

Ruckus LTE AP Support Guide

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Document Conventions

The following table lists the text conventions that are used throughout this guide.

TABLE 1 Text Conventions

Convention	Description	Example
monospace	Identifies command syntax examples	<code>device(config)# interface ethernet 1/1/6</code>
bold	User interface (UI) components such as screen or page names, keyboard keys, software buttons, and field names	On the Start menu, click All Programs .
<i>italics</i>	Publication titles	Refer to the <i>Ruckus Small Cell Release Notes</i> for more information.

Notes, Cautions, and Safety Warnings

Notes, cautions, and warning statements may be used in this document. They are listed in the order of increasing severity of potential hazards.

NOTE

A NOTE provides a tip, guidance, or advice, emphasizes important information, or provides a reference to related information.

ATTENTION

An ATTENTION statement indicates some information that you must read before continuing with the current action or task.



CAUTION

A CAUTION statement alerts you to situations that can be potentially hazardous to you or cause damage to hardware, firmware, software, or data.



DANGER

A DANGER statement indicates conditions or situations that can be potentially lethal or extremely hazardous to you. Safety labels are also attached directly to products to warn of these conditions or situations.

Command Syntax Conventions

Bold and italic text identify command syntax components. Delimiters and operators define groupings of parameters and their logical relationships.

Convention	Description
bold text	Identifies command names, keywords, and command options.

Preface

Document Feedback

Convention	Description
<i>italic text</i>	Identifies a variable.
[]	Syntax components displayed within square brackets are optional. Default responses to system prompts are enclosed in square brackets.
{ x y z }	A choice of required parameters is enclosed in curly brackets separated by vertical bars. You must select one of the options.
x y	A vertical bar separates mutually exclusive elements.
< >	Nonprinting characters, for example, passwords, are enclosed in angle brackets.
...	Repeat the previous element, for example, <i>member</i> [<i>member</i> ...].
\	Indicates a “soft” line break in command examples. If a backslash separates two lines of a command input, enter the entire command at the prompt without the backslash.

Document Feedback

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

You can email your comments to Ruckus at #Ruckus-Docs@commscope.com.

When contacting us, include the following information:

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

For example:

- Ruckus SmartZone Upgrade Guide, Release 5.0
- Part number: 800-71850-001 Rev A
- Page 7

Ruckus Product Documentation Resources

Visit the Ruckus website to locate related documentation for your product and additional Ruckus resources.

Release Notes and other user documentation are available at <https://support.ruckuswireless.com/documents>. You can locate the documentation by product or perform a text search. Access to Release Notes requires an active support contract and a Ruckus Support Portal user account. Other technical documentation content is available without logging in to the Ruckus Support Portal.

White papers, data sheets, and other product documentation are available at <https://www.ruckuswireless.com>.

Online Training Resources

To access a variety of online Ruckus training modules, including free introductory courses to wireless networking essentials, site surveys, and Ruckus products, visit the Ruckus Training Portal at <https://training.ruckuswireless.com>.

Contacting Ruckus Customer Services and Support

The Customer Services and Support (CSS) organization is available to provide assistance to customers with active warranties on their Ruckus products, and customers and partners with active support contracts.

For product support information and details on contacting the Support Team, go directly to the Ruckus Support Portal using <https://support.ruckuswireless.com>, or go to <https://www.ruckuswireless.com> and select **Support**.

What Support Do I Need?

Technical issues are usually described in terms of priority (or severity). To determine if you need to call and open a case or access the self-service resources, use the following criteria:

- Priority 1 (P1)—Critical. Network or service is down and business is impacted. No known workaround. Go to the **Open a Case** section.
- Priority 2 (P2)—High. Network or service is impacted, but not down. Business impact may be high. Workaround may be available. Go to the **Open a Case** section.
- Priority 3 (P3)—Medium. Network or service is moderately impacted, but most business remains functional. Go to the **Self-Service Resources** section.
- Priority 4 (P4)—Low. Requests for information, product documentation, or product enhancements. Go to the **Self-Service Resources** section.

Open a Case

When your entire network is down (P1), or severely impacted (P2), call the appropriate telephone number listed below to get help:

- Continental United States: 1-855-782-5871
- Canada: 1-855-782-5871
- Europe, Middle East, Africa, Central and South America, and Asia Pacific, toll-free numbers are available at <https://support.ruckuswireless.com/contact-us> and Live Chat is also available.
- Worldwide toll number for our support organization. Phone charges will apply: +1-650-265-0903

We suggest that you keep a physical note of the appropriate support number in case you have an entire network outage.

Self-Service Resources

The Ruckus Support Portal at <https://support.ruckuswireless.com> offers a number of tools to help you to research and resolve problems with your Ruckus products, including:

- Technical Documentation—<https://support.ruckuswireless.com/documents>
- Community Forums—<https://forums.ruckuswireless.com/ruckuswireless/categories>
- Knowledge Base Articles—<https://support.ruckuswireless.com/answers>
- Software Downloads and Release Notes—https://support.ruckuswireless.com/#products_grid
- Security Bulletins—<https://support.ruckuswireless.com/security>

Using these resources will help you to resolve some issues, and will provide TAC with additional data from your troubleshooting analysis if you still require assistance through a support case or RMA. If you still require help, open and manage your case at https://support.ruckuswireless.com/case_management.

About This Document

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Purpose of the Document

This document provides information on Ruckus Command Line Interface and KPI Visualization tool. It provides details of CLI commands and guidelines to create, save, and print various reports and graphs using KPI Visualization GUI.

Audience

The target audience for this document is Ruckus LTE AP users.

Related Document

Ruckus LTE AP KPI Reference Guide

Command Line Interface

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Overview of Command Line Interface

The Ruckus LTE AP Command Line interface (CLI) is a software tool that enables you to configure and manage LTE APs.

Using the Command Line interface, you can issue commands from an operating system prompt, such as the Microsoft Windows command prompt or a Linux operating system terminal. Each command performs a specific action for configuring device settings or returning information about the status of a specific device feature.

This section describes the Ruckus LTE AP Production CLIs and the requirements for accessing these CLIs.

Production CLI

Based on the network from which CLI is invoked, CLI can operate either as a Production CLI or a Debug CLI. Production CLI provides a limited set of commands when the CLI is invoked from the Enterprise network. On the other hand, if, CLI is invoked from Management Cloud network, a debug CLI with a comprehensive list of commands is invoked. At any given point of time, only one instance of CLI can be invoked per LTE AP.

Requirements

To access the LTE AP CLI, you need the following:

- A computer that you want to designate as administrative computer.
- A network connection to LTE AP.
- An RS-232 serial cable (type depends on the model).

NOTE

It is optional.

- An SSH (secure shell) client program.

Access to LTE AP Command Line Interface

The LTE AP Command Line Interface can be accessed in one of the two ways:

- Using SSH
- Using a Serial Connection

Using SSH

Ensure that the administrative computer and LTE AP are on the same subnet or broadcast domain.

Command Line Interface

Debug CLI

To start and configure the SSH client, perform the following steps.

1. Start PuTTY.
The **PuTTY Configuration** dialog box appears showing the Session screen.
2. In the **Connection Type** field, select SSH.
3. In the **Host Name (or IP address)** field, enter the LTE AP IP address.
4. Click **Open**.
The **PuTTY console** appears displaying the login prompt.
5. After successful login to the terminal, write `LTE_CLI` and press **Enter** to launch the CLI.
6. To access LTE AP P-CLI from enterprise network, at the Login prompt, type "super" as the default username and press **Enter**.

Using a Serial Connection

To start and configure the SSH client, perform the following steps.

1. Start PuTTY.
The **PuTTY Configuration** dialog box appears showing the Session screen.
2. In **Connection** type, select **Serial** if you are connecting through serial cable.
3. Click **Open**.
The **PuTTY Console** appears displaying the login prompt.
4. After successful login to the terminal, write `RSC_CLI` and press **Enter** to launch the CLI.
5. To access LTE AP P-CLI from enterprise network, at the Login prompt, type "super" as the default username and press **Enter**.

Debug CLI

When user accesses CLI via management cloud network then a login prompt is displayed.

Based on the login used, the commands available to the user differs. Following logins are currently supported:

1. super - with this login the user is provided a detailed set of commands.
2. user - with this login the user is provided only a subset of commands. The list of commands is similar to the commands provided to the user in the P-CLI

D-CLI access using SSH from the Cloud Network

Ensure that the administrative computer is in the Cloud network.

To access the D-CLI, perform the following steps:

1. Start PuTTY.
The PuTTY configuration dialog box displays `Session` screen.
2. In the **Connection Type** field, select **SSH**, In the **Host Name or IP address** field, enter the **Virtual IP address** of the AP.
3. Click **Open**.
The PuTTY console displays the login prompt. Write `RSC_CLI` and and press **Enter** to launch the CLI.
4. At the **Login** prompt, type the login name **super/user**.

- At the **Password** prompt, enter the **password**. The PuTTY displays Ruckus LTE AP CLI interface welcome message and the Ruckus prompt.

Top-Level P-CLI Commands

The following table lists the top-level CLI commands available in the privileged mode.

TABLE 2 Top Level Commands

Command	Description
Get	To get the status/statistics.
Set	To configure/change LTE AP parameters.
Control	Control commands.
exit	Ends the CLI session.
help	Shows available commands.

Get Commands

The following are Get commands for Production CLI.

