USER GUIDE

Ruckus SmartCell Insight™ User Guide, 5.3.0

Supporting SmartCell Insight™ 5.3.0

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Contents

About this Document **9**
- Overview 9
- Document Conventions 9
- Related Documentation 10
- Documentation Feedback 10

SmartCell Insight Overview **11**
- SmartCell Insight Introduction 11
- Definition of Terms 11
- Navigating the SCI User Interface 12
- Header Panel 13
- Using the Navigation Bar 15
- Using the Scheduler 15

Overview Dashboard **19**
- Using the Overview Dashboard - Content Panel 19
- Using Ruckus Smart Analytics 21
  - Actions You Can Perform on the Smart Analytics Display 22
  - How to View Details from the Ruckus Smart Analytics Display 24

Filters **27**
- Working With Filters 27
- AP, SSID and Radio filter 27
- Date Filter 29
- Download 29
- Rx+Tx Filter 30
- Time Filter 30
- AP Filters 31
- SSID Filter 31
- Client Filter 32
- Application Filter 32
- Alarms Filter 32
- Events Filter 33
- Sessions Filter 33
- Using Saved Filters 33
  - Actions You Can Take on a Saved Filter 37

Network Report Dashboard **39**
- Network - Wireless Report 39
  - Overview 39
  - Traffic Distribution 40
  - Top APs by Traffic 41
  - Top APs by Client Count 42
  - Traffic Trend 43
  - Traffic Over Time 44
- Network - Wired Report 44
  - Network - Wired Report Overview 45
  - Network - Wired Report Traffic Distribution by Switch Model and Port Speed 45

Network - Wired Report Top Switches by PoE Usage 46
Network - Wired Report Top Switches by PoE Usage (Table) 47
Network - Wired Report Top Switches By Traffic 47
Network - Wired Report Top Switches by Traffic (table) 48
Network - Wired Report Traffic Trend 48

Inventory Dashboard 49
Inventory - APs Report 49
Inventory - APs Report Overview 50
Inventory - APs Report: Top APs by Offline Duration 51
Inventory - APs Report: Top APs by Offline Duration (table) 51
Inventory - APs Report: AP Count Trend 52
Inventory - APs Report: AP Status Trends 52
Inventory - APs Report: Top AP Models 53
Inventory - APs Report: Top AP Models (table) 53
Inventory - APs Report: Top AP Software Versions 54
Inventory - APs Report: Top AP Software Versions (table) 54
Inventory - APs Report: Top 10 AP Reboot Reasons 55
Inventory - APs Report: Top APs by Reboot Count 55
Inventory - APs Report: Top APs by Reboot Count (table) 56
Inventory - APs Report: Top 10 AP Alarm Types 56
Inventory - APs Report: APs Configured in Multiple Systems 57
Inventory - APs Report: AP Details for Online/Offline Status 57
Inventory - APs Report: AP Details for Other Statuses 58
Inventory - Controllers Report 58
Inventory - Controllers Report Overview 59
Inventory - Controllers Report: Resource Utilization 60
Inventory - Controllers Report: License Utilization 60
Inventory - Controllers Report: KRACK Assessment 61
Inventory - Switches Report 62
Inventory - Switches Report Overview 63

WLANs Report Dashboard 67
WLANs Report 67
Overview 67
SSID Changes Over Time 68
Top SSIDs by Traffic 68
Top SSIDs by Client Count 69
Active SSIDs Trend 71

Clients Report Dashboard 73
Clients Report 73
Overview 73
Top 10 Unique Clients by Traffic 74
Clients Details 74
Unique Clients Trend 75
Top 10 OS by Client Count 76
Top 10 Manufacturers by Client Count 76
Top 10 Authentication Methods 76

Applications Report Dashboard 79
Applications Report 79

Applications - Overview 80
Applications - Top 10 by Traffic Volume 81
Applications - Top Applications by Traffic (table) 81
Applications - Top Applications by Client Count 82
Applications - Top Applications by Client Count (table) 82

Airtime Utilization Report Dashboard 83
Airtime Utilization Report 83
Overview 83
Top 10 APs by Airtime Utilization 84
Top APs by Airtime Utilization for 2.4 Ghz 84
Top APs by Airtime Utilization for 5 GHz 85
Airtime Utilization Trend 85
Airtime Utilization Over Time 86

AP Details Report Dashboard 87
AP Details Report 87
AP Details - Summary 89
AP Details - Performance 90
AP Details - Details 90
AP Details - Stats 91
AP Details - Uptime History 91
AP Details - Traffic Trend 92
AP Details - Unique Clients Trend Over Time 92
AP Details - Top 10 Clients by Traffic Volume 93
AP Details - Top 10 Applications by Traffic Volume 94
AP Details - Top SSIDs by Traffic 94
AP Details - Sessions 94
AP Details - RSS Trend 95
AP Details - SNR Trend 95
AP Details - Airtime Utilization Trend 96
AP Details - Clients Details 97
AP Details - Alarms 97
AP Details - Events 98
AP Details - Anomalies 98

Client Details Report Dashboard 99
Client Details Report 99
Client Details - Summary 100
Client Details - Stats 101
Client Details - Top 10 Applications by Traffic Volume 101
Client Details - Traffic Trend 102
Client Details - RSS Trend 102
Client Details - SNR Trend 103
Client Details - Sessions 103

Switch Details Report Dashboard 105
Switch Details Report 105
Switch Details - Summary 106
Switch Details - Details 107
Switch Details - Resource Utilization 107
Switch Details - Top Ports By Traffic 108

Switch Details - Traffic Trend....108
Switch Details - LLDP Neighbor List....109
Switch Details - Uptime History....109

Data Explorer Dashboard....111
Data Explorer and Data Cubes....111
Data Exploration....111
Applications....113
Network....113
Airtime Utilization....114
Clients....115
Sessions....115
Events....116
AP Inventory....116
AP Alarms....117
Controller Inventory....117
Rogue APs....118
Switch Inventory....118
Switch Network....119
WiFi-Calling....120
Data Cube Filters....121
Dimensions....122
Measures....131
Filter....135
Explore....137
View Outputs....138
Add to Dashboard....139
Share Link....139
Options....140
Pinboard....141
Time Compares....141
Creating a Data Explorer Dashboard....147
Actions You Can Perform on an Existing Dashboard....152
Opening a Dashboard....152
Editing a Dashboard....153
Using the Explain Feature....155
Applying Filters At the Dashboard Level....156
Exporting Raw Data Using the SCI Virtual Machine Command Line Interface....157
Template File for Exporting Raw Data....158
Raw Data Output for Dimensions and Measures....159

PII Hashing....169
Hashing Data-Source Attributes....169
Template File for PII Hashing....169

Admin Dashboard....171
Admin Console....171
Status and Update....171
Nodes....171
Notifications....172
Update....173
Diagnostics....174

Settings....176
Controller Settings....176
SMTP Settings....177
Data Retention....179
Instantly Pruning Old Data....180
Authentication Tab on the SCI UI....181
License....203
PCI Profiles....204
Creating a PCI Profile....205
Opening and Downloading a PCI Profile Report....207
Editing or Deleting a PCI Profile....208
Users and Roles....208
Resource Groups....208
Users and Their Roles....209
Creating Resource Groups....210
Creating Users and Roles....212

About this Document

- Overview....9
- Document Conventions....9
- Related Documentation....10
- Documentation Feedback....10

Overview

This *SmartCell Insight User Guide* provides instructions about how the Ruckus Wireless™ SmartCell Insight (SCI) application works, the reports that it generates, and how to use these reports.

This guide is written for service operators and system administrators who are responsible for managing, configuring, and troubleshooting Wi-Fi networks. This guide 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

The following two tables list the text and notice conventions that are used throughout this guide.

TABLE 1 Text conventions

Convention	Description	Example
`monospace`	Represents information as it appears on screen	`[Device name]>`
`monospace bold`	Represents information that you enter	`[Device name]>` **`set ipaddr 10.0.0.12`** **ruckus# show running-configap-heartbeat**
default font bold	UI components such as screen or page names, keyboard keys, software buttons, and field names CLI command names and keywords	On the **Start** menu, click **All Programs**. **ruckus# show running-config ap-heartbeat**
italics	Publication titles CLI command modifiers and variables.	Refer to the *SmartZone™ (SZ) 100 and Virtual SmartZone Essentials (vSZ-E) Command Reference* for more information **ap-** *mac*

TABLE 2 Notice conventions

Notice Type	Description
NOTE	Information that describes important features or instructions

TABLE 2 Notice conventions (continued)

Notice Type	Description
CAUTION	Information that alerts you to potential loss of data or potential damage to an application, system, or device
WARNING	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

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 Introduction....11
- Definition of Terms....11
- Navigating the SCI User Interface....12
- Header Panel....13
- Using the Navigation Bar....15
- Using the Scheduler....15

SmartCell Insight Introduction

SmartCell Insight (SCI) is a big data analytics and reporting platform that enables efficient management of wireless networks. SCI provides visibility into network performance, operation, and planning of Ruckus wireless networks.

SCI also provides predictive analytics through automated machine learning, without requiring manual configuration.

SCI uses scale-out architecture with support for clustering. A single instance of SCI can collect, process, correlate and aggregate data from more than 100,000 access points.

SCI helps manage and optimize a wireless network by providing analytics, reporting, and key performance indicators (KPIs) about devices, users, applications, access points, controllers, and more. SCI has several pre-built dashboards/reports, in addition to the ability to slice-and-dice data in Data Explorer to create custom reports.

SCI supports Ruckus SmartZone and Ruckus ZoneDirector controllers.

NOTE
All values in the reports, except AP counts, are approximate values unless otherwise stated.

Definition of Terms

The following are terms used in SCI.

TABLE 3 Definition of Terms

Term	Definition
User Traffic	
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
Management Traffic	
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 *Mgmt* or *Mgt* are frequently used in the user interface. Mgmt Traffic = Rx Mgmt + Tx Mgmt
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.

TABLE 3 Definition of Terms (continued)

Term	Definition
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
Total Traffic	
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.
Relationship between various traffic metrics	
• Total Traffic = User Traffic + Management Traffic = Rx Total + Tx Total • Rx Total = Rx User + Rx Managemet • Tx Total = Tx User + Tx Managemet • User Traffic = Rx User + Tx User • Managemet Traffic = Rx Managemet + Tx Managemet	
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. **NOTE** *All Radios* 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 *All Radios* 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. **NOTE** This is **NOT** 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.

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 elements

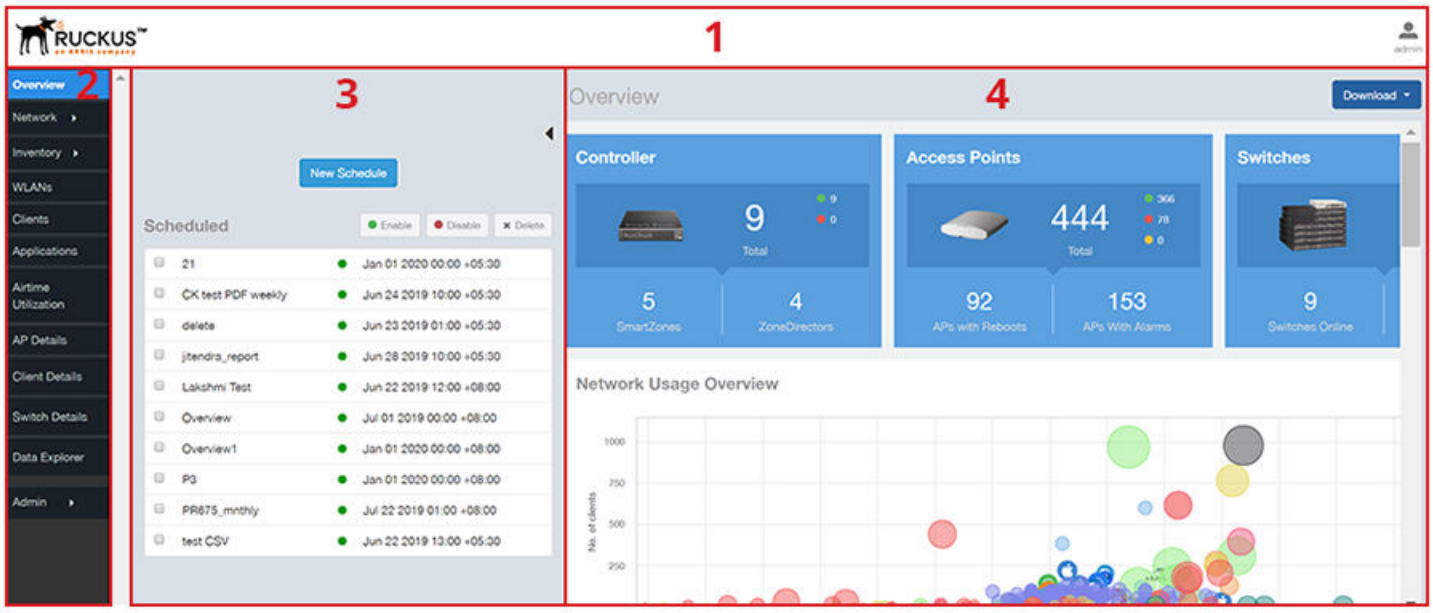


TABLE 4 SCI web interface elements

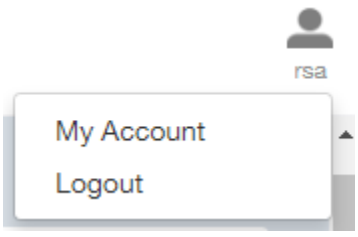
No.	Name	Description
1	Header Panel	Displays the currently logged in user profile. Click the user icon to update the profile or change the password as required.
2	Navigation Bar	Contains links that take you to the various dashboards and the Data Explorer cubes and Admin console.
3	Schedules Panel	Allows 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.

Header Panel

The header panel contains information about the user.

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

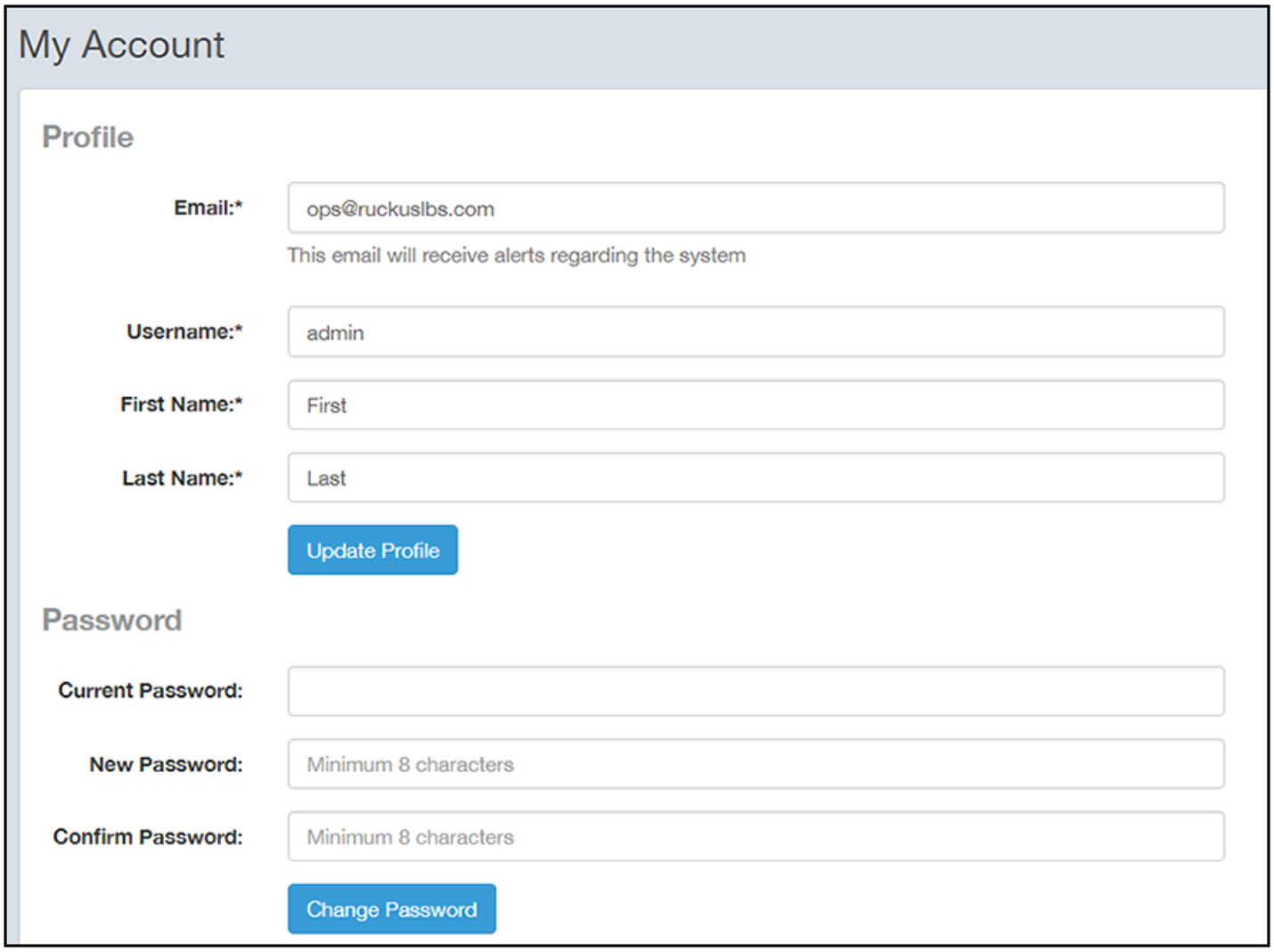
FIGURE 2 User Information pop-up



Click the:

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

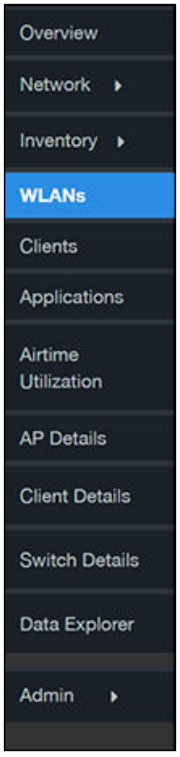
FIGURE 3 My Account



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.

Using the Navigation Bar

Use the navigation bar to access all dashboards of the SCI, as shown in the following figure.



The main actions you can take from the navigation bar include:

- Using the **Admin** console. The Admin console is where you add controllers to your network. The admin console also shows the health of the system and checks for updates. Links to view the status of external sources that SCI uses, such as Hadoop, Spark and Druid, are also provided.
- Using **Data Explorer**. Data Explorer is a custom reporting tool that allows you to manipulate an OLAP (Online Analytical Processing) cube to address the needs of a wide variety of users. Refer to Data Explorer and Data Cubes on page 111 for details.
- Generating reports. The remaining dashboards in SCI can be used to generate reports.
  - To filter the content displayed, click either the **AP - SSID - Radio** filter or the **Time Period** filter. For more information about using filters to generate specific reports, refer to the Working With Filters on page 27
  - To download a copy of the content currently displayed on the screen, click **Download**, and select **CSV** or **PDF** as the file type.

Using the Scheduler

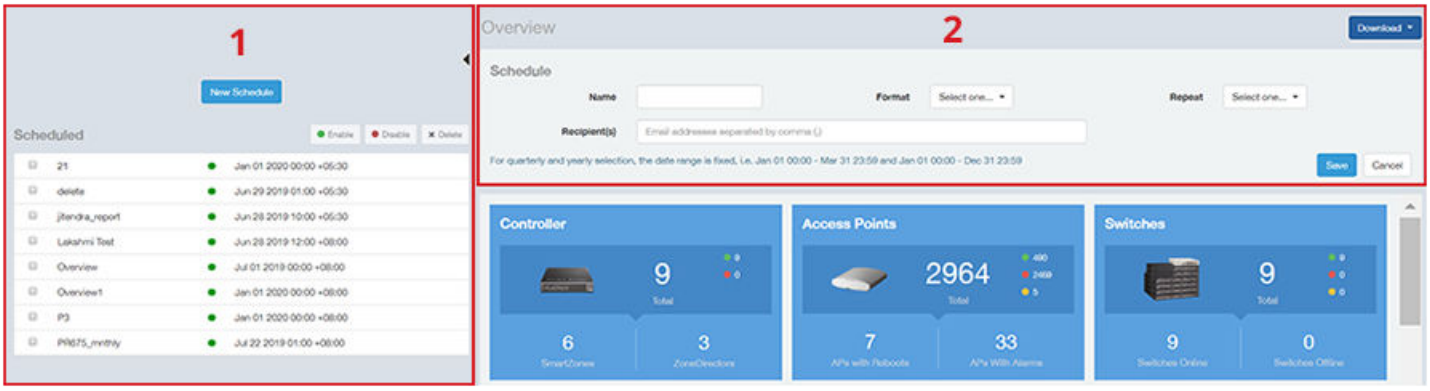
The Scheduler allows you to create schedules to generate reports to be sent out to recipients.

To invoke the Scheduler, click the thin "Schedule" frame just to the right of the navigation bar in any of the report dashboards. The example below is from the Overview dashboard.

FIGURE 4 Schedule frame to click to invoke Scheduler

The Scheduler allows you to create reports at set dates and times. The area numbered 1 in the figure below 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, as shown in the area numbered 2 in the figure below.

FIGURE 5 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.

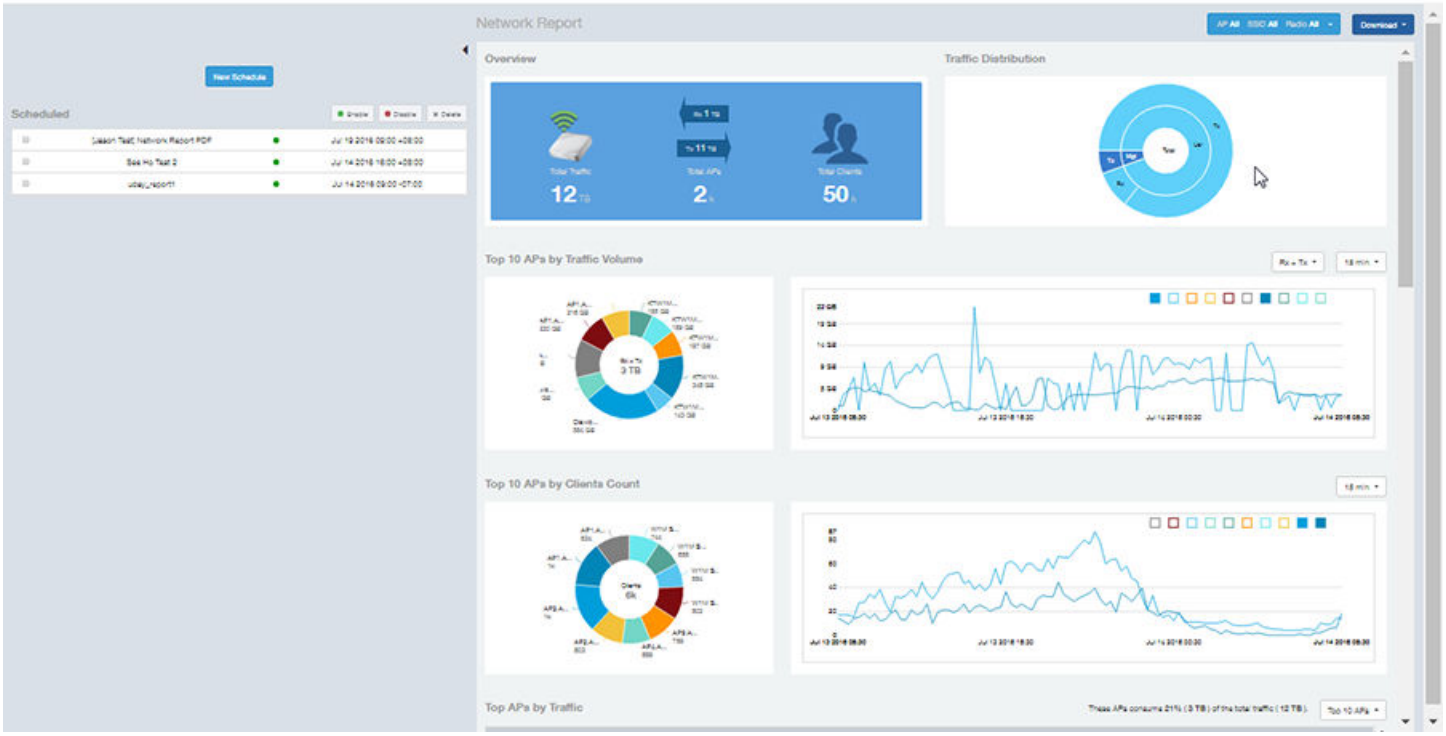
NOTE
The Scheduler creates reports one hour after the specified time regardless of whether data exists.

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.

The schedule frame is integrated into all the report dashboards. 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 Wireless dashboard is shown in the figure below. Refer to the specific dashboard for the description of how the dashboard and filters work.

FIGURE 6 Network - Wireless Dashboard Containing Schedules



Overview Dashboard

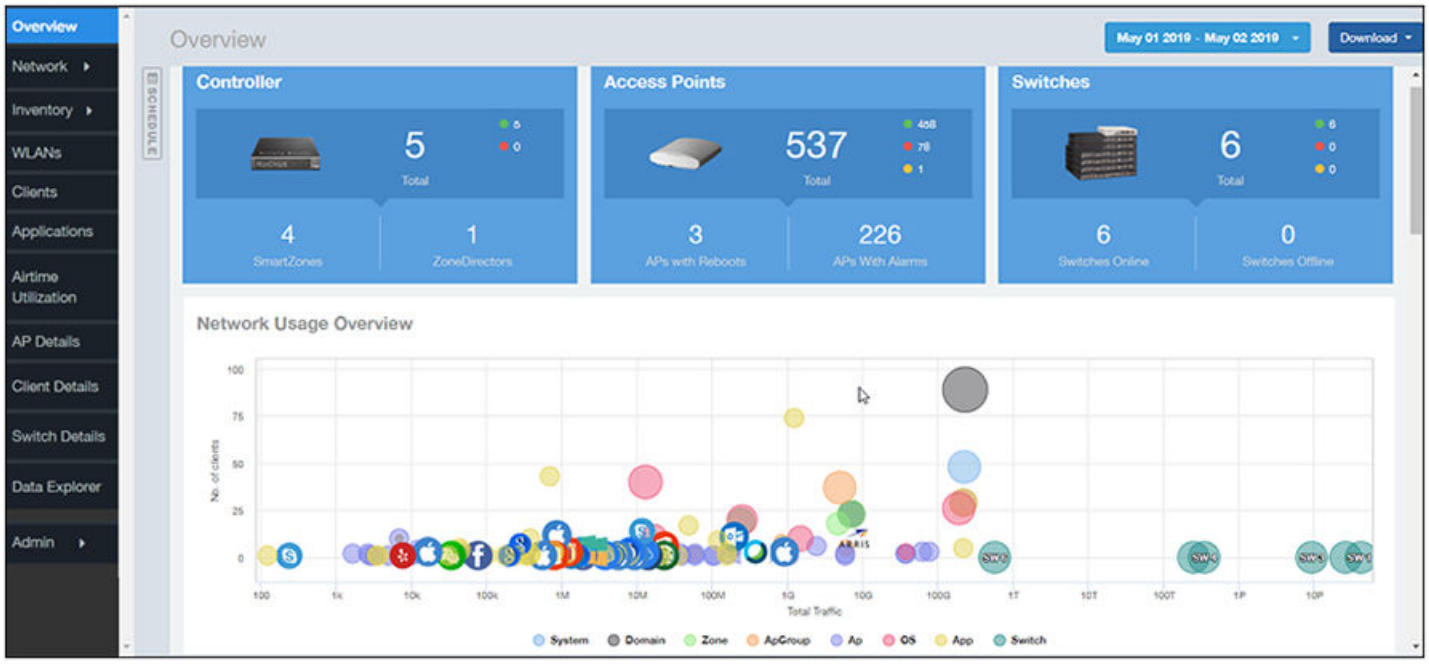
- Using the Overview Dashboard - Content Panel..... 19
- Using Ruckus Smart Analytics..... 21

Using the Overview Dashboard - Content Panel

The Overview dashboard is the main dashboard that is displayed when you log in to SCI. It provides an overview of some important statistics of your WiFi network, shown in the figures below.

The purpose of this section is to describe the areas of the content panel of the Overview dashboard.

FIGURE 7 Overview Dashboard - Top Portion

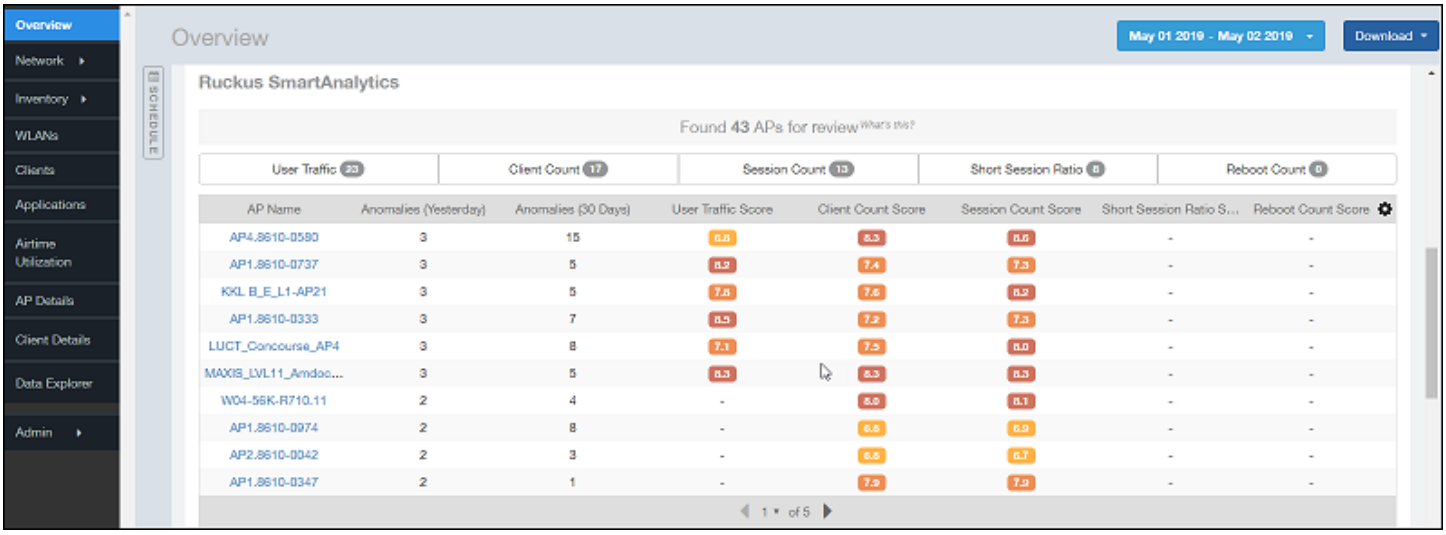


The areas shown in this portion of the Overview Dashboard are:

- Controller- Displays the number of controllers being used in your WiFi network. The green and red dots depict how many of these controllers are active and inactive.
- Access Points - Shows the number of APs in the network. Green and red status indicates if they are up or down, and yellow indicates other statuses, such as "Provisioned," "Discovery," and " Rebooting."
- Switches - Shows the number of switches in the network. Green and red status indicates if they are up or down, and yellow indicates other statuses, such as "Provisioned," "Discovery," and " Rebooting."
- Network Usage overview - This is a plot showing the relationship between the number of clients and the total traffic in the network. It contains bubbles of different colors that indicate different dimensions of the network including **Applications**, **Domain**, **OS Types**, **System**, **AP Group**, **Switch**, and **SSID**. Hover over any of the bubbles to display the

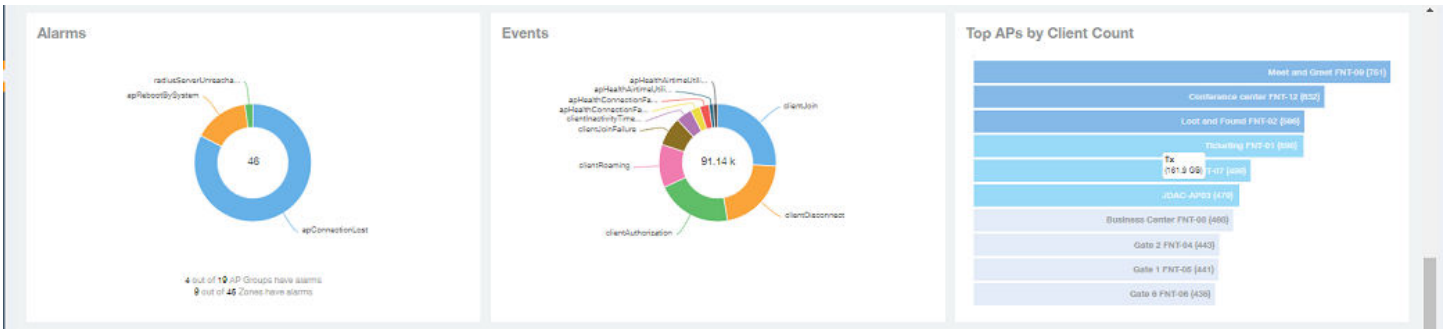
number of connected clients and traffic information. Bubble sizes vary, depending on their value (except for APs and Switches).

FIGURE 8 Overview Dashboard - Ruckus SmartAnalytics



For information about how to use Ruckus SmartAnalytics, refer to Using Ruckus Smart Analytics on page 21

FIGURE 9 Overview Dashboard - Middle Portion



The areas shown in this portion of the Overview Dashboard are:

- Alarms - Displays the most frequently occurring alarms in the network. Hover over a color or name to display the full name of the alarm. Go to the Data Explorer dashboard for more information about events.
- Events - Displays the most frequently occurring events in the network. Hover over a color or name to display the full name of the event. Go to the Data Explorer dashboard for more information about events.
- Top APs by Client Count - Displays the APs being accessed by the most clients. This information is also represented in more detail in the Network Dashboard.

FIGURE 10 Overview Dashboard - Lower Portion

The areas shown in this portion of the Overview Dashboard are:

- Total Traffic - Shows statistics about traffic received and transmitted by the access points, including the maximum and minimum rates of traffic. Go to the Network dashboard for more information about traffic.
- Total Unique Sessions - Shows the number of IEEE 802.11 sessions between all clients and APs on the network. Go to the Data Explorer dashboard for more information about sessions.
- WLANs - Displays the top SSIDs by traffic, which is also shown in the WLANs dashboard. Hover over a portion of the pie display to obtain more information about each SSID.
- Radios - Displays client data usage, in terabytes, for both the 2.4 GHz and 5.0 GHz networks. For more information about radios, go to the Airtime Utilization dashboard.
- Applications - Shows the applications being used more frequently by the clients in the network. For more information about applications usage, go to the Applications dashboard.
- "Did you know?" - Provides a short, bulleted list about your system, such as the average duration of a session for a week, or the busiest SSID. The "Did you know?" section is updated every time you return to the Overview dashboard.

Using Ruckus Smart Analytics

Ruckus Smart Analytics uses advanced analytics techniques to identify APs that are exhibiting different-from-normal behavior, and flags them for review.

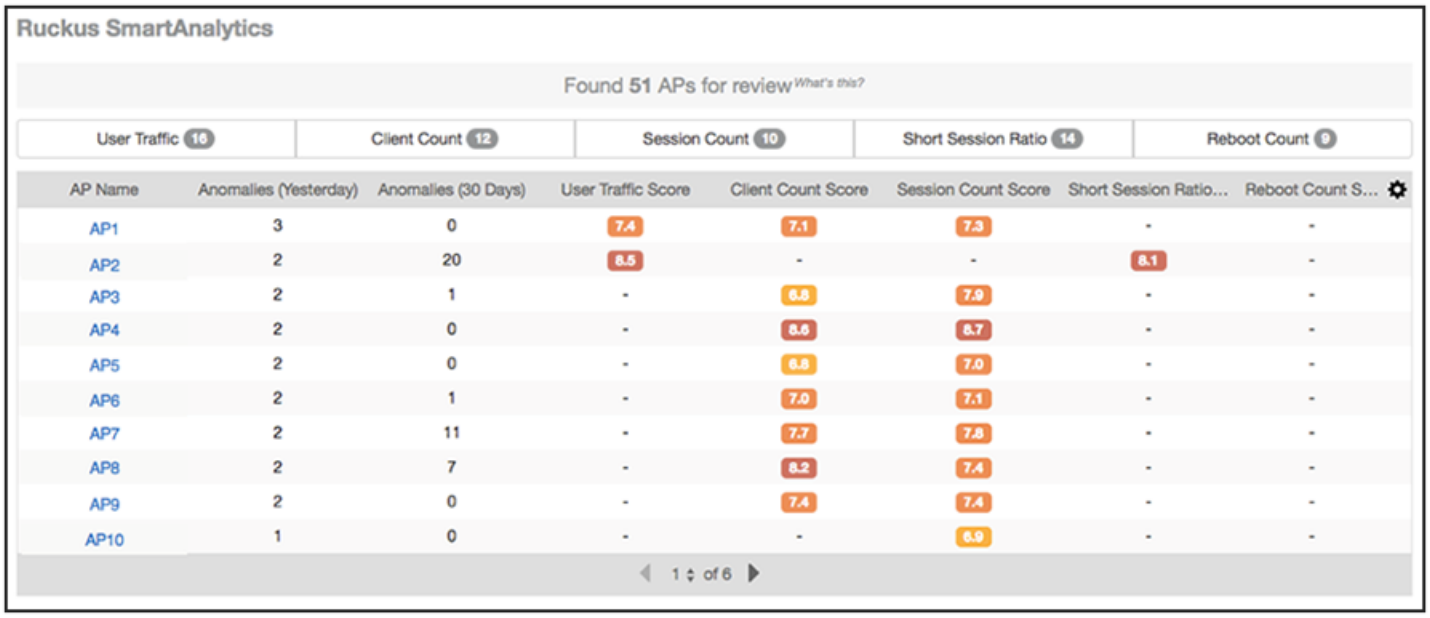
If an AP is flagged for review, it does not necessarily mean that there is a problem with the AP. It just means that Ruckus Smart Analytics detected outside-of-normal behavior for that AP. An AP is flagged for review under the following conditions:

- User Traffic: An AP is flagged for review when the User Traffic is unusually high or low compared to the expected trends
- Client Count: An AP is flagged for review when the Client Count is unusually high or low compared to the expected trends
- Session Count: An AP is flagged for review when the Session Count is unusually high or low compared to the expected trends

- Short Session Ratio: An AP is flagged for review when the ratio of short sessions per total sessions becomes unusually high.
- Reboot Count: An AP is flagged for review when the number of times the AP has been rebooted is unusually high.

The following figure shows an example of Ruckus Smart Analytics output, which appears only on the Overview dashboard:

FIGURE 11 Default Display Example of Ruckus SmartAnalytics



After the first few days, the system begins showing results, but the accuracy of the results improves over time, as the system learns more about the AP user traffic, client and session patterns. The results are usually accurate after one month, when the system completes learning and understands the short-term, medium-term and long-term trends for each of these metrics for each AP. The list of APs for review is refreshed every 24 hours.

NOTE
At the top of the SmartAnalytics display, shown above, each anomaly type (User Traffic, Client Count, Session Count, Short Session Ratio, and Reboot Count) has a number in grey. These numbers indicate the total number of access points flagged for possible problems for the corresponding anomaly type.

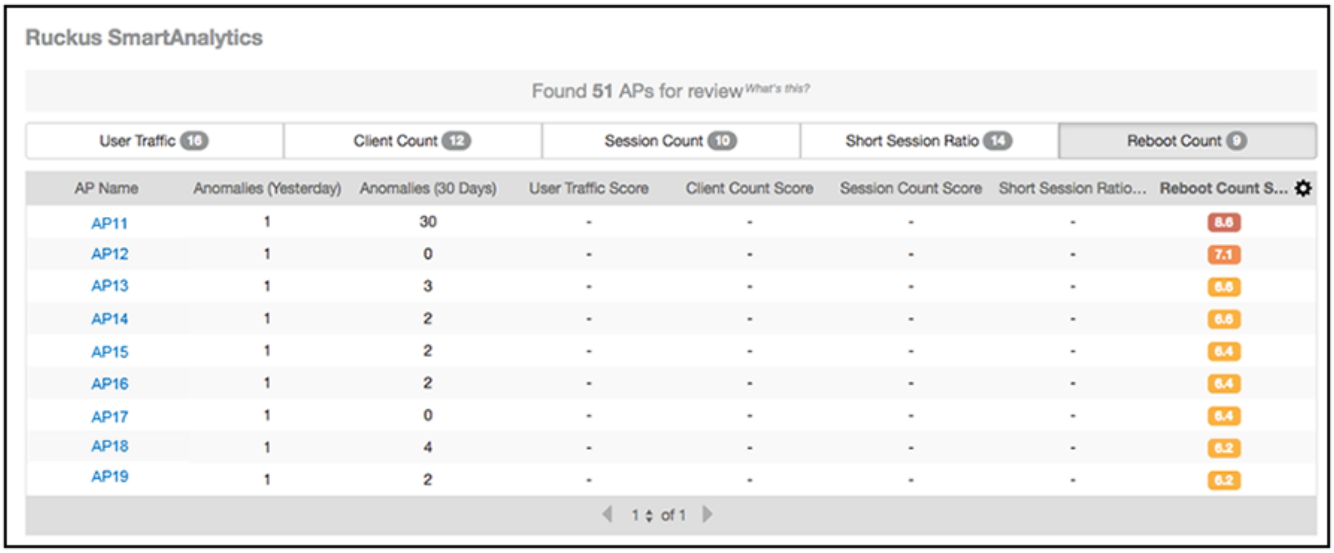
Actions You Can Perform on the Smart Analytics Display

The default display of the Ruckus SmartAnalytics information shows all possible anomalies for all access points that you have currently selected. You can do the following:

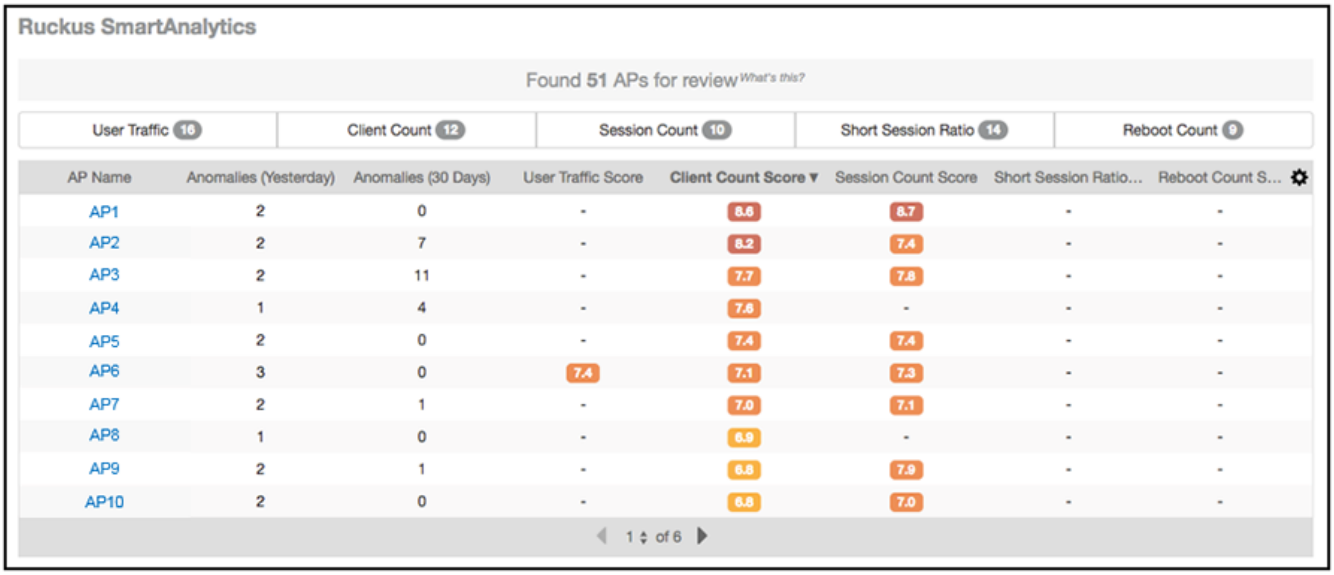
- To interpret the color coding and associated scores, note that the closest the score is to 10, the more likely there is to be an issue with the AP for the corresponding anomaly type:
  - Deep red = a score in the range of 9 to 10
  - Orange red = a score in the range of 8 to 9
  - Amber = a score in the range of 7 to 8
  - Deep yellow = a score in the range of 6 to 7
  - Bright yellow = a score in the range of 5 to 6

- Click on any AP to go to the AP Details dashboard for that AP, where you can then view anomaly charts for details, as shown in How to View Details from the Ruckus Smart Analytics Display.
- Use the gear icon on the upper right of the SmartAnalytics display to customize the output.
- Click on any of the Anomaly tabs to display the output for only the tabs you select. For example, if you want to view only the access points that have a possible anomaly with reboot count, highlight the Reboot Count tab only. The following figure shows a sample display for this scenario (note that the Reboot Count tab has been selected and appears in gray below):

FIGURE 12 Ruckus SmartAnalytics Output When Filtering on Reboot Count Only



- To sort anomalies by one of the scores, click on the desired column, then use the arrow that appears. The screen below shows sorting on Client Score Count, with the highest score on top.



How to View Details from the Ruckus Smart Analytics Display

From the Ruckus Smart Analytics output, you can click on an AP/MAC Address link, which takes you to the AP Details Dashboard, where graphical representations of each anomaly type for that AP are shown (see the illustrations below for examples).

The following figures show examples of each anomaly type, with extra detail provided when you place your cursor over a portion of the chart.

FIGURE 13 Client Count

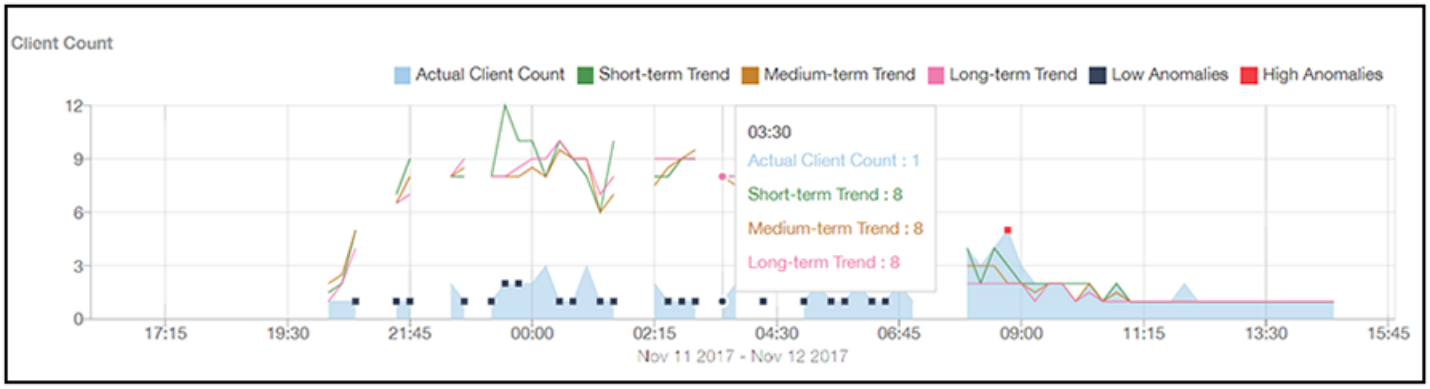


FIGURE 14 User Traffic

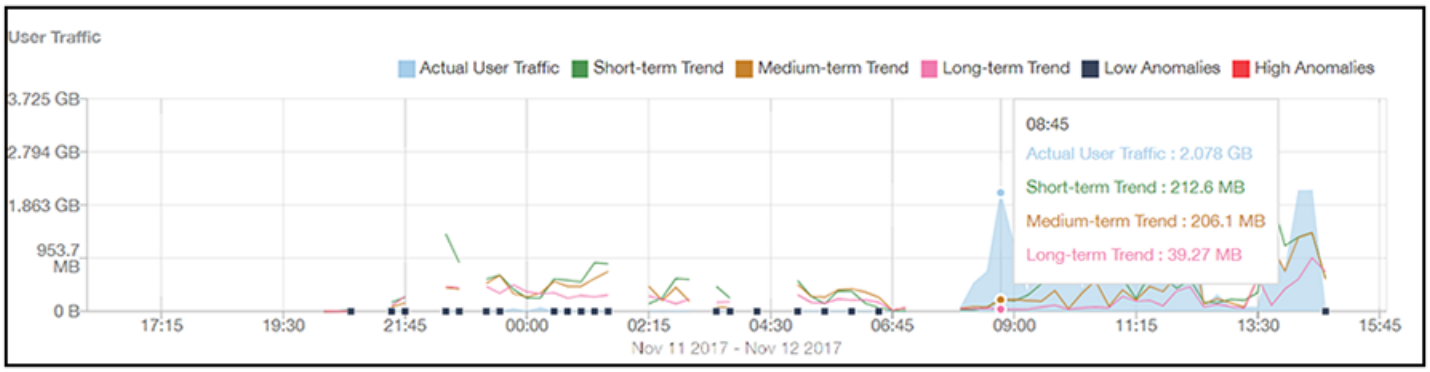


FIGURE 15 Session Count

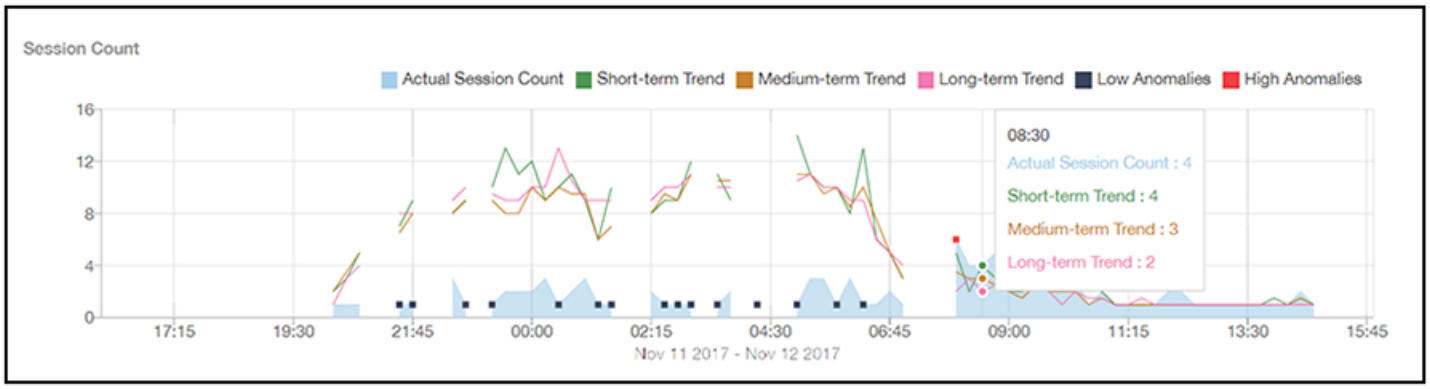


FIGURE 16 Short Session Ratio

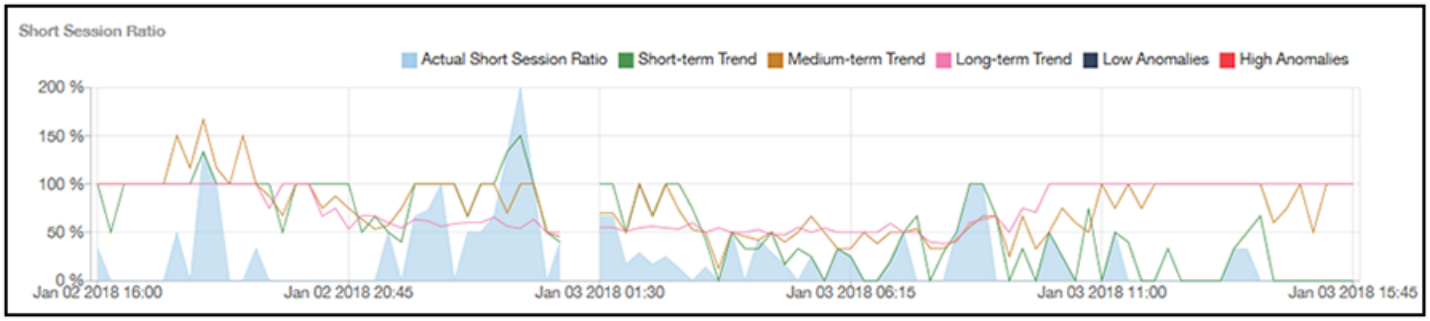
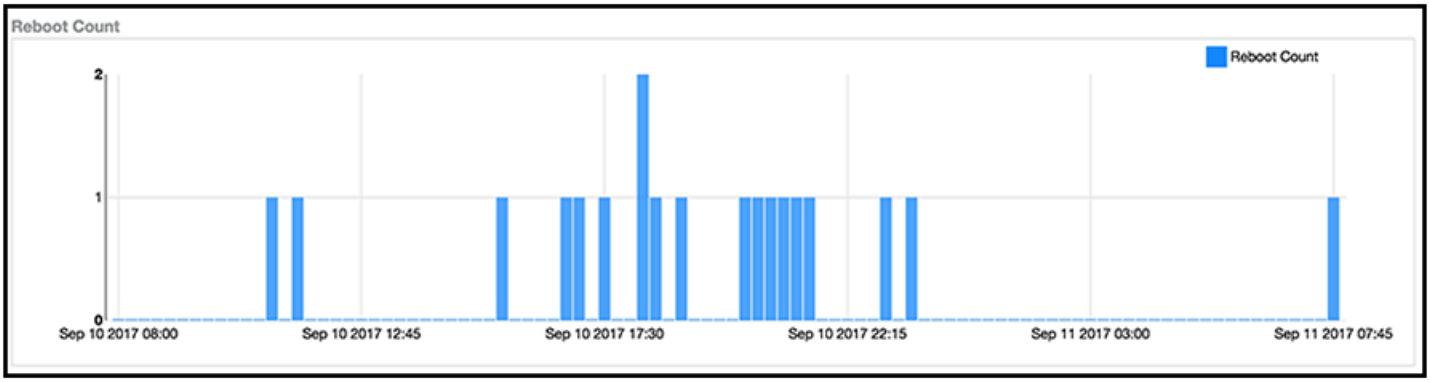


FIGURE 17 Reboot Count



Filters

- Working With Filters....27
- AP, SSID and Radio filter....27
- Date Filter....29
- Download....29
- Rx+Tx Filter....30
- Time Filter....30
- AP Filters....31
- SSID Filter....31
- Client Filter....32
- Application Filter....32
- Alarms Filter....32
- Events Filter....33
- Sessions Filter....33
- Using Saved Filters....33

Working With Filters

Filters are built into the report dashboards so that you can segregate and drill down into the data.

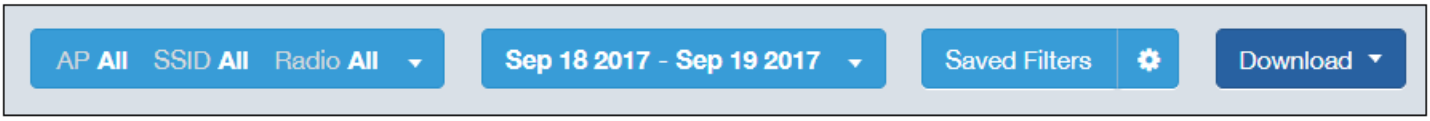
By selecting APs and setting a date range, you can examine specific subsets of data for any AP or group of APs for any time period in any of your wireless networks. For example, if you want to see just the total traffic and client counts for a certain AP on a certain day, you could use the Network Overview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

The same filters are available on most dashboards:

- **AP/Radio Filter** (on some screens, **AP/SSID/Radio** filter)
- **Date Filter**
- **Saved Filters**. For information on how to use Saved Filters, refer to Using Saved Filters on page 33.

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

FIGURE 18 AP/Radio Filter, Date Filter, Saved Filters, and Download button

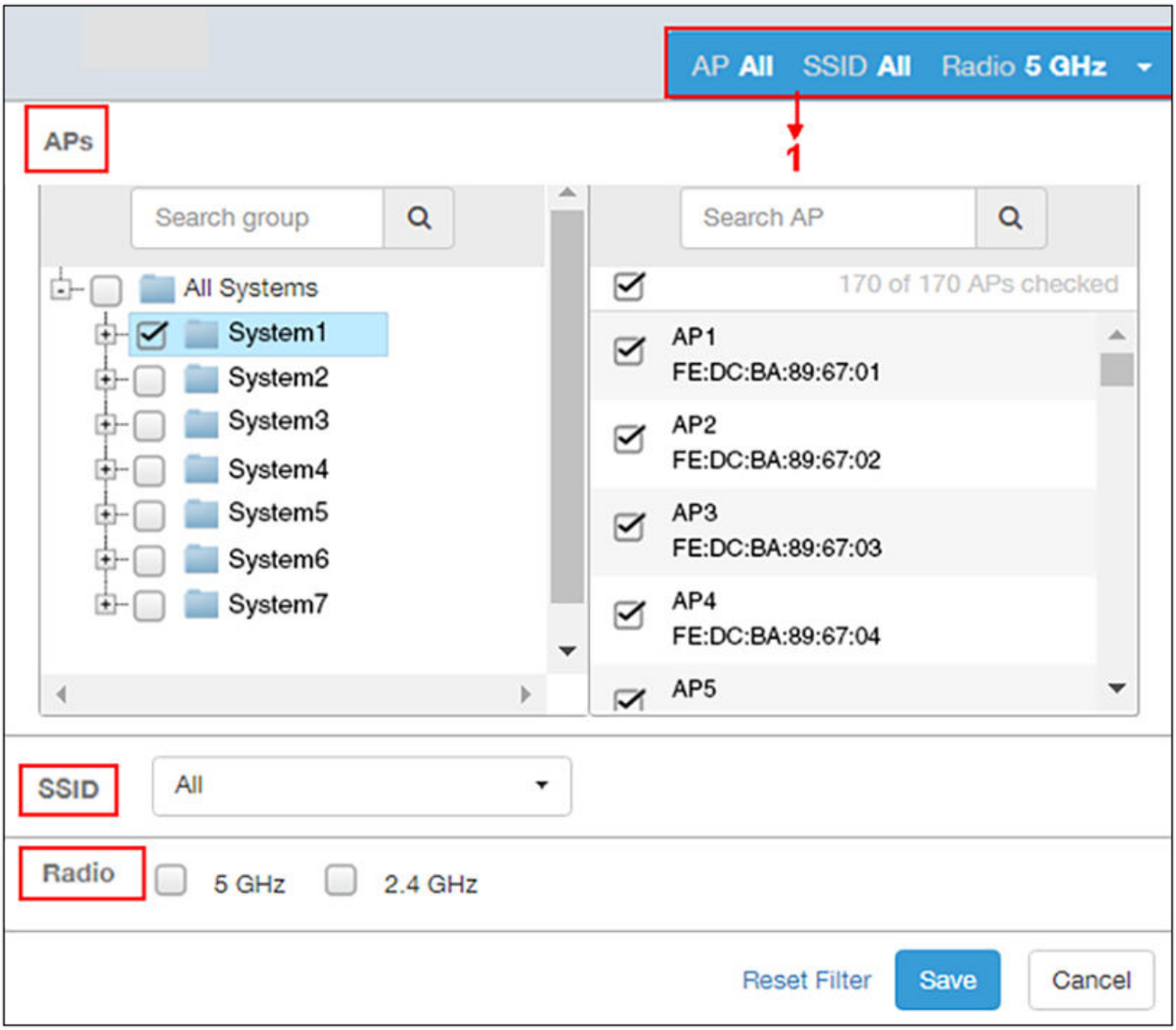


AP, SSID and Radio filter

Use these filters to generate SCI dashboards.

Custom AP, SSID and Radio Filter: The user can select APs, SSID and Radio (numbered **1** in the figure below) to view and analyze data.

FIGURE 19 Custom AP and Radio Filter



- The APs area contains a nested list of APs, You need to click on one of the system names and continue to expand the list to drill down to the APs. The hierarchy of the list is: System > Controller > Domain > Zone > AP group > AP. 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 nework, WLAN, client and application dashboards.

- Radio select 5 or 2.4 or both GHz.

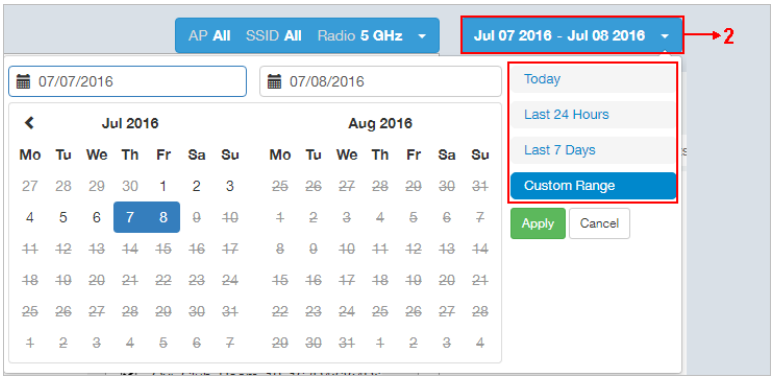
Follow these steps to:

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 20 Custom Date Filter



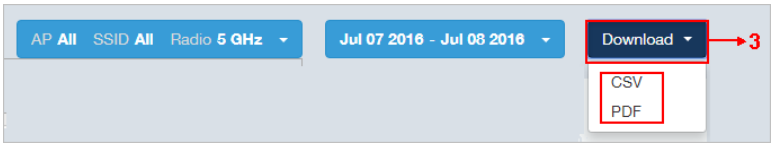
Custom Date Select a date range to update the dashboard. You can plot time for a certain period which could be today, last 24 hours, last 7 days, or a custom range (default value). This filter is numbered as **2** in the figure above.

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 21 Download option



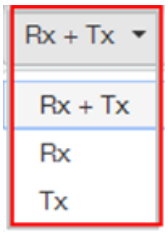
This filter (numbered **3** in the figure above) is available on most dashboards.

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

Rx+Tx Filter

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

FIGURE 22 Rx+Tx filter



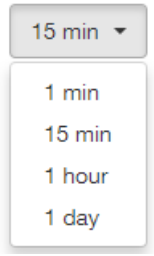
Select the Rx+Tx (default value), Rx, or Tx operating ranges. This filter can be used in the Network, WLAN and Application dashboards.

Time Filter

Time filter for various dashboards allows you to specify the level of granularity.

The smaller the amount of time you specify, the more detail will appear in the corresponding dashboard.

FIGURE 23 Time filter

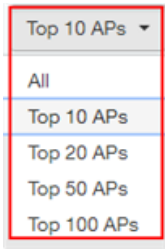


Specify the time frame of 1 minute, 15 minutes (default value), 1 hour or 1 day for applicable dashboards.

AP Filters

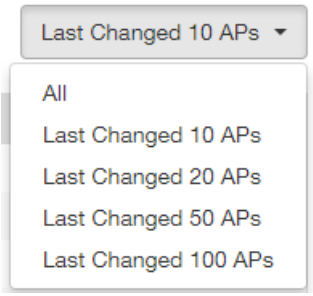
AP filters for various dashboards.

FIGURE 24 Top 100 APs



Specify the APs filter of top 10 (default value), 20, 50, or 100 for applicable dashboards.

FIGURE 25 Last Changed 10 APs

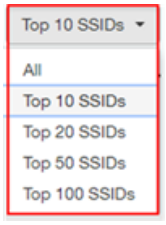


Specify the changed APs to display; the default is 10.

SSID Filter

SSID filter for WLAN dashboard.

FIGURE 26 SSID filter

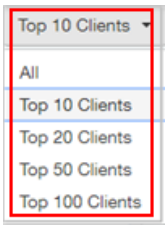


Specify the SSID filter of top 10 (default value), 20, 50, or 100 SSIDs for WLAN traffic and client sections.

Client Filter

Use the Client filter for determining client usage.

FIGURE 27 Client filter



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

Application Filter

Application filter for the Applications dashboard:

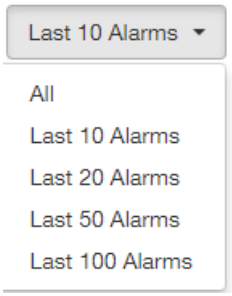
FIGURE 28 Application filter

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

Alarms Filter

Specify the last 10 (default value), 20, 50, or 100 alarms to display on applicable dashboards.

FIGURE 29 Alarms Filter



Events Filter

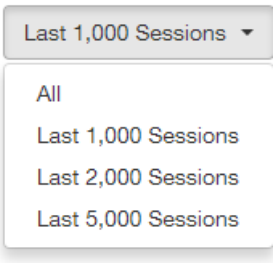
Specify the last 1,000 (default value), 2000, or 5,000 events to display on applicable dashboards.

FIGURE 30 Events Filter

Sessions Filter

Specify the last 1,000 (default value), 2000, or 5,000 sessions in applicable dashboards.

FIGURE 31 Sessions Filter



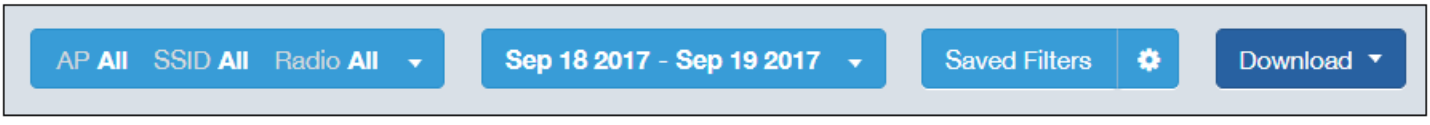
Using Saved Filters

SCI allows you to create custom filters and then save them for future use on a per-report basis.

For all dashboards that support filters, you can create any number of customized filters from which to run reports. This can be useful if you want to use a specific filter repeatedly for a specific set of APs, for example.

The bar at the top of a dashboard that support filters is shown below:

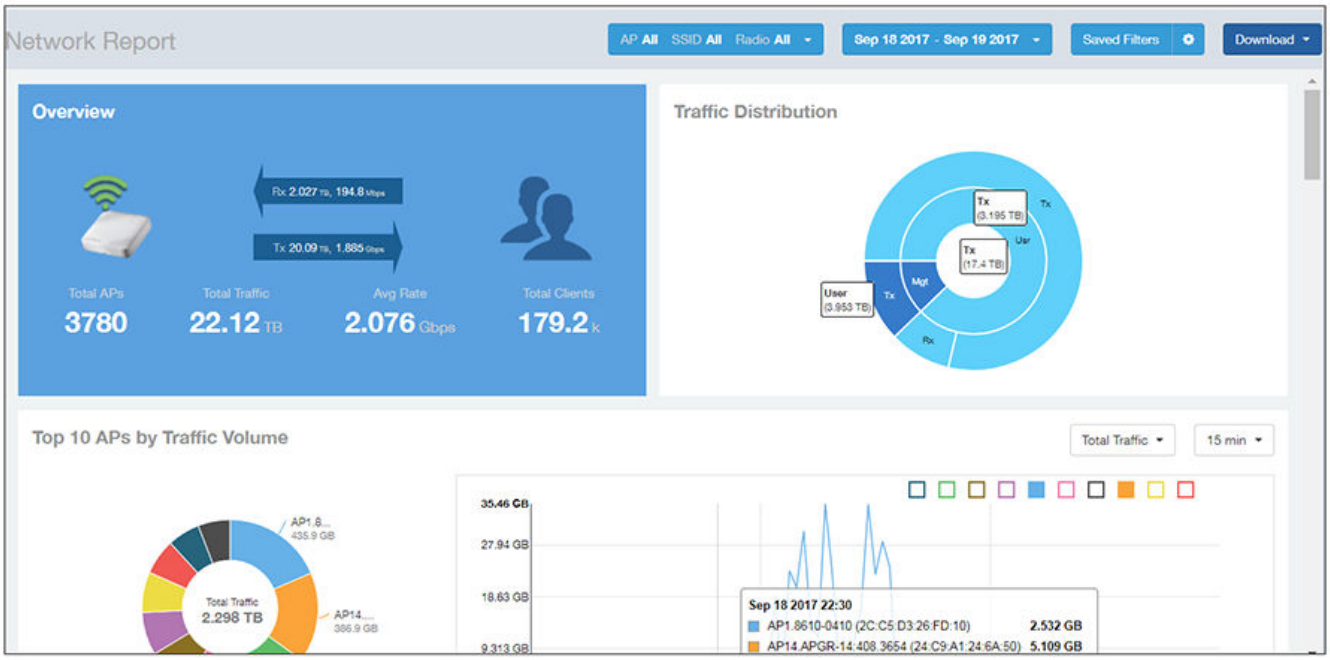
FIGURE 32 Radio, Date and Saved Filters and Download bar



The following steps show an example of how to create and save a new filter:

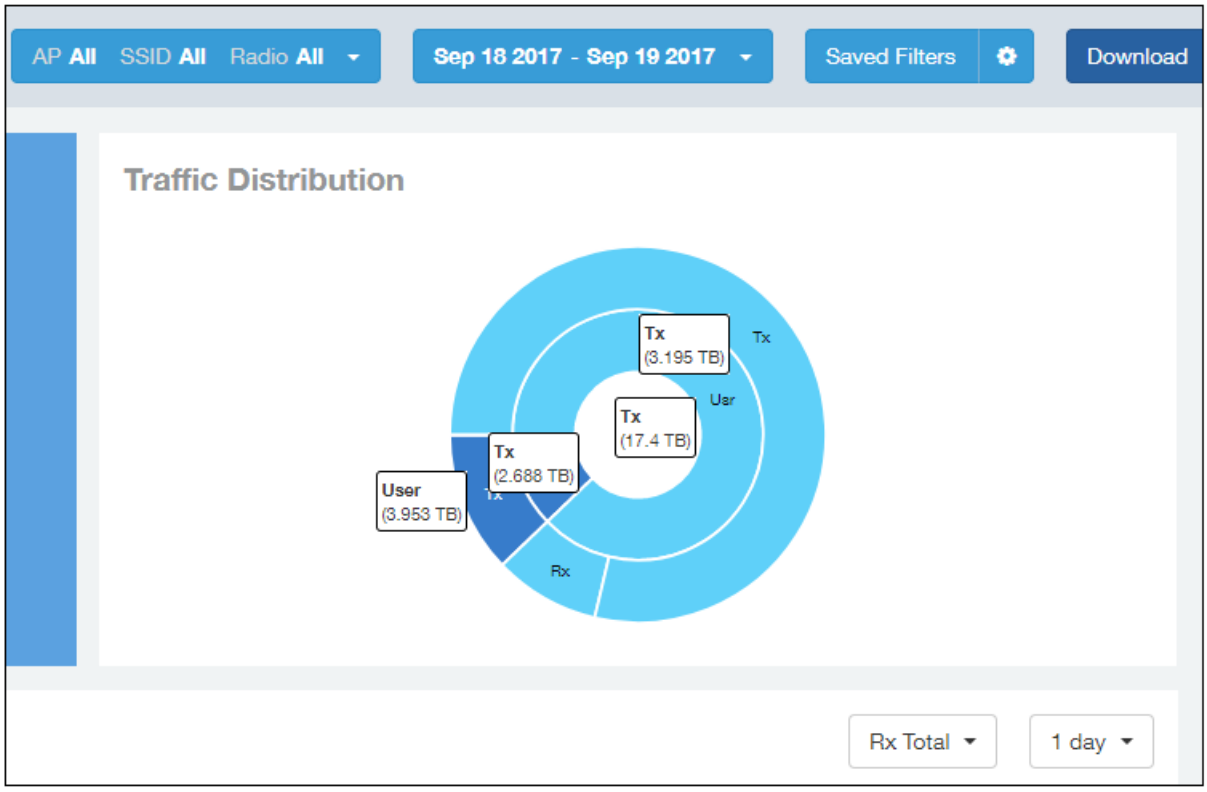
1. Open a dashboard for which you want to create a filter. For example, if you want to create a saved filter for the Network dashboard, the upper portion of that dashboard is shown below.

   FIGURE 33 Network Dashboard Example of Creating a Saved Filter - Before Changes



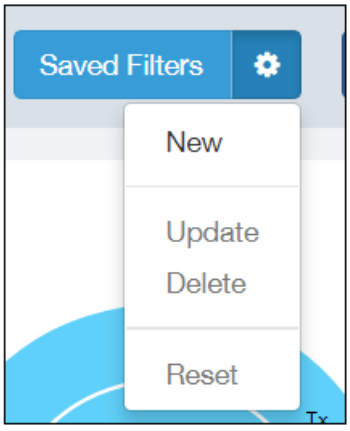
2. Make the desired selections to any filter. In the example figure below, no changes are made to the Radio or Date filters, but in the Top 10 APs by Traffic Volume filters, the Traffic and time-increment drop-downs have been changed to Rx Total and 1 day, respectively.

FIGURE 34 Network Dashboard Example of Creating a Saved Filter - After Desired Filter Selections



3. To save these settings so that they can be used again at a later time, click the wheel icon as shown below, and you are presented with a popup.

