOTE: Refer to [Data Explorer and Data Cubes](#) on page 55 for details.

## Overview - Admin

The Administration console helps you manage the functioning of SCI by providing status and updates and diagnostics.

**Admin:** The Administration (Admin) console helps you manage the functioning of SCI by providing status and updates and diagnostics. It provide visibility into the health of the system and check for updates. This also includes links to view the status of external sources that SCI uses, such as Hadoop, Spark, and Druid.

NOTE: Refer to [Admin Console](#) on page 70 for details.

## 3

## Using the Scheduler

The Scheduler allows you to create schedules to generate reports to be sent out to recipients.

The Scheduler allows you to create reports at set dates and times. The second frame to the left side of the screen, adjacent to the Navigation Frame and numbered 1 in the figure above, contains the Schedules frame. The black arrow head at the top right hand corner of the Schedules frame works like a toggle switch, and allows you to expand or collapse the frame. Select the **New Schedule** button on the top of the Scheduler to create a new schedule. The **Create Schedule** screen appears above the Overview dashboard, numbered 2 in the figure above.

On the Schedule screen:

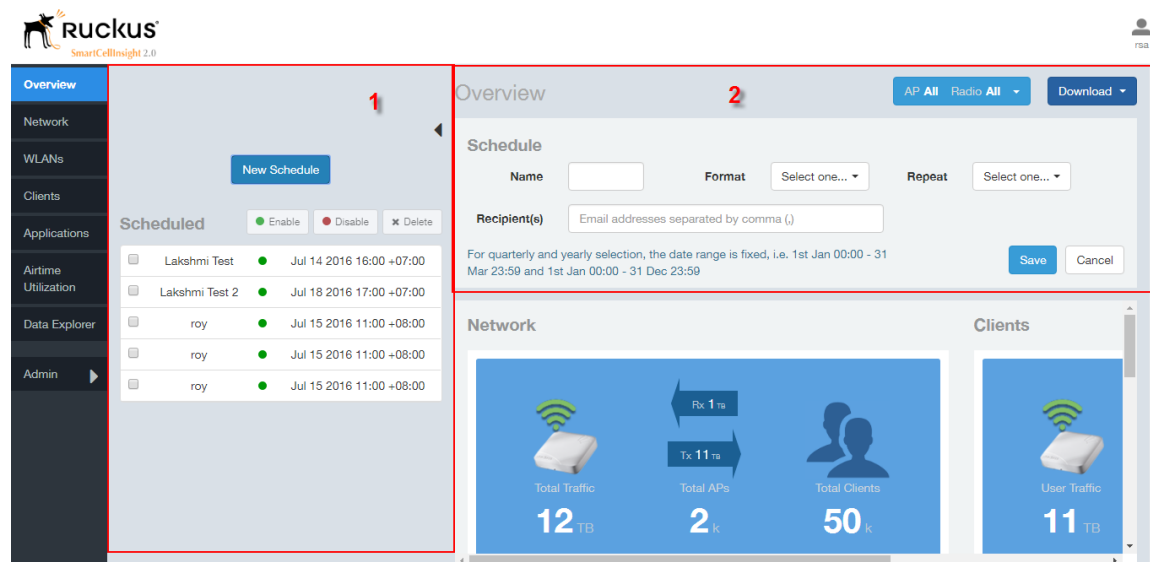


Figure 17: Scheduler on the Overview Dashboard

- **Name:** Enter the name of the schedule.
- **Format:** Select the format of the report from the drop down list, either PDF or CSV.
- **Repeat:** Select a time frame for the schedule, whether Daily, Weekly, Monthly, Quarterly, or Yearly. If you select Daily, you also need to set the hour from the Hour drop down list. If you select Weekly, you also need to set the Day of Week and Hour. If you select Monthly, you also need to set the Day of Month and Hour. If you set Quarterly or Yearly, the date range is fixed before hand.
- **Recipient(s):** Enter the email addresses of one or more recipients. If you have more than one email address to enter, separate the email addresses with a comma.

Click **Save** to save the schedule details. A new schedule is created and listed in the Schedule frame numbered 1 in the figure above.

The Schedule frame contains the list of created schedules, and above this list of schedules, the **Enable**, **Disable**, and **Delete** buttons. Select the schedule from the list and click the:

- **Enable** button to activate the schedule.
- **Disable** button to deactivate the schedule.
- **Delete** button to remove the schedule.

Schedules can be created for all the dashboards, namely Network, WLANs, Clients, Airtime Utilization, and Applications. The schedule frame is integrated into every dashboard. All the filters and functionality of the dashboards can be used to create reports to be sent at specific dates and times to recipients. A sample Network dashboard is shown in the figure below. Refer to the specific dashboard for the description of how the dashboard and filters work.

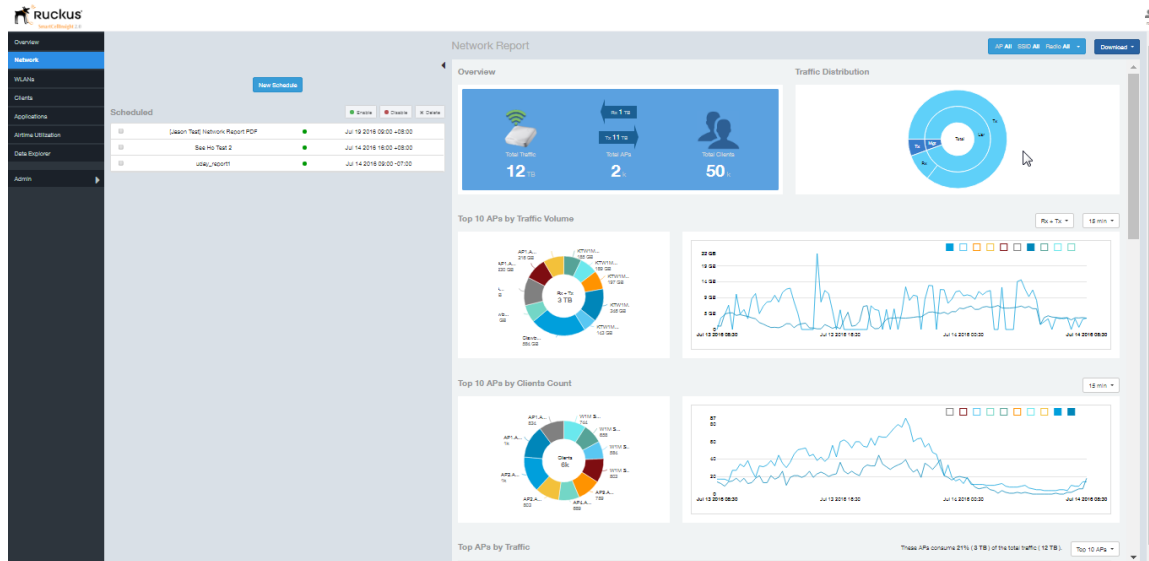


Figure 18: Network Dashboard Containing Schedules

## Working With Filters

Filters are built into every dashboard and allow you to segregate and drill down into the data.

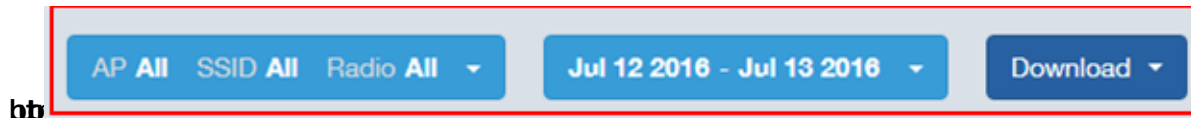
By selecting APs and setting a date range, you can examine specific subsets of data for any AP or group of APs for any time period in any of your wireless networks. For example, if you want to see just the total traffic and client counts for a certain AP on a certain day, you could use the Network Overview report, and simply select that AP and date only.

The same two filters are available on every dashboard:

- **AP/Radio Filter** (on some screens, **AP/SSID/Radio** filter)
- **Date Filter**

Once you have filtered the data, you can use the **Download** button to download the current dashboard reports in CSV or PDF format.

Figure 19: AP/Radio Filter, Date Filter and Download



## AP, SSID and Radio filter

Use these filters to generate SCI dashboards.

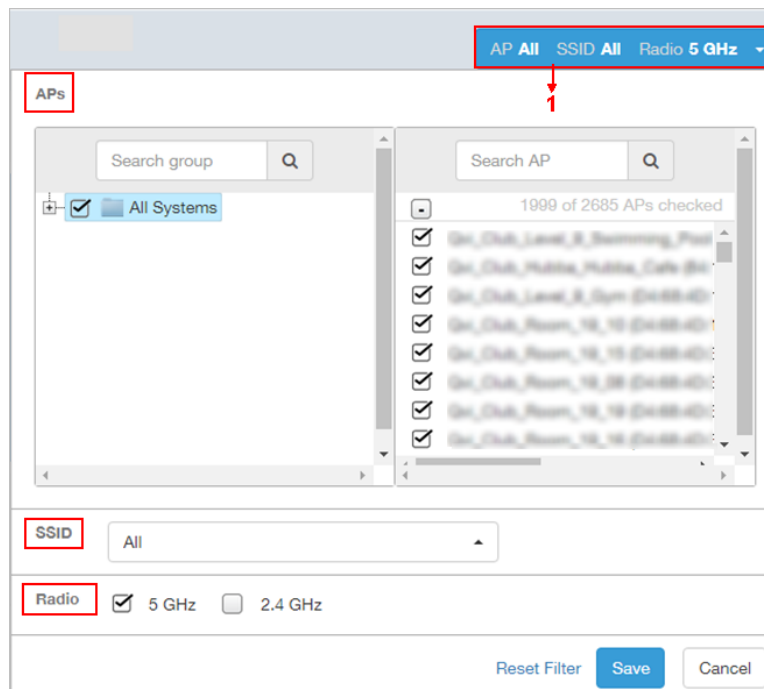


Figure 20: Custom AP and Radio Filter

**Custom AP, SSID and Radio Filter:** The user can select APs, SSID and Radio to view and analyze data.

- The AP dropdown lists contains a nested list of APs, the connected controller, and the related zones. You can select the AP, or/and controller, or/and zone as per your requirement. If you select a particular zone or AP group, the total number of APs is displayed. You can search the APs by AP name, and AP MAC. You can also search by controller, zone, AP group, and even a partial string.
- The SSID dropdown lists contains a nested list of SSID. You can select the SSID and by default all SSID is selected. You can select or deselect all SSID or a particular SSID.

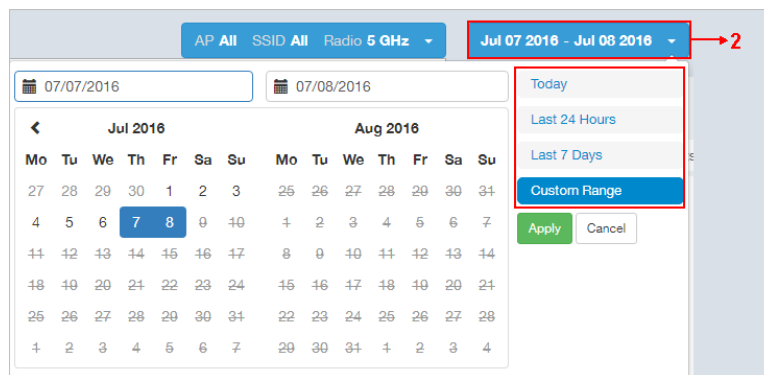
**NOTE:** SSID option is seen on the network, WLAN, client and application dashboards.

- Radio select 5 or 2.4 or both GHz.

Follow these steps to:

1. Choose the AP, SSID and Radio filters
2. Click the **Save** button to save your selections
3. Use the **Reset Filter** button to clear the previous selections.

## Date Filter



**Figure 21: Custom Date Filter**

**Custom Date** Select a date range to update the dashboard. You can plot time for a certain period which could be today, last 24 hours, last 7 days, or a custom range (default value). This filter is numbered as two (2) in .On selection

Click on **Apply** to save the specified filters and to update the dashboard.

## Download

Use the download option to export the report in either CSV or PDF format.

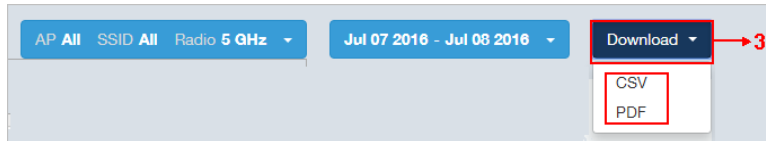


Figure 22: Download option

**Download Option** Use the download option to export the report in either CSV or PDF format. This filter is available on all dashboards except Data explorer and Admin.

Click on the format required. The report is downloaded, which needs to be opened and saved to the selected drive.

## Rx+Tx Filter

Rx+Tx filters to choose operating ranges in various dashboards.

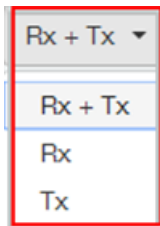


Figure 23: Rx+Tx filter

**Rx+Tx** : Select the Rx+Tx (default value) or Rx or Tx operating ranges. This filter can be used in network, WLAN and application dashboard.

## Time Filter

Time filter for various dashboard.

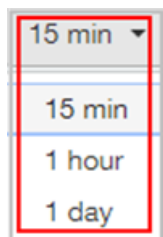
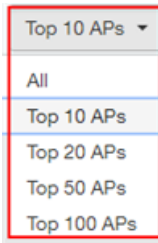


Figure 24: Time filter

**Time**: Specify the time frame of 15 minutes (default value), 1 hour or 1 day for network, client, application and airtime dashboards.

## AP Filter

AP filter for Network dashboard.

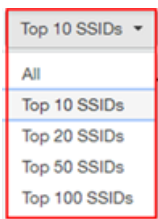


**Figure 25: AP filter**

**Top APs** Specify the APs filter of top 10 (default value), 20, 50, or 100 for Network dashboard of traffic and client sections.

## SSID Filter

SSID filter for WLAN dashboard.



**Figure 26: SSID filter**

**Top SSID** Specify the SSID filter of top 10 (default value), 20, 50, or 100 SSIDs for WLAN traffic and client sections.

## Client Filter

Client filter for determining client usage.

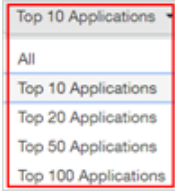


**Figure 27: Client filter**

**Client** Specify the client filter of top 10 (default value), 20, 50, or 100 for client and trends section in Client dashboard.

## Application Filter

Application filter for application dashboard.



**Figure 28: Application filter**

**Top Application** Specify the application filter of top 10 (default value), 20, 50, or 100 for application dashboard sections of traffic and client reports.



# Network Report

The Network report provides details of traffic, clients, and trends by APs, SSIDs, Radio, or Clients over time.

The Network report gives you an average traffic rate overview of the network - the total traffic, the total APs received and transmitted, and the client details.

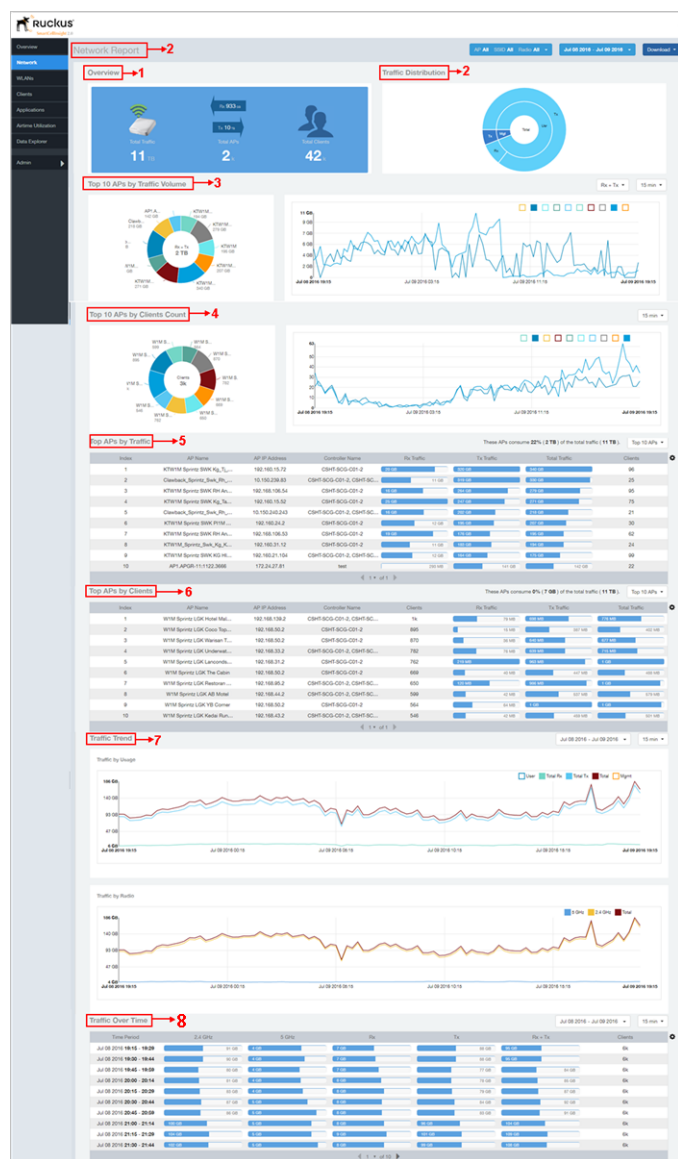


Figure 29: Network Report

The network report consists of several sections as per the table below. For ease of reading, each section has been numbered in the figure above, and corresponds to the table below.