TABLE 3 Dynamic Host Configuration Protocol (DHCP) Parameters

Syntax	Get DHCPParams
Description	To get details of IP Address, Subnet mask, Gateway IP and DNS server IPs of all the LTE AP interfaces. This command takes no input.
Supported Modes	PCLI

TABLE 3 Dynamic Host Configuration Protocol (DHCP) Parameters (continued)

Example	<pre> RSC_P-CLI #>Get DHCPParams ----- InternetGatewayDevice.X_001392_DhcpParams.EpcPlaneDNSServerAddress1 = 10.203.171.38 InternetGatewayDevice.X_001392_DhcpParams.EpcPlaneDNSServerAddress2 = 172.19.61.3 InternetGatewayDevice.X_001392_DhcpParams.EpcPlaneDNSServerAddress3 = 192.168.151.46 InternetGatewayDevice.X_001392_DhcpParams.EpcPlaneGatewayIpAddress = 192.168.151.1 InternetGatewayDevice.X_001392_DhcpParams.EpcPlaneIpAddress = 192.168.151.122 InternetGatewayDevice.X_001392_DhcpParams.EpcPlaneSubnetMask = 255.255.255.0 InternetGatewayDevice.X_001392_DhcpParams.MgtPlaneDNSServerAddress1 = 10.203.171.38 InternetGatewayDevice.X_001392_DhcpParams.MgtPlaneDNSServerAddress2 = 172.19.61.3 InternetGatewayDevice.X_001392_DhcpParams.MgtPlaneDNSServerAddress3 = 192.168.151.46 InternetGatewayDevice.X_001392_DhcpParams.MgtPlaneGatewayIpAddress = 192.168.151.1 InternetGatewayDevice.X_001392_DhcpParams.MgtPlaneIpAddress = 192.168.151.122 InternetGatewayDevice.X_001392_DhcpParams.MgtPlaneSubnetMask = 255.255.255.0 InternetGatewayDevice.X_001392_DhcpParams.PtpPlaneDNSServerAddress1 = 10.203.171.38 InternetGatewayDevice.X_001392_DhcpParams.PtpPlaneDNSServerAddress2 = 172.19.61.3 InternetGatewayDevice.X_001392_DhcpParams.PtpPlaneDNSServerAddress3 = 192.168.151.46 InternetGatewayDevice.X_001392_DhcpParams.PtpPlaneGatewayIpAddress = 192.168.151.1 InternetGatewayDevice.X_001392_DhcpParams.PtpPlaneIpAddress = 192.168.151.122 InternetGatewayDevice.X_001392_DhcpParams.PtpPlaneSubnetMask = 255.255.255.0 ----- </pre>
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TABLE 4 Local SCR Query

Syntax	Get LocalSCRQuery
Description	To get details of the local LTE AP configuration. It provides information about the management cloud IPsec server and HeMS IP addresses. This command takes no input.
Supported Modes	PCLI
Example	<pre> RSC_P-CLI #>Get LocalSCRQuery ----- InternetGatewayDevice.ManagementServer.URL = http://10.98.63.202:8080/ftacs/ACS ----- InternetGatewayDevice.X_001392_FAPMgmtSecGW.SecGWServer1 = 104.197.162.14 InternetGatewayDevice.X_001392_FAPMgmtSecGW.SecGWServer2 = InternetGatewayDevice.X_001392_FAPMgmtSecGW.SecGWServer3 = ----- </pre>

TABLE 5 Alarm History

Syntax	Get AlarmHistory
Description	To display the historical details of past alarms.
Supported Modes	PCLI

TABLE 5 Alarm History (continued)

<p>Example</p>	<pre> RSC_P-CLI #>Get AlarmHistory ----- ----- InternetGatewayDevice.FaultMgmt.HistoryEvent.1.AdditionalInformation = Alarm is triggered when GPS session could not be maintained InternetGatewayDevice.FaultMgmt.HistoryEvent.1.AdditionalText = InternetGatewayDevice.FaultMgmt.HistoryEvent.1.AlarmIdentifier = 901 InternetGatewayDevice.FaultMgmt.HistoryEvent.1.EventTime = 2017-10-01T01:26:27 InternetGatewayDevice.FaultMgmt.HistoryEvent.1.EventType = Equipment Alarm InternetGatewayDevice.FaultMgmt.HistoryEvent.1.ManagedObjectInstance = eNB.Loc.gpsLost InternetGatewayDevice.FaultMgmt.HistoryEvent.1.NotificationType = ClearedAlarm InternetGatewayDevice.FaultMgmt.HistoryEvent.1.PerceivedSeverity = CLEARED InternetGatewayDevice.FaultMgmt.HistoryEvent.1.ProbableCause = Location source is missing or lost InternetGatewayDevice.FaultMgmt.HistoryEvent.1.SpecificProblem = GPS session could not be established or maintained InternetGatewayDevice.FaultMgmt.HistoryEvent.2.AdditionalInformation = Alarm is triggered when GPS session could not be maintained InternetGatewayDevice.FaultMgmt.HistoryEvent.2.AdditionalText = Location source is missing or lost. InternetGatewayDevice.FaultMgmt.HistoryEvent.2.AlarmIdentifier = 901 InternetGatewayDevice.FaultMgmt.HistoryEvent.2.EventTime = 2017-10-01T02:42:48 InternetGatewayDevice.FaultMgmt.HistoryEvent.2.EventType = Equipment Alarm InternetGatewayDevice.FaultMgmt.HistoryEvent.2.ManagedObjectInstance = eNB.Loc.gpsLost InternetGatewayDevice.FaultMgmt.HistoryEvent.2.NotificationType = NewAlarm InternetGatewayDevice.FaultMgmt.HistoryEvent.2.PerceivedSeverity = Major InternetGatewayDevice.FaultMgmt.HistoryEvent.2.ProbableCause = Location source is missing or lost InternetGatewayDevice.FaultMgmt.HistoryEvent.2.SpecificProblem = GPS session could not be established or maintained InternetGatewayDevice.FaultMgmt.HistoryEvent.3.AdditionalInformation = Alarm is triggered when GPS session could not be maintained InternetGatewayDevice.FaultMgmt.HistoryEvent.3.AdditionalText = InternetGatewayDevice.FaultMgmt.HistoryEvent.3.AlarmIdentifier = 901 InternetGatewayDevice.FaultMgmt.HistoryEvent.3.EventTime = 2017-10-01T02:50:02 InternetGatewayDevice.FaultMgmt.HistoryEvent.3.EventType = Equipment Alarm InternetGatewayDevice.FaultMgmt.HistoryEvent.3.ManagedObjectInstance = eNB.Loc.gpsLost InternetGatewayDevice.FaultMgmt.HistoryEvent.3.NotificationType = ClearedAlarm InternetGatewayDevice.FaultMgmt.HistoryEvent.3.PerceivedSeverity = CLEARED InternetGatewayDevice.FaultMgmt.HistoryEvent.3.ProbableCause = Location source is missing or lost InternetGatewayDevice.FaultMgmt.HistoryEvent.3.SpecificProblem = GPS session could not be established or maintained InternetGatewayDevice.FaultMgmt.HistoryEvent.4.AdditionalInformation = Alarm is triggered when GPS session could not be maintained InternetGatewayDevice.FaultMgmt.HistoryEvent.4.AdditionalText = Location source is missing or lost. InternetGatewayDevice.FaultMgmt.HistoryEvent.4.AlarmIdentifier = 901 InternetGatewayDevice.FaultMgmt.HistoryEvent.4.EventTime = 2017-10-01T03:46:12 InternetGatewayDevice.FaultMgmt.HistoryEvent.4.EventType = Equipment Alarm InternetGatewayDevice.FaultMgmt.HistoryEvent.4.ManagedObjectInstance = eNB.Loc.gpsLost InternetGatewayDevice.FaultMgmt.HistoryEvent.4.NotificationType = NewAlarm InternetGatewayDevice.FaultMgmt.HistoryEvent.4.PerceivedSeverity = Major </pre>
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TABLE 6 Ping FQDN or IP Address

Syntax	Get ping <FQDN or IP address>
Description	To get the ping response for a given server FQDN or IP address. LTE AP must verify the provided administrator input for correctness before executing the command.
Supported Modes	PCLI
Example	<pre>RSC_P-CLI #>Get ping 192.168.151.1 64 bytes from 192.168.151.1: icmp_seq=1 ttl=255 time=5.97 ms 64 bytes from 192.168.151.1: icmp_seq=2 ttl=255 time=0.588 ms 64 bytes from 192.168.151.1: icmp_seq=3 ttl=255 time=0.596 ms 64 bytes from 192.168.151.1: icmp_seq=4 ttl=255 time=0.573 ms 64 bytes from 192.168.151.1: icmp_seq=5 ttl=255 time=1.35 ms --- 192.168.151.1 ping statistics --- 5 packets transmitted, 5 received, 0% packet loss, time 3999ms rtt min/avg/max/mdev = 0.573/1.817/5.971/2.098 ms <-----HostName : 192.168.151.1 is pingable-----></pre>

TABLE 7 Diagnosis NS Lookup

Syntax	Diagnosis GetNslookup
Description	To get resolved FQDN IP.
Supported Modes	PCLI
Example	<pre>RSC_P-CLI #>Diagnosis GetNslookup ----- InternetGatewayDevice.NSLookupDiagnostics.Result.1.AnswerType = NonAuthoritative InternetGatewayDevice.NSLookupDiagnostics.Result.1.DNSServerIP = 10.203.171.38 InternetGatewayDevice.NSLookupDiagnostics.Result.1.HostNameReturned = www.google-sas.com InternetGatewayDevice.NSLookupDiagnostics.Result.1.IPAddresses = 104.197.61.50,2600:1901:0:d53c:: InternetGatewayDevice.NSLookupDiagnostics.Result.1.ResponseTime = 30 InternetGatewayDevice.NSLookupDiagnostics.Result.1.Status = Success -----</pre>

TABLE 8 Traceroute FQDN or IP Address

Syntax	Get Traceroute <FQDN or IP address>
Description	To get the trace route of the FQDN or IP address.
Supported Modes	PCLI
Example	<pre>RSC_P-CLI #>Get Traceroute 172.19.61.42 traceroute to 172.19.61.42 (172.19.61.42), 30 hops max, 38 byte packets 1 192.168.151.1 (192.168.151.1) 7.565 ms 0.508 ms 0.507 ms 2 172.19.61.42 (172.19.61.42) 0.271 ms 0.242 ms 0.243 ms <-----Traceroute of HostName : 172.19.61.42 Success-----></pre>

TABLE 9 VLAN Configuration

Syntax	Get VLANConfig
Description	To show the VLAN configuration.
Supported Modes	PCLI
Example	<pre>RSC_P-CLI #>Get VLANConfig ----- ----- InternetGatewayDevice.Layer2Bridging.Bridge.1.VLAN.1.VLANEnable = false InternetGatewayDevice.Layer2Bridging.Bridge.1.VLAN.1.VLANID = 1 InternetGatewayDevice.Layer2Bridging.Bridge.1.VLAN.1.VLANName = MGMT InternetGatewayDevice.Layer2Bridging.Bridge.1.VLAN.2.VLANEnable = false InternetGatewayDevice.Layer2Bridging.Bridge.1.VLAN.2.VLANID = 1 InternetGatewayDevice.Layer2Bridging.Bridge.1.VLAN.2.VLANName = EPC InternetGatewayDevice.Layer2Bridging.Bridge.1.VLAN.3.VLANEnable = false InternetGatewayDevice.Layer2Bridging.Bridge.1.VLAN.3.VLANID = 1 InternetGatewayDevice.Layer2Bridging.Bridge.1.VLAN.3.VLANName = PTP -----</pre>

TABLE 10 Bridge Configuration

Syntax	Get BridgeConfig
Description	To show the Bridge Configuration details.
Supported Modes	PCLI
Example	<pre>RSC_P-CLI #>Get BridgeConfig ----- bridge name bridge id STP enabled interfaces</pre>

TABLE 11 Software Version

Syntax	Get SWVersion
Description	To get software version currently installed in the CPE.
Supported Modes	PCLI
Example	<pre>RSC_P-CLI #>Get SWVersion ----- InternetGatewayDevice.DeviceInfo.SoftwareVersion = 02.00.01.0014.f79aa1cd64ea</pre>