FIGURE 35 Popup Window to Take Actions on Filters

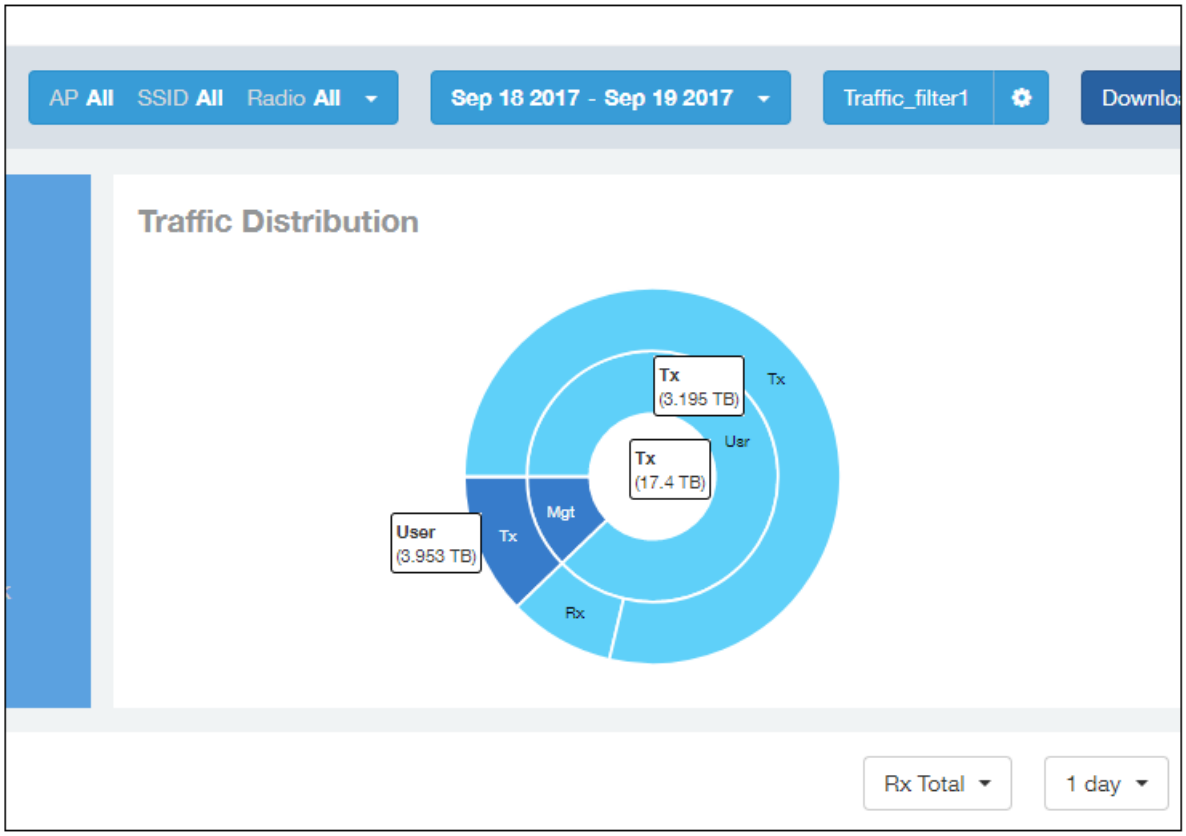


4. Select New. A popup appears. Enter a name for the filter, as shown in the example below, and click **Create**.

FIGURE 36 Entering a Name for the New Saved Filter

5. Check that the newly created saved filter is now in effect on this dashboard. For the example shown, the Network Dashboard should now appear as follows, with the selections of Rx Total and 1 day in effect, and the name of the saved filter shown next to the wheel icon:

FIGURE 37 Network Dashboard Example of Creating a Saved Filter - After Saving the Filter

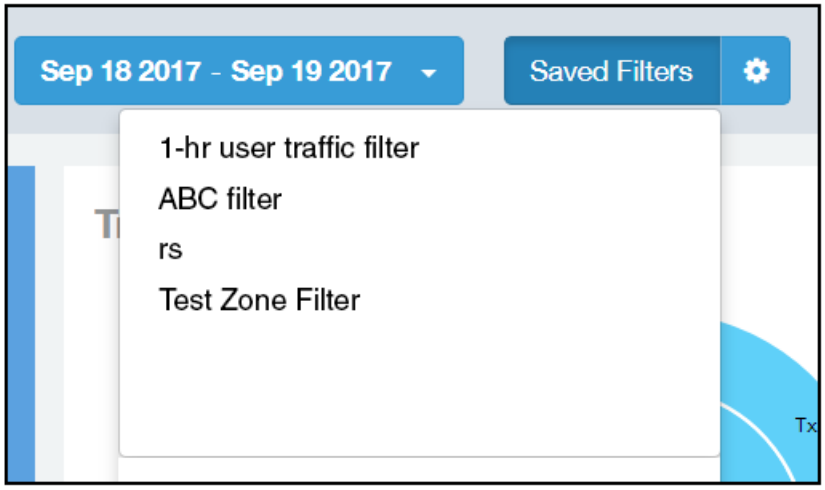


NOTE
A saved filters apply only to the dashboard on which it was created. You cannot import a saved filter on another dashboard.

Actions You Can Take on a Saved Filter

Whenever you go to a dashboard that supports filters, you can click on **Saved Filters** in the Radio, Date and Saved Filters and Download bar. If there are any saved filters, they will display, as shown in the following example figure:

FIGURE 38 Example List of Saved Filters

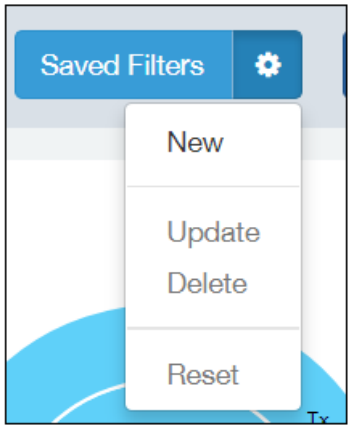


You can click on any of the saved filters and generate a report.

> **NOTE**
> The "Saved Filters" text will be replaced by the name of any filter that you open. But you can still click in the same area, and the list of saved filters is displayed.

If you click on the wheel icon, the following possible actions are allowed on a filter:

FIGURE 39 Actions You can Take on Filters



Descriptions of each action are:

- New: Allows you to create a new saved filter, as shown in the example earlier in this section.

- Update: Allows you to make changes to an existing saved filter, including changing the filter name if desired. Make any changes you wish to the filter selections, then select Update. A popup appears next, where you click **Update** again to save your changes.
- Delete: Deletes an existing saved filter.
- Reset: Displays default settings for all filters. To return to a saved filter, simply click on **Saved Filters** again in the Radio, Date and Saved Filters and Download bar.

Network Report Dashboard

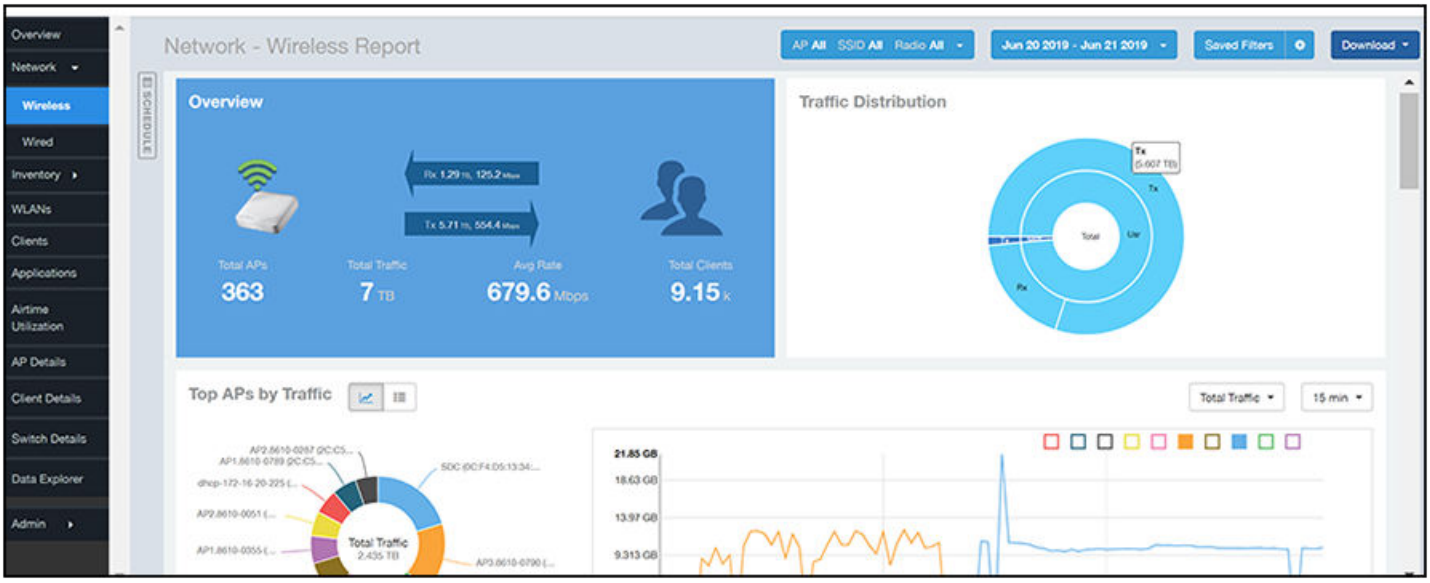
- Network - Wireless Report..... 39
- Network - Wired Report..... 44

Network - Wireless Report

The Network - Wireless Report provides details of traffic, clients, and trends by APs, SSIDs, radio, or clients over time.

The following figure shows only the upper portion of the Network - Wireless Report update.

FIGURE 40 Network - Wireless Report (upper portion)



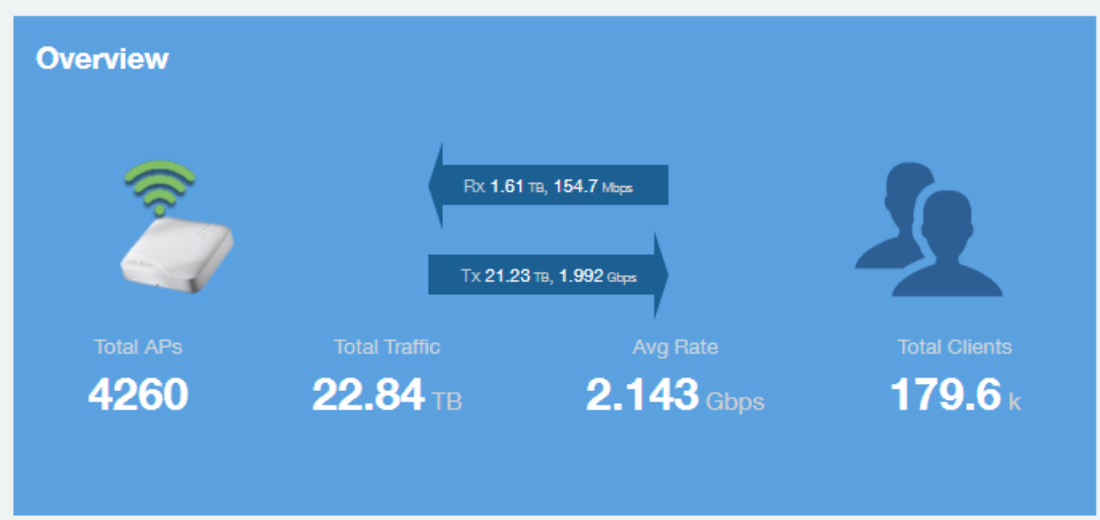
The Network - Wireless Report consists of the following sections.

Overview

The **Overview** section provides a general overview of the entire network. It 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 41 Network - Wireless Report: Overview

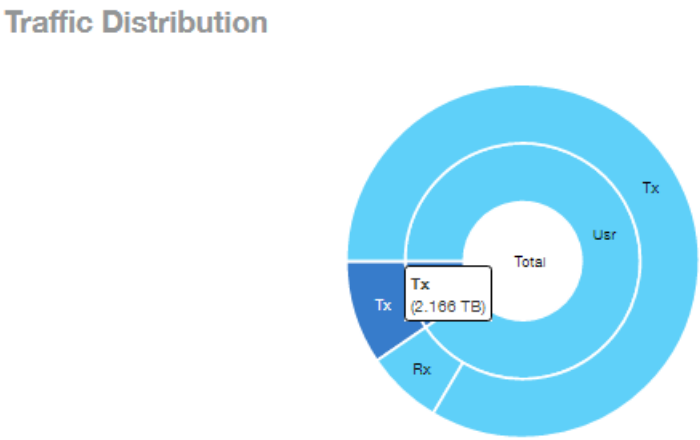


Traffic Distribution

The **Traffic Distribution** pie chart of the **Network -Wireless Report** displays the distribution of traffic types. Use this chart 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 42 Network -Wireless Report: Traffic Distribution



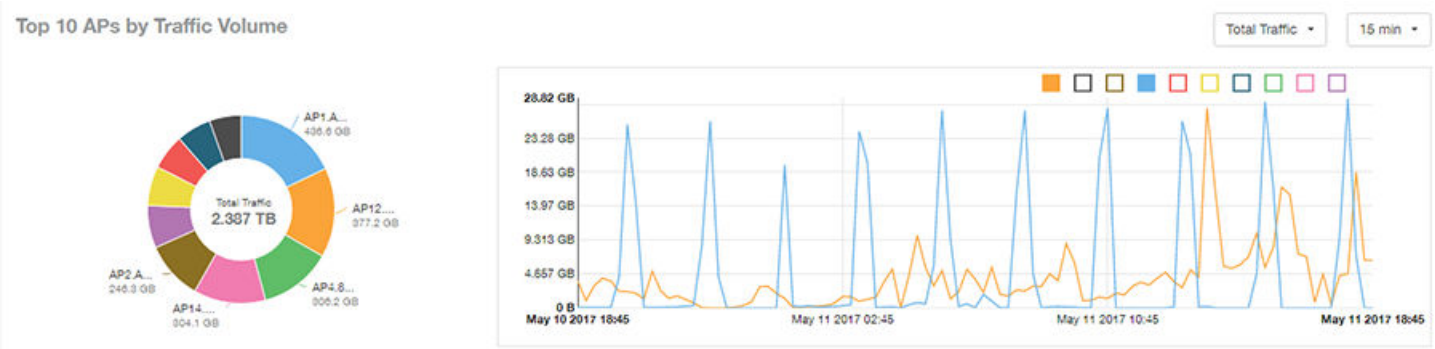
Top APs by Traffic

The **Top 10 APs by Traffic** are represented as a chart and table. The chart/table along with the **Network - Wireless Report** graph displays the APs with the highest traffic volume in the network. You can use these icons  to toggle between the chart and table views.

In the chart, use the drop-down menus to specify the traffic type (Tx, Rx, or Tx+Rx) and the time granularity. 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 43 Network -Wireless Report: Top 10 APs by Traffic (Chart)

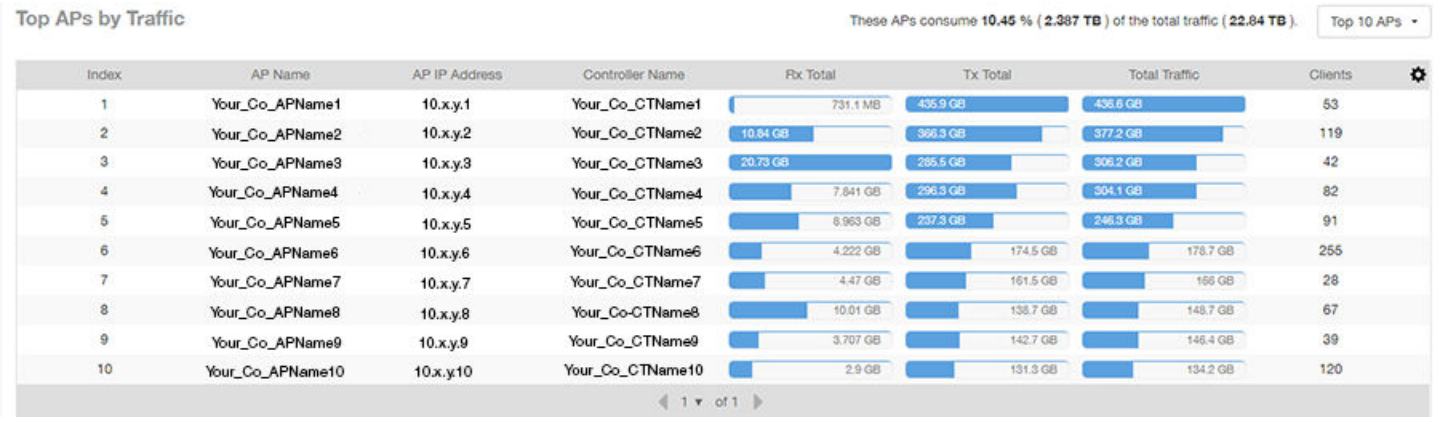


> **NOTE**
> If you hover over the line graph, a pop-up appears containing the selected AP details.

In the table, 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 44 Network - Wireless Report: Top APs by Traffic (Table)

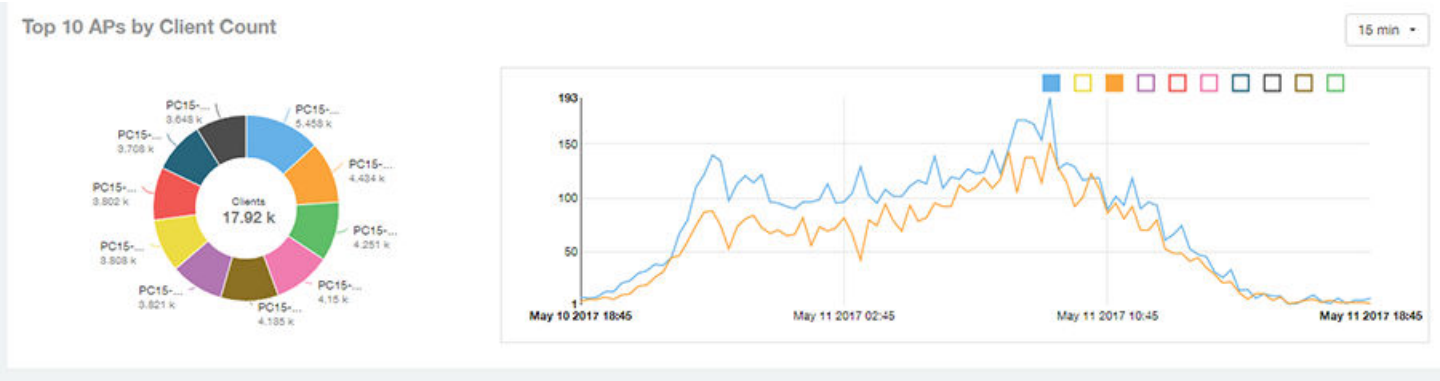


Top APs by Client Count

The **Top 10 APs by Client Count** are represented as a chart and table. The chart/table along with the **Network - Wireless Report** graph display the APs with the most clients on the network. You can use these icons  to toggle between the chart and table views.

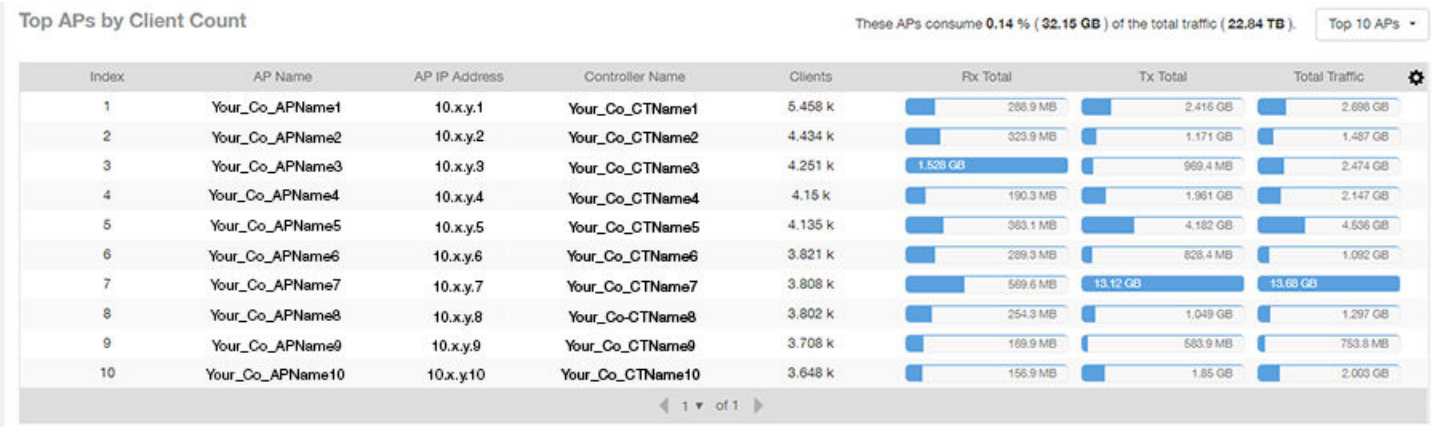
In the chart, use the drop-down menu to specify the time granularity of 15 minutes, 1 hour or 1 day. If you hover over the line graph a pop-up appears containing the details on the selected data points. Click any of the colored squares to toggle display of the AP in the line graph.

FIGURE 45 Network - Wireless Report: Top 10 APs by Client Count (Chart)



In the table, 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 the table settings drop-down list.

FIGURE 46 Network - Wireless Report : Top APs by Client (Table)



Top APs by Client Count

These APs consume 0.14 % (32.15 GB) of the total traffic (22.84 TB).

Top 10 APs

Index	AP Name	AP IP Address	Controller Name	Clients	Rx Total	Tx Total	Total Traffic
1	Your_Co_APName1	10.x.y.1	Your_Co_CTName1	5.458 k	288.9 MB	2.416 GB	2.696 GB
2	Your_Co_APName2	10.x.y.2	Your_Co_CTName2	4.434 k	323.9 MB	1.171 GB	1.487 GB
3	Your_Co_APName3	10.x.y.3	Your_Co_CTName3	4.251 k	1.528 GB	969.4 MB	2.474 GB
4	Your_Co_APName4	10.x.y.4	Your_Co_CTName4	4.15 k	190.3 MB	1.961 GB	2.147 GB
5	Your_Co_APName5	10.x.y.5	Your_Co_CTName5	4.135 k	363.1 MB	4.182 GB	4.536 GB
6	Your_Co_APName6	10.x.y.6	Your_Co_CTName6	3.821 k	289.3 MB	828.4 MB	1.092 GB
7	Your_Co_APName7	10.x.y.7	Your_Co_CTName7	3.808 k	569.6 MB	13.12 GB	13.68 GB
8	Your_Co_APName8	10.x.y.8	Your_Co-CTName8	3.802 k	254.3 MB	1.049 GB	1.297 GB
9	Your_Co_APName9	10.x.y.9	Your_Co_CTName9	3.708 k	169.9 MB	583.9 MB	753.8 MB
10	Your_Co_APName10	10.x.y.10	Your_Co_CTName10	3.648 k	156.9 MB	1.85 GB	2.003 GB

1 ▾ of 1

Traffic Trend

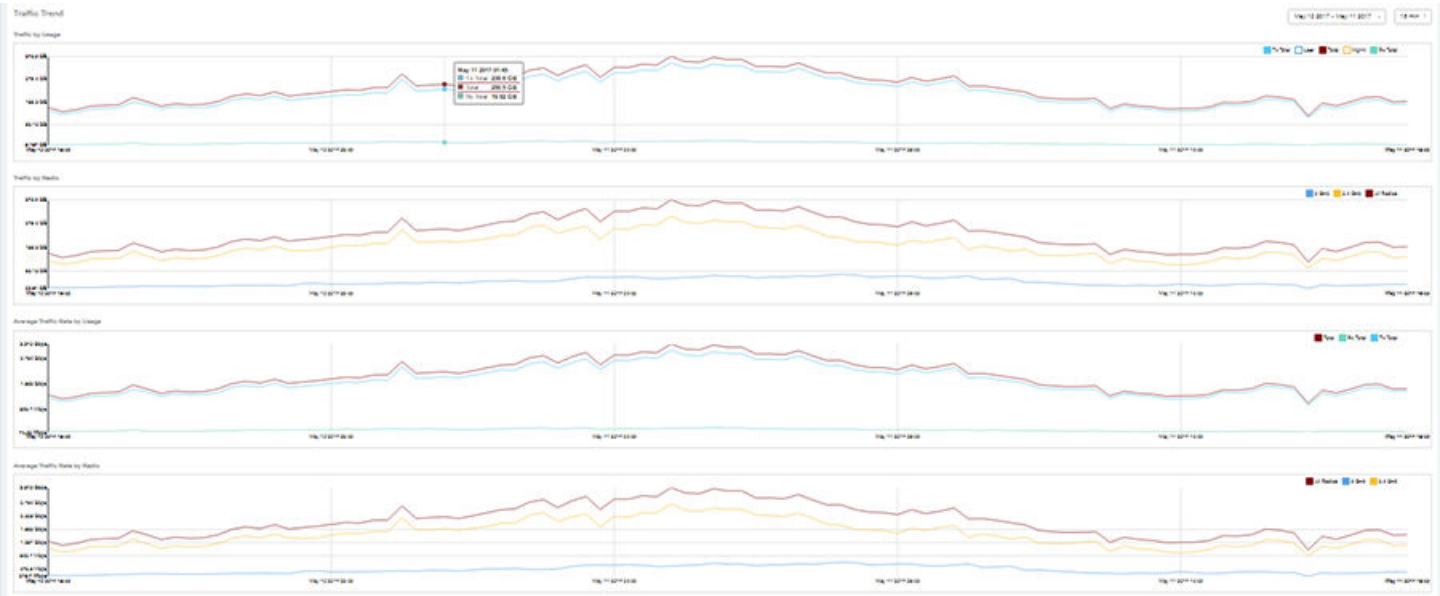
The **Traffic Trend** graphs of the **Network - Wireless Report** display the traffic by usage and radio over time.

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 increment.

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 47 Network - Wireless Report: Traffic Trend



Traffic Over Time

The **Traffic Over Time** table of the Network - Wireless 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.

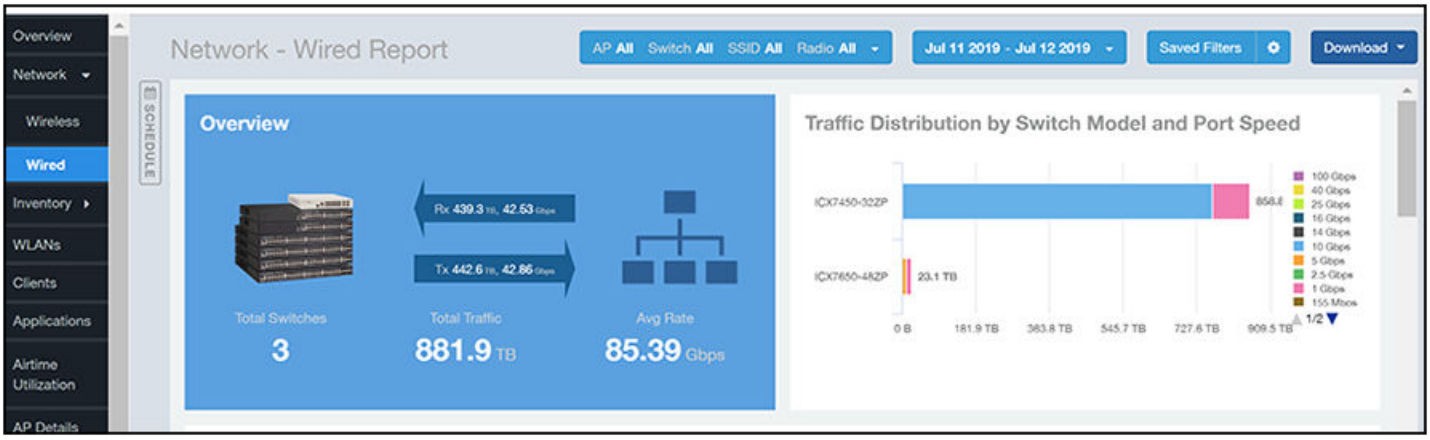
FIGURE 48 Network - Wireless Report: Traffic Over Time

Network - Wired Report

The Network - Wired Report provides details of total traffic, APs and clients on the network. It also contains the received and transmitted traffic between them.

The following figure shows the upper portion of the Network - Wired Report that appears when you click **Wired** on the navigation bar.

FIGURE 49 Network - Wired Report (upper portion)



The Network - Wired Report consists of the following sections. Figures showing each of these sections appear later.

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 by Switch Model and Port Speed	Contains the distribution of traffic by port speed for each switch model in use.
3	Top Switches by Traffic	A pie chart and graph display the switches with the most traffic. You can toggle to a table view of this information by clicking on the Table icon.
4	Top Switches by PoE Usage	A pie chart and graph display the switches with the highest power over Ethernet (PoE) utilization. You can toggle to a table view of this information by clicking on the Table icon.
5	Traffic Trend	A graph displays the traffic by usage, and also shows the corresponding average traffic rate.

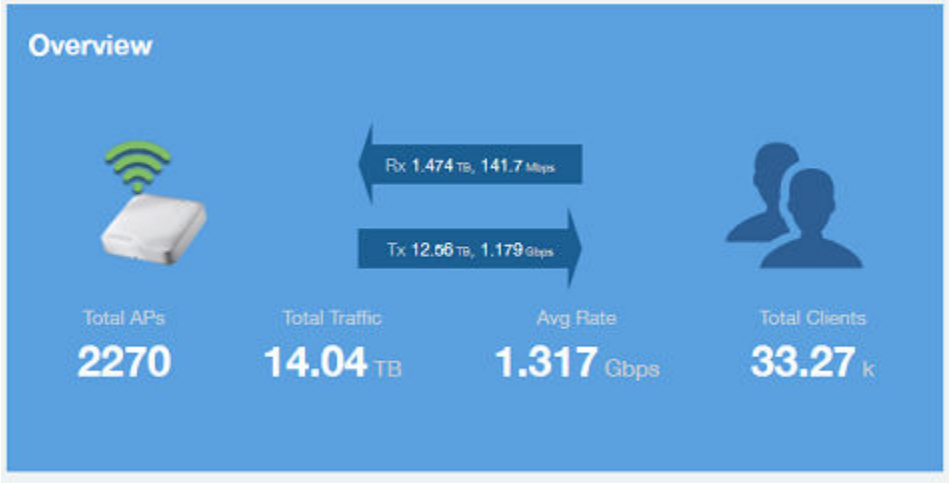
Network - Wired Report Overview

The Network - Wired Report Overview section provides a general overview of the entire network.

The Overview section 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 50 Network - Wired Report: Overview

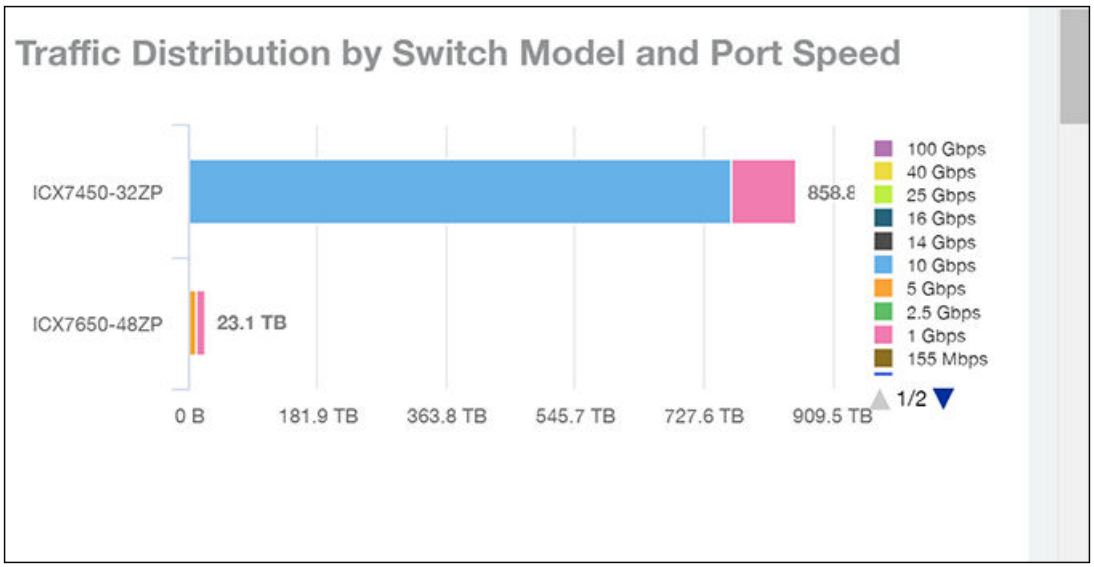


Network - Wired Report Traffic Distribution by Switch Model and Port Speed

The Traffic Distribution by Switch Model and Port Speed chart of the Network -Wired Report displays the distribution of traffic by port speed for each switch model being used.

Use this chart to display traffic distribution based on your selection of APs, SSID, Radio and Date Range filters.

FIGURE 51 Network - Wired Report: Traffic Distribution by Switch Model and Port Speed

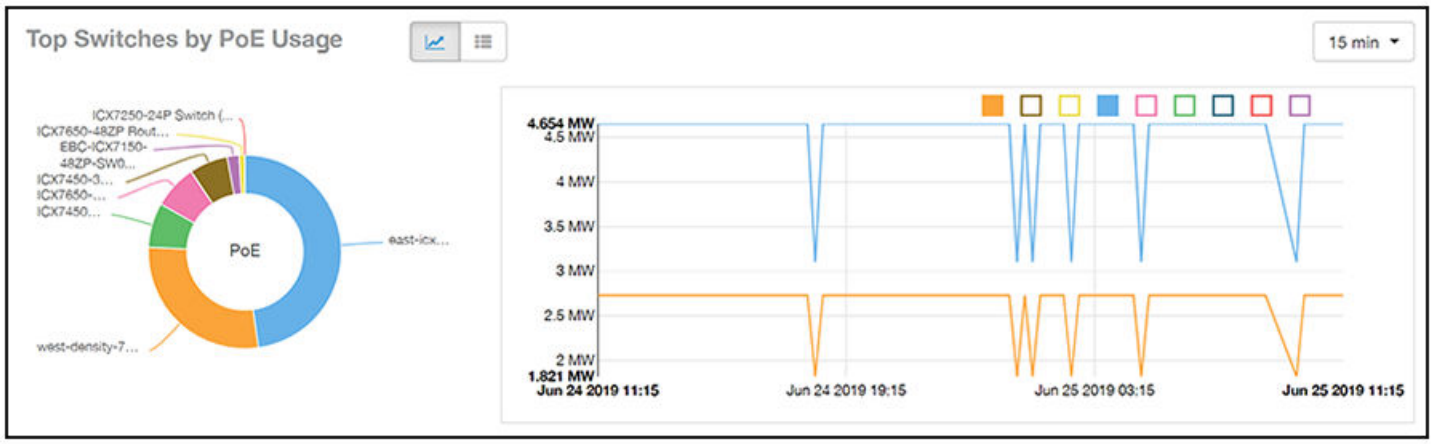


Network - Wired Report Top Switches by PoE Usage

Use the Top Switches by PoE Usage pie chart and graph of the Network - Wired report to view which wired switches are utilizing the most power over internet.

On the pie chart, you can hover over any area to view more details, or click on one of the areas of the pie chart to go to the Switch Details dashboard for the corresponding switch. In the line graph, you can hover to view switch utilization at different times; you can toggle the boxes on and off to display or not display the switches they represent.

FIGURE 52 Network - Wired Report Top Switches by PoE Usage

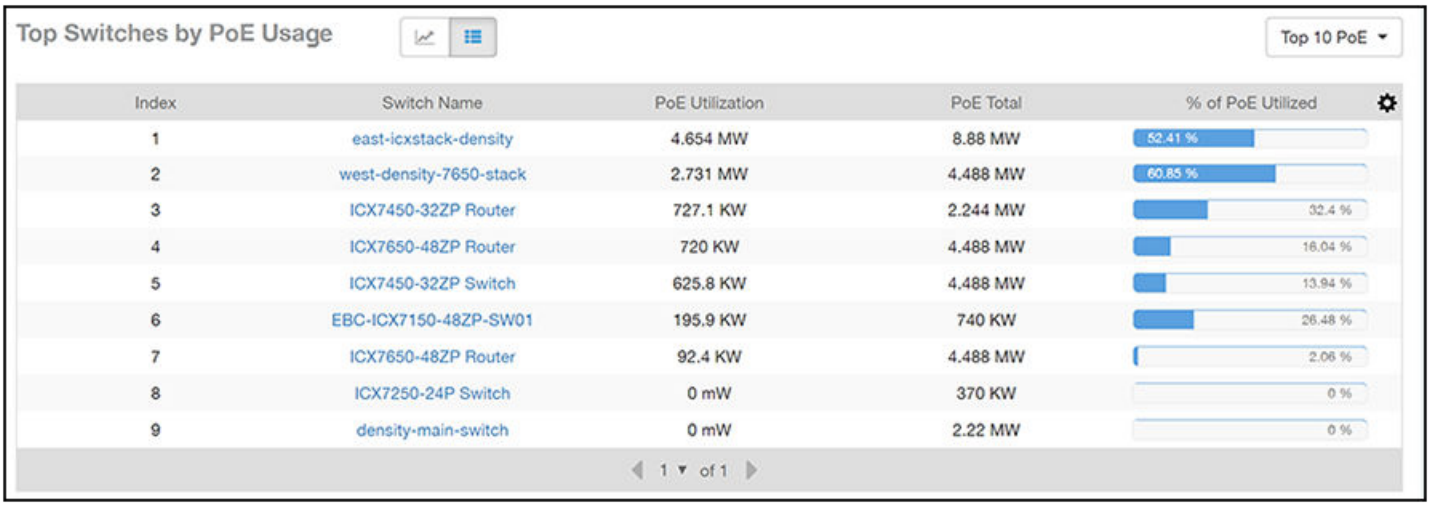


Network - Wired Report Top Switches by PoE Usage (Table)

Use the Top Switches by PoE Usage table of the Network - Wired report to view which wired switches are utilizing the most power over internet.

You can click various headings to sort the table as desired. You can also use the drop-down menu to select the number of switches shown, and use the gear icon to include or exclude any columns.

FIGURE 53 Network - Wired Report Top Switches by PoE Usage (table)

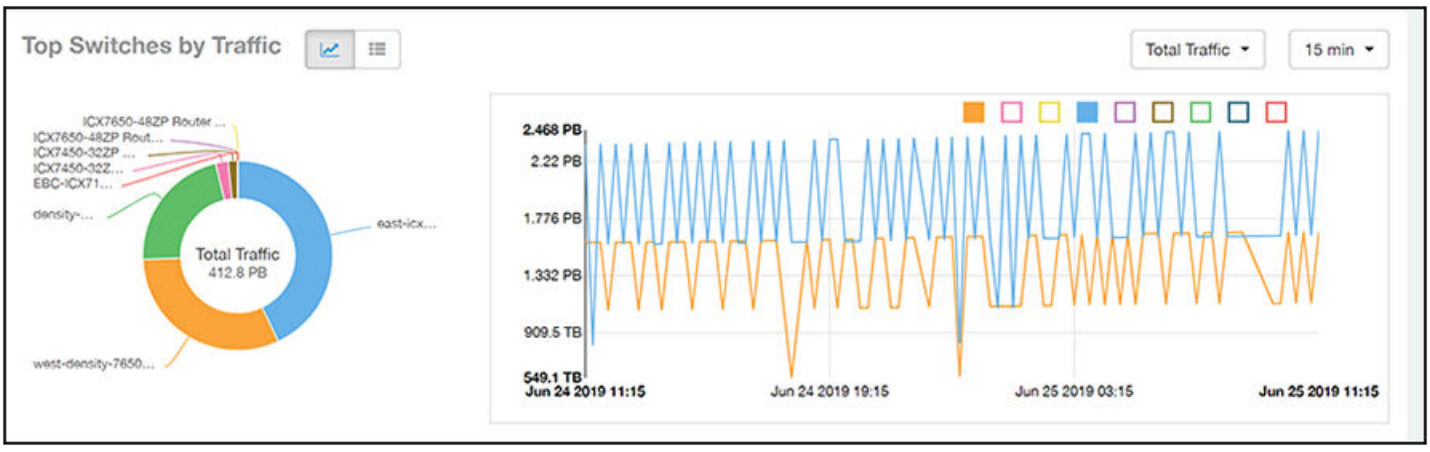


Network - Wired Report Top Switches By Traffic

Use the Top Switches By Traffic pie chart and graph of the Network - Wired report to view which wired switches have the most traffic. You can use the Traffic drop-down to show total traffic, transmitted traffic only, or received traffic only.

On the pie chart, you can hover over any area to view more details, or click on one of the areas of the pie chart to go to the Switch Details dashboard for the corresponding switch. In the line graph, you can hover to view traffic for switches at different times; you can toggle the boxes on and off to display or not display the switches they represent.

FIGURE 54 Network - Wired Report Top Switches By Traffic

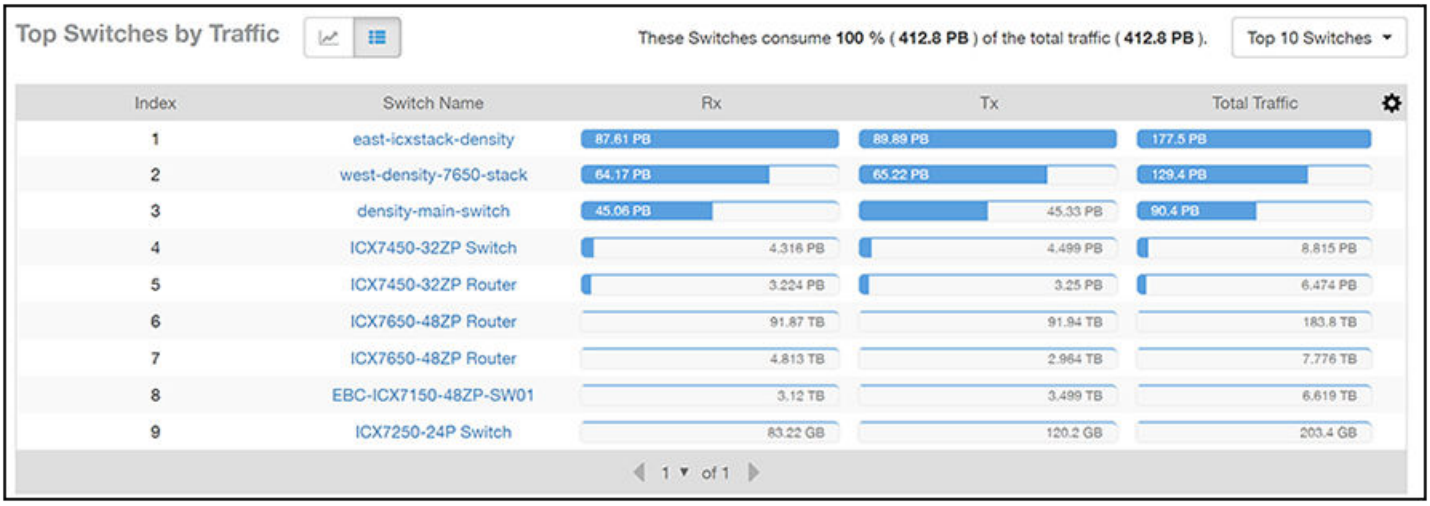


Network - Wired Report Top Switches by Traffic (table)

Use the Top Switches by Switches table of the Network - Wired report to view which wired switches have the most traffic.

You can click various headings to sort the table as desired. You can also use the drop-down menu to select the number of switches shown, and use the gear icon to include or exclude any columns.

FIGURE 55 Network - Wired Report Top Switches by Traffic (table)

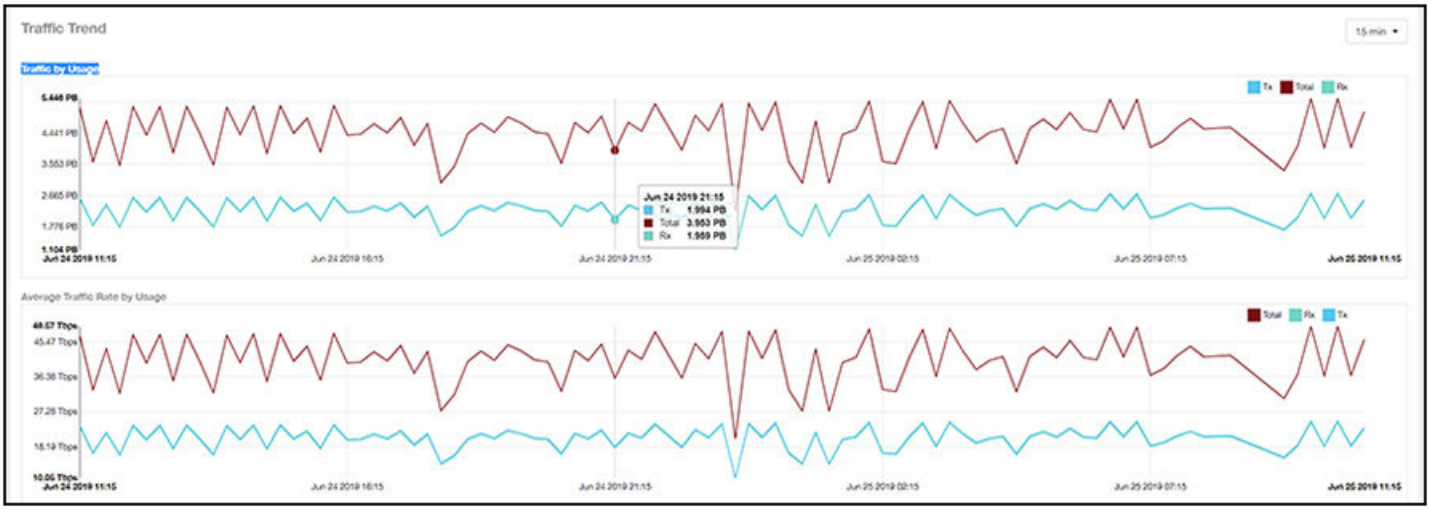


Network - Wired Report Traffic Trend

The Traffic Trend section of the Network - Wired report contains two line graphs that provide traffic information about the wired switches in the network.

Use the drop-down menus to specify the time frame and the granularity of the graphs.

FIGURE 56 Network - Wired Traffic Trend



Inventory Dashboard

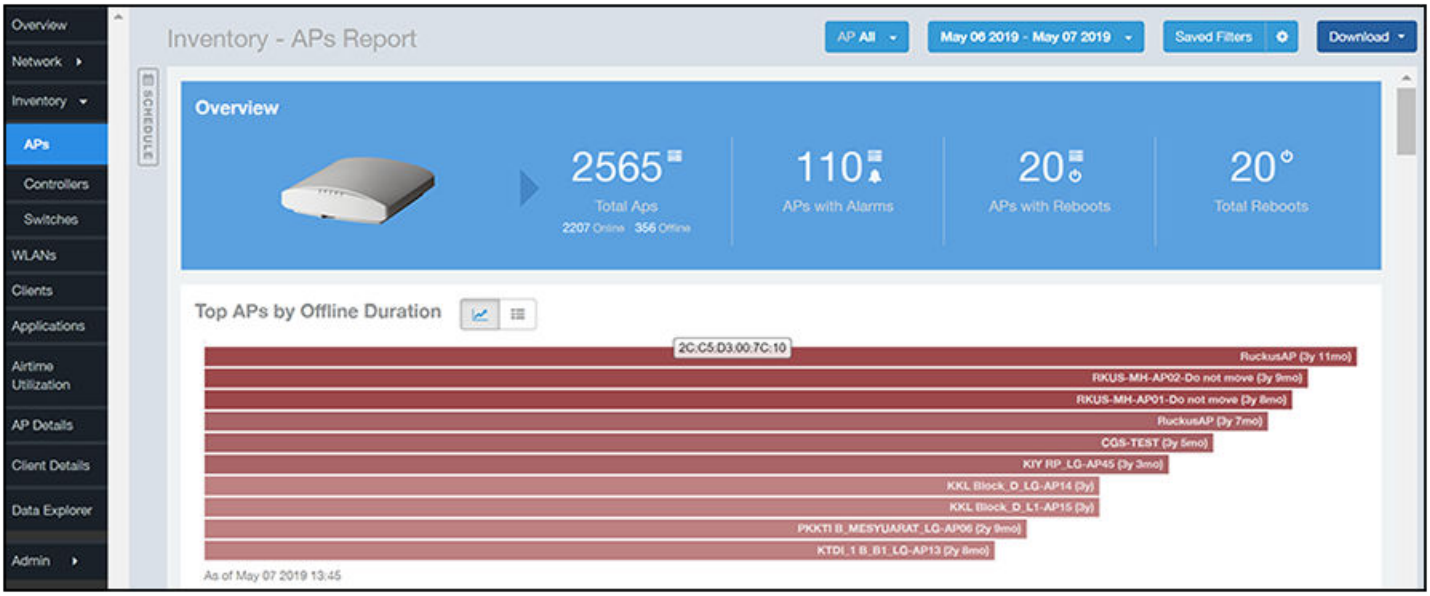
- Inventory - APs Report..... 49
- Inventory - Controllers Report..... 58
- Inventory - Switches Report..... 62

Inventory - APs Report

The Inventory - APs Report provides details on AP inventory, such as AP reboots, AP software version, AP models and AP Alarms.

The following figure shows only the upper portion of the Inventory - APs dashboard that appears when you click **Inventory > APs** on the navigation bar.

FIGURE 57 Inventory - APs Dashboard (upper portion)



The Inventory - APs Report consists of the 12 sections that are listed in the table below. Figures showing each of these sections appear later.

NOTE

All counts shown in bar charts, pie charts and tables are exact counts. The counts in trend charts are approximate.

TABLE 5 Sections of the Inventory - APs Report Dashboard

1	Overview	Contains an overview of the AP inventory – how many APs are connected, how many reboots, and so on.
2	Top APs By Offline Duration (graph)	Contains the APs that have been disconnected over a specified duration. The APs are ordered from longest offline duration to shortest offline duration. You can click the Table View icon to toggle to a table view of this information.
3	AP Count Trend	A pie chart and graph show the number of available APs on the network based on the total number of APs and its online status.

TABLE 5 Sections of the Inventory - APs Report Dashboard (continued)

4	AP Status Trends	A line chart shows the trend of various AP statuses such as online, offline, provisioned, discovery and so on.
5	Top AP Models	A pie chart and graph contain the top APs models by count in the network, along with the trend of APs models over a specified time frame. You can click the Table View icon to toggle to a table that shows the distribution of AP models in the network.
6	Top AP Software Versions	A pie chart and graph contain the top APs software versions by AP count in the network, along with the trend of APs software versions over a specified time frame. You can click the Table View icon to toggle to a table that shows the software versions that are being used the most.
7	Top 10 AP Reboot Reasons	A pie chart and graph list the most common reasons why the APs in your network have restarted over a specified time frame.
8	Top APs by Reboot Counts	A pie chart and graph contain the top APs that restarted, along with the APs based on the number of restart over a specified time frame. You can click the Table View icon to toggle to a table that shows the APs that have restarted over a specified time.
9	Top 10 AP Alarm Types	A pie chart and graph contain the Top 10 Alarm types that have been generated, along with number of occurrences generated over a specified time frame.
10	APs Configured in Multiple Systems	A table lists APs that have been associated with multiple controllers.
11	AP Details for Online/Offline Status	A table lists the APs on the network based on its online or offline status with AP name, IP address, location, model, controller and status.
12	AP Details for Other Statuses	A table lists the APs on the network based on AP name, IP address, location, model, controller and status

Inventory - APs Report Overview

The Inventory - APs Report overview section provides a general overview of the APs on the network.

This overview section displays the following, based on your selection of AP, Radio and Date Range filters:

- Total APs
- APs with alarms
- APs with reboots
- Total reboots

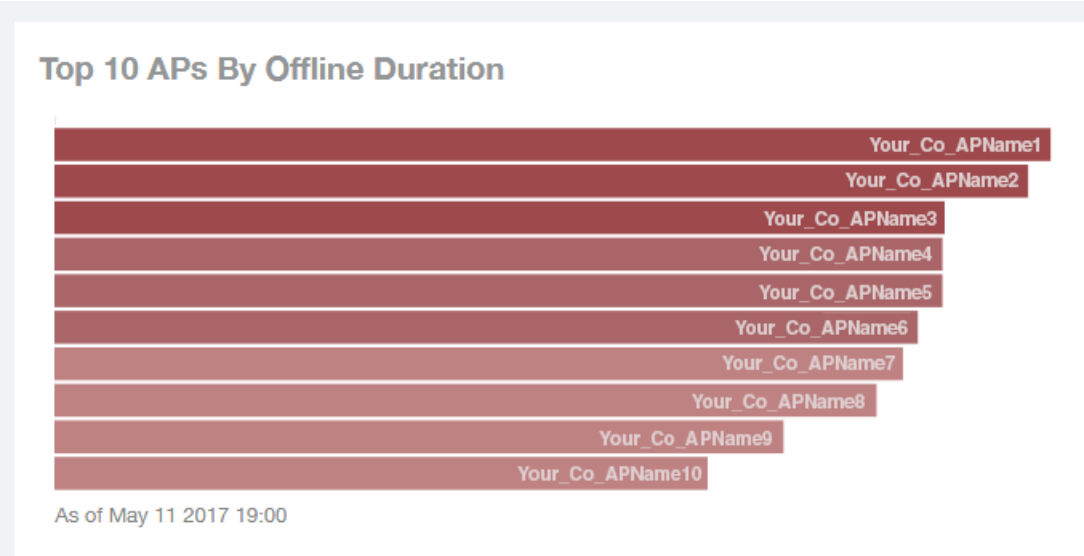
FIGURE 58 Inventory - APs Report Overview

Inventory - APs Report: Top APs by Offline Duration

The Top APs by Offline Duration chart of the Inventory - APs Report displays the top 10 APs in the network that have been disconnected for the longest duration.

Use the drop-down menu to specify the time granularity. If you hover over the line graph, a pop-up appears that allows you to obtain details on the selected data points.

FIGURE 59 Inventory - APs Report: Top APs by Offline Duration

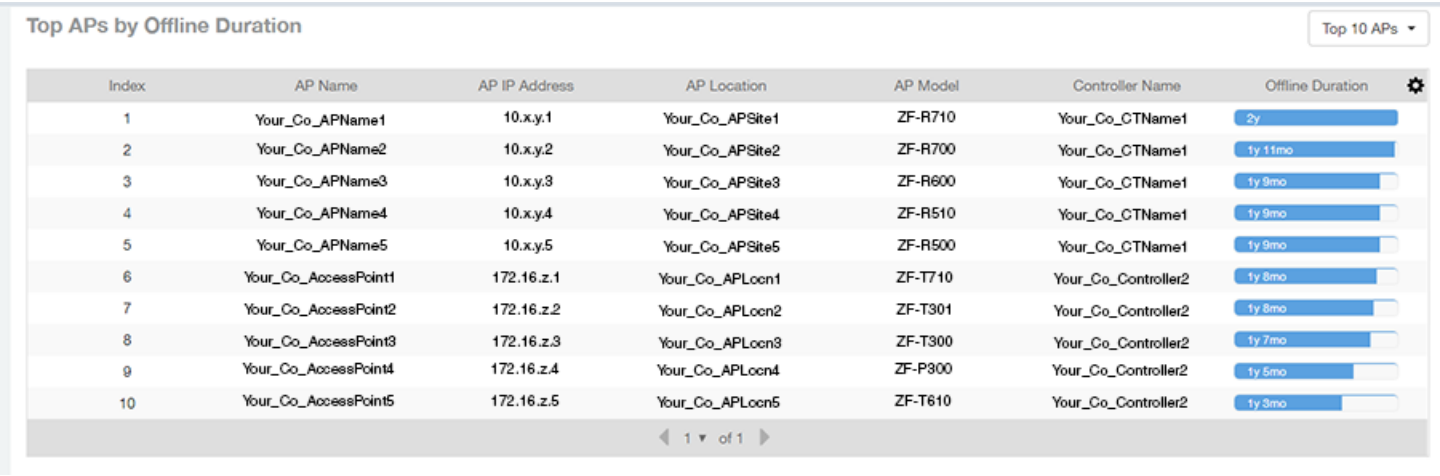


Inventory - APs Report: Top APs by Offline Duration (table)

The Top APs by Offline Duration table of the Inventory - APs Report displays the top APs based on which ones have been offline for the longest duration, with details of AP name, IP address, location, model, controllers and duration in a tabular format.

Click the gear icon to select the list of columns to display. The table is sorted on the top AP model 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 AP models. The number of rows per page is defined by the **Rows per Page** option in the table settings menu.

FIGURE 60 Inventory - APs Report: Top APs by Offline Duration



Inventory - APs Report: AP Count Trend

The Count Trend graph of the Inventory - APs Report depicts how many access points in your network are being utilized over time.

To show access points being used over certain time periods, use the drop-down menu to specify the time granularity. If you hover over the line graph and pie chart, a pop-up appears containing the details on the selected data points. Click any of the colored squares to toggle the display of the AP in the line graph.

FIGURE 61 Inventory - APs Report: AP Count Trend

Inventory - APs Report: AP Status Trends

The AP Status Trends pie chart and graph of the Inventory - APs Report display the top APs by connection and uptime status, such as online, offline, provisioned, discovery and other classifications.

Use the drop-down menu to specify the time granularity. If you hover over the line graph and pie chart, 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.

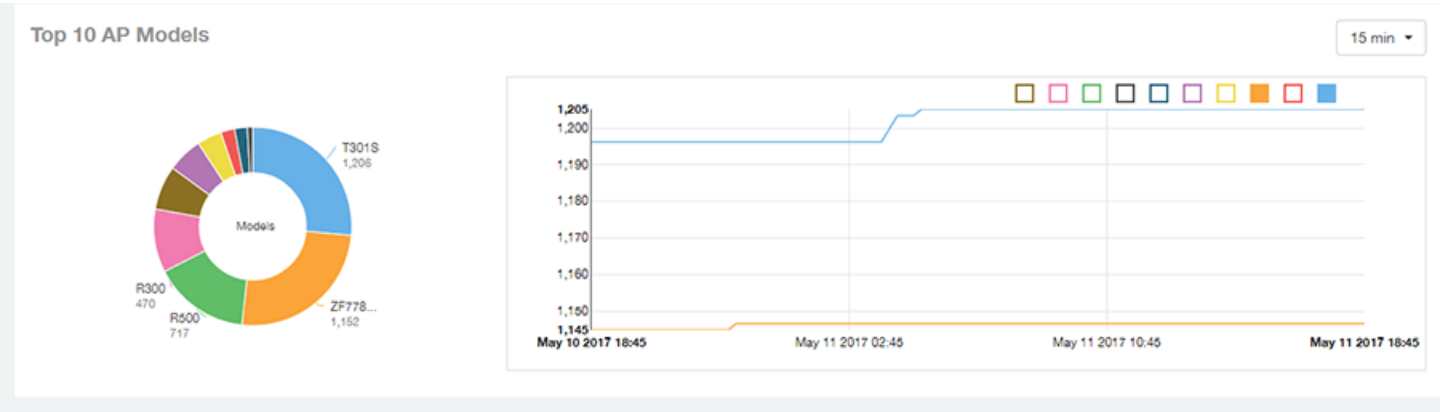
FIGURE 62 Inventory - APs Report: AP Status Trends

Inventory - APs Report: Top AP Models

The Top AP Models pie chart and line graph of the Inventory - APs Report display the model type that is most often used in your network.

Use the drop-down menu to specify the time granularity. If you hover over the line graph and pie chart, 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 63 Inventory - APs Report: Top AP Models

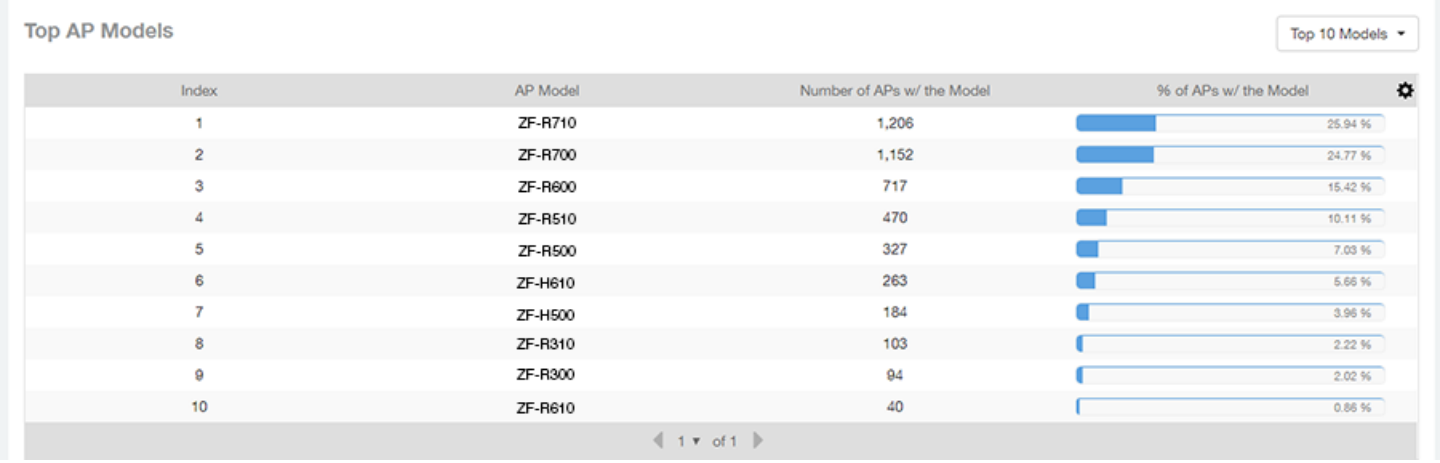


Inventory - APs Report: Top AP Models (table)

The Top AP Models table of the Inventory - APs Report displays the model type being used most often by the APs in your network.

Click the gear icon to select the list of columns to display. The table is sorted on the top AP model by default. Click any column heading to sort by that value. You can also select the top 10 (default value), 20, 50, or 100 models to display, or display all AP models. The number of rows per page is defined by the **Rows per Page** option in the table settings menu.

FIGURE 64 Inventory - APs Report: Top AP Models (table)

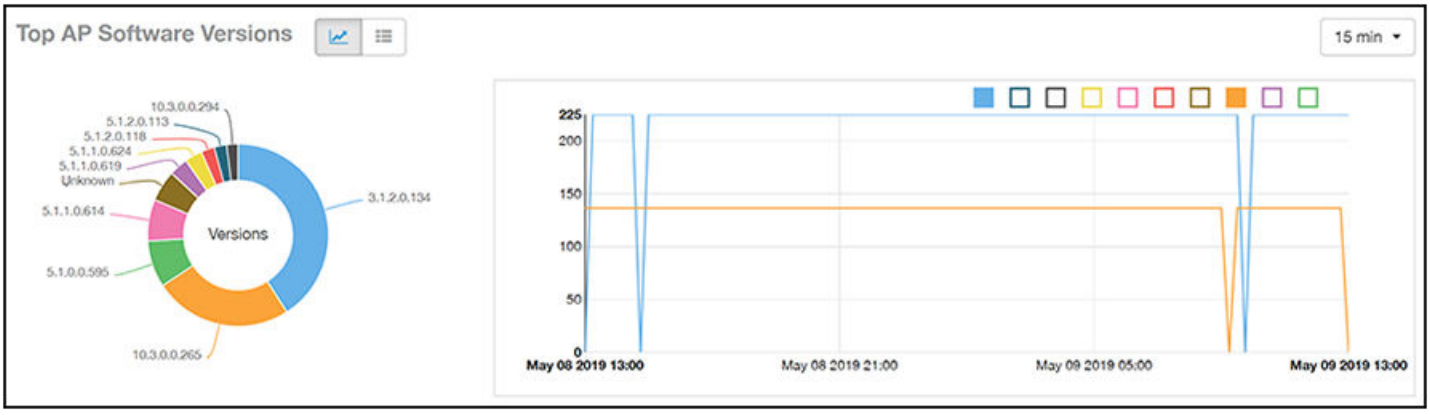


Inventory - APs Report: Top AP Software Versions

The Top AP Software Versions pie chart and graph of the Inventory - APs Report display the most-used software versions in your network, and show how many APs are using each version.

Use the drop-down menu to specify the time granularity. If you hover over the line graph or the pie chart, 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 65 Inventory - APs Report: Top AP Software Versions

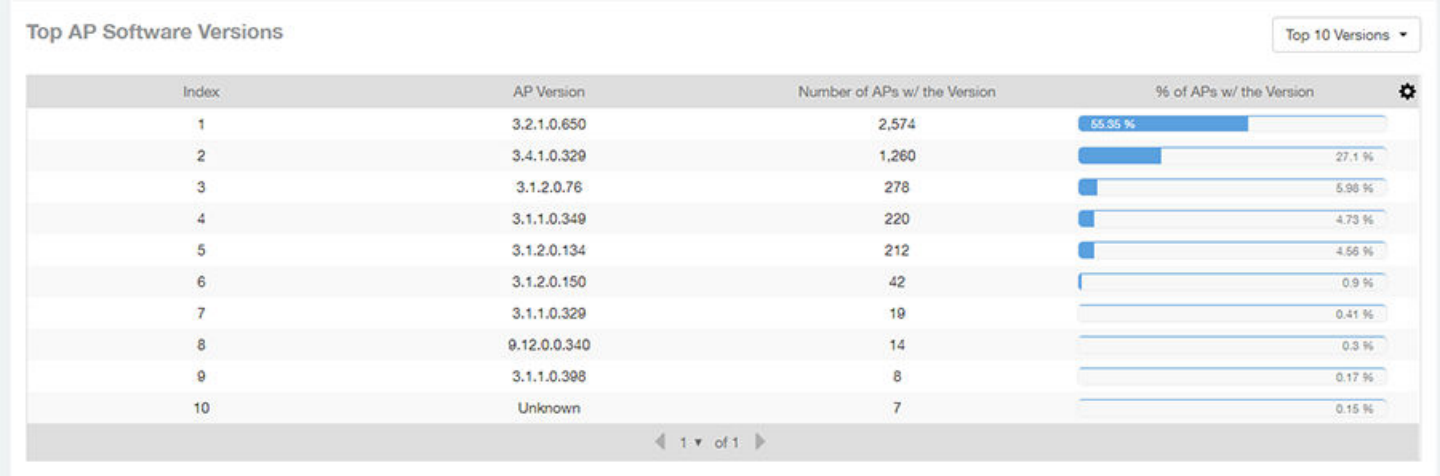


Inventory - APs Report: Top AP Software Versions (table)

The Top AP Software Versions table of the Inventory - APs Report displays the AP software versions most frequently used in your network and the number of APs using each version.

Click the gear icon to select the list of columns to display. The table is sorted on the top AP software version 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 AP models. The number of rows per page is defined by the **Rows per Page** option in the table settings menu.

FIGURE 66 Inventory - APs Report: Top AP Software Versions (table)

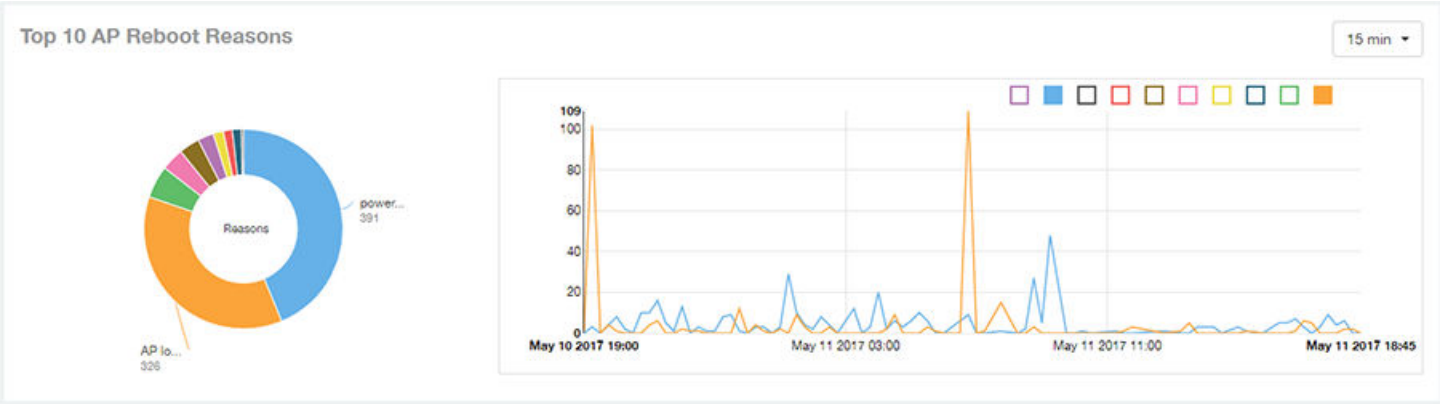


Inventory - APs Report: Top 10 AP Reboot Reasons

The Top 10 AP Reboot Reasons pie chart and graph of the APs & Controllers report display the 10 most common reasons why APs in your network have rebooted.

Use the drop-down menu to specify the time granularity. If you hover over the line graph and pie chart, 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 67 Inventory - APs Report: Top 10 AP Reboot Reasons

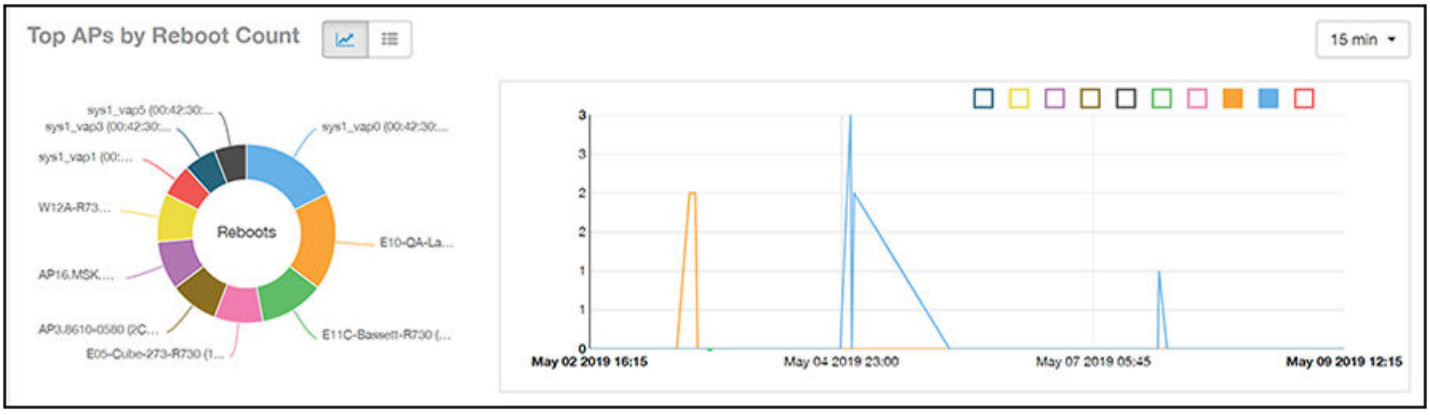


Inventory - APs Report: Top APs by Reboot Count

The Top APs by Reboot Count pie chart and line graph of the Inventory - APs Report display the top 10 APs in your network that have rebooted most frequently.

Use the drop-down menu to specify the time granularity. If you hover over the line and pie 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 68 Inventory - APs Report: Top APs by Reboot Count



Inventory - APs Report: Top APs by Reboot Count (table)

The Top AP by Reboot Count table of the Inventory - APs Report displays the APs that have rebooted the most times, and includes AP name, IP address, location, number of reboots, last reboot date and reason.

Click the gear icon to select the list of columns to display. The table is sorted on the top AP name 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 AP models. The number of rows per page is defined by the **Rows per Page** option in the table settings menu.