1	Overview	Contains the total traffic and the total clients on the network. It also contains the received and transmitted traffic between them.
2	Traffic Distribution	Contains the distribution of traffic in terms of size.
3	Top 10 APs by Traffic Volume	The pie chart and graph contain the top APs with the largest traffic volume in the network, alongwith the received and transmitted traffic volumes.
4	Top 10 APs by Client Count	The pie chart and graph contain the top APs by client count in the network, alongwith the received and transmitted traffic volumes.
5	Top APs by Traffic	This table contains the top APs with the largest traffic volume in the network.
6	Top APs by Client	This table contains the top APs by client count in the network.
7	Traffic Trend	This graph displays the traffic by usage and radio, and also the corresponding average traffic rate.
8	Traffic Over Time	This table tracks the traffic on the network based on time and other components.

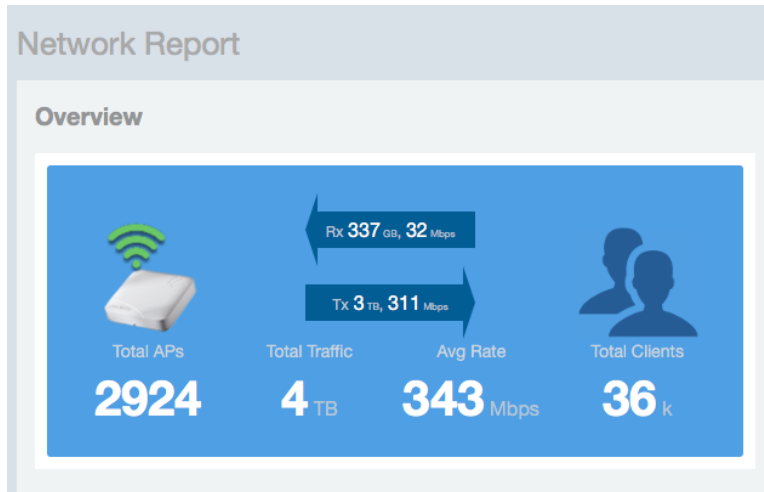
## Network - Overview

The Network Overview report provides a general overview of the entire network.

The Overview report displays the following, based on your selection of AP, SSID and Radio and Date Range filters:

- Total traffic and the average traffic rate
- Total traffic received and transmitted and the average traffic rate
- Total number of APs
- Total clients on the network

**Figure 30: Overview**



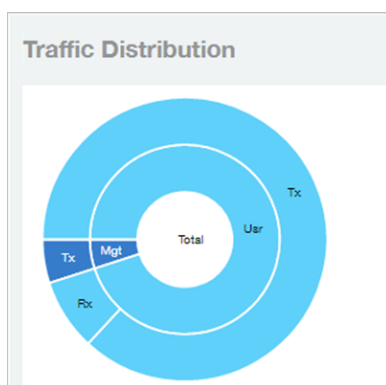
## Network - Traffic Distribution

The Traffic Distribution report displays the distribution of traffic types in pie chart format.

Use the **Traffic Distribution** report to display management traffic vs. user traffic, for example, based on your selection of APs, SSID, Radio and Date Range filters.


- Tx - Transmitted traffic
- Rx - Received traffic
- Mgmt - Management traffic
- Usr - User traffic
- Total - Total of all traffic

**Figure 31: Traffic Distribution**



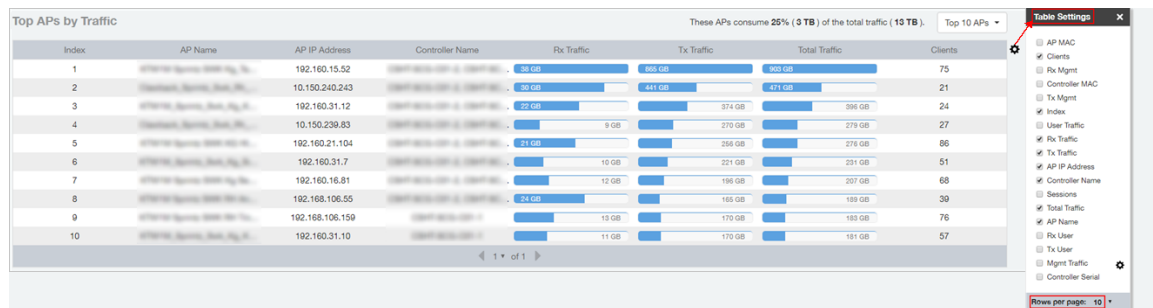
## Network - Top APs by Traffic Volume Table

This table lists the APs with the highest traffic volume in the network.

Use this report to view a list the top APs with the highest traffic volume sorted according to the selected columns. Click the gear icon  to select which columns to display, or click any column heading to sort by that column.

You can also select whether to display the top 10, 20, 50, or 100 APs by traffic volume from the Top APs filter. The number of rows per page can be defined using the **Rows per page** option in the table settings drop down list.


**Figure 32: Top APs by Traffic**



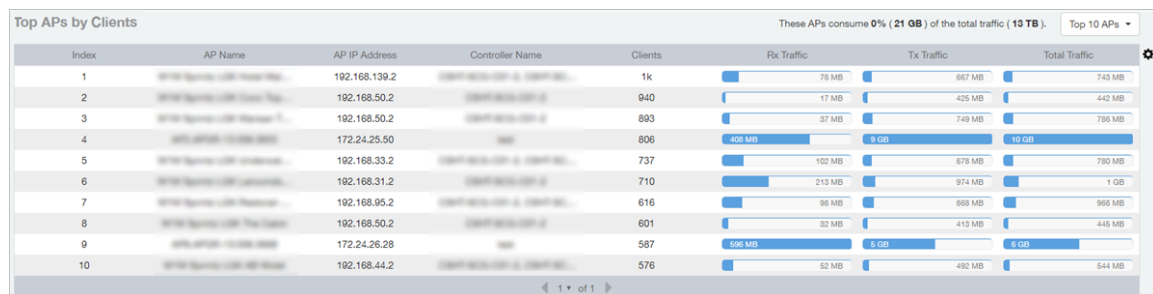
Index	AP Name	AP IP Address	Controller Name	Rx Traffic	Tx Traffic	Total Traffic	Clients
1	WPA100-AP-001-001	192.160.15.52	WPA100-001-001	30 GB	665 GB	695 GB	75
2	WPA100-AP-001-002	10.150.240.243	WPA100-001-002	30 GB	441 GB	471 GB	21
3	WPA100-AP-001-003	192.160.31.12	WPA100-001-003	22 GB	374 GB	396 GB	24
4	WPA100-AP-001-004	10.150.239.83	WPA100-001-004	9 GB	270 GB	279 GB	27
5	WPA100-AP-001-005	192.160.21.104	WPA100-001-005	21 GB	256 GB	278 GB	86
6	WPA100-AP-001-006	192.160.31.7	WPA100-001-006	10 GB	221 GB	231 GB	51
7	WPA100-AP-001-007	192.160.16.81	WPA100-001-007	12 GB	186 GB	207 GB	68
8	WPA100-AP-001-008	192.168.106.55	WPA100-001-008	24 GB	165 GB	189 GB	39
9	WPA100-AP-001-009	192.168.106.159	WPA100-001-009	13 GB	170 GB	183 GB	76
10	WPA100-AP-001-010	192.160.31.10	WPA100-001-010	11 GB	170 GB	181 GB	57

## Network - Top APs by Client Count Table

This report displays the top APs by client count in the network.

Click the gear icon  to view the list of table columns, or click any column heading to sort by that column. You can also select the top 10, 20, 50, or 100 APs by client count. The number of rows in a page is defined by the Rows per Page list in table settings drop down list.

**Figure 33: Top APs by Client**



Index	AP Name	AP IP Address	Controller Name	Clients	Rx Traffic	Tx Traffic	Total Traffic
1	WPA100-AP-001-001	192.168.139.2	WPA100-001-001	1k	76 MB	667 MB	743 MB
2	WPA100-AP-001-002	192.168.50.2	WPA100-001-002	940	17 MB	425 MB	442 MB
3	WPA100-AP-001-003	192.168.50.2	WPA100-001-003	893	97 MB	749 MB	786 MB
4	WPA100-AP-001-004	172.24.25.50	WPA100-001-004	806	400 MB	9 GB	10 GB
5	WPA100-AP-001-005	192.168.33.2	WPA100-001-005	737	102 MB	678 MB	780 MB
6	WPA100-AP-001-006	192.168.31.2	WPA100-001-006	710	213 MB	974 MB	1 GB
7	WPA100-AP-001-007	192.168.95.2	WPA100-001-007	616	99 MB	888 MB	965 MB
8	WPA100-AP-001-008	192.168.50.2	WPA100-001-008	601	32 MB	413 MB	445 MB
9	WPA100-AP-001-009	172.24.26.28	WPA100-001-009	597	699 MB	5 GB	6 GB
10	WPA100-AP-001-010	192.168.44.2	WPA100-001-010	576	52 MB	492 MB	544 MB

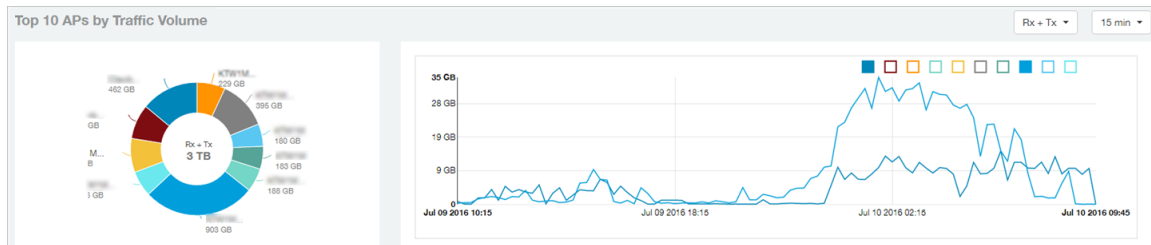
## Network - Top 10 APs by Traffic Volume

The Top 10 APs by Traffic Volume report displays the list of highest traffic APs in pie chart and graph format.

Use the drop-down menus to specify the traffic type (Tx, Rx, or Tx+Rx), and the time granularity in increments of 15 minutes, 1 hour or 1 day. Click any of the colored squares to toggle display of the AP in the line graph.

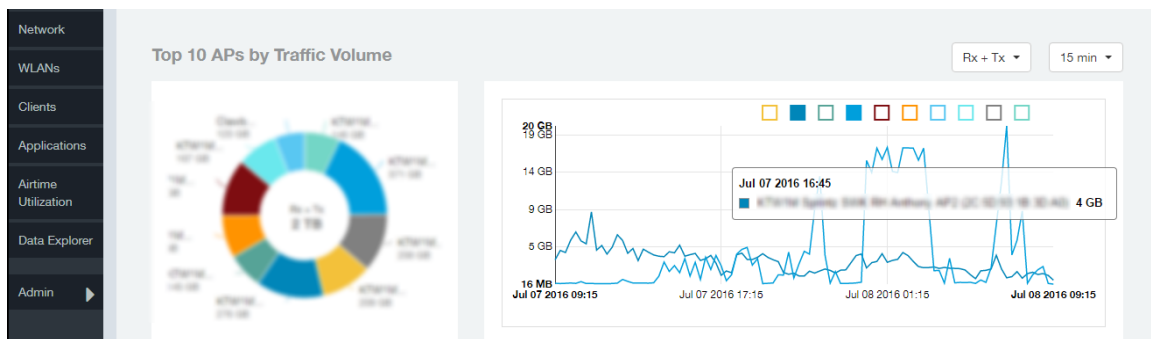
**NOTE:** The **Rx+Tx** drop-down menu applies to both the pie chart and the line graph, but the time granularity applies to the line graph only. This applies to all sections in all reports that appear in this format (pie chart + line graph with Rx/Tx + time granularity menus).

**Figure 34: Top 10 APs by Traffic Volume**



If you hover over the line graph a pop-up appears containing the selected AP details as shown in the figure below.

**Figure 35: Top 10 APs by Traffic Volume - Hover Over Example**

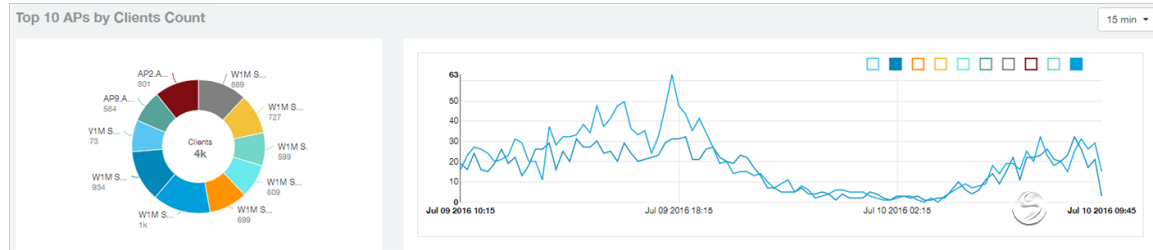


## Network - Top 10 APs by Client Count

This report displays the top 10 APs by client count in pie chart and graph format.

Use the drop-down menu to specify the time granularity of 15 minutes, 1 hour or 1 day. If you hover over the line graph a pop-up appears containing the details on the selected data points. Click any of the colored squares to toggle display of the AP in the line graph.

**Figure 36: Top 10 APs by Client Count**



## Network -Traffic Trend

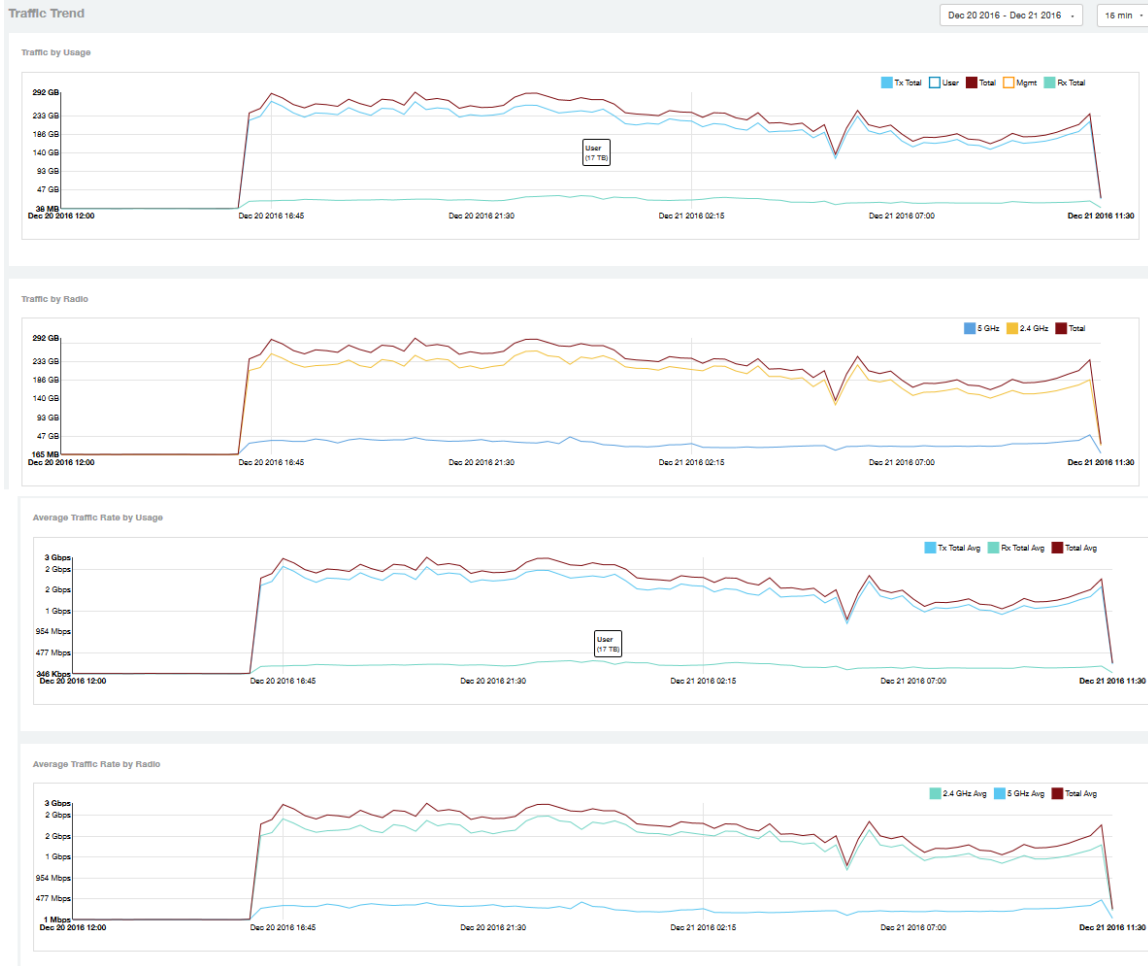
The Traffic Trend report displays the traffic by usage and radio over time.