TABLE 12 Current Alarms

Syntax	Get CurrentAlarms
Description	To display the current alarms that have been generated by controller.
Supported Modes	PCLI

TABLE 12 Current Alarms (continued)

Example	<pre> RSC_P-CLI #>Get CurrentAlarms ----- InternetGatewayDevice.FaultMgmt.CurrentAlarm.1.AdditionalInformation = Received Indication from LTE for OP state is disabled InternetGatewayDevice.FaultMgmt.CurrentAlarm.1.AdditionalText = LTE Radio OP State is disabled InternetGatewayDevice.FaultMgmt.CurrentAlarm.1.AlarmChangedTime = InternetGatewayDevice.FaultMgmt.CurrentAlarm.1.AlarmIdentifier = 105 InternetGatewayDevice.FaultMgmt.CurrentAlarm.1.AlarmRaisedTime = 2018-01-29T08:43:49 InternetGatewayDevice.FaultMgmt.CurrentAlarm.1.EventType = E_LTE_OP_STATE_DISABLED InternetGatewayDevice.FaultMgmt.CurrentAlarm.1.ManagedObjectInstance = eNB.Lte.OPStateDown InternetGatewayDevice.FaultMgmt.CurrentAlarm.1.PerceivedSeverity = Minor InternetGatewayDevice.FaultMgmt.CurrentAlarm.1.ProbableCause = OP State is disabled InternetGatewayDevice.FaultMgmt.CurrentAlarm.1.SpecificProblem = LTE Radio OpState is disabled ----- </pre>
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TABLE 13 Board Information

Syntax	Get BoardInfo
Description	To get information of the Board device.
Supported Modes	PCLI
Example	<pre> RSC_P-CLI #>Get BoardInfo ----- InternetGatewayDevice.DeviceInfo.HardwareVersion = 52 InternetGatewayDevice.DeviceInfo.ModelName = SKU B48: P01-Q910-US01 InternetGatewayDevice.DeviceInfo.SerialNumber = 461629000067 InternetGatewayDevice.DeviceInfo.X_001392_BoardInfo.AntennaType = Beam flex InternetGatewayDevice.DeviceInfo.X_001392_BoardInfo.NIType = In band InternetGatewayDevice.DeviceInfo.X_001392_BoardInfo.RegulatoryDomain = US InternetGatewayDevice.DeviceInfo.X_001392_BoardInfo.WlanEnabled = Disabled ----- </pre>

Set Commands

Following Set command is used for Production CLI.

TABLE 14 Default Hems URL and Default Gateway

Parameters	CloudSCRQuery
Syntax	Set CloudSCRQuery
Description	<p>The command queries about SCR and provides information about the management cloud IPSec server and HeMS IP addresses. This command takes no input.</p> <p style="text-align: center;">NOTE The command is essentially a manually-invoked SCR query; the response from the SCR updates the LTE AP's data model.</p>
Supported Modes	PCLI

TABLE 14 Default Hems URL and Default Gateway (continued)

Example	<pre>RSC_P-CLI #>Set CloudSCRQuery ----- ----- Command successful ----- -----</pre>
---------	--

TABLE 15 Diagnosis

Parameters	NA
Syntax	Diagnosis SetNslookup HostName www.google-sas.com
Description	The command diagnose FQDN and IP address.
Supported Modes	PCLI
Example	<pre>RSC_P-CLI #>Diagnosis SetNslookup HostName www.google-sas.com ----- ----- Command successful ----- -----</pre>

Control Commands

The following section provides information about the Control commands for Production CLI.

TABLE 16 Restart

Syntax	Control restart
Description	To restart the device.
Supported Modes	PCLI

TABLE 17 Factory Reset

Syntax	Control FactoryReset
Description	To reset LTE AP to factory defaults.
Supported Modes	PCLI

Exit Command

The following table describes the exit command.

TABLE 18 Exit Command

Syntax	exit
Description	To exit from the Command Line Interface.
Example	RSC_P-CLI #>exit

Help Command

Use the help command to display all commands that the Ruckus LTE AP CLI supports.

Using the "?" command or tab displays the list of commands that are available within a specific context.

For example:

To display commands within the debug context, enter the following command for tab:

```
RSC_P-CLI #>
```

Example of Help command:

```
RSC_P-CLI #>help
```

Control -- Control commands

Get -- To get status and statistics

Set -- To configure/change LTE AP parameters.

exit -- To exit from LTE AP CLI.

NOTE

Help command can be executed in sub-trees also.

```
RSC_P-CLI #>control
```

```
RSC_P-CLI Control#>help
```

RESTART... -- To restart/shutdown LTE AP.

FactoryReset... -- Factory Reset

AdminState [--AdminState] <CHOICE true|false> -- To change the LTE AP Admin state.

State... -- To exit from Control, write '!' or '..' or 'end' or 'back'.

Ruckus KPI Visualization GUI

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KPI Visualization GUI Setup

Below sections describe steps to be followed to install Jasper Server, install LTE AP Jasper reports binary, and configure the data-sources.

Installation of Jasper Server

KPI visualization GUI works on Jasper report server community edition (Copyright: TIBCO Software, Inc).

Installation Pre-Requisites

Before installing Jasper server, ensure that the target system fulfils the following pre-requisites.

- Root privileges are available while installing Jasper server.
- Ensure server with following hardware configuration is used:

TABLE 19 Server Hardware Configuration

Resource	Footprint	Minimum	Recommended
Disk	~1.3 Gigabytes	10 GB free	40 GB +
RAM		4 GB	8 GB +
Processor		2 core minimum	2.5 GHz + multi-core Pentium for Windows, Mac, and Linux

- Pre-installed Python 2.7 and above.
- Pre-installed Mozilla Firefox browser (39.0.3 and above).
- LTE AP release rsc_main_2.0_19 and rsc_1.3_18 and above.
- Necessary hardware and software requirements are fulfilled. The hardware and software requirements are similar to Jasper server requirements.

For more information, check the following link.

<http://community.jaspersoft.com/documentation/jasperreports-server-install-guide/v561/system-requirements>

- Download only **community** version of Jasper server according to your Linux server, jasperreports-server-cp-6.3.0-linux-x64-installer.run for 64-bit Linux and jasperreports-server-cp-6.3.0-linux-x86-installer.run for 32-bit Linux (only 6.3.0 version is supported). The community version of Jasper server is available at

<http://community.jaspersoft.com/project/jasperreports-server/releases>

NOTE

Before starting KPI offline script, close CLI and postgres terminals.

Manual Installation

Manual installation of Jasper server includes the following steps.

- Install Jasper server
- Import postgres settings
- Configure DB
- Start data collection scripts

Install Jasper Server

Execute the following commands where Jasper server executable (jasperreports-server-cp-6.3.0-linux-x64-installer.run) is placed.

1. Provide executable permission to Jasper server binary.

```
chmod +x jasperreports-server-cp-6.3.0-linux-x64-installer.run
```

2. Run Jasper server binary.

```
./jasperreports-server-cp-6.3.0-linux-x64-installer.run
```

3. Select custom installation option as mentioned below.

```
Press [Enter] to continue:
Do you accept this license? [y/n]: y
Please choose an install option below:
[1] Install All Components and Samples (requires disk space of: 1.5 GB)
[2] Custom Install
Please choose an option [1]:2
```

4. Provide Installation folder (choose a path on the disk where you have enough space).

```
Please, choose a folder to install JasperReports Server CP 6.3.0
Select a folder [/opt/jasperreports-server-cp-6.3.0]: /opt/jasperreports-server-cp-6.3.0
```

5. Select **bundled Tomcat** from the given options.

```
Please select the Tomcat configuration you want to use
[1] I want to use the bundled Tomcat
[2] I want to use an existing Tomcat
Please choose an option [1]:1
```

6. Select **bundled PostgreSQL database** from the given options.

```
Please select which database configuration you want to use
[1] I want to use the bundled PostgreSQL database
[2] I want to use an existing PostgreSQL database
Please choose an option [1]: 1
Setup will try to install new databases and will overwrite any existing duplicate. Do you want to
continue? [Y/n]
: Y
```

7. Provide Tomcat Port Configuration.

```
Please enter the Tomcat configuration parameters you want to use.
Tomcat Server Port: [8080]: 8080
```



```
Tomcat Shutdown Port: [8005]: 8005  
Tomcat AJP Port: [8009]: 8009
```

8. Provide port number to start the database server for Jasper.

```
Please enter the port of your database.  
Database Server port [5432]: 5432
```

9. Final Installation.

```
Setup is now ready to begin installing JasperReports Server CP 6.0.1 on your computer.  
Do you want to continue? [Y/n]: Y
```

Installation is completed successfully.

10. Update the iptables for Jasper server.

Ports used for tomcat server and database should be updated in the **iptables** (i.e /etc/sysconfig/iptables) file.

```
iptables -A INPUT -i em2 -p tcp --dport 8080 -m state --state NEW,ESTABLISHED -j ACCEPT  
iptables -A OUTPUT -o em2 -p tcp --sport 8080 -m state --state ESTABLISHED -j ACCEPT
```

11. Execute the following command.

service iptables restart

12. Go to the folder where Jasper Reports server CP 6.3.0 was installed.

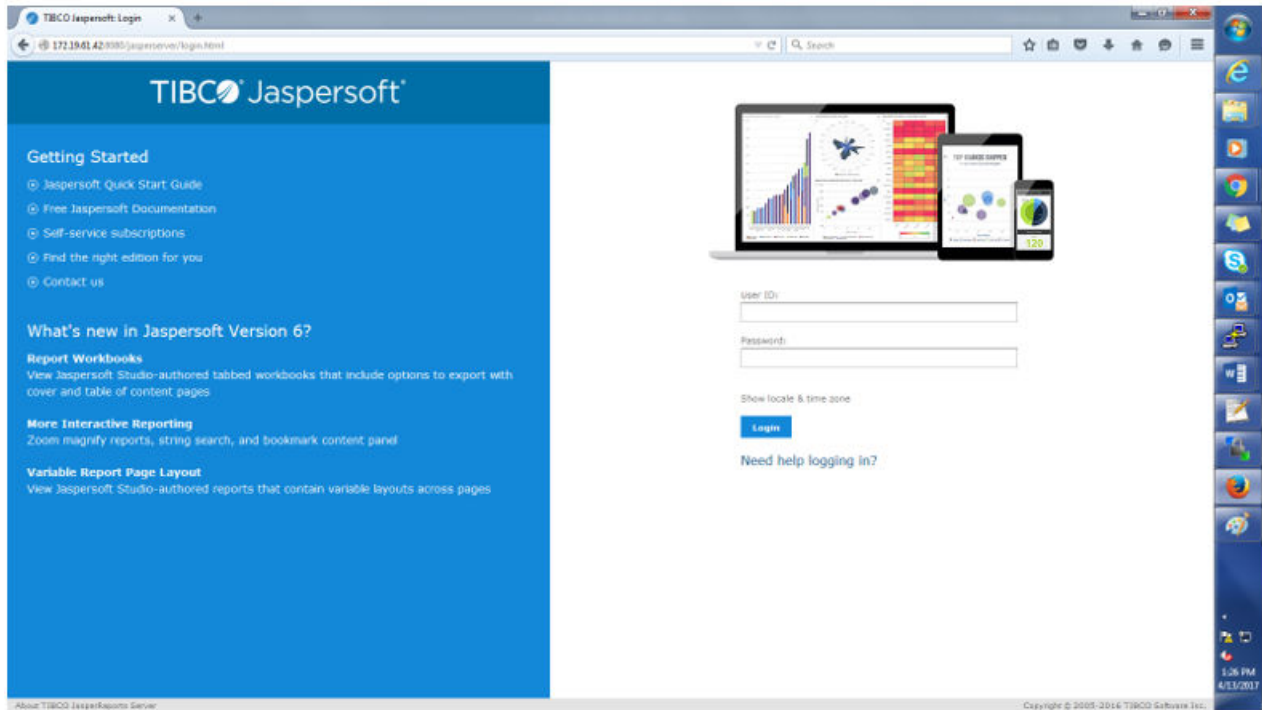
13. Execute ctlscript.sh script for start Jasper server (root permission required for restarting jasper server).

```
/opt/jasperreports-server-cp-6.3.0/ctlscript.sh start
```

14. Try accessing URL, <http://<server-ip>:8080/jasperserver> from browser.

The following screen appears.