FIGURE 69 Inventory - APs Report: Top APs by Reboot Count (table)

Top APs by Reboot Count — Top 10 APs

Index	AP Name	AP IP Address	AP Location	# of Reboots	Last Reboot Date	Reason for Last Reboot
1	Your_Co_APName1	10.x.y.1	Your_Co_APsite1	16	May 11 2017 18:03	unknown reason
2	Your_Co_APName2	10.x.y.2	Your_Co_APSite2	13	May 11 2017 10:00	unknown reason
3	Your_Co_APName3	10.x.y.3	Your_Co_APSite3	8	May 11 2017 18:17	power cycle
4	Your_Co_APName4	10.x.y.4	Your_Co_APSite4	8	May 11 2017 18:17	power cycle
5	Your_Co_APName5	10.x.y.5	Your_Co_APSite5	8	May 11 2017 18:17	power cycle
6	Your_Co_AccessPoint1	172.16.z.1	Your_Co_APLocn1	6	May 11 2017 08:34	system recovery by wat...
7	Your_Co_AccessPoint2	172.16.z.2	Your_Co_APLocn2	5	May 11 2017 00:28	AP rebooted by control...
8	Your_Co_AccessPoint3	172.16.z.3	Your_Co_APLocn3	5	May 11 2017 15:47	AP lost SCG more than...
9	Your_Co_AccessPoint4	172.16.z.4	Your_Co_APLocn4	4	May 11 2017 00:28	AP rebooted by control...
10	Your_Co_AccessPoint5	172.16.z.5	Your_Co_APLocn5	4	May 10 2017 21:35	power cycle

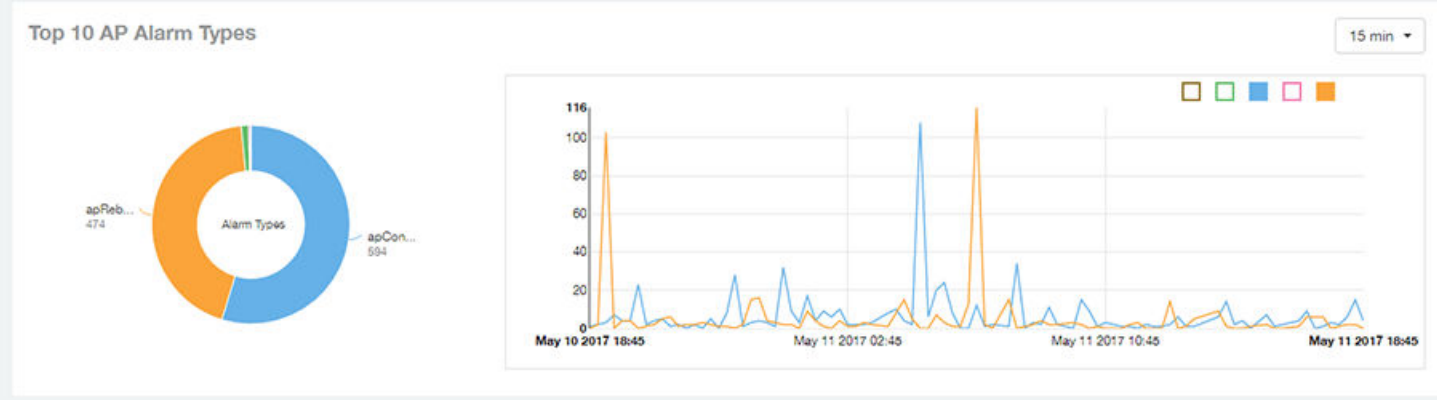
1 of 1

Inventory - APs Report: Top 10 AP Alarm Types

The Top 10 AP Alarm Types pie chart and line graph of the Inventory - APs Report display the 10 alarm types most that have most frequently occurred to access points in your network.

Use the drop-down menu to specify the time granularity. 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 70 Inventory - APs Report: Top 10 AP Alarm Types



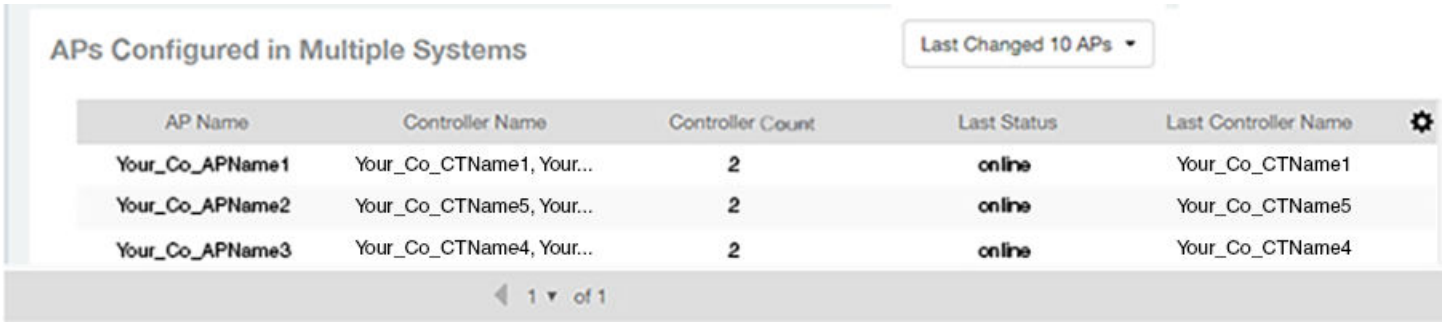
Inventory - APs Report: APs Configured in Multiple Systems

The APs Configured in Multiple Systems table of the Inventory - APs Report shows you information about APs that have been associated with more than one controller.

In the Controller Name field, all controllers that the AP has been associated with are listed, separated by commas. The last known controller that this AP has been associated with is listed in the Last Controller Name column.

Click the gear icon to select the list of columns to display. Click any column heading to sort by that value. You can also select the top 10 (default value), 20, 50, or 100 APs to display, or display all APs. The number of rows per page is defined by the **Rows per Page** option in the table settings menu.

FIGURE 71 Inventory - APs Report: APs Configured in Multiple Systems

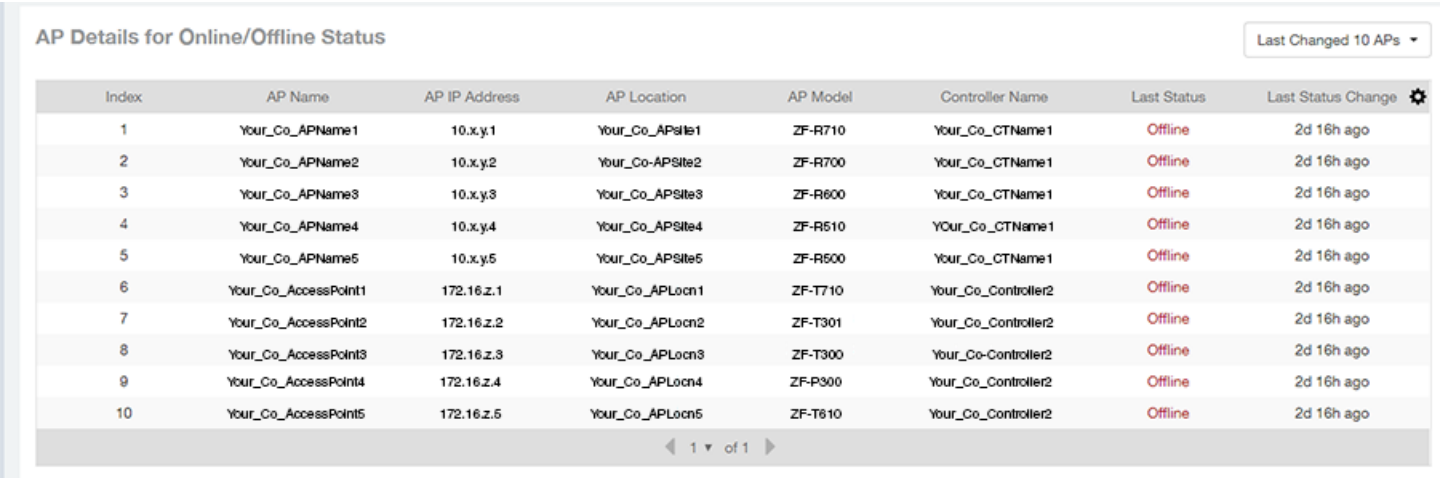


Inventory - APs Report: AP Details for Online/Offline Status

The AP Details for Online/Offline Status table of the Inventory - APs Report displays its status details based on AP name, IP address, location, model name, controller name, last status and last status change.

Click the gear icon to select the list of columns to display. The table is sorted on the top AP model 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 AP models. The number of rows per page is defined by the **Rows per Page** option in the table settings menu.

FIGURE 72 Inventory - APs Report: AP Details for Online/Offline Status

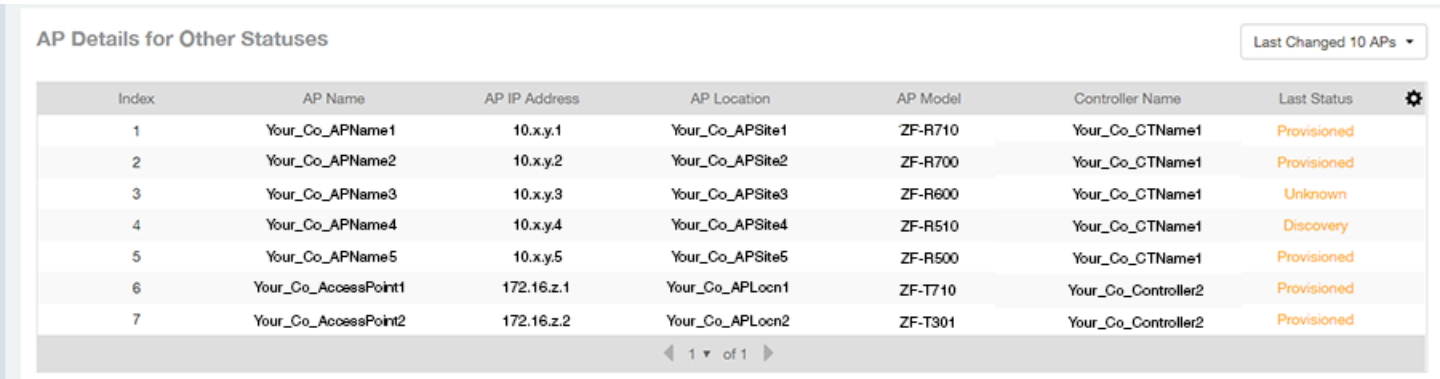


Inventory - APs Report: AP Details for Other Statuses

The AP Details for Other Statuses table of the Inventory - APs Report displays the details for APs that are currently in a status other than online or offline.

Click the gear icon to select the list of columns to display. The table is sorted on the top AP model by default. Click any column heading to sort by that value. You can also select the top 10 (default value), 20, 50, or 100 APs to display, or display all AP models. The number of rows per page is defined by the **Rows per Page** option in the table settings menu.

FIGURE 73 Inventory - APs Report: AP Details for Other Statuses

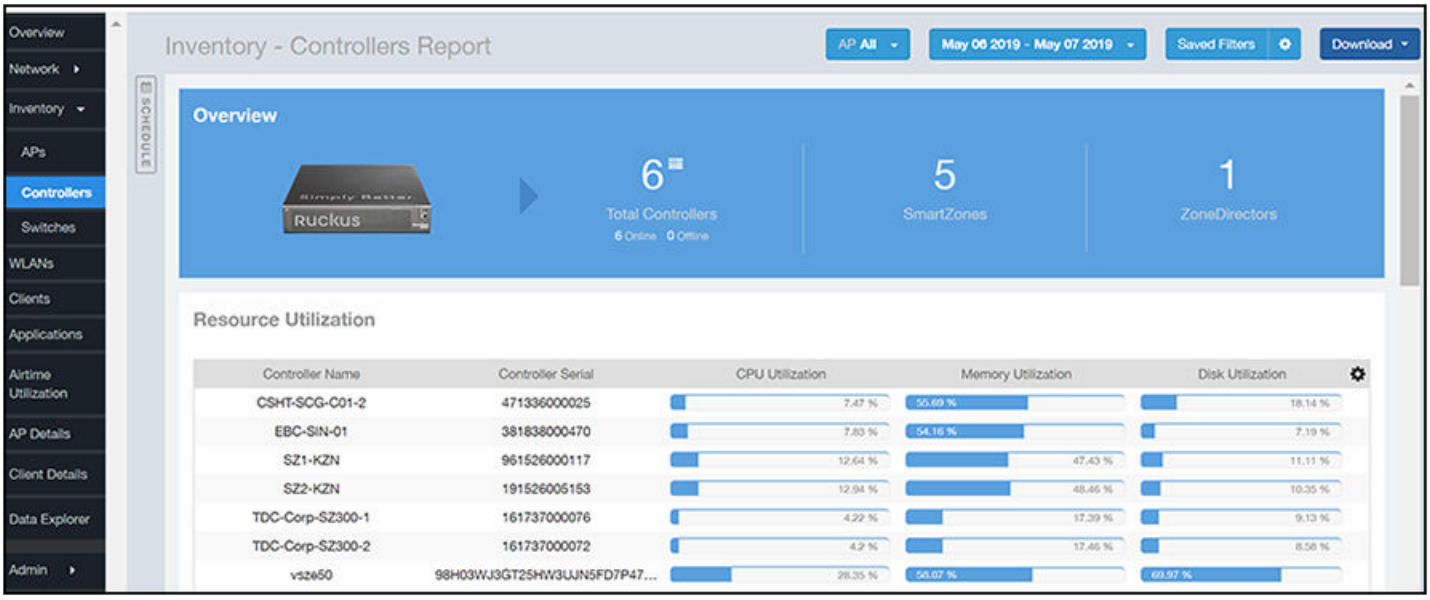


Inventory - Controllers Report

The Inventory - Controllers Report provides details on controller inventory, including resource and license utilization.

The following figure shows only the upper portion of the Inventory - Controllers dashboard that appears when you click **Inventory > Controllers** on the navigation bar.

FIGURE 74 Inventory - Controllers Dashboard (upper portion)



The Inventory - Controllers Report consists of four sections, which are listed in the table below. Figures showing each of these sections appear later.

NOTE
All counts shown are exact counts.

1	Overview	Contains an overview of the controller inventory, such as which controllers are being used, and their online/offline status.
2	Resource Utilization	A table shows the CPU, memory and disk utilization percentages for each controller in your system.
3	License Utilization	A table shows the licenses available and consumed for the APs for each system.
4	KRACK Assessment	A table shows the KRACK vulnerability status of all Access Points that are filtered to be displayed.

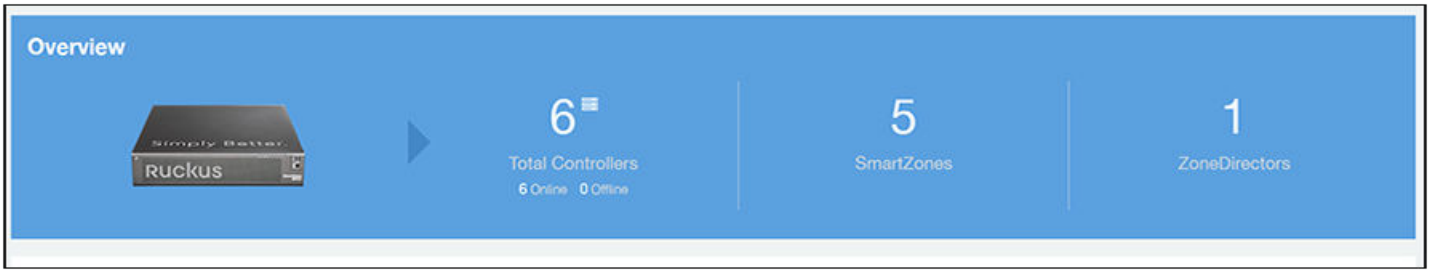
Inventory - Controllers Report Overview

The Inventory - Controllers Report overview section provides a general overview of the controllers on the network.

This overview section displays the following, based on your selection of AP, Radio and Date Range filters:

- Total number of controllers (and how many are online and offline)
- Number of SmartZone controllers
- Number of ZoneDirector controllers

FIGURE 75 Inventory - Controllers Report Overview

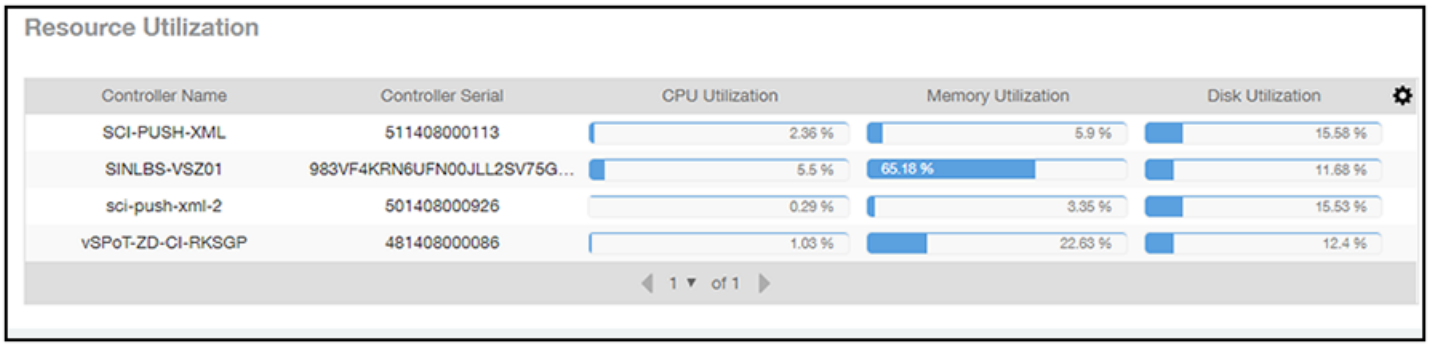


Inventory - Controllers Report: Resource Utilization

The Resource Utilization table of the Inventory - Controllers Report displays the CPU, memory and disk utilization percentages for each controller in your system.

Click the gear icon to select the list of columns to display. Click any column heading to sort by that value. You can also select the top 10 (default value), 20, 50, or 100 controllers to display, or display all controller names. The number of rows per page is defined by the **Rows per Page** option in the table settings menu.

FIGURE 76 Inventory - Controllers Report: Resource Utilization

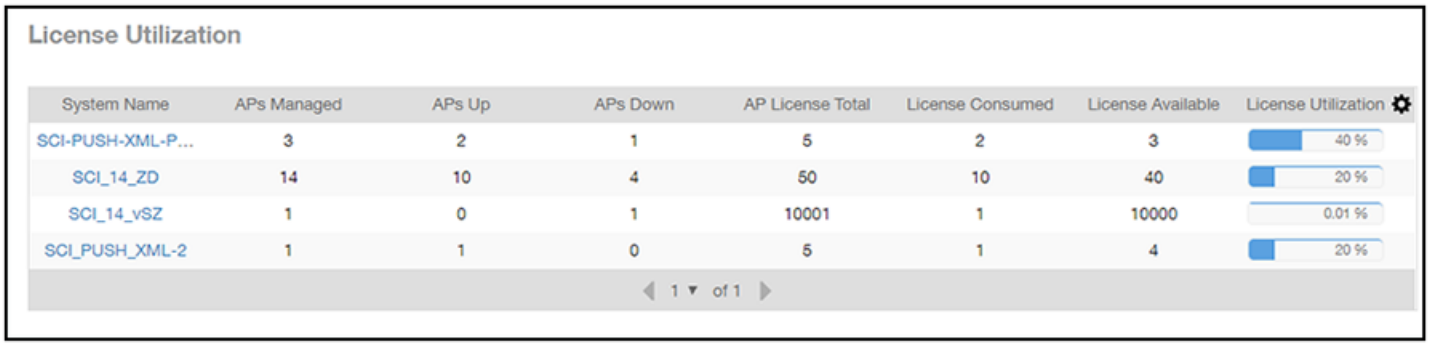


Inventory - Controllers Report: License Utilization

The License Utilization table of the Inventory - Controllers Report displays the number of available and consumed licenses for the APs for each system.

Click the gear icon to select the list of columns to display. Click any column heading to sort by that value. You can also select the top 10 (default value), 20, 50, or 100 systems to display, or display all system names. The number of rows per page is defined by the **Rows per Page** option in the table settings menu.

FIGURE 77 Inventory - Controllers Report: License Utilization

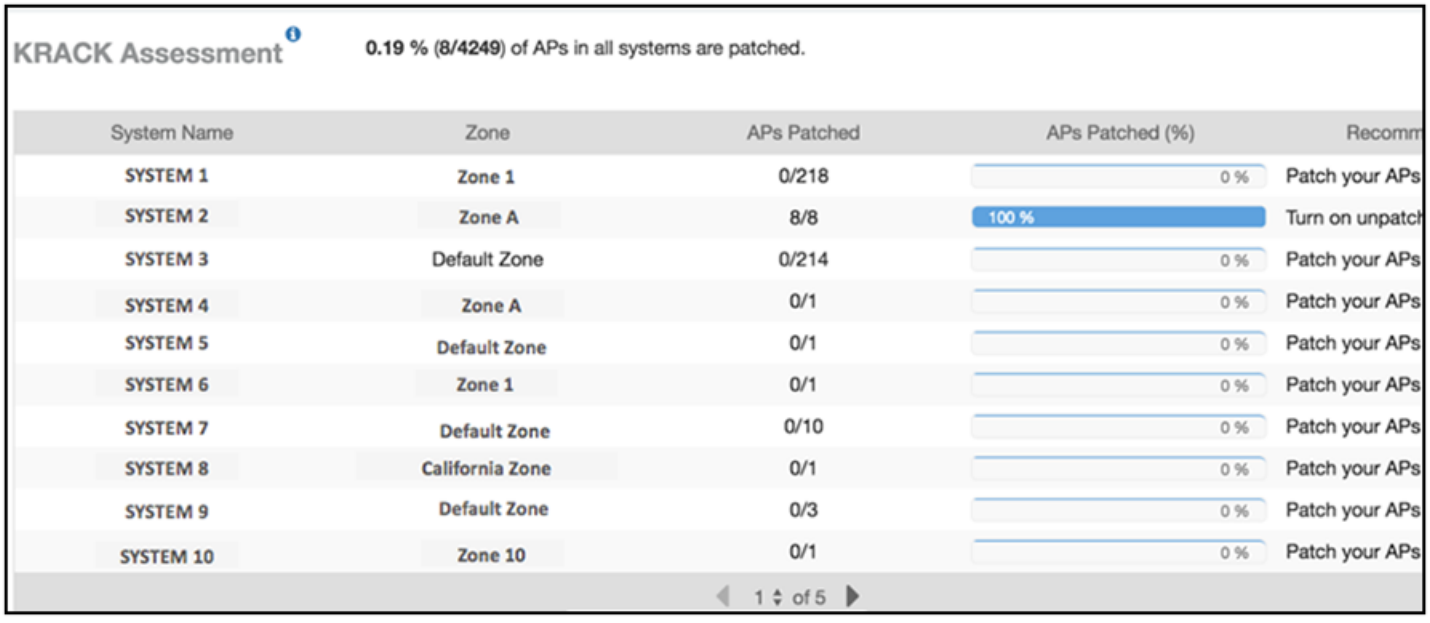


Inventory - Controllers Report: KRACK Assessment

The KRACK Assessment table of the Inventory - Controllers Report shows the KRACK vulnerability status of all Access Points that are filtered to be displayed.

The following is an example of the Krack Assessment section.

FIGURE 78 Inventory - Controllers Report: KRACK Assessment



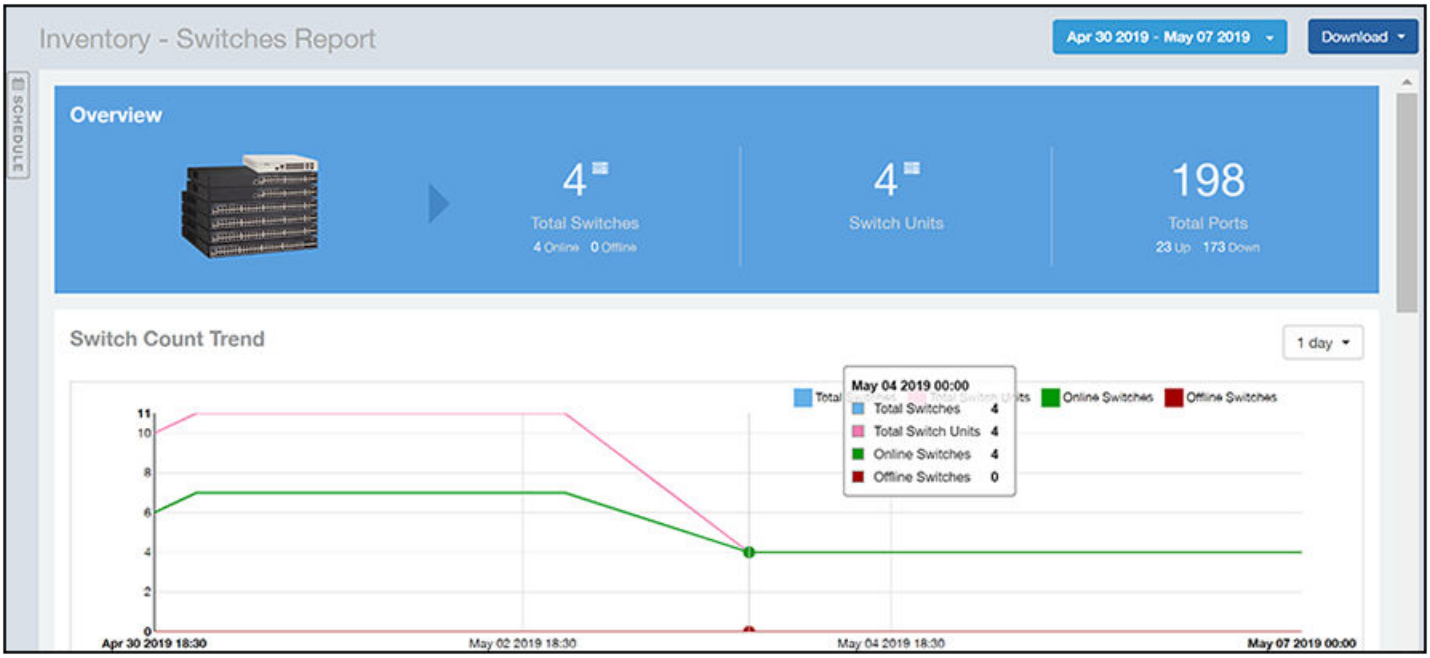
You can follow the recommendations displayed to patch your Access points. Refer to the following site for information and instructions: https://support.ruckuswireless.com/krack-ruckus-wireless-support-resource-center

Inventory - Switches Report

The Inventory - Switches Report provides details on switch inventory, including switch models and software versions that are being used the most.

The following figure shows only the upper portion of the Inventory - Switches dashboard that appears when you click **Inventory > Switches** on the navigation bar.

FIGURE 79 Inventory - Switches Dashboard (upper portion)



The Inventory - Switches Report consists of four sections, which are listed in the table below. Figures showing each of these sections appear later.

NOTE
All counts shown in bar charts, pie charts and tables are exact counts. The counts in trend charts are approximate.

1	Overview	Contains an overview of the switch inventory, such as the total number of switches and ports that are currently in use.
2	Switch Count Trend	A line chart shows the trend of total switches, total switch units, online status, and offline status over specified time intervals.
3	Top Switch Software Versions	A pie chart and graph contain the most-used switch software versions and the number of switches using each version, along with the trend of software versions over a specified time frame. You can click the Table View icon to toggle to a table that shows the software versions that are being used the most.
4	Top Switch Models	A pie chart and graph contain the top switch models by count in the network, along with the trend of switch models over a specified time frame. You can click the Table View icon to toggle to a table that shows the distribution of switch models in the network.

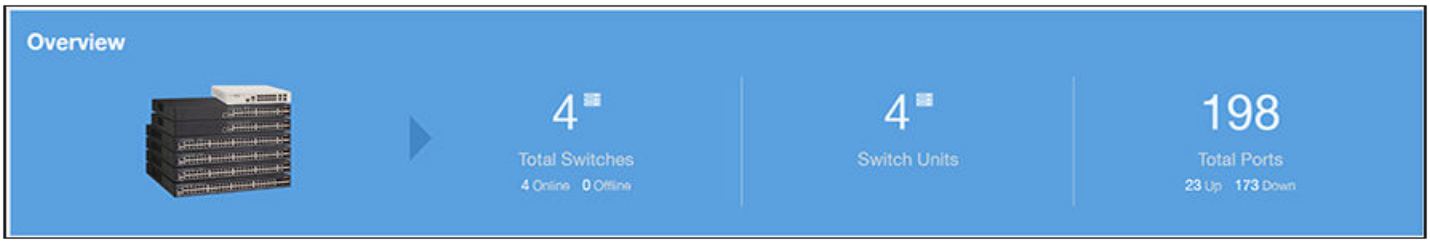
Inventory - Switches Report Overview

The Inventory - Switches Report overview section provides a general overview of the switches in the network.

This overview section displays the following, based on your selection of filters:

- Total number of switches (and how many are online and offline)
- Number of switch units
- Total number of ports (and how many are up and down)

FIGURE 80 Inventory - Switches Report Overview

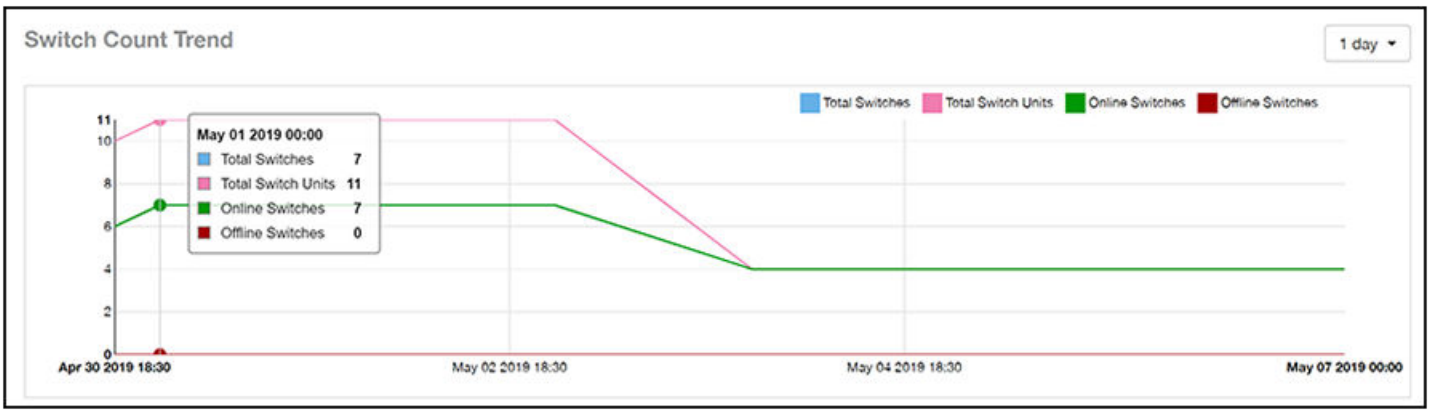


Inventory - Switches Report: Switch Count Trend

The Switch Count Trend graph of the Inventory - Switches Report displays the trend of total switches, total switch units, online status, and offline status over specified time intervals.

Use the drop-down menu to specify the time granularity. 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 the display of the switches in the line graph.

FIGURE 81 Inventory - Switches Report: Switch Count Trend

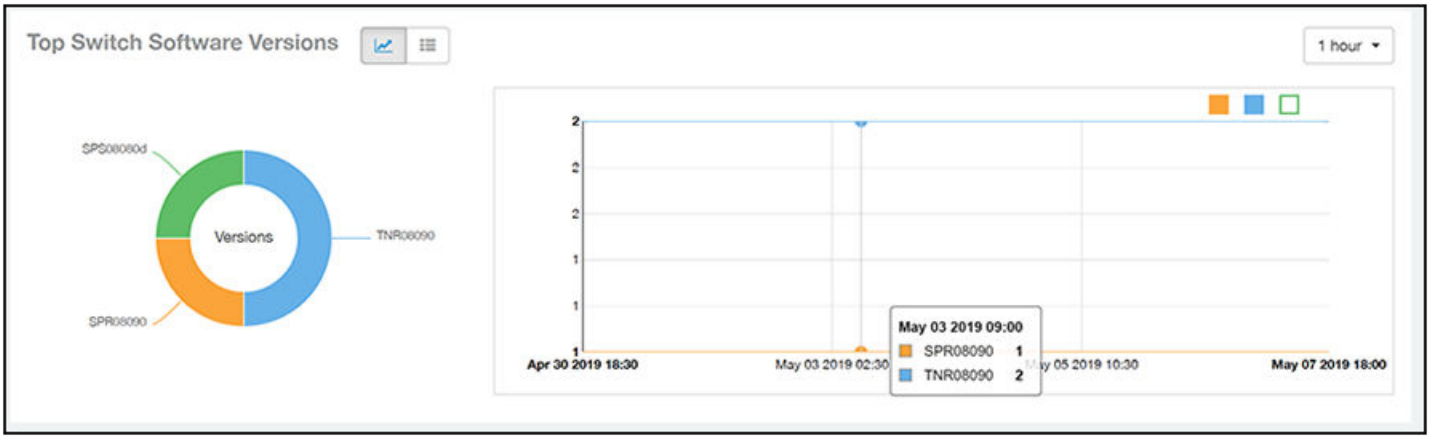


Inventory - Switches Report: Top Switch Software Versions

The Top Switch Software Versions pie chart and graph of the Inventory - Switches Report display the most-used switch software versions in your network, and show the number of switches using each version.

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

FIGURE 82 Inventory - Switches Report: Top Switch Software Versions

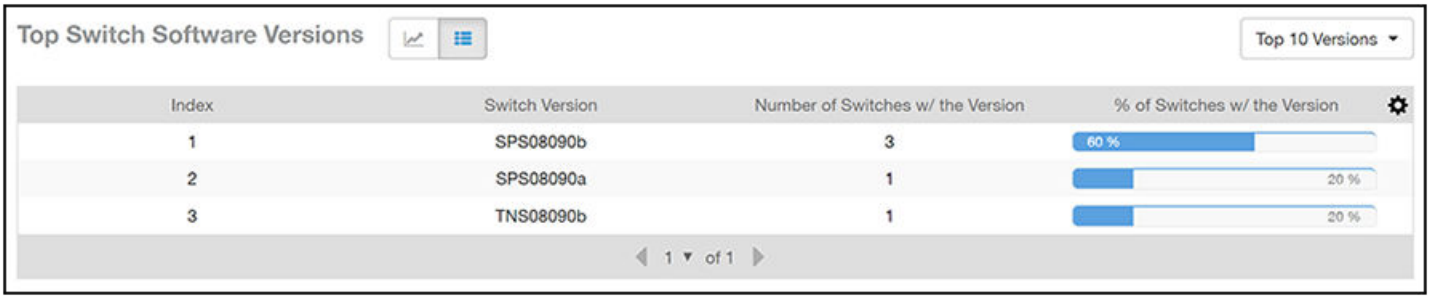


Inventory - Switches Report: Top Switch Software Versions (table)

The Top Switch Software Versions table of the Inventory - Switches Report displays the switch software versions most frequently used in your network and the number of switches using each version.

Click the gear icon to select the list of columns to display. The table is sorted on the top switch software version 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 switch models. The number of rows per page is defined by the **Rows per Page** option in the table settings menu.

FIGURE 83 Inventory - Switches Report: Top Switch Software Versions (table)

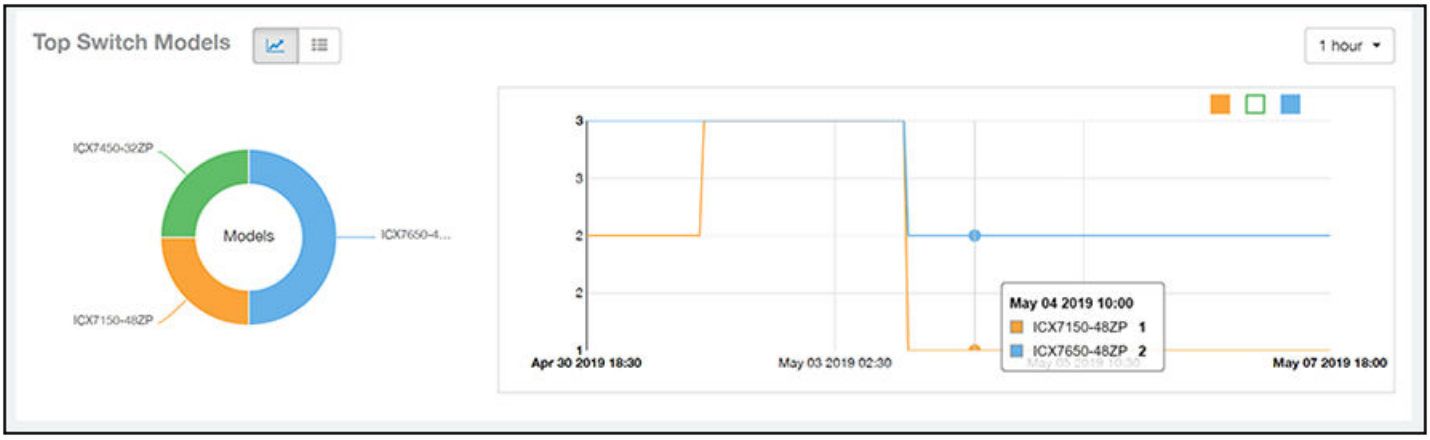


Inventory - Switches Report: Top Switch Models

The Top Switch Models pie chart and line graph of the Inventory - Switches Report display the model type that is most often used in your network.

Use the drop-down menu to specify the time granularity. If you hover over the line graph and pie chart, a pop-up appears containing the details on the selected data points. Click any of the colored squares to toggle display of the switch in the line graph.

FIGURE 84 Inventory - Switches Report: Top Switch Models

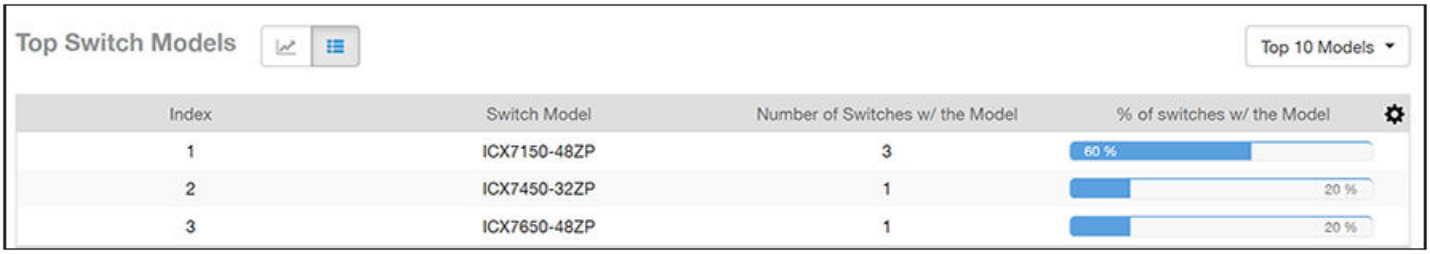


Inventory - Switches Report: Top Switch Models (table)

The Top Switch Models table of the Inventory - Switches Report displays the model type being used most often by the switches in your network.

Click the gear icon to select the list of columns to display. The table is sorted on the top switch model by default. Click any column heading to sort by that value. You can also select the top 10 (default value), 20, 50, or 100 models to display, or display all switch models. The number of rows per page is defined by the **Rows per Page** option in the table settings menu.

FIGURE 85 Inventory - Switches Report: Top Switch Models (table)



WLANs Report Dashboard

- WLANs Report 67

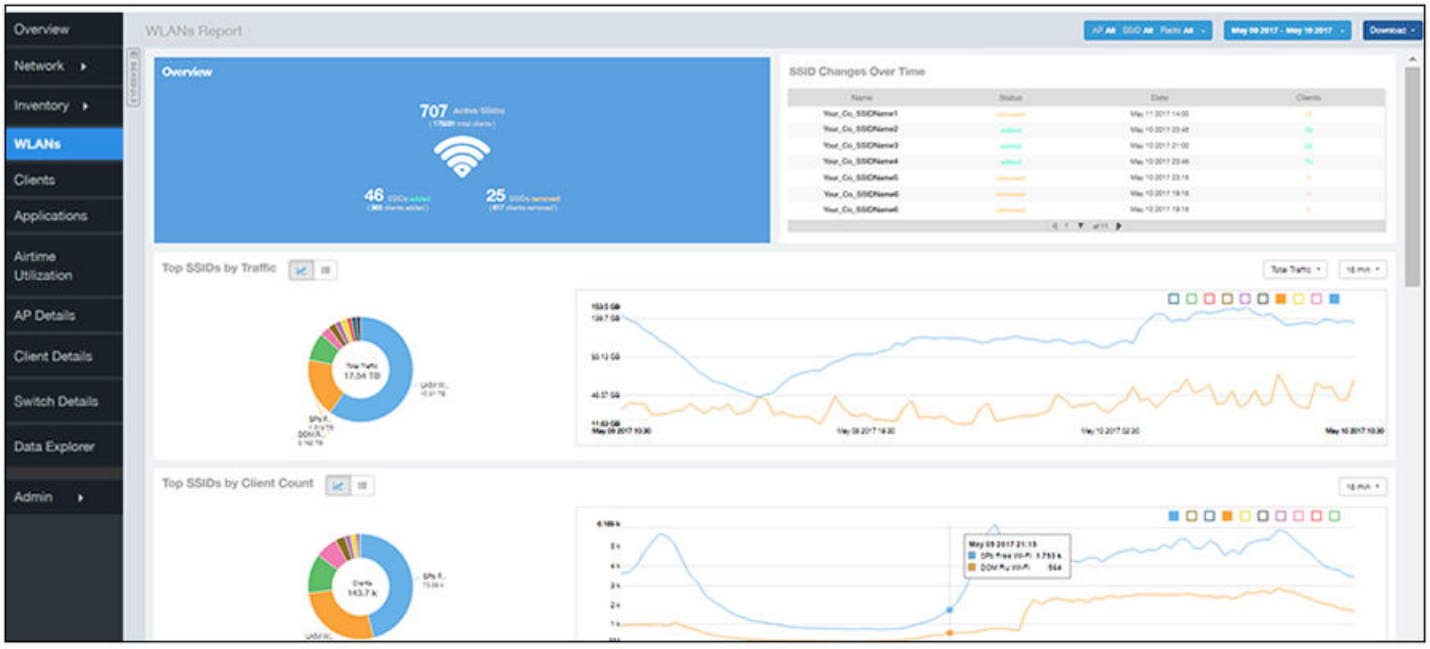
WLANs Report

The Wireless LANs report contains information about the SSIDs added as well as which are active or have been removed.

The report also includes details about 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 be selecting the list of available components for each category.

The following figure shows only the upper portion of the WLANs dashboard that appears when you click **WLANs** on the navigation bar.

FIGURE 86 WLANs Report (upper portion)

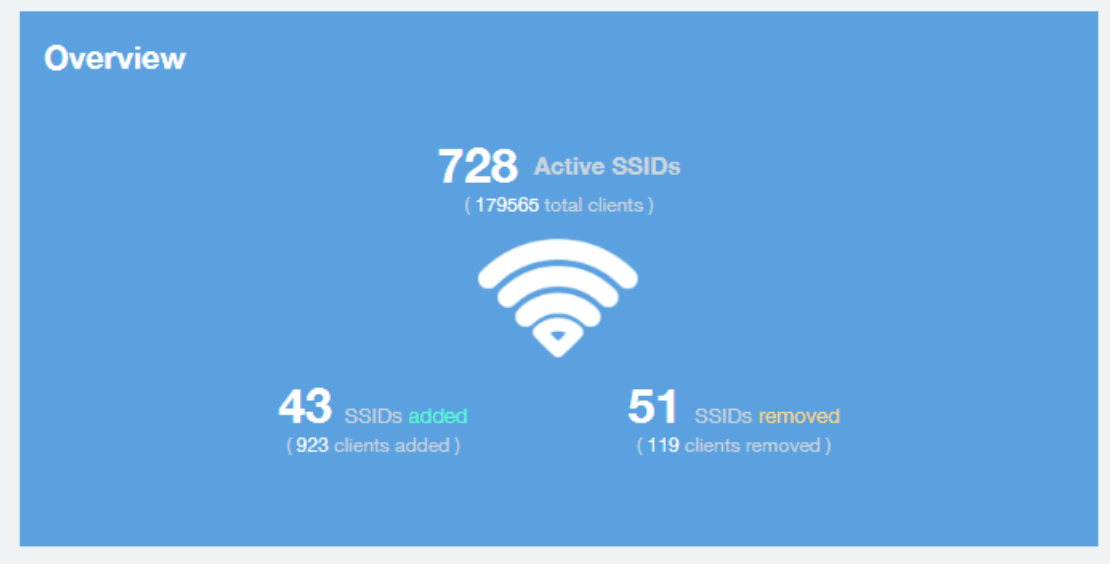


The WLANs report consists of the following sections:

Overview

The **Overview** section of the WLANs report shows the total number of active SSIDs, and the number of added and removed SSIDs over the selected period.

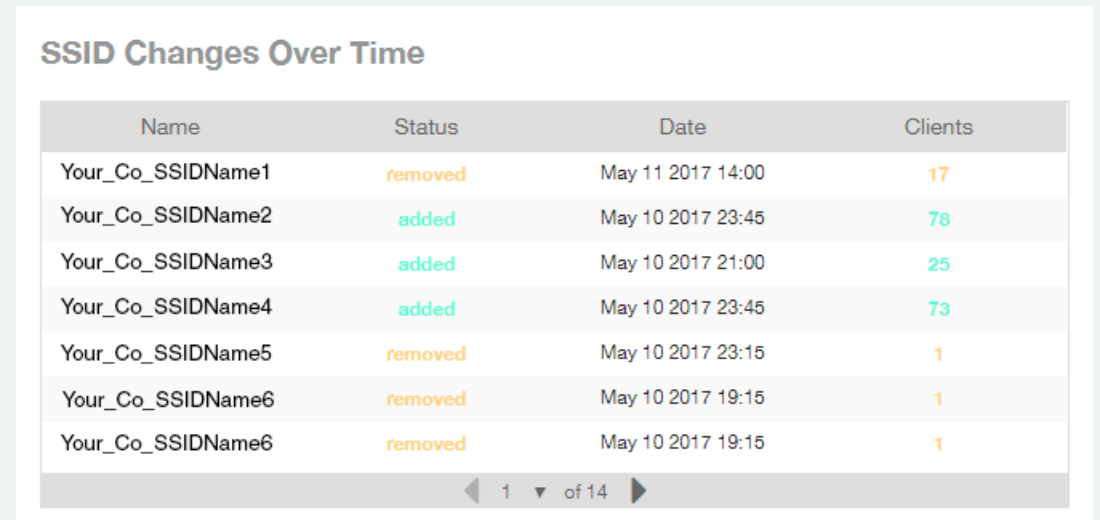
FIGURE 87 WLANs - Overview



SSID Changes Over Time

The **SSID Changes Over Time** display of the WLANs report shows the most recent SSID changes.

FIGURE 88 WLANs - SSID Changes Over Time



Top SSIDs by Traffic

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

The **Top SSIDs by Traffic** are represented as a chart and table. You can use these icons  to toggle between the chart and table views.

In the chart, click any of the colored squares to toggle display of the corresponding SSID. You can use the Total Traffic drop-down menu to choose whether to display transmitted data only, received data only, or total traffic.

FIGURE 89 WLANs - Top Ten SSIDs by Traffic

In the table view, 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 configure the number of rows per a page using the **Rows per Page** option in the table settings drop down menu.

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.

FIGURE 90 WLANs - Top SSIDs by Traffic (table)

Top SSIDs by Client Count

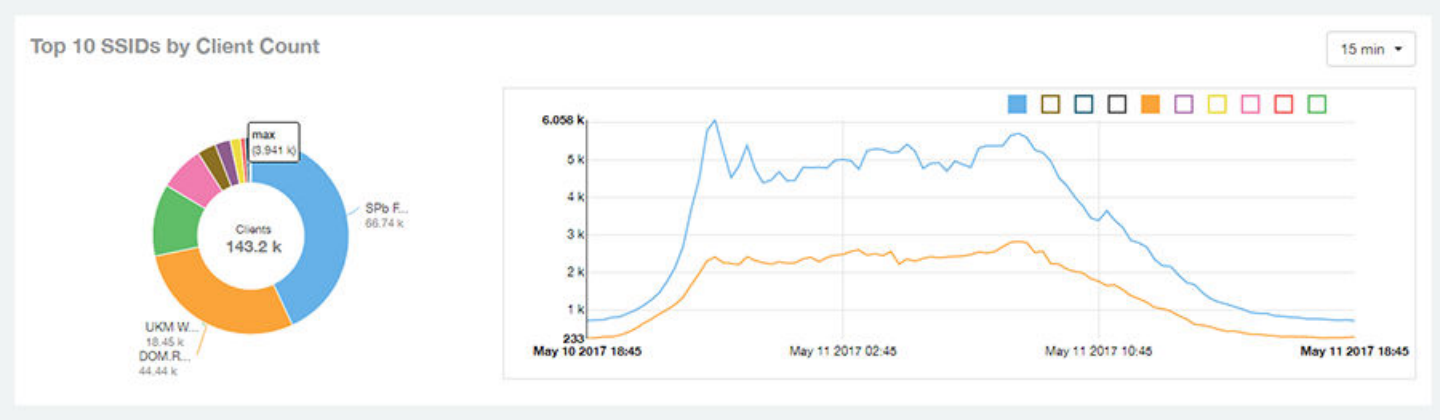
Use the **Top SSIDs by Client Count** pie chart and graph of the WLANs report to view which wireless networks are most congested in terms of client count, and to compare client counts over different time periods.

The **Top SSIDs by Client Count** are represented as a chart and table. You can use these icons  to toggle between the chart and table views.

In the chart, click any of the colored squares to toggle the 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.

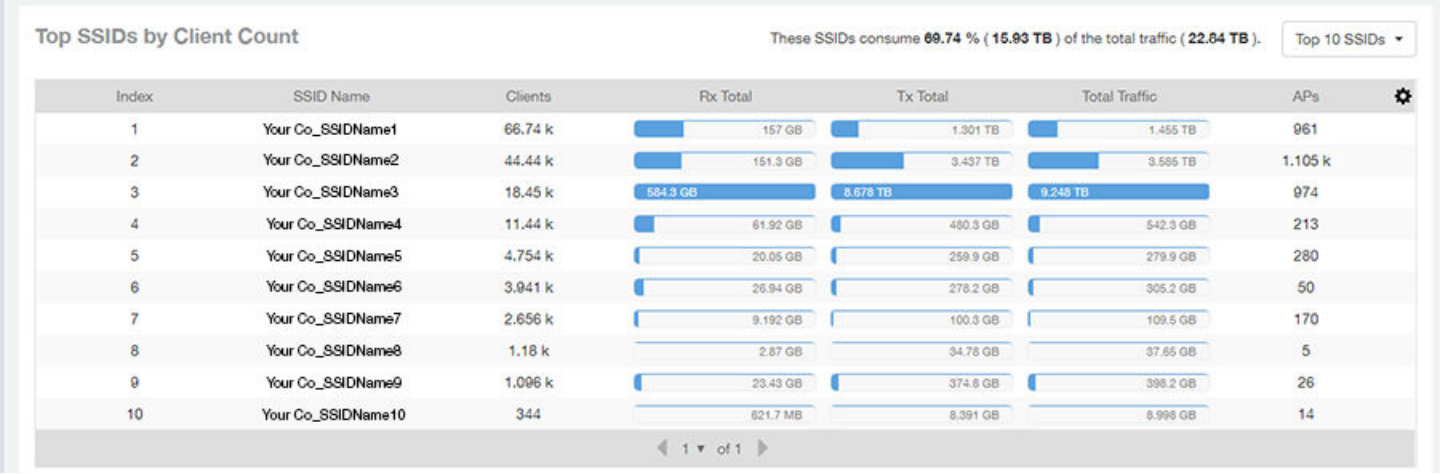
FIGURE 91 WLANs - Top Ten SSIDs by Client Count (chart)



In the table view, 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 configure the number of rows per a page using the **Rows per Page** option in the table settings drop down menu.

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.

FIGURE 92 WLANs - Top SSIDs by Client Count (table)



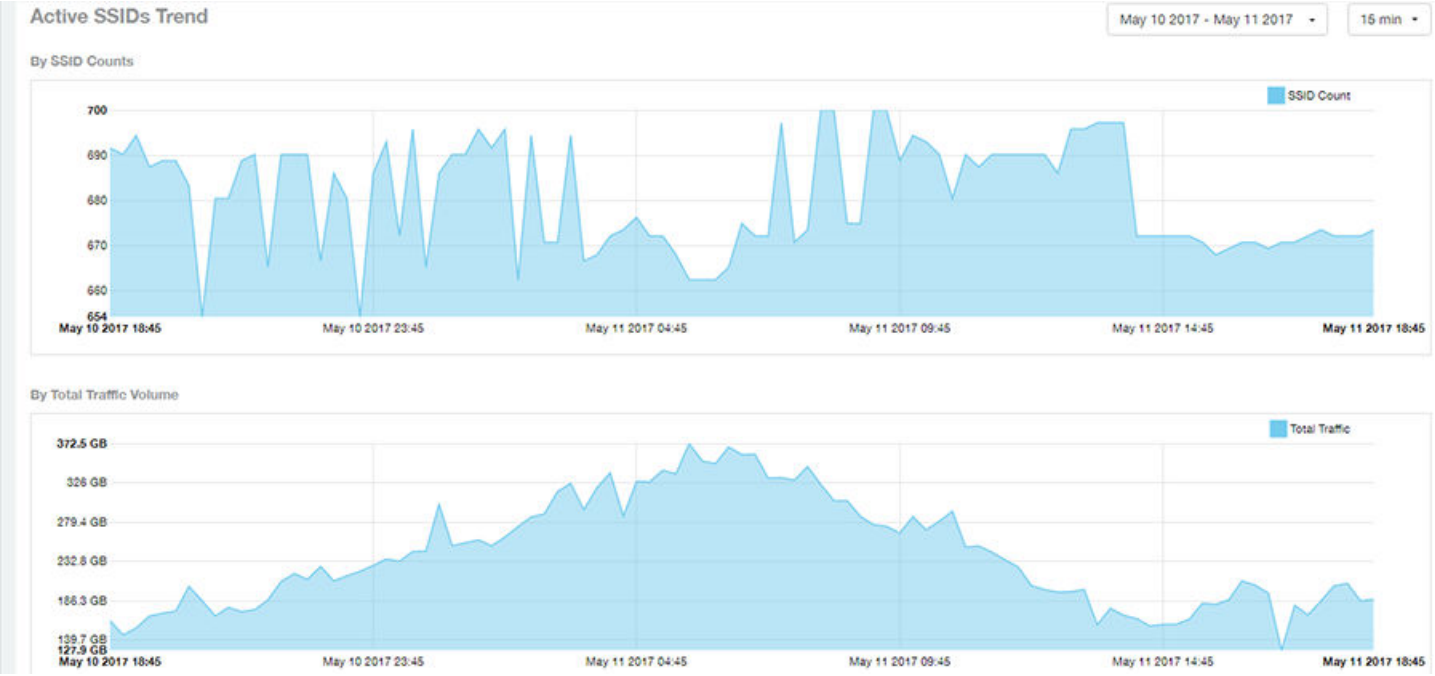
Active SSIDs Trend

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

These graphs allow you to quickly view how many WLANs are active and what the total traffic volume is over time.

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

FIGURE 93 WLANs - Active SSIDs Trend Graphs



Clients Report Dashboard

- Clients Report..... 73

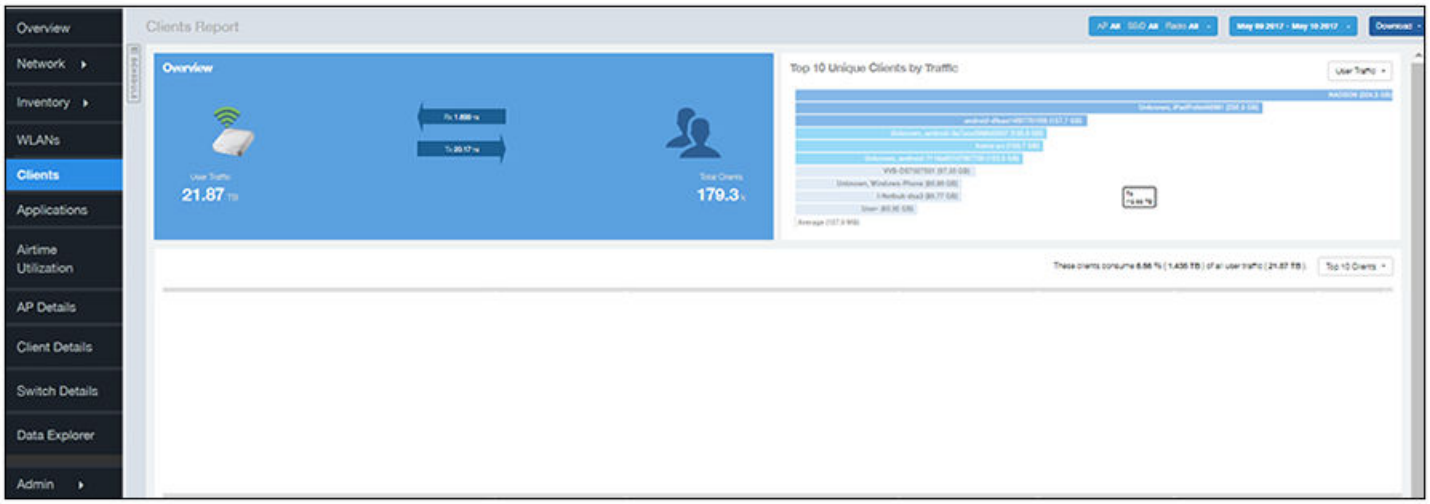
Clients Report

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.

The following figure shows only the upper portion of the Clients report that appears when you click **Clients** on the navigation bar.

FIGURE 94 Clients Report (upper portion)



The Clients report consists of the following sections.

Overview

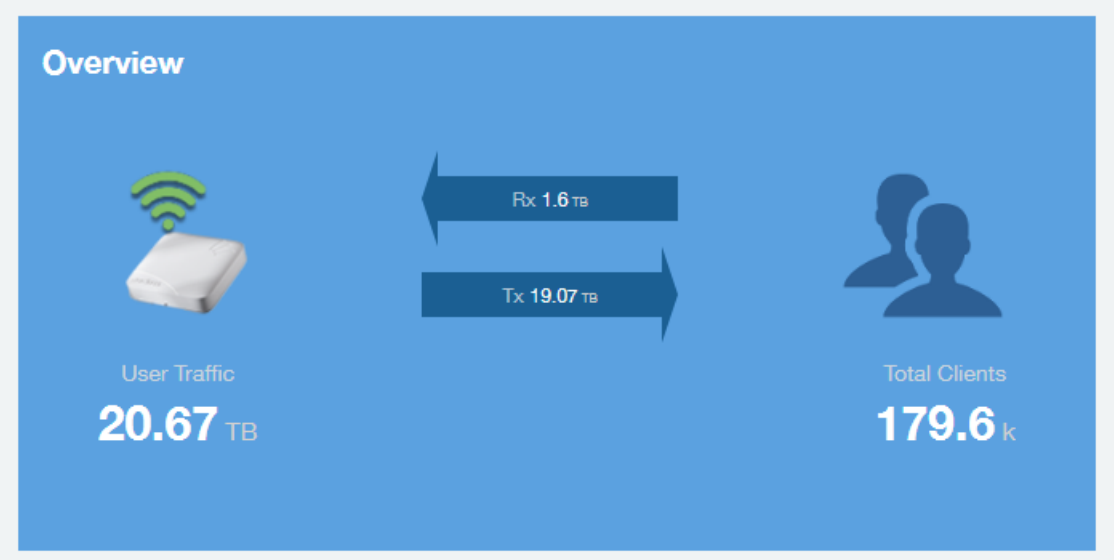
The **Overview** section of the **Clients report** provides information about the total traffic, both received and transmitted, and the total number of clients over the selected time period.

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.

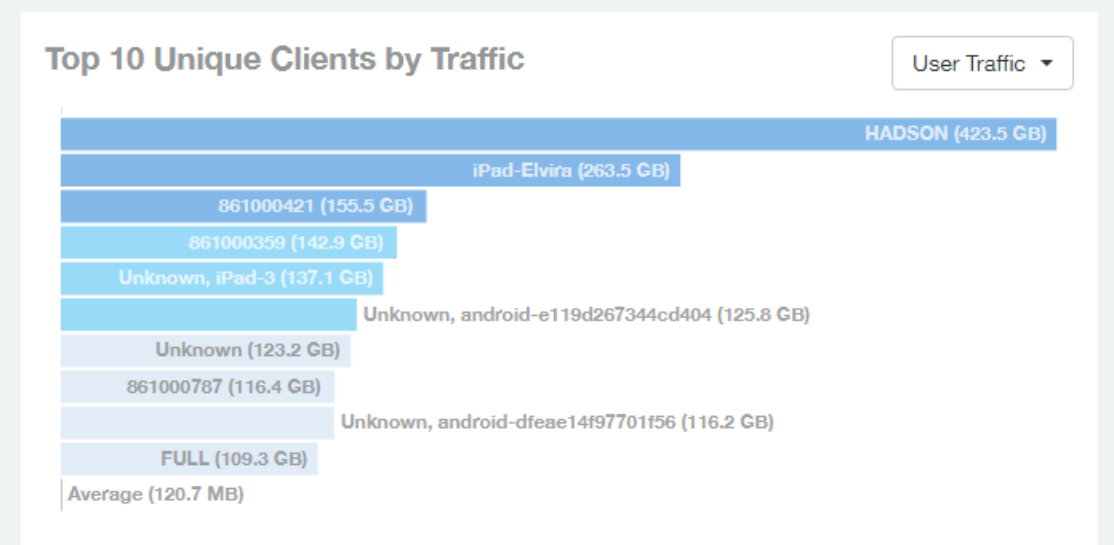
FIGURE 95 Overview



Top 10 Unique Clients by Traffic

The **Top 10 Unique Clients by Traffic** chart of the Clients report provides you with information about the top 10 unique clients by traffic, which you can filter on received traffic, transmitted traffic, and total traffic.

FIGURE 96 Clients - Top 10 Unique Clients by Traffic

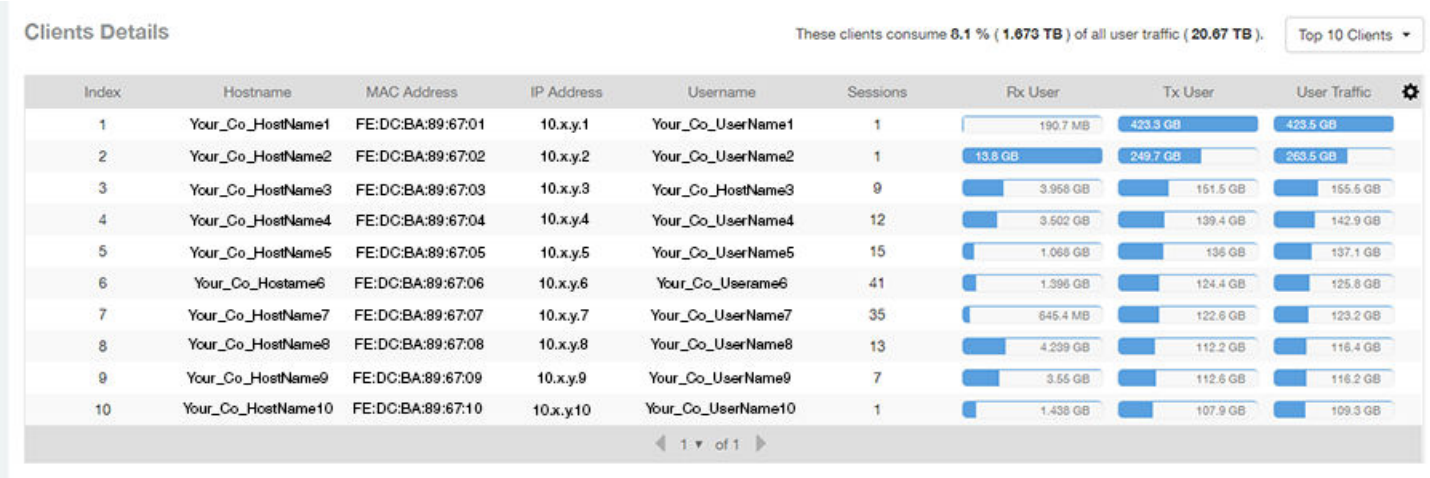


Clients Details

The **Clients Details** table of the Clients report shows 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.

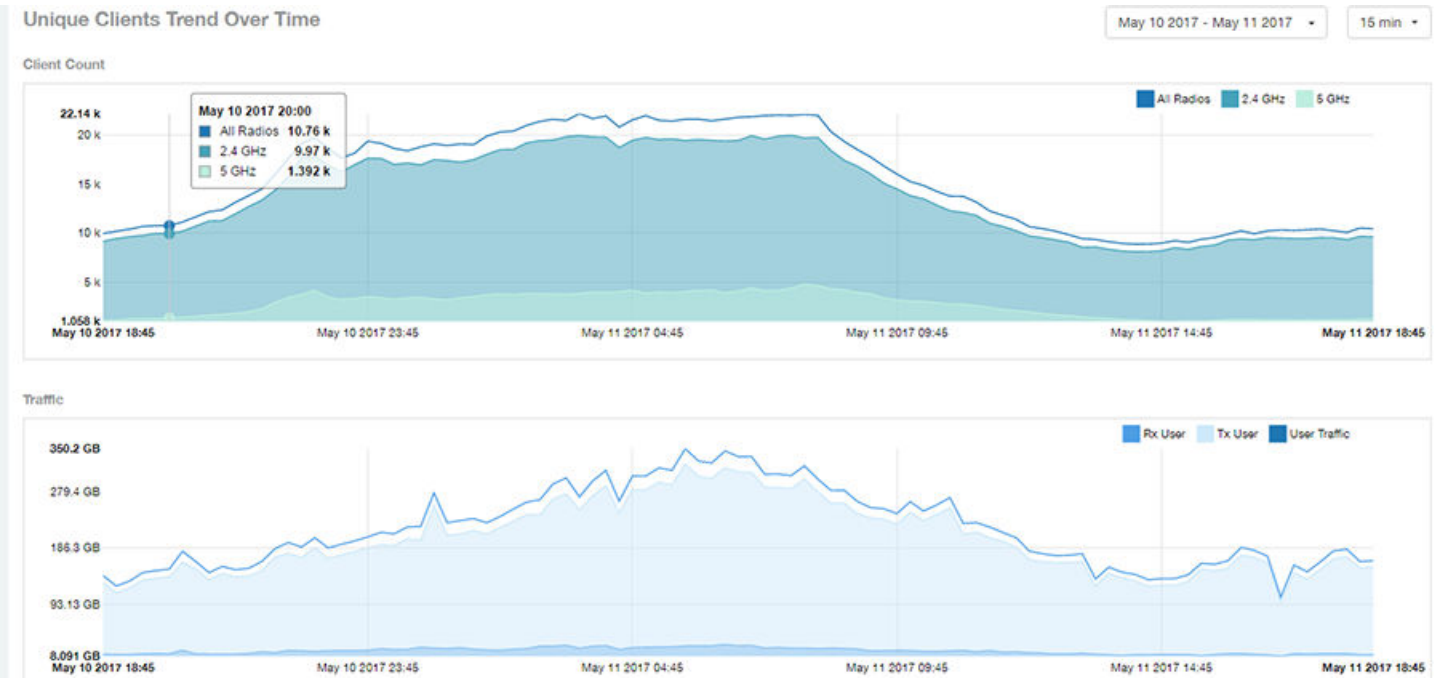
FIGURE 97 Clients - Clients details



Unique Clients Trend

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

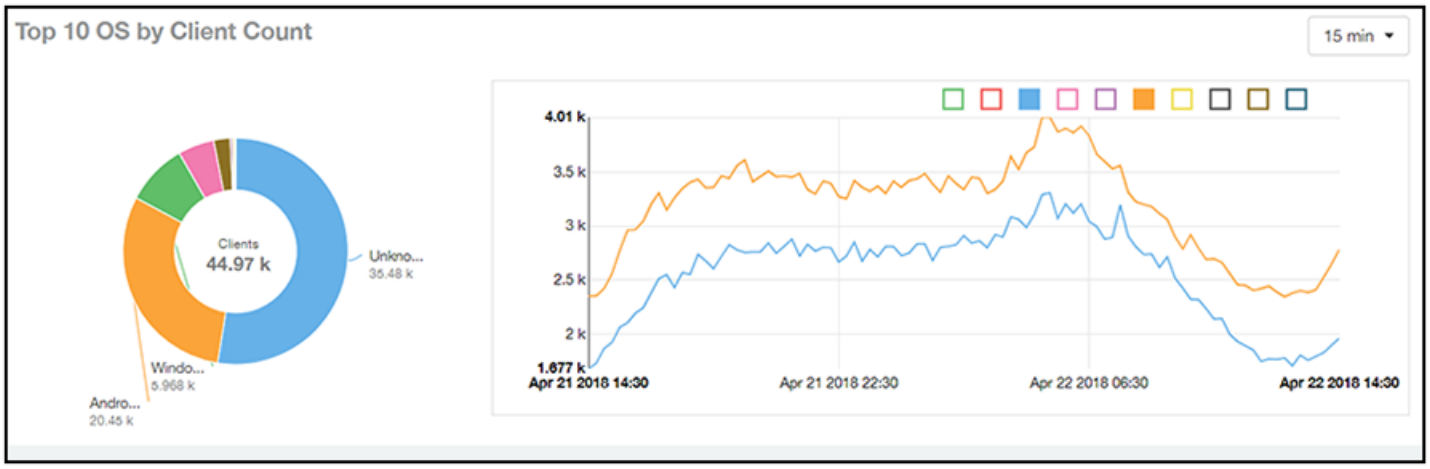
FIGURE 98 Clients - Unique Clients Trend Over Time Chart



Top 10 OS by Client Count

The **Top 10 OS by Client Count** chart and graph of the Clients report provides you with information about the 10 operating systems being used the most by the clients in your network.

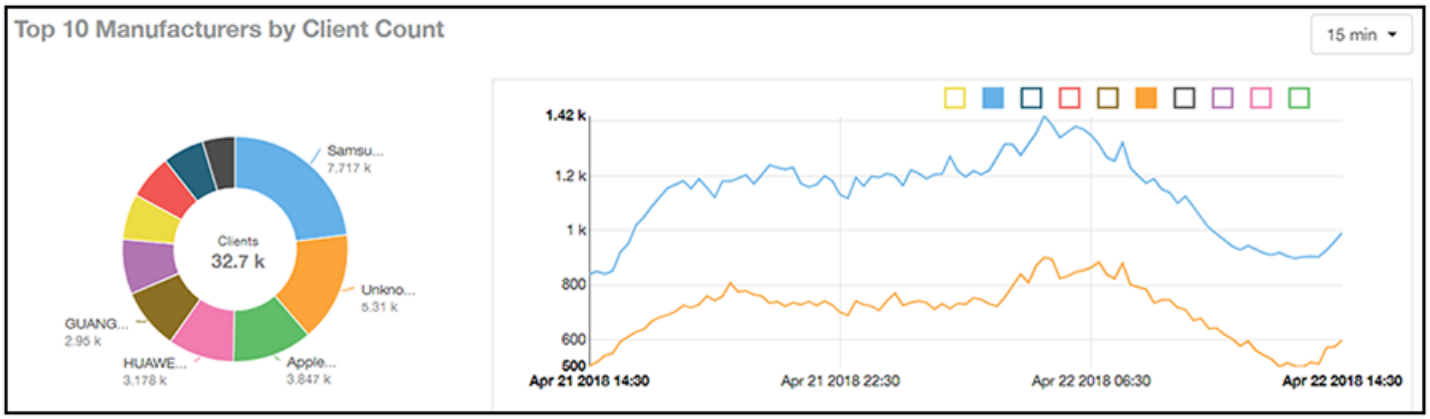
FIGURE 99 Clients - Top 10 OS by Client Count



Top 10 Manufacturers by Client Count

The **Top 10 Manufacturers by Client Count** chart and graph of the Clients report provides you with information about the 10 manufacturers of wireless equipment most represented in your network.

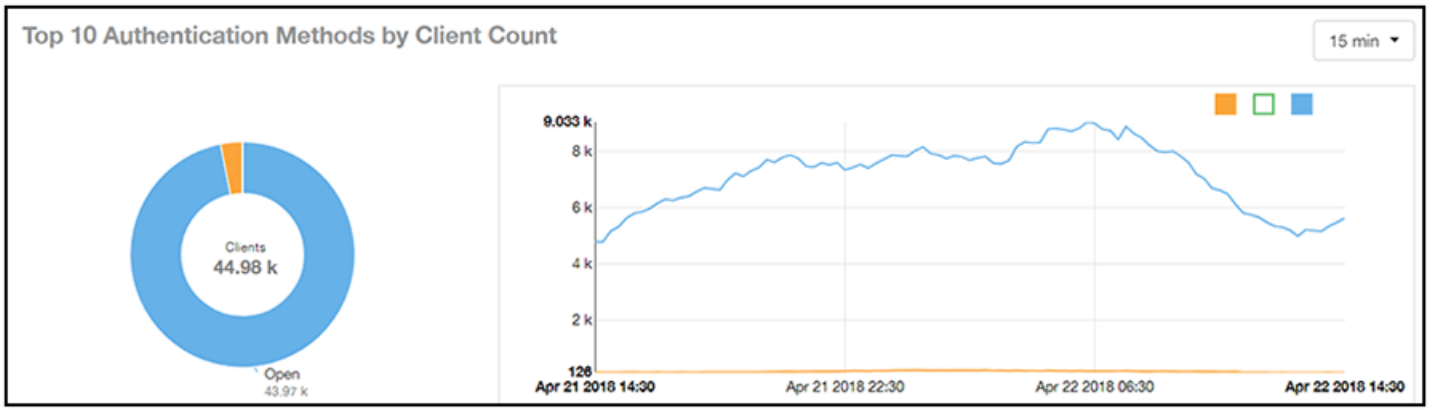
FIGURE 100 Clients - Top 10 Manufacturers by Client Count



Top 10 Authentication Methods

The **Top 10 Authentication Methods** chart and graph of the Clients report provides you with information about the top 10 methods most commonly used in your system to authenticate users.