If you hover over the line graph a pop-up appears containing the selected AP details.

**Traffic by Usage:** You can select the traffic by usage details from the check boxes listed in the legend on top of the graph, - namely by user, total received traffic, total transmitted traffic, the total received and transmitted traffic, and the management traffic. You can also select a date range to view this date on the line graph. You can also specify the time granularity in 15 minutes, 1 hour or 1 day increments.

**Traffic by Radio:** You can select the traffic by radio details from the check boxes listed in the legend on top of the graph - namely by 5GHz, 2.4GHz, or/and view the total traffic by radio details. You can also select a date range to view this date on the line graph. This also applies to the corresponding average traffic rate graphs.

**Figure 37: Traffic Trend**



## Network - Traffic Over Time

The Traffic Over Time report displays the traffic on the network over time.

This report allows you to compare traffic over multiple time periods. Click the gear icon to select/deselect columns to display, or click any column heading to sort by that column.

Figure 38: Traffic Over Time

Time Period	2.4 GHz	5 GHz	Rx	Tx	Rx + Tx	Clients
Jul 08 2016 18:15 - 19:29	91 GB	4 GB	7 GB	88 GB	95 GB	6k
Jul 08 2016 19:30 - 19:44	90 GB	4 GB	7 GB	88 GB	95 GB	6k
Jul 08 2016 19:45 - 19:59	90 GB	4 GB	7 GB	77 GB	84 GB	6k
Jul 08 2016 20:00 - 20:14	91 GB	4 GB	8 GB	79 GB	85 GB	6k
Jul 08 2016 20:15 - 20:29	93 GB	4 GB	8 GB	79 GB	87 GB	6k
Jul 08 2016 20:30 - 20:44	87 GB	5 GB	8 GB	94 GB	92 GB	6k
Jul 08 2016 20:45 - 20:59	96 GB	5 GB	8 GB	83 GB	91 GB	6k
Jul 08 2016 21:00 - 21:14	100 GB	5 GB	8 GB	95 GB	104 GB	6k
Jul 08 2016 21:15 - 21:29	104 GB	5 GB	9 GB	101 GB	109 GB	6k
Jul 08 2016 21:30 - 21:44	100 GB	5 GB	8 GB	99 GB	108 GB	6k





# WLANs Report

The Wireless LANs report contains information on the SSIDs added, that which are active and removed. It also contains details of: SSID changes over time, SSIDs by received and transmitted traffic. Client count over a time range and trend of the SSIDs based on traffic count and volume. The WLANs report allows you to filter the information based on APs, SSID and Radio, day and date and Rx+Tx filters. You can also customize the table reports by selecting the list of available components for each category.

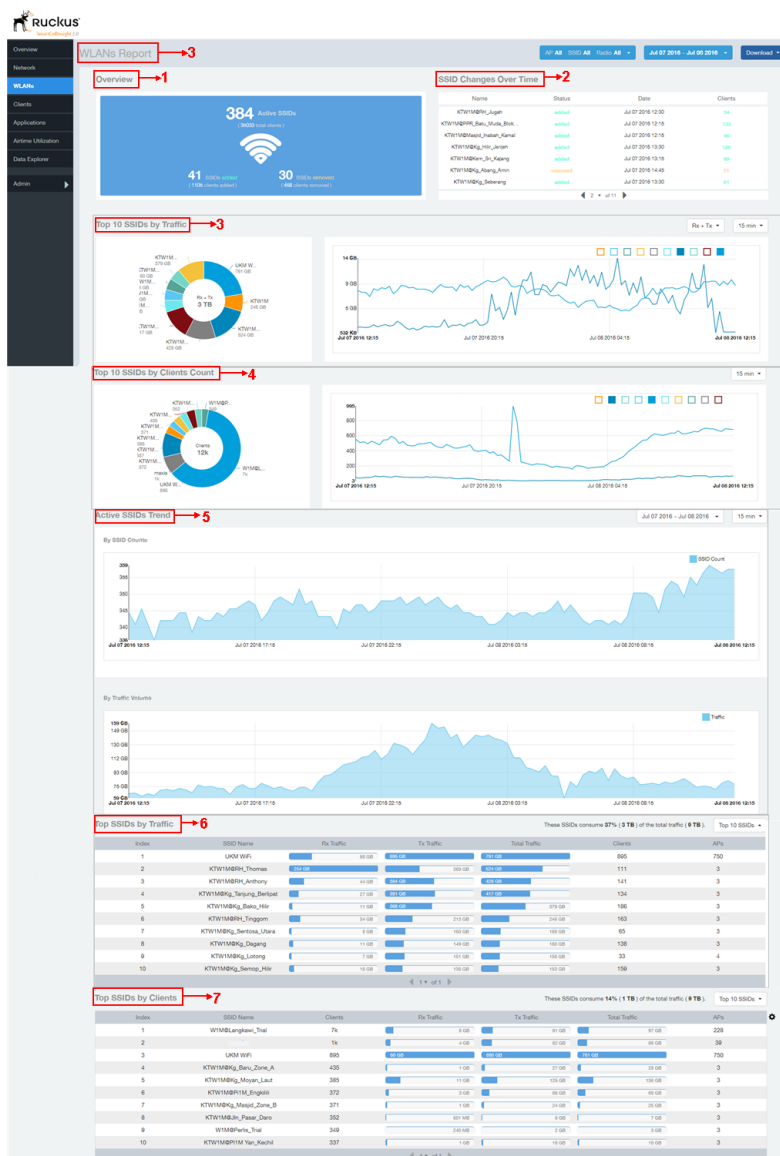


Figure 39: WLANs Report

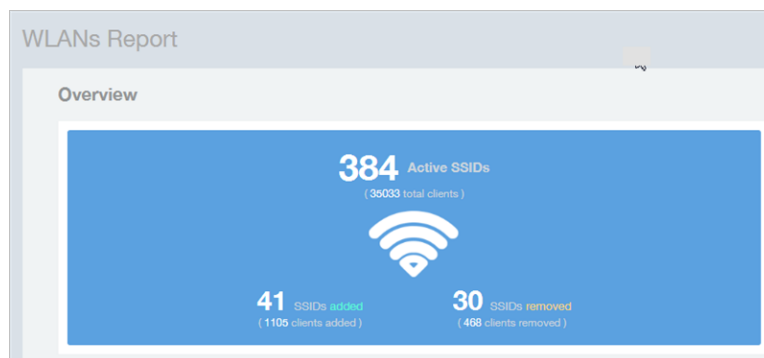
The following table lists the reports on the WLANs page.

1	Overview	This report section contains the total number of active SSIDs, added and removed.
2	SSID Changes Over Time	This tabular report pertains to the SSID status, its last modified date and number of clients associated to the SSID.
3	Top 10 SSIDs by Traffic	The pie chart and graph contain the top 10 SSIDs traffic volume of received and transmitted traffic volumes
4	Top 10 SSID by Client Count	The pie chart and graph contain the top 10 SSIDs client count of received and transmitted count
5	Active SSIDs Trends	The active SSID trend displays the traffic by SSID count and traffic volume
6	Top SSIDs by Traffic	This tabular report contains the top SSIDs with the largest traffic volume in the network as per the selected components
7	Top SSIDs by Client	The tabular report contains the top SSIDs by client count in the network as per the selected components.

## WLANs Overview

The overview report provides a general overview of the total number of active SSIDs, and the number of added and removed SSIDs over the selected period.

**Figure 40: WLANs Overview**



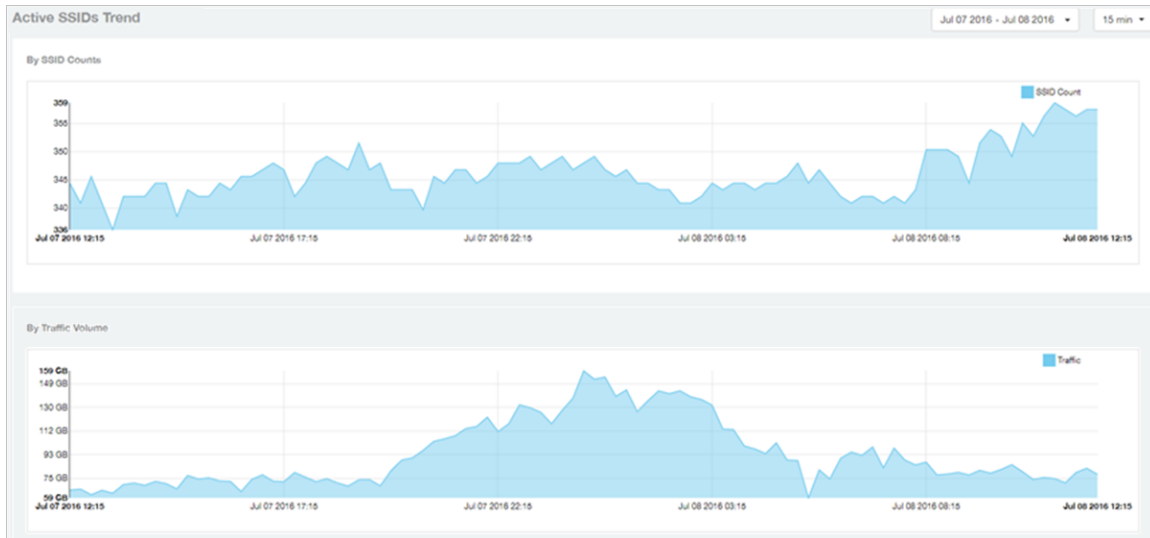
## WLAN-Active SSID Trend

The Active SSIDs Trend report contains two graphs: total number of SSIDs over time, and total traffic volume over time.

This report allows you to quickly see how many WLANs are active and the total traffic volume over time. Select a date range and the time increments by which to display the graph.

Hover over the graphs to display the total SSID count or total traffic volume at any specific data point.

**Figure 41: Active SSID Trend report**



## WLAN-SSID Changes Over Time

Use the SSID Changes Over Time report to quickly view the most recent SSID changes.

By default, this report displays the most recent changes up to the current time. To view changes for a previous time period, use the Time Period Filter.

**Figure 42: SSID Changes Over Time**

Name	Status	Date	Clients
ssid-282145	added	Jul 08 2016 11:00	1
ssid-282145	removed	Jul 07 2016 12:45	1
ssid-282145	removed	Jul 07 2016 12:15	1
Unknown	removed	Jul 07 2016 12:00	1
47717684g_282145	added	Jul 07 2016 12:45	19
ssid-282145	added	Jul 07 2016 12:45	1
ssid-282145	added	Jul 07 2016 12:15	1

◀ 1 of 11 ▶

## WLAN-Top SSIDs by Client

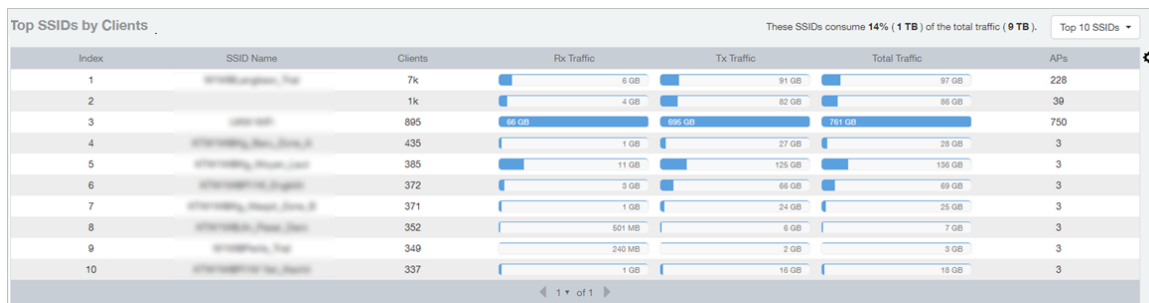
The Top SSIDs by Client report contains a table listing the top wireless networks by client count.

You can sort the table by Total Traffic, Clients, AP count, or alphabetically by SSID name.

Additionally, you can customize the table by clicking the gear icon  and selecting from the list of columns.

You can also select whether to display only the top 10 (default value), 20, 50, or 100 SSIDs by client count, or list all SSIDs. Configure the number of rows per a page using the **Rows per Page** option in the table settings drop down menu.

**Figure 43: Top SSIDs by Clients**



Index	SSID Name	Clients	Rx Traffic	Tx Traffic	Total Traffic	APs
1	SSIDName_1	7k	6 GB	91 GB	97 GB	228
2	SSIDName_2	1k	4 GB	82 GB	86 GB	39
3	SSIDName_3	895	66 GB	695 GB	761 GB	750
4	SSIDName_4	435	1 GB	27 GB	28 GB	3
5	SSIDName_5	385	11 GB	125 GB	136 GB	3
6	SSIDName_6	372	3 GB	56 GB	59 GB	3
7	SSIDName_7	371	1 GB	24 GB	25 GB	3
8	SSIDName_8	352	501 MB	6 GB	7 GB	3
9	SSIDName_9	349	240 MB	2 GB	3 GB	3
10	SSIDName_10	337	1 GB	16 GB	18 GB	3

## WLAN-Top SSIDs by Traffic

The Top SSIDs by Traffic table lists the top 10, 20, 50 or 100 SSIDs in the network by traffic volume.

You can sort the table by Total Traffic, Clients, AP count, or alphabetically by SSID name.

Additionally, you can customize the table by clicking the gear icon  and selecting from the list of columns.

You can also select whether to display only the top 10 (default value), 20, 50, or 100 SSIDs by traffic volume, or list all SSIDs. Configure the number of rows per a page using the **Rows per Page** option in the table settings drop down menu.

**Figure 44: Top SSIDs by Traffic**

Top SSIDs by Traffic

These SSIDs consume 97% ( 3 TB ) of the total traffic ( 3 TB ). Top 10 SSIDs

Index	SSID Name	Rx Traffic	Tx Traffic	Total Traffic	Clients	APs
1	W1MQR...	66 GB	686 GB	752 GB	895	750
2	W1MQR...	254 GB	269 GB	524 GB	111	3
3	W1MQR...	44 GB	354 GB	408 GB	141	3
4	W1MQR...	27 GB	391 GB	418 GB	134	3
5	W1MQR...	11 GB	365 GB	376 GB	186	3
6	W1MQR...	34 GB	213 GB	247 GB	163	3
7	W1MQR...	8 GB	160 GB	168 GB	65	3
8	W1MQR...	11 GB	149 GB	160 GB	138	3
9	W1MQR...	7 GB	151 GB	158 GB	33	4
10	W1MQR...	16 GB	138 GB	154 GB	150	3

Table Settings

- APs
- Clients
- Rx Mgmt
- Tx Mgmt
- Index
- User Traffic
- Rx Traffic
- Tx Traffic
- Sessions
- Total Traffic
- Rx User
- SSID Name
- Tx User
- Mgmt Traffic

Rows per page: 10

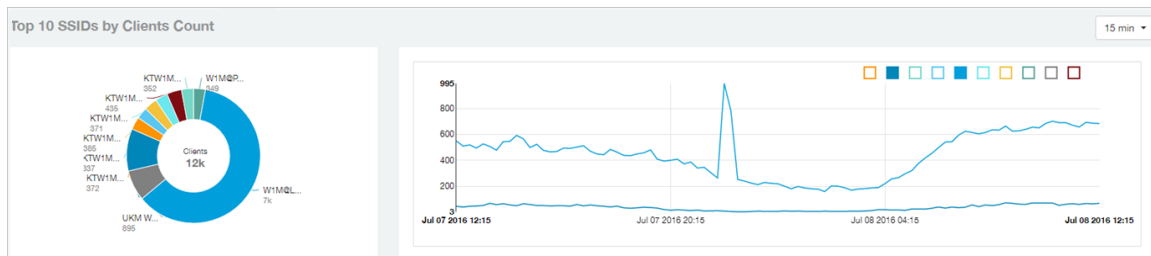
## WLAN-Top Ten SSIDs by Client Count

The Top 10 SSIDs by Client Count report contains a pie chart and line graph used to view which wireless networks are most congested in terms of client count, and to compare client counts over different time periods.

Select a time increment to display (15 minutes, 1 hour or 1 day), and click any of the colored squares to toggle display of the corresponding SSID.

If you hover over the line graph a pop-up appears containing the selected SSID names and client counts at the chosen data point.