FIGURE 1 Jasper Login screen



Installation of MQTT Client

Perform the following steps to install MQTT client.

1. Use the following command to install MQTT client.

pip install paho-mqtt

2. You can also install MQTT client from the repository.

```
git clone https://github.com/eclipse/paho.mqtt.python.git
cd org.eclipse.paho.mqtt.python.git
python setup.py install
```

Installation of Protobuf 3.3

Perform the following steps to install Protobuf 3.3.

1. Untar Package protobuf-python-3.3.0.tar.gz.
2. **cd protobuf-3.3.0/**

Run the following commands.

\$/configure

\$ make

\$ make check

\$ sudo make install

```
$ sudo ldconfig # refresh shared library cache
```

3. cd python

Run the following commands.

```
$ python setup.py build
```

```
$ python setup.py test
```

```
$ python setup.py install
```

Installation of Python Package

Execute the following commands to install Python package.

```
yum install python-pip
```

```
pip install paho-mqtt==1.2.3
```

```
pip install pexpect
```

```
pip install apscheduler==2.1.2
```

```
yum install python-psycpg2
```

```
pip install libpq-dev==9.4.3 psycpg2
```

```
yum install gcc-c++
```

```
sudo yum install python-devel
```

```
sudo yum install libffi-devel
```

```
sudo yum install python-devel postgresql-devel
```

```
pip install protobuf==3.4.0
```

```
pip install paramiko==1.7.6
```

Start postgres Process

Perform the following steps to start postgres process.

1. Make soft link for psql and pg_dump.

```
ln -s /opt/jasperreports-server-cp-6.3.0/postgresql/bin/pg_dump /bin/pg_dump  
ln -sf /opt/jasperreports-server-cp-6.3.0/postgresql/bin/psql /bin/psql
```

2. Start psql server on postgres db port which you have provided during Jasper server installation (i.e. 5432).

```
/opt/jasperreports-server-cp-6.3.0/postgresql/bin/psql -p 5432 -U postgres postgres
```

NOTE

In case you face authentication failure during login to postgres, follow troubleshooting step as mentioned below.

```
-bash-4.2# /opt/jasperreports-server-cp-6.3.0/postgresql/bin/psql -p 5432 -U postgres postgres  
Password for user postgres:  
psql.bin: FATAL: password authentication failed for user "postgres"  
-bash-4.2#
```

- a. Change METHOD of host to **trust** which was previously **md5** in the **pg_hba.conf** file as follows.

```
-----
# IPv4 local connections:
host      all             all             127.0.0.1/32    trust
-----
```

- b. Restart the ctlscrip.

```
bash-4.2# /opt/jasperreports-server-cp-6.3.0/ctlscrip.sh restart :
waiting for server to shut down.....
pg_ctl.bin: server does not shut down
HINT: The "-m fast" option immediately disconnects sessions rather
waiting for session-initiated disconnection.
```

- c. Run the following command.

```
postgres=# ALTER USER postgres WITH PASSWORD 'abc123';
```

- d. Revert the changes of `pg_hba.conf`.

```
# TYPE  DATABASE  USER          ADDRESS          METHOD
local   postgres  postgres     peer
# "local" is for Unix domain socket connections only
local   all       all          md5
# IPv4 local connections:
host    all       all          127.0.0.1/32    md5
# IPv6 local connections:
host    all       all          ::1/128         md5
```

- e. Restart `ctlscrip.sh` again.

```
bash-4.2# /opt/jasperreports-server-cp-6.3.0/ctlscrip.sh restart
```

- f. Try Step 2 again as mentioned below and you will be able to login into postgres DB.

```
-bash-4.2# /opt/jasperreports-server-cp-6.3.0/postgresql/bin/psql -p 5432 -U postgres postgres
Password for user postgres:
psql.bin (9.3.9)
Type "help" for help.
postgres=#
```

3. Create the database and check the database list.

```
postgres=# CREATE DATABASE rsc_kpi_visualisation_db_ctech;
CREATE DATABASE
postgres=# CREATE DATABASE rsc_kpi_visualisation_db_cary;
CREATE DATABASE
postgres=# CREATE DATABASE rsc_kpi_visualisation_db_woburn;
CREATE DATABASE
postgres=# CREATE DATABASE rsc_kpi_visualisation_db_sunnywale;
CREATE DATABASE
```

```
postgres=# \l
                                List of databases
-----+-----+-----+-----+-----+-----+-----
Name          | Owner   | Encoding | Collate | Ctype  | Access privileges
-----+-----+-----+-----+-----+-----+-----
foodmart      | jasperdb | UTF8     | C       | C      |
jasperserver  | jasperdb | UTF8     | C       | C      |
postgres      | postgres | UTF8     | C       | C      |
rsc_kpi_visualisation_db_cary | postgres | UTF8     | C       | C      |
rsc_kpi_visualisation_db_ctech | postgres | UTF8     | C       | C      |
```

```
rsc_kpi_visualisation_db_sunnywale | postgres | UTF8 | C | C |  
rsc_kpi_visualisation_db_woburn | postgres | UTF8 | C | C |  
  
postgres=#postgres=# \q  
-bash-4.2#
```

NOTE

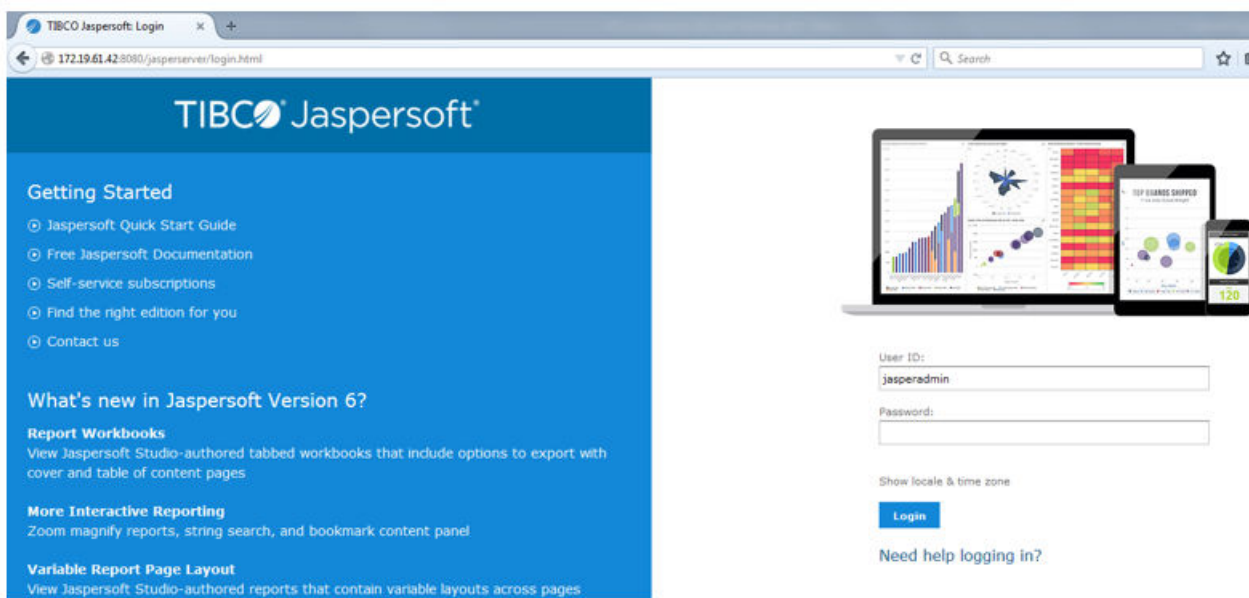
Database can also be created using python db_create.py.

Import Postgres Settings

Perform the following steps to import postgres settings which are provided with the build.

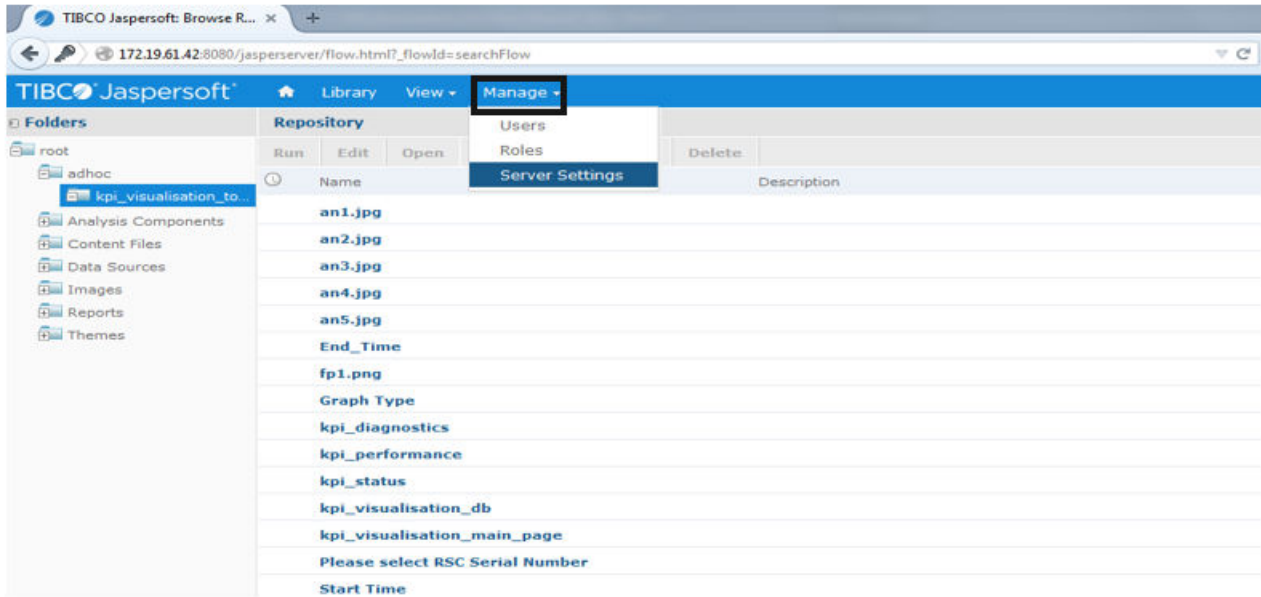
1. Administrator should log in with the following credentials.
 - **username:** jasperadmin
 - **password:** jasperadmin