FIGURE 101 Clients - Top 10 Authentication Methods



Applications Report Dashboard

- Applications Report....79
- Applications - Overview....80
- Applications - Top 10 by Traffic Volume....81
- Applications - Top Applications by Traffic (table)....81
- Applications - Top Applications by Client Count....82
- Applications - Top Applications by Client Count (table)....82

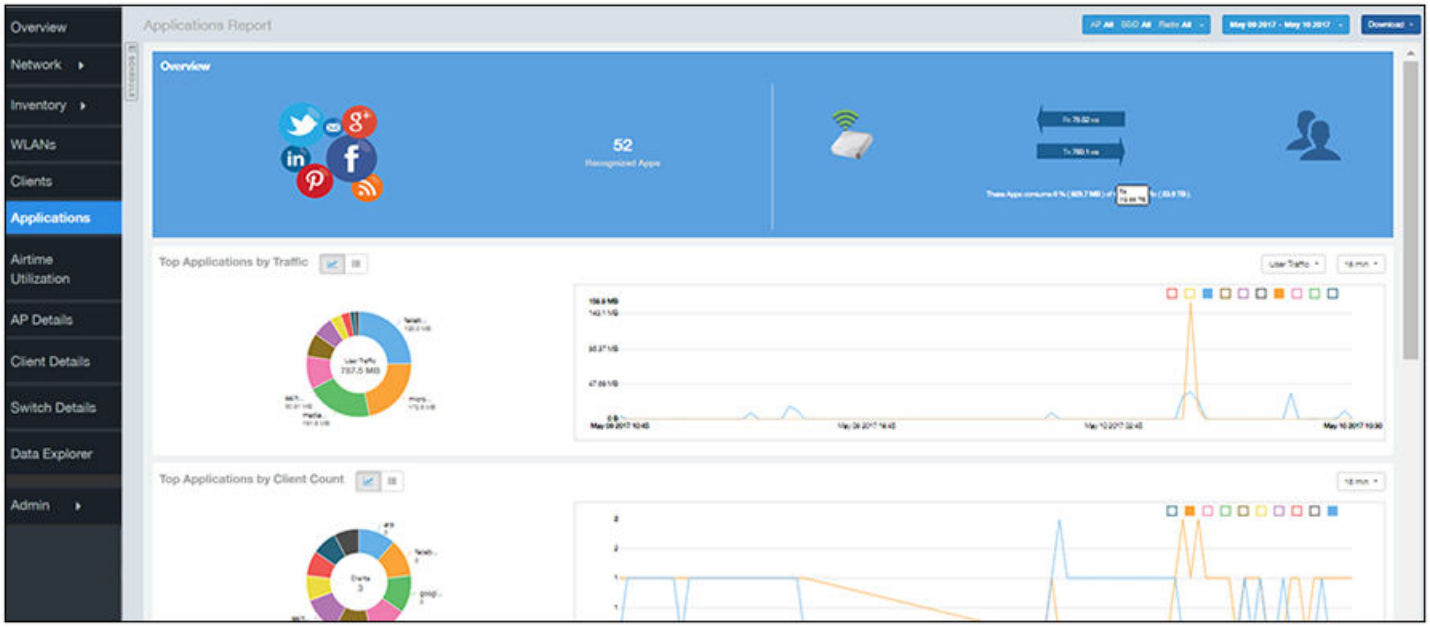
Applications Report

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.

The following figure shows only the upper portion of the Applications dashboard that appears when you click **Applications** on the navigation bar.

FIGURE 102 Applications Dashboard (upper portion)



The Applications report consists of the following sections.

1	Overview	Contains the list of applications that SCI recognizes, and displays the percentage of traffic consumed by these applications.

2	Top Applications by Traffic	Contains the list of top 10 applications in terms of volume of traffic. To view a table with this information, click the Table icon.
3	Top Applications by Client Count	Contains the application information and displays the quantity of traffic consumed by the listed applications. To view a table with this information, click the Table icon.

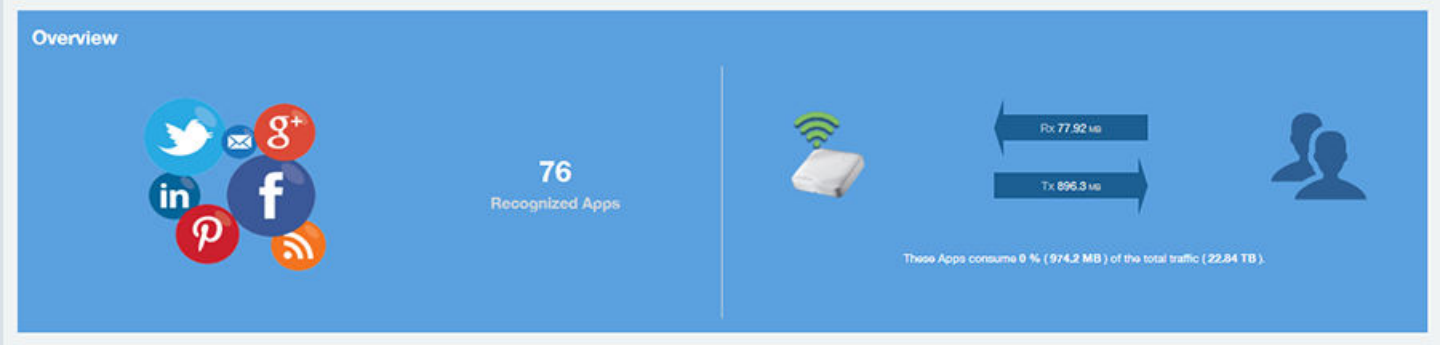
Applications - Overview

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

This Overview report 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

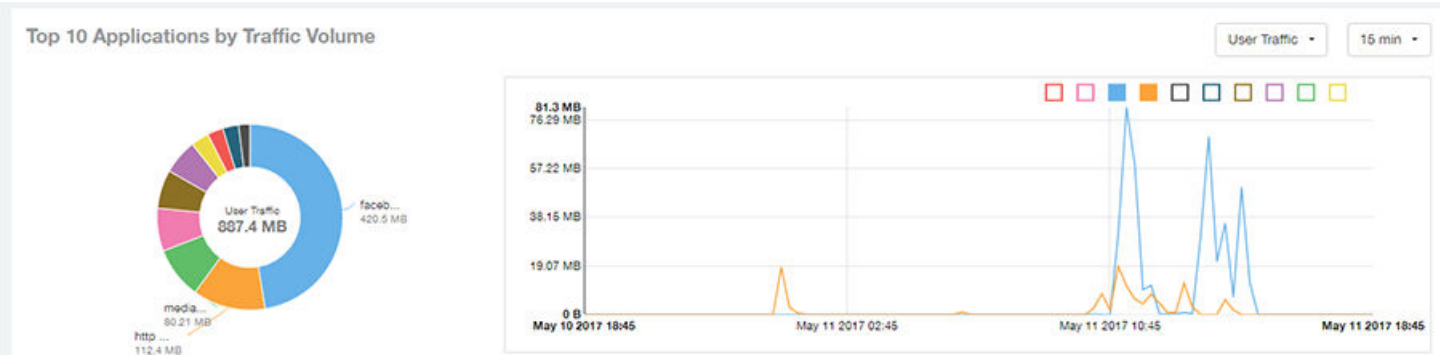
FIGURE 103 Applications - Overview



Applications - Top 10 by Traffic Volume

The Top 10 Applications by Traffic Volume pie chart and graph of the Applications report display the top applications with the largest traffic volume in the network, along with the received and transmitted traffic volumes.

FIGURE 104 Applications - Top 10 Applications by Traffic Volume

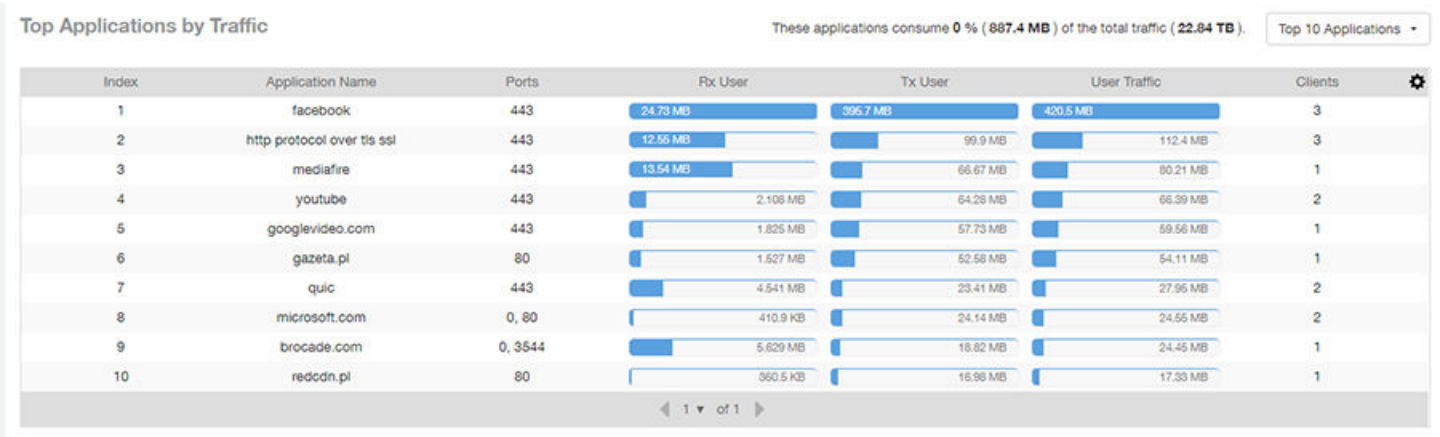


The pie chart and graph contain the top applications with the largest traffic volume in the network, along with the received and transmitted traffic volumes. You can view the received and transmitted traffic volumes based on the Rx+Tx Filter on page 30. To view the top 10 applications, choose from the legend available on the top of the graph. Each application will appear as a separate graph line. If you hover over the line graph a pop-up appears containing the selected details.

Applications - Top Applications by Traffic (table)

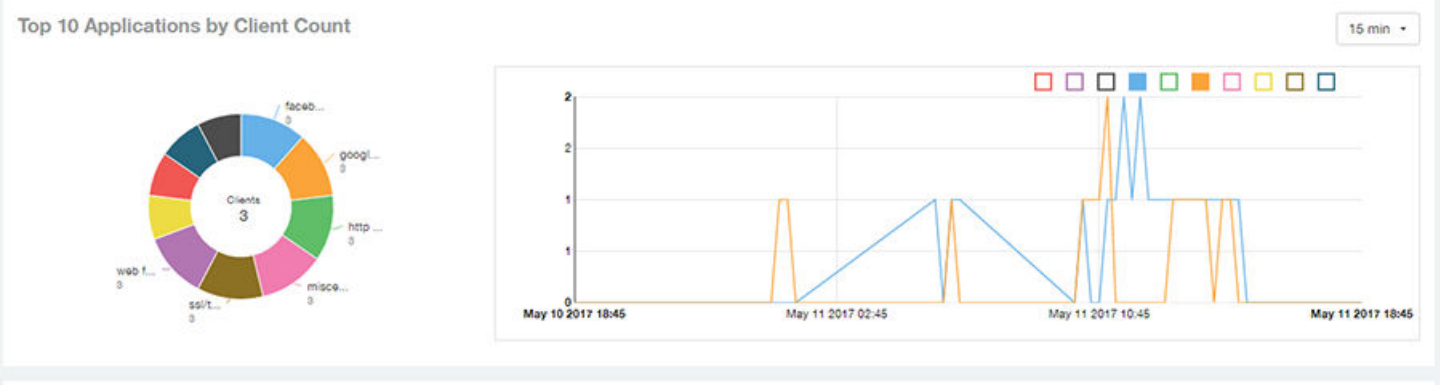
The Top Applications by Traffic table of the Applications report displays the top (10, 20 or 50) applications by the amount of traffic generated over the time period selected.

FIGURE 105 Applications - Top Applications by Traffic



Applications - Top Applications by Client Count

The Top 10 by Client Count pie chart and graph of the Applications report show the applications that are most frequently being used by the clients in the network over specified time intervals.



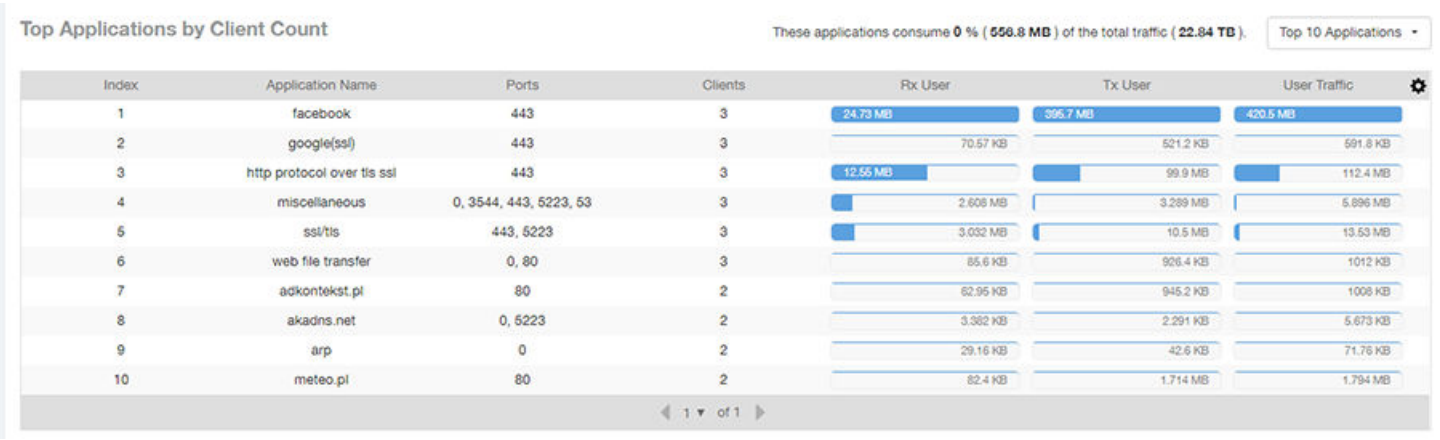
Applications - Top Applications by Client Count (table)

Use the Top Applications by Client Count table of the Applications report 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 106 Applications - Top Applications by Client Count



Index	Application Name	Ports	Clients	Rx User	Tx User	User Traffic
1	facebook	443	3	24.73 MB	396.7 MB	420.5 MB
2	google(ssl)	443	3	70.57 KB	521.2 KB	591.8 KB
3	http protocol over tls ssl	443	3	12.55 MB	99.9 MB	112.4 MB
4	miscellaneous	0, 3544, 443, 5223, 53	3	2.608 MB	3.289 MB	5.896 MB
5	ssl/tls	443, 5223	3	3.032 MB	10.5 MB	13.53 MB
6	web file transfer	0, 80	3	85.6 KB	926.4 KB	1012 KB
7	adkontekst.pl	80	2	62.95 KB	945.2 KB	1008 KB
8	akadns.net	0, 5223	2	3.382 KB	2.291 KB	5.673 KB
9	arp	0	2	29.16 KB	42.6 KB	71.76 KB
10	meteo.pl	80	2	82.4 KB	1.714 MB	1.794 MB

Airtime Utilization Report Dashboard

- Airtime Utilization Report.....83

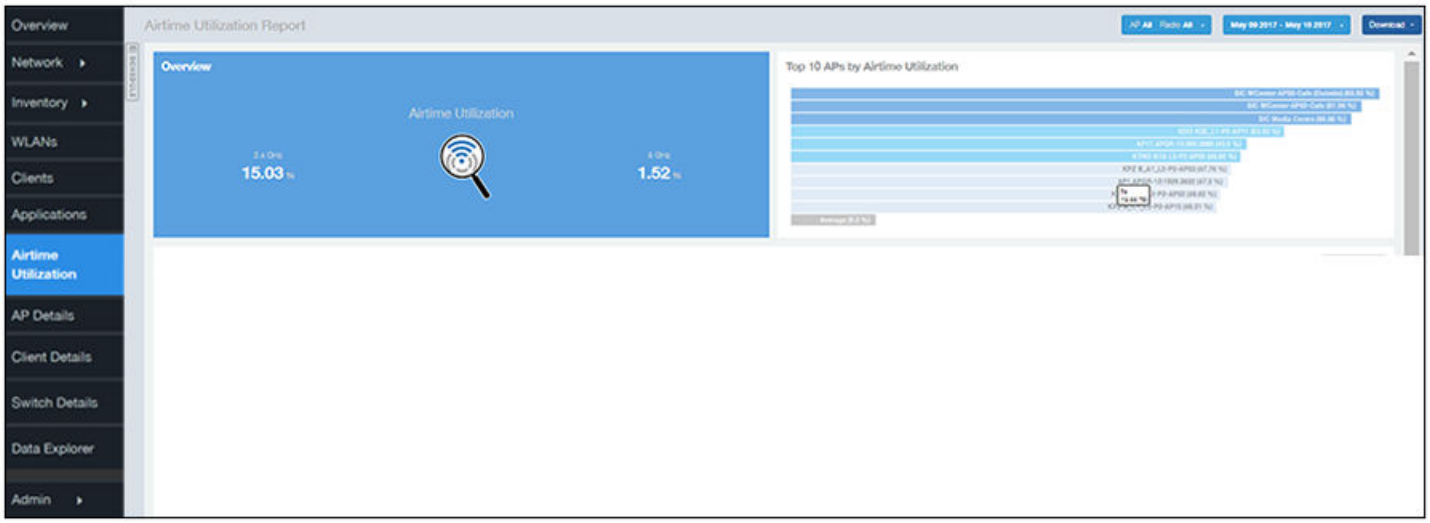
Airtime Utilization Report

The Airtime Utilization report provides an overview of airtime utilization.

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.

The following figure shows the upper portion of the Airtime Utilization dashboard that appears when you click **Airtime Utilization** on the navigation bar.

FIGURE 107 Airtime Utilization Dashboard (upper portion)

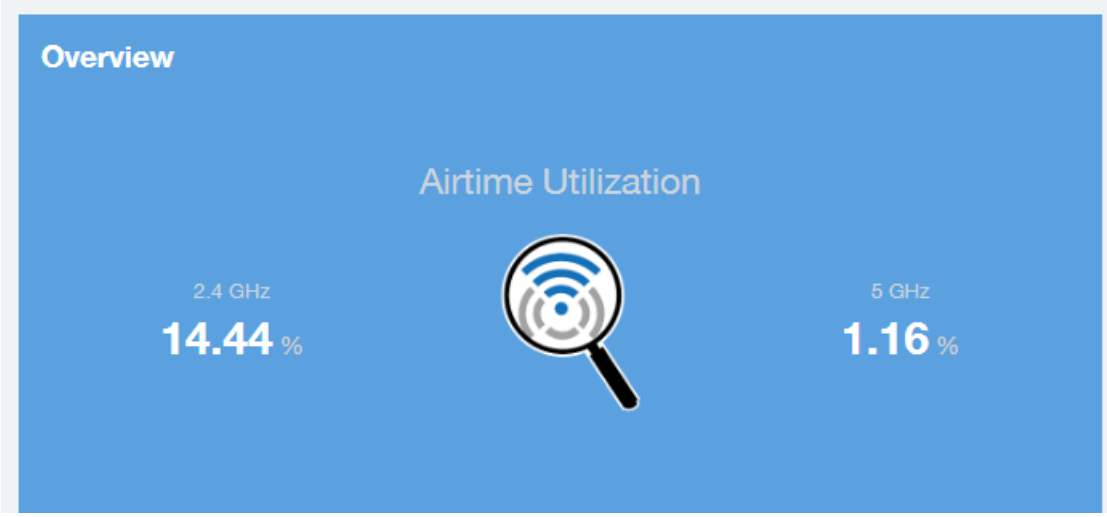


The Airtime Utilization report consists of the following sections .

Overview

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

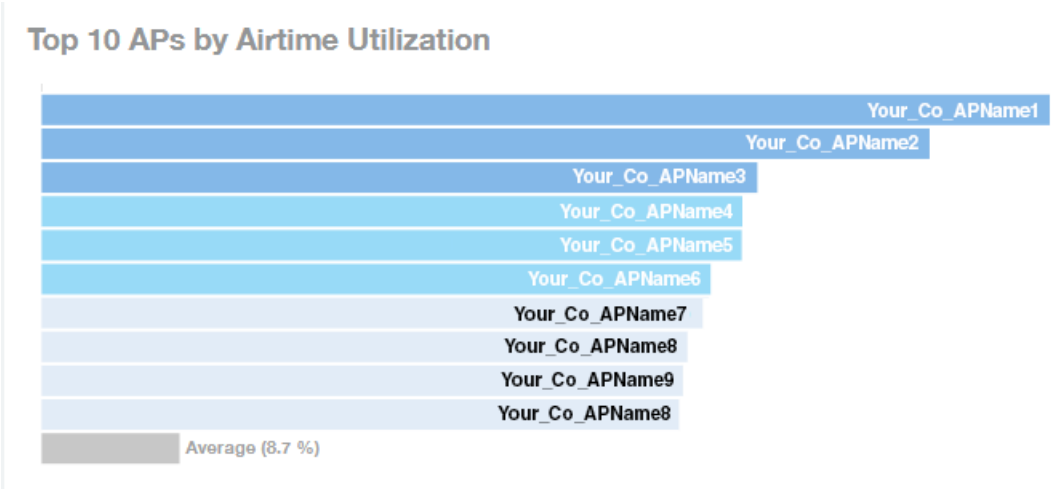
FIGURE 108 Airtime Utilization - Overview



Top 10 APs by Airtime Utilization

Use the **Top 10 APs by Airtime Utilization** chart to view which APs have the highest airtime utilization percentage rates.

FIGURE 109 Top 10 APs by Airtime Utilization



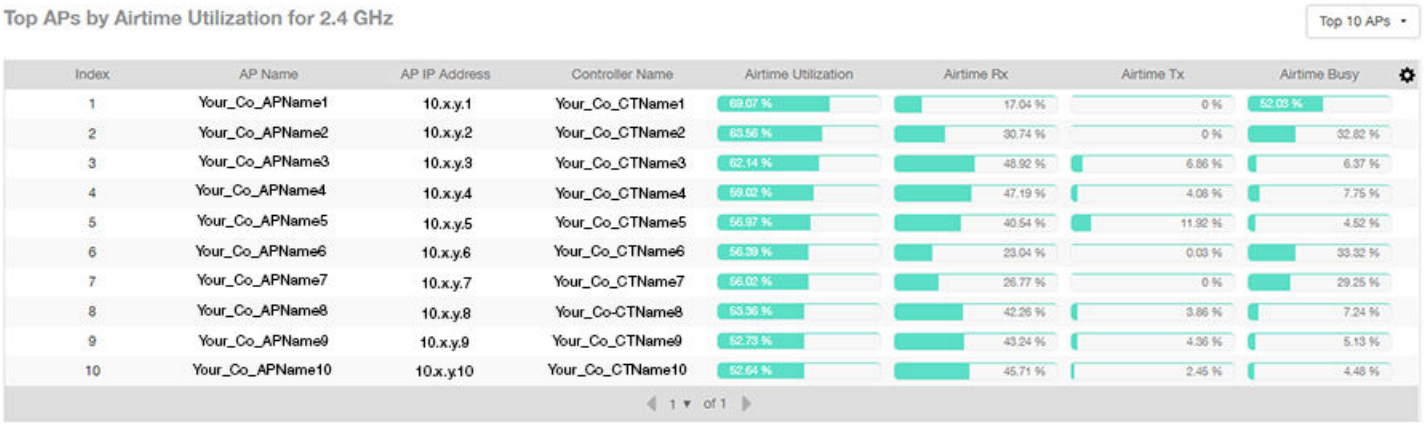
Top APs by Airtime Utilization for 2.4 Ghz

The **Top APs by Airtime Utilization for 2.4 GHz** 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 110 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	Your_Co_APName1	10.x.y.1	Your_Co_CTName1	69.07 %	17.04 %	0 %	52.03 %
2	Your_Co_APName2	10.x.y.2	Your_Co_CTName2	63.56 %	30.74 %	0 %	32.82 %
3	Your_Co_APName3	10.x.y.3	Your_Co_CTName3	62.14 %	48.92 %	6.86 %	6.37 %
4	Your_Co_APName4	10.x.y.4	Your_Co_CTName4	59.02 %	47.19 %	4.08 %	7.75 %
5	Your_Co_APName5	10.x.y.5	Your_Co_CTName5	56.97 %	40.54 %	11.92 %	4.52 %
6	Your_Co_APName6	10.x.y.6	Your_Co_CTName6	56.39 %	23.04 %	0.03 %	33.32 %
7	Your_Co_APName7	10.x.y.7	Your_Co_CTName7	56.02 %	26.77 %	0 %	29.25 %
8	Your_Co_APName8	10.x.y.8	Your_Co-CTName8	53.36 %	42.26 %	3.86 %	7.24 %
9	Your_Co_APName9	10.x.y.9	Your_Co_CTName9	52.73 %	43.24 %	4.36 %	5.13 %
10	Your_Co_APName10	10.x.y.10	Your_Co_CTName10	52.64 %	45.71 %	2.45 %	4.48 %

1 ▾ of 1

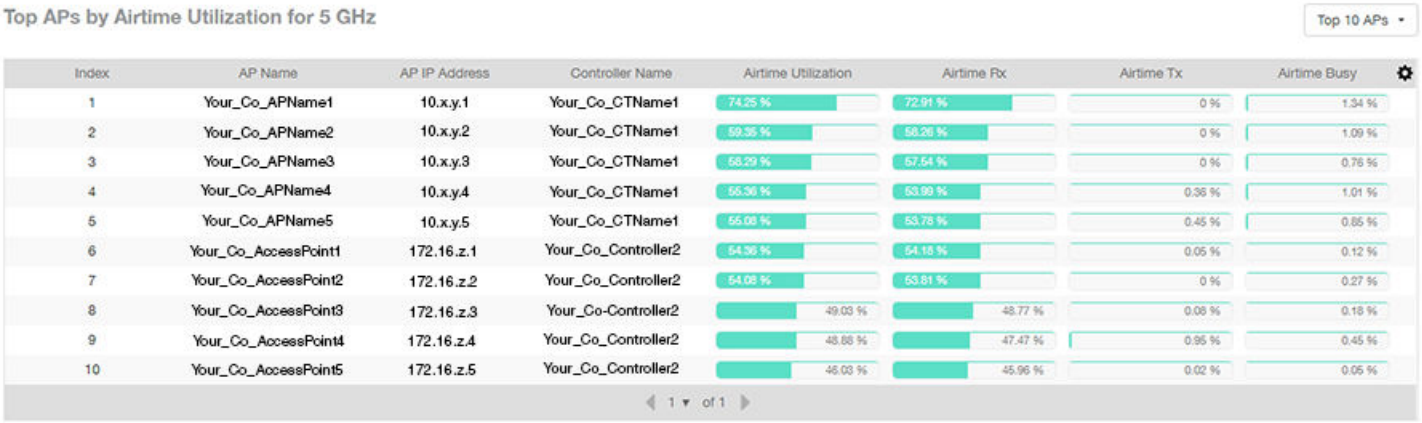
Top APs by Airtime Utilization for 5 GHz

The **Top APs by Airtime Utilization for 5 GHz** table of the Airtime Utilization 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 by 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 111 Airtime Utilization - Top APs by Airtime Utilization for 5 GHz



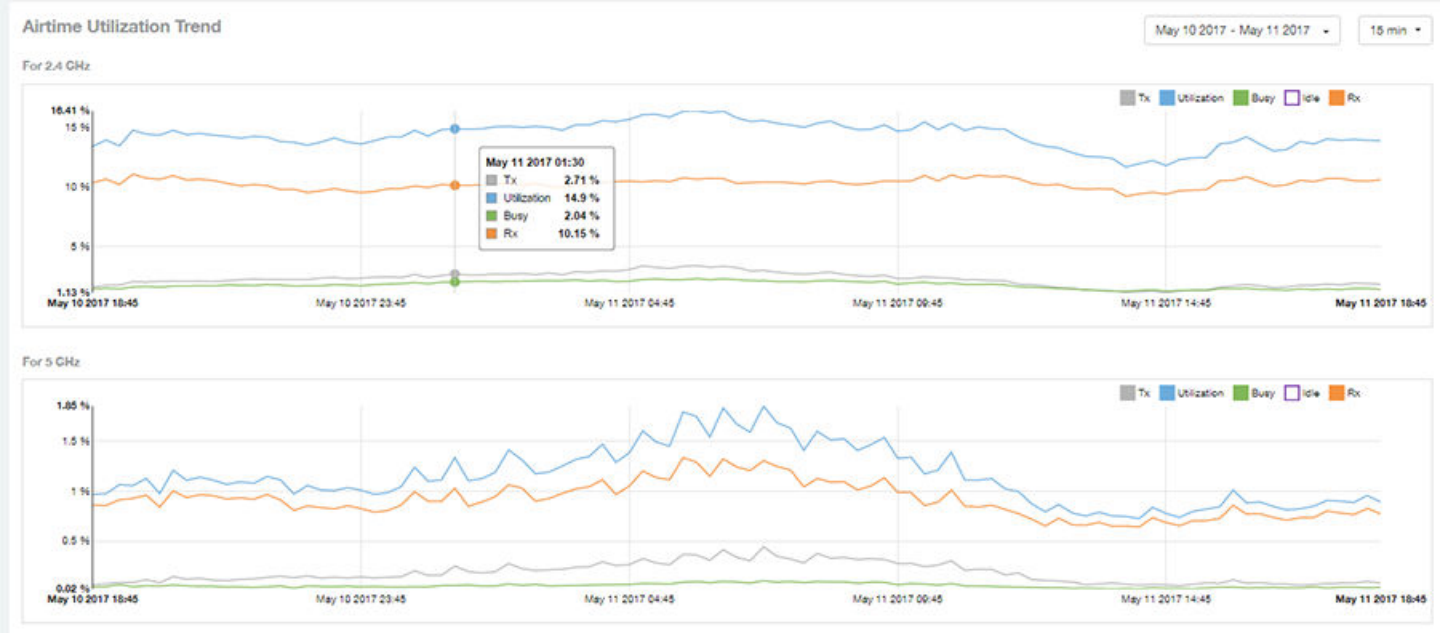
Index	AP Name	AP IP Address	Controller Name	Airtime Utilization	Airtime Rx	Airtime Tx	Airtime Busy
1	Your_Co_APName1	10.x.y.1	Your_Co_CTName1	74.25 %	72.91 %	0 %	1.34 %
2	Your_Co_APName2	10.x.y.2	Your_Co_CTName1	59.35 %	58.26 %	0 %	1.09 %
3	Your_Co_APName3	10.x.y.3	Your_Co_CTName1	58.29 %	57.54 %	0 %	0.76 %
4	Your_Co_APName4	10.x.y.4	Your_Co_CTName1	55.36 %	53.99 %	0.36 %	1.01 %
5	Your_Co_APName5	10.x.y.5	Your_Co_CTName1	55.08 %	53.78 %	0.45 %	0.85 %
6	Your_Co_AccessPoint1	172.16.z.1	Your_Co_Controller2	54.36 %	54.18 %	0.05 %	0.12 %
7	Your_Co_AccessPoint2	172.16.z.2	Your_Co_Controller2	54.08 %	53.81 %	0 %	0.27 %
8	Your_Co_AccessPoint3	172.16.z.3	Your_Co-Controller2	49.03 %	48.77 %	0.08 %	0.18 %
9	Your_Co_AccessPoint4	172.16.z.4	Your_Co_Controller2	48.88 %	47.47 %	0.95 %	0.45 %
10	Your_Co_AccessPoint5	172.16.z.5	Your_Co_Controller2	46.03 %	45.96 %	0.02 %	0.05 %

1 ▾ of 1

Airtime Utilization Trend

The **Airtime Utilization Trend** graph shows the airtime utilization trends for 2.4 and 5 GHz radios in percentages over time.

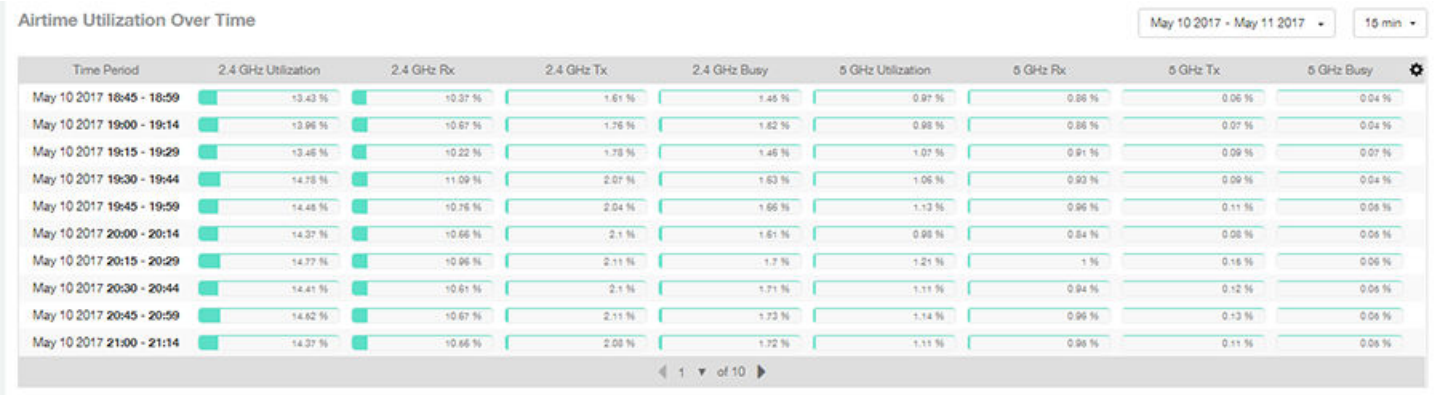
FIGURE 112 Airtime Utilization Trend



Airtime Utilization Over Time

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

FIGURE 113 Airtime Utilization Over Time



AP Details Report Dashboard

- AP Details Report....87
- AP Details - Summary....89
- AP Details - Performance....90
- AP Details - Details....90
- AP Details - Stats....91
- AP Details - Uptime History....91
- AP Details - Traffic Trend....92
- AP Details - Unique Clients Trend Over Time....92
- AP Details - Top 10 Clients by Traffic Volume....93
- AP Details - Top 10 Applications by Traffic Volume....94
- AP Details - Top SSIDs by Traffic....94
- AP Details - Sessions....94
- AP Details - RSS Trend....95
- AP Details - SNR Trend....95
- AP Details - Airtime Utilization Trend....96
- AP Details - Clients Details....97
- AP Details - Alarms....97
- AP Details - Events....98
- AP Details - Anomalies....98

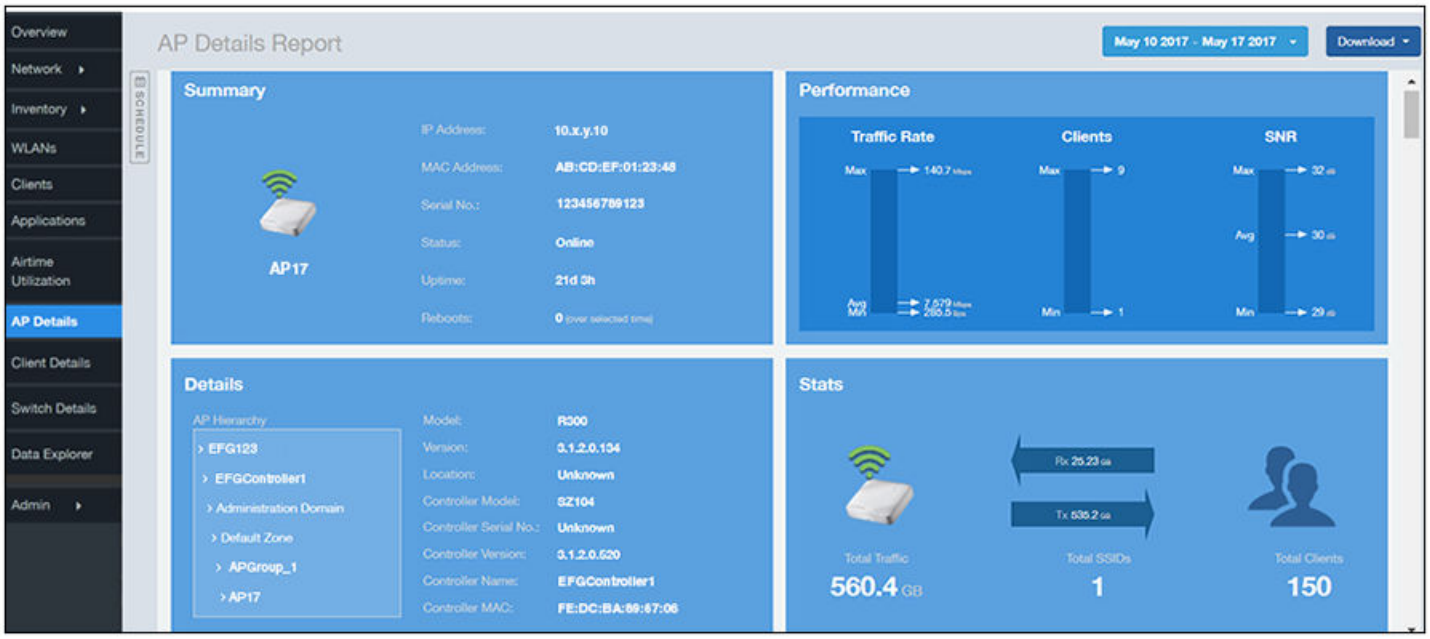
AP Details Report

The AP Details Report provides details about one specific access point.

You can reach this report by either clicking on a hyperlink of an AP name from another dashboard, or by clicking **AP Details** on the navigation bar. If you click **AP Details** to get to the AP Details Report, you then need to enter the MAC address of the AP whose details you want to view.

The following figure shows only the upper portion of the AP Details Report screen:

FIGURE 114 AP Details Report (upper portion)



The AP Details report consists of the sections described in the following table. Figures showing each of these sections appear later.

1	Summary	Contains basic information about the AP. The AP in this example figure above is AP17.
2	Performance	Contains performance data about the access point named AP17 in the example figure above.
3	Details	Contains some details about the example AP17 access point, including showing the nested hierarchy of how the administrator has set up the APs in the network.
4	Stats	Contains statistics specific to the example AP 17 access point.
5	Uptime History	A line graph shows when this AP has been up or down over different time periods.
6	Traffic Trend	Two types of line graphs depict traffic by usage, and two line graphs depict traffic by radio type for this AP.
7	Unique Clients Trend Over Time	Two line graphs depict unique clients associated with this AP. One graph shows the number of unique clients and the other shows the traffic generated by unique clients - both over specified time periods.
8	Top 10 Clients by Traffic Volume	A pie chart and line graph depict the clients that have generated the largest volume of traffic over this AP over a specified period of time.
9	Top Applications by Traffic	A pie chart and line graph depict the applications that have generated the largest volume of traffic over this AP over a specified time period. You can click the Table icon to toggle to a table of this same information.
10	Top SSIDs by Traffic	A table lists the SSIDs that have generated the most traffic associated with this AP over a specified time period. An SSID is a logical group of APs. An AP can belong to multiple SSIDs.
11	Sessions	A table provides details for whatever number of client sessions that you specify for this AP.
12	RSS Trend	A line graph depicts the received signal strength trends over time for this AP.

13	SNR Trend	A line graph depicts the signal-to-noise ratio trends over time for this AP.
14	Airtime Utilization Trend	Two line graphs depict the airtime utilization for this AP, by radio type, over a specified time period.
15	Clients Details	A table provides details for however many top clients for this AP that you specify.
16	Alarms	A table lists the alarms that have been generated for this AP for the time period that you specify.
17	Events	A table lists the events that have been generated for this AP for the time period that you specify.
18	Anomalies	Charts provide information about any behavior that might be out of the normal range for this AP.
19	Anomalies for the Past 30 Days	Provides the same information as the Anomalies section for the past 30 days.

AP Details - Summary

The Summary section of the AP Details report displays basic information about a specific AP.

The AP shown in this example is named AP17.

FIGURE 115 AP Details - Summary

AP Details - Performance

The Performance section of the AP Details report displays data about the specified AP.

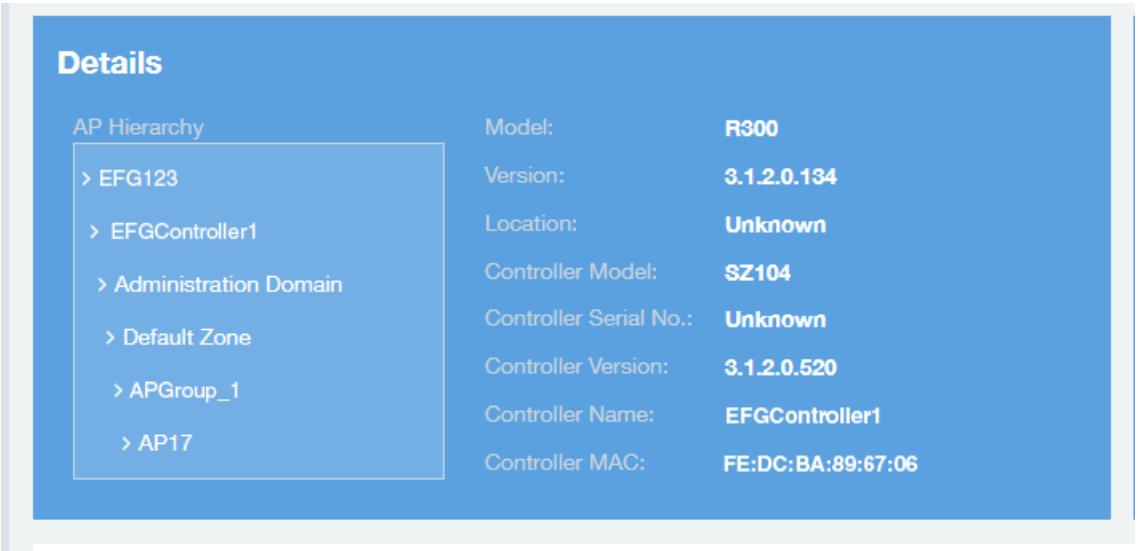
FIGURE 116 AP Details - Performance

AP Details - Details

The Details section of the AP Details report contains some details about the specified AP, including its hierarchy in the network.

The AP shown in this example is named AP17. It belongs to a group of access points that the administrator has named APGroup_1. EFGController1 in this example is one of the controllers being used on a wireless network named EFG123.

FIGURE 117 AP Details - Details



AP Details - Stats

The Stats section of the AP Details report displays some traffic statistics about the specified AP.

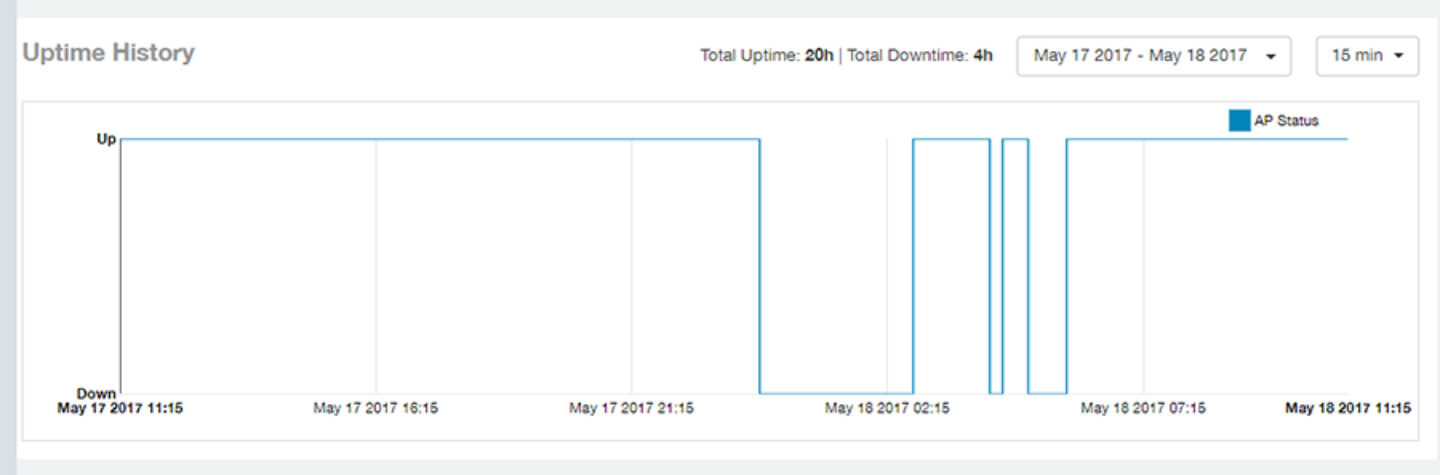
FIGURE 118 AP Details - Summary

AP Details - Uptime History

The Uptime History line graph of the AP Details report shows when this AP has been up or down over different time periods.

The blue bar indicates when the AP has been up or down. Use the drop-down menus to specify the timeframe and the granularity of the graph.

FIGURE 119 AP Details - Uptime History



AP Details - Traffic Trend

The Traffic Trend section of the AP Details report contains four line graphs that provide information about the specified AP: two types of line graphs that depict traffic by usage, and two types of line graphs that depict traffic by radio type for this AP.

Use the drop-down menus to specify the timeframe and the granularity of the graphs.

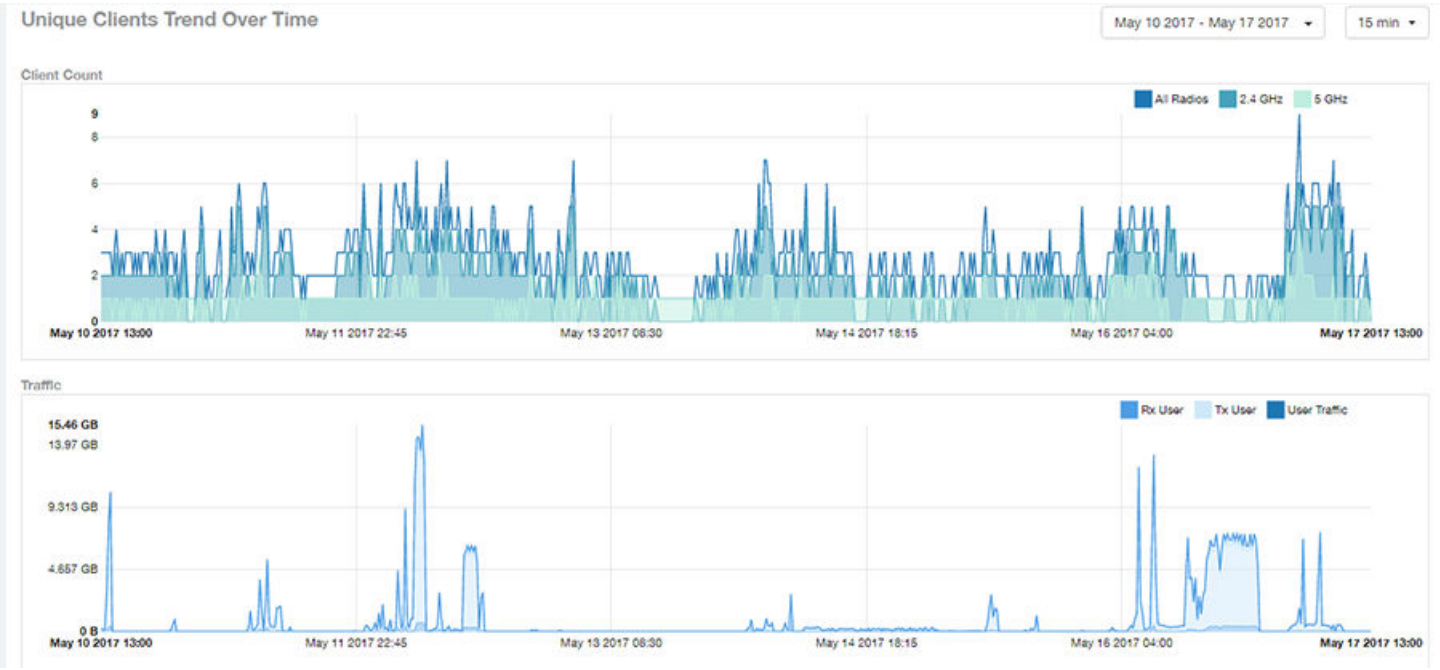
FIGURE 120 AP Details - Traffic Trend

AP Details - Unique Clients Trend Over Time

The Unique Clients Trend Over Time section of the AP Details report contains two line graphs that provide information about unique clients associated with the specified AP over a certain time period.

One graph shows the number of unique clients and the other shows the traffic generated by unique clients.

Use the drop-down menus to specify the timeframe and the granularity of the graphs.



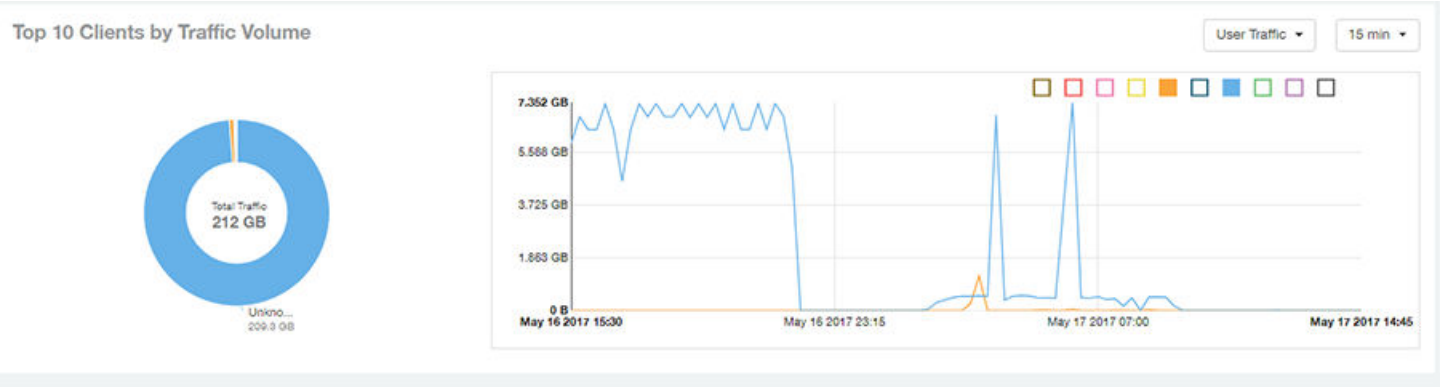
AP Details - Top 10 Clients by Traffic Volume

The Top 10 Clients by Traffic Volume pie chart and line graph of the AP Details report depict the clients that have generated the largest volume of traffic over this AP for a specified period of time.

Use the drop-down menus to specify the timeframe and the granularity of the graph. Click any of the colored squares to toggle display of the corresponding clients.

NOTE
If you click on one of the clients listed in the pie chart, you will be taken to the Client Details dashboard for that client.

FIGURE 121 AP Details - Top 10 Clients by Traffic Volume



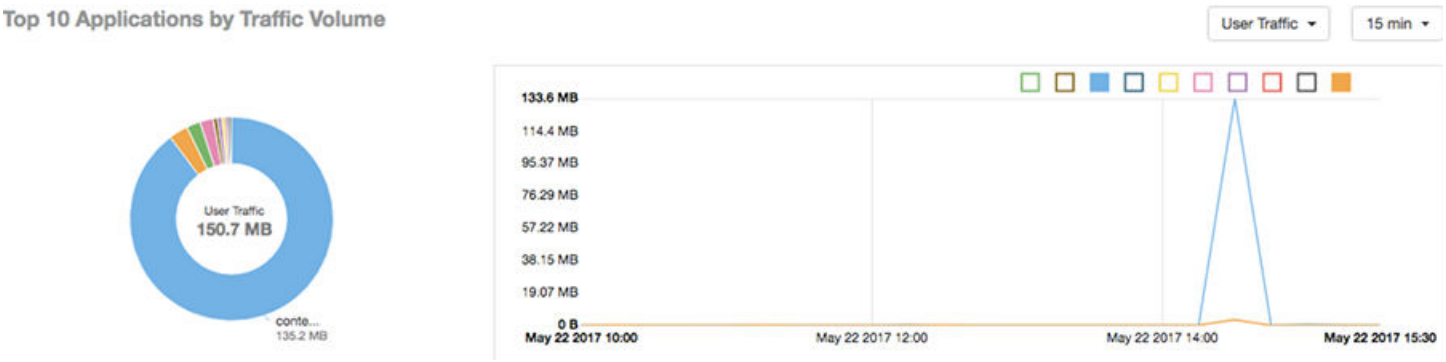
AP Details - Top 10 Applications by Traffic Volume

The Top 10 Applications by Traffic Volume pie chart and line graph of the AP Details report depict the applications that have generated the largest volume of traffic over this AP for a specified period of time.

Use the drop-down menus to specify the traffic type and the granularity of the graph. Click any of the colored squares to toggle display of the corresponding applications.

NOTE
You can click the Table icon to toggle to a table of this same information.

FIGURE 122 AP Details - Top 10 Applications by Traffic Volume



AP Details - Top SSIDs by Traffic

The Top SSIDs by Traffic table of the AP Details report lists the SSIDs that have generated the most traffic associated with this AP.

An SSID is a logical group of APs. An AP can belong to multiple SSIDs. Use the drop-down menu to specify the number of SSIDs to display.

FIGURE 123 AP Details - Top SSIDs by Traffic

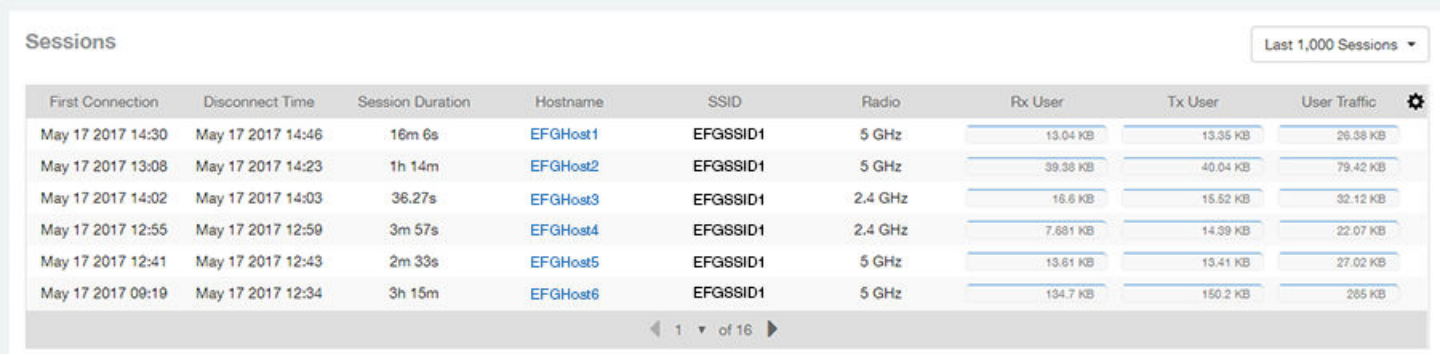
AP Details - Sessions

The Sessions table of the AP Details report provides details for however many client sessions that you specify for this AP.

Use the drop-down menu to specify how many sessions to display.

If you click on one of the client **hostname** links, you will be taken to the Client Details report for that client.

FIGURE 124 AP Details - Sessions



AP Details - RSS Trend

The RSS Trend graph of the AP Details report depicts the received signal strength trends over time for this AP.

Use the drop-down menus to specify the timeframe and the granularity of the graph.

FIGURE 125 AP Details - RSS Trend

AP Details - SNR Trend

The SNR Trend graph of the AP Details report depicts the signal-to-noise ratio over time for this AP.

You can use the drop-down arrows to select the time frame and granularity for this graph.

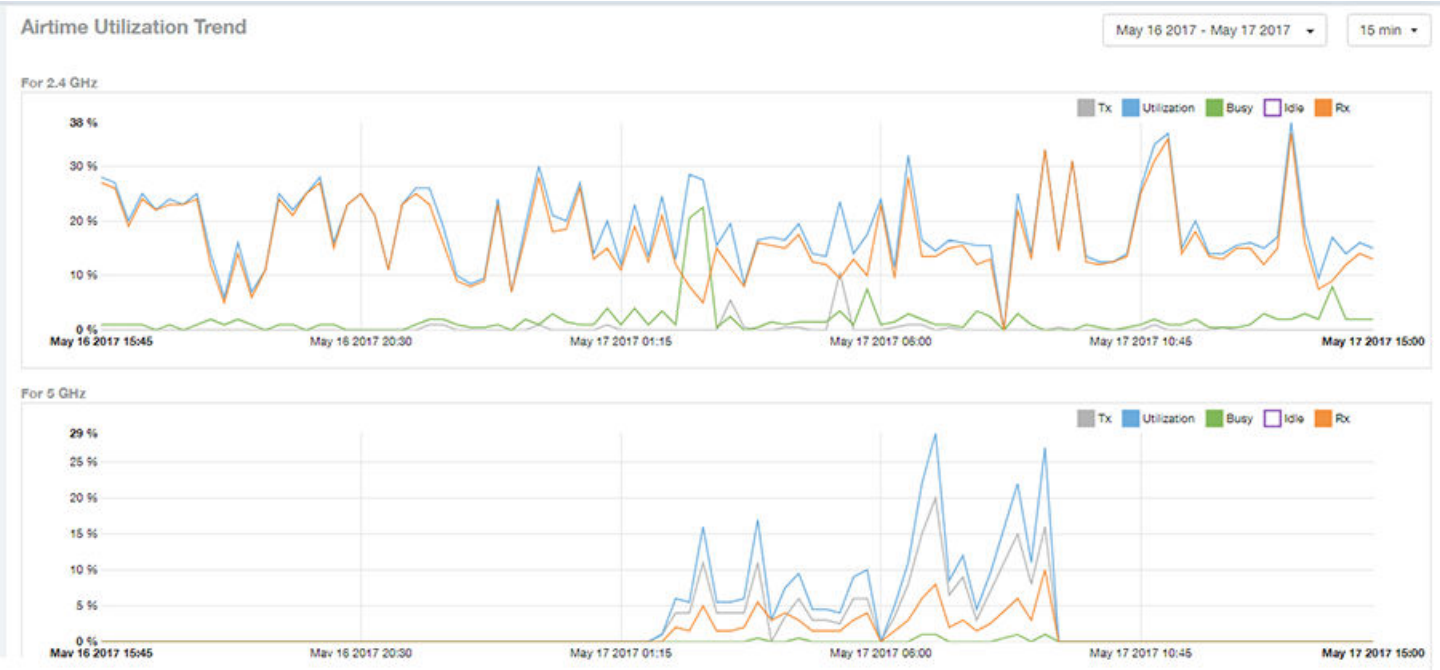
FIGURE 126 AP Details - SNR Trend

AP Details - Airtime Utilization Trend

The Airtime Utilization Trend line graphs of the AP Details report depict the airtime utilization for this AP, by radio type, over a specified time period.

You can use the drop-down arrows to select the time frame and granularity for this graph.

FIGURE 127 AP Details - Airtime Utilization Trend



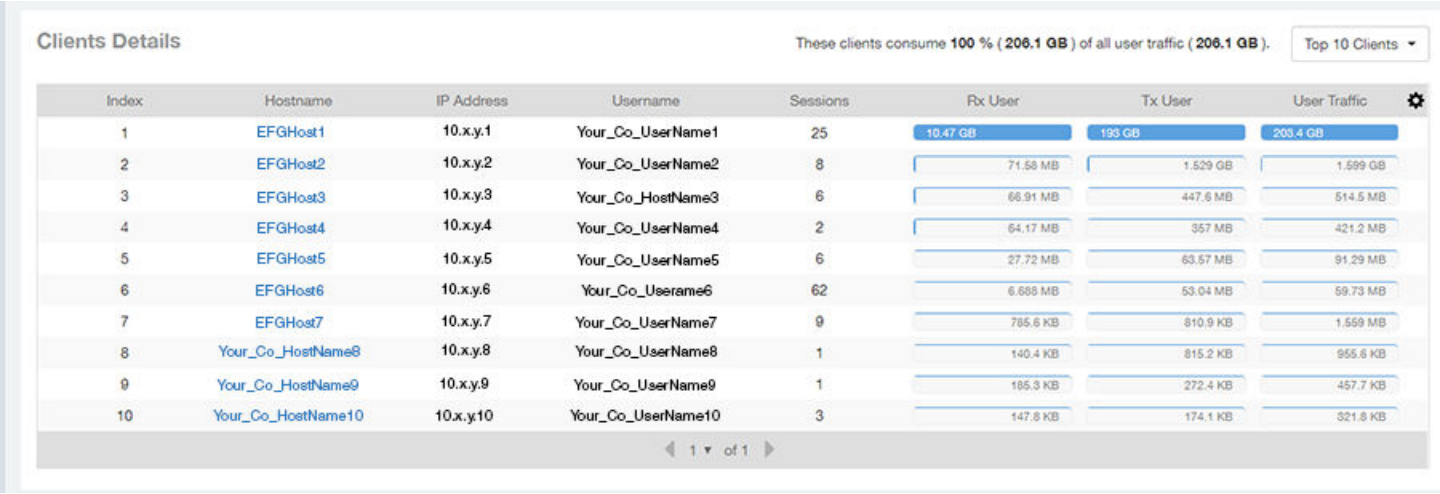
AP Details - Clients Details

The Clients Details table of the AP Details report provides details for however many top clients that you specify for this AP.

Use the drop-down menu to specify how many top clients to display.

If you click on one of the client **hostname** links, you will be taken to the Client Details report for that client.

FIGURE 128 AP Details - Clients Details



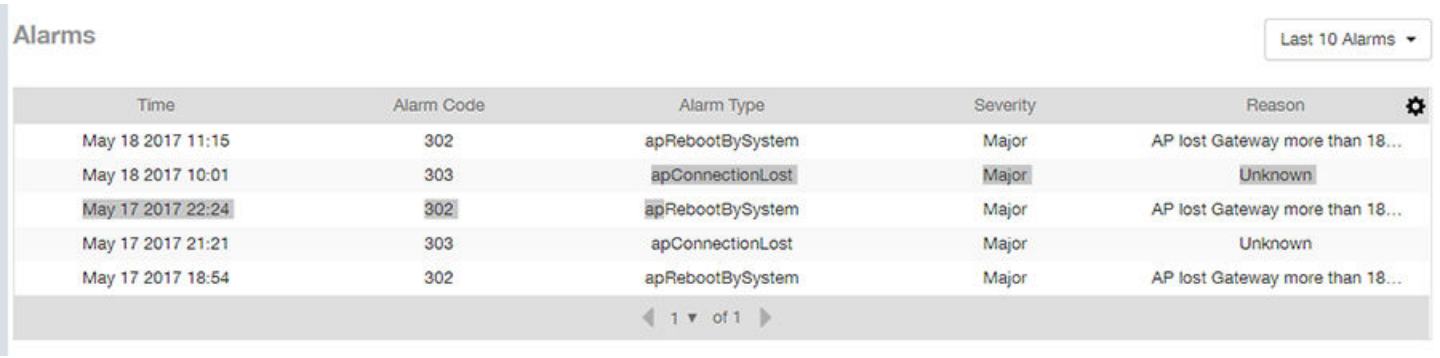
AP Details - Alarms

The Alarms table of the AP Details report lists the alarms generated for this AP for the time period that you specify.

Use the drop-down menu to specify how many alarms to display.

You can use the gear icon to choose what columns of information you wish to display.

FIGURE 129 AP Details - Alarms



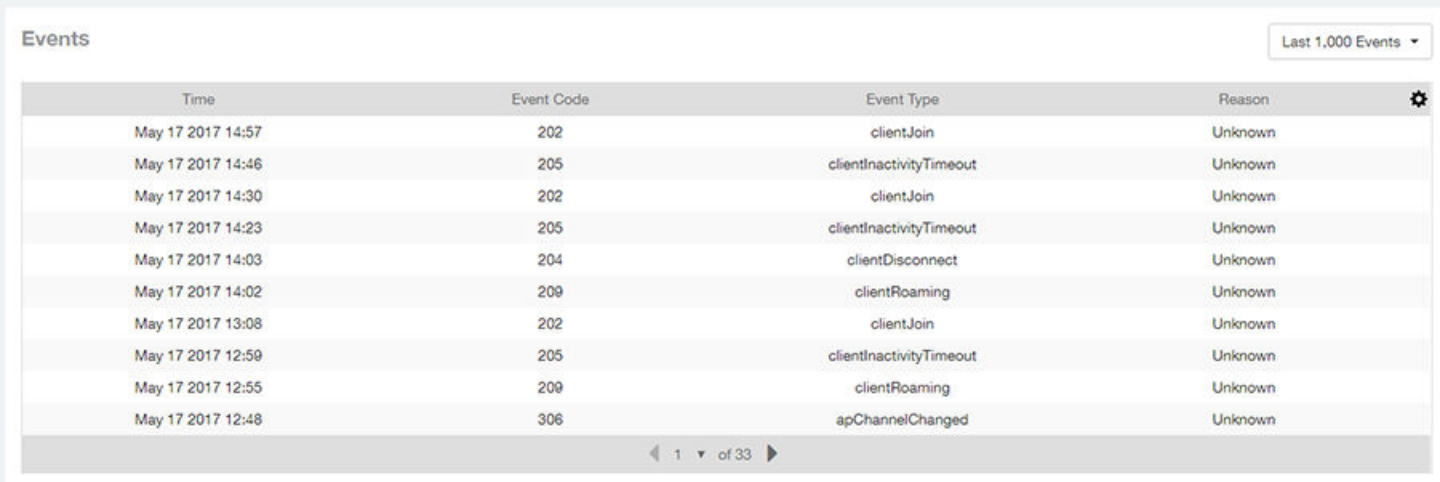
AP Details - Events

The Events table of the AP Details report lists the events generated for this AP for the time period that you specify.

Use the drop-down menu to specify how many events to display.

You can use the gear icon to choose what columns of information you wish to display.

FIGURE 130 AP Details - Events



AP Details - Anomalies

The anomalies charts provide information about any behavior that might be out of the normal range for this AP, such as high reboot count, unusually high or low user traffic, unusually high or low client count, or unusually high or low session count.

For more information about anomalies, as well as screen shots of each type, refer to the Using Ruckus Smart Analytics on page 21.

Client Details Report Dashboard

- Client Details Report..... 99
- Client Details - Summary..... 100
- Client Details - Stats..... 101
- Client Details - Top 10 Applications by Traffic Volume..... 101
- Client Details - Traffic Trend..... 102
- Client Details - RSS Trend..... 102
- Client Details - SNR Trend..... 103
- Client Details - Sessions..... 103

Client Details Report

The Client Details report provides details about one specific client.

You can reach this report by either clicking on a hyperlink of a client name from another dashboard, or by clicking **Client Details** on the navigation bar. If you click **Client Details** to get to this screen, you then need to enter the MAC address of the client whose details you want to view.

The following figure shows only the upper two sections of the Client Details report:

FIGURE 131 Client Details Report (upper portion)

The Client Details report consists of seven sections and are described in the following table. Figures showing each of these sections appear later.

1	Summary	Contains basic information about the client. The hostname in this example figure above is XYZ123.
2	Stats	Contains basic statistics specific to this client.

3	Top 10 Applications by Traffic Volume	A pie chart and line graph contain the applications run by this client that have the largest traffic volume. You can click the Table icon to toggle to a table of this same information.
4	Traffic Trend	Two line graphs depict traffic by usage and traffic by radio type for this client.
5	RSS Trend	A line graph depicts the received signal strength trends over time for this client.
6	SNR Trend	A line graph depicts the signal-to-noise ratio trends over time for this client.
7	Sessions	A table provides details for sessions between this client and associated access points.

Client Details - Summary

The Summary section of the Client Details report displays basic information about a specific client .

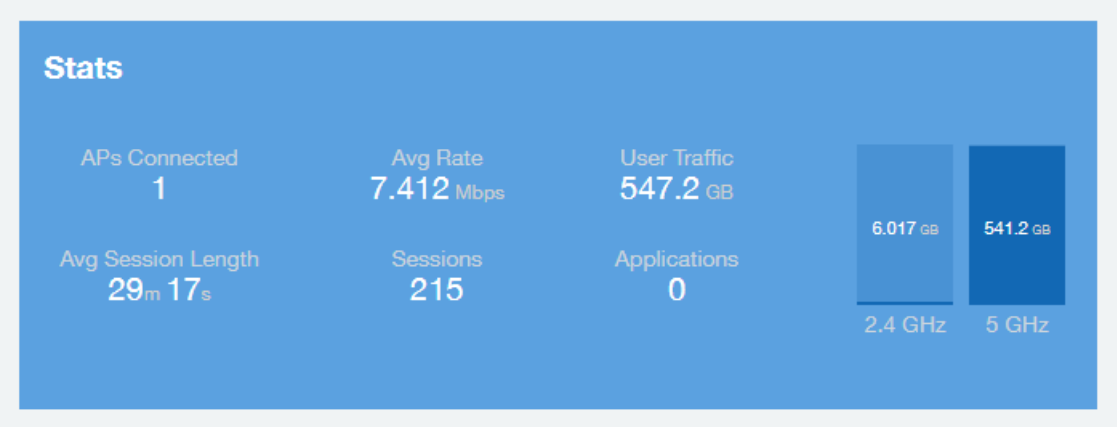
The hostname for the client shown in this example is XYZ123.

FIGURE 132 Client Details - Summary

Client Details - Stats

The Stats section of the Client Details report shows statistics for the specified client.

FIGURE 133 Client Details Stats

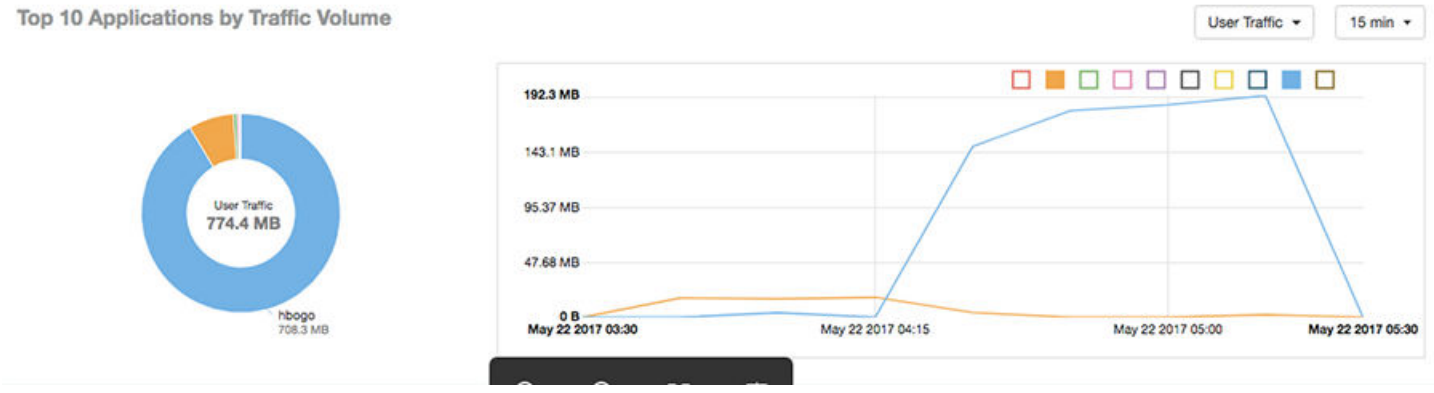


Client Details - Top 10 Applications by Traffic Volume

The Client Details - Top 10 Applications by Traffic Volume pie chart and graph show the applications run by this client that have the largest traffic volume.

Use the drop-down menus to specify the traffic type and the granularity of the graph. Click any of the colored squares to toggle display of the corresponding applications.

NOTE
You can click the Table icon to toggle to a table of this same information.