Figure 45: Top Ten SSIDs by Client Count

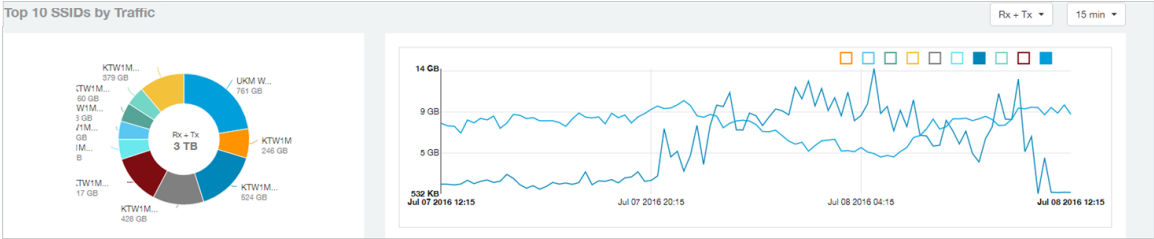


## WLAN-Top Ten SSIDs by Traffic

Use the Top 10 SSIDs by Traffic reports to view which wireless networks are generating the most traffic, compare usage of the top WLANs over different time periods, and compare Tx and Rx statistics independently.

Click any of the colored squares to toggle display of the corresponding SSID. Select a time increment to display (15 minutes, 1 hour or 1 day), and choose whether to display transmit data only, receive data only, or total traffic.

Figure 46: Top Ten SSIDs by Traffic



# Clients Report

The Clients report provides you with the details of traffic and trends over time from the client perspective.

The Clients report provides an overview of the total traffic, both received and transmitted and the total number of clients over time. It also contains details of the top unique clients by traffic, both received and transmitted, and unique client trends over time, by client count and by traffic.

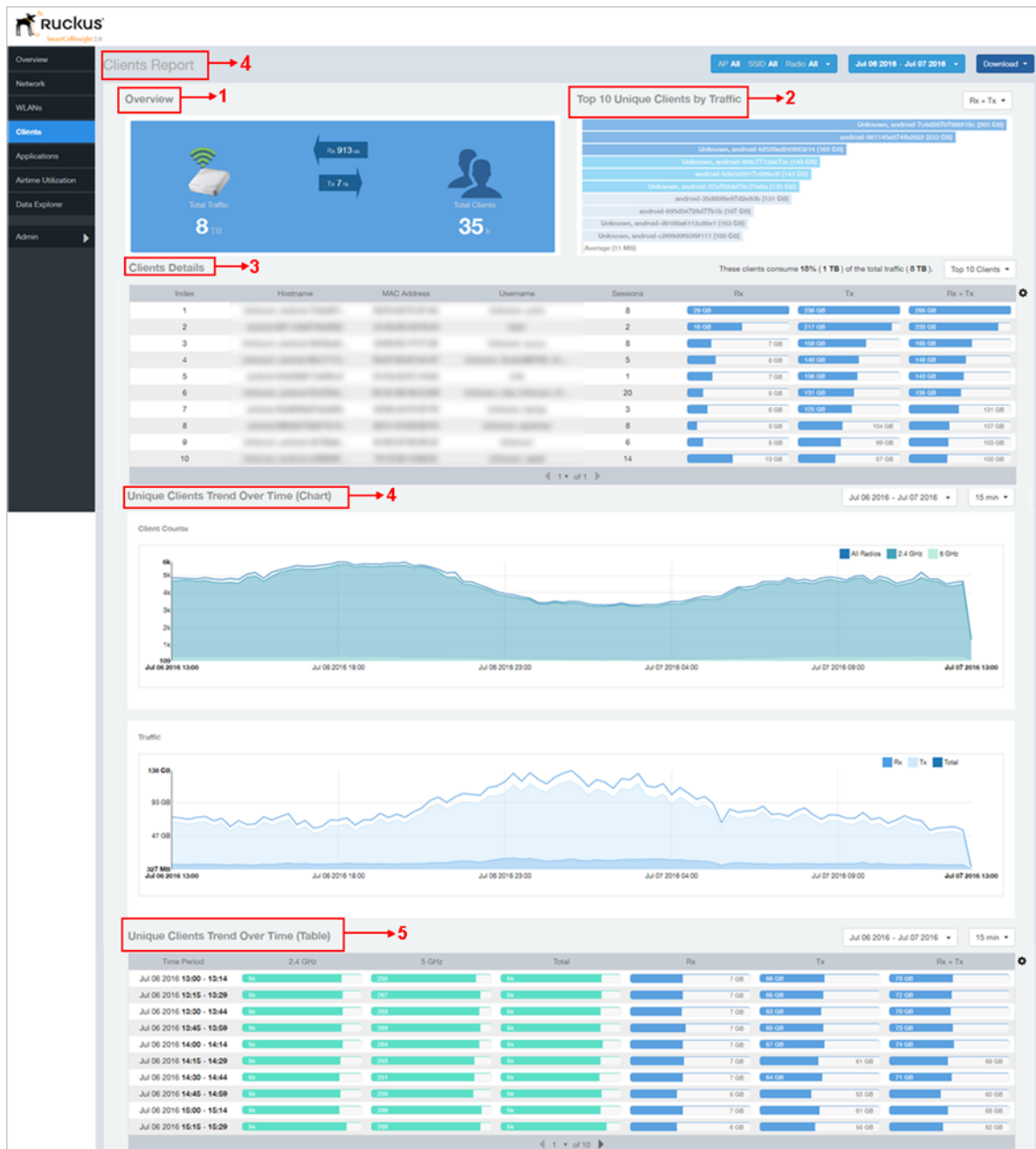


Figure 47: Clients Report

The clients report consists of several sections as per the table below. For ease of reading, each section has been numbered in the figure above, and corresponds to the table below.

1	Overview	Contains the total traffic and the total clients on the network. It also contains the received and transmitted traffic between them.
2	Top 10 Unique Clients by traffic	Contains the list of top 10 clients in terms of size of traffic.
3	Client details	Contains the client information and display the quantity of traffic consumed by the listed clients.
4	Unique Clients Trend over time	Displays the unique clients trend over time for client count and for traffic.
5	Unique Clients Trend over time	Lists the unique clients trend over time.

## Clients - Overview

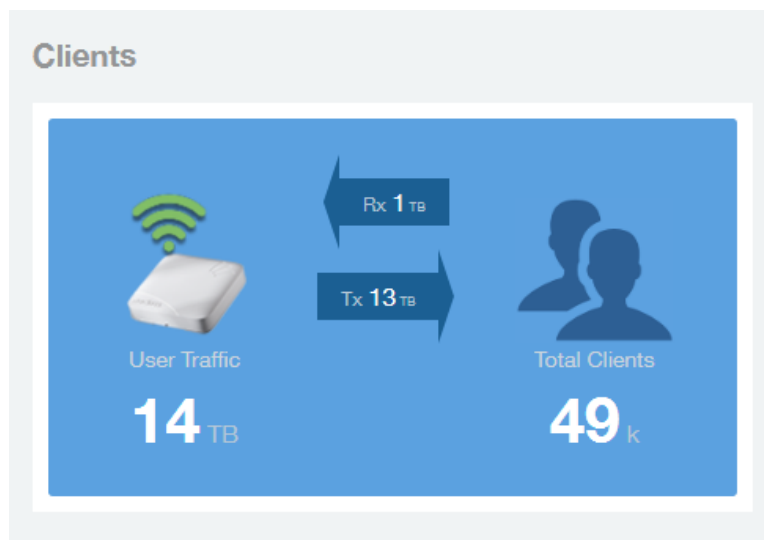
Provides an overview of the total traffic, both received and transmitted, and the total number of clients over the selected time period.

The Overview section contains the following:

- Total user traffic
- Total received and transmitted user traffic
- Total clients on the network

This is based on your selection of AP/Radio and Date Range filters.

**Figure 48: Overview**

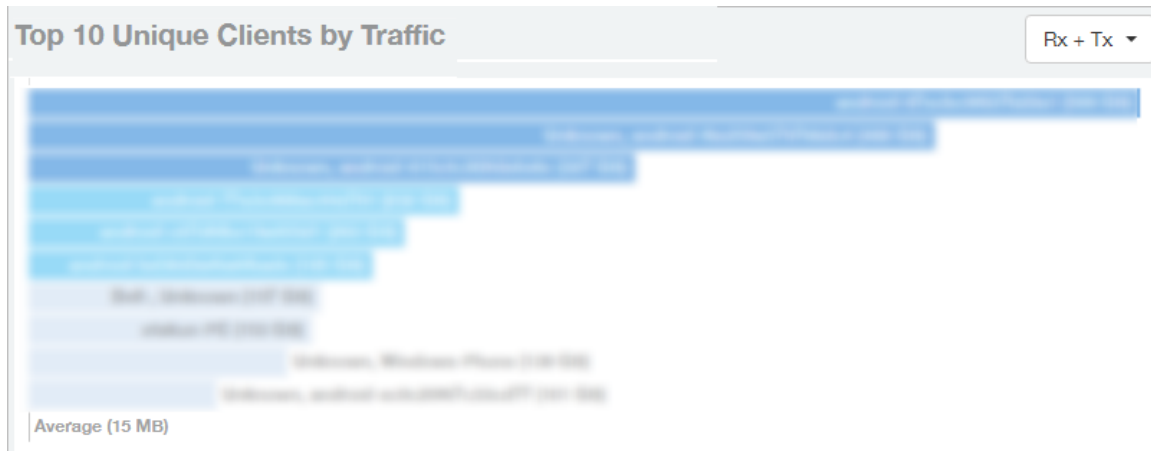




## Clients - Top 10 Unique Clients by Traffic

This section provides you with the details of the top 10 unique clients by traffic, filtered on received traffic, transmitted traffic, and received and transmitted traffic.

Figure 49: Top 10 Unique Clients by Traffic



## Client Details

This table contains a list of clients with the highest traffic volume in the network as per the selected components.



Click the gear icon  to select the list of components from the table. By default, the table is sorted by total traffic (Rx + Tx). Click on a column heading to sort by that value. You can also select the top 10 (default), 20, 50, or 100 clients to display. The number of rows per page is defined by the **Rows per Page** option in the table settings menu.

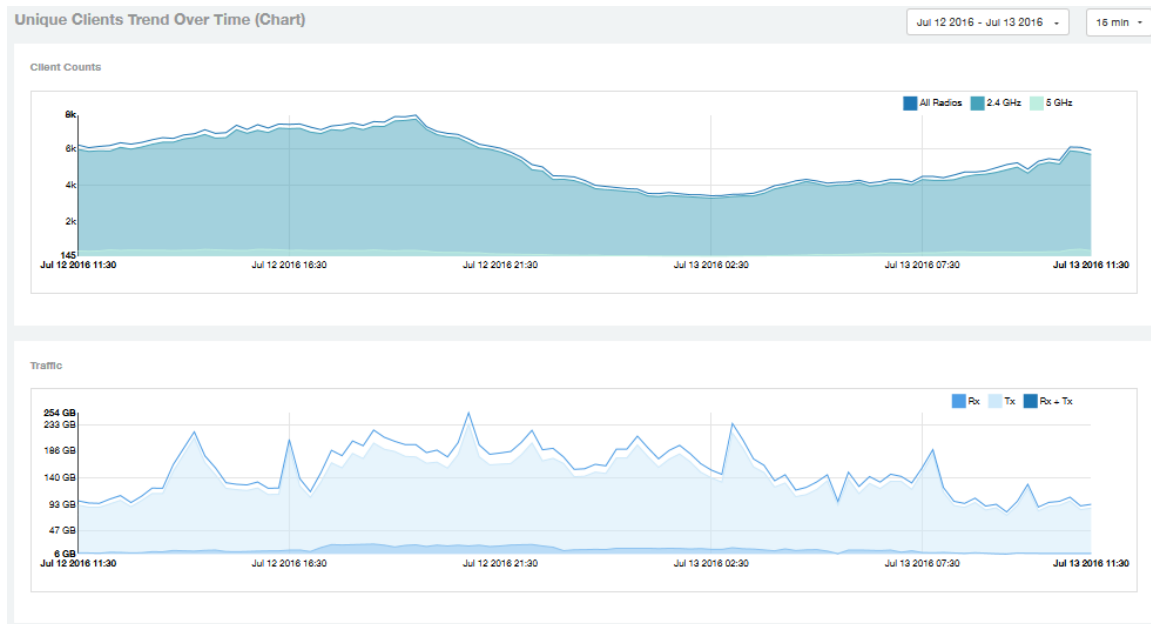
Figure 50: Client details

Clients Details					These clients consume 19% ( 3 TB ) of the total traffic ( 13 TB ).			Top 10 Clients
Index	Hostname	MAC Address	Username	Sessions	Rx	Tx	Rx + Tx	
1	...	...	...	1	34 GB	565 GB	599 GB	
2	...	...	...	12	21 GB	467 GB	488 GB	
3	...	...	...	3	17 GB	339 GB	357 GB	
4	...	...	...	1	7 GB	225 GB	232 GB	
5	...	...	...	1	11 GB	192 GB	203 GB	
6	...	...	...	1	7 GB	173 GB	180 GB	
7	...	...	...	29	1 GB	156 GB	157 GB	
8	...	...	...	1	9 GB	144 GB	153 GB	
9	...	...	...	3	5 GB	135 GB	139 GB	
10	...	...	...	7	4 GB	98 GB	101 GB	

## Clients - Unique Clients Trends Over Time (Chart)


Use the Unique Clients Trend chart to view a breakdown of unique clients by radio type over time.

**Figure 51: Unique Clients Trend Over Time Chart**



## Clients Unique Clients Trend Over Time (Table)

This table displays the total numbers of unique clients over the specified time intervals, as well as unique client count per radio, and client traffic (Tx, Rx, total) for a given time period.

The unique clients trend can be used to identify which time periods have the highest number of new clients connecting to the networks, or to compare transmit/receive traffic over different time periods throughout the day. Click the gear icon  to select the list of columns to display. The table is sorted on the total traffic by default. Click any column heading to sort by that value. You can also select the top 10 (default value), 20, 50, or 100 clients to display, or display all clients. The number of rows per page is defined by the **Rows per Page** option in the table settings menu.

**Figure 52: Unique Clients Trend Over Time Table**

Unique Clients Trend Over Time (Table) Jul 12 2016 - Jul 13 2016 15 min

Time Period	2.4 GHz	5 GHz	Total	Rx	Tx	Rx + Tx
Jul 12 2016 11:30 - 11:44	6k	480	6k	7 GB	92 GB	99 GB
Jul 12 2016 11:45 - 11:50	6k	411	6k	7 GB	88 GB	95 GB
Jul 12 2016 12:00 - 12:14	6k	429	6k	7 GB	88 GB	95 GB
Jul 12 2016 12:15 - 12:20	6k	484	6k	8 GB	94 GB	102 GB
Jul 12 2016 12:30 - 12:44	6k	459	6k	8 GB	100 GB	108 GB
Jul 12 2016 12:45 - 12:50	6k	478	6k	7 GB	89 GB	96 GB
Jul 12 2016 13:00 - 13:14	6k	470	6k	8 GB	99 GB	107 GB
Jul 12 2016 13:15 - 13:20	6k	468	6k	10 GB	112 GB	121 GB
Jul 12 2016 13:30 - 13:44	6k	469	7k	9 GB	112 GB	121 GB
Jul 12 2016 13:45 - 13:50	6k	448	7k	12 GB	151 GB	163 GB

1 of 10

# Applications Report

The Applications report provides the details of the applications accessed by the user.

The Applications report contains the details of the applications accessed by the user and predefined by SCI. The overview contains the list of recognized applications. The rest of the report contains the top 10 applications by traffic volume received and transmitted over time, client count, traffic, and clients.