FIGURE 2 Login Screen



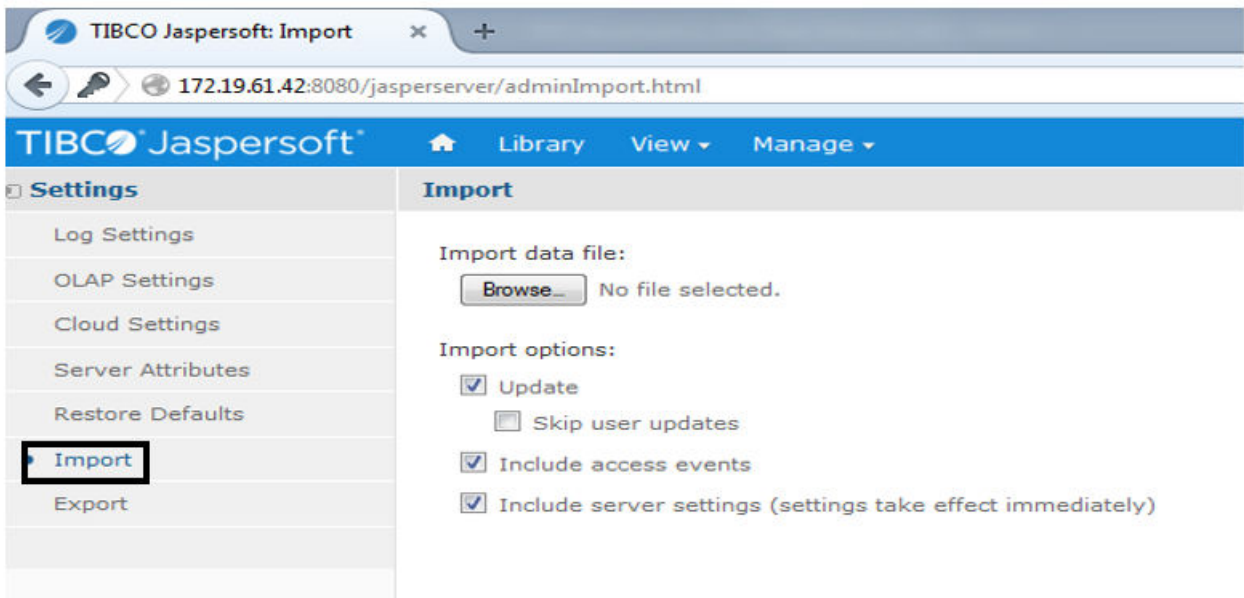
2. Click **Manage > Server Settings**.

FIGURE 3 Manage > Server Settings Menu Option



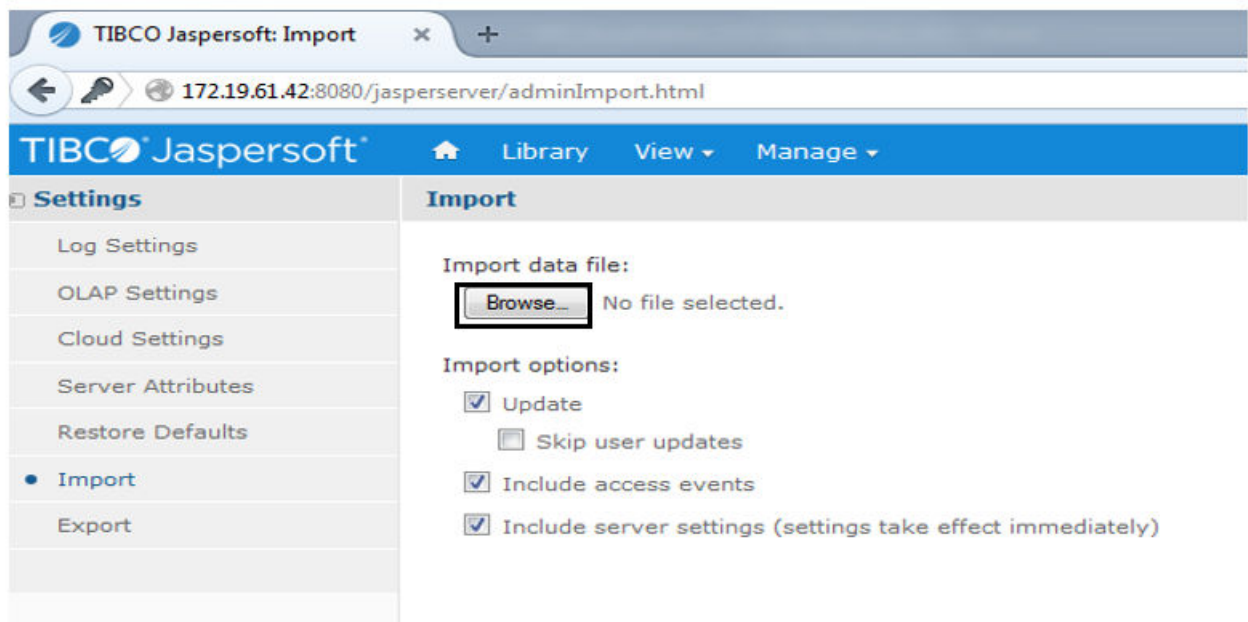
3. Click Import.

FIGURE 4 Import Menu Option



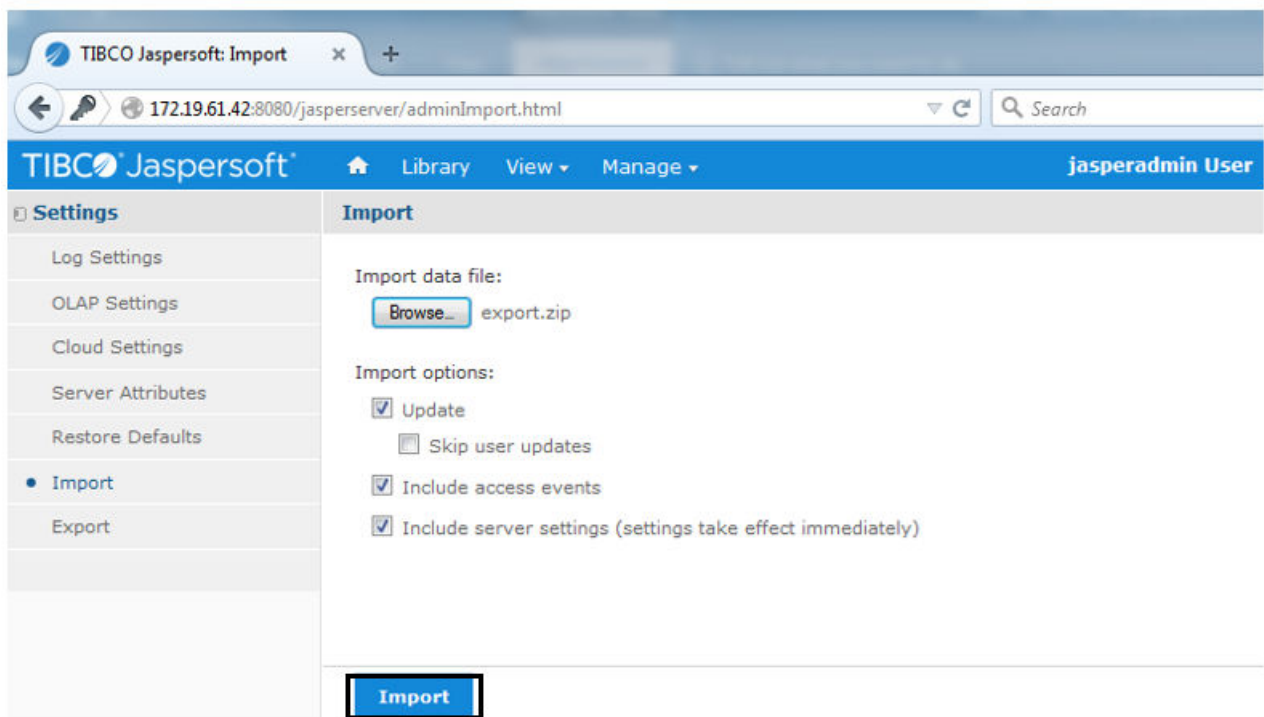
4. Click **Browse** and choose **export.zip** file which is available in the aztec (aztec/ruckus/som/common/kpi_offline_collection).

FIGURE 5 Browse Button



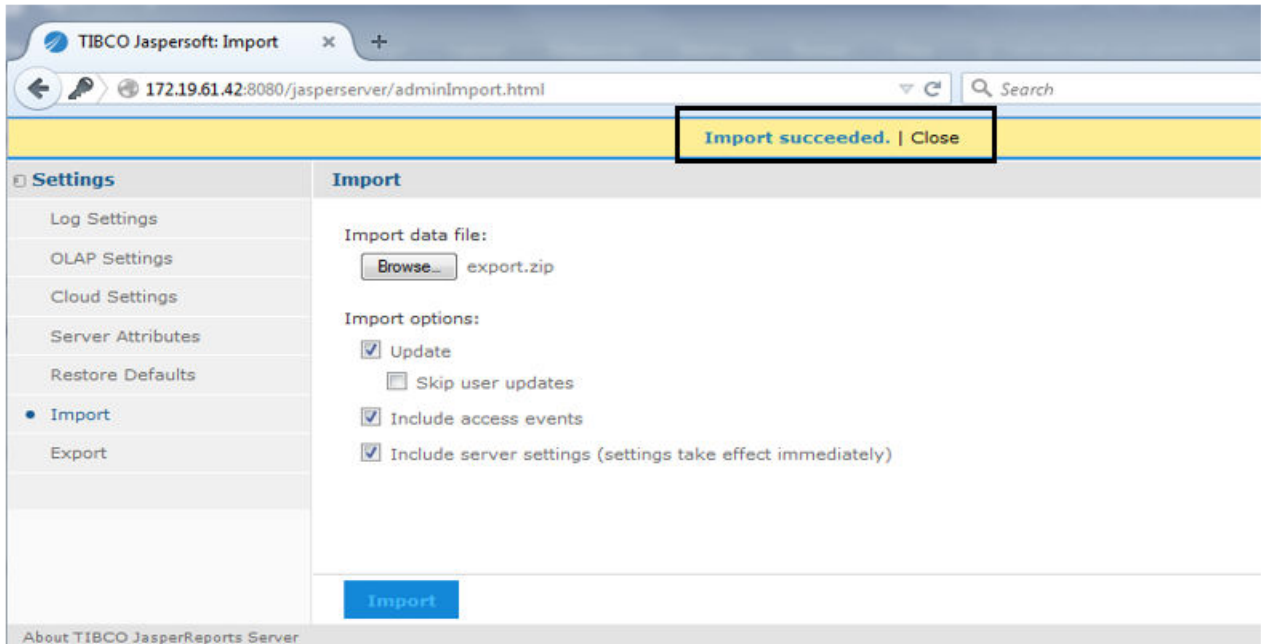
5. Once the file is uploaded then click on import as shown below.