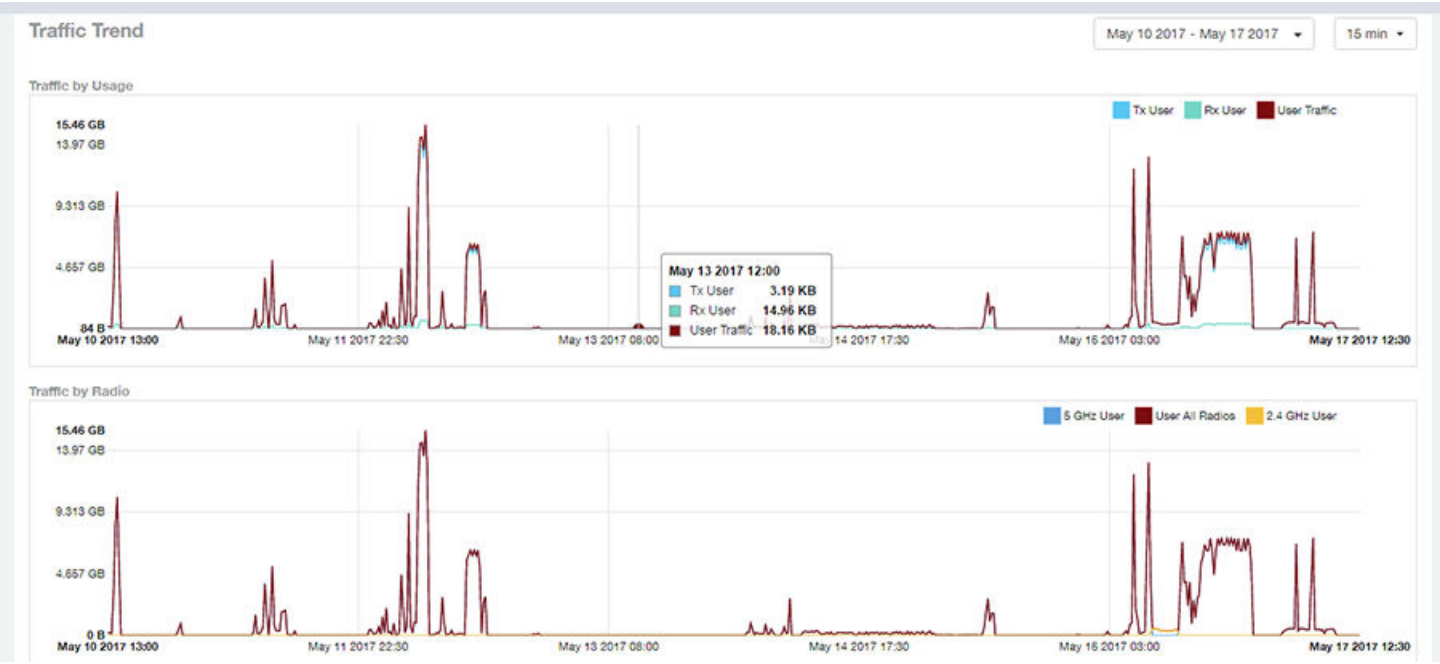


Client Details - Traffic Trend

The Traffic Trend graphs of the Client Details report depict traffic by usage and traffic by radio type for the client.

You can use the drop-down arrows to select the time frame and granularity for the graphs.

FIGURE 134 Client Details - Traffic Trend

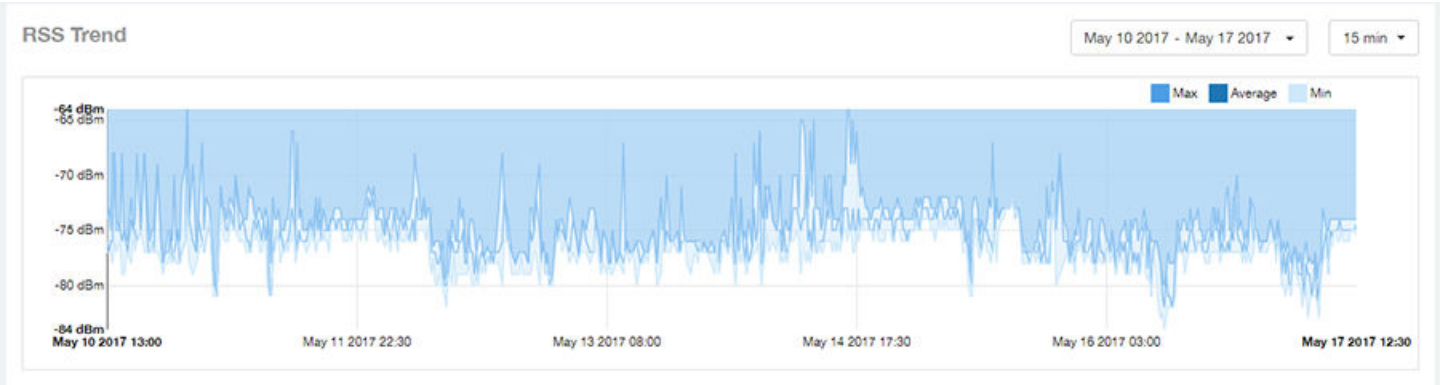


Client Details - RSS Trend

The RSS Trend graph of the Client Details report depicts the received signal strength trends over time for this client.

Use the drop-down menus to specify the timeframe and the granularity of the graph.

FIGURE 135 Client Details - RSS Trend

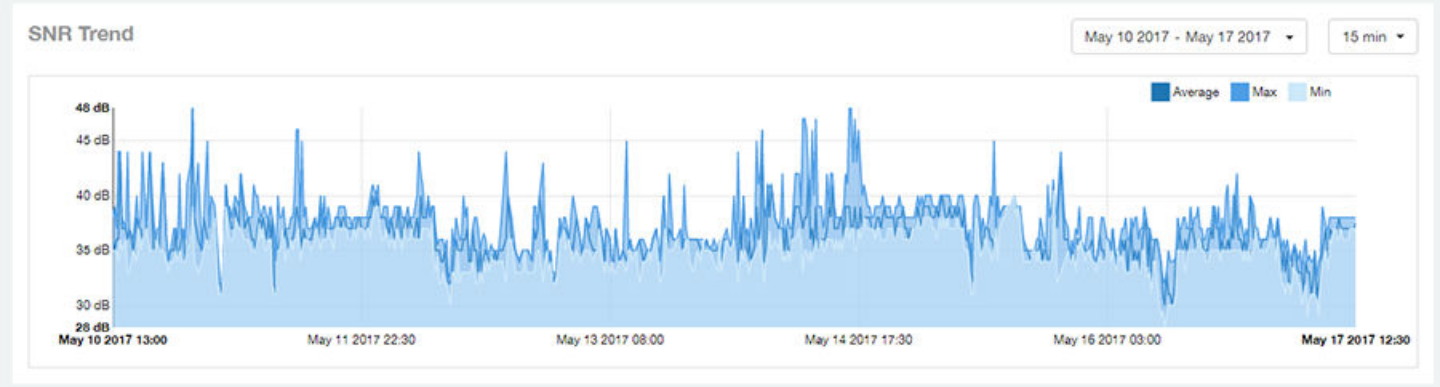


Client Details - SNR Trend

The SNR Trend graph of the Client Details report depicts the signal-to-noise ratio over time for this client.

You can use the drop-down arrows to select the time frame and granularity for this graph.

FIGURE 136 Client Details - SNR Trend



Client Details - Sessions

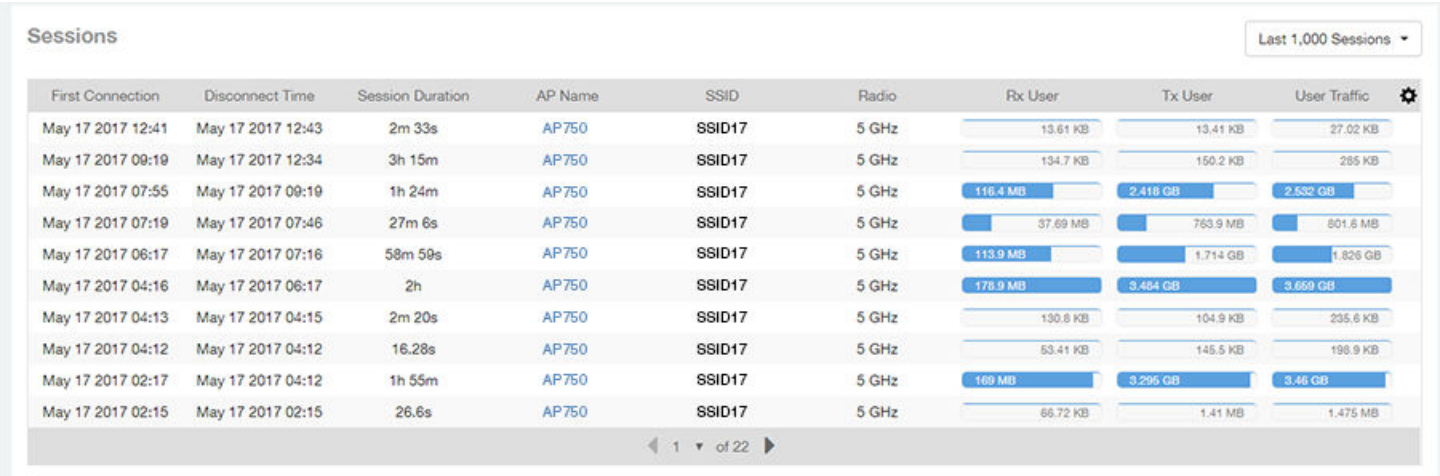
The Sessions table of the Client Details report provides details for sessions between this client and associated access points.

You can use the drop-down arrows to select the number of sessions you want to display.

You can use the gear icon to choose what columns of information you wish to display.

NOTE
If you click one of the AP Name links, you will be taken to the AP Details report for that AP.

FIGURE 137 Client Details Sessions



Switch Details Report Dashboard

- Switch Details Report....105
- Switch Details - Summary....106
- Switch Details - Details....107
- Switch Details - Resource Utilization....107
- Switch Details - Top Ports By Traffic....108
- Switch Details - Traffic Trend....108
- Switch Details - LLDP Neighbor List....109
- Switch Details - Uptime History....109

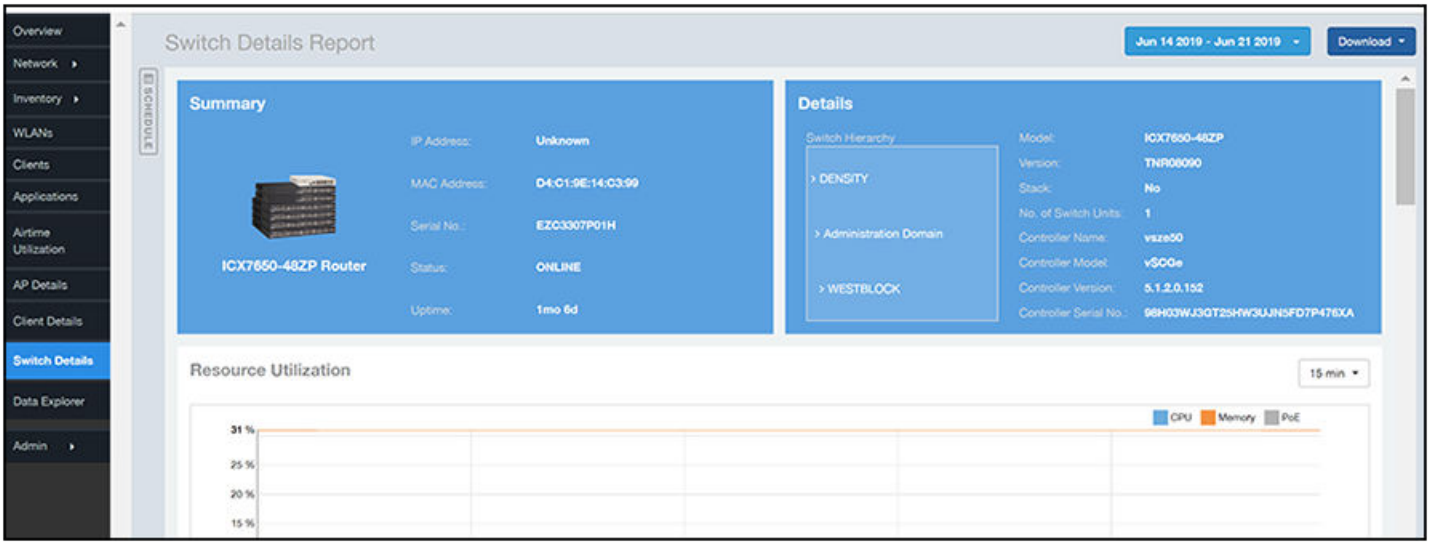
Switch Details Report

The Switch Details report provides details about one specific switch.

You can reach this report by either clicking on a hyperlink of a switch name from another dashboard, or by clicking **Switch Details** on the navigation bar. If you click **Switch Details** to get to this screen, you then need to enter the MAC address of the switch whose details you want to view.

The following figure shows only the upper sections of the Switch Details report:

FIGURE 138 Switch Details Report (upper portion)



The Switch Details report consists of seven sections and are described in the following table. Figures showing each of these sections appear later.

1	Summary	Contains basic information about the switch.
2	Details	Contains basic statistics specific to this switch.
3	Resource Utilization	A graph shows the CPU, memory and power over Ethernet (PoE) utilization percentages for each switch in your system.

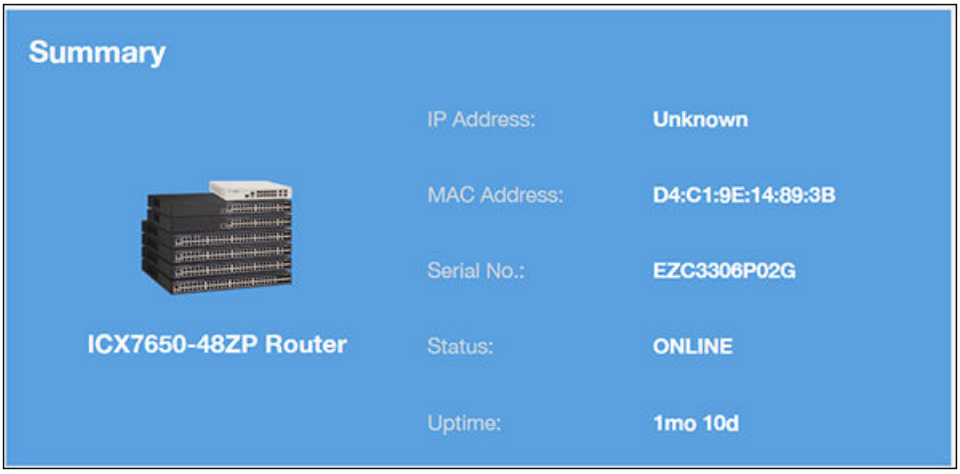
		.
4	Top Ports By Traffic	A pie chart and line graph show the ports that are handling the most traffic. You can toggle to a table view of this information by clicking the Table icon.
5	Traffic Trend	Two line graphs depict traffic by usage and average traffic rate for this switch.
6	LLDP Neighbor List	A table that provides information about all the LLDP neighbors for this switch.
7	Uptime History	A line graph shows when this switch has been up or down over different time periods.

Switch Details - Summary

The Summary section of the Switch Details report displays basic information about a specific switch.

The switch shown in this example is named ICX7650-48ZP Router.

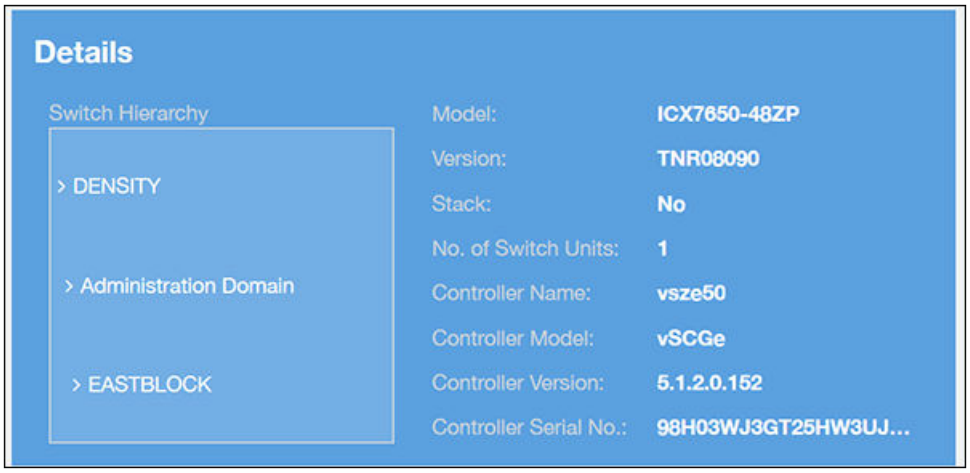
FIGURE 139 Switch Details - Summary



Switch Details - Details

The Details section of the Switch Details report contains information about the specified switch, including its hierarchy in the network.

FIGURE 140 Switch Details - Details

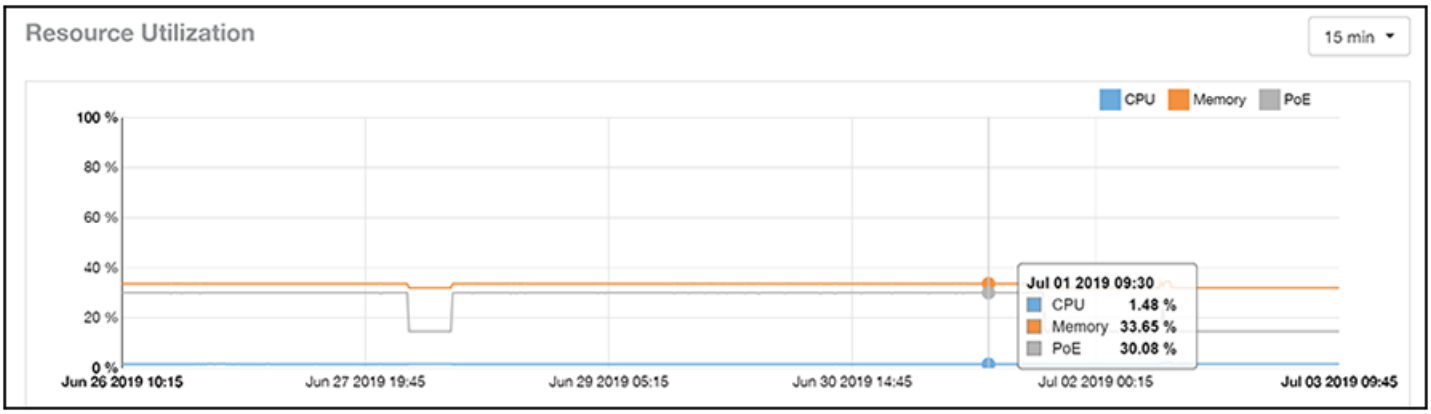


Switch Details - Resource Utilization

The Resource Utilization table of the Switch Details Report displays the CPU, memory and disk utilization percentages for each switch in your system.

You can hover to view resource utilization at different times; you can toggle the boxes on and off to display or not display the data they represent.

FIGURE 141 Switch Details - Resource Utilization

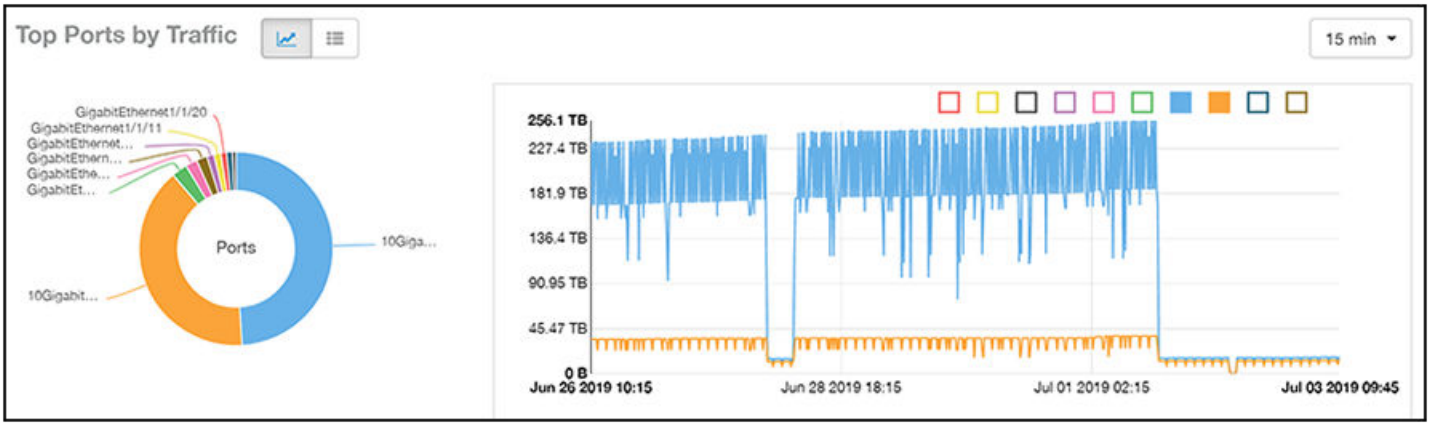


Switch Details - Top Ports By Traffic

The Top Ports By Traffic pie chart and line graph of the Switch Details report depict the ports that have generated the largest volume of traffic over this switch for a specified period of time.

Use the drop-down menus to specify the time frame and the granularity of the graph. Click any of the colored squares to toggle display of the corresponding ports.

FIGURE 142 Switch Details - Top Ports By Traffic

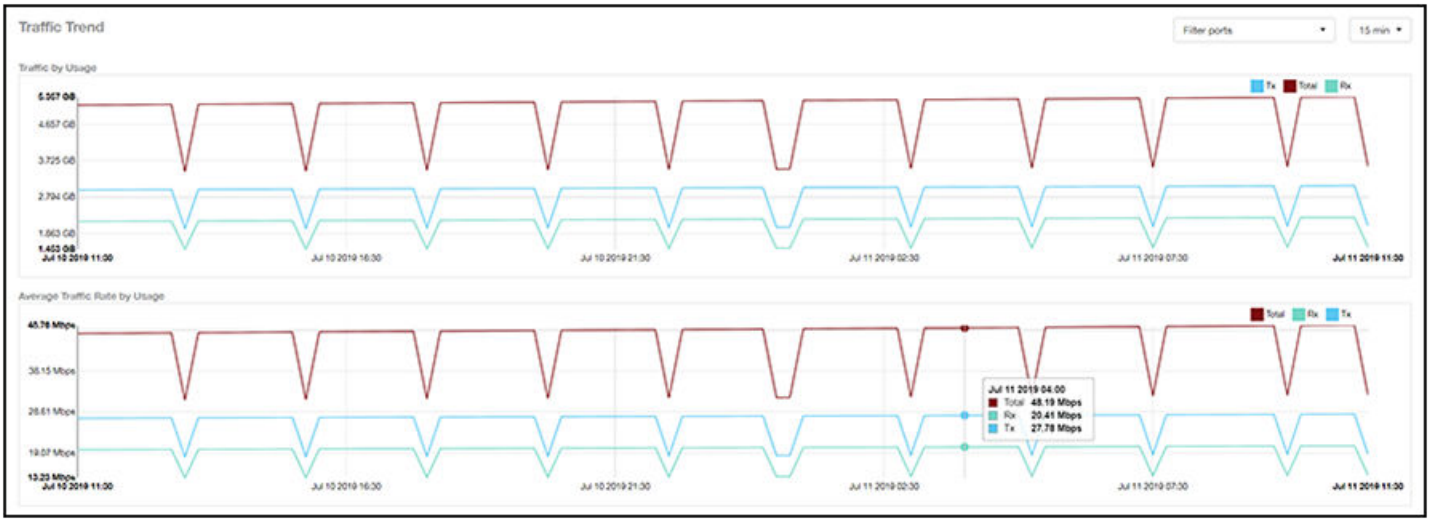


Switch Details - Traffic Trend

The Traffic Trend section of the Switch Details report contains two line graphs that provide information about the specified switch: one that depicts traffic by usage, and one that shows the average traffic rate by usage.

You can hover over portions of the line graph to view different types of traffic at certain time intervals, and you can click any of the colored squares to toggle display of the corresponding type of traffic.

FIGURE 143 Switch Details - Traffic Trend

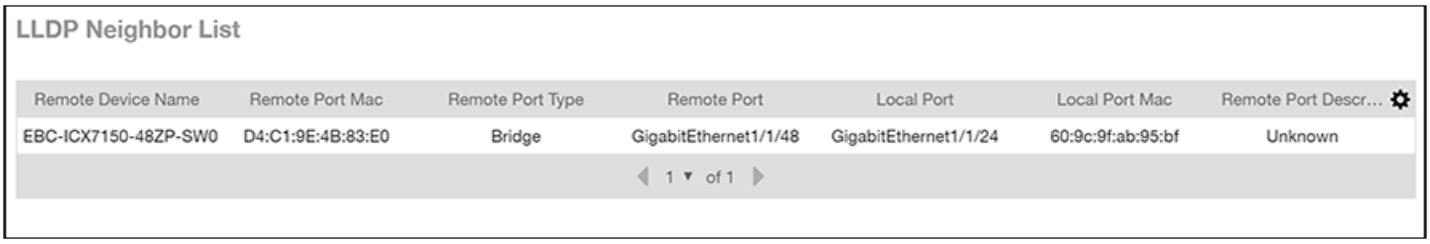


Switch Details - LLDP Neighbor List

The LLDP Neighbor List table of the Switch Details report provides information about all the LLDP neighbors of the specified switch.

Click the gear icon to select the list of columns to display. The number of rows per page is defined by the **Rows per Page** option in the table settings menu.

FIGURE 144 Switch Details - LLDP Neighbor List

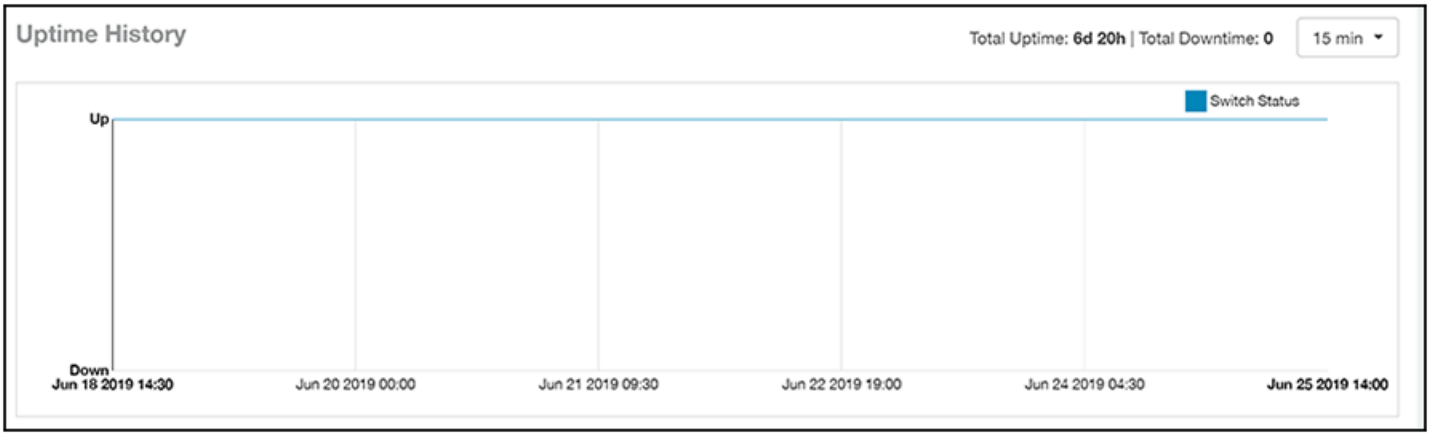


Switch Details - Uptime History

The Uptime History line graph of the Switch Details report shows when this switch has been up or down over different time periods.

The blue bar indicates when the switch has been up or down. Use the drop-down menu to specify the timeframe and the granularity of the graph.

FIGURE 145 Switch Details - Uptime History



Data Explorer Dashboard

- Data Explorer and Data Cubes..... 111
- Data Cube Filters..... 121
- Creating a Data Explorer Dashboard..... 147
- Actions You Can Perform on an Existing Dashboard..... 152
- Exporting Raw Data Using the SCI Virtual Machine Command Line Interface..... 157

Data Explorer and Data Cubes

The Data Explorer and its individual cubes allows you to view, filter, and manipulate data in many different ways.

Data Exploration

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

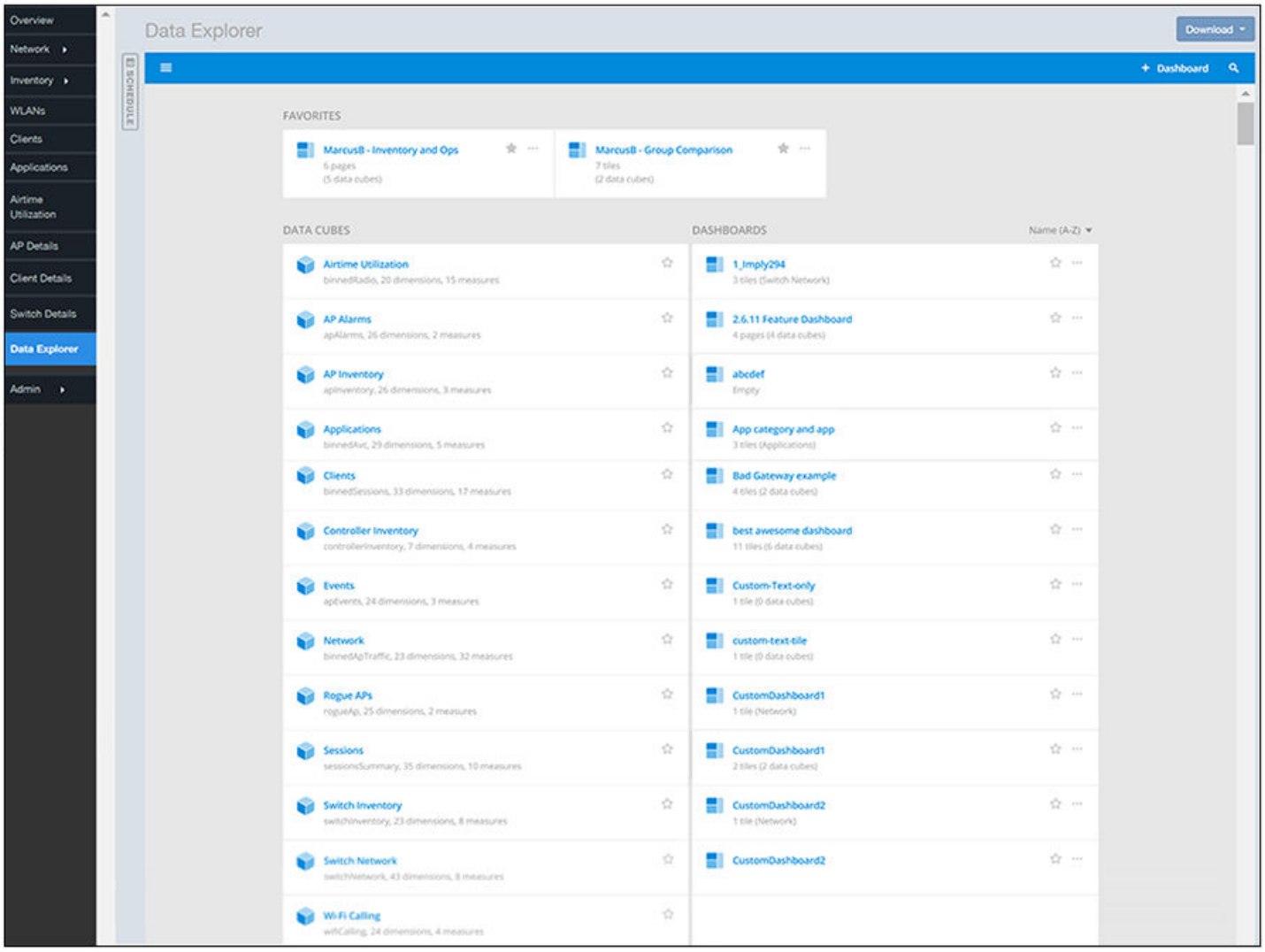
Consider your data to be a three-dimensional cube which you would like to explore, both inside out and outside in, so that you could glean more insights from your data. Of course, most real world data sets will have more than three dimensions, but the concepts from a 3D cube can be directly extended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

With an OLAP cube, there are five 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. After the above slice and dice is a smaller piece of the original OLAP cube.
3. **Drill Up/Down:** In order to delve 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, refer to these five operations.

FIGURE 146 Data Explorer and Data Cubes



The Data Explorer allows you to explore the data under various categories, using your own permutations and combinations, unlike the other canned reports available.

NOTE
The Schedule tab is for use only with dashboards you create, not with data cubes themselves.

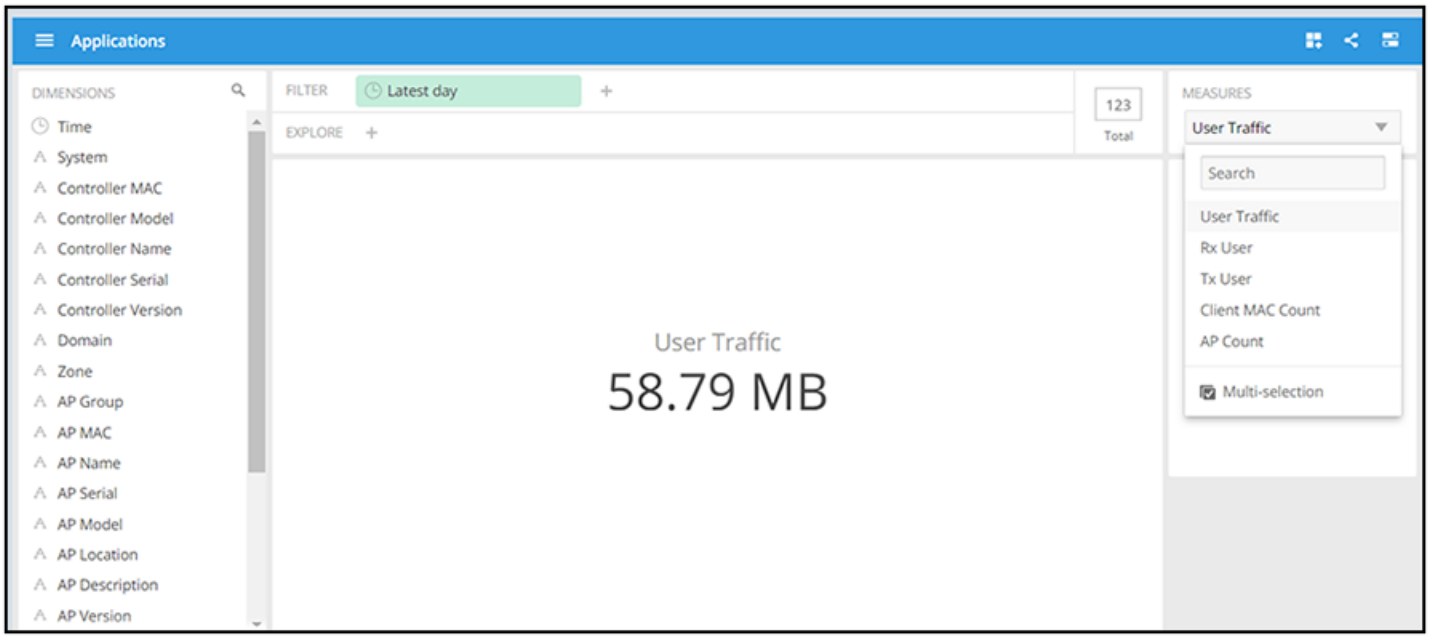
For information on how to use data cube filters, which are common to all the data cubes, refer to Data Cube Filters on page 121. You can also create and save dashboards, which allow you to customize reports by using data from any or all of the data cubes. Refer to Creating a Data Explorer Dashboard on page 147 and Actions You Can Perform on an Existing Dashboard on page 152 for more information.

Following are the available data cubes:

Applications

The Applications cube allows you to explore the application data your system uses.

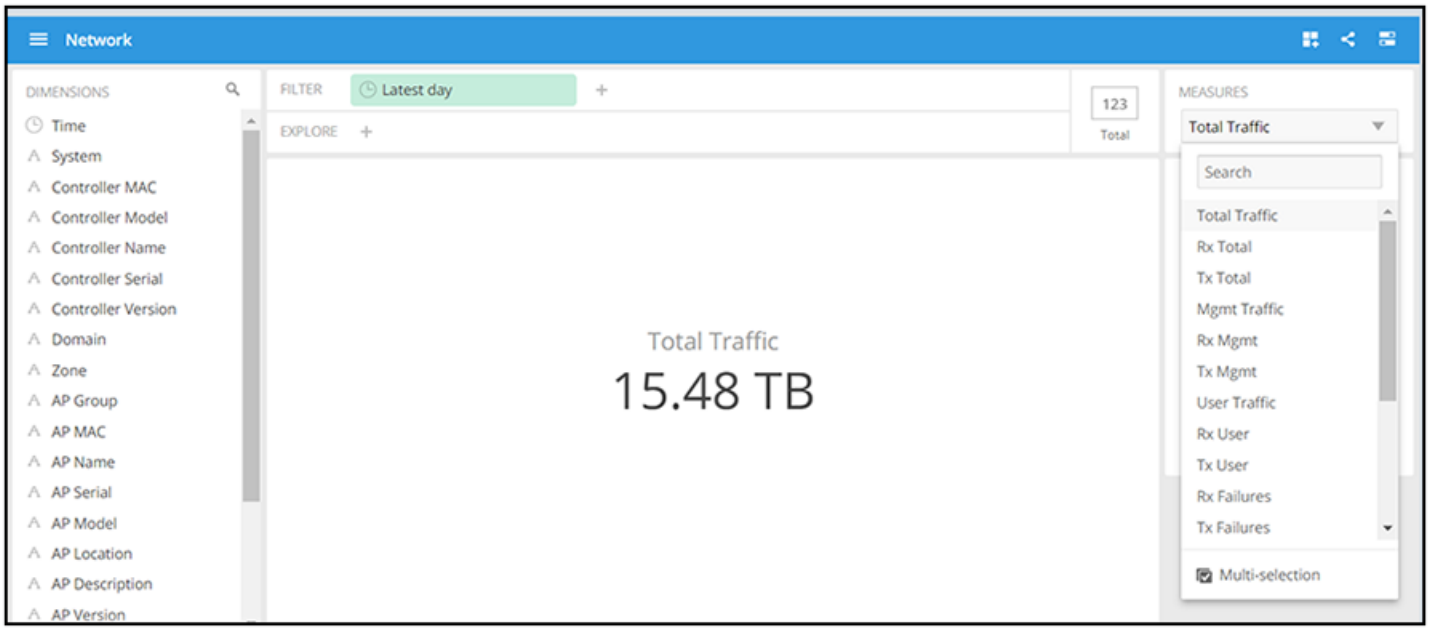
FIGURE 147 Data Explorer - Applications



Network

The Network cube allows you to explore network traffic data and its usage.

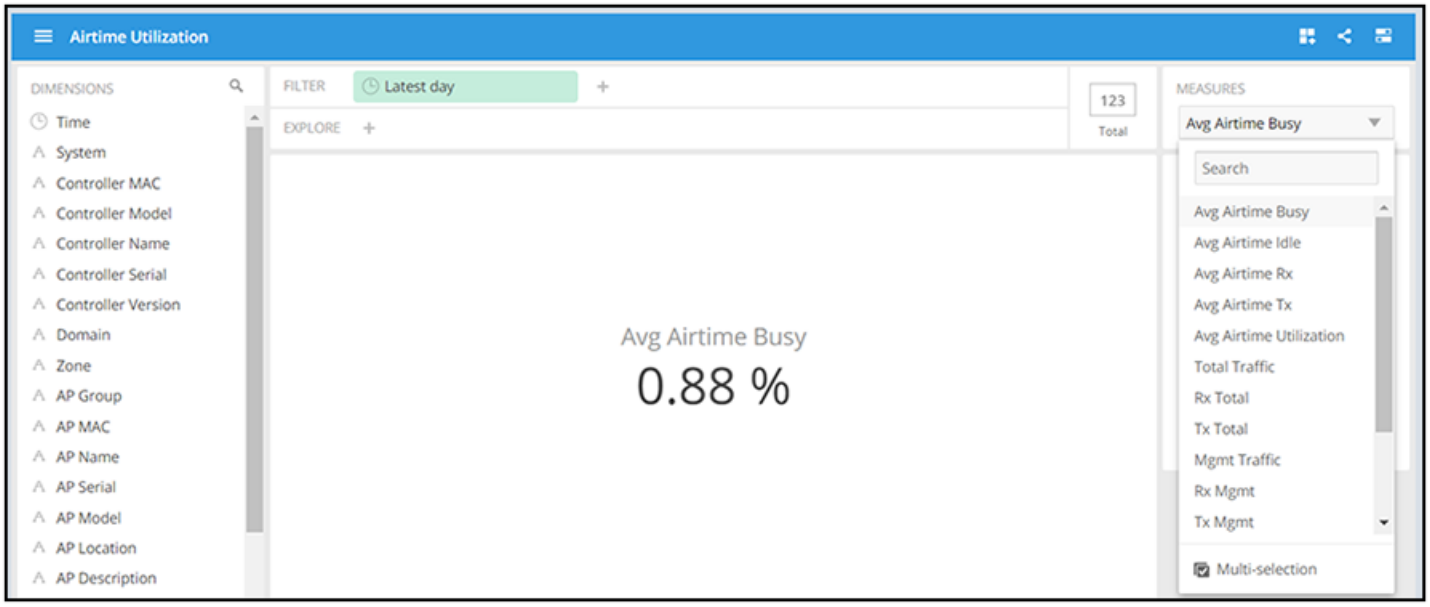
FIGURE 148 Data Explorer - Network



Airtime Utilization

The Airtime Utilization cube allows you to explore the airtime utilization data in your system.

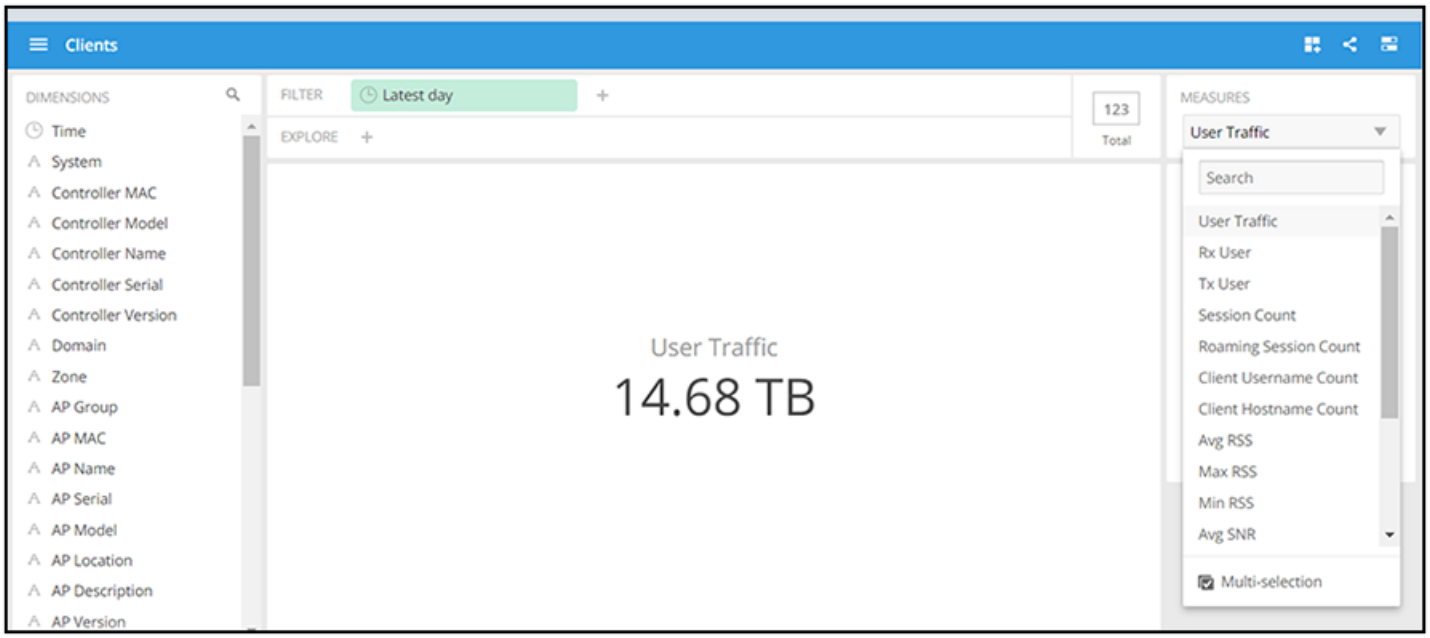
FIGURE 149 Data Explorer - Airtime Utilization



Clients

The Clients cube allows you to explore client data for your system.

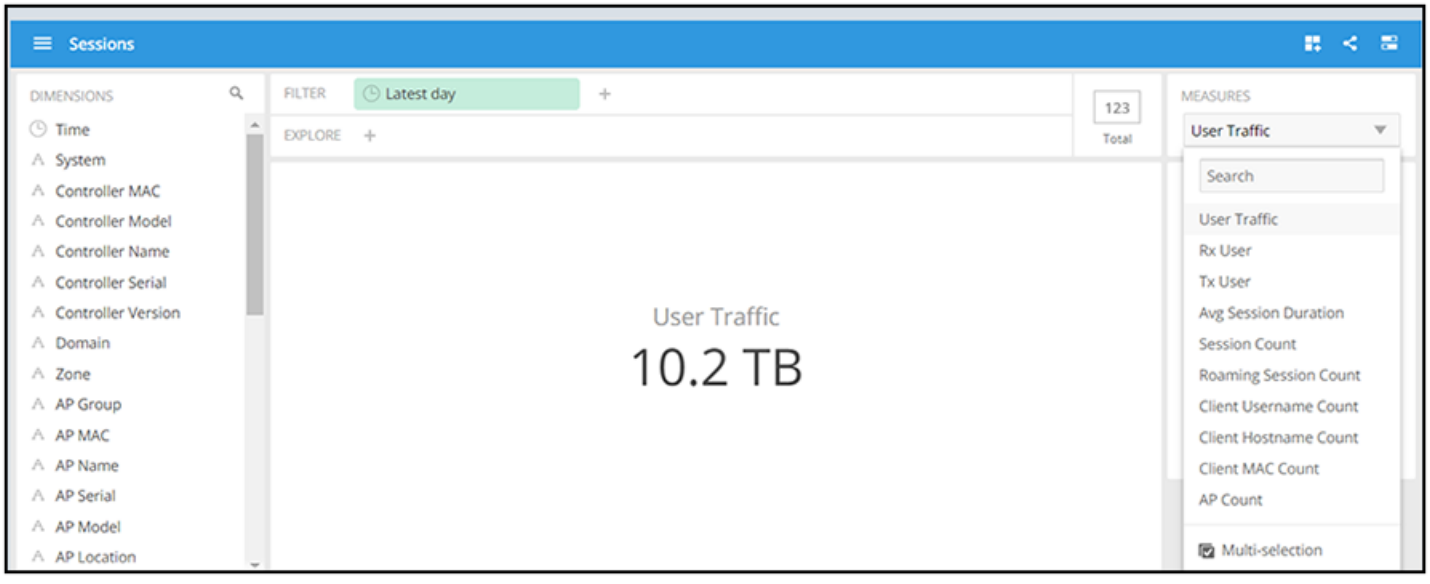
FIGURE 150 Data Explorer - Clients



Sessions

The Sessions cube allows you to explore data about the various sessions in your system.

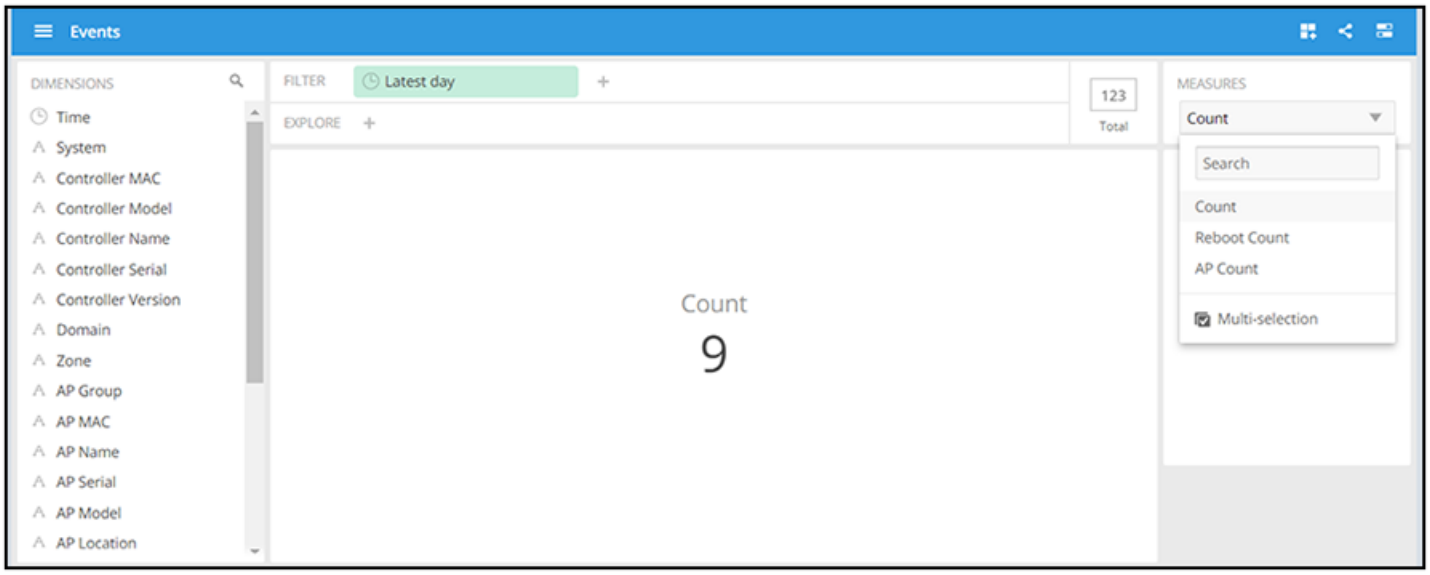
FIGURE 151 Data Explorer - Sessions



Events

The Events cube allows you to view data about events that have occurred in your system.

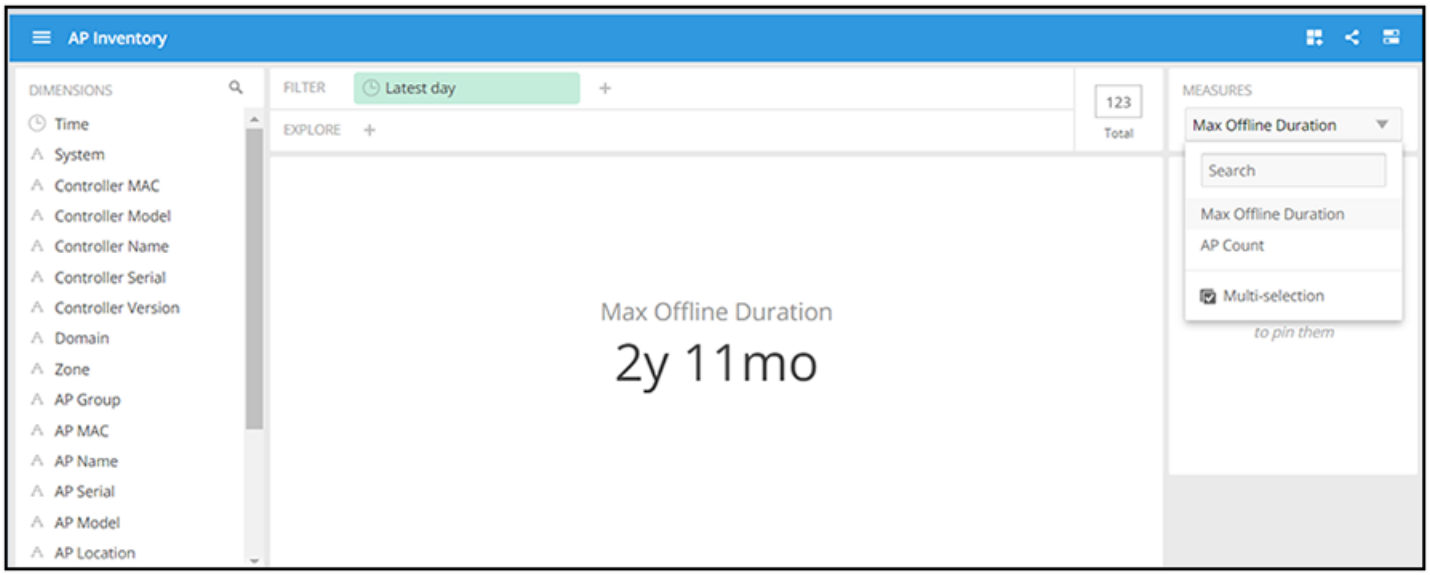
FIGURE 152 Data Explorer - Events



AP Inventory

The AP Inventory cube allows you to view information about the various AP models your system uses.

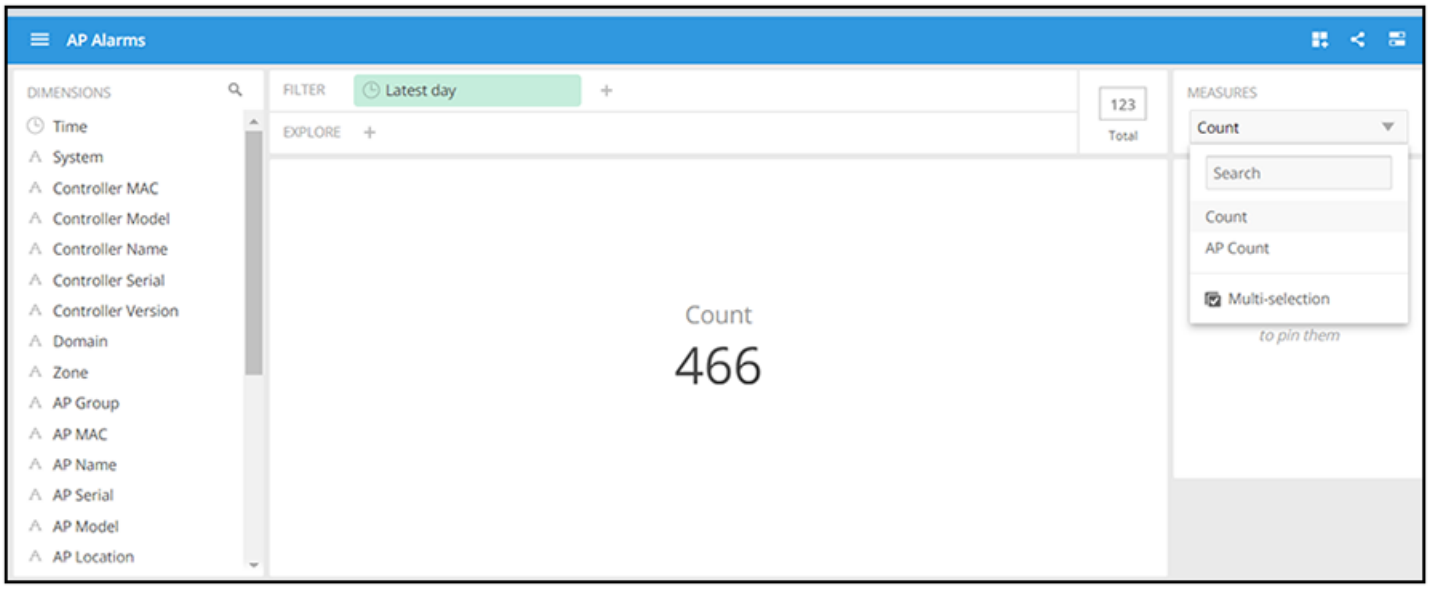
FIGURE 153 AP Inventory



AP Alarms

The AP Alarms cube allows you to view information about alarms in your system.

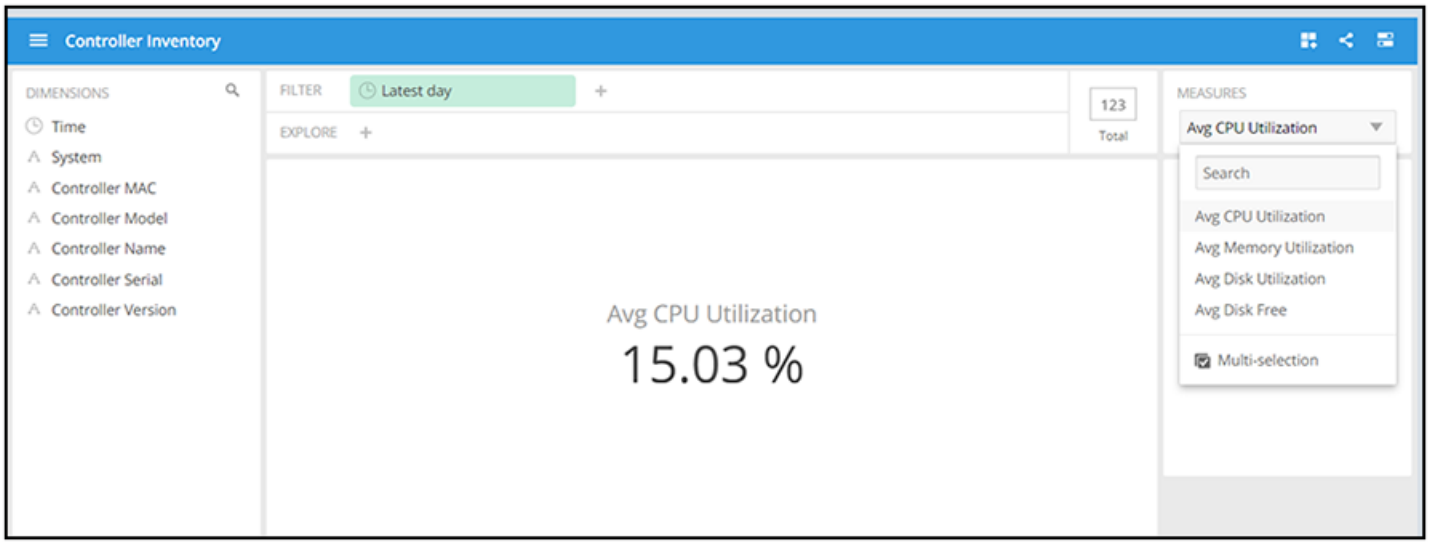
FIGURE 154 AP Alarms



Controller Inventory

The Controller Inventory cube allows you to view CPU, memory, and disk utilization for the controllers in the system.

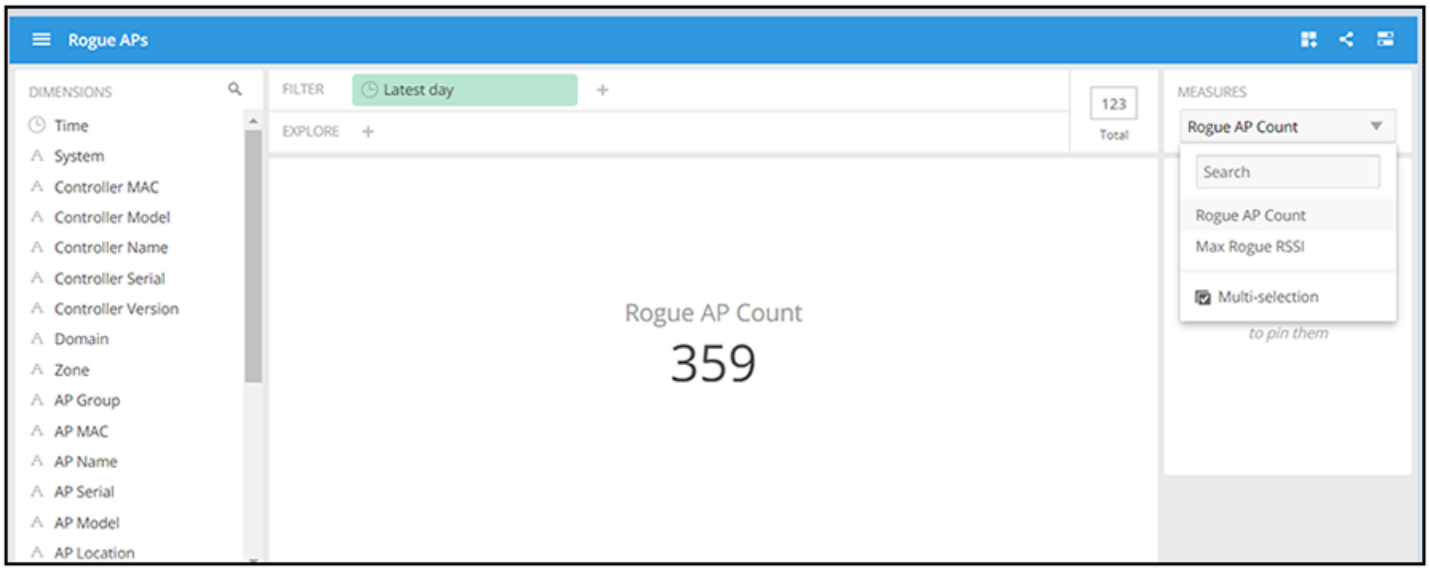
FIGURE 155 Controller Inventory



Rogue APs

The Rogue APs cube allows you to view information about APs that have been flagged as "Rogue" because they cannot be identified by existing APs in your system.

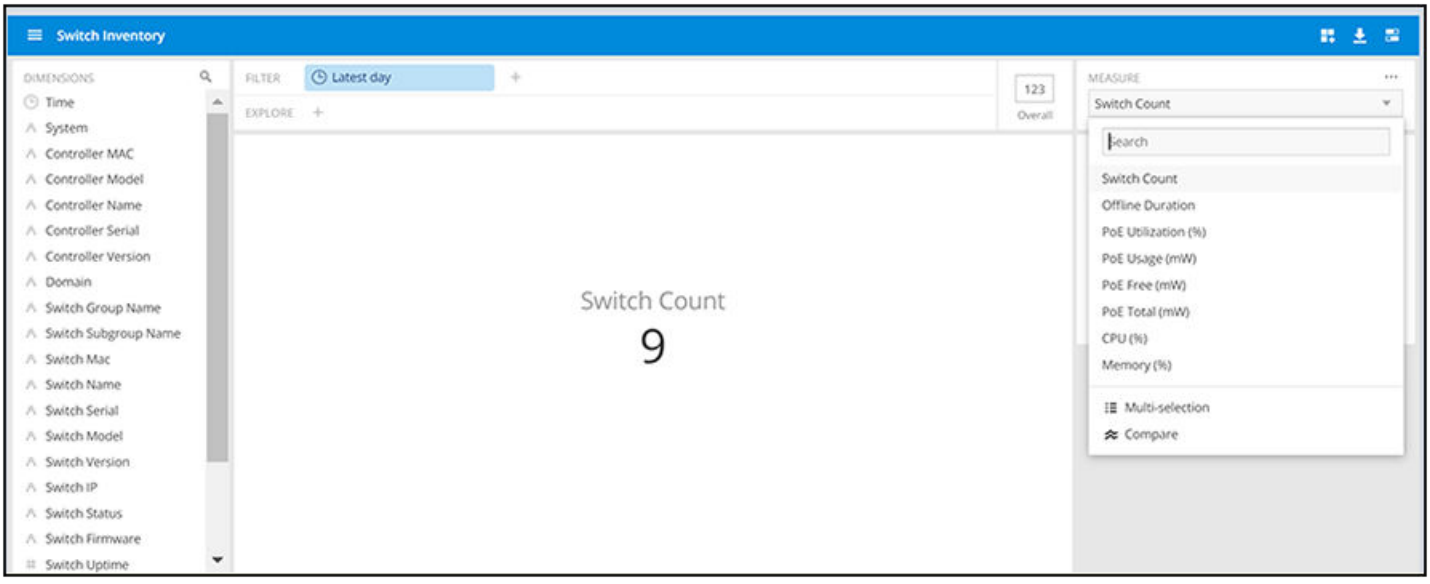
FIGURE 156 Rogue APs



Switch Inventory

The Switch Inventory cube allows you to view CPU, memory, and power over Ethernet (PoE) utilization for the switches in the system.

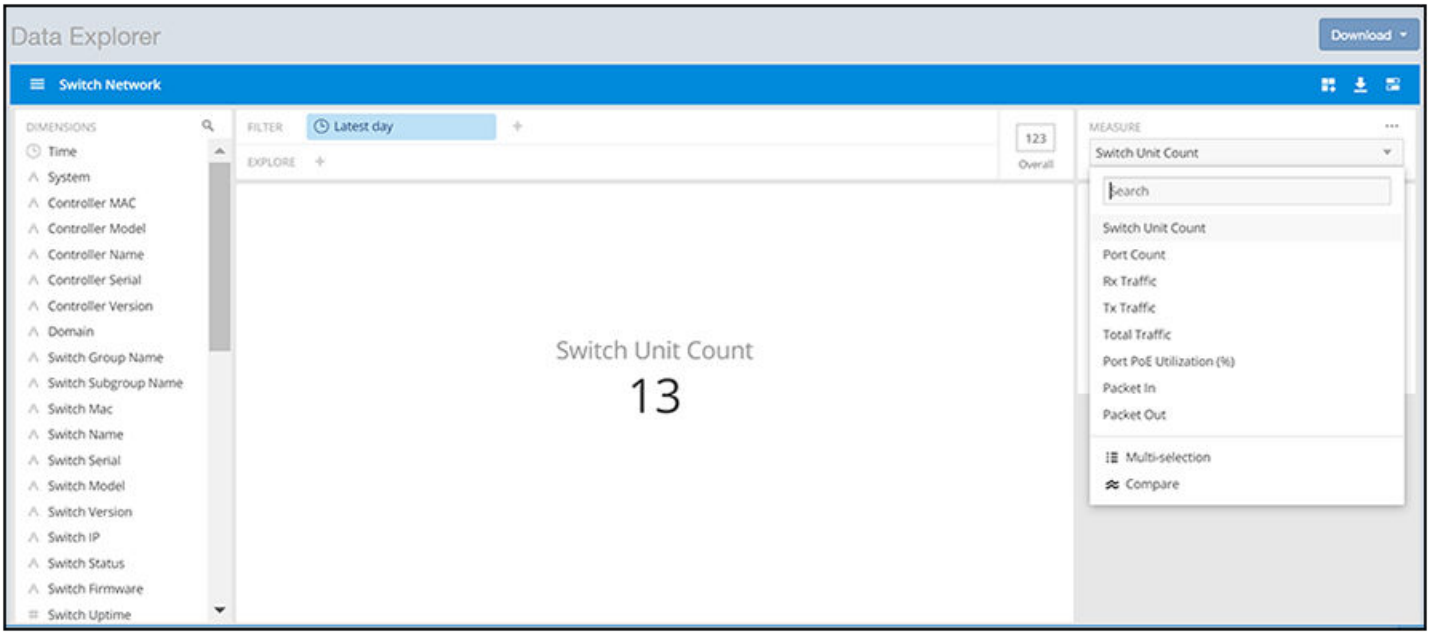
FIGURE 157 Switch Inventory



Switch Network

The Switch Network cube allows you to view traffic, packets, and port power over Ethernet (PoE) utilization on the network switches.

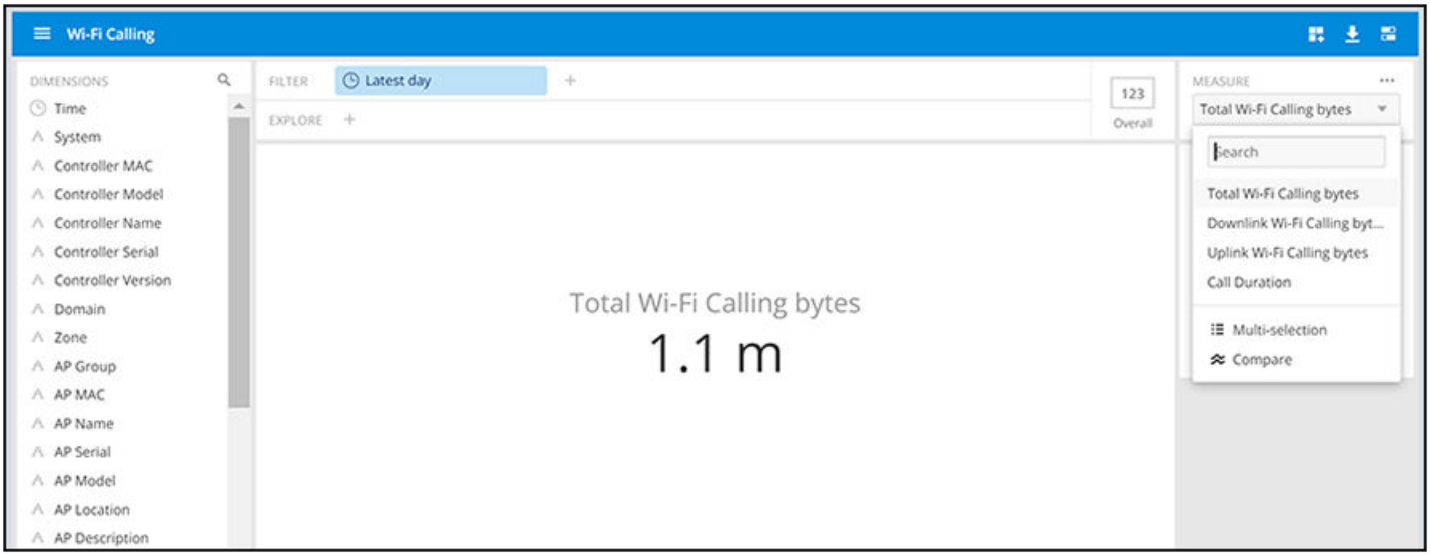
FIGURE 158 Switch Network



WiFi-Calling

The WiFi-Calling cube allows you to view statistics such as uplink and downlink bytes and call duration.

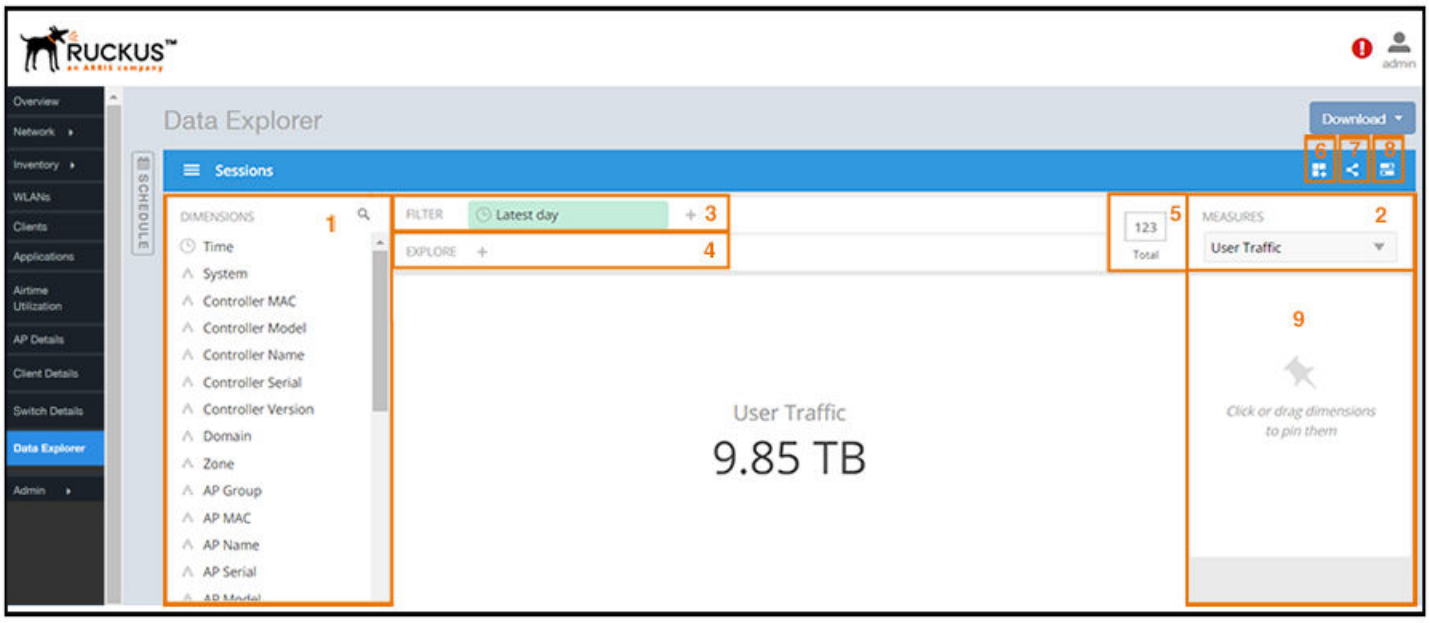
FIGURE 159 WiFi-Calling



Data Cube Filters

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.

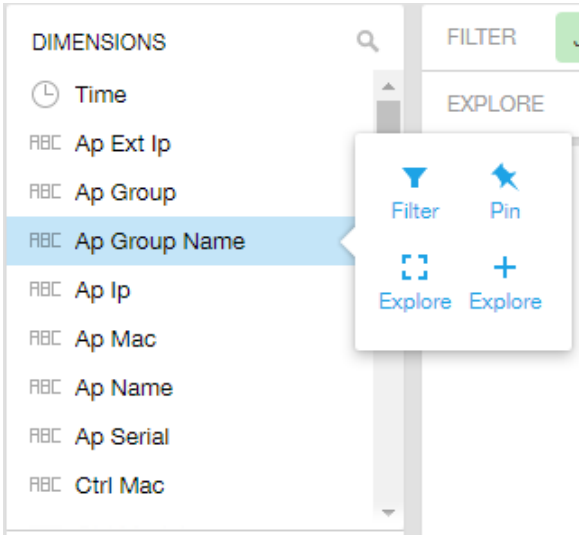
FIGURE 160 Data Cube Filters



The data cube filters are explained in detail in the sections below.