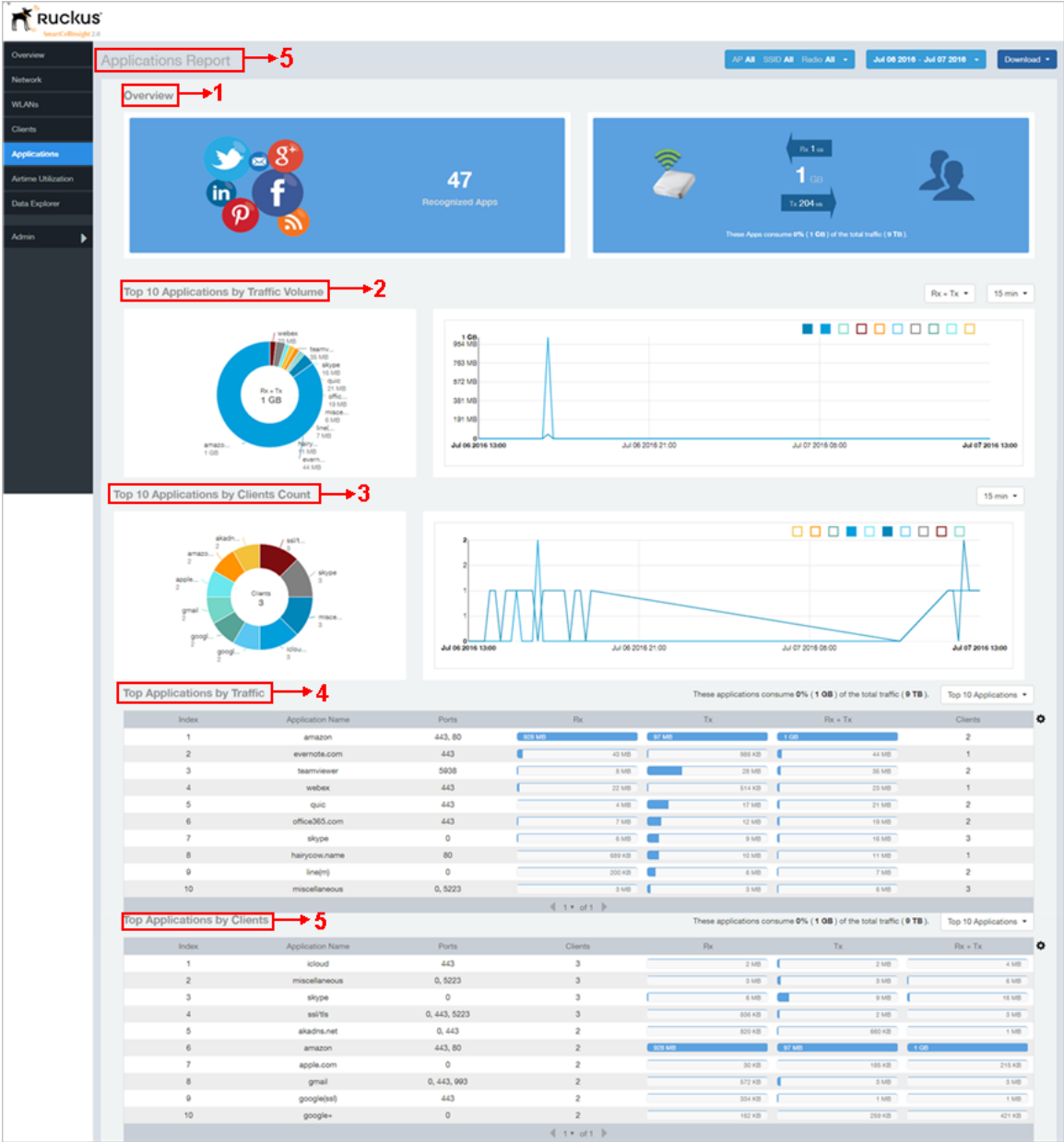


Figure 53: Applications Report

The Applications report consists of several sections as per the table below. For ease of reading, each section has been numbered in the figure above, and corresponds to the table below.

1	<a href="#">Overview</a>	Contains the list of applications that SCI recognizes, and displays the percentage of traffic consumed by these applications
2	<a href="#">Top 10 Applications by traffic volume</a>	Contains the list of top 10 applications in terms of volume of traffic.
3	<a href="#">Top 10 Applications by Client Count</a>	Contains the application information and displays the quantity of traffic consumed by the listed applications.
4	<a href="#">Top Applications by Traffic</a>	Displays the top applications by traffic and the percentage consumed of the total traffic.
5	<a href="#">Top Applications by Clients</a>	Displays the top applications by clients and the percentage consumed of the total traffic by the applications.

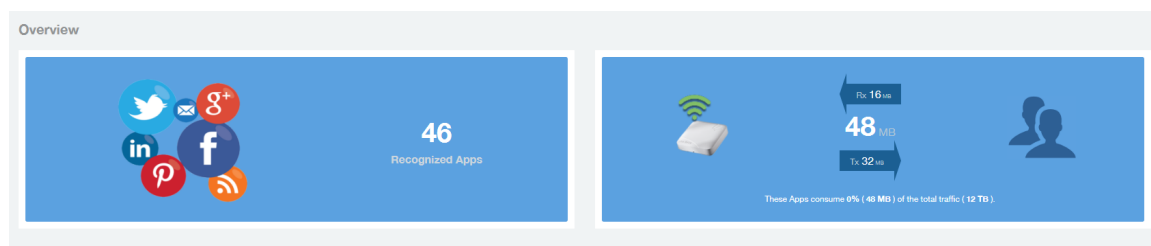
## Applications - Overview

The Applications Overview report provides an overview of all the applications recognized by the application recognition engine and the traffic volumes that these applications consume.

The Overview section contains the following:

- The number of recognized applications
- Total traffic
- Total number of APs, which also contains the received and transmitted traffic between them
- Total clients on the network

**Figure 54: Applications Overview**



## Applications - Top 10 by Traffic Volume

Displays the top applications with the largest traffic volume in the network, along with the received and transmitted traffic volumes.

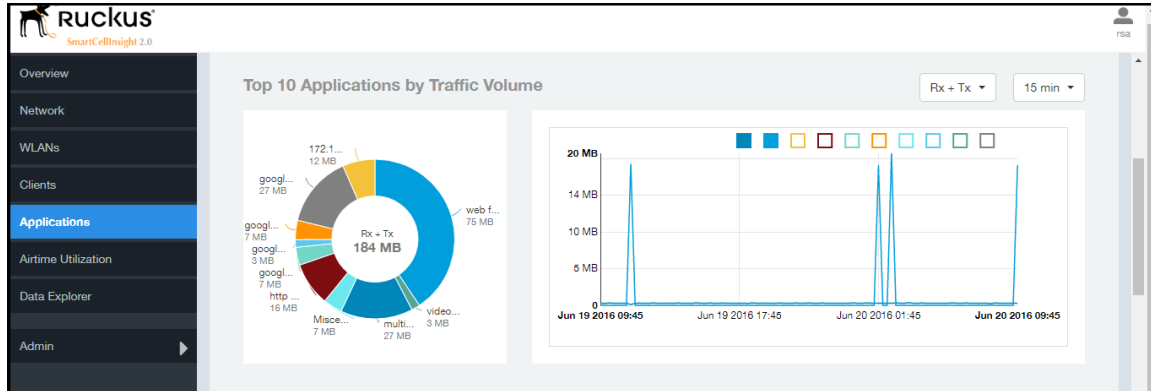


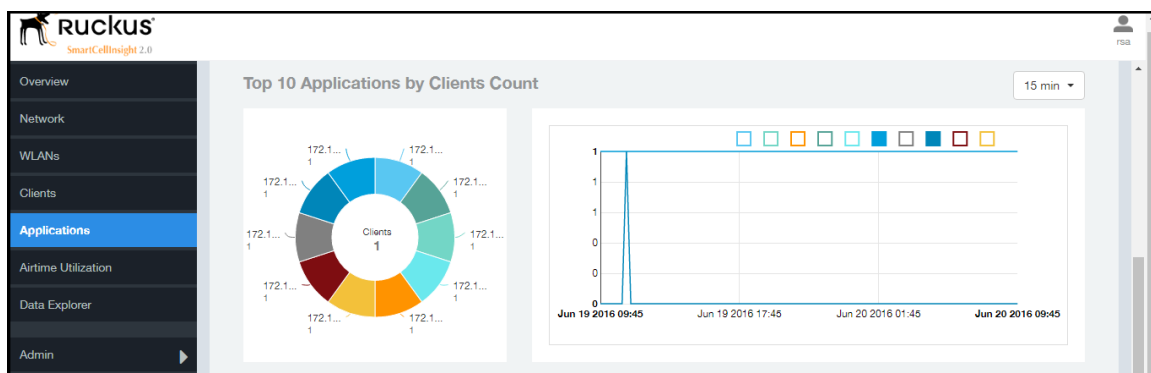
Figure 55: Top 10 Applications by Traffic Volume

The pie chart and graph contain the top applications with the largest traffic volume in the network, along with the received and transmitted traffic volumes. You can view the received and transmitted traffic volumes based on the [Rx and Tx filter](#). You can also specify the time of 15 minutes, 1 hour or 1 day for data granularity purpose using the [Time Filter](#) on page 22. To view the top 10 APs choose from the legend available on the top of the graph. Each AP will appear as a separate graph line. If you hover over the line graph a pop-up appears containing the selected details.

## Applications - Top 10 by Client Count

The Top 10 Applications by Client Count report consists of a pie chart and graph containing the top 10 applications by client count in the network.

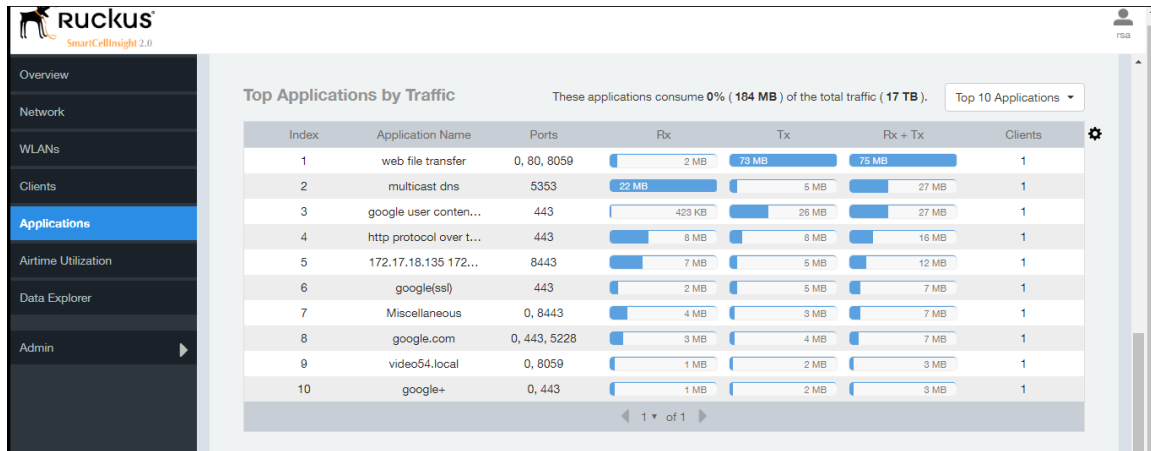
Figure 56: Top 10 Applications by Clients Count



## Applications - Top Applications by Traffic


The Top Applications by Traffic report displays the the top (10, 20 or 50) applications by amount of traffic generated over the time period selected.

Figure 57: Top Applications by Traffic



## Applications - Top Applications by Clients

Use the Top Applications by Clients table to view which applications are being used by the most clients on the network.

You can sort the table by any column by clicking on the column heading. Additionally, you can customize the table by clicking the gear icon  and selecting from the list of columns to display.

You can also select whether to display only the top 10 (default value), 20, 50, or 100 applications, or list all applications. Configure the number of rows per a page using the **Rows per Page** list in the table settings drop down menu.

Figure 58: Top Applications by Clients

**Top Applications by Clients**      These applications consume **0%** (**13 MB**) of the total traffic (**17 TB**).      Top 10 Applications ▾

Index	Application Name	Ports	Clients	Rx	Tx	Rx + Tx
1	172.17.18.135 172...	8443	1	7 MB	5 MB	12 MB
2	172.17.19.74 172.1...	8443	1	14 KB	27 KB	42 KB
3	172.17.19.74 172.1...	8443	1	19 KB	42 KB	61 KB
4	172.17.19.74 172.1...	8443	1	15 KB	30 KB	45 KB
5	172.17.19.74 172.1...	8443	1	7 KB	14 KB	21 KB
6	172.17.19.74 172.1...	8443	1	19 KB	42 KB	61 KB
7	172.17.19.74 172.1...	8443	1	12 KB	29 KB	41 KB
8	172.17.19.74 172.1...	8443	1	15 KB	30 KB	45 KB
9	172.17.19.74 172.1...	8443	1	7 KB	14 KB	21 KB
10	172.17.19.74 172.1...	8443	1	26 KB	57 KB	82 KB



# Airtime Utilization Report

The Airtime Utilization report provides the overview of airtime utilization for radios and APs.

The Airtime Utilization report lists the APs by airtime utilization for radio (2.4 and 5 GHz). It also lists the airtime utilization trend over time based on APs and radio.

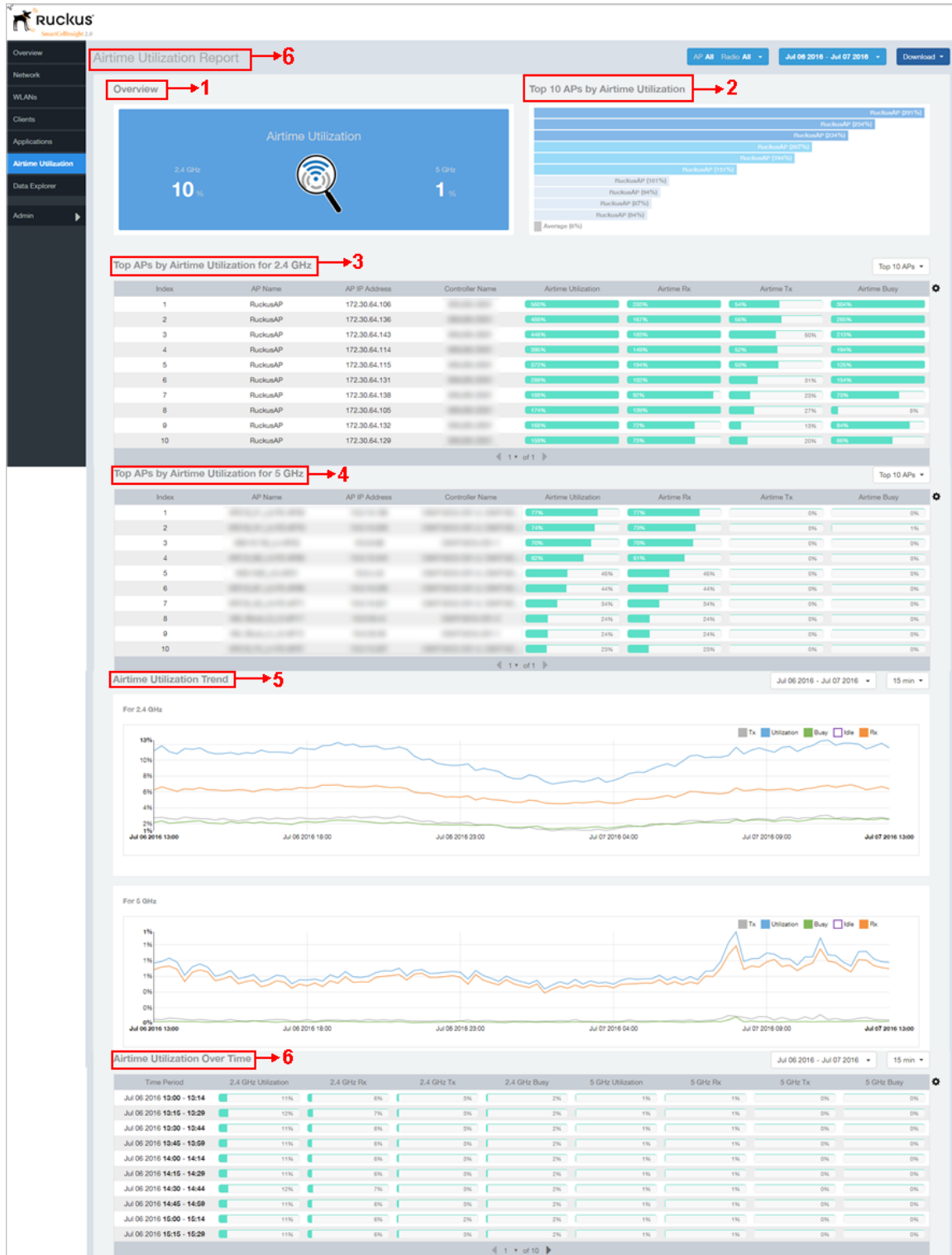


Figure 59: Airtime Utilization Report

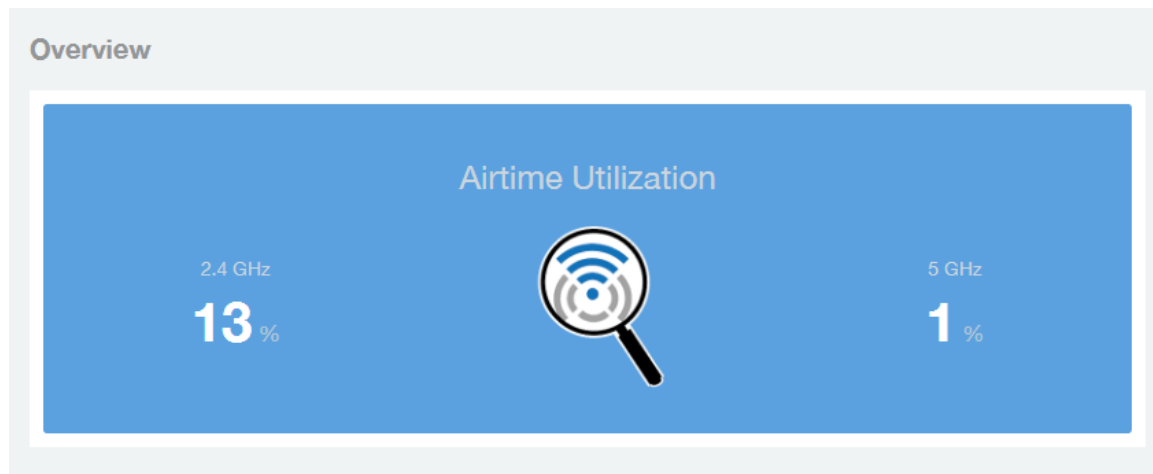
The Airtime utilization report consists of several sections as per the table below. For ease of reading, each section has been numbered in the figure above, and corresponds to the table below.