FIGURE 6 Import Button



6. After successful import, the following screen appears.

FIGURE 7 Successful Import



Role Configuration

There is a default user having the following credentials

Username: postgres

Password: abc123

Perform the following steps to create different users and their roles in Jasper server.

1. Change "homePageByRole" bean in the "jasperserver-servlet.xml" file.

The path of the file is **/opt/jasperreports-server-cp-6.3.0/apache-tomcat/webapps/jasperserver/WEB-INF/jasperserver-servlet.xml**

```
<bean id="homePageByRole" class="java.util.ArrayList">
    <constructor-arg index="0" type="java.util.Collection">
        <list>
<value>ROLE_SUNNYWALE|redirect:/flow.html?_flowId=viewReportFlow&
ParentFolderUri=%2FTrial_Sunnywale%2Fkpi_visualisation_tool&
reportUnit=%2FTrial_Sunnywale%2Fkpi_visualisation_tool
%2Fkpi_visualisation_main_page&standAlone=true</value>

<value>ROLE_CTECH|redirect:/flow.html?_flowId=viewReportFlow&
ParentFolderUri=%2FTrial_Ctech%2Fkpi_visualisation_tool&
reportUnit=%2FTrial_Ctech%2Fkpi_visualisation_tool
%2Fkpi_visualisation_main_page&standAlone=true</value>

<value>ROLE_CARY|redirect:/flow.html?_flowId=viewReportFlow&
ParentFolderUri=%2FTrial_Cary%2Fkpi_visualisation_tool&
reportUnit=%2FTrial_Cary%2Fkpi_visualisation_tool%2Fkpi_visualisation_main_page&standAlone=true</
value>

<value>ROLE_WOBURN|redirect:/flow.html?_flowId=viewReportFlow&
```



```
ParentFolderUri=%2FTrial_Woburn%2Fkpi_visualisation_tool&amp;
reportUnit=%2FTrial_Woburn%2Fkpi_visualisation_tool
%2Fkpi_visualisation_main_page&amp;standAlone=true</value>

<value>ROLE_TAMPA|redirect:/flow.html?_flowId=viewReportFlow&amp;
ParentFolderUri=%2FTrial_Tampa%2Fkpi_visualisation_tool&amp;
reportUnit=%2FTrial_Tampa%2Fkpi_visualisation_tool%2FVenue_Selection&amp;standAlone=true</value>

<value>ROLE_DAYTONA|redirect:/flow.html?_flowId=viewReportFlow&amp;
ParentFolderUri=%2FTrial_Daytona%2Fkpi_visualisation_tool&amp;
reportUnit=%2FTrial_Daytona%2Fkpi_visualisation_tool
%2Fkpi_visualisation_main_page&amp;standAlone=true</value>

<value>ROLE_BOINGO|redirect:/flow.html?_flowId=viewReportFlow&amp;
ParentFolderUri=%2FTrial_Boingo%2Fkpi_visualisation_tool&amp;
reportUnit=%2FTrial_Boingo%2Fkpi_visualisation_tool%2FVenue_Selection&amp;standAlone=true</value>

<value>ROLE_RUCKUSHQ|redirect:/flow.html?_flowId=viewReportFlow&amp;
ParentFolderUri=%2FTrial_Ruckushq%2Fkpi_visualisation_tool&amp;
reportUnit=%2FTrial_Ruckushq%2Fkpi_visualisation_tool
%2Fkpi_visualisation_main_page&amp;standAlone=true</value>

<value>ROLE_HQSYSTEM|redirect:/flow.html?_flowId=viewReportFlow&amp;
ParentFolderUri=%2FTrial_Hqsystem%2Fkpi_visualisation_tool&amp;
reportUnit=%2FTrial_Hqsystem%2Fkpi_visualisation_tool
%2Fkpi_visualisation_main_page&amp;standAlone=true</value>

<value>ROLE_VENUE|redirect:/flow.html?_flowId=viewReportFlow&amp;
ParentFolderUri=%2FTrial_VenueStats&amp;reportUnit=%2FTrial_VenueStats%2FVenue_Statistics&amp;
standAlone=true</value>

<value>ROLE_MOBILITE|redirect:/flow.html?_flowId=viewReportFlow&amp;
ParentFolderUri=%2FTrial_Mobilite%2Fkpi_visualisation_tool&amp;
reportUnit=%2FTrial_Mobilite%2Fkpi_visualisation_tool
%2Fkpi_visualisation_main_page&amp;standAlone=true</value>

<value>ROLE_TEMP1|redirect:/flow.html?_flowId=viewReportFlow&amp;
ParentFolderUri=%2FTrial_Temp1%2Fkpi_visualisation_tool&amp;
reportUnit=%2FTrial_Temp1%2Fkpi_visualisation_tool
%2Fkpi_visualisation_main_page&amp;standAlone=true</value>

<value>ROLE_TEMP2|redirect:/flow.html?_flowId=viewReportFlow&amp;
ParentFolderUri=%2FTrial_Temp2%2Fkpi_visualisation_tool&amp;
reportUnit=%2FTrial_Temp2%2Fkpi_visualisation_tool
%2Fkpi_visualisation_main_page&amp;standAlone=true</value>

<value>ROLE_TEMP3|redirect:/flow.html?_flowId=viewReportFlow&amp;
ParentFolderUri=%2FTrial_Temp3%2Fkpi_visualisation_tool&amp;
reportUnit=%2FTrial_Temp3%2Fkpi_visualisation_tool
%2Fkpi_visualisation_main_page&amp;standAlone=true</value>

<value>ROLE_TEMP4|redirect:/flow.html?_flowId=viewReportFlow&amp;
ParentFolderUri=%2FTrial_Temp4%2Fkpi_visualisation_tool&amp;
reportUnit=%2FTrial_Temp4%2Fkpi_visualisation_tool
%2Fkpi_visualisation_main_page&amp;standAlone=true</value>

<value>ROLE_TEMP5|redirect:/flow.html?_flowId=viewReportFlow&amp;
ParentFolderUri=%2FTrial_Temp5%2Fkpi_visualisation_tool&amp;
reportUnit=%2FTrial_Temp5%2Fkpi_visualisation_tool
%2Fkpi_visualisation_main_page&amp;standAlone=true</value>

<value>ROLE_TEMP6|redirect:/flow.html?_flowId=viewReportFlow&amp;
ParentFolderUri=%2FTrial_Temp6%2Fkpi_visualisation_tool&amp;
reportUnit=%2FTrial_Temp6%2Fkpi_visualisation_tool
%2Fkpi_visualisation_main_page&amp;standAlone=true</value>

<value>ROLE_TEMP7|redirect:/flow.html?_flowId=viewReportFlow&amp;
ParentFolderUri=%2FTrial_Temp7%2Fkpi_visualisation_tool&amp;
reportUnit=%2FTrial_Temp7%2Fkpi_visualisation_tool
%2Fkpi_visualisation_main_page&amp;standAlone=true</value>

<value>ROLE_TEMP8|redirect:/flow.html?_flowId=viewReportFlow&amp;
```

```
ParentFolderUri=%2FTrial_Temp8%2Fkpi_visualisation_tool&
reportUnit=%2FTrial_Temp8%2Fkpi_visualisation_tool
%2Fkpi_visualisation_main_page&standAlone=true</value>

<value>ROLE_TEMP9|redirect:/flow.html?_flowId=viewReportFlow&
ParentFolderUri=%2FTrial_Temp9%2Fkpi_visualisation_tool&
reportUnit=%2FTrial_Temp9%2Fkpi_visualisation_tool
%2Fkpi_visualisation_main_page&standAlone=true</value>

<value>ROLE_TEMP10|redirect:/flow.html?_flowId=viewReportFlow&
ParentFolderUri=%2FTrial_Temp10%2Fkpi_visualisation_tool&
reportUnit=%2FTrial_Temp10%2Fkpi_visualisation_tool
%2Fkpi_visualisation_main_page&standAlone=true</value>
<value>ROLE_ADMINISTRATOR|redirect:/flow.html?_flowId=searchFlow</value>
<value>ROLE_USER|redirect:/flow.html?_flowId=searchFlow</value>
</list>
</constructor-arg>
</bean>
```

2. Restart Jasperserver using **/opt/jasperreports-server-cp-6.3.0/ctlscript.sh restart**.

Enable CGI Server

For enabling CGI Server, perform the following steps:

1. Change the following Servlet in **/opt/jasperreports-server-cp-6.3.0/apache-tomcat/conf/web.xml**:

```
<servlet>
  <servlet-name>cgi</servlet-name>
  <servlet-class>org.apache.catalina.servlets.CGIServlet</servlet-class>
  <init-param>
    <param-name>debug</param-name>
    <param-value>0</param-value>
  </init-param>
  <init-param>
    <param-name>cgiPathPrefix</param-name>
    <param-value>WEB-INF/cgi</param-value>
  </init-param>
  <init-param>
    <param-name>passShellEnvironment</param-name>
    <param-value>>true</param-value>
  </init-param>
  <init-param>
    <param-name>executable</param-name>
    <param-value>/usr/bin/python</param-value>
  </init-param>
<load-on-startup>5</load-on-startup>
</servlet>

<servlet-mapping>
  <servlet-name>cgi</servlet-name>
  <url-pattern>/cgi-bin/*</url-pattern>
</servlet-mapping>
```

2. Do following changes in **/opt/jasperreports-server-cp-6.3.0/apache-tomcat/conf/context.xml**.
 - a. Change the string "**<Context>**" to "**<Context privileged="true">**".
 - b. Add Null Uri Fix (Set Session timeout to 0 in **apache-tomcat/webapps/jasperserver/WEB-INF/classes/esapi/security-config.properties**)
3. Restart Jasperserver using **/opt/jasperreports-server-cp-6.3.0/ctlscript.sh restart**.