Dimensions

FIGURE 161 Dimensions



Number 1 in Data Cube Filters. 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 dimensions on the Pinboard for easy reference.

You can use the scroll bar on the screen for each data cube to view the supported dimensions for that cube. The following table lists and describes all the dimensions that are supported on one or more data cubes in SCI:

TABLE 6 Dimensions

Dimension name	Description	Supported Data Cubes
Alarm Code	Unique string assigned by the controller to an alarm.	AP Alarms
Alarm State	Indicates if the alarm is outstanding.	AP Alarms
Alarm Type	Description for access point and controller alarms.	AP Alarms
Alarm UUID	Unique string assigned by the controller to an alarm.	AP Alarms
AP Description	Description string of the access point that is configured in the controller.	• Applications • Network • Airtime Utilization • Clients • Sessions • Events • AP Inventory • AP Alarms • Rogue AP

TABLE 6 Dimensions (continued)

Dimension name	Description	Supported Data Cubes
		• Wifi-Calling
AP External IP	External IP address of the access point.	• Applications • Network • Airtime Utilization • Clients • Sessions • Events • AP Inventory • AP Alarms • Rogue AP • Wifi-Calling
AP Group	AP Groups configured in the controller.	• Applications • Network • Airtime Utilization • Clients • Sessions • Events • AP Inventory • AP Alarms • Rogue AP • Wifi-Calling
AP Internal IP	Internal IP address of the access point.	• Applications • Network • Airtime Utilization • Clients • Sessions • Events • AP Inventory • AP Alarms • Rogue AP • Wifi-Calling
AP Latitude	Latitude of GPS coordinates	AP Inventory
AP Longitude	Longitude of GPS coordinates	AP Inventory
AP Location	Location string of the access point that is configured in the controller.	• Applications • Network • Airtime Utilization • Clients • Sessions • Events • AP Inventory • AP Alarms • Rogue AP • Wifi-Calling
AP MAC	Base MAC address of the access point.	• Applications • Network

TABLE 6 Dimensions (continued)

Dimension name	Description	Supported Data Cubes
		• Airtime Utilization • Clients • Sessions • Events • AP Inventory • AP Alarms • Rogue AP • Wifi-Calling
AP Model	Description of the access point model type.	• Applications • Network • Airtime Utilization • Clients • Sessions • Events • AP Inventory • AP Alarms • Rogue AP • Wifi-Calling
AP Name	Name of the access point configured in the controller.	• Applications • Network • Airtime Utilization • Clients • Sessions • Events • AP Inventory • AP Alarms • Rogue AP • Wifi-Calling
AP Serial	Serial number of the access point.	• Applications • Network • Airtime Utilization • Clients • Sessions • Events • AP Inventory • AP Alarms • Rogue AP • Wifi-Calling
AP Version	Firmware version number of the access point.	• Applications • Network • Airtime Utilization • Clients • Sessions • Events • AP Inventory

TABLE 6 Dimensions (continued)

Dimension name	Description	Supported Data Cubes
		• AP Alarms • Rogue AP • Wifi-Calling
Application Category	Amount of user traffic by category	Applications
Application Name	Name of the application accessed by the WiFi client.	Applications
Authentication Method	The WiFi encryption and authentication method adopted.	• Clients • Sessions
BSSID	Basic service set identifier	Network
Cable modem firmware	Firmware version of the cable modem.	AP Inventory
Cable modem IP	IP address of the cable modem.	AP Inventory
Cable modem MAC	MAC address of the cable modem.	AP Inventory
Category	Category for access point and controller alarms or events.	• Events • AP Alarms
Channel	The WiFi channel number used.	• Network • Clients • Sessions
Client IP	Internal IP address of the WiFi client.	• Clients • Sessions
Client MAC	MAC address of the WiFi client.	• Applications • Clients • Sessions • Wifi-Calling
Client Radio Mode	Possible values are: ac, n, a, g, b, or "unknown" (if SmartZone version is prior to 3.6).	• Clients • Sessions
Connection Status	Connection status of the access point: Online, Offline, Discovery, Provisioned.	• AP Inventory
Controller MAC	MAC address of the controller.	• Applications • Network • Airtime Utilization • Clients • Sessions • Events • AP Inventory • AP Alarms • Controller Inventory • Rogue AP • Switch Inventory • Switch Network • Wifi-Calling
Controller Model	Description of the model of the controller.	• Applications • Network • Airtime Utilization • Clients

TABLE 6 Dimensions (continued)

Dimension name	Description	Supported Data Cubes
		• Sessions • Events • AP Inventory • AP Alarms • Controller Inventory • Rogue AP • Switch Inventory • Switch Network • Wifi-Calling
Controller Name	Name of the configured controller.	• Applications • Network • Airtime Utilization • Clients • Sessions • Events • AP Inventory • AP Alarms • Controller Inventory • Rogue AP • Switch Inventory • Switch Network • Wifi-Calling
Controller Serial	Serial number of the controller.	• Applications • Network • Airtime Utilization • Clients • Sessions • Events • AP Inventory • AP Alarms • Controller Inventory • Rogue AP • Switch Inventory • Switch Network • Wifi-Calling
Controller Version	Firmware version number of the controller.	• Applications • Network • Airtime Utilization • Clients • Sessions • Events • AP Inventory • AP Alarms • Controller Inventory • Rogue AP

TABLE 6 Dimensions (continued)

Dimension name	Description	Supported Data Cubes
		• Switch Inventory • Switch Network • Wifi-Calling
Disconnect Time	Disconnect time of a session.	Sessions
Domain	Domains configured in the controller.	• Applications • Network • Airtime Utilization • Clients • Sessions • Events • AP Inventory • AP Alarms • Rogue AP • Switch Inventory • Switch Network • Wifi-Calling
Event Code	Code number for access point and controller events.	Events
Event Type	Description for access point and controller events.	Events
First Connection	First connection time of a session.	Sessions
FQDN of ePDG	Fully qualified domain name of Evolved Packet Data Gateway.	Wifi-Calling
Hostname	Hostname configured in the WiFi client.	• Clients • Sessions
Is Ruckus AP	Indicates if the connected device on this port is a Ruckus AP.	Switch Network
Lag Name	Link aggregation name of the port.	Switch Network
Last Status Change	Date and time of the last change in Connection Status of the access point.	AP Inventory
Manufacturer	Manufacturer information for the WiFi client.	• Clients • Sessions
Number of Ports	The number of ports on the switch.	• Switch Inventory • Switch Network
Operators	WiFi operators.	Wifi-Calling
Number of Switch Units	The number of individual hardware switches (which may or may not be stacked).	• Switch Inventory • Switch Network
Optics	The optics, by Gbits per second, being used in the switch network.	Switch Network
OS Type	OS information for the WiFi client.	• Clients • Sessions
Port	Port of the application accessed by the WiFi client.	Applications
Port Mac	The MAC addresses of individual ports on a switch.	Switch Network

TABLE 6 Dimensions (continued)

Dimension name	Description	Supported Data Cubes
Port Name	All the port names being used in the switch network.	Switch Network
Port Number	All the port numbers being used in the switch network.	Switch Network
Port Status	The up/down operating status of the port.	Switch Network
Port Link Status	The up/down status of all port links in the switch network.	Switch Network
Port Admin Status	The admin-configured port status (up/down).	Switch Network
Port Speed	All the port speeds in use in the switch network.	Switch Network
Port VLans	All the port VLans in use in the switch network.	Switch Network
Radio	Indicates the radio frequency band: 2.4GHz or 5GHz.	• Applications • Network • Airtime Utilization • Clients • Sessions • Wifi-Calling
Reason	Additional description for access point and controller alarms or events, if available.	• Events • AP Alarms
Remote Device Name	The name of the device connected to the switch/port, as learned from LLDP.	Switch Network
Remote Port Mac	The MAC address of the device connected to the switch/port.	Switch Network
Remote Port Type	The functionality of the device connected to the switch/port, as learned from LLDP.	Switch Network
Remote Port Description	The description of the device connected to the switch/port, as learned from LLDP.	Switch Network
Remote Port	The port used by the remote device to connect to this switch/port, as learned from LLDP.	Switch Network
Roaming Session ID	A unique session ID that is created when a client roams to multiple APs within a short-enough time span that the client is connected to these APs simultaneously.	• Clients • Sessions
Rogue AP MAC	MAC Address of the detected Rogue AP.	Rogue AP
Rogue Channel	The WiFi channel that the rogue AP was operating on.	Rogue AP
Rogue Encryption	The WiFi encryption and authentication method adopted by the rogue AP.	Rogue AP
Rogue Radio	The radio band (2.4GHz or 5GHz) that the rogue AP was operating on.	Rogue AP
Rogue SSID	SSID of the detected Rogue AP.	Rogue AP
Rogue Type	Possible types are: ignore, known, rogue, and malicious	Rogue AP
Router ID	The router IDs being used in the network.	• Switch Inventory • Switch Network

TABLE 6 Dimensions (continued)

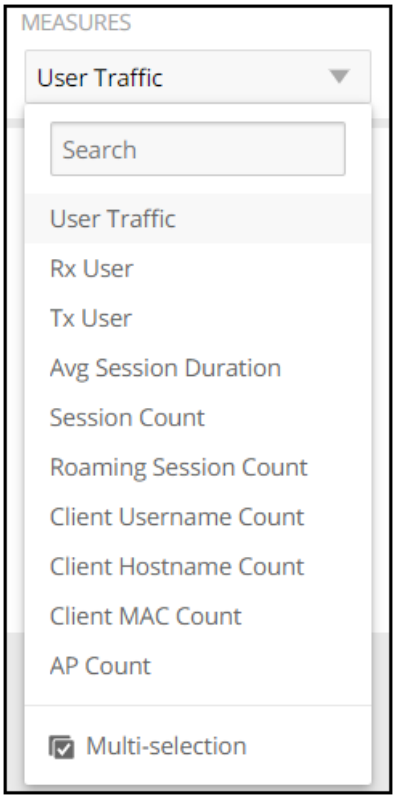
Dimension name	Description	Supported Data Cubes
Session ID	ID string assigned to a session.	• Clients • Sessions
Session Type	Indicates whether the session is authorized or unauthorized.	• Clients • Sessions
Severity	Severity level for access point and controller alarms or events.	• Events • AP Alarms
SSID	Service set identifier (SSID) configured in the controller.	• Applications • Network • Clients • Sessions • Wifi-Calling
Switch Firmware	Firmware versions being used by the switches in the network.	• Switch Inventory • Switch Network
Switch Group Name	Names of all the switch groups in the network.	• Switch Inventory • Switch Network
Switch MAC	MAC addresses of the switches in the network.	• Switch Inventory • Switch Network
Switch Model	Model numbers of the switches in the network.	• Switch Inventory • Switch Network
Switch Name	Names of the switches in the network.	• Switch Inventory • Switch Network
Switch Serial	Serial numbers of the switches in the network.	• Switch Inventory • Switch Network
Switch Status	Online/offline/flagged status of the switches in the network.	• Switch Inventory • Switch Network
Switch Subgroup Name	Names of the switch subgroups in the network.	• Switch Inventory • Switch Network
System	System ID of the controller or the SmartZone Cluster.	• Applications • Network • Airtime Utilization • Clients • Sessions • Events • AP Inventory • AP Alarms • Controller Inventory • Rogue AP • Switch Inventory • Switch Network • Wifi-Calling
Time	Allows the data to be viewed in terms of data points with timestamps. Time granularity of 1 minute, 15 minutes, 1 hour, 1 day and 1 week can be chosen.	• Applications • Network • Airtime Utilization

TABLE 6 Dimensions (continued)

Dimension name	Description	Supported Data Cubes
		• Clients • Sessions • Events • AP Inventory • AP Alarms • Controller Inventory • Rogue AP • Switch Inventory • Switch Network • Wifi-Calling
Username	Username of the user account associated with the WiFi client.	• Clients • Sessions
Zone	Zones configured in the controller.	• Applications • Network • Airtime Utilization • Clients • Sessions • Events • AP Inventory • AP Alarms • Rogue AP • Wifi-Calling

Measures

FIGURE 162 Measures



Number 2 in Data Cube Filters with the drop-down list shown. Select one or more measures by which you want to sort the selected dimension.

Based on the selected cube, measures can vary.

You can use the drop-down lists on the screen for each data cube to view the supported measures for that cube. The following table lists and describes all the measures that are supported on one or more data cubes in SCI:

NOTE
For more information about traffic-related terms, refer to the Definition of Terms on page 11 section.

TABLE 7 Measures

Measure name	Description	Supported Data Cubes
AP Count	Unique number of access points.	• Applications • Network • Airtime Utilization • Clients • Sessions • Events • AP Inventory • AP Alarms

TABLE 7 Measures (continued)

Measure name	Description	Supported Data Cubes
AP Uptime	Uptime percentage for an access point.	AP Inventory
AP-to-SZ Ping Latency	Average time, in milliseconds, for the AP to transmit a packet to the SZ controller, and receive the packet back.	Network
Avg Airtime Busy	Average of the airtime busy metric.	Airtime Utilization
Avg Airtime Idle	Average of the airtime idle metric.	Airtime Utilization
Avg Airtime Rx	Average of the airtime receive metric.	Airtime Utilization
Avg Airtime Tx	Average of the airtime transmit metric.	Airtime Utilization
Avg Airtime Utilization	Average of the total airtime utilization.	Airtime Utilization
Avg CPU Utilization	Average CPU utilization for the controller.	Controller Inventory
Avg Disk Free	Average free disk space for the controller.	Controller Inventory
Avg Disk Utilization	Average disk utilization for the controller.	Controller Inventory
Avg Memory Utilization	Average memory utilization for the controller.	Controller Inventory
Avg Noise Floor	Average noise floor power in dBm.	Clients
Avg RSS	Average received signal strength of the access point in dBm.	Clients
Avg Session Duration	Average time duration for a session.	Sessions
Avg SNR	Average signal to noise ratio at the access point in dB.	Clients
Avg Throughput Estimate	Average throughput estimate for the WiFi client.	• Clients
Call Duration	Length of call to the nearest second.	WiFi Calling
Client Hostname		• Clients • Sessions
Client MAC Count	Unique number of WiFi clients.	• Applications • Clients • Sessions
Client Username		• Clients • Sessions
Count		• Events • AP Alarms
CPU (%)	Percentage of CPU currently in use.	Switch Inventory
Downlink Wifi-Calling Bytes	Number of bytes being used only in the downlink communications of the wifi calling.	WiFi-Calling
Failed Associations	Number of failed associations.	Network
Failed Authentications	Number of failed open authentications	Network
Mgmt Traffic	Traffic volume, which is transmitted and received in IEEE 802.11 control and management frames. This includes all unicast, multicast and broadcast traffic.	• Network • Airtime Utilization
Max Offline Duration	The maximum offline duration within the selected time range.	AP Inventory
Max Rogue SNR	The maximum detected SNR of the rogue AP.	Rogue AP
Max RSS	Maximum received signal strength of the access point in dBm.	Clients

TABLE 7 Measures (continued)

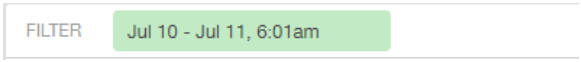
Measure name	Description	Supported Data Cubes
Max SNR	Maximum signal to noise ratio at the access point in dB.	Clients
Memory (%)	Percentage of memory currently in use.	Switch Inventory
Min RSS	Minimum received signal strength of the access point in dBm.	Clients
Min SNR	Minimum signal to noise ratio at the access point in dB.	Clients
Offline Duration	Duration given in milliseconds.	Switch Inventory
PoE Utilization (%)	Percentage of available power over Ethernet wattage being utilized.	Switch Inventory
PoE Usage (mW)	Power over Ethernet usage.	Switch Inventory
PoE Free (mW)	Available power over Ethernet not currently being used.	Switch Inventory
PoE Total (mW)	PoE usage plus PoE free.	Switch Inventory
Port Count	Number of ports for a given switch that are part of the corresponding dimension.	Switch Network
Port PoE Utilization (%)	Percentage of PoE used by a specific port out of the total of PoE being used by the switch at the specified time.	Switch Network
Reboot Count		Events
Roaming Session Count	The number of roaming sessions for a specific client. A roaming session occurs when a client roams quickly enough to remain connected to multiple APs simultaneously. If you find a client that has a large number of roaming sessions, you can use various dimensions in Data Explorer to obtain details about the APs.	• Clients • Sessions
Rogue AP Count	The number of Rogue APs detected by all the APs in your network.	Rogue AP
Rx Failures	Receive packets which failed to be processed due to insufficient buffer in AP.	Network
Rx Management	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.	• Network • Airtime Utilization
Rx Traffic	Traffic received for each dimension measure.	Switch Network
Rx Total	Sum of the Rx user and management traffic.	• Network • Airtime Utilization
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.	• Applications • Network • Airtime Utilization • Clients • Sessions
Session Count	Number of unique sessions.	• Clients • Sessions
Successful Associations	Number of successful associations.	Network
Successful Authentications	Number of successful open authentications	Network

TABLE 7 Measures (continued)

Measure name	Description	Supported Data Cubes
Successful Authentication Ratio	Ratio of number of successful open authentications over total number of open authentications.	Network
Switch Count	Number of switches for each corresponding dimension.	Switch Inventory
Switch Unit Count	Number of switch units for each corresponding dimension.	Switch Network
Total Data Frames Ratio	Percentage of all Tx and Rx packets that are data.	Network
Total Management Frames Ratio	Percentage of all Tx and Rx packets that are management.	Network
Total Traffic	Sum of the user and management traffic.	• Network • Airtime Utilization • Switch Network
Total Wifi-Calling Bytes	Total number of downlink WiFi calling bytes plus uplink WiFi calling bytes.	WiFi-Calling
TxBroadcastFrames	Number of broadcast packets transmitted by the network.	Network
Tx Client MCS Rate	Client transmission data rate.	Clients
TxDropDataFrames	Tx data frames that are dropped by the message queue.	Network
Tx Failures	Transmit packets which failed to be processed due to insufficient buffer in AP.	Network
Tx Management	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.	• Network • Airtime Utilization
TxMulticastFrames	Number of multicast packets transmitted by the network.	Network
Tx Total	Sum of the Tx user and management traffic.	• Network • Airtime Utilization
Tx Traffic	Traffic transmitted for each corresponding dimension.	Switch Network
TxUnicastFrames	The number of data packets transmitted by the network that are not broadcast or multicast packets.	Network
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.	• Applications • Network • Airtime Utilization • Clients • Sessions
Uplink Wifi-Calling Bytes	Number of bytes being used only in the uplink communications of the wifi calling.	WiFi-Calling
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	• Applications • Network • Airtime Utilization • Clients • Sessions

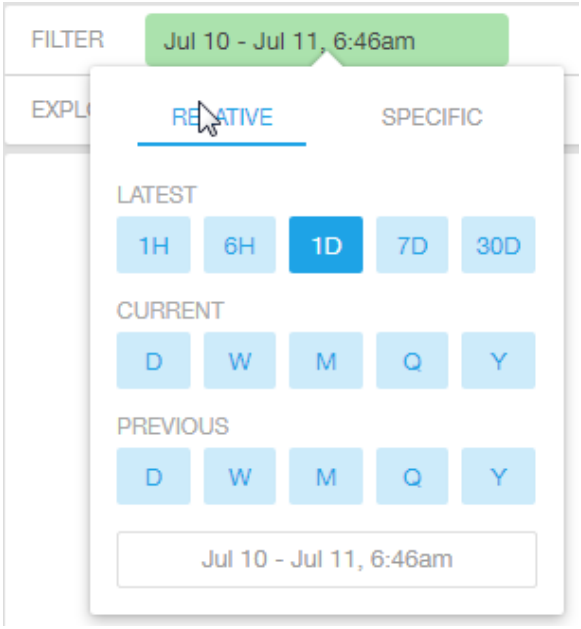
Filter

FIGURE 163 Filter



Number 3 in Data Cube Filters. 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.

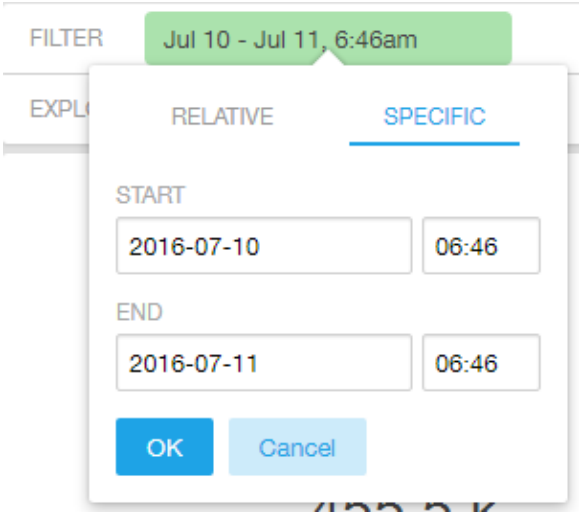
FIGURE 164 Time - Relative Settings



You can specify the following:

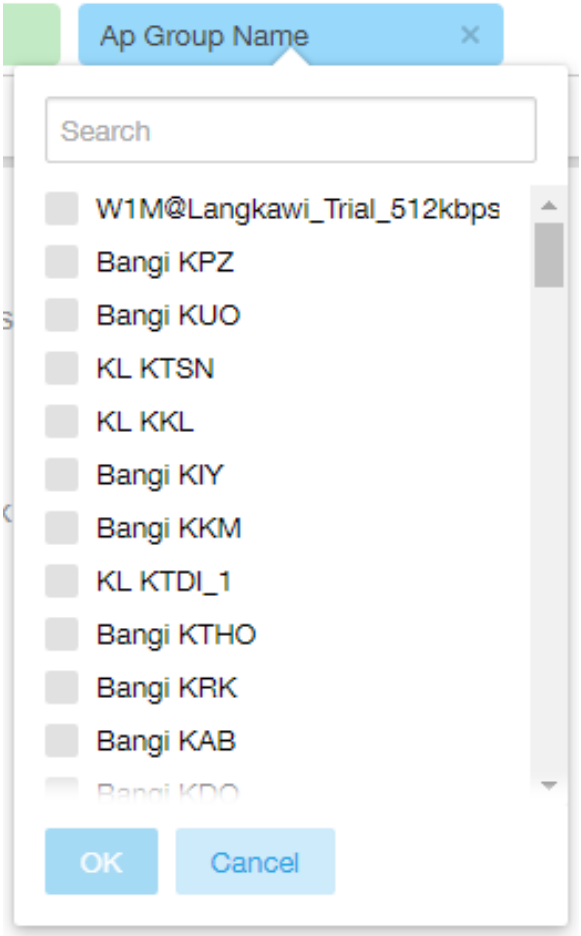
- Latest time of 1 hour, 6 hours, 1 day, 7 days, or 30 days.
- Current time of day, week, month, quarter, or year.
- Previous time of day, week, month, quarter, or year.

FIGURE 165 Time - Specific Settings



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

FIGURE 166 Dimension Options



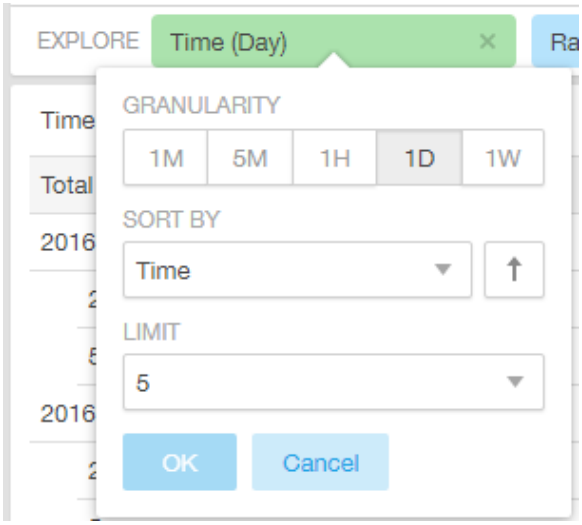
You can search the list of the dimension and choose specific entries. By default all the data that matches the dimension is listed.

Explore

FIGURE 167 Explore

Number 4 in Data Cube Filters. Enables visualization based on dimensions and time (data granularity).

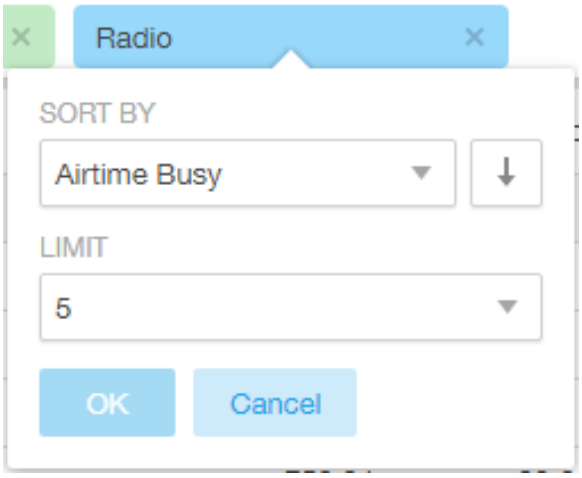
FIGURE 168 Explore Time



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 169 Sort Dimension by Measure



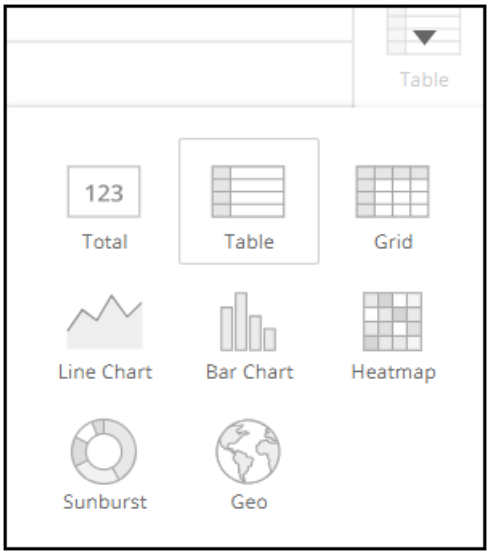
Use this filter to:

- 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 170 View Outputs



Number 5 in Data Cube Filters. Create outputs from visualization in the forms shown above. The default view is Totals.

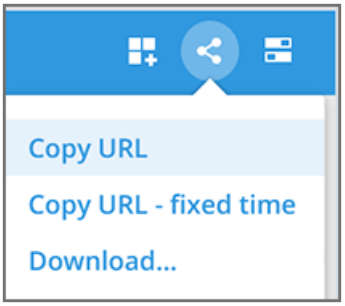
Add to Dashboard

FIGURE 171 Add to Dashboard

Number 6 in Data Cube Filters. Allows you to add a tile you are currently developing to an existing dashboard or to a dashboard that you want to create.

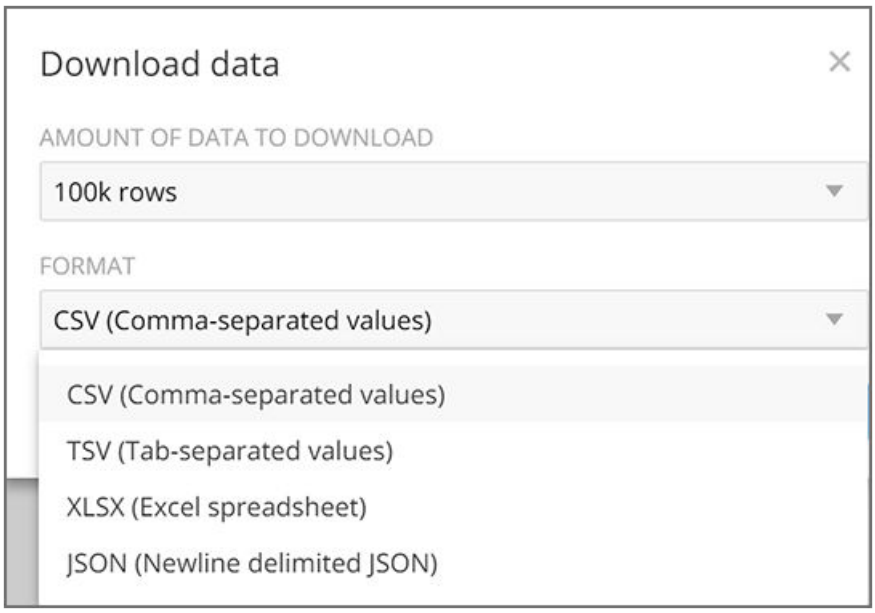
Share Link

FIGURE 172 Share Link



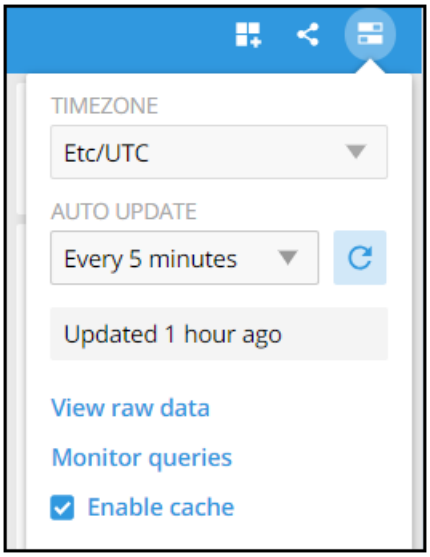
Number 7 in Data Cube Filters. You can share the URL, Export to various formats, View raw data, or download the information. The following figure shows the various formats you can choose for downloading data. You can also select the number of rows to download:

FIGURE 173 Selecting the Amount of Data to Download and the Desired Format



Options

FIGURE 174 Options



Number 8 in Data Cube Filters. Allows you to set the time zone as well as to perform the other functions shown.

Pinboard

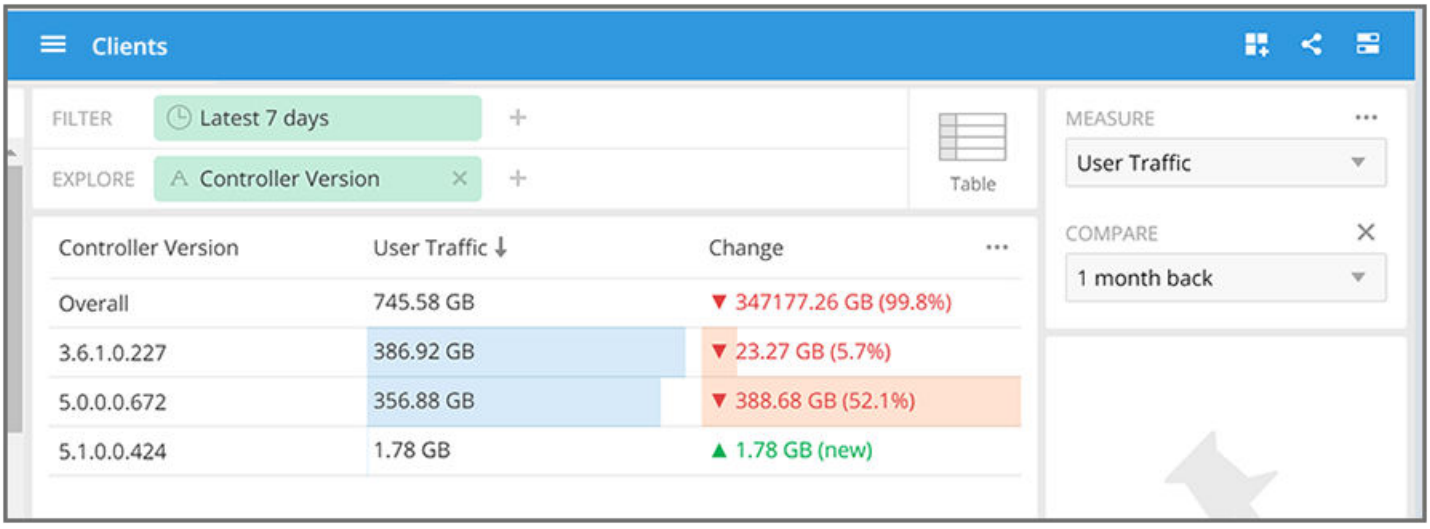
FIGURE 175 Pinboard

Number 9 in Data Cube Filters. Click or drag dimensions and pin them on the pinboard. Retain the dimensions for ready reference during visualization.

Time Compares

The Time Compares feature allows you to compare the current data of specified dimensions and measures to the same dimensions and measures during previous time periods. An example is shown in the following figure, where the Controller Version dimension has been chosen along with the User Traffic measure. The Change column indicates how much user traffic has gone up or down for the corresponding controller version over the specified period of time. The method of specifying time periods is described later.

FIGURE 176 Time Compares

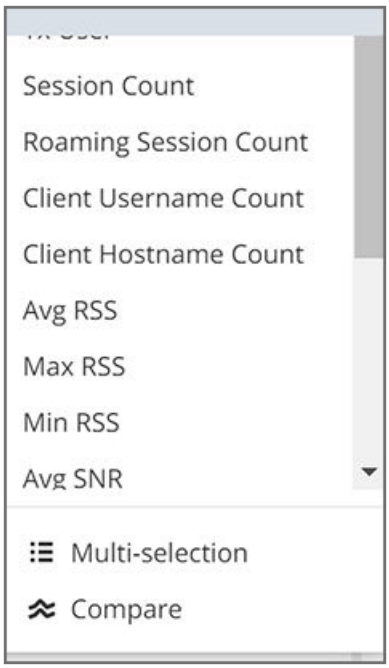


Creating a Data Comparison

The following procedure demonstrates how you can create a data comparison from scratch, using the figure above as an example:

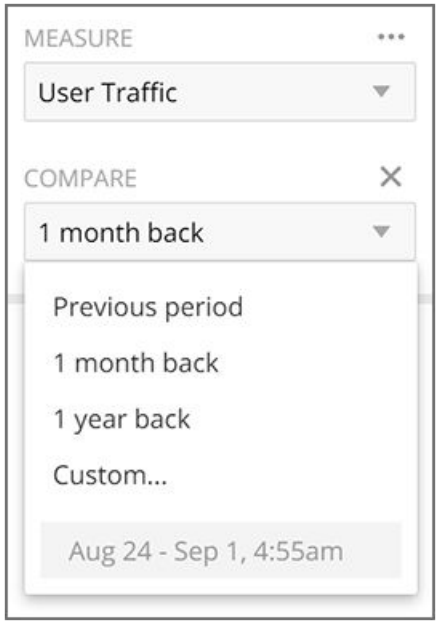
1. From Data Explorer, select one of the data cubes. (In the figure above, the Clients data cube is being used.)
2. Drag one or more dimensions into the center pane. In the above example, Controller Version is the only dimension.
3. From the Measure drop-down list, you can select one or more measure (use Multi-Selection for more than one). By default, User Traffic is already selected in this example.
4. From the Measure drop-down list, select Compare:

FIGURE 177 Selecting Compare from the Measure Drop-Down List



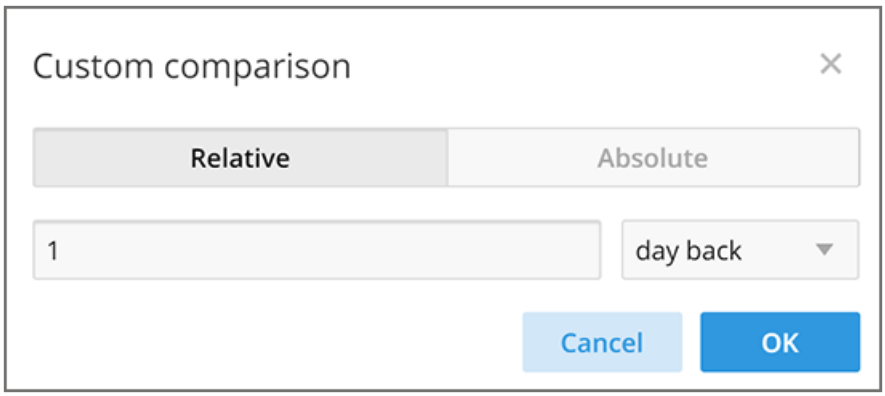
5. If you have already invoked the Compare feature, the previous time period you selected is automatically used, and a display such as the one in Figure 176 appears. However, if you have not yet used Compare, or if you want to change the current time-period, invoke the **Compare** drop-down list:

FIGURE 178 Using the Compare Drop-Down



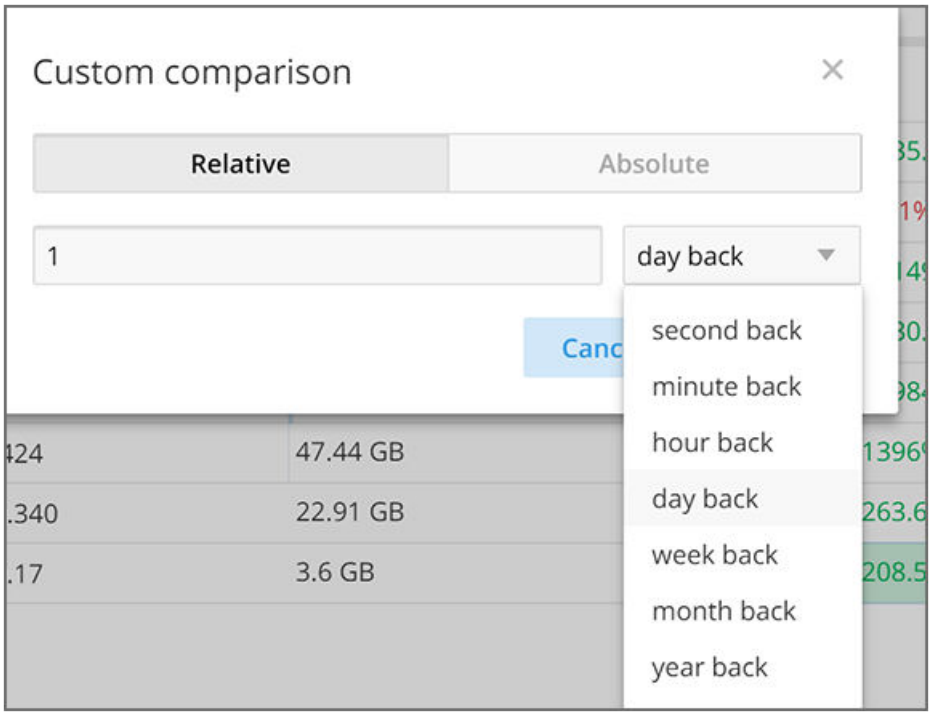
6. You can select one of the listed time periods or you can customize your choice.
7. (Optional) To customize your choice, click **Custom**. The following pop-up appears:

FIGURE 179 Custom Comparison Pop-Up Window



- If you want to use one of the selections from the **Relative** tab, click the drop-down arrow to view the following possibilities:

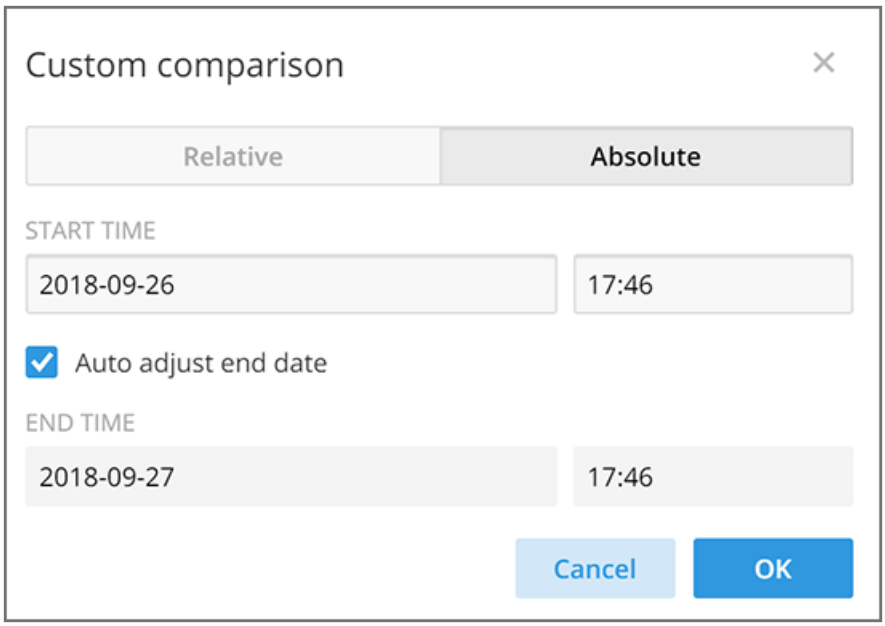
FIGURE 180 List of Choices from the Relative Drop-Down List



You can also change the Number 1 to a different number to correspond to your choice in the drop-down list. Click **OK** to have this selection take effect.

- If you want to create a custom time-period, click the **Absolute** Tab:

FIGURE 181 Custom Comparison - Absolute Tab

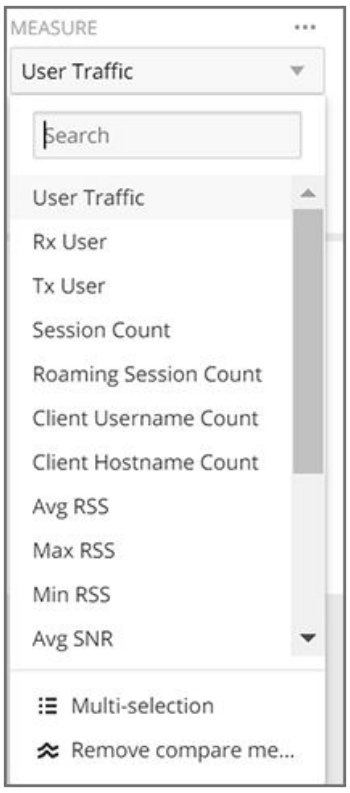


You can change the times as desired, or you can have the end date automatically adjusted to exactly one day later, then click **OK** for your choices to take effect.

Removing the Compare Feature

If you want to remove the Compare feature from the data display, go back to the Measure drop-down list, and select Remove Compare Measure, as shown in the following figure:

FIGURE 182 Removing the Compare Measure



Creating a Data Explorer Dashboard

You can create custom dashboards in the Data Explorer portion of SCI to focus on data you are interested in that encompasses any or all of the nine existing data cubes. These dashboards can be saved so that you can create reports for this unique data set whenever you wish.

The steps below guide you through an example of creating a dashboard in Data Explorer.

1. Click **+ Dashboard** in the upper-right portion of the Data Explorer page in SCI.

   The **New dashboard** screen is displayed:

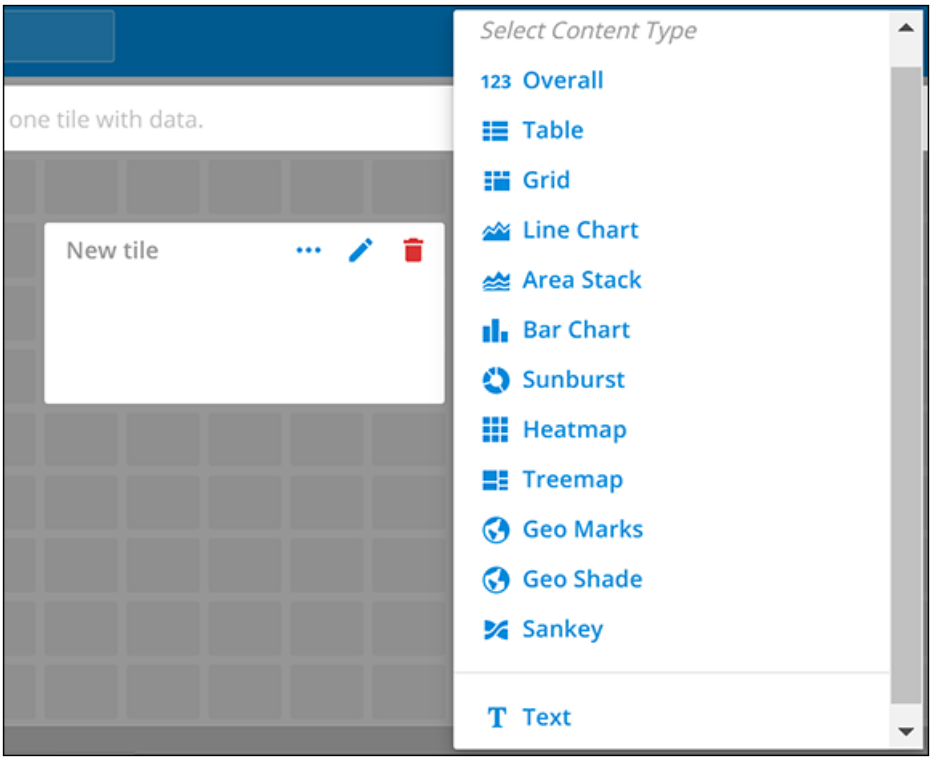
   FIGURE 183 New Dashboard screen

2. Highlight the "New dashboard" text and give the dashboard a name (**DemoDB** in this example):

   FIGURE 184 Naming the New Dashboard

3. Drag your cursor to highlight any number of small boxes on this screen. A popup configuration window appears, as shown in the following figure:

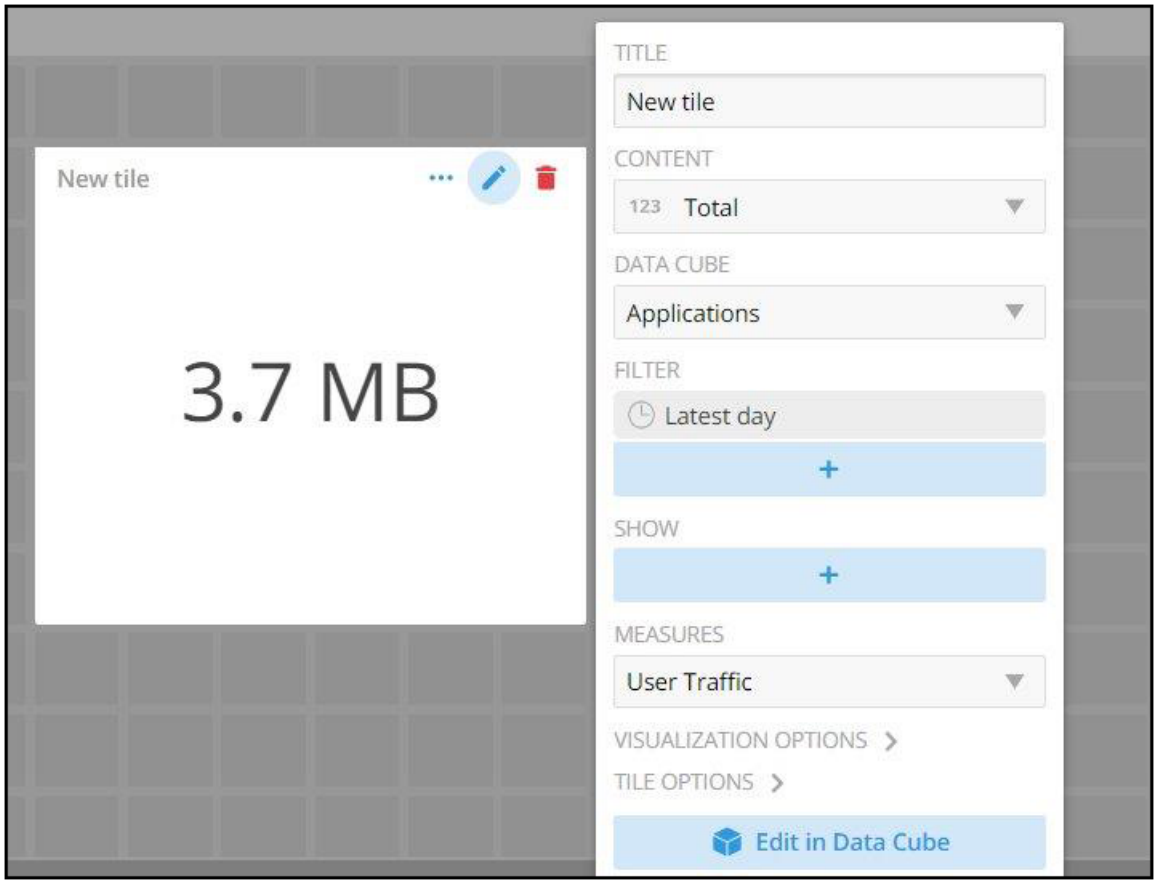
FIGURE 185 Adding a Tile to Your Dashboard by Using the Popup



4. Using the popup and the icons, continue to build your tile. For example, you could select the following the Content Type **123 Total**.

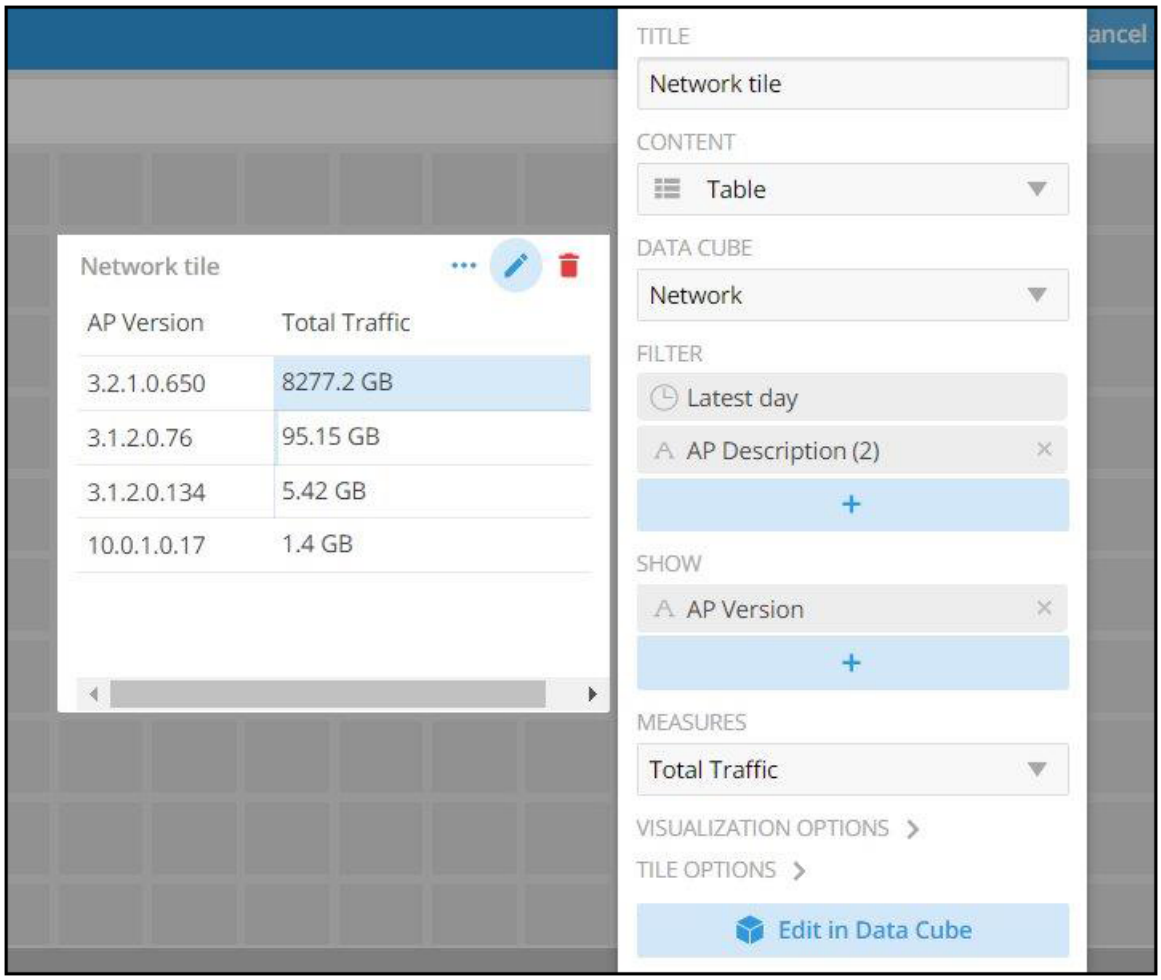
   The following popup appears:

FIGURE 186 New-Tile Popup After Selecting Content Type of 123 Total



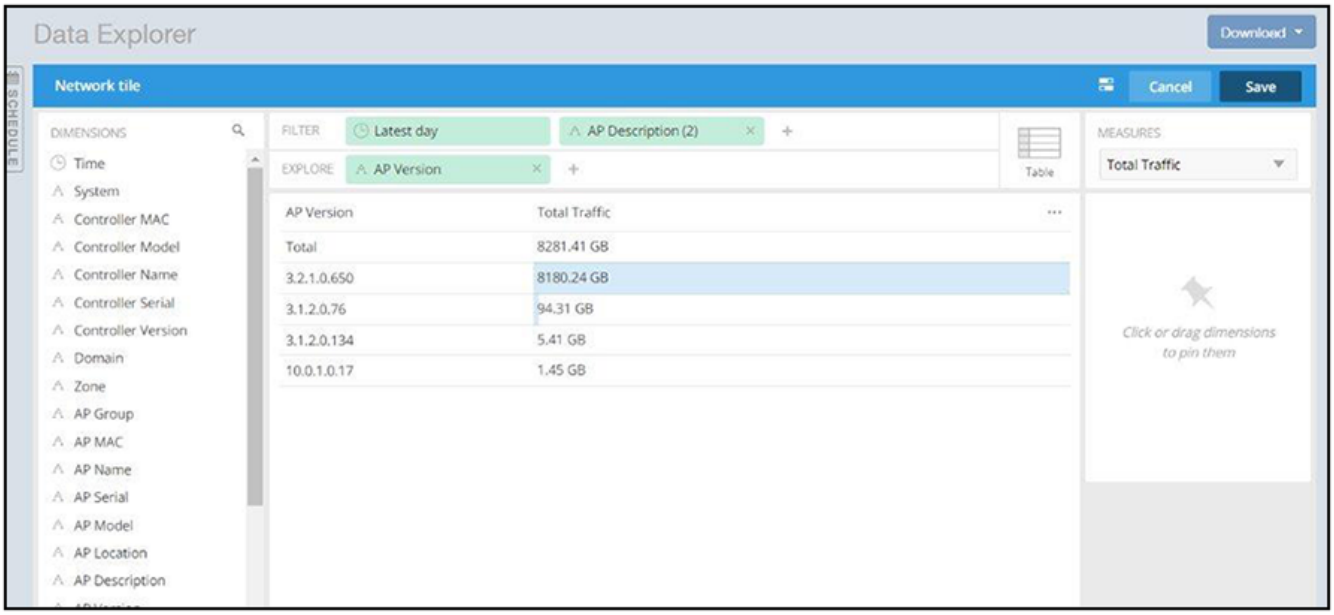
5. Next, you can customize this tile by making the selections you want, as shown in the following example:

FIGURE 187 New-Tile Popup After Doing Some Customization



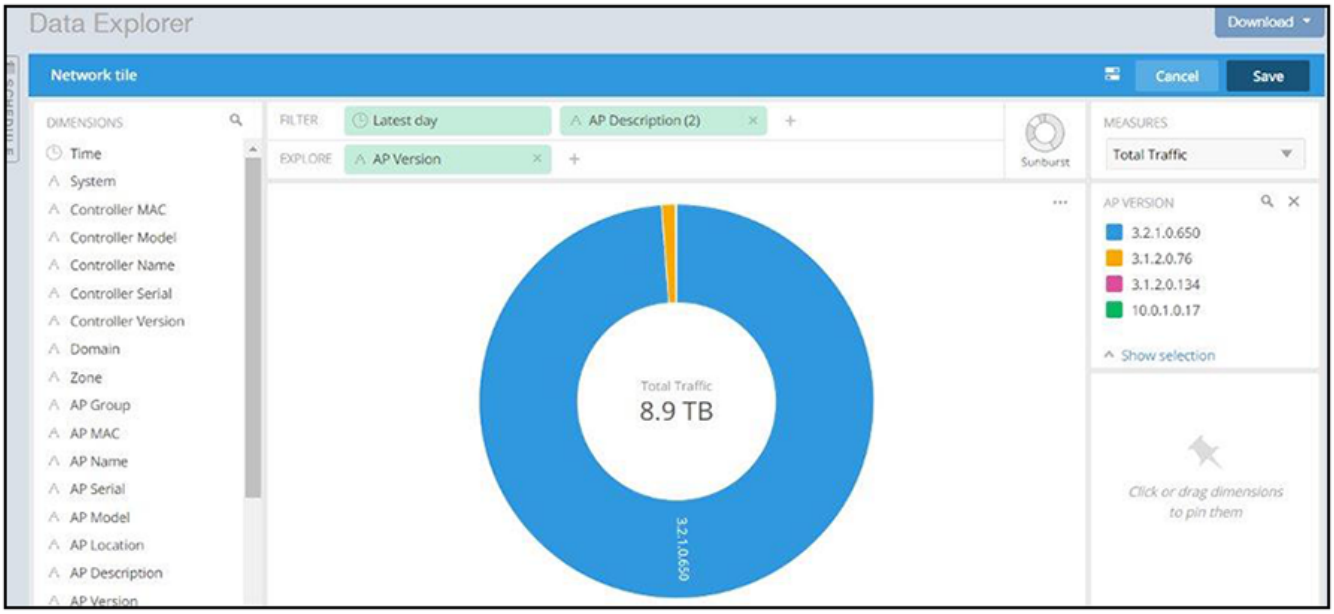
6. You could then click the option to Edit in Data Cube, which brings you to the following mode:

FIGURE 188 Editing New Tile in the Data Cube



7. You can continue to make edits to the tile. For example, you can hover over the Table icon and change the way the data is represented. The example below shows this data in a sunburst representation.

FIGURE 189 Sunburst Representation of Tile in Data Cube



8. When you are done with your selections for the first tile you are adding to your dashboard, click **Save** in the upper-right portion of the screen.
9. Using the steps demonstrated above, you can continue to add as many tiles as you want to your dashboard.

Actions You Can Perform on an Existing Dashboard

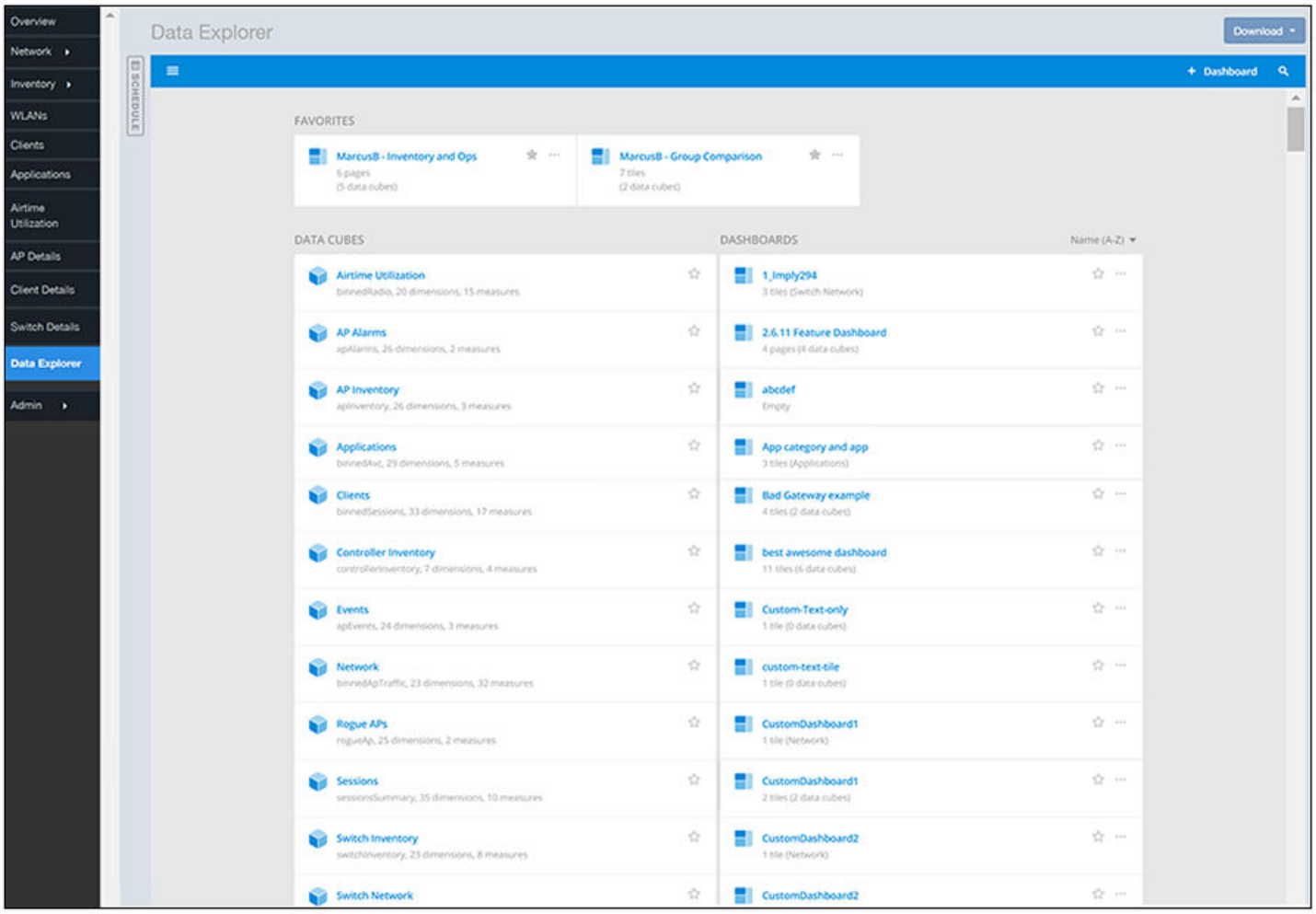
You can perform many actions on an existing dashboard, such as adding or removing tiles, editing existing tiles, deleting tiles and deleting the entire dashboard.

Opening a Dashboard

When you click the Data Explorer tab in SCI, you get a display of all the data cubes on the left side of the window, and a list of existing dashboard on the right side. To open a dashboard, do one of the following:

- Locate the dashboard you are interested in from the list on the right side of the screen, and click on it.
- Click the Options menu (the three horizontal-lines "hamburger" bar near the upper-left portion of the screen), then either use the Search area or locate the desired dashboard to open it.

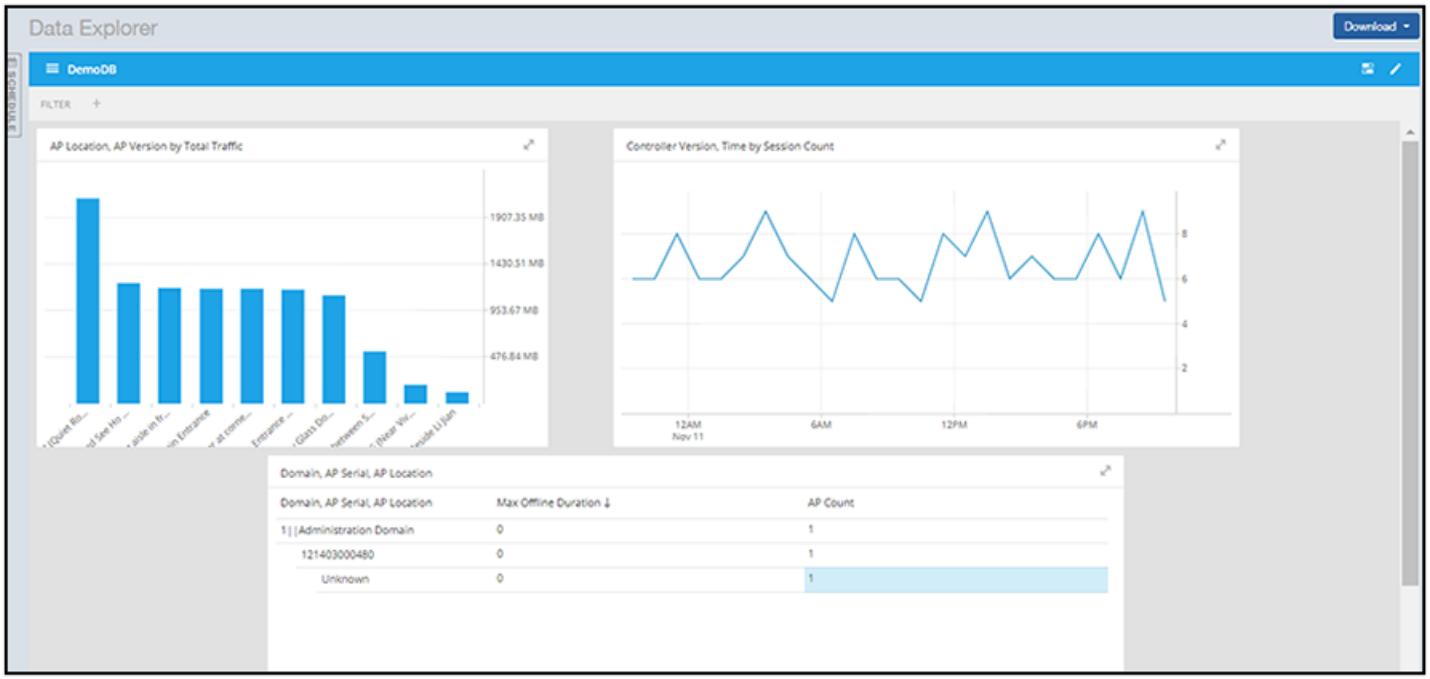
FIGURE 190 Existing Dashboards Listed on Main Data Explorer Window



Editing a Dashboard

To perform various editing functions on a dashboard, first open the dashboard you want, as in the example below:

FIGURE 191 Dashboard example with three tiles



In the upper-right portion of the screen, the following icons are displayed:

FIGURE 192 Dashboard-Editing buttons

The following table identifies each icon and the actions you can perform:

TABLE 8 Icons for Editing a Dashboard

Icon	Name of Icon	Actions You Can Perform
	Dashboard options	Clicking this icon allows you to change the following settings: • Time zone • Auto-update interval • Enabling/disabling cache
	Edit this dashboard	Clicking this icon allows you to do the following: • Rearrange or resize the tiles by using your cursor. • Make changes to specific tiles within the dashboard by using the icons

TABLE 8 Icons for Editing a Dashboard (continued)

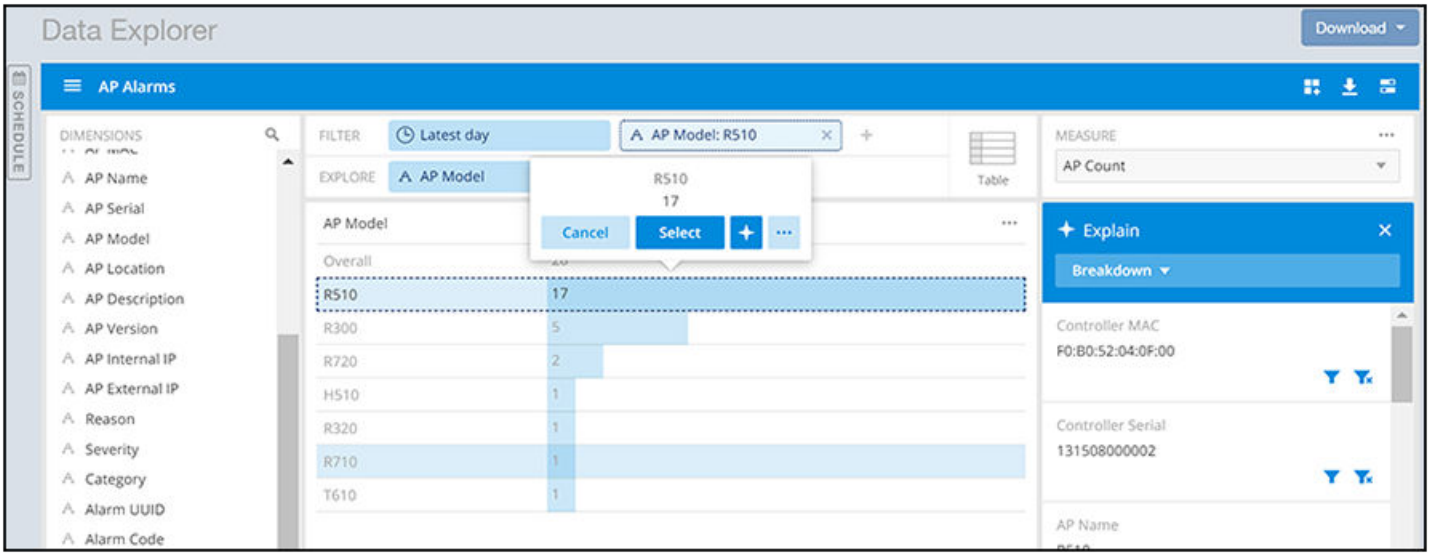
Icon	Name of Icon	Actions You Can Perform
		that appear for each tile:  – Use the three dots to duplicate the tile. – Use the Pencil icon to add or remove dimensions and measures for the tile as well as to change the representation of the data for the tile. – Use the garbage-can icon to delete the tile from the dashboard. • Click on the **Options** tab in the upper-right portion of the screen: This invokes another screen containing general information about the dashboard. From there, there are two tabs - one called "General" and one called "Sharing." In the **General** tab, you can do the following: – Rename the dashboard – Add or modify a description of the dashboard – Change the color theme – Decide whether to enforce the time filter – Delete the dashboard. In the **Sharing** tab, you can set who you want to view and edit the dashboard. **NOTE** Remember to click **Save** to save your changes.

Using the Explain Feature

The Explain feature allows you to select a portion of data and receive automated explanations of what is contributing to that data.

In the following figure, the row of data called "R510" is selected. When you select a portion of data, a popup appears above the data selected. If you then click the Star icon in that popup, the Explain feature is invoked, as shown in the right pane below.

FIGURE 193 Explain Feature Invoked



The Explain feature includes three different algorithms:

- Breakdown (shown in the example figure above): Shown when you select a singe slice of data. It will find the contributing factors to the selected slice.
- Change Compare: Shown when you select a comparison, Explain finds the contributing factors in the current value versus the comparison.
- Trend Analysis: Shown when you select a trend such as a spike, dip, rise, or fall. Explain automatically detects the trend and then finds the contributing factors.

Applying Filters At the Dashboard Level

Once you have created a custom dashboard, you can apply global filters, default filters, global measures and global comparisons at the dashboard level, meaning that these selections would be applied to all the tiles in your dashboard at once.

To accomplish this, click the pencil icon in the upper right of the dashboard (not the individual pencil icons for each time). Then, make the desired selections. In the example below, the default filter is Controller Serial, and the Global Measures and Global Comparisons are turned on by clicking their on/off switches so that they move to the right. After you select the desired settings, click **Save**.

FIGURE 194 Applying Filters to a Dashboard

Exporting Raw Data Using the SCI Virtual Machine Command Line Interface

You can use the SCI VM command line interface to export larger amounts of raw data than can be obtained with the user interface. This data can come from any data cubes, dimensions, filters, etc. that you want.

Follow these steps to export the raw data you are interested in.

> **NOTE**
> It is recommended to never run more than one export command at a time because data could accidentally be overwritten.

1. Log in to your SCI VM.
2. Navigate to the following directory:

   ```
   /storage/ rsa-api/ export /configs
   ```

3. Locate the file called config-template.yml
4. Open the file using a text editor.

   The file contains instructions on what to do. You will need to either comment out certain lines or un-comment certain lines in the file, as directed, and will need to fill in the desired values of data cubes, dimensions, and other items as directed.
5. Once you have made the changes in the config-template.yml file, be sure to save it under a different name that is meaningful to you, while leaving the original config-template.yml file in tact for future use.

   > **NOTE**
   > If you are using SFTP, place the key file in the following directory:
   >
   > ```
   > /storage/rsa-api/ export /keys
   > ```

6. Run the following command to export the raw data:

```
sudo docker exec -it rsa-api yarn export-raw <config-file-name>
```

where <config-file-name> is the name of your customized .yml file.