1	<a href="#">Overview</a>	The overview report section contains the total number of APs based on the radio category.
2	<a href="#">Top 10 APs by Airtime Utilization</a>	This tabular report pertains to top ten APs airtime utilization, represented as percentage. This is based on your selection of APs, Radio and Date Range filters.
3	<a href="#">Top APs by Airtime Utilization for 2.4 GHz</a>	This tabular report pertains to top APs airtime utilization based on the radio category of 2.4 GHz.
4	<a href="#">Top APs by Airtime Utilization for 5 GHz</a>	This tabular report pertains to top APs airtime utilization based on the radio category of 5 GHz.
5	<a href="#">Airtime Utilization Trend</a>	This graph pertains to the utilization trend of APs based on the radio category of 2.4 and 5 GHz.
6	<a href="#">Airtime Utilization Over Time</a>	The tabular report contains the utilization trend of APs as per the selected components.

## Airtime Utilization - Overview

The Airtime Utilization Overview report displays the aggregate utilization rates for all of the 2.4 and 5 GHz radios on all APs selected for the time period.

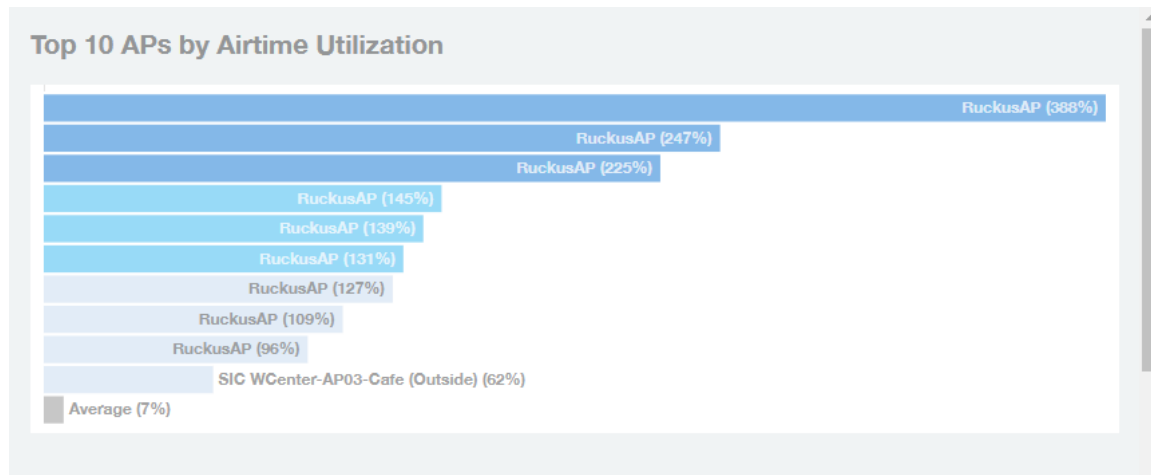
**Figure 60: Airtime Utilization Overview**



## Top 10 APs By Airtime Utilization


Use the Top APs by Utilization report to view which APs have the highest airtime utilization rates.

Figure 61: Top 10 APs by Airtime Utilization



## Top APs by Airtime Utilization for 2.4 Ghz

This report displays which APs have the highest utilization on the 2.4 GHz radio.

Use this report to view a list the top APs with the highest airtime utilization sorted according to the selected columns. Click the gear icon  to select which columns to display, or click any column heading to sort by that column.

You can also select whether to display the top 10, 20, 50, or 100 APs by airtime utilization from the Top APs filter. The number of rows per page can be defined using the **Rows per page** option in the table settings drop down list.

Figure 62: Top APs by Airtime Utilization for 2.4 GHz

Top APs by Airtime Utilization for 2.4 GHz

Index	AP Name	AP IP Address	Controller Name	Airtime Utilization	Airtime Rx	Airtime Tx	Airtime Busy
1	RuckusAP	192.168.1.10	192.168.1.1	43%	15%	44%	23%
2	RuckusAP	192.168.1.11	192.168.1.1	38%	14%	47%	14%
3	RuckusAP	192.168.1.12	192.168.1.1	38%	18%	43%	13%
4	RuckusAP	192.168.1.13	192.168.1.1	28%	11%	44%	13%
5	RuckusAP	192.168.1.14	192.168.1.1	23%	8%	20%	13%
6	RuckusAP	192.168.1.15	192.168.1.1	23%	10%	44%	7%
7	RuckusAP	192.168.1.16	192.168.1.1	13%	5%	20%	5%
8	RuckusAP	192.168.1.17	192.168.1.1	13%	7%	22%	5%
9	RuckusAP	192.168.1.18	192.168.1.1	13%	7%	24%	5%
10	RuckusAP	192.168.1.19	192.168.1.1	13%	8%	22%	10%


Table Settings

- AP MAC
- Airtime Busy
- Clients
- Rx Mgmt
- Controller MAC
- Tx Mgmt
- Airtime Utilization
- Airtime Idle
- Index
- User Traffic
- Total Rx
- Airtime Rx
- Total Tx
- AP IP Address
- Controller Name
- Airtime Tx
- Sessions
- Total Traffic
- AP Name
- Rx User
- Tx User
- Mgmt Traffic
- Controller Serial

Rows per page: 10

## Top APs by Airtime Utilization for 5 GHz

This report displays which APs have the highest utilization on the 5 GHz radio.

Use this report to view a list the top APs with the highest airtime utilization sorted according to the selected columns. Click the gear icon  to select which columns to display, or click any column heading to sort by that column.

You can also select whether to display the top 10, 20, 50, or 100 APs by airtime utilization from the Top APs filter. The number of rows per page can be defined using the **Rows per page** option in the table settings drop down list.

**Figure 63: Top APs by Airtime Utilization for 5 GHz**

Top APs by Airtime Utilization for 5 GHz

Index	AP Name	AP IP Address	Controller Name	Airtime Utilization	Airtime Rx	Airtime Tx	Airtime Busy
1	WPE_8_P2_L3-F2-AP06	192.16.206	CMPT-803A-C01-2, CMPT-803A-C01-1	78%	78%	0%	0%
2	WPE_8_P2_L3-F2-AP05	192.16.206	CMPT-803A-C01-1	73%	73%	0%	0%
3	RuckusAP	172.28.84.138	192.168.1.1	66%	60%	6%	0%
4	RuckusAP	172.28.84.139	192.168.1.1	64%	52%	3%	5%
5	RuckusAP	172.28.84.137	192.168.1.1	59%	29%	19%	10%
6	WPE_8_P2_L3-F2-AP06	192.16.206	CMPT-803A-C01-2, CMPT-803A-C01-1	55%	51%	0%	0%
7	WPE_8_P2_L3-F2-AP07	192.16.207	CMPT-803A-C01-2, CMPT-803A-C01-1	49%	49%	0%	0%
8	WPE_8_P2_L3-F2-AP05	192.16.205	CMPT-803A-C01-2, CMPT-803A-C01-1	48%	47%	0%	1%
9	RuckusAP	172.28.84.136	192.168.1.1	45%	42%	2%	2%
10	WPE_8_P2_L3-F2-AP06	192.16.206	CMPT-803A-C01-2, CMPT-803A-C01-1	45%	44%	0%	1%

## Airtime Utilization Trend

This graph shows the airtime utilization trends for 2.4 and 5 GHz radios in percentages over time.

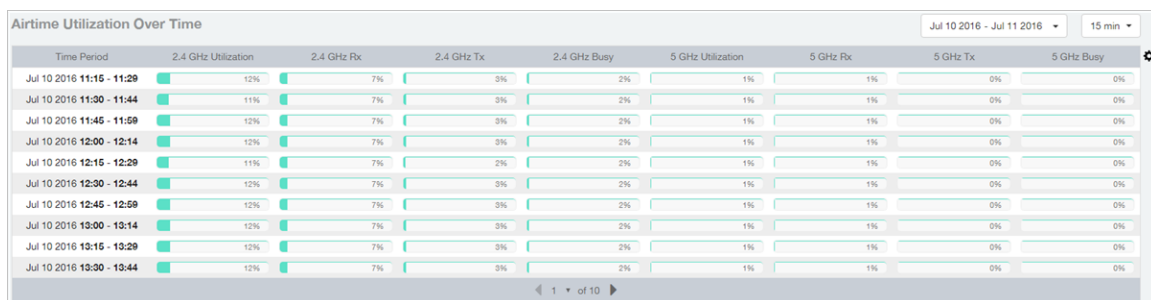
Figure 64: Airtime Utilization Trend



## Airtime Utilization - Over Time

Use the Airtime Utilization Over Time report to compare utilization rates between time periods, and to examine specific airtime utilization data, such as time spent busy/idle, transmitting/receiving, user traffic vs. management traffic, etc.

Figure 65: Airtime Utilization Over Time



# Data Explorer and Data Cubes

The Data Explorer and its individual cubes allows you to view, filter, and manipulate data in virtually any way and from any perspective you can imagine.

## Data Exploration

Data exploration is the act of diving into the minute details of an OLAP (OnLine Analytical Processing) cube.

Consider your data to be a 3-dimensional cube which you would like to explore, both inside out and outside in, so that you could glean more insights from your data. Of course, most real world datasets will have more than 3 dimensions, but the concepts from a 3D cube can be directly extended to a multi-dimensional hypercube.

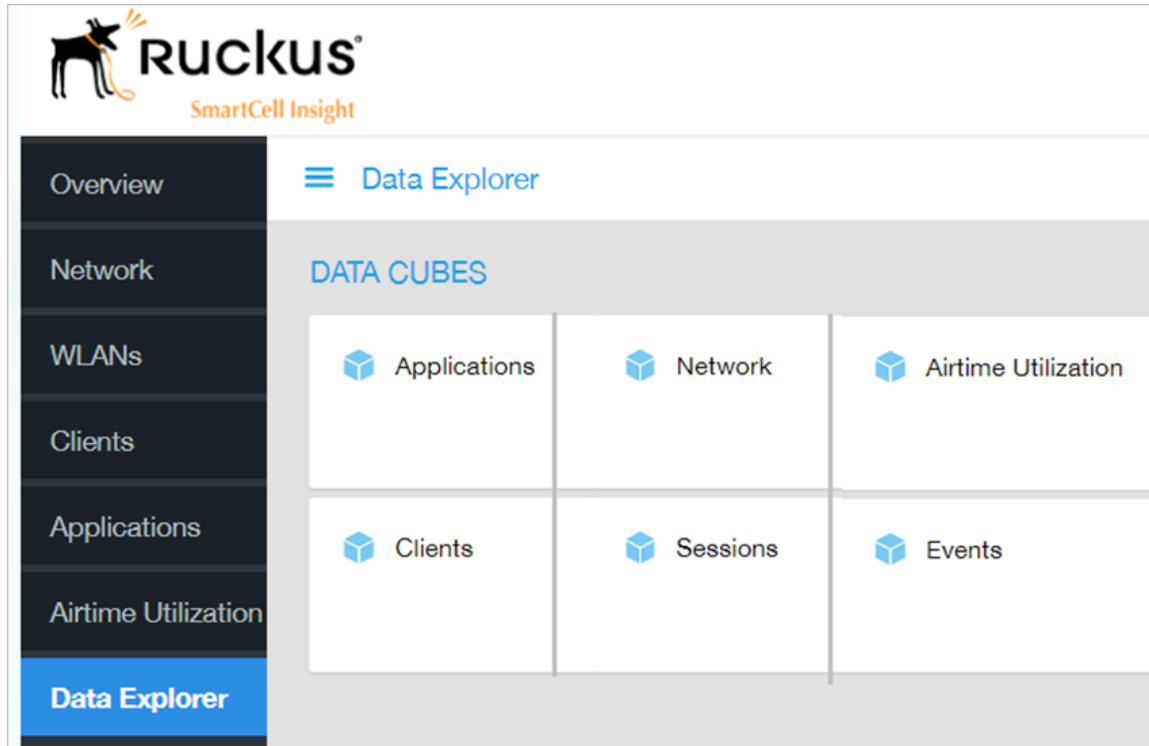
With an OLAP cube, there are actually only 5 operations that you can perform:

- 1. Slice:** Think of slicing a piece of cheese – you make a single cut to the cheese to expose the insides. A typical slice operation is the time slice. Instead of looking at all the data from Day 1, you slice the data to just the last 30 days.
- 2. Dice:** Think of dicing a piece of cheese – you make multiple cuts and mash the cheese into much smaller pieces. A typical dice operation is after slicing the cube to just the last 30 days, you “cut” it further by filtering by the controller name and AP group. So what you have after the above slice and dice, is a smaller piece of the original OLAP cube.
- 3. Drill Up/Down:** In order to get into the details, you drill down into a specific AP in the above AP Group, and further drilling down to a specific client hostname. Conversely, you could also search for client MAC in the beginning and drill up to see which AP and controller it belongs to.
- 4. Roll Up:** This operation typically involves certain numbers, also known as measures which will be explained in detail below. In short, after doing your slice, dice and drill down, you would like to “roll up” the numbers to find out the total transmit traffic for the selected APs.
- 5. Pivot:** Pivot is simply an operation that allows you to view the data from a different perspective. For example, you have a table showing a list of controllers and the APs belonging to each controller. You may pivot the table to show a list of APs and the controllers they belong to. Think of pivoting as changing the hierarchy between the dimensions.

Thus, as you use the custom reporting, always refer to these 5 simple operations and you will never be lost! A good reference on OLAP cubes can be found in Wikipedia

[https://en.wikipedia.org/wiki/OLAP\\_cube](https://en.wikipedia.org/wiki/OLAP_cube)

## Figure 66: Data Explorer and Data Cubes



The SCI Data Explorer allows you to explore the data under various categories, using your own permutations and combinations, unlike the other canned reports available. The Data Explorer contains the following data cubes or data tables:

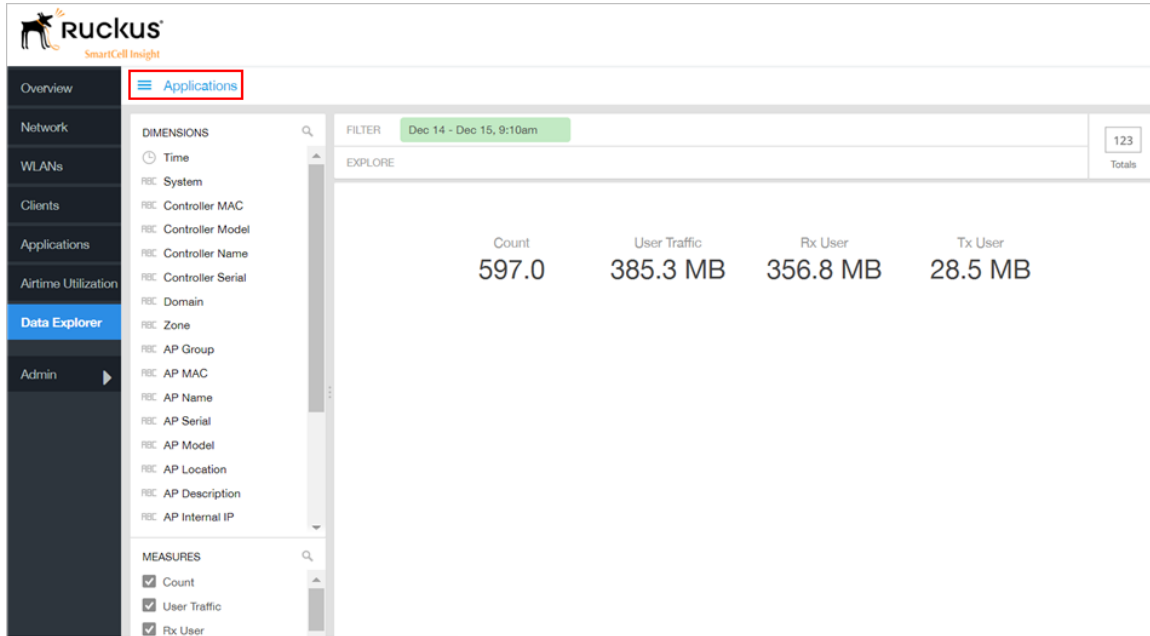
- [Applications](#) on page 56
- [Network](#) on page 57
- [Airtime Utilization](#) on page 58
- [Clients](#) on page 58
- [Sessions](#) on page 59
- [Events](#) on page 59

## Applications

The Applications cube allows you to explore the application data in any method of your choice.

**Figure 67: Data Explorer - Application**





## Network

Network cube allows you to explore the network traffic data and use or share the same for custom requirements.