Installation of Jasper Server via Install Script

To install Jasper server via Install script, perform the following steps:

1. Copy following files on Jasper server.
 - kpi_installer.sh
 - installer.sh
 - option.txt
2. Execute the command,
chmod 755 kpi_installer.sh and installer.sh
3. Execute the following command to install Jasper server.
./kpi_installer -option option.txt -run_all
4. Execute ctlscript.sh script to start Jasper server (root permission required to restart Jasper server).

```
/opt/jasperreports-server-cp-6.3.0/ctlscript.sh start
```

Procedure to Start Streaming on LTE AP

Topics for messages used by KPI tool are

- sci-topic/sc/proxy1/1.0.0/ApReportNonCumKpi/RscSerialNumber\$
- sci-topic/sc/proxy1/1.0.0/ApReportCumKpi\$
- sci-topic/sc/proxy1/1.0.0/ApReportAlarms\$

where RscSerialNumber is serial number of LTE AP which is streaming GPB data to MQTT broker (i.e. MQTT Publisher).

MQTT Subscriber need to subscribe MQTT broker by using the above mentioned topics.

To start streaming on LTE AP, perform the following steps:

1. InternetGatewayDevice.FAP.PerfMgmt.Config.1.Enable should be set to True.
2. InternetGatewayDevice.FAP.PerfMgmt.Config.1.ReportingType should be set to FILE_STREAMING.
While making ReportingType to FILE_STREAMING, set PeriodicUploadTime to any absolute reference value as 2015-03-24T09:00:00Z).
3. Enable KPI streaming for respective category by editing "kpi_tool_config.xml" file which has been kept on /opt/qcom/bin.

```
# cat /opt/qcom/bin/kpi_tool_config.xml
<?xml version="1.0"?>
<root>
  <sample name="sci">
    <enable>1</enable>
    <reporting>3600</reporting>
    <sampling>900</sampling>
    <topic></topic>
  </sample>
  <sample name="non_cumulative">
    <enable>1</enable>
    <reporting>60</reporting>
    <sampling>10</sampling>
    <topic>sci-topic/sc/proxy1/1.0.0/ApReportNonCumKpi$</topic>
  </sample>
  <sample name="cumulative">
    <enable>1</enable>
    <reporting>120</reporting>
    <sampling>60</sampling>
    <topic>sci-topic/sc/proxy1/1.0.0/ApReportCumKpi$</topic>
  </sample>
</root>
```

```

</sample>
<sample name="alarm">
  <enable>1</enable>
  <reporting>60</reporting>
  <sampling>60</sampling>
  <topic>sci-topic/sc/proxy1/1.0.0/ApReportAlarms$</topic>
</sample>
</root>

```

Sampling interval and Reporting interval for ApReport (if enabled) should be 900 and 3600, respectively (same as it was previously).

Reporting interval for other messages should be in multiple of sampling interval for better visibility (i.e. if sampling interval is 10 sec for ApReportNonCumKpi, then reporting interval should be 60 sec).

Configuration of Jasper Server

To configure Jasper server, perform the following steps:

1. Copy the following scripts and files (which are available in the package) at the following location `"/opt/jasperreports-server-cp-6.3.0/apache-tomcat/webapps/test/WEB-INF/cgi"` on the server:

```

ap_report_pb2.pyc
ridgewoodpark_floor_plan.csv
airporeast_floor_plan.csv
ap_report.proto
jasper_config.py
ruc_kpi_input_config_file.csv
airportnorth_floor_plan.csv
kpi_backup.py
ruckushq_floor_plan.csv
airportsouth_floor_plan.csv
sci_message_pb2.py
kpi_compile.py
sci_message_pb2.pyc
ap_alarms_report_pb2.py
beachpark_floor_plan.csv
kpi_dbcheck.py
sci_message.proto
ap_alarms_report_pb2.pyc
boingol_floor_plan.csv
seminoleheights_floor_plan.csv
ap_alarms_report.proto
boingo2_floor_plan.csv
ap_cumulative_report_pb2.py
cary_floor_plan.csv
kpi_start.py
sunnywale_floor_plan.csv
ap_cumulative_report_pb2.pyc
ctech_floor_plan.csv
kpi_visual_ctrl.py
ap_cumulative_report.proto
daytona_floor_plan.csv
utampa_floor_plan.csv
ap_non_cumulative_report_pb2.py
db_create.py
mcfarlaneeast_floor_plan.csv
venue_config.csv
ap_non_cumulative_report_pb2.pyc
dblist
mcfarlanewest_floor_plan.csv
venue_no_of_ap.csv
ap_non_cumulative_report.proto
woburn_floor_plan.csv
apreport_floor_plan.csv
harborisland_floor_plan.csv
null_uri_fix.txt
yborheights_floor_plan.csv

```

```
ap_report_pb2.py
hqsystem_floor_plan.csv
plazaterrace_floor_plan.csv
ctlscript.sh
rsc_add_serial.py
rsc_config.py
```

2. Provide executable permission to the scripts using the following command.

```
chmod 755 /opt/jasperreports-server-cp-6.3.0/apache-tomcat/webapps/test/WEB-INF/cgi/*
```

3. Update *ruc_kpi_input_config_file.csv* according to your configuration.

```
-bash-4.2# cat ruc_kpi_input_config_file.csv
psql_port,5432
psql_pwd,abc123
broker_address, <address of mqtt broker>
logging_enable,true
log_file_size,9500117
backup_count,30
secgw_ip,172.19.8.3
secgw_user,root
secgw_pwd,abc123
key_name,cloud.key
```

Details of the fields are:

- **psql_port:** Port number of the postgres server which was given during configuration of Jasper server.
 - **psql_pwd:** Password of the postgres database which was given during configuration of Jasper server.
 - **broker_address:** Address of MQTT broker.
 - **logging_enable:** Whether to enable or disable logging.
 - **log_file_size:** Maximum size of Log file.
 - **backup_count:** Maximum number of days for which backup is required.
 - **secgw_ip:** Address of Security Gateway.
 - **secgw_user:** Username of Security Gateway Login.
 - **secgw_pwd:** Password of Security Gateway.
 - **key_name:** Path of Security Gateway key.
4. Update the floor plan according to your lab setup for each venue at "opt/jasperreports-server-cp-6.3.0/apache-tomcat/webapps/test/WEB-INF/cgi":
 - For **Ctech** venue update **ctech_floor_plan.csv**
 - For **Sunnywale** venue update **sunnywale_floor_plan.csv**
 - For **Woburn** venue update **woburn_floor_plan.csv**
 - For **Cary** venue update **cary_floor_plan.csv**

Similarly for following venues, respective floor plan needs to be updated:

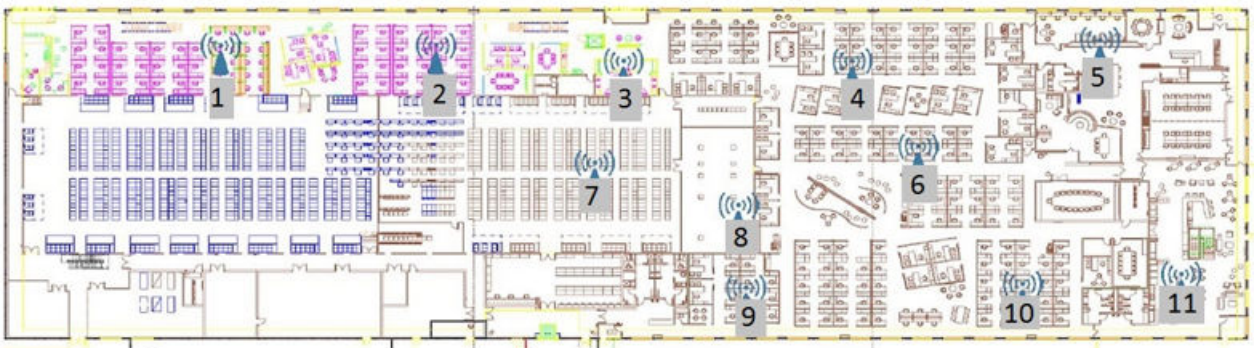
- **ridgewoodpark_floor_plan.csv**
- **airporeast_floor_plan.csv**
- **airportnorth_floor_plan.csv**
- **ruckushq_floor_plan.csv**
- **airportsouth_floor_plan.csv**
- **beachpark_floor_plan.csv**
- **boingo1_floor_plan.csv**

- seminoleheights_floor_plan.csv
- boingo2_floor_plan.csv
- daytona_floor_plan.csv
- utampa_floor_plan.csv
- mcfarlaneeast_floor_plan.csv
- mcfarlanewest_floor_plan.csv
- harborisland_floor_plan.csv
- yborheights_floor_plan.csv
- hqsystem_floor_plan.csv
- plazaterrace_floor_plan.csv

For Temp floor plans, use temp<1-10>_floor_plan.csv.

Floor plan position and indexing is as follows.

FIGURE 8 Floor Plan



- Update serial number in the **floor_plan.csv** file according to the location of LTE AP for each venue.

Position	Serial Number
1	2280c600aa11
5	2280c3457604
6	228030077125
8	123865355501

- Replace `ctlscript.sh` script at `/opt/jasperreports-server-cp-6.3.0/` with the one at `/opt/jasperreports-server-cp-6.3.0/apache-tomcat/webapps/test/WEB-INF/cgi`.
- Create Db using `python db_create.py`.
- Execute `ctlscript.sh` script to restart Jasper server (root permission required to restart Jasper server).

```
/opt/jasperreports-server-cp-6.3.0/ctlscript.sh restart
```

- Enter Jasper server external IP when prompted by running `ctlscript.sh`.

```
Enter Jasper Server External Ip without quotes:172.19.61.5
```

KPI Visualization GUI

KPI Visualization GUI is accessed through a web URL, **http://<serverip>:8080/jasperserver**.

For example: <http://172.19.61.42:8080/jasperserver>

KPI Visualization Tool Login Page

Following table lists the venues along with the username and password supported in KPI Visualization tool. Currently, KPI Visualization tool supports four venues, Ctech, Cary, Sunnywale, and Woburn. There are four users configured at Jasper server according to each venue.

Venue Name	Username	Password
Ctech	ctech	ctech
Cary	cary	cary
Woburn	woburn	woburn
Sunnywale	sunnywale	sunnywale
Tampa	tampa	tampa
Daytona	daytona	daytona
Boingo	boingo	boingo
Ruckushq	systemtest	systemtest
Hqsystem	timingtest	timingtest
Temp1	temp1	temp1
Temp2	temp2	temp2
Temp3	temp3	temp3
Temp4	temp4	temp4
Temp5	temp5	temp5
Temp6	temp6	temp6
Temp7	temp7	temp7
Temp8	temp8	temp8
Temp9	temp9	temp9
Temp10	temp10	temp10
Venuestat	venuestat	venuestat

To successfully log into KPI Visualization tool, you have to provide valid user ID and password. Enter username/password according to the venue for which you want to start KPI visualization.