The raw data should be returned to the command line interface. Refer to the following topics for more information:

- Template File for Exporting Raw Data on page 158
- Raw Data Output for Dimensions and Measures on page 159

Template File for Exporting Raw Data

This is the example config-template.yml that you can copy and edit according to the desired output.

```
#
# This is an example configuration file in YAML format. Lines starting with '#' are comments.
# Refer to http://www.yaml.org for detailed specification. Please change values accordingly.
#
# All attributes are required unless specified as 'Optional'.
#
# Version: 1.0
# Date:    17 Oct 2017
#
source:
  # The data source name (case-sensitive). Refer to detailed API reference guide regarding how to
  # retrieve the actual value of data source name. Alternatively you may get it from URL
  # while accessing a particular Data cube via Data Explorer.
  #
  # Example: access Data cube 'Clients' by accessing URL (replace {HOST} with your SCI master node
  # IP address, authentication may be required):
  #
  #   https://{HOST}/report/dataExplorer#/d/binnedSessions/Clients
  #
  # The 'dataSource' of 'Clients' is 'binnedSessions' in this example
  dataSource: 'foo'

  # ISO 8601 timestamp (e.g, yyyy-MM-ddTHH:mmZ)
  #
  # Examples:
  #  (1) '1970-01-01T00:00Z' for UTC
  #  (2) '2017-01-01T00:00+0300' for UTC +3
  #  (3) '2017-01-01T00:00-0800' for UTC -8
  #  (4) '2017-01-01T00:00+0530' for UTC +5:30
  #
  # Make sure that 'startTime' is before 'endTime'.
  startTime: '2017-01-01T00:00:00Z'
  endTime:   '2017-02-01T00:00:00Z'

  # Optional (comment out if it does not apply)
  #
  # In the format of '<key>': [a list of values], e.g., 'system': ['foo', 'bar']
  #
  # The key name refers to the actual case-sensitive value (not display name) of a particular
  # dimension of a data cube. Refer to detailed API reference guide regarding how to retrieve the values of
  # dimensions. Alternatively, you may export a few rows (i.e., 1 minute) without filter and check
  # out the title of the CSV file for all filter dimension names
  #
  # For a particular filter, results match any of the values specified in the list for that specific
  # key would be returned. If multiple filters specified, only results match all of them would be
  # returned.
  #
  # Example:
  #
  # (1) Get all rows for 'system' equals to 'foo' or 'bar'
  #
  # filters:
  #   'system': ['foo', 'bar']
```

```
    #
    # (2) Get all rows for 'system' equals to 'foo', AND 'ctrlMac' equals '99:F6:66:2A:B2:80'
    #
    # filters:
    #   'system': ['foo']
    #   'ctrlMac': ['99:F6:66:2A:B2:80']
    #
    # Uncomment and change the following lines to apply filters
    # filters:
    #  '<key1>': ['value1', 'value2']
    #  '<key2>': ['value1', 'value2']

  destination:
    # 'ftp' or 'sftp' only (case-sensitive)
    protocol: 'ftp'

    # The hostname or IP address of the FTP server
    host: 'localhost'

    # FTP login username
    # For 'sftp', it refers to the SSH login username
    user: 'ftp-username'

    # Required by 'ftp' protocol only
    # FTP server login password
    password: 'ftp-password'

    # Required by 'sftp' protocol only
    # File name only of the SSH public key. The file must exist in directory
    # '/storage/rsa-api/export/keys' on 'SCI' master host
    #
    # privateKey:  'changeme.pem'

    # Apply to 'sftp' protocol only
    # Passphrase for 'privateKey' if any, leave it with empty value '' or remove it otherwise
    #
    # passphrase: 'changeme'

    # The prefix for exported file names. If it contains path of sub-directories (e.g.,
    # 'path/to/dir/example'), those directories (i.e., 'path/to/dir') must exist on FTP server
    # beforehand
    prefix: 'example'
```

Raw Data Output for Dimensions and Measures

The output you generate from raw data contains dimensions and measurements for the various data cubes.

Refer to the following tables:

- Table 9
- Table 10

The following table lists and describes all the dimensions that can be displayed in the raw-data output you generate.

TABLE 9 Dimensions

Dimension name	Description	Supported Data Sources
alarmCode	Unique string assigned by the controller to an alarm.	• AP Alarms
alarmState	Indicates if the alarm is outstanding.	• AP Alarms
alarmType	Description for access point and controller alarms.	• AP Alarms
alarmUUID	Unique string assigned by the controller to an alarm.	• AP Alarms

TABLE 9 Dimensions (continued)

Dimension name	Description	Supported Data Sources
apDescription	Description string of the access point that is configured in the controller.	• Applications • Network traffic • Airtime Utilization • Clients • Sessions • AP Events • AP Inventory • AP Alarms
apExtIp	External IP address of the access point.	• Applications • Network traffic • Airtime Utilization • Clients • Sessions • AP Events • AP Inventory • AP Alarms
apFwVersion	Firmware version number of the access point.	• Applications • Network traffic • Airtime Utilization • Clients • Sessions • AP Events • AP Inventory • AP Alarms
apGroupName	AP Groups configured in the controller.	• Applications • Network traffic • Airtime Utilization • Clients • Sessions • AP Events • AP Inventory • AP Alarms
apIp	Internal IP address of the access point.	• Applications • Network traffic • Airtime Utilization • Clients • Sessions • AP Events • AP Inventory • AP Alarms
apLocation	Location string of the access point that is configured in the controller.	• Applications • Network traffic • Airtime Utilization • Clients • Sessions

TABLE 9 Dimensions (continued)

Dimension name	Description	Supported Data Sources
		• AP Events • AP Inventory • AP Alarms
apMac	Base MAC address of the access point.	• Applications • Network traffic • Airtime Utilization • Clients • Sessions • AP Events • AP Inventory • AP Alarms
apModel	Description of the access point model type.	• Applications • Network traffic • Airtime Utilization • Clients • Sessions • AP Events • AP Inventory • AP Alarms
apName	Name of the access point configured in the controller.	• Applications • Network traffic • Airtime Utilization • Clients • Sessions • AP Events • AP Inventory • AP Alarms
app	Name of the application accessed by the WiFi client.	• Applications
apSerial	Serial number of the access point.	• Applications • Network traffic • Airtime Utilization • Clients • Sessions • AP Events • AP Inventory • AP Alarms
AuthMethod	The WiFi encryption and authentication method adopted.	• Clients • Sessions
category	Category for access point and controller alarms or events.	• AP Events • AP Alarms
channel	The WiFi channel number used.	• Network • Clients • Sessions

TABLE 9 Dimensions (continued)

Dimension name	Description	Supported Data Sources
clientIp	Internal IP address of the WiFi client.	• Clients • Sessions
clientMac	MAC address of the WiFi client.	• Applications • Clients • Sessions
connectionStatus	Connection status of the access point: Online, Offline, Discovery, Provisioned.	• AP Inventory
ctrlFwVersion	Firmware version number of the controller.	• Applications • Network traffic • Airtime Utilization • Clients • Sessions • AP Events • AP Inventory • AP Alarms • Controller Inventory
ctrlMac	MAC address of the controller.	• Applications • Network traffic • Airtime Utilization • Clients • Sessions • AP Events • AP Inventory • AP Alarms • Controller Inventory
ctrlModel	Description of the model of the controller.	• Applications • Network traffic • Airtime Utilization • Clients • Sessions • AP Events • AP Inventory • AP Alarms • Controller Inventory
ctrlName	Name of the configured controller.	• Applications • Network traffic • Airtime Utilization • Clients • Sessions • AP Events • AP Inventory • AP Alarms • Controller Inventory
ctrlSerial	Serial number of the controller.	• Applications • Network traffic

TABLE 9 Dimensions (continued)

Dimension name	Description	Supported Data Sources
		• Airtime Utilization • Clients • Sessions • AP Events • AP Inventory • AP Alarms • Controller Inventory
disconnectTime	Disconnect time of a session.	• Sessions
domains	Domains configured in the controller.	• Applications • Network traffic • Airtime Utilization • Clients • Sessions • AP Events • AP Inventory • AP Alarms
eventCode	Code number for access point and controller events.	• AP Events
eventType	Description for access point and controller events.	• AP Events
firstConnection	First connection time of a session.	• Sessions
hostname	Hostname configured in the WiFi client.	• Clients • Sessions
lastStatusChangeTime	Date and time of the last change in Connection Status of the access point.	• AP Inventory
manufacturer	Manufacturer information for the WiFi client.	• Clients • Sessions
memoryUtilization	Percentage of memory being used by the controller.	• Controller Inventory
osType	OS information for the WiFi client.	• Clients • Sessions
port	Port of the application accessed by the WiFi client.	• Applications
radio	Indicates the radio frequency band: 2.4GHz or 5GHz.	• Applications • Network traffic • Airtime Utilization • Clients • Sessions
radioMode	Possible values are: ac, n, a, g, b, or "unknown" (if SmartZone version is prior to 3.6).	• Clients • Sessions
reason	Additional description for access point and controller alarms or events, if available.	• AP Events • AP Alarms
roamingSessionId	A unique session ID that is created when a client roams to multiple APs within a short-	• Clients • Sessions

TABLE 9 Dimensions (continued)

Dimension name	Description	Supported Data Sources
	enough time span that the client is connected to these APs simultaneously.	
sessionId	ID string assigned to a session.	• Clients • Sessions
sessionType	Indicates whether the session is authorized or unauthorized.	• Clients • Sessions
severity	Severity level for access point and controller alarms or events.	• AP Events • AP Alarms
ssid	Service set identifier (SSID) configured in the controller.	• Applications • Network traffic • Clients • Sessions
system	System ID of the controller or the SmartZone Cluster.	• Applications • Network traffic • Airtime Utilization • Clients • Sessions • AP Events • AP Inventory • AP Alarms • Controller Inventory
timestamp	Timestamps are represented in UTC timezone format.	• Airtime Utilization • Network traffic • Applications • AP Events • AP Alarms • AP Inventory • Clients • Controller Inventory • Sessions
username	Username of the user account associated with the WiFi client.	• Clients • Sessions
zoneName	Zones configured in the controller.	• Applications • Network traffic • Airtime Utilization • Clients • Sessions • AP Events • AP Inventory • AP Alarms

The following table lists and describes all the measures that can be displayed in the raw-data output you generate.

TABLE 10 Measures

Measure name	Description	Supported Data Sources
airtimeBusy	Average of the airtime busy metric in percentage form.	• Airtime Utilization
airtimeIdle	Average of the airtime idle metric in percentage form.	• Airtime Utilization
airtimeRx	Average of the airtime receive metric in percentage form.	• Airtime Utilization
airtimeTx	Average of the airtime transmit metric in percentage form.	• Airtime Utilization
airtimeUtilization	Average of the total airtime utilization in percentage form.	• Airtime Utilization
Avg 2.4 GHz Capacity	Average 2.4 GHz capacity over a specified period of time, measured in Mbps.	Network
Avg 5 GHz Capacity	Average 5 GHz capacity over a specified period of time, measured in Mbps.	Network
Avg Capacity Per Ap	Average capacity per access point over a specified period of time, measured in Mbps.	Network
count	A count for each event and alarm type.	• AP Events • AP Alarms
cpuUtilization	Average CPU utilization for the controller in percentage form.	• Controller Inventory
disconnectDuration	Indicated how many milliseconds an AP has been disconnected.	• AP Inventory
diskFree	Average free disk space, in bytes, for the controller.	• Controller Inventory
diskUtilization	Average disk utilization, in percentage, for the controller.	• Controller Inventory
failedAssoc	Number of failed associations.	Network
diskTotal	Total amount of disk space, in bytes, on the controller.	• Controller Inventory
firstRss	First received signal strength of the access point in dBm.	• Clients
firstSnr	First signal to noise ratio at the access point in dB.	• Clients
lastRss	Last received signal strength of the access point in dBm.	• Clients
lastSnr	Last signal to noise ratio at the access point in dB.	• Clients
licenseCount	Total number of licenses available on the controller?	• Controller Inventory
licenseUtilization	Percentage of available licenses currently being used on the controller.	• Controller Inventory
maxRss	Maximum received signal strength of the access point in dBm.	• Clients
maxSnr	Maximum signal to noise ratio at the access point in dB.	• Clients
memoryUtilization	Average memory utilization for the controller, given in percentage form.	• Controller Inventory

TABLE 10 Measures (continued)

Measure name	Description	Supported Data Sources
mgmtRxBytes	Traffic volume, which is received from AP (Access Point) in IEEE 802.11 control and management frames. This includes all unicast, multicast and broadcast traffic.	• Network traffic • Airtime Utilization
mgmtTraffic	Traffic volume, which is transmitted and received in IEEE 802.11 control and management frames. This includes all unicast, multicast and broadcast traffic.	• Network traffic • Airtime Utilization
mgmtTxBytes	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.	• Network traffic • Airtime Utilization
minRss	Minimum received signal strength of the access point in dBm.	• Clients
minSnr	Minimum signal to noise ratio at the access point in dB.	• Clients
noiseFloor	Average noise floor power in dBm.	• Clients
newAssoc	Number of successful associations.	Network
rxFail_r	Receive packets which failed to be processed due to insufficient buffer in AP.	Network
rxBytes	Sum of userRxBytes and mgmtRxBytes.	• Network traffic • Airtime Utilization • Applications • Clients • Sessions
Session Count	Number of unique sessions.	• Clients • Sessions
sessionDuration	The length of a session, given in milliseconds.	• Sessions
throughputEstimate	Average throughput estimate for the WiFi client.	• Clients
traffic	Sum of the user and management traffic.	• Network traffic • Airtime Utilization • Applications • Clients • Session
txBcastFrames_r	Number of broadcast packets transmitted by the network.	Network
txDropDataFrames_r	Tx data frames that are dropped by the message queue.	Network
txFail_r	Transmit packets which failed to be processed due to insufficient buffer in AP.	Network
txBytes	Sum of userTxBytes and mgmtTxBytes.	• Network traffic • Airtime Utilization • Applications • Clients • Sessions

TABLE 10 Measures (continued)

Measure name	Description	Supported Data Sources
txMcastFrames_r	Number of multicast packets transmitted by the network.	Network
txUcastFrames_r	The number of data packets transmitted by the network that are not broadcast or multicast packets.	Network
userRxBytes	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.	• Applications • Network traffic • Airtime Utilization • Clients • Sessions
userTraffic	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	• Applications • Network traffic • Airtime Utilization • Clients • Sessions
userTxBytes	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.	• Applications • Network traffic • Airtime Utilization • Clients • Sessions

PII Hashing

- Hashing Data-Source Attributes....169
- Template File for PII Hashing....169

Hashing Data-Source Attributes

You can use the SCI VM command line interface to hash various data-source attributes.

Follow these steps to hash the attributes you are interested in.

1. Log in to your SCI VM.
2. Navigate to the following directory:

   ```
   /storage/rsa-api/hashing/configs
   ```

3. Locate the file called config.template.yml
4. Open the file using a text editor.

   The file contains instructions on what to do. You will need to either comment out certain lines or un-comment certain lines in the file, as directed, and specify the desired data-source attributes that you want hashed.
5. Once you have made the changes in the config.template.yml file, be sure to save it under a different name that is meaningful to you, while leaving the original config.template.yml file in tact for future use.
6. Run the following command to perform hashing on the desired attributes:

   ```
   sudo docker exec -it rsa-api yarn configure-hashing <config-file-name>
   ```

   where <config-file-name> is the name of your customized .yml file.

Template File for PII Hashing

Use the example config.template.yml file to copy and edit according to the desired attributes to hash.

```
# This is an example configuration file for PII data hashing in YAML format.
# Lines starting with '#' are comments. Refer to http://www.yaml.org for detailed specification.
# Please change values accordingly. It expects content in the following format:
#
# <datasource>: [<attribute>]
#
# where <datasource> refers to the data source name and <attribute> refers to the field to be hashed.
# Multiple attributes are separated by comma. Note that only data sources with `clientMac` dimension
# are hashable.
#
# !!! WARNING !!!
#
# Values of attributes given in this configuration file will be hashed to meaningless strings and
# they are NOT reversible. Resetting hash for those attributes only affect future values.
#
# Version: 1.0
# Date:    18 Jan 2018
#
# Example:
example: ['attr1', 'attr2', 'attr3']

# Hash `clientMac`, `hostname`, `username` and `clientIp` for data source `binnedSessions`
```

```
# Uncomment to apply changes. You may add or remove one or more attributes.
#binnedSessions: ['clientMac', 'hostname', 'username', 'clientIp']

# Hash `clientMac` for data source `binnedAvc`
# Uncomment to apply changes. You may add or remove one or more attributes.
#binnedAvc: ['clientMac']

# Hash `clientMac`, `hostname`, `username` and `clientIp` for data source `sessionsSummary`
# Uncomment to apply changes. You may add or remove one or more attributes.
#sessionsSummary: ['clientMac', 'hostname', 'username', 'clientIp']
```

Admin Dashboard

- Admin Console..... 171
- Status and Update..... 171
- Diagnostics..... 174
- Settings..... 176
- License..... 203
- PCI Profiles..... 204
- Users and Roles..... 208

Admin Console

The Admin pages provide options for configuring SCI's administrative settings, performing diagnostics and system updates, and defining user roles and creating resource groups.

The Admin section is divided into the following pages:

- Status and Updates
- Diagnostics
- Settings
- License
- PCI
- Users & Roles

NOTE
For information on SCI installation, refer to the SCI Installation Guide, available from `support.ruckuswireless.com`

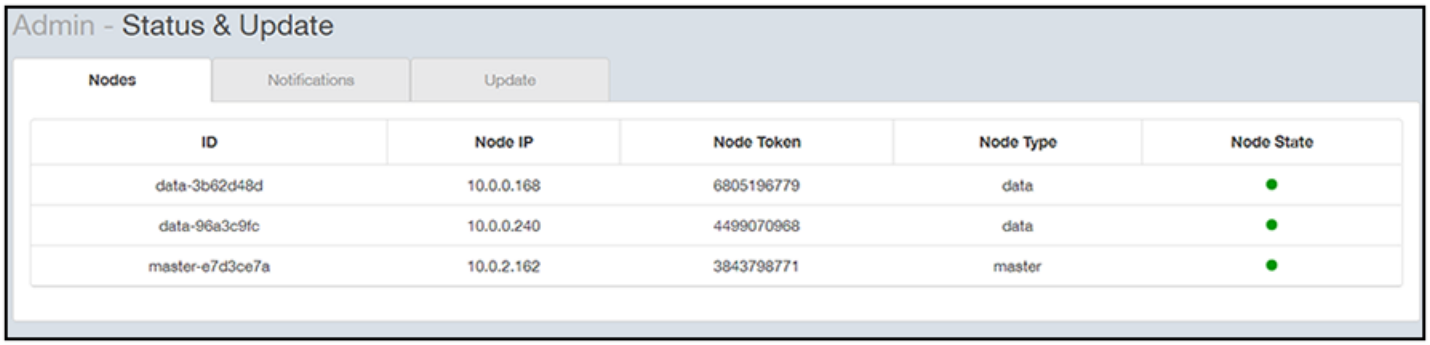
Status and Update

The Status & Update page lists the active SCI nodes, alerts you to any important notifications, and displays the current firmware version.

Nodes

The following illustration shows an example of the Status and Update screen when the **Node** tab is selected.

FIGURE 195 Status and Update Screen with Node Tab selected



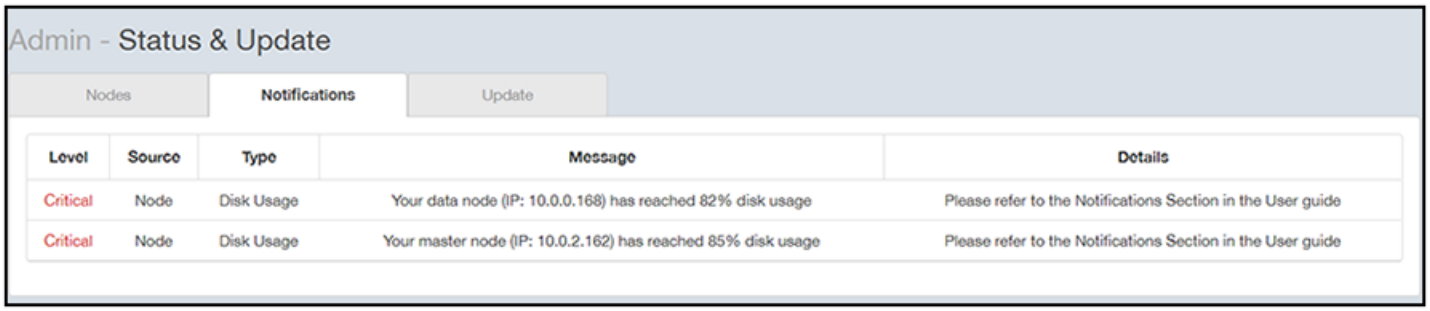
The Nodes section lists the active SCI nodes, and includes the following information on each node:

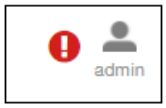
- **Node ID:** The ID number of the node
- **Node IP:** The IP address of the node
- **Node Token:** The Token number or SSH password of the node. This token number is required for a node to connect to another node. The number is available on the UI so that it is a ready reference to the user who wants to connect to a specific node.
- **Node Type:** The type of node. There are two types of nodes, namely master and data nodes. One or more data nodes are required as the system scales and grows larger.
- **Node State:** The node state is green when in use and red when disconnected and not in use.

Notifications

The following illustration shows an example of the Status and Update screen when the **Notifications** tab is selected.

FIGURE 196 Status and Update Screen with Notifications Tab selected



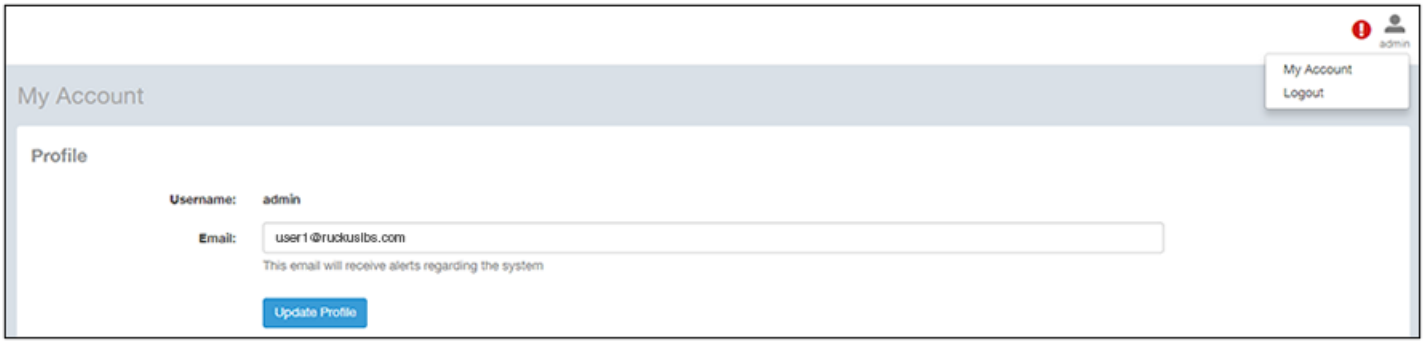
If any notifications are present in this section of the SCI UI, a red notifications icon 

appears in the upper-right portion of the SCI user interface next to the admin icon. (This icon disappears once the issue has been handled.)

NOTE
The only current "level" of notification at this time is *critical*, as shown in the screen above.

In addition, an email notification is sent out every 15 minutes to the email address provided in the **My Account screen > Profile** section of the SCI UI, which you open by clicking on the admin icon in the upper right of the SCI user interface, as shown in the following figure.

FIGURE 197 Email Address to Receive Notifications



To receive notifications, you must also be sure that you have configured the outgoing mail server (SMTP) in the Admin dashboard > Settings section.

The following table lists examples of the two types of notifications that you could receive, along with possible solutions.

TABLE 11 Notifications and Possible Corrective Actions

Notification	Description	Action(s) to Try
Your master node (IP: 10.x.y.1) has reached 83 percent disk usage.	This notification appears whenever one of the SCI nodes has a disk usage of 80% or more. This notification indicates that you could potentially run out of disk space on SCI.	• Reduce the data retention period by going to the **Admin > Settings** screen, "Data Retention" section. For more information, refer to the Settings on page 176 section, "Data Retention" portion. • Copy your data to a new SCI with more disk space. If you need assistance, contact Ruckus support. • Add new data nodes. Because the Hadoop Distributed File System (HDFS) replication factor is two, you need at least two data nodes in your SCI cluster.
Your Spark cluster (Spark master IP: 10.x.y.2) was unable to accept a job submission.	This notification appears when an ETL Spark job is taking a long time, and SCI is unable to submit the next job. This could mean that SCI is unable to ingest data from the controllers and that SCI is unable to continue to collect data.	Go to **Admin > Diagnostics > Spark Master.** Search for "Running Applications." If this section shows more than one job running, check again in a half hour. If there is still more than one job shown running in the "Running Application" section, contact Ruckus customer support to ensure that you are not losing data.

Update

The following illustration shows an example of the Status and Update screen when the **Update** tab is selected.

FIGURE 198 Status and Update Screen with Update Tab selected

The Update section contains the details of the current version of SCI that you are running and the latest version of SCI that is available (if any).

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`
- **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`

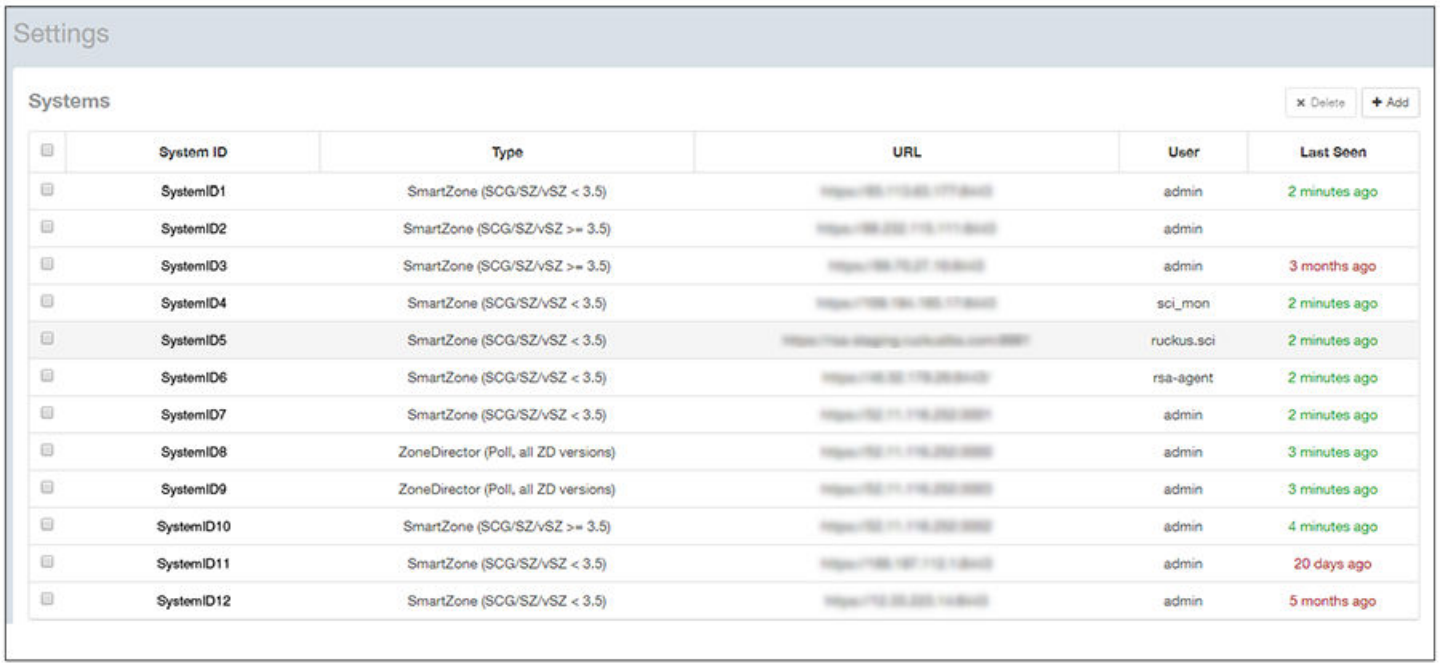
FIGURE 199 Diagnostics

Settings

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

Controller Settings

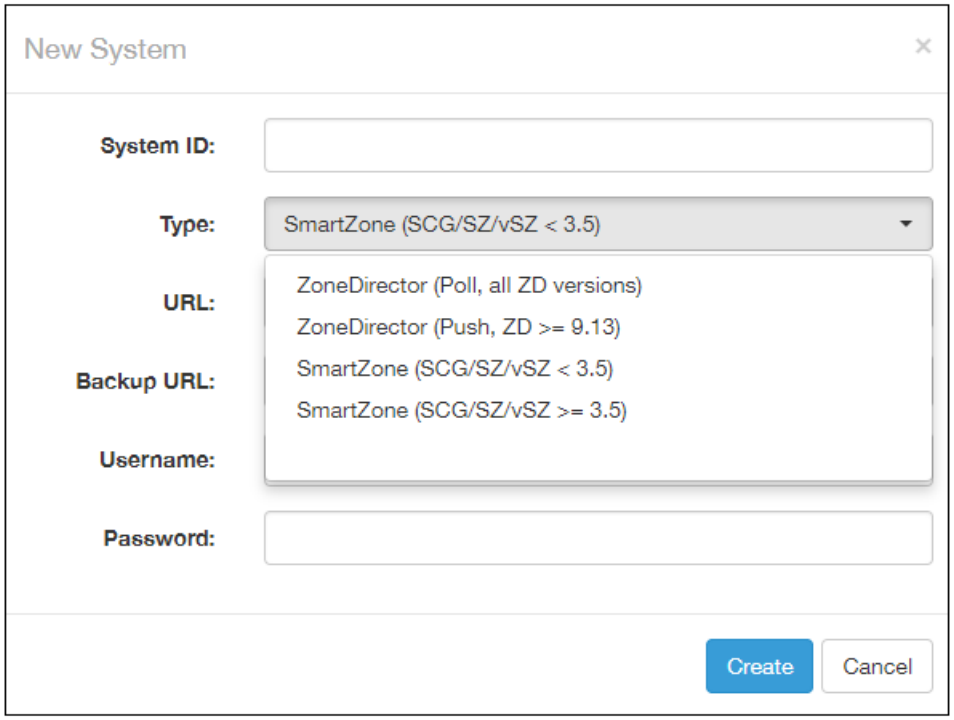
FIGURE 200 Controller Settings



System ID	Type	URL	User	Last Seen
SystemID1	SmartZone (SCG/SZ/vSZ < 3.5)	[redacted]	admin	2 minutes ago
SystemID2	SmartZone (SCG/SZ/vSZ >= 3.5)	[redacted]	admin	
SystemID3	SmartZone (SCG/SZ/vSZ >= 3.5)	[redacted]	admin	3 months ago
SystemID4	SmartZone (SCG/SZ/vSZ < 3.5)	[redacted]	sci_mon	2 minutes ago
SystemID5	SmartZone (SCG/SZ/vSZ < 3.5)	[redacted]	ruckus.sci	2 minutes ago
SystemID6	SmartZone (SCG/SZ/vSZ < 3.5)	[redacted]	rsa-agent	2 minutes ago
SystemID7	SmartZone (SCG/SZ/vSZ < 3.5)	[redacted]	admin	2 minutes ago
SystemID8	ZoneDirector (Poll, all ZD versions)	[redacted]	admin	3 minutes ago
SystemID9	ZoneDirector (Poll, all ZD versions)	[redacted]	admin	3 minutes ago
SystemID10	SmartZone (SCG/SZ/vSZ >= 3.5)	[redacted]	admin	4 minutes ago
SystemID11	SmartZone (SCG/SZ/vSZ < 3.5)	[redacted]	admin	20 days ago
SystemID12	SmartZone (SCG/SZ/vSZ < 3.5)	[redacted]	admin	5 months ago

To add a controller, click the **Add** button in the upper right of the Settings screen; a drop-down menu appears for you to select the controller type, as shown in the figure below.

FIGURE 201 Adding a New Controller Popup

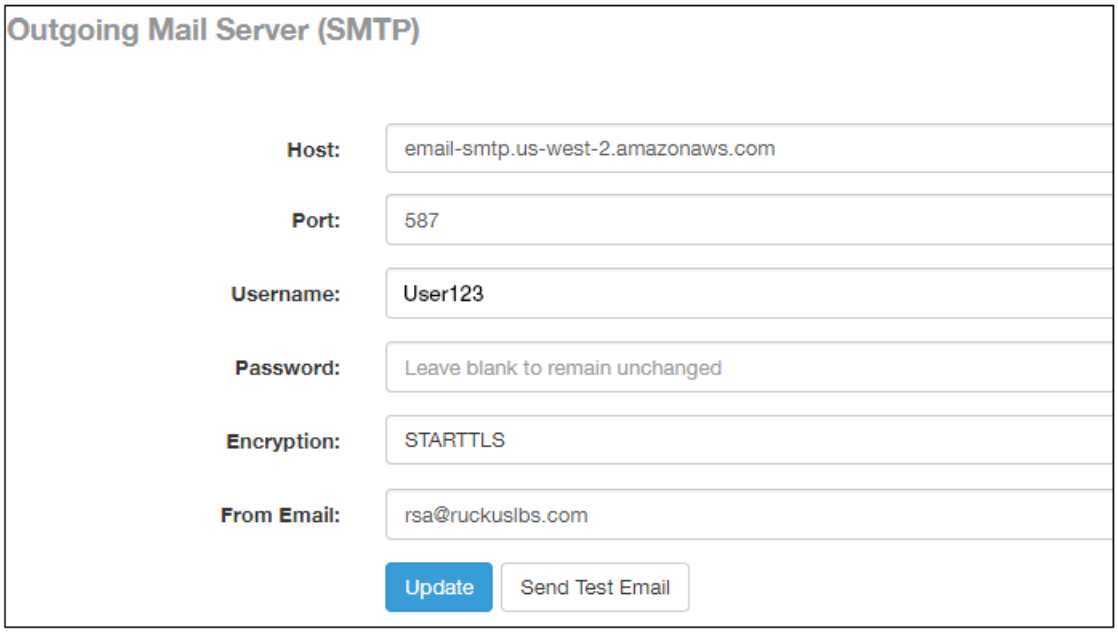


NOTE
For instructions on adding the different types of controllers as well as instructions on deleting or editing controllers, refer to the *SmartCell Insight Installation Guide*, "Configuring SCI" chapter, "Adding and Managing Controllers" section.

SMTP Settings

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

FIGURE 202 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.

To save your changes, click **Update**.

You can test your settings by sending a test email. Follow these steps:

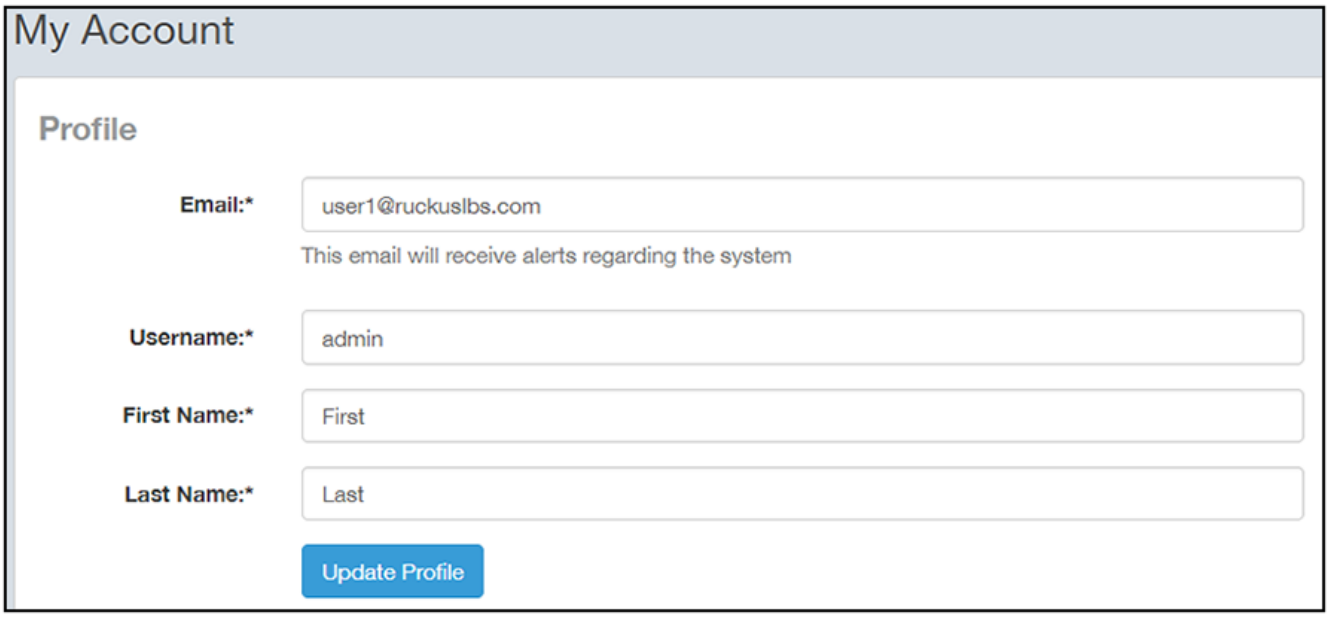
1. After you have configured SMTP and saved your changes, click **Send Test Email**. The following popup should appear:

FIGURE 203 Send Test Email Popup

2. Click **Send**.
3. Check that you receive an email to confirm that SMTP is working properly. The subject of the email that you receive should be: "Test email from your Ruckus SmartCell Insight." The body of the email should be: " Hi there, this is a test email."

NOTE
You should receive the email almost instantly. The email will be sent to the email address that is configured in the My Account screen > Profile section, which you open by clicking on the admin icon in the upper right of the SCI user interface, as shown in the following figure:

FIGURE 204 Email Address to Receive SMTP Test Email Reply from Ruckus



Data Retention

You can configure the time, in months, that you want SCI to retain all your raw and indexed data.

By default, this setting is 12 months, as shown in the screen below:

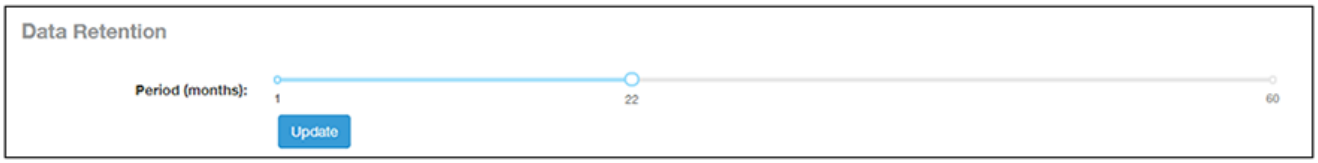
FIGURE 205 Data Retention section of Admin Dashboard

This means that SCI will delete any data older than 12 months. This action takes place on the 1st of each month.

If you want to change the data-retention time, follow example the steps below:

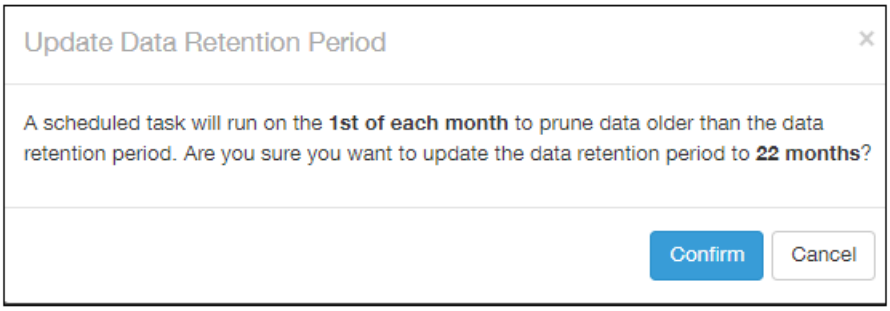
1. Slide the bar to the desired time in months (from 1 to 60) for which you want to retain data. For example, if you want to retain data for 22 months, slide the bar as follows:

   FIGURE 206 Retaining Data for 22 Months

2. Click **Update**. A confirmation popup appears:

   FIGURE 207 Data Retention Confirmation Popup window

3. Click **Confirm**. SCI will now flush data every 22 months, starting on the first of the upcoming month.

   NOTE
   Once data is deleted from SCI, the data cannot be recovered.

Instantly Pruning Old Data

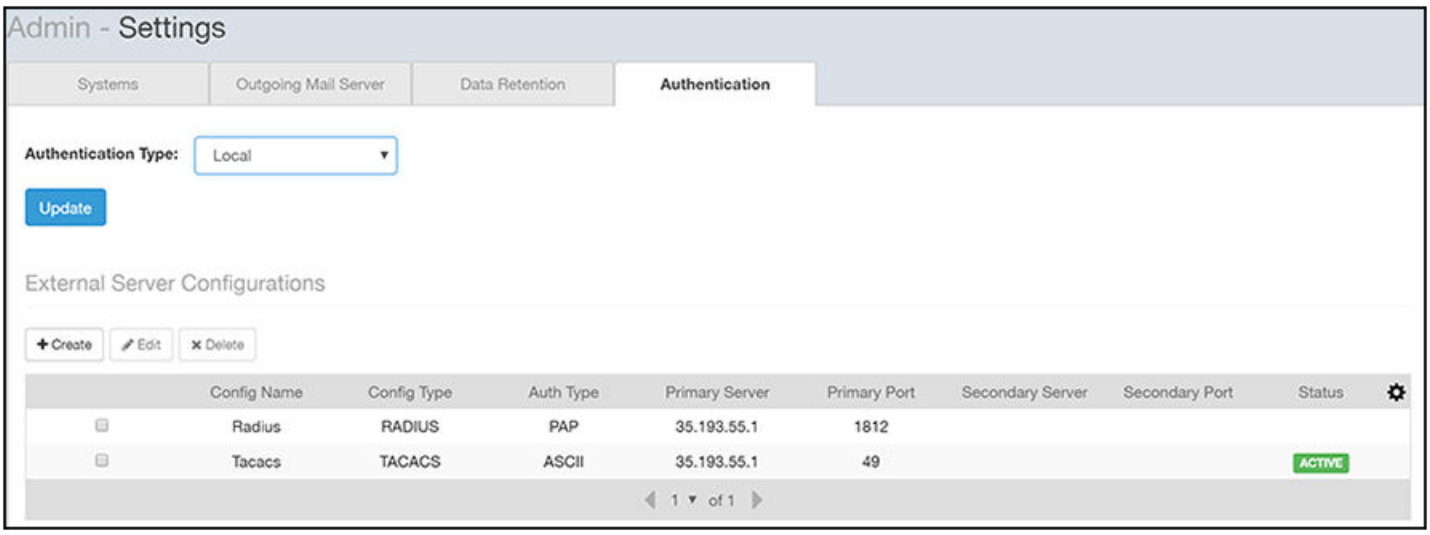
If you need to purge data immediately instead of waiting until the first of the month, run the following script as root user:
sudo /root/cronscripts/prune-data.sh

The length of time that the script runs depends of the amount of data to remove. Any data older than the data-retention period specified in **Admin > Settings** of the SCI user interface is immediately purged.

Authentication Tab on the SCI UI

The Authentication tab of the **Admin > Settings** screen lets you set whether you want local SCI users or external AAA server users to authenticate to SCI. You can also add new external servers from the Authentication tab. The following figure shows this tab if there are already some configured external servers (the IP addresses are just example values) :

FIGURE 208 Authentication Tab Main Page Example



By default, only users local to the SCI are authenticated.

Before you add external servers, there are certain steps you need to perform on the external server. Depending on whether the external server is RADIUS, TACACS+, or Cisco ACS, see the subsections below for how to add users, roles, and resource groups.

> **NOTE**
> If you add users and roles via external server configuration, this is indicated in the Figure 239 on page 209.

Configuration to Perform on External AAA RADIUS Server:

1. Add the SCI server as a RADIUS client, specifying the AAA client name, IP address, shared secret, and other parameters.
2. If you are using the Ruckus dictionary file for vendor-specific attributes, install a new Ruckus dictionary file (or update the existing file) with the following attributes:
   - ATTRIBUTE, Ruckus-SCI-Role, 200, string
   - ATTRIBUTE, Ruckus-SCI-Resource-Group, 201, string
3. Configure an authentication policy with the following objectives:
   - Allow authentication from the SCI server.
   - Define the valid users and user groups.
   - Configure vendor-specific return attributes for the Ruckus-SCI-Role and Ruckus-SCI-Resource-Group, which maps the RADIUS user into SCI privilege sets.

NOTE
As with SCI, one user is associated with one resource group and one role only. There are three roles.

Sample Configuration Using FreeRADIUS for External AAA RADIUS Authentication:

1. Using SSH, log in to the FreeRADIUS server.
2. Enter CLI mode.
3. AAA admin should add two new attributes to dictionary.ruckus as shown below:

```
vi /usr/share/freeradius/dictionary.ruckus

ATTRIBUTE   Ruckus-SCI-Role              200    string
ATTRIBUTE   Ruckus-SCI-Resource-Group    201    string
```

4. Add all users, their roles and their resource groups:

```
vi /etc/freeradius/3.0/users

aaaadmin Cleartext-Password := "admin123"
      Reply-Message = "Hello Admin",
      Ruckus-SCI-Role = admin,
      Ruckus-SCI-Resource-Group = Default

aaagroupadmin Cleartext-Password := "admin123"
      Reply-Message = "Hello Group Admin",
      Ruckus-SCI-Role = groupadmin,
      Ruckus-SCI-Resource-Group = AAA_MLISA

aaaview Cleartext-Password := "admin123"
          Reply-Message = "Hello User",
          Ruckus-SCI-Role = view-only,
          Ruckus-SCI-Resource-Group = AAA_VIDEO54
```

5. Configure the SCI server IP that you wish to authenticate with the FreeRADIUS server:

```
vi /etc/freeradius/3.0/clients.conf

client all {
        ipaddr = 0.0.0.0/0
       secret = testing123
}
```

6. After adding the above configuration, restart FreeRADIUS by running the following command:

```
service freeradius restart
```

Configuration to Perform on External AAA TACACS+ Server:

1. Identify the TACACS administrators who need SCI administration privileges, and then create an admin group (or reuse an existing group).
2. Assign the SCI administrators to the SCI admin group on the TACACS server.
3. Within the TACACS SCI admin group, configure the SCI service (service = sci-resource-group) and map the Ruckus RBAC attributes (e.g. Ruckus-SCI-Role = admin; Ruckus-SCI-Resource-Group = Default).

Sample Configuration For External AAA TACACS+ Authentication:

1. Using SSH, log in to the TACACS+ server.
2. Enter CLI mode.

3. Open *vi* and type:

```
/etc/tacacs+/tac_plus.conf
```

4. Create a group:

```
group = admins {

}
```

5. Add a service, role, and mgmt-devicegroups to the group you created above, as follows:

```
service = sci-resource-group {
            Ruckus-SCI-Role = admin
            Ruckus-SCI-Resource-Group = Default
        }
```

6. If needed, create additional groups and add a service, role, and mgmt-devicegroups to the group, as you did previously.
7. Create a user, associate the user with the correct group, and create a user password, as shown below:

```
user = aaaadmin {
       member = admins
       global = cleartext admin123
}
```

8. The final configuration should now appear as follows:

```
vi /etc/tacacs+/tac_plus.conf

group = admins {
        service = sci-resource-group {
            Ruckus-SCI-Role = admin
            Ruckus-SCI-Resource-Group = Default
        }
}

user = aaaadmin {
       member = admins
       global = cleartext admin123
}

group = groupadmins {
        service = sci-resource-group {
            Ruckus-SCI-Role = groupadmin
            Ruckus-SCI-Resource-Group = AAA_MLISA
        }
}

user = aaagroupadmin {
       member = groupadmins
       global = cleartext admin123
}

group = view-only {
        service = sci-resource-group {
            Ruckus-SCI-Role = view-only
          Ruckus-SCI-Resource-Group = AAA_VIDEO54
        }
}

user = aaaview {
    member = view-only
    global = cleartext admin123
}
```

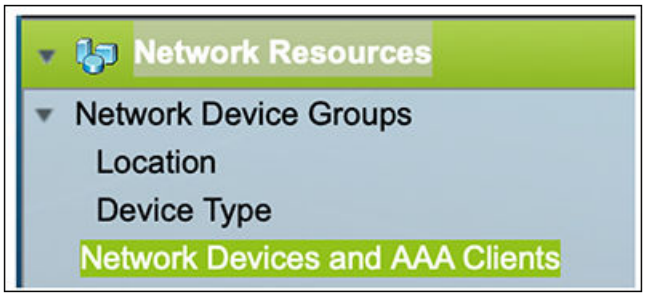
9. Restart the TACACS+ server by running the command:

```
service tacacs+ restart
```

Configuration to Perform on Cisco ACS Server:

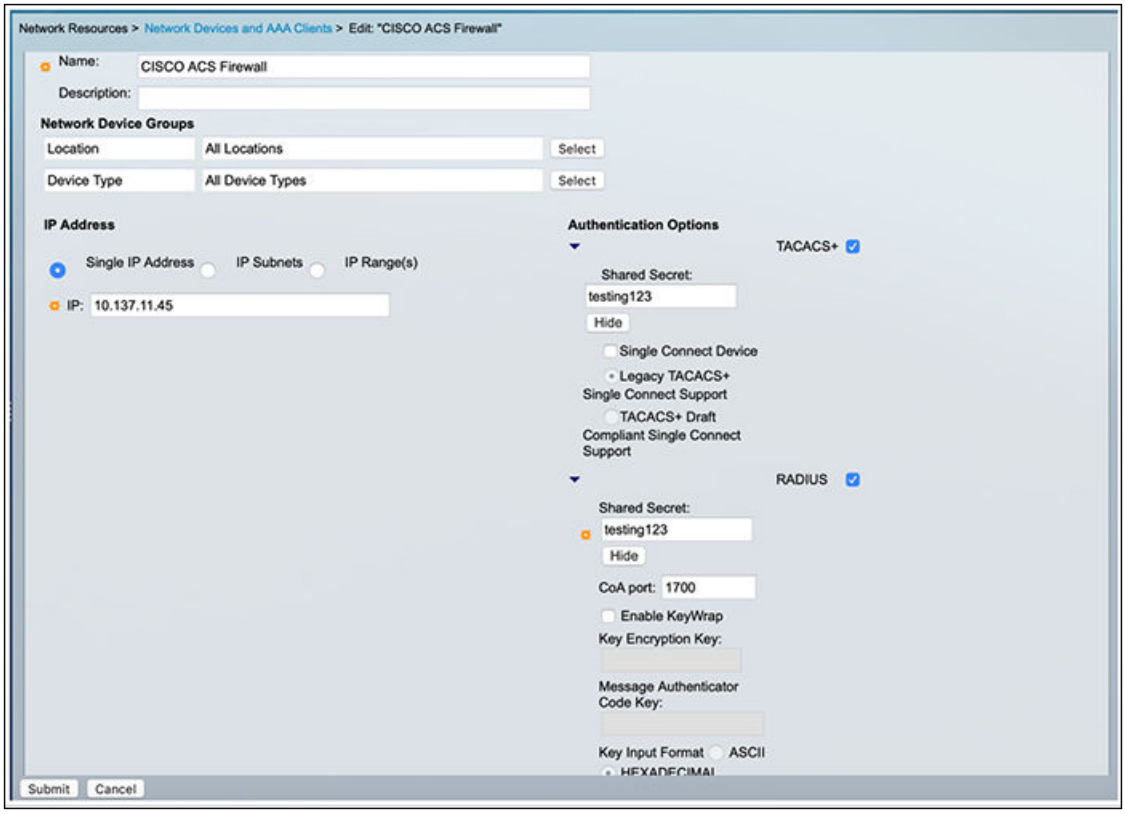
1. To configure ACS to accept connections from SCI, click **Network Devices and AAA Clients** on the Cisco ACS configuration screen shown below:

   FIGURE 209 Invoking Network Devices and AAA Clients Configuration



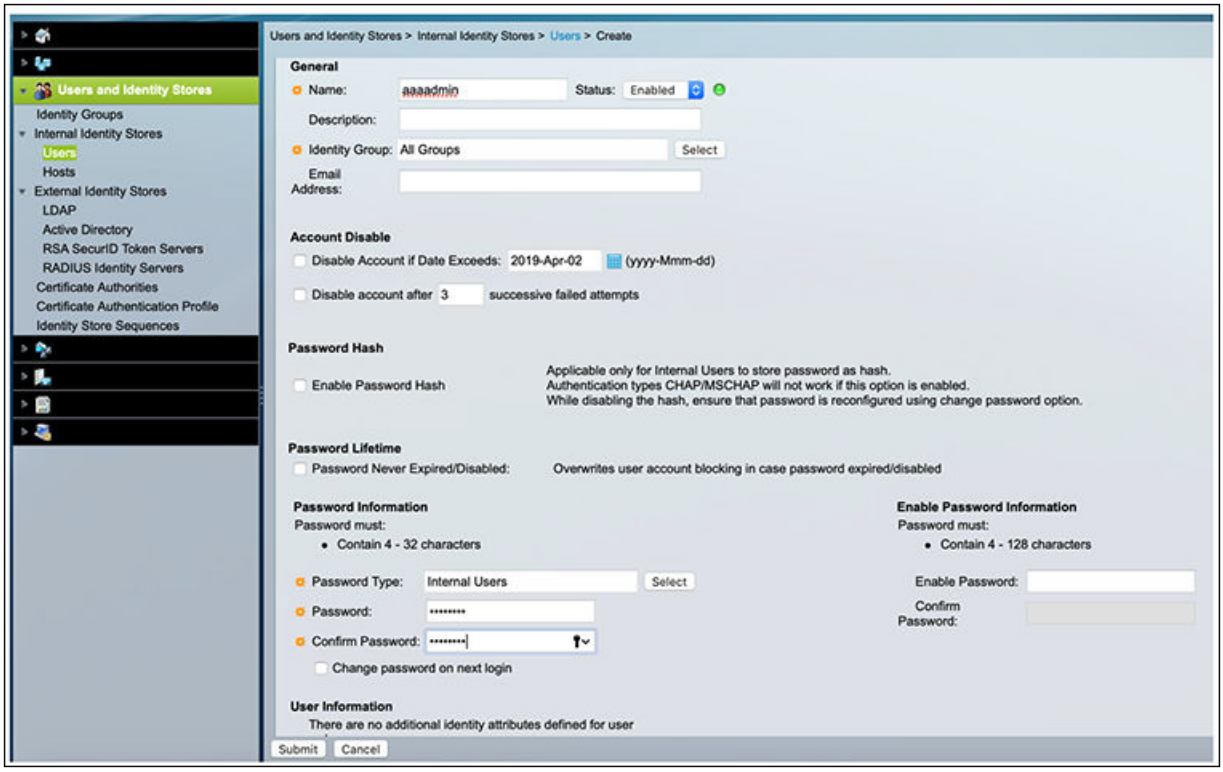
2. In the Network Devices and Clients screen (shown below):
   a. Enter the name.
   b. Enter the IP address of the SCI.
   c. Select either RADIUS or TACACS+ from the drop-down list.
   d. Click **Submit**.

FIGURE 210 Network Devices and Clients Configuration Screen



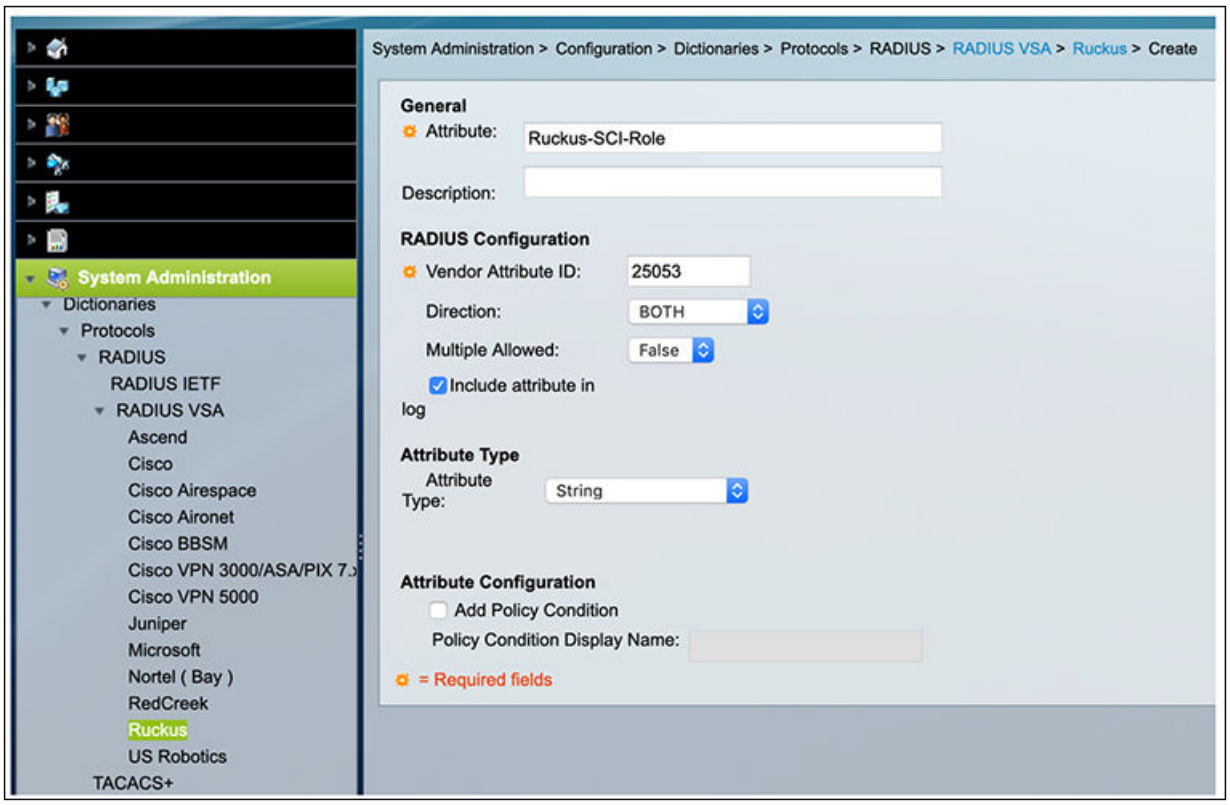
3. To create AAA users, click **Users** in the left pane of the Create Users screen (shown below), and do the following:
   a. Enter the Name.
   b. Enter the password.
   c. Confirm the password.
   d. Click **Submit**.
   e. Repeat the preceding steps to add more users.

FIGURE 211 Creating Users Configuration Screen



4. Install a new Ruckus dictionary file or update an existing dictionary with the following attributes to create the Ruckus-SCI-Role (see figure below):
   a. Attribute: Ruckus-SCI-Role
   b. Vendor Attribute ID: 25053
   c. Attribute Type: String
   d. Click **OK**.

FIGURE 212 Creating the Ruckus-SCI-Role

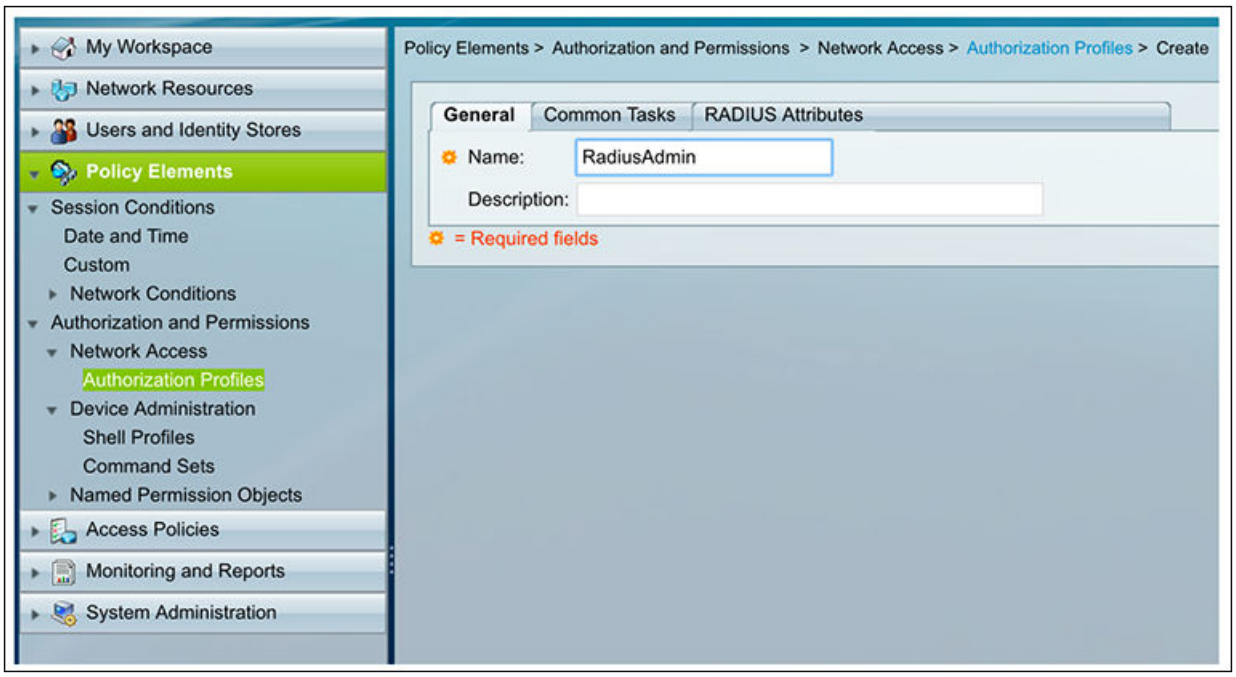


5. Install a new Ruckus dictionary file or update an existing dictionary with the following attributes to create the Ruckus-SCI-Resource-Group (see figure below):
   a. Attribute: Ruckus-SCI-Resource-Group
   b. Vendor Attribute ID: 25053
   c. Attribute Type: String
   d. Click **OK**.

FIGURE 213 Creating the Ruckus-SCI-Resource-Group

6. Go to the Create RADIUS Authorization Profiles screen (shown below).

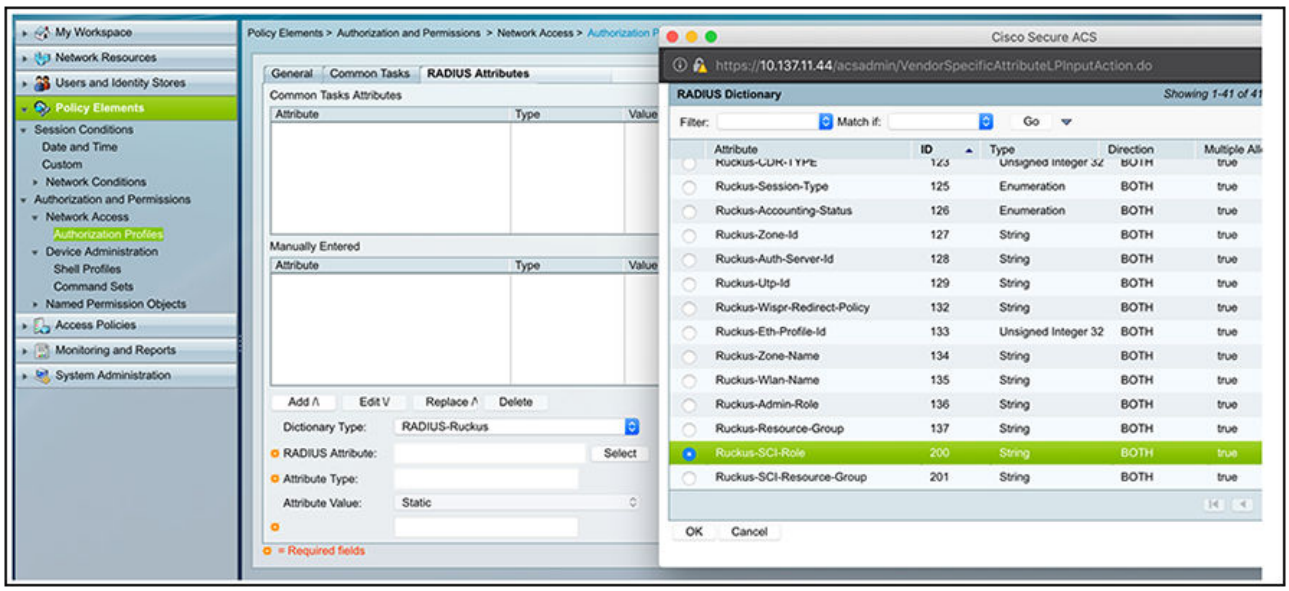
FIGURE 214 Create RADIUS Authorization Profiles Screen



a. Enter **RadiusAdmin** in the Name field.

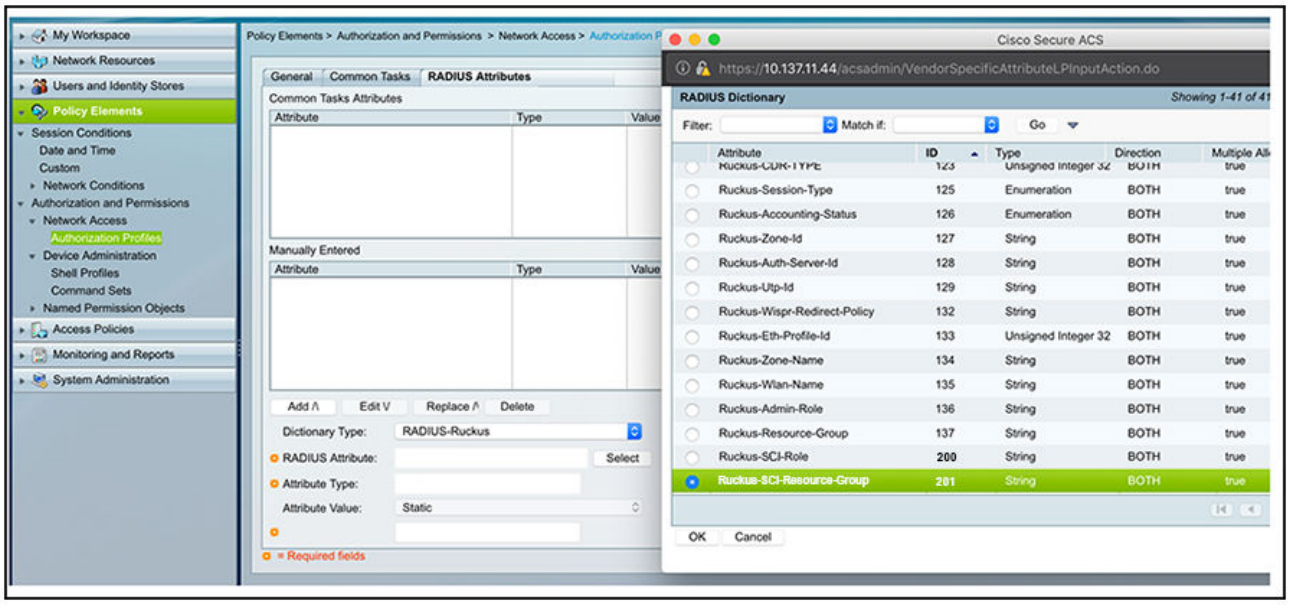
b. In the RADIUS Attributes tab, select RADIUS-RUCKUS from the Dictionary Type drop-down list, then, for the RADIUS Attribute, select Ruckus-SCI-Role (see screen below), and enter **admin** for the Attribute Value.

FIGURE 215 Selecting Ruckus-SCI-Role



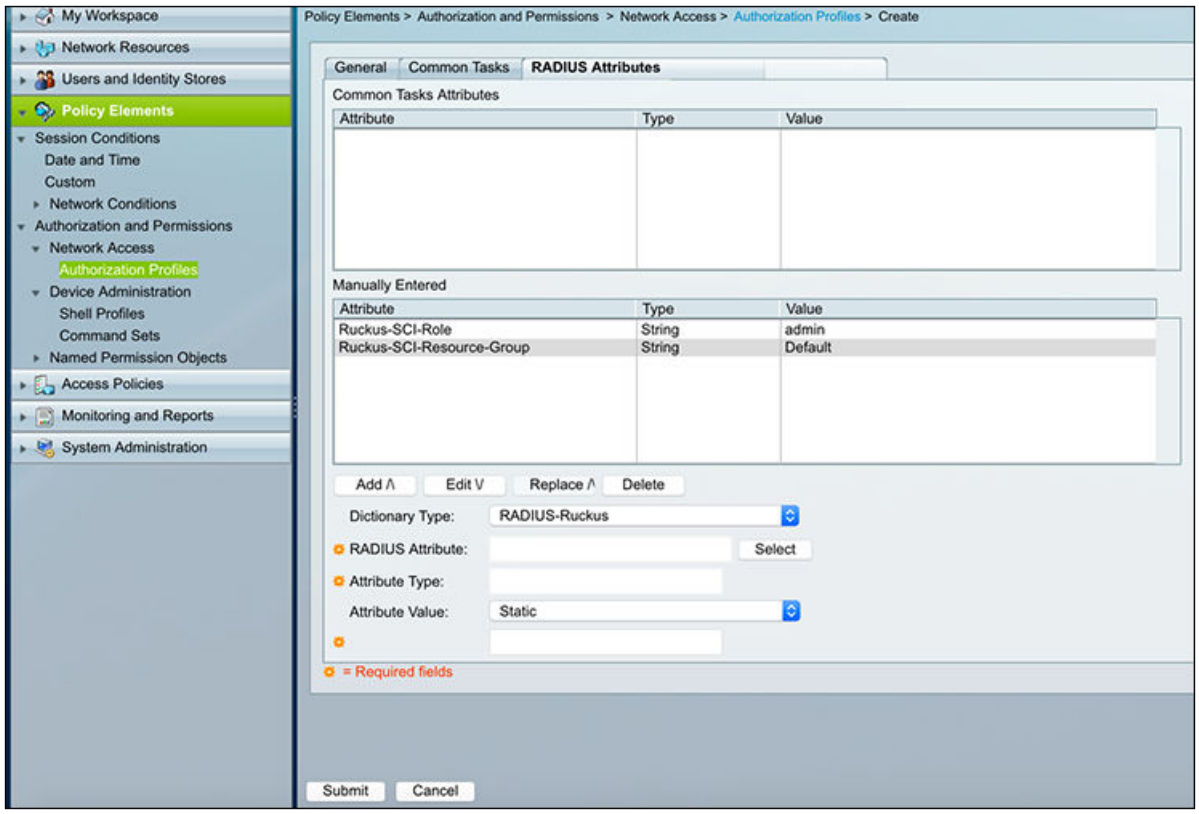
c. Still in the RADIUS Attributes tab, for the RADIUS Attribute, select Ruckus-SCI-Resource-Group (see screen below), and enter **Default** for the Attribute Value.

FIGURE 216 Selecting Ruckus-SCI-Resource-Group



d. Check that the Create RADIUS Authorization Profiles screen now shows the added attributes:

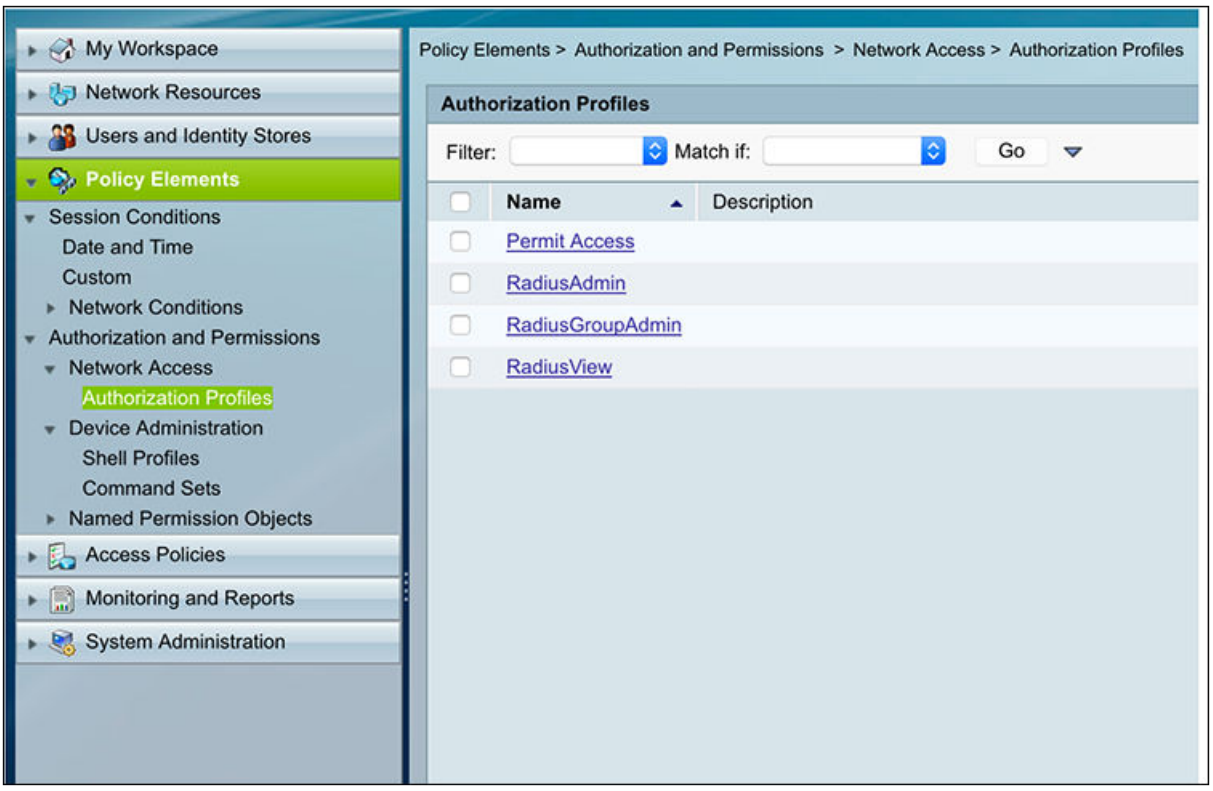
FIGURE 217 Added Attributes Now Appearing on Authorization Profiles Screen



e. Click **Submit**.