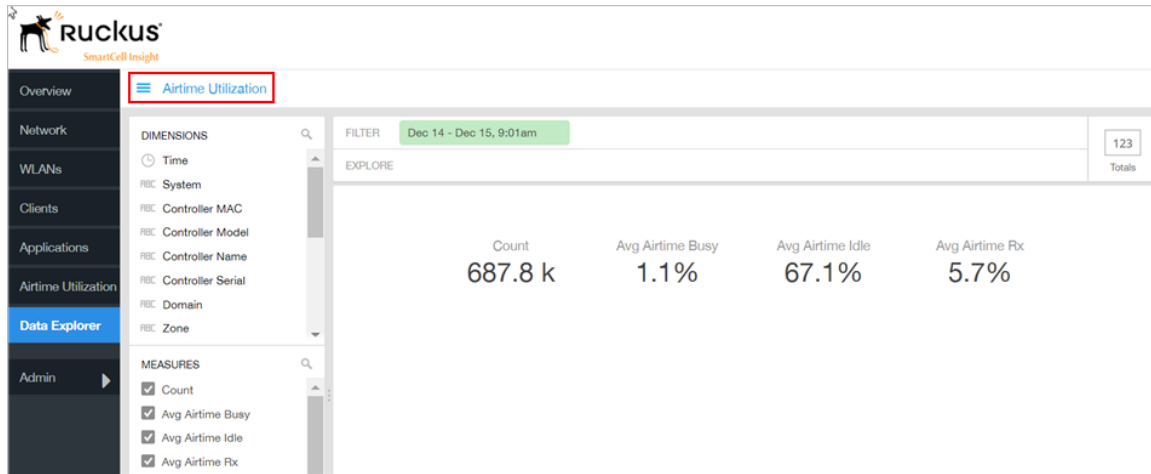
Figure 68: Data Explorer - Network



## Airtime Utilization

Airtime Utilization cube allows you to explore the airtime utilization data in any method of your choice. It provides you a platform to experiment with the data and use the same for custom requirements.

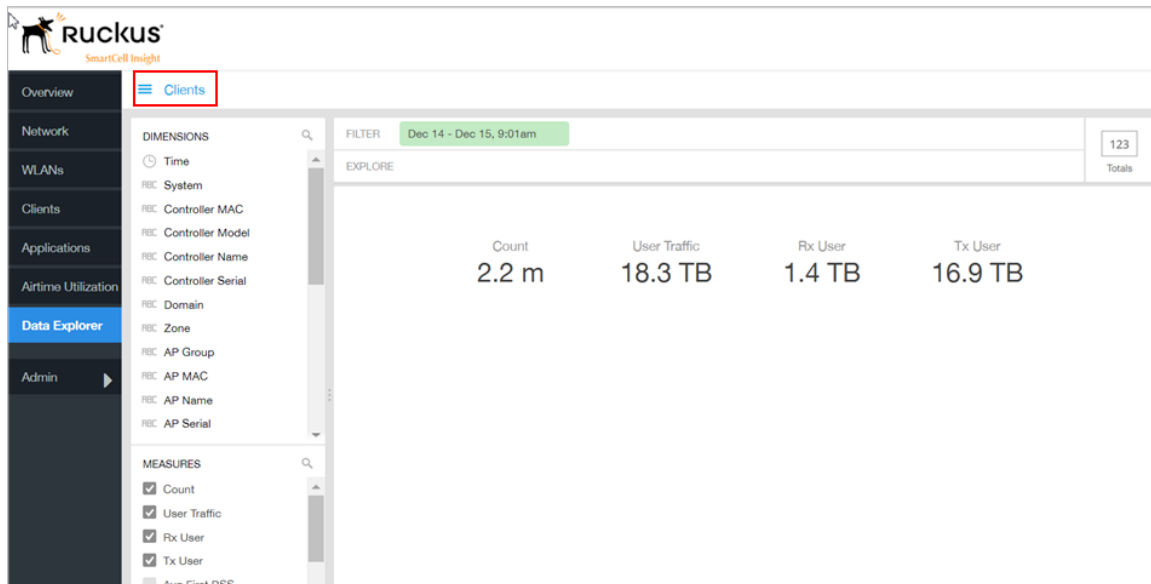
Figure 69: Data Explorer - Airtime Utilization



## Clients

The Clients cube allows you to explore client data in any method of your choice.

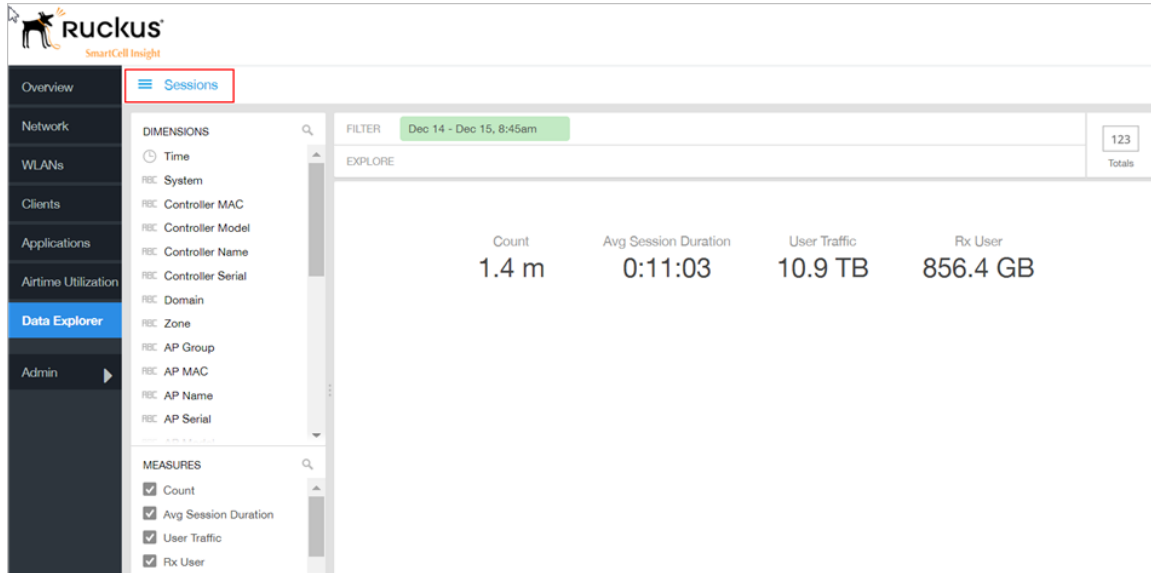
Figure 70: Data Explorer - Clients



## Sessions

The Sessions cube allows you to explore the sessions summary in any method of your choice.

Figure 71: Data Explorer - Sessions



## Events

Events cube allows you to explore the information on events and share the same as per custom requirements.

Figure 72: Data Explorer - Events

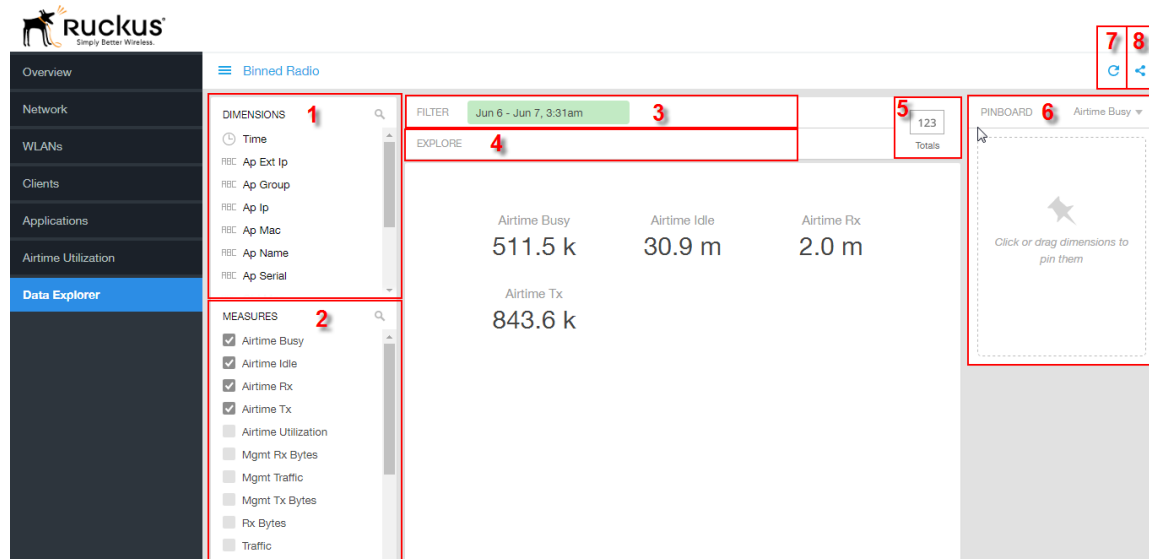
The screenshot shows the Ruckus SmartCell Insight Data Explorer interface. The sidebar on the left contains navigation options: Overview, Network, WLANs, Clients, Applications, Airtime Utilization, Data Explorer (highlighted), and Admin. The 'Events' tab is selected in the top navigation bar. The main area displays a data cube for 'Dec 15' with 123 total records. The data is presented in a table with three columns: Count, Reboot Count, and AP Count.

Count	Reboot Count	AP Count
98 k	351	2 k

# Data Cube Filters

The Data cubes contain groups of data sets, some of which exist in multiple cubes. The data cube filters are common to all the data cubes and are explained in detail in the sections below.

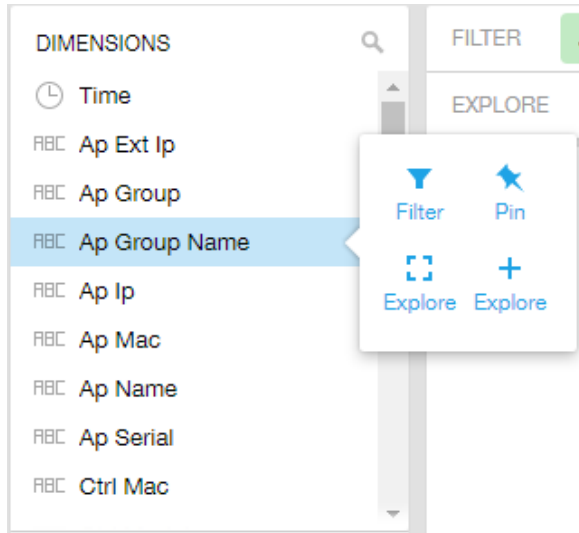
Figure 73: Data Cube Filters



The data cube filters are common to all the data cubes and are explained in detail in the sections below.

## Dimensions

Figure 74: Dimensions

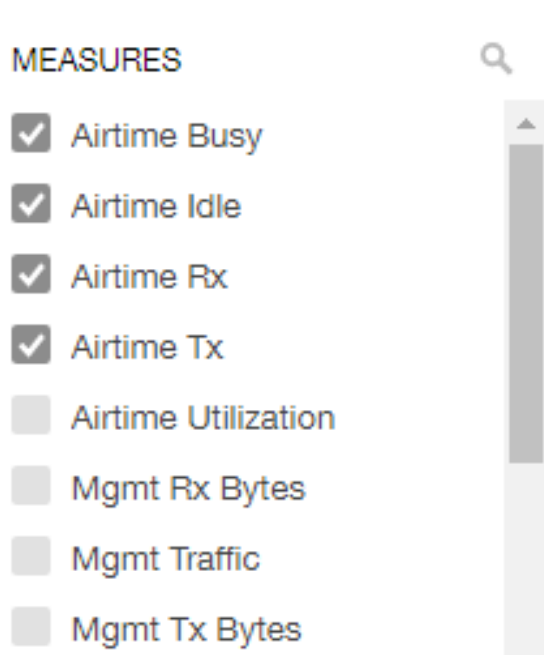


Number 1 in [Figure 73: Data Cube Filters](#) on page 61. Lists industry standard details for Radio such as Time, AP name, System, and Zone name. You can use one or more dimensions to:

- Filter - on one or more dimensions. The default dimension is Time.
- Explore - on one or more dimensions. Every dimension used in Explore can be sorted by one or more selected measures, and the number to be listed in the table can be selected (5, 10, 25, 50, 100, 500 or 1000). You can also change the sorting order of the dimensions to be explored and pivot or change the hierarchy.
- Pin - one or more dimensionson on the Pinboard for easy reference.

## Measures

### Figure 75: Measures



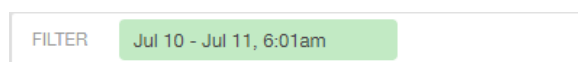
Number 2 in [Figure 73: Data Cube Filters](#) on page 61. Lists numbers such as Rx bytes, Traffic and Tx bytes. Select one or more measures by which you want to sort the selected dimension (in Explore). The first four measures in the list are the default measures.

Based on the selected cube, measures could vary. For example, **Events** displays the count, reboot count and AP count. Newly added measures are:

- Unique Client Count for Clients and Sessions data cubes
- Hostname Count for Clients and Sessions data cubes
- AP Count for all data cubes
- Username count for Clients and Sessions data cubes

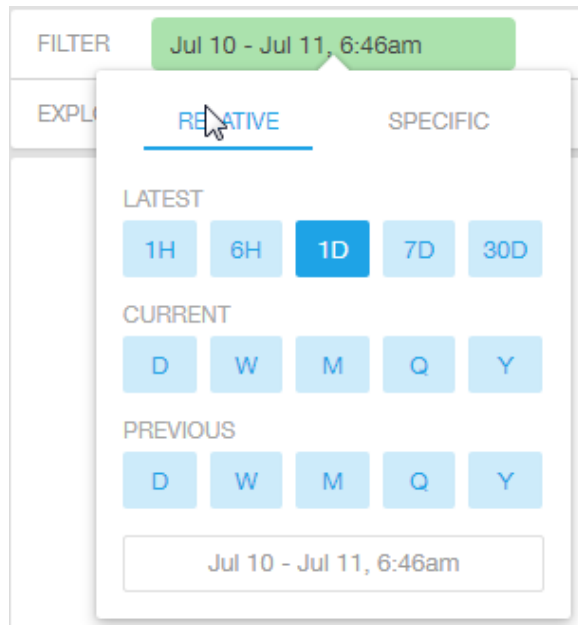
## Filter

### Figure 76: Filter



Number 3 in [Figure 73: Data Cube Filters](#) on page 61. Segregates the data by dimensions such as Time Range, and other dimensions. You can filter on one or more dimensions, and change the sorting hierarchy as required. You can also define the dimensions based on specific properties of the dimension, for example, Time has relative and specific settings. The default dimension is Time, as the databases are very large and can crash the system without this filter.

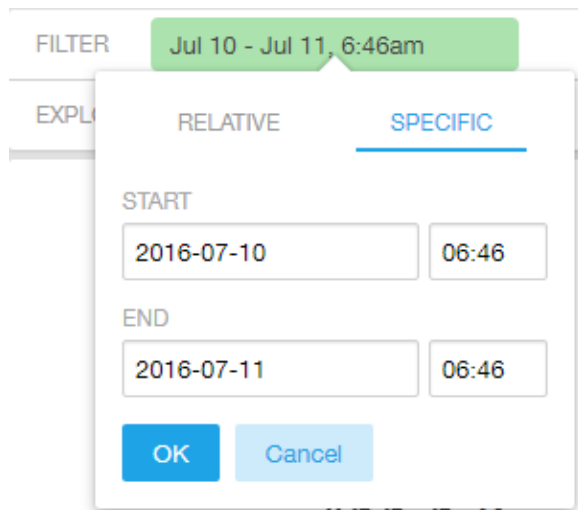
### Figure 77: Time - Relative Settings



You can specify the:

- Latest time of 1 hour, 6 hours, 1 day, 7 days, or 30 days.
- Current time of day, week, month, quarter, or year.
- Previous time of day, week, month, quarter, or year.

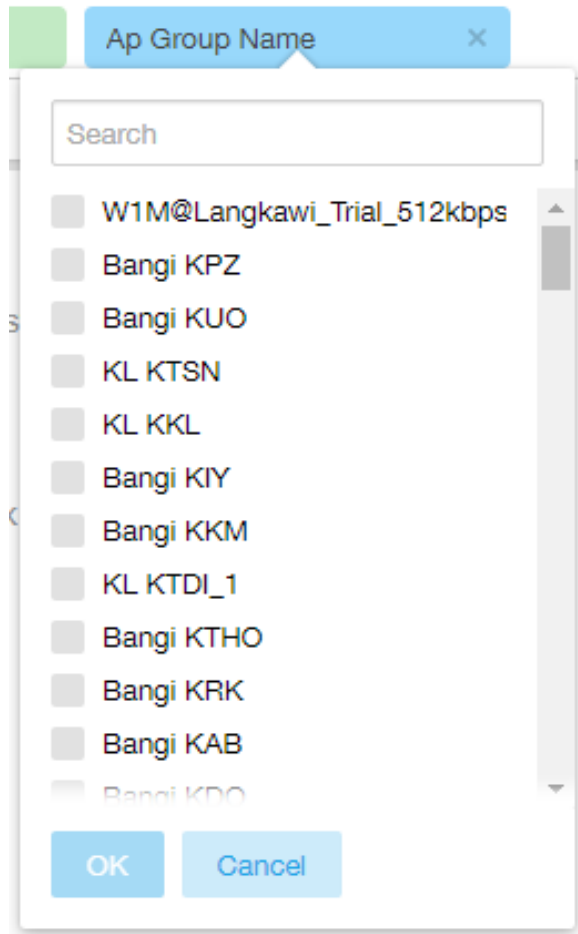
**Figure 78: Time - Specific Settings**



You can specify the start and end dates and times and click **OK** to save the details.