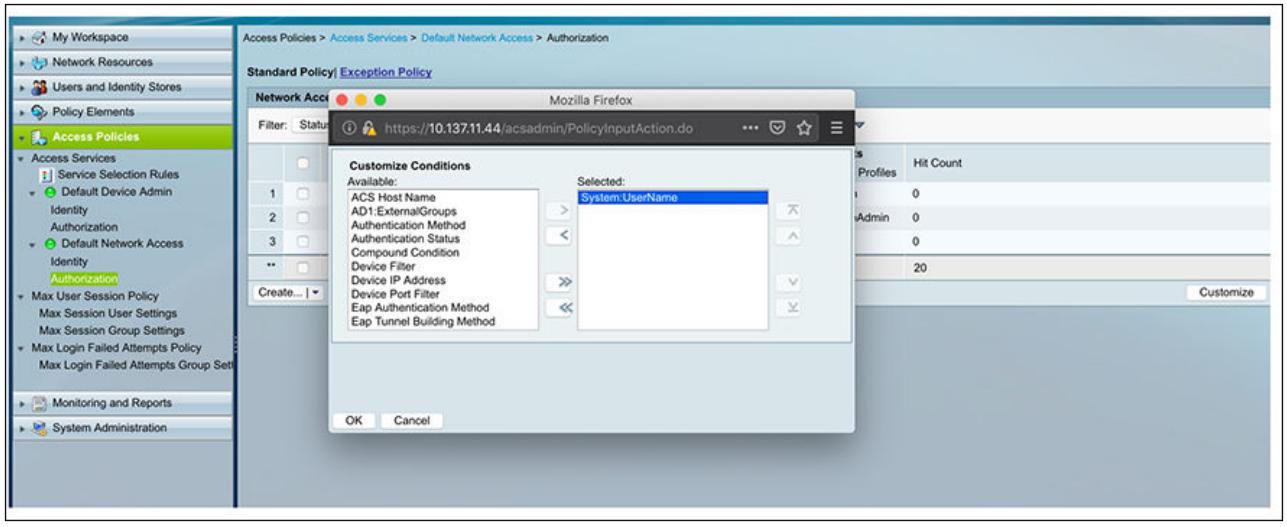
f. Repeat the steps you followed when you created the RadiusAdmin authorization profile to create profiles for RadiusGroupAdmin and RadiusView, listed on the screen below:

FIGURE 218 RadiusGroupAdmin and RadiusView Profiles Must Also Be Created



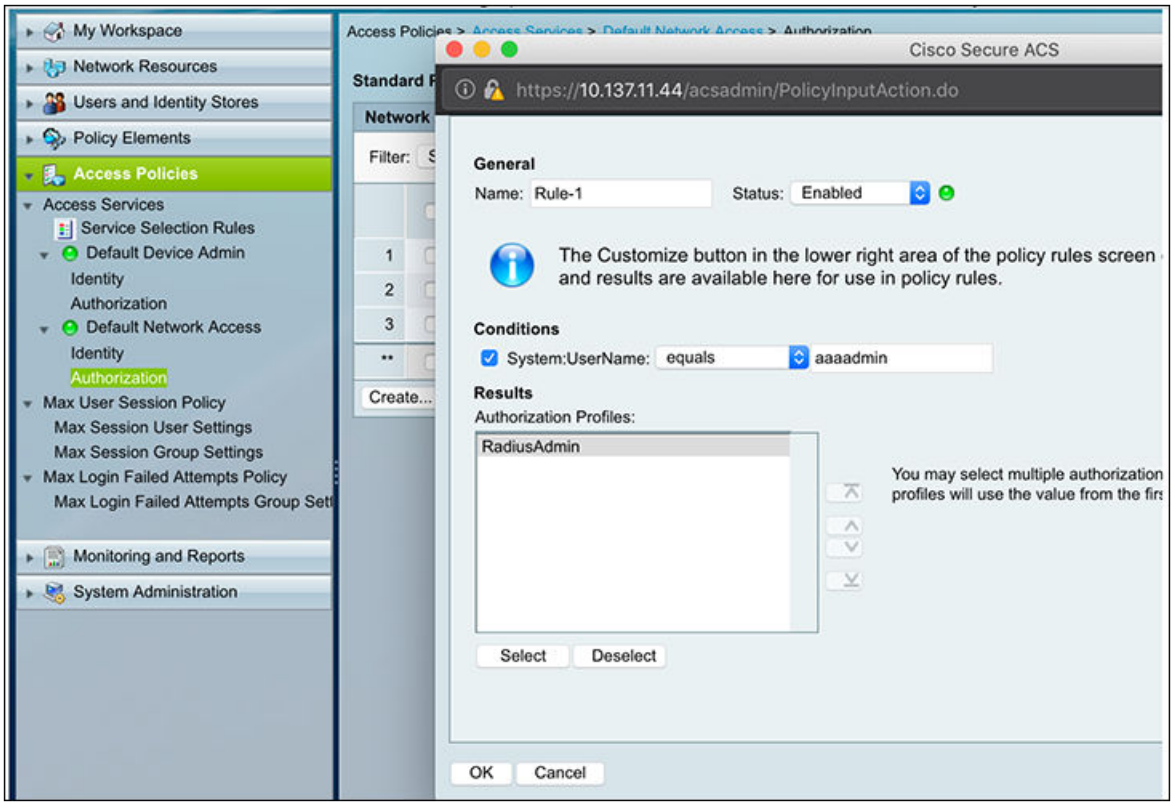
7. Create access policies for RADIUS:
   a. Go to **Authorization**, click the Customize button on the far right, then select **System:Username**, and click **OK**:

FIGURE 219 Selecting System:Username Customization



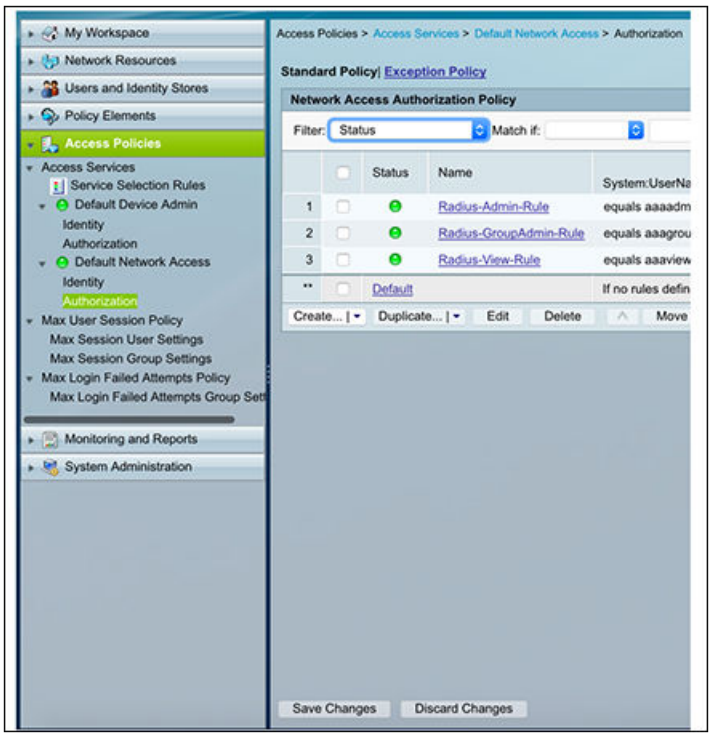
b. Click the **Create** button (just to the left of the popup shown below), then configure the popup with the values shown ("Name" can be anything you want), then click **OK**:

FIGURE 220 Configuring a Rule



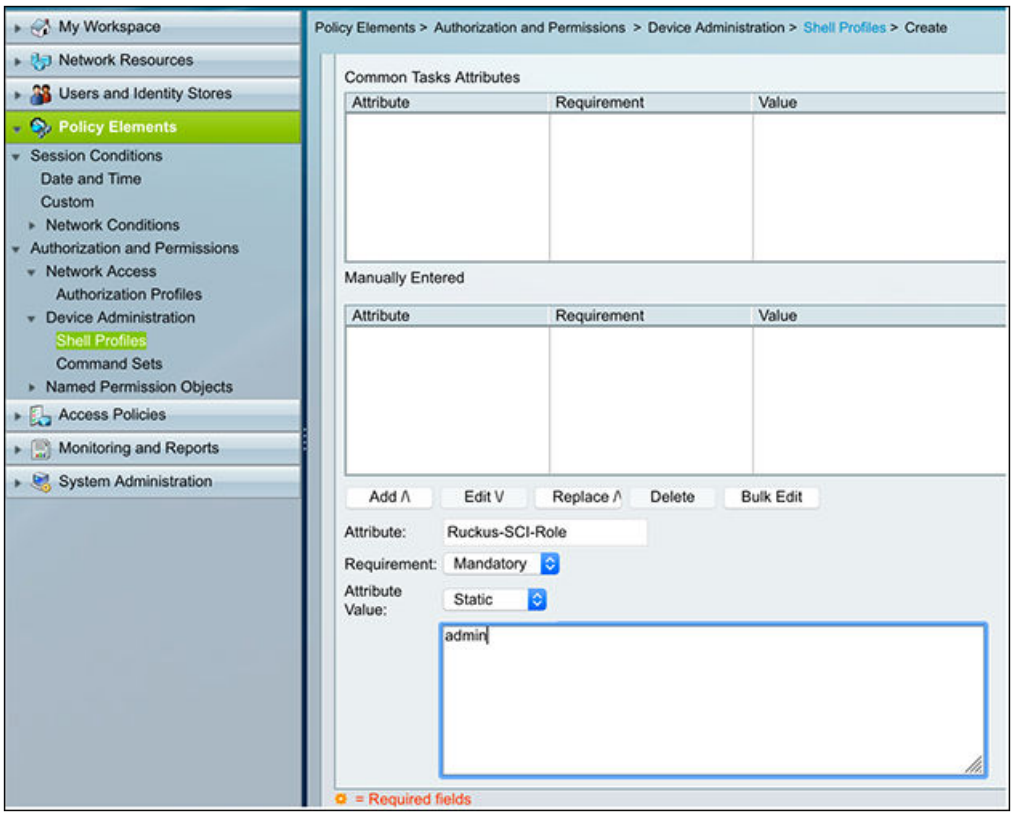
c. Repeat the steps that you followed for creating **aaaadmin** to create policies for **aaagroupadmin** and **aaaview**, which are listed on the screen below:

FIGURE 221 Authorization Policy Screen



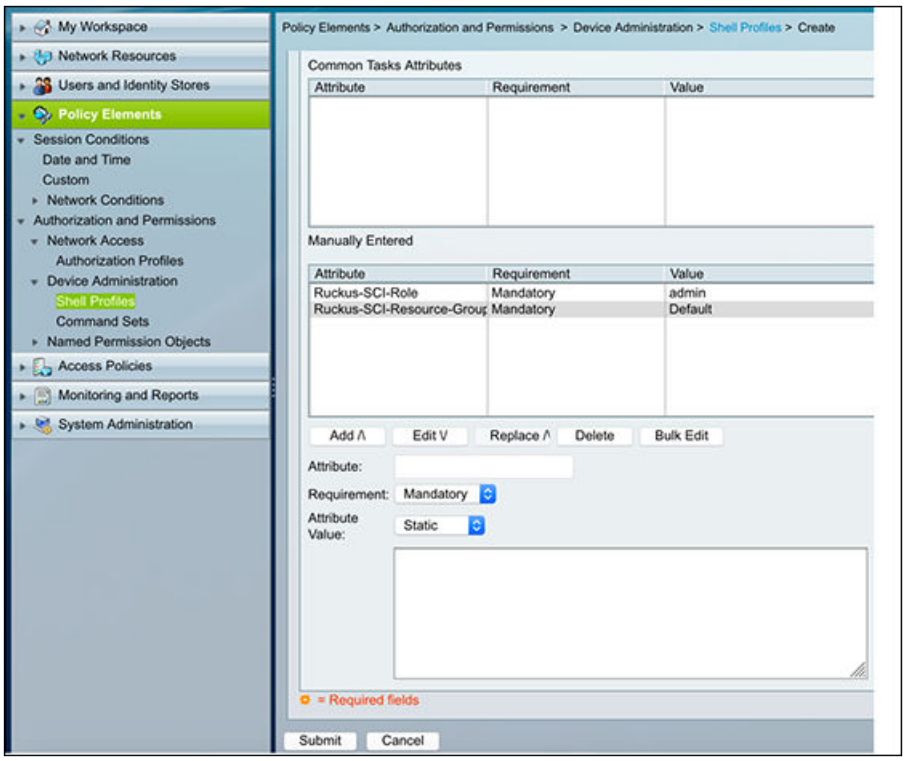
8. Create TACACS+ shell profiles:
   a. Go to Shell Profiles (shown below):

FIGURE 222 Creating Shell Profiles



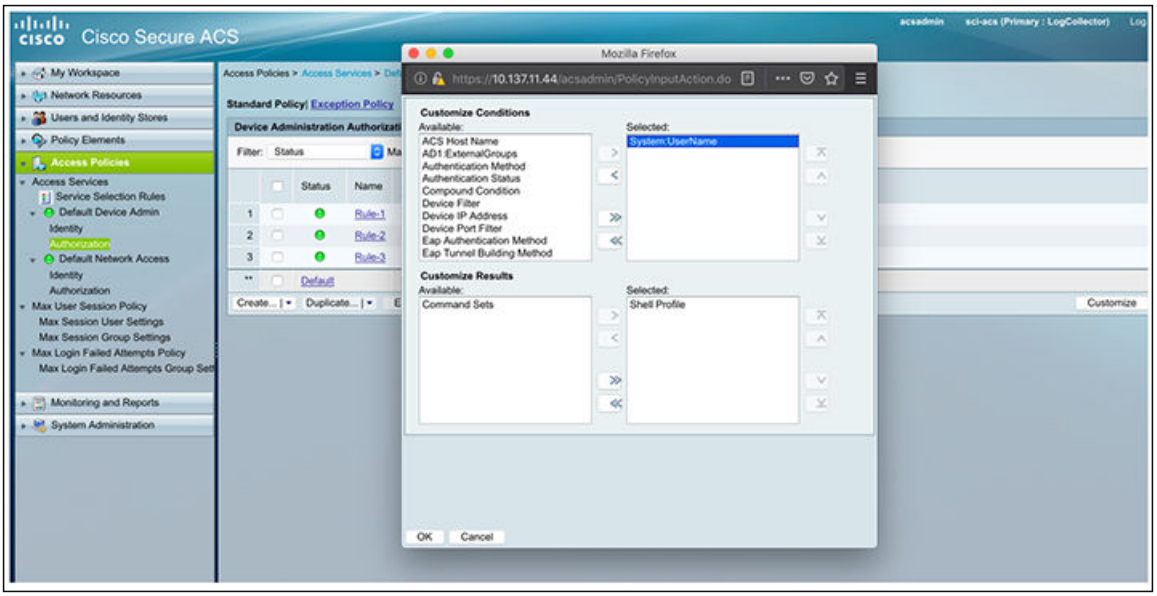
b. In the Attribute field, enter **Ruckus-SCI-Role**.
c. For the Attribute value, enter **admin**.
d. Click **Add**.
e. In the Attribute field, enter **Ruckus-SCI-Resource-Group**.
f. For the Attribute value, enter **Default**.
g. Click **Add**.
h. Check that both shell profiles have been added to the Shell Profile Create screen, shown below, then click **Submit**.

FIGURE 223 Shell Profile Create Screen



9. Configure access policies to enable TACACS+:
   a. Go to **Default Device Admin > Authorization** (see the highlighted areas on the left pane of the screen below):

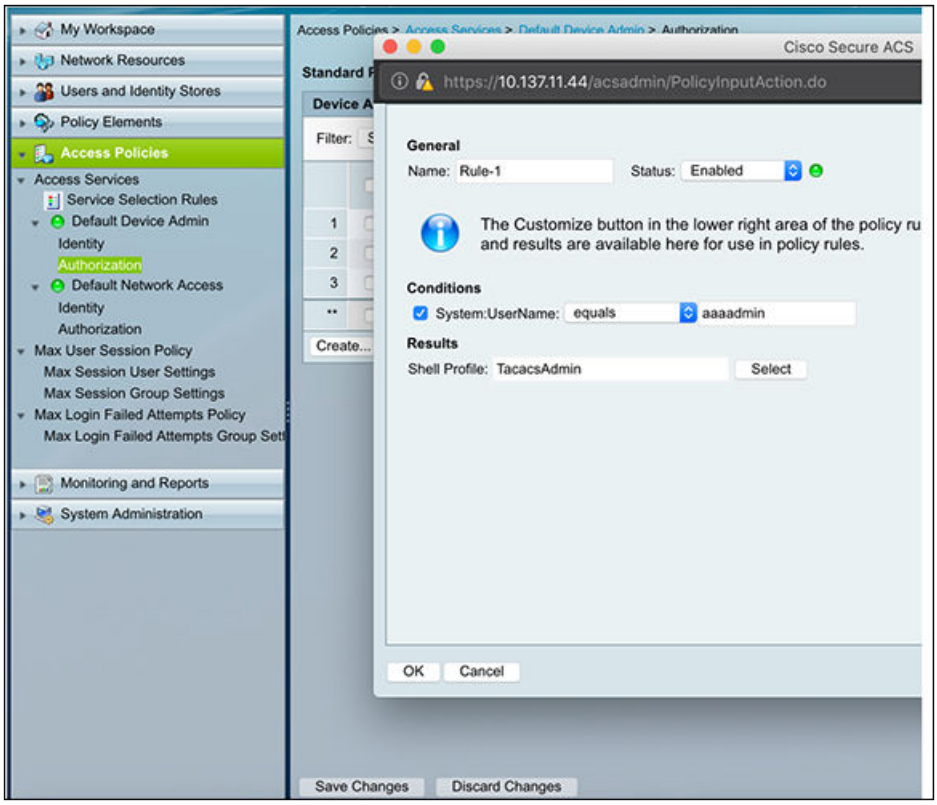
FIGURE 224 Configuring Access Policies



b. Click the **Customize** button in the lower right of the screen to invoke the popup that is shown above, then select **System:Username**, then click **OK**.

10. Create an authorization rule:
    a. Still in the Authorization area, click **Create** to invoke the popup shown below:

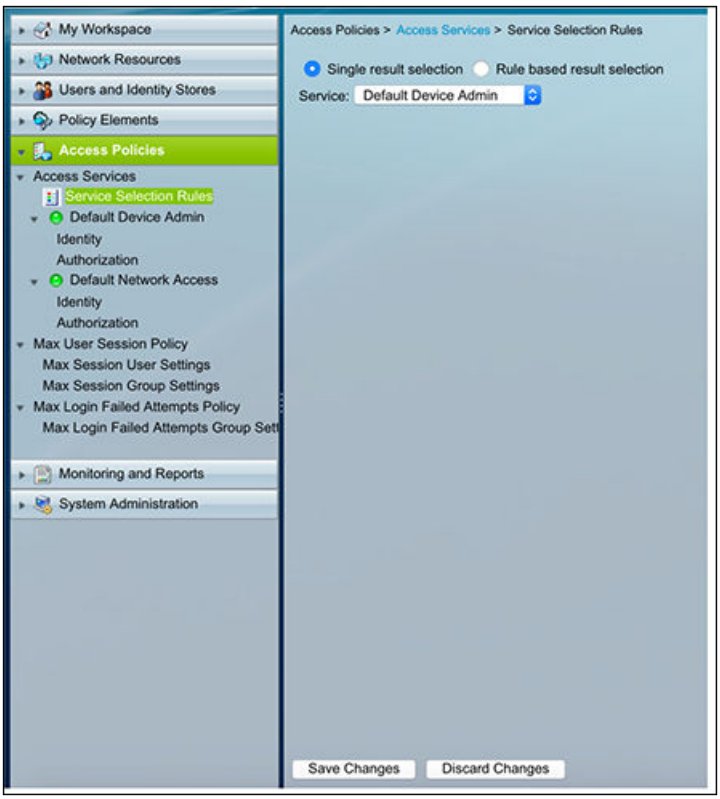
FIGURE 225 Creating an Authorization Rule



    b. Enter a descriptive name of your choice in the Name field, and configure the settings with the values shown above to create a rule for **aaaadmin**.
    c. Click **OK**.
    d. Create rules for **aaagroupadmin** and **aaaview** by repeating the steps you just performed for **aaaadmin**.

11. Enable the AAA server by performing the steps listed below the figure:

FIGURE 226 Enabling the AAA Server



a. Click **Service Selection Rules** (highlighted above in the left pane).

b. For Service, select either:

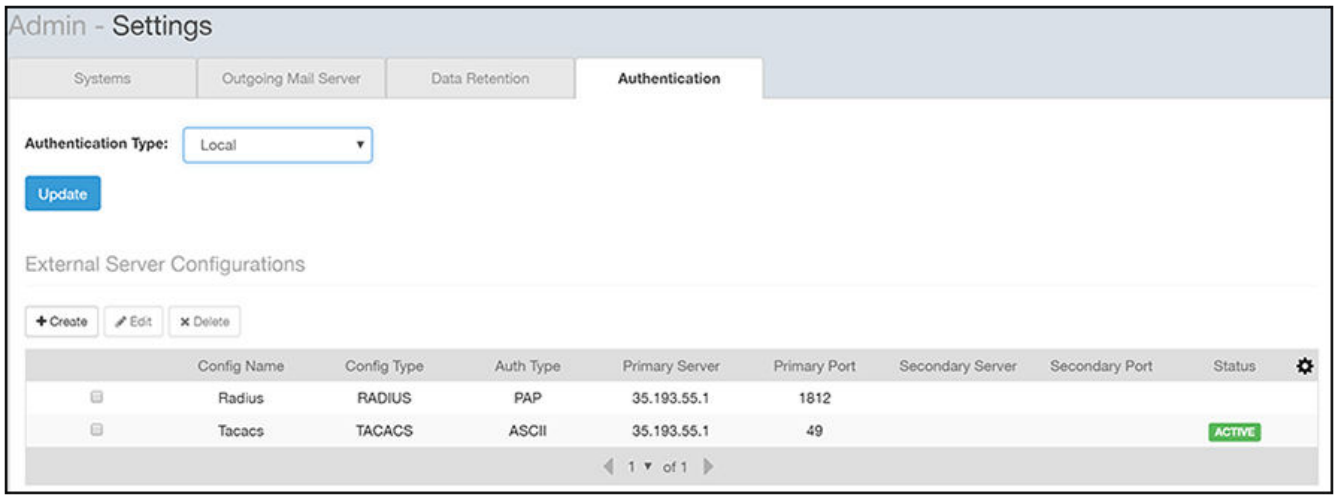
- "Default Device Admin" to enable TACACS+
- "Default Network Access" to enable RADIUS

c. Click **Save Changes**.

Adding an External Server:

1. To add an external AAA server for user authentication, navigate to **Admin > Settings** in the SCI UI, and click the Authentication tab:

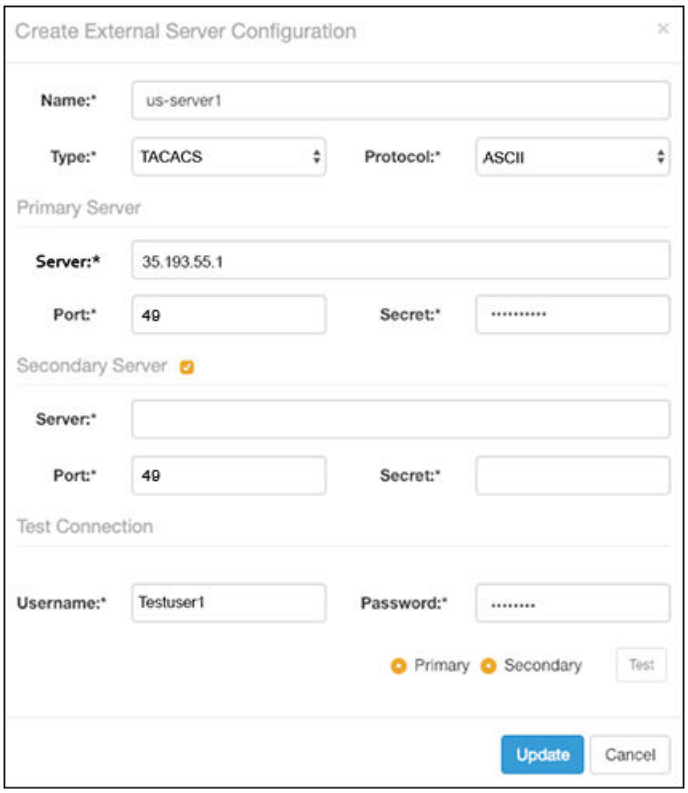
FIGURE 227 Authentication Tab



NOTE
Config Name (in the figure above) is not used by SCI, but is a descriptive name that the administrator of the external server configured to help identify the server.

2. Click **Create**.
3. Configure the external server information, an example of which is shown below:

FIGURE 228 Creating an External Server



- Name: The name of the external AAA server that you can choose to activate.
- Type: RADIUS or TACACS+. Select the proper value for the external server.
- Protocol: For a RADIUS server, this value can be either PAP or CHAP. For a TACACS+ server, the only choice for protocol is ASCII. Make sure the value matches that of the external server.

  NOTE
  The protocol must be the same for the secondary server as for the primary server.

- Server: The IP address of the external server.
- Port: Must match the port being used for authentication on the external server. Default is 1812 for RADIUS and 49 for TACACS+.
- Secret: The secret key that has been configured on the server to allow communication between the server and SCI; *must match exactly* the secret that has been configured on the external server.

Test AAA Server Connection:

To test the AAA configuration, perform the following steps:

a. Enter the username and password (used only for test-connection purpose) that are configured on the AAA server (RADIUS or TACACS+).
b. Select "Primary" for validating the connection with primary-server details, then click **Test**.
c. If secondary server details are provided, then select "Secondary" for validating the connection with secondary-server details, then click **Test**.

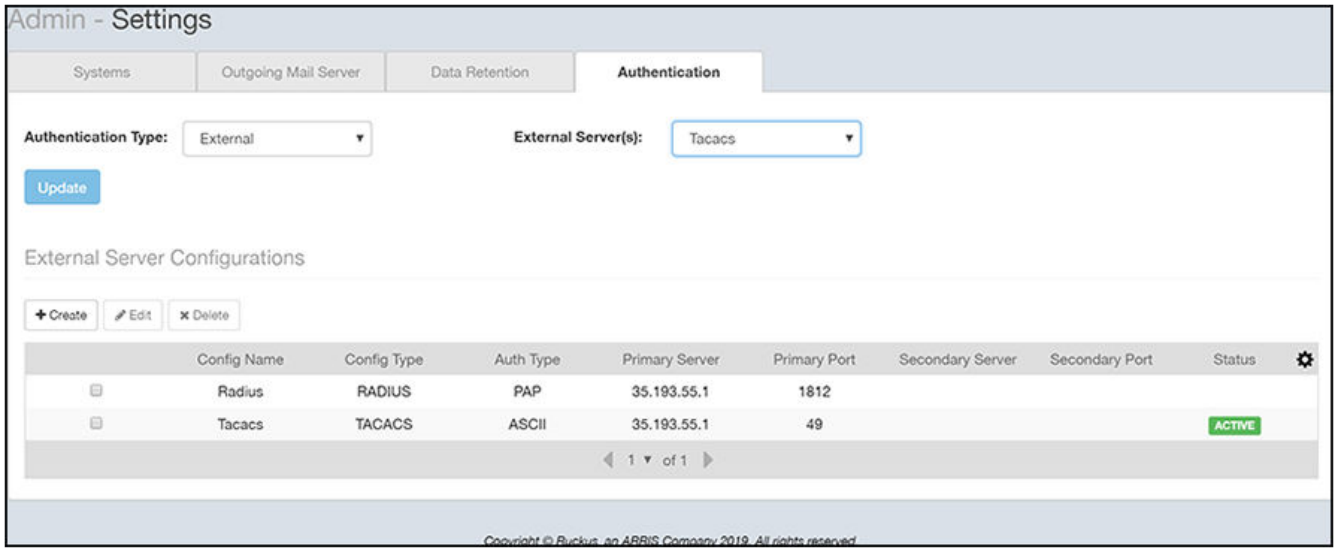
NOTE
The secondary server is an optional standby server, which is tried only when the primary server is not reachable after 3 retries.

Selecting an External Server for User Authentication:

To select one specific external AAA server for SCI user authentication, follow these steps:

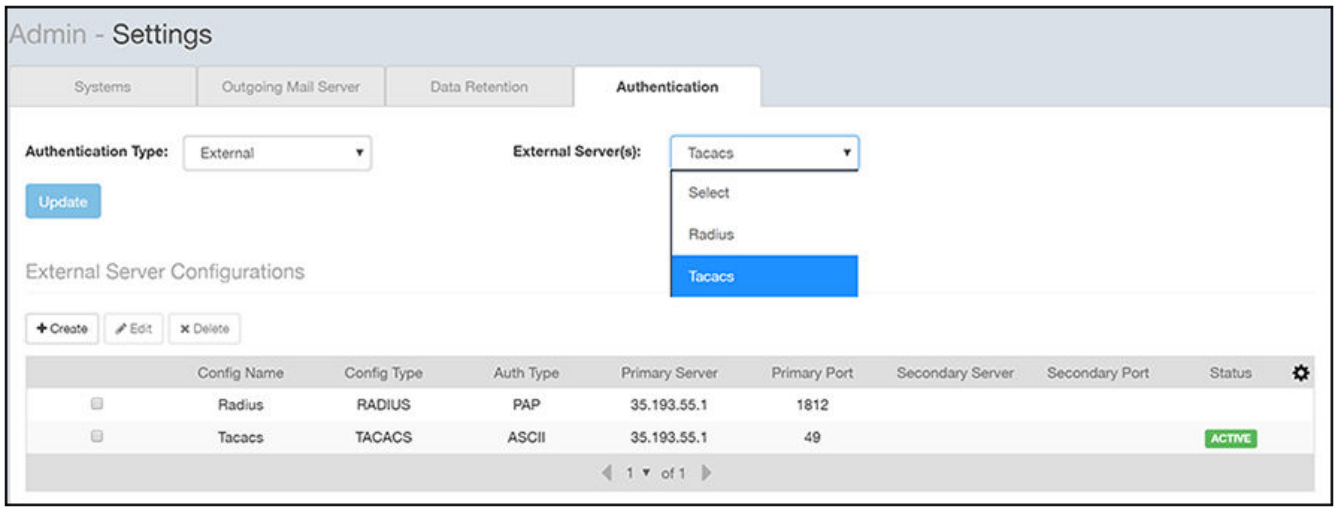
1. From the **Authentication Type** drop-down list, select **External**:

   FIGURE 229 Selecting the External Authentication Type



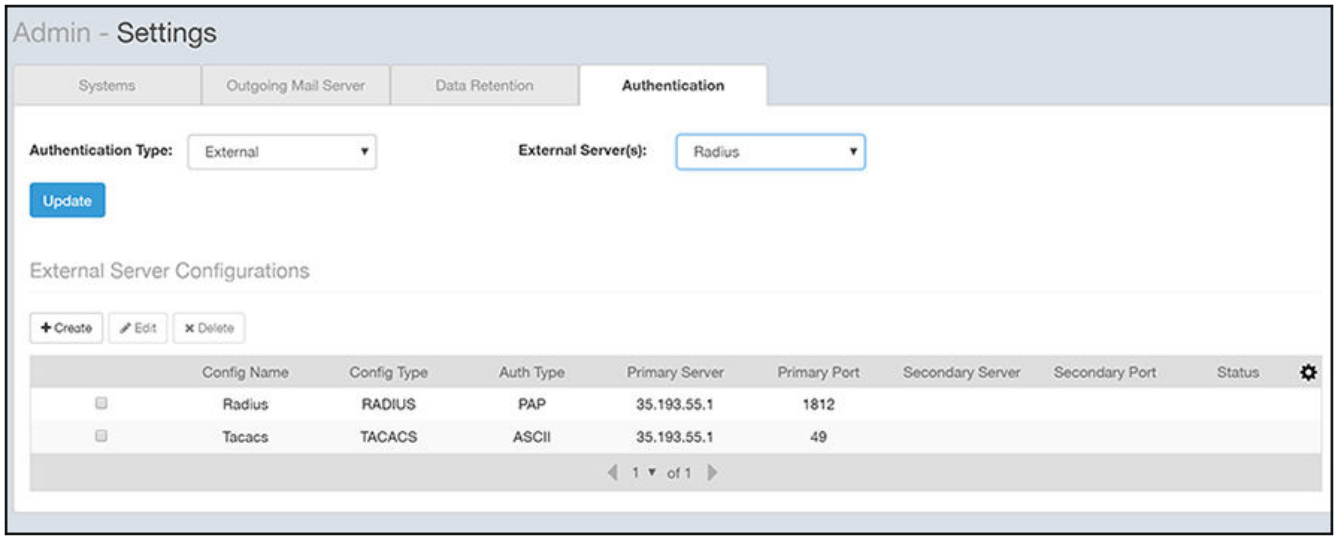
2. Click the External Server(s) drop-down list to view all configured external servers. The figure below shows such an example:

   FIGURE 230 Configured External Servers in the Drop-Down List



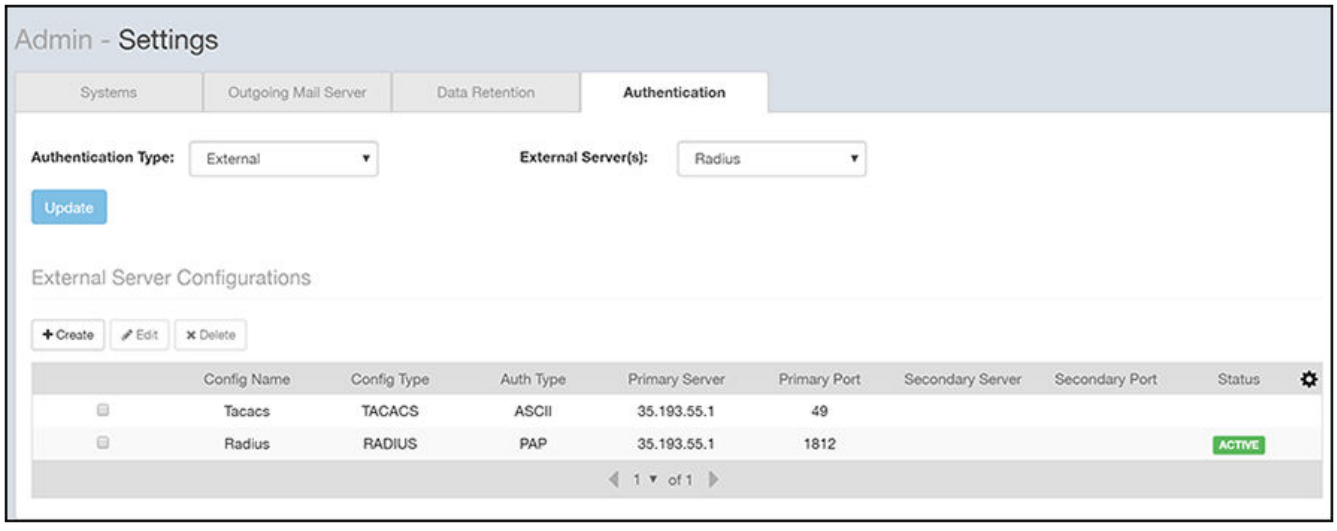
3. From this drop-down list, select the external server from which users must be authenticated. You can select only one such server. If a user is not associated with that server, that user cannot be authenticated and will not be able to log in to SCI.

FIGURE 231 Selecting the External Server from the Drop-Down List



4. Once you have selected the desired external server ("Radius" in the example above), click **Update**. You will need to confirm a pop-up message that you wish to continue because all active sessions will be invalidated. At next login, the status "ACTIVE" appears for the corresponding external server, as shown below:

FIGURE 232 "ACTIVE" Appears in Status Column for Selected External Server



5. (Optional) To edit or delete an external server, check the box for the server, then use the **Edit** or **Delete** buttons as desired.

NOTE
If you want to revert to only local SCI users being authenticated, select "Local" from the Authentication Type drop-down list, then click **Update**. You will need to confirm a pop-up message that you wish to continue because all active sessions will be invalidated.

Notes about the "admin" user:

The "admin" user is always authenticated locally and is a fallback user if the external server is not reachable for the admin to log in and make changes. The "admin" user cannot be deleted or renamed.

License

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

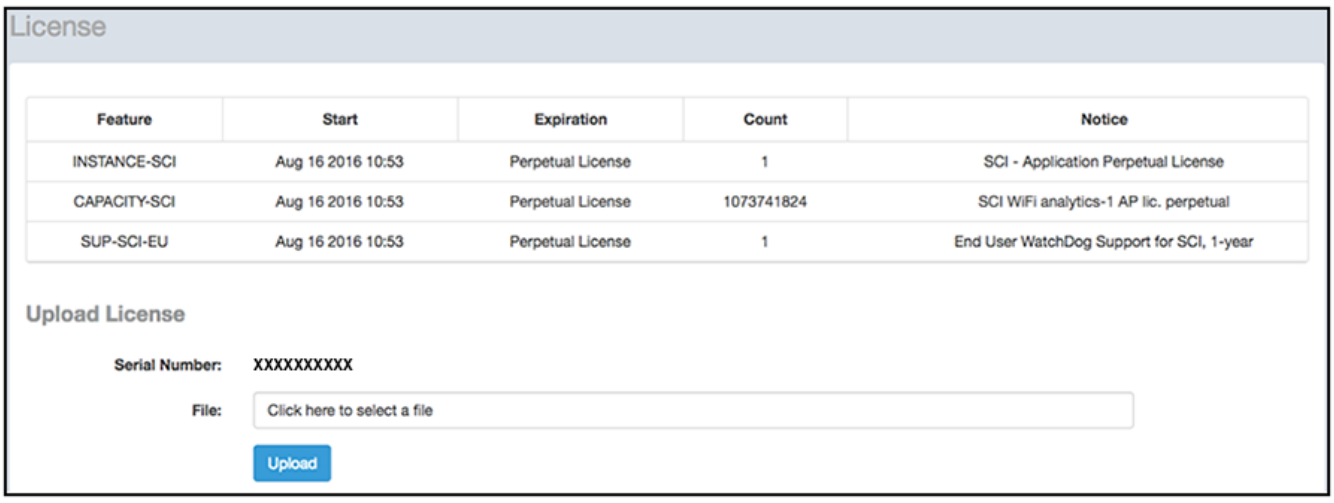
SCI has a built in trial license that is valid for three months. You must update this license to the permanent license before the trial license expires to prevent you from being locked out of SCI.

NOTE
When your license has expired, you cannot log in to SCI. Instead, you receive a message that your trial license has expired, along with a link to the License page to upload your permanent license.

Follow these steps to upgrade to the permanent license:

1. In the SCI 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. The following illustration is example of how the License Page appears, providing status of your licenses:

FIGURE 233 Page to Upload Your License and Obtain Status of Licenses

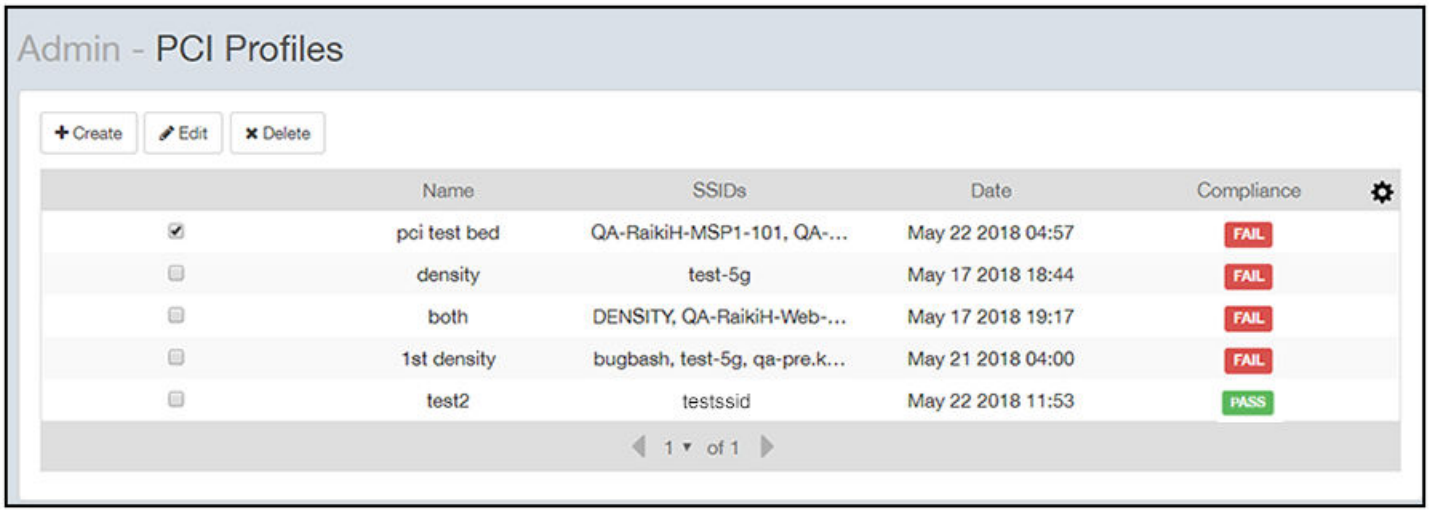


PCI Profiles

You can generate reports in SCI to determine if your WLANs are compliant with the Payment Card Industry (PCI) Data Security Standard v3.2.

When you navigate to **Admin > PCI** in the left pane of the SCI user interface, the main PCI Profiles screen appears, as shown in the following example.

FIGURE 234 PCI Profiles Screen



This screen lists the names of the various reports that have been run, the SSIDs on which each report has been run, the date of each report, and whether the overall report passed or failed the PCI compliance test. You can click on the red "Fail" or green "Pass" to observe the detailed report.

Creating a PCI Profile

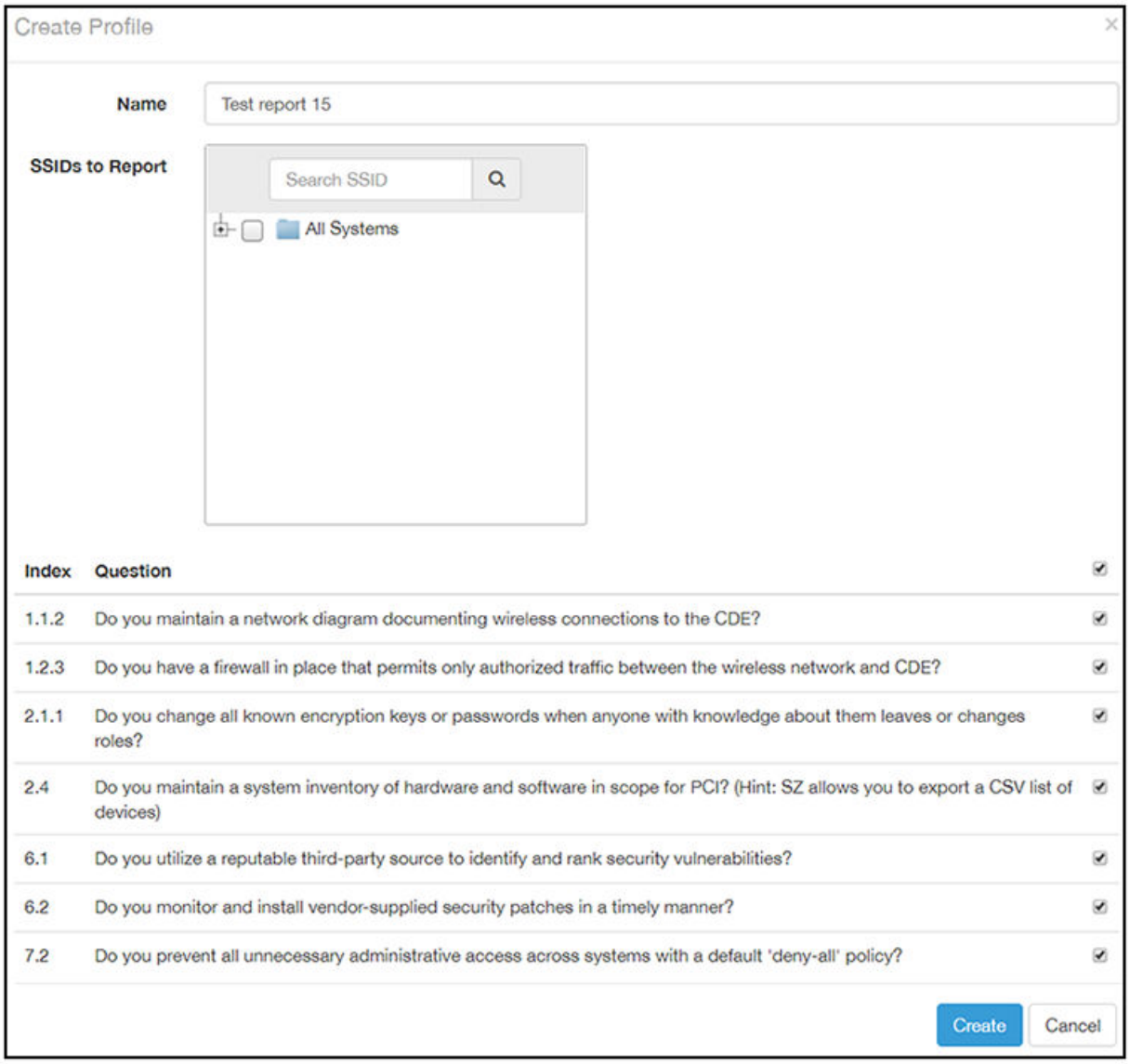
You can create a PCI profile to run a report that indicates if a WLAN is in compliance with the PCI Data Security Standard v3.2.

Follow the steps below to create a PCI profile:

1. From **Admin > PCI** in the SCI user interface, click the **Create** button in the upper left of the screen.

   The **Create Profile** screen is displayed.

   FIGURE 235 Creating a PCI Profile



2. Complete the screen configuration as follows:
   - Name: Enter any descriptive name for your PCI profile.
   - SSIDs to report: Use the Search area and the **+** buttons to locate all the SSIDs you want to include in the report, then click the box next to each desired SSID.

     NOTE
     When an SSID is selected for the PCI report, this SSID is identified as part of the cardholder data environment (CDE). Unselected SSIDs in the same zone are considered non-CDE SSIDs. The system will compare the security settings of CDE and non-CDE SSIDs to ensure that the network complies with PCI requirements. Only the zone(s) of selected SSIDs are evaluated for each PCI report.

   - Index/Question: Checkmark the compliance questions that you want included in your report. SCI will pull data directly from the controller to check the compliance of each question against the PCI Data Security Standard.

     NOTE
     Not all questions are shown in the screen example above.

3. Click **Create** at the bottom right of the screen.

   The result of the report (Pass or Fail) appears in the list of PCI profiles on the main PCI Profiles screen, an example of which is shown in Figure 234 on page 204.

Opening and Downloading a PCI Profile Report

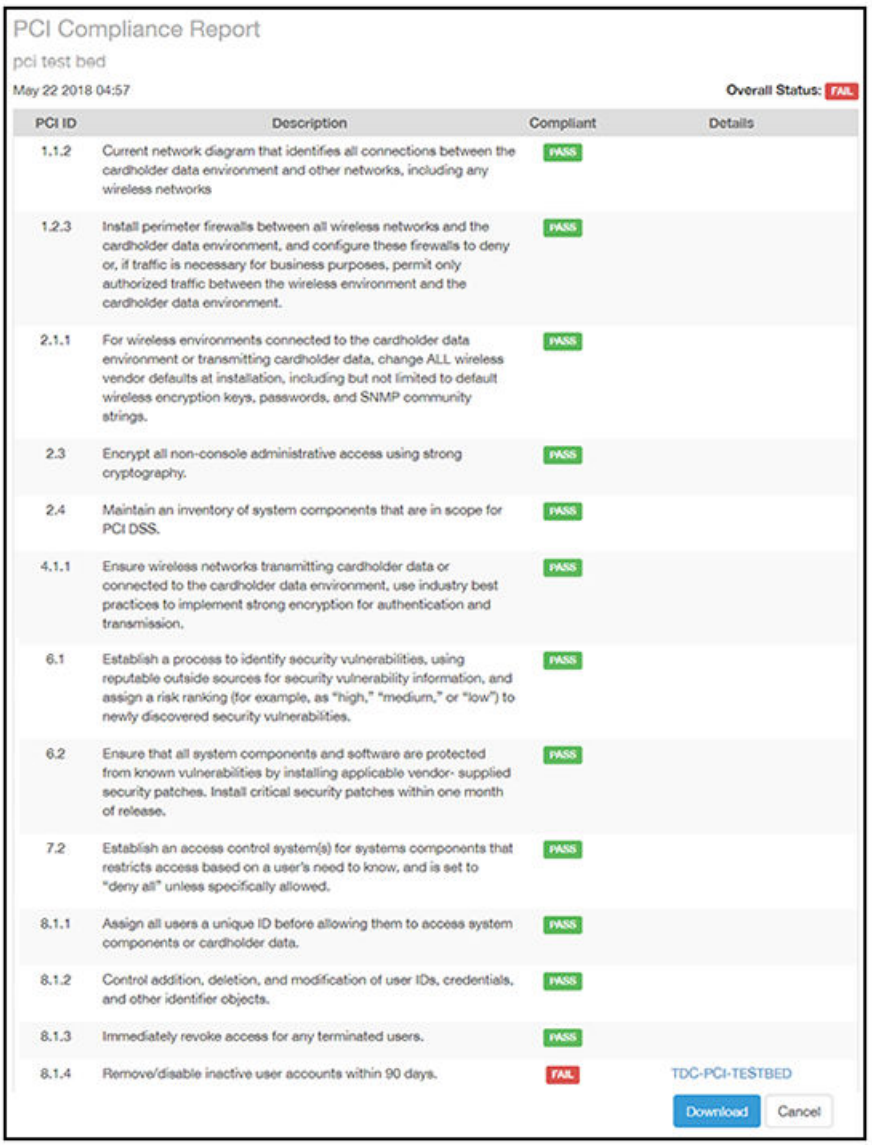
The PCI Profile report gives you an overall status (Pass of Fail) as well as a breakdown of all categories you requested when you created the PCI profile.

Follow the steps below to view and download a copy of your PCI report.

1. From the main PCI Profile screen, an example of which is shown in Figure 234 on page 204, click on either the green "Pass" or red "Fail" button, depending on the report you wish to view.

   The report is displayed, as shown in the following example, where both the overall status is provided (in the upper right) as well as the compliancy of each individual item you chose when you created the PCI profile.

   FIGURE 236 PCI Report Example



2. Click the **Download** button (lower right) to obtain a PDF copy of the report.

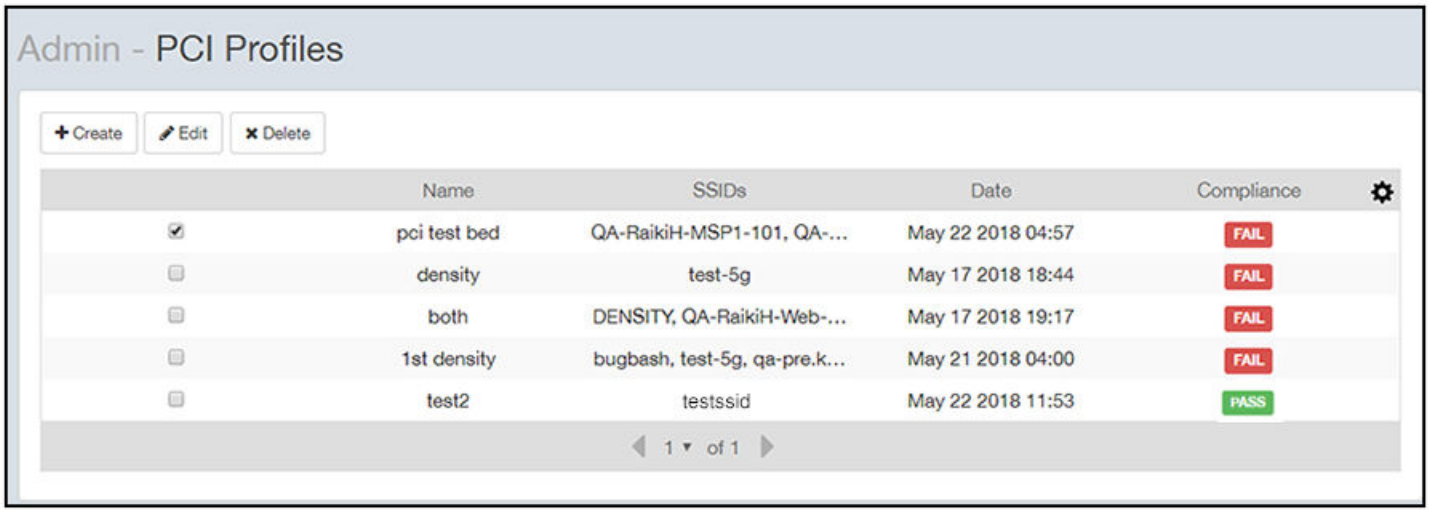
Editing or Deleting a PCI Profile

You can edit or delete any PCI profile, as desired.

To edit or delete a profile, check the box or boxes next to the PCI profile, then click the applicable button - either **Edit** or **Delete** - to perform the desired actions.

> **NOTE**
> You can select and delete multiple profiles simultaneously if desired.

FIGURE 237 Edit or Delete PCI Profiles



Users and Roles

The Users and Roles page of the Admin dashboard allows you to define who can control the various wifi resources in your system.

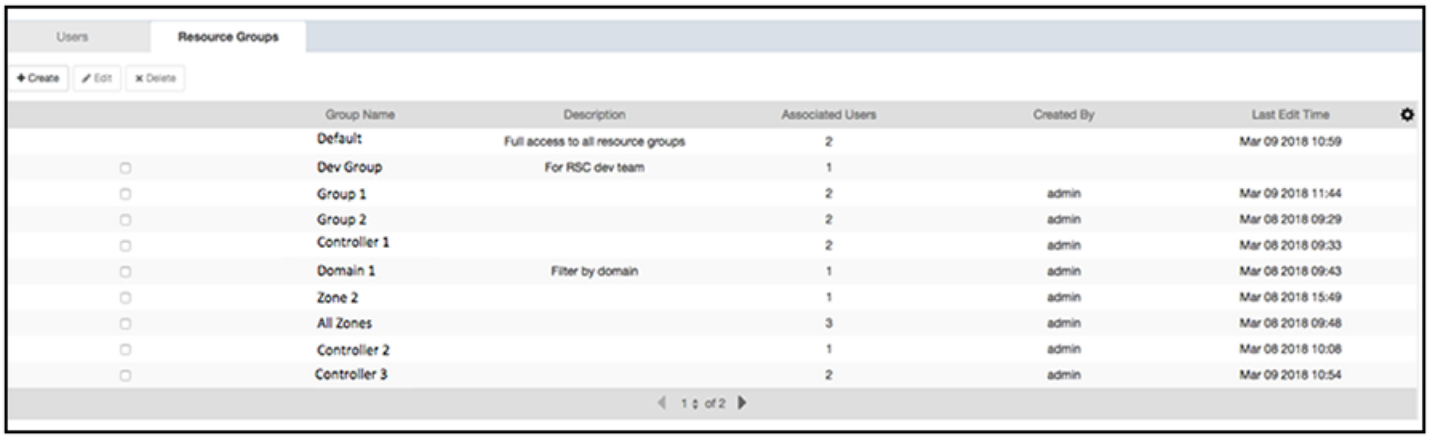
At its most basic level, you perform the following steps to define who has control over these resources:

1. Create resource groups. For each group that you create, you select the Access Points, SSIDs, and other assets that you want to belong to that group. This procedure is described in Creating Resource Groups on page 210.
2. Create users, then give the user a role, then assign the user to an resource group. The Super Admin role automatically is assigned to all resource groups. This procedure is described in Creating Users and Roles on page 212.

Resource Groups

The following screen shows an example of several configured resource groups:

FIGURE 238 Resource Groups Screen



A resource group is made up of your selection of a subset of the wifi assets available in SCI. The filters provided during resource-group selection allow you to select any systems, controllers, domains, zones, AP groups, SSIDs, or individual APs. A resource group allows the Super Admin to confine access for a group of users to a restricted set of wifi assets. Therefore, a resource group is equivalent to a tenant.

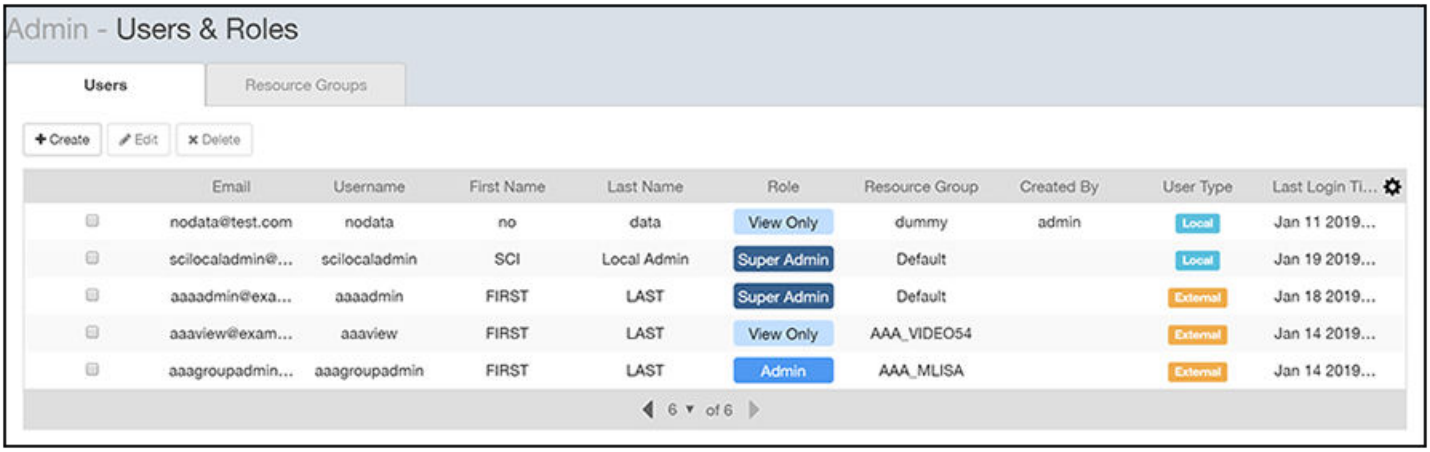
SCI contains a **Default** resource group. This group corresponds to the entire set of wifi assets. The **Default** resource group cannot be edited or deleted.

NOTE
SCI can support up to 2,000 resource groups.

Users and Their Roles

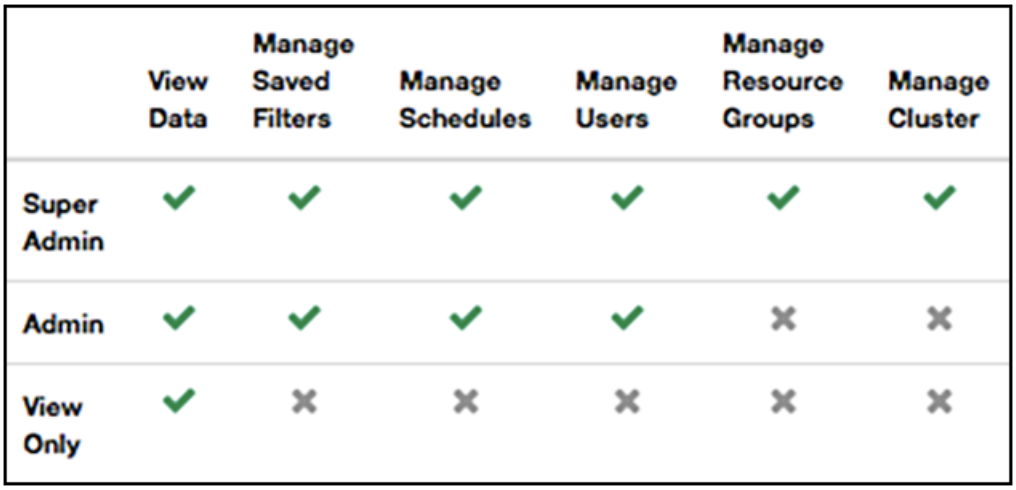
The following screen shows an example of several configured users and their roles, including those belonging to external AAA authentication servers:

FIGURE 239 Users and Roles Screen



Users are uniquely defined by their email address and their username. and each user must be assigned to only one of three possible roles: Super Admin, Admin, and View Only. The following figure shows the access rights of each role.

FIGURE 240 Access Rights for Each User Role



	View Data	Manage Saved Filters	Manage Schedules	Manage Users	Manage Resource Groups	Manage Cluster
Super Admin	✔	✔	✔	✔	✔	✔
Admin	✔	✔	✔	✔	✖	✖
View Only	✔	✖	✖	✖	✖	✖

Note the following information about the Super Admin and Admin roles:

- Super Admin: This role can be assigned *only* to the **Default** resource group. The Super Admin has full access rights to all functionality in SCI. The Super Admin is the only role that can exist within the default resource group.
- Admin: This role exists within a resource group. However, a resource group *can* exist without anyone assigned to the role of Admin.

Creating Resource Groups

You can create resource groups and then assign user roles who can manage various wifi resources in your system.

It is recommended that you first create a resource group, and then create users and roles to assign to the resource group. The reason is that, during user creation, you are required to assign a user to a resource group.

Creating a New Resource Group

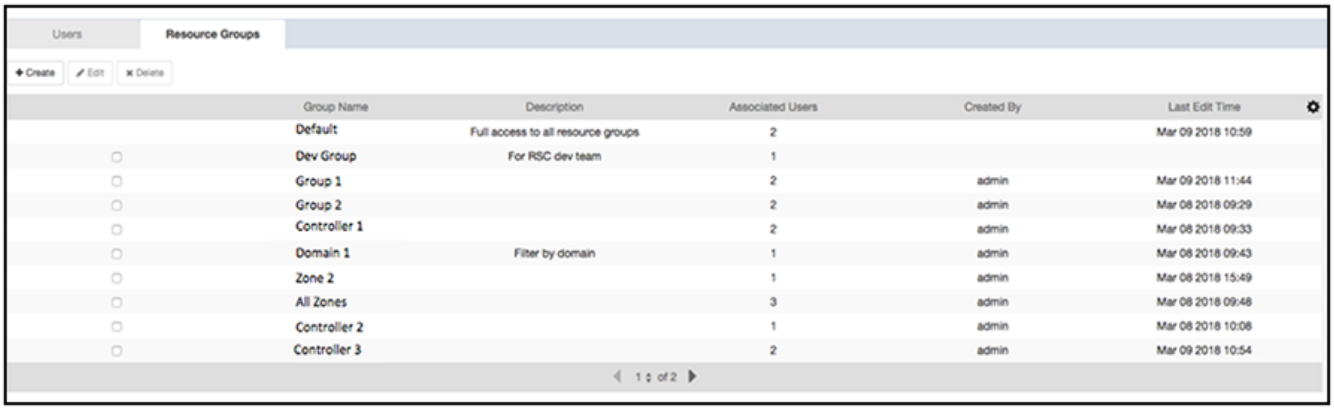
Follow these steps to create a new resource group:

1. In SCI, navigate to **Admin > Users & Roles**.

2. On the **Users & Roles** screen, click the **Resource Groups** tab.

   A screen such as the following appears, assuming that some resource groups have already been configured.

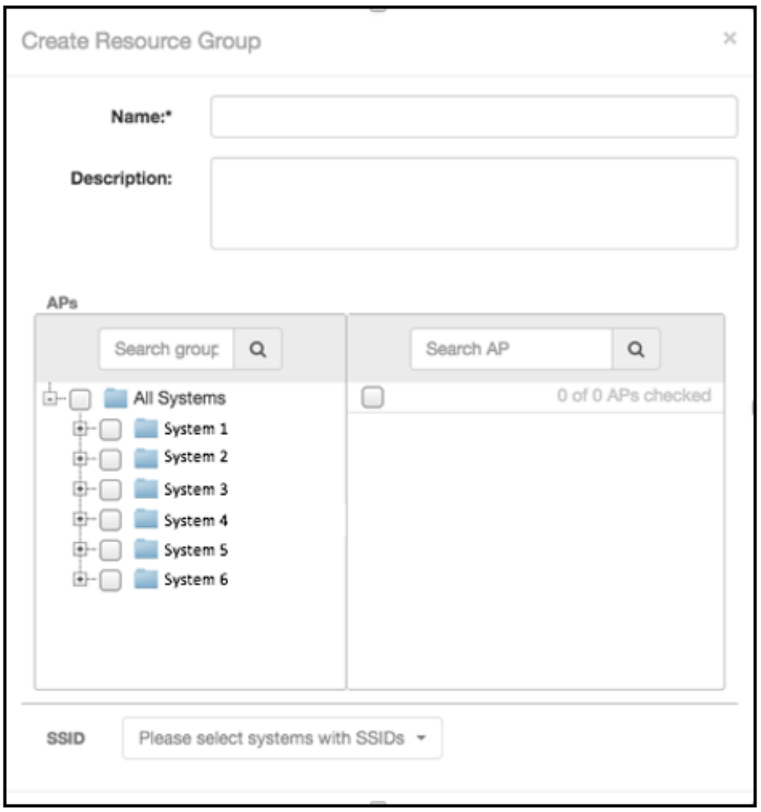
FIGURE 241 Resource Groups Screen Example



3. Click **Create**.

   A popup appears, such as in the example below:

FIGURE 242 Create Resource Group Popup



4. In the **Create Resource Group** popup, do the following:
   a) In the **Name** field, enter a universally unique name for the resource group.
   b) In the **Description** field, enter a useful description of the group for your own information.
   c) In the **APs** section, use the filters to select the desired wifi assets.
   d) Once you select one or more APs, the SSID dropdown is activated, and you can select desired SSIDs.
   e) To complete the configuration of the new resource group, click **Create**.

   The newly configured resource group should now appear in the list of resource groups on the **Users & Roles** screen under the **Resource Groups** tab.

Editing a Resource Group

To edit a resource group, do the following:

1. Click the box to the left of the group you want to edit.
2. Click **Edit**.
3. In the popup, make the desired changes, then click **Update**.

Deleting One or More Resource Groups

To delete resource groups, do the following:

1. Click the box to the left of the group for each group that you want to delete.
2. Click **Delete**.

   NOTE
   All users associated with these groups are also deleted.

Creating Users and Roles

Once you create resource groups, you can create users, assign roles to these users, and assign users to manage one or all resource groups.

It is recommended that you first create a resource group, and then create users and roles to assign to the resource group. The reason is that, during user creation, you are required to assign a user to a resource group.

Creating a New User

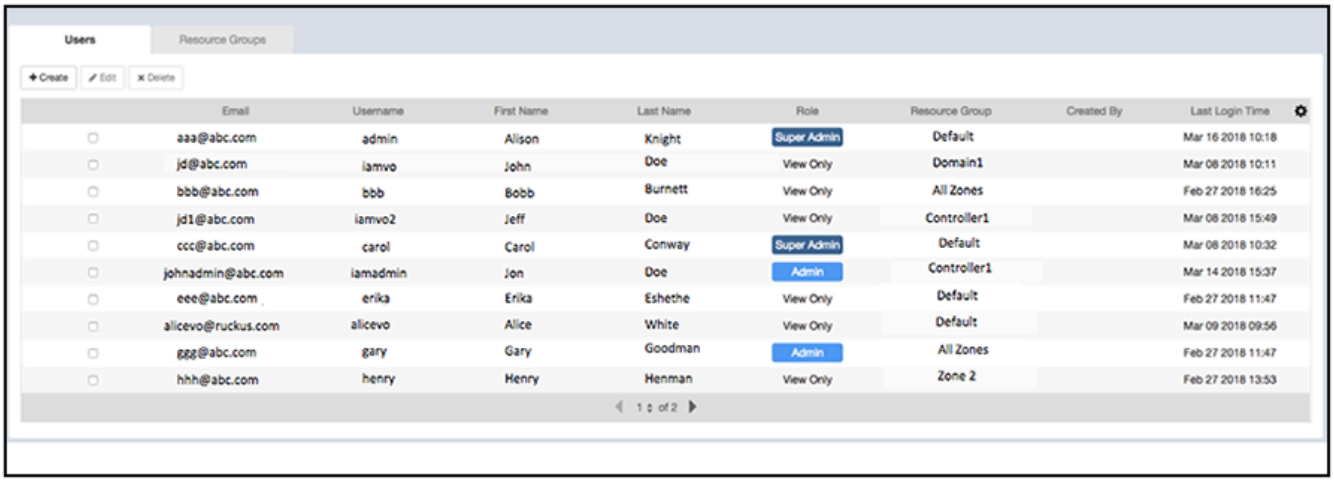
Follow these steps to create a new user:

1. In SCI, navigate to **Admin > Users & Roles**.

2. On the **Users & Roles** screen, click the **Users** tab.

   A screen such as the following appears, assuming there are already configured users and resource groups:

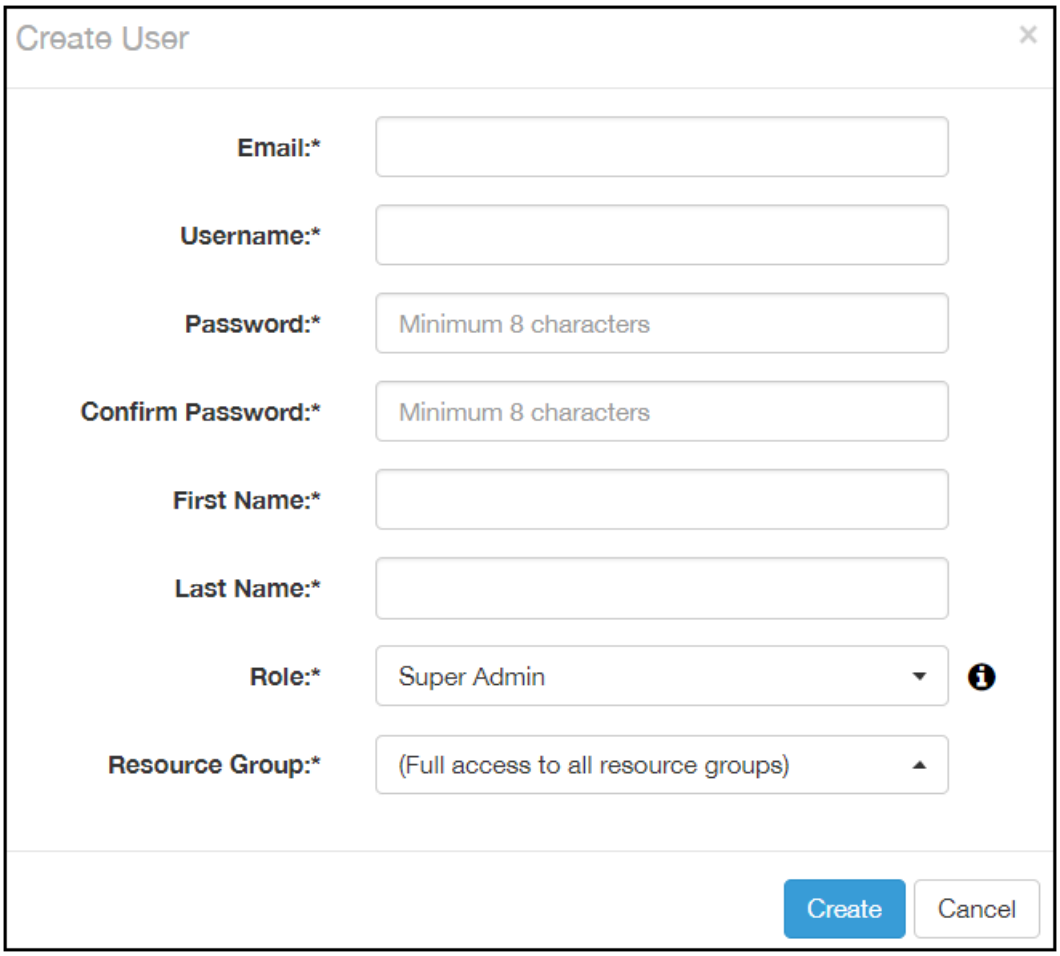
FIGURE 243 Users Screen Example



3. Click **Create**.

   The **Create Users** popup appears:

   FIGURE 244 Create User Popup



4. In the **Create Users** popup, fill out all the information, taking into account the following:
   - All fields are mandatory.
   - Users are uniquely defined by their email address and their username. Therefore, no two users can share the same email address and/or username.
   - The **Role** field has three possible roles: **Super Admin**, **Admin**, and **View Only**. If you select **Super Admin**, then this user automatically has full access to all resource groups, as shown in the popup above. Therefore, a Super Admin is assigned to the **Default** resource group because that group contains the entire set of wifi assets in the system. However, if you select either the **Admin** or **View Only** role for the user, you then need to select only one group from the **Resource Group** dropdown.
5. Click **Create**.

   The newly configured user should now appear in the list of users on the **Users & Roles** screen under the **Users** tab.

Editing a User

To edit a user, do the following:

1. Click the box to the left of the user whose configuration you wish to edit.
2. Click **Edit**.
3. In the popup, make the desired changes, then click **Update**.

Deleting One or More Users

To delete users, do the following:

1. Click the box to the left of the user for all users that you want to delete.
2. Click **Delete**.

> **NOTE**
> Only a Super Admin can delete another Super Admin. However, a Super Admin cannot be demoted to Admin or View Only roles. The only way to demote a Super Admin is to delete the Super Admin user, then recreate the user with the desired role.

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