**Figure 79: Dimension Options**

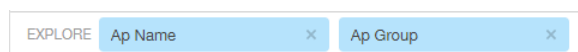




You can search the list of the dimension and choose specific entries. By default all the data that matches the dimension is listed.

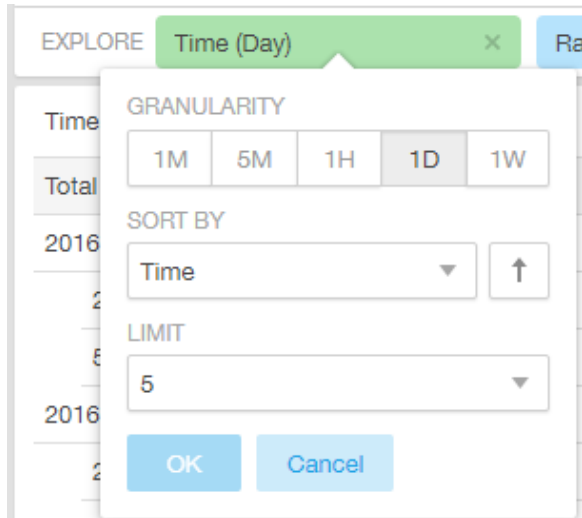
## Explore

**Figure 80: Explore**



Number 4 in [Figure 73: Data Cube Filters](#) on page 61. Enables visualization based on dimensions and time (data granularity).

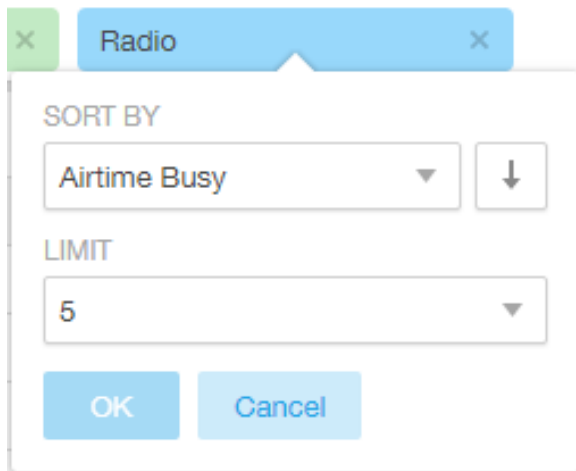
**Figure 81: Explore Time**



Use this filter to:

- Set the data granularity to 1 minute, 5 minutes, 1 hour, 1 day, or 1 week.
- Sort by any of the measures related to the dimension.
- Limit the number of rows displayed for the dimension to 5, 10, 25, 50, 100, 500 or 1000.

**Figure 82: Sort Dimension by Measure**



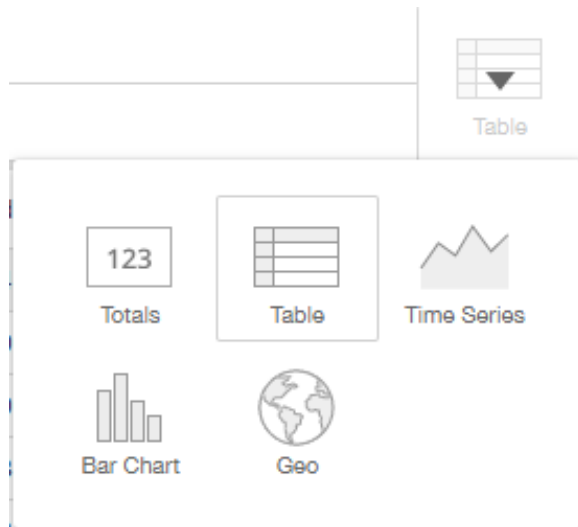
Use this filter to:

- Sort by any of the measures related to the dimension.
- Limit the number of rows displayed for the dimension to 5, 10, 25, 50, 100, 500 or 1000.

You can explore on one or more dimensions using a methodology similar to pivot tables, and change the sorting hierarchy as required. You can define the number of rows to be listed on the screen.

## View Outputs

Figure 83: View Outputs



Number 5 in [Figure 73: Data Cube Filters](#) on page 61. Create outputs from visualization in the form of Totals, Tables, Bar chart, and Time Series. The default view is Totals. The Geo view is not supported in this release.

## Pinboard

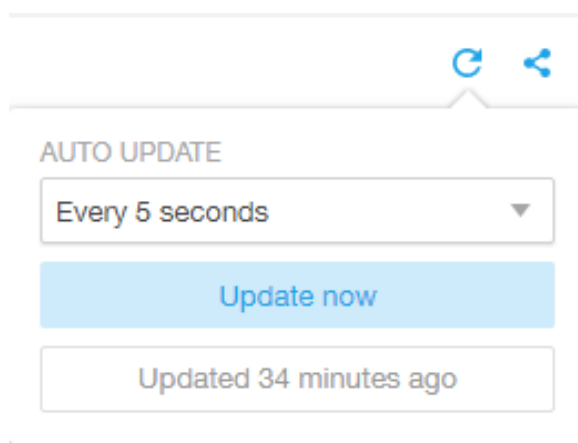
Figure 84: Pinboard



Number 6 in [Figure 73: Data Cube Filters](#) on page 61. Click or drag dimensions and pin them on the pinboard. Retain the dimensions for ready reference during visualization. You can sort the dimensions pinned on the pinboard by the drop down list of measures on the top right hand corner of the pinboard.

## Refresh Options

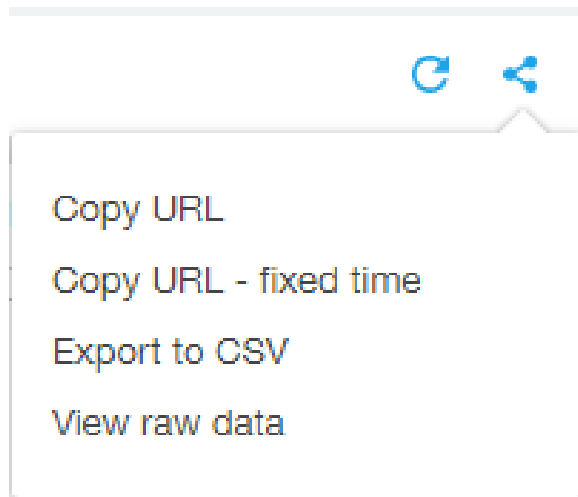
**Figure 85: Refresh**



Number 7 in [Figure 73: Data Cube Filters](#) on page 61. Refresh or auto update the screen at a selected time of 5 seconds, 15 seconds, every minute, 5 minutes, 10 minutes, 30 minutes, or not at all (off). The default option is **Update now**. It displays at the bottom of the pop-up, when the last update occurred.

## Share Link

Figure 86: Share Link



Number 8 in [Figure 73: Data Cube Filters](#) on page 61. You can share the URL, Export to CSV, View raw data, or download the information.

# Admin Console

The Admin pages provide options for configuring SCI's administrative settings, performing diagnostics and performing system updates.

The Admin section is divided into three pages:

- [Status and Updates](#)
- [Diagnostics](#) on page 70
- [Settings Page](#)
- [License Page](#)

**NOTE:** For information on SCI installation, refer to the SCI 2.0 Installation Guide, available from [support.ruckuswireless.com](http://support.ruckuswireless.com)

## Diagnostics

The Diagnostics admin page provides links to external tools that can be used to troubleshoot issues in database storage and data transformation.

The following links to diagnostic tools are provided:

- **Data ingestion and ETL jobs:**The Spark Master UI provides details of workers, running applications, running drivers, completed applications and completed drivers.

For more details, see

<http://spark.apache.org/docs/latest/spark-standalone.html>

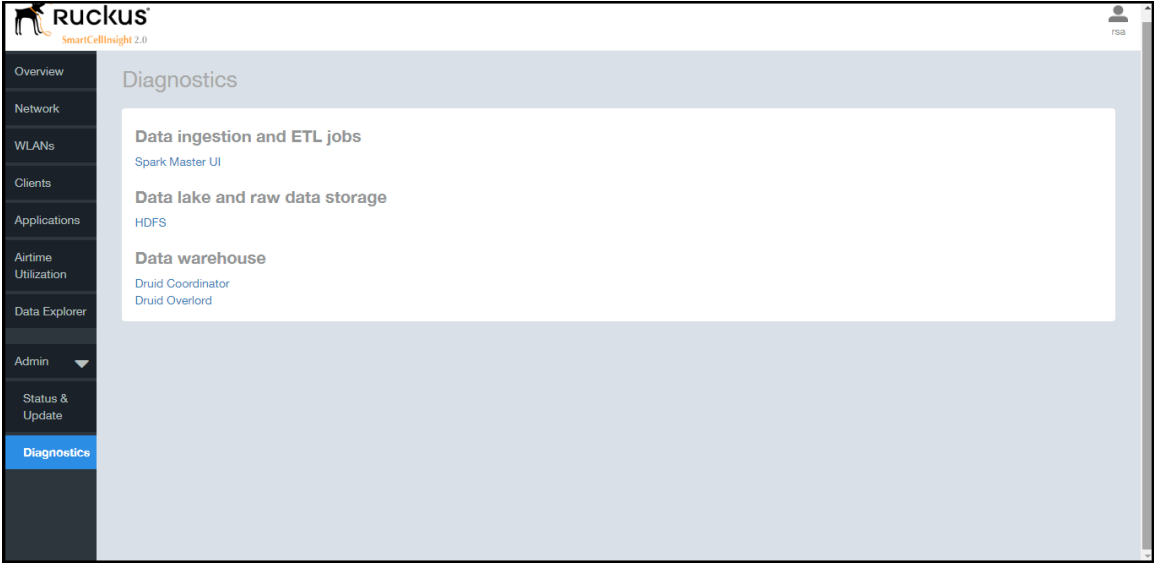
- **Data lake and raw data storage:**The HDFS or Hadoop system provides details of datanodes, datanode volume failures, snapshot summaries, startup progress, and utilities such as logs and browsing the file system.

For more details, see [https://en.wikipedia.org/wiki/Apache\\_Hadoop](https://en.wikipedia.org/wiki/Apache_Hadoop)

- **Data warehouse:**The Druid Coordinator or Console provides details of the data sources, cluster and indexing services.

For more details, see <http://druid.io/docs/latest/design/coordinator.html>

**Figure 87: Diagnostics**



# SCI Settings

The Settings screen is the location to store and update settings required for various features of SCI.

SCI requires certain settings to enable different areas of the functionality. These settings are listed in this section.

## SMTP Settings

**Outgoing Mail Server (SMTP)**

Unable to update SMTP settings

**Host:** email-smtp.us-west-2.amazonaws.

Cannot connect to the SMTP server → SMTP authentication

**Port:** 587

**Username:**

**Password:** Leave blank to remain unchanged

**Encryption:** STARTTLS

**From Email:**

**Figure 88: SMTP Settings**

You can configure the SMTP mail server to send or receive e-mail messages to or from SCI. The SMTP settings section contains the configuration details:

- **Host:** Enter the name of the host. The system now checks the SMTP connectivity and displays an error if the authentication is not successful.
- **Port:** Enter the port number.
- **Username:** Enter the user name required to access the SMTP mail server.
- **Password:** Enter the password required to access the SMTP mail server.
- **Encryption:** Select the encryption method from the drop down list. You can also disable the encryption by selecting **Disabled** from the drop down list.



- **From email:** Enter the email ID that the messages are sent from.

### Controller Settings

**NOTE:** The **Last Contacted** column in the above figure lists the last SCG controller connection and uptime status.

**Figure 89: Controller Settings**

<input type="checkbox"/>	System ID	Type	URL	User	Last Contacted
<input type="checkbox"/>	SCI_14_vSZ	SmartZone (SCG/SZ/vSZ)	https://52.11.116.252:3001	admin	3 minutes ago
<input type="checkbox"/>	SCI_14_ZD	ZoneDirector	https://52.11.116.252:3000	admin	3 minutes ago

**Figure 90: Adding Controller Settings for ZoneDirector**

**New Controller** [X]

**System ID:**

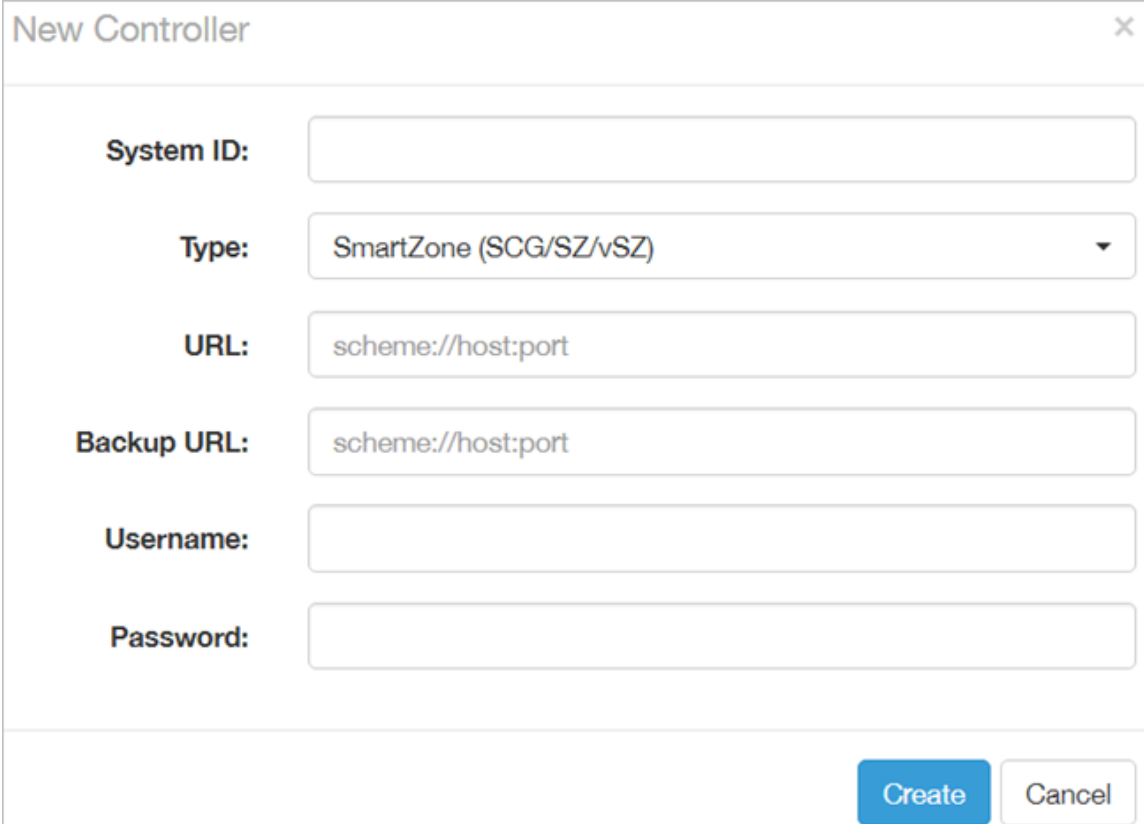
**Type:**

**URL:**

**Username:**

**Password:**

**Figure 91: Adding Controller Settings for SmartZone Controllers**



**New Controller** [X]

**System ID:**

**Type:** SmartZone (SCG/SZ/vSZ) ▼

**URL:**

**Backup URL:**

**Username:**

**Password:**

**Create** **Cancel**

If you have an SmartZone cluster, you can provide a backup URL for SCI to connect to it if it is not able to connect to the default location.

You need to add these settings for every controller that you add to SCI.

- **System ID:** type the name of the controller you want to add to SCI

**NOTE:** The controller name should be unique and cannot be changed.

- **Type:** select the controller type from the drop-down menu
- **URL:** type the URL of the controller
- **Backup URL:** type the URL of the backup controller location
- **Username:** type the username to access the controller
- **Password:** type the password to access the controller

**NOTE:** The username and password must be created in the controller.

Click **Create** to save the controller settings. An entry appears in the Controller section with the controller details. You can delete a controller by selecting it from the Controller section, and then clicking **Delete**.

# License

SCI 2.0 supports a trial license that you can use to try out the product before you purchase it. SCI 2.0 also supports a permanent SCI license.

SCI has a built in trial license which is valid for 3 months. This license needs to be updated to the permanent license before the trial license expires. Follow these steps to upgrade to the permanent license.

1. In the SCI 2.0 web UI, click **Admin > License**.
2. Generate a serial number for the SCI product.
3. Use the serial number to purchase and activate a license from the Ruckus support website. The Ruckus website provides a license file that you can download.
4. Upload this file to SCI on the License page.

You have successfully upgraded to the permanent license.

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