The Jasper GUI Login screen appears as below:

FIGURE 9 Jasper GUI Login screen



User ID:

Password:

Show locale & time zone

Login

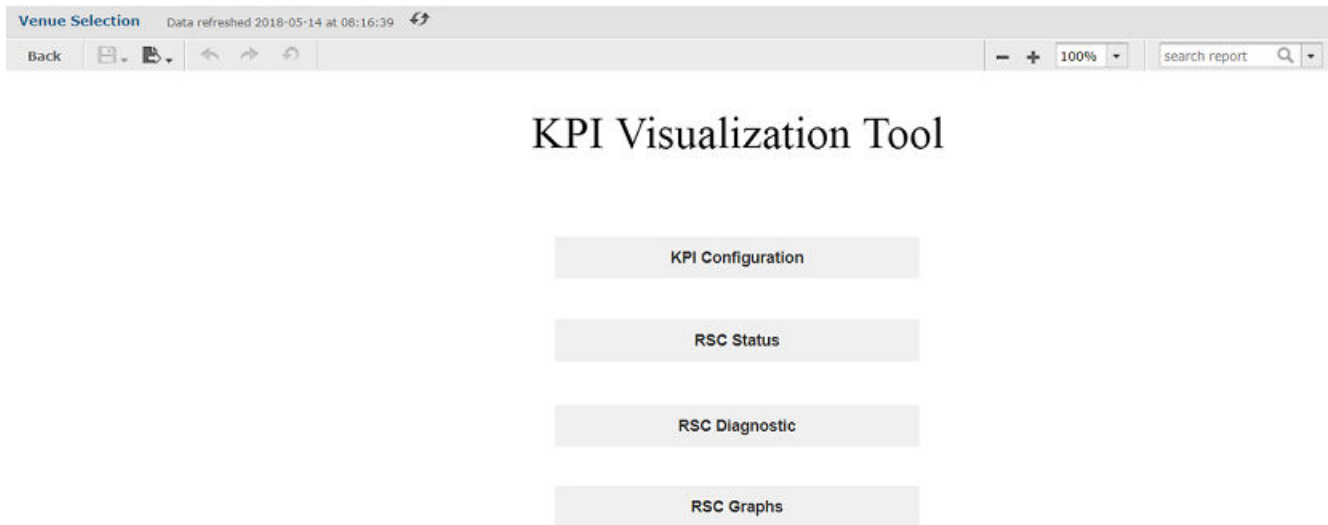
[Need help logging in?](#)

KPI Visualization Tool Home Page

On the KPI Visualization Tool home screen, following tabs appear.

- KPI Configuration
- RSC status
- RSC Diagnostic
- RSC Graphs

FIGURE 10 KPI Visualization Home screen



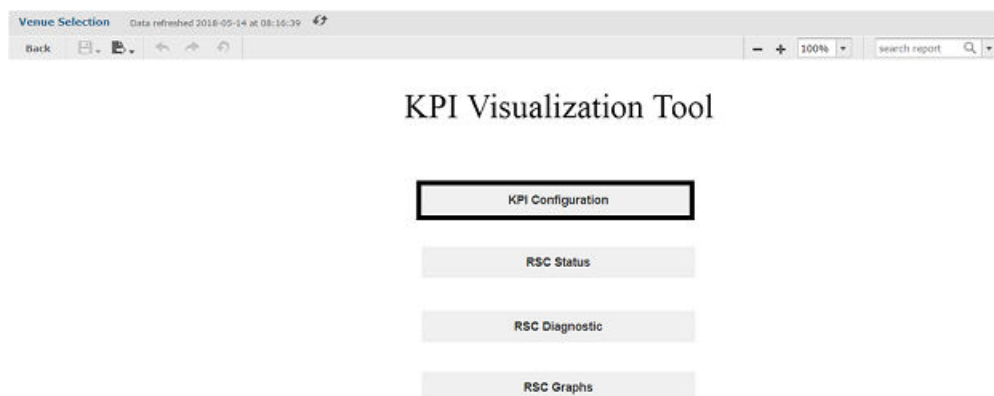
KPI Configuration

The KPI Configuration screen has the following tabs.

- Start KPI Visualisation
- Restart KPI Visualisation
- Stop KPI Visualisation
- Offline KPI Analytics

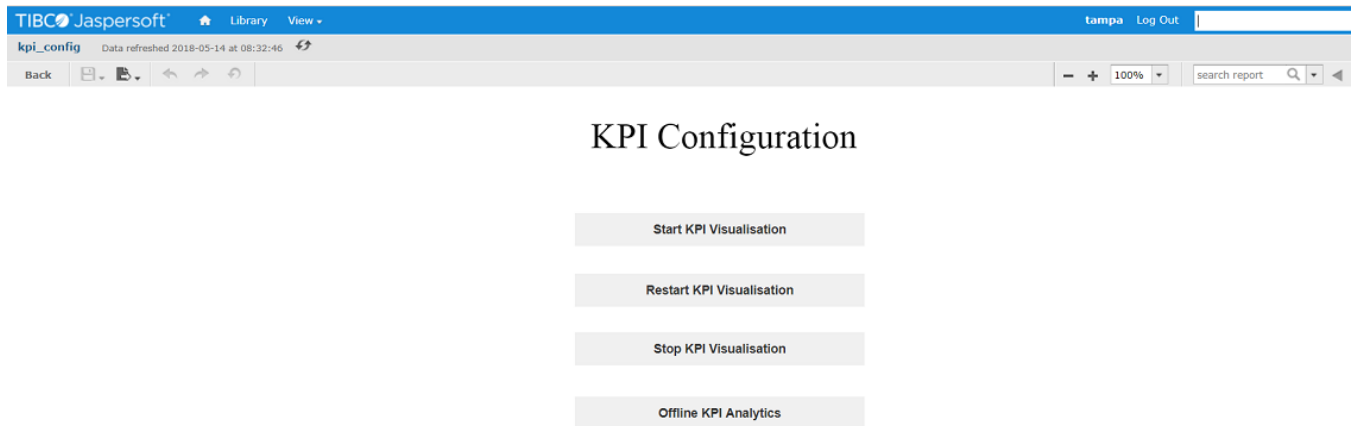
1. On the KPI Visualization Tool screen, click **KPI Configuration** tab.

FIGURE 11 KPI Configuration tab



The KPI Configuration screen appears.

FIGURE 12 KPI Configuration Home screen

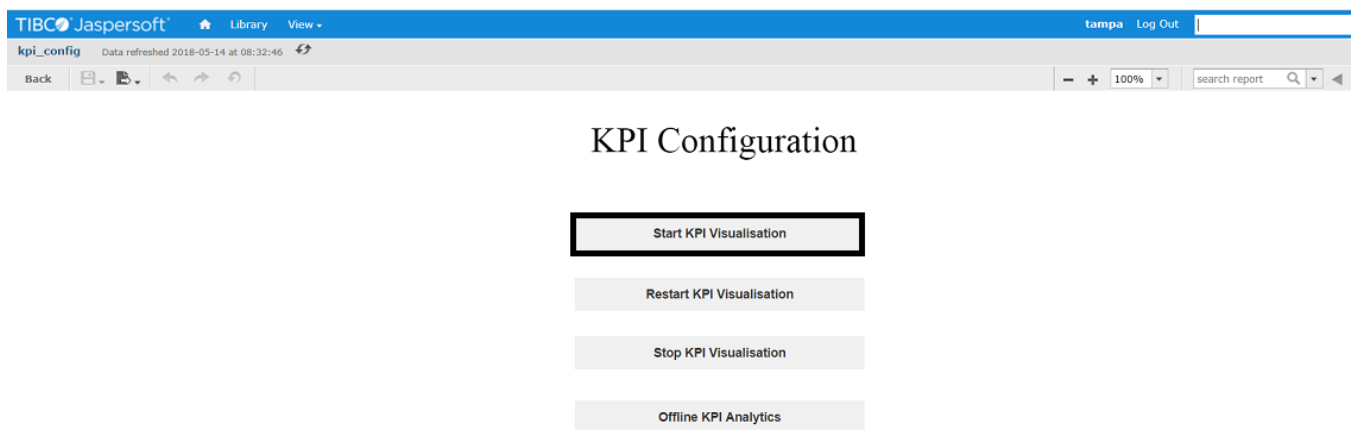


Start KPI Visualization

To start KPI Visualization tool, perform the following steps.

1. On the KPI Configuration screen, click **Start KPI Visualisation** tab.

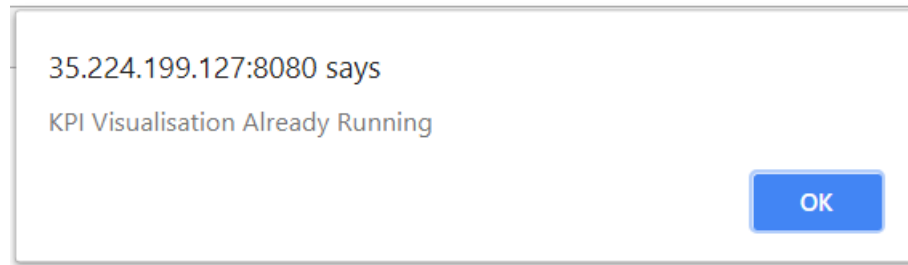
FIGURE 13 Start KPI Visualisation tab



NOTE

Ensure floorplan.csv is updated with LTE AP serial numbers.

The following message appears.

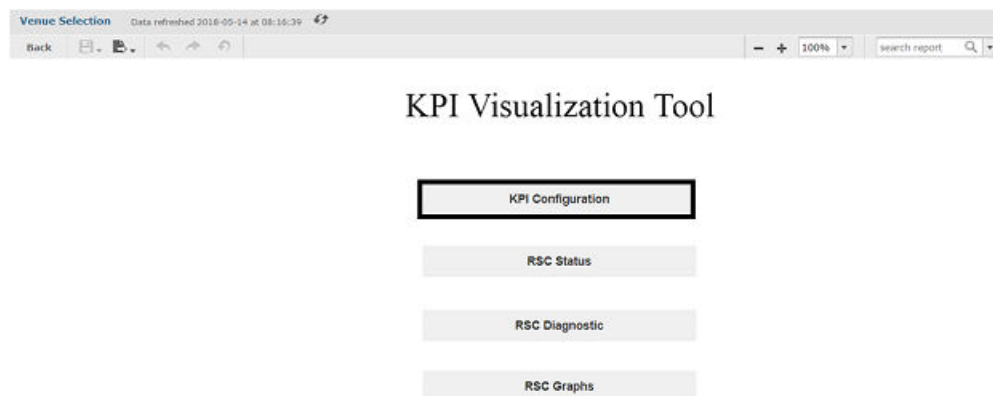


Stop KPI Visualization

To stop KPI Visualization, perform the following steps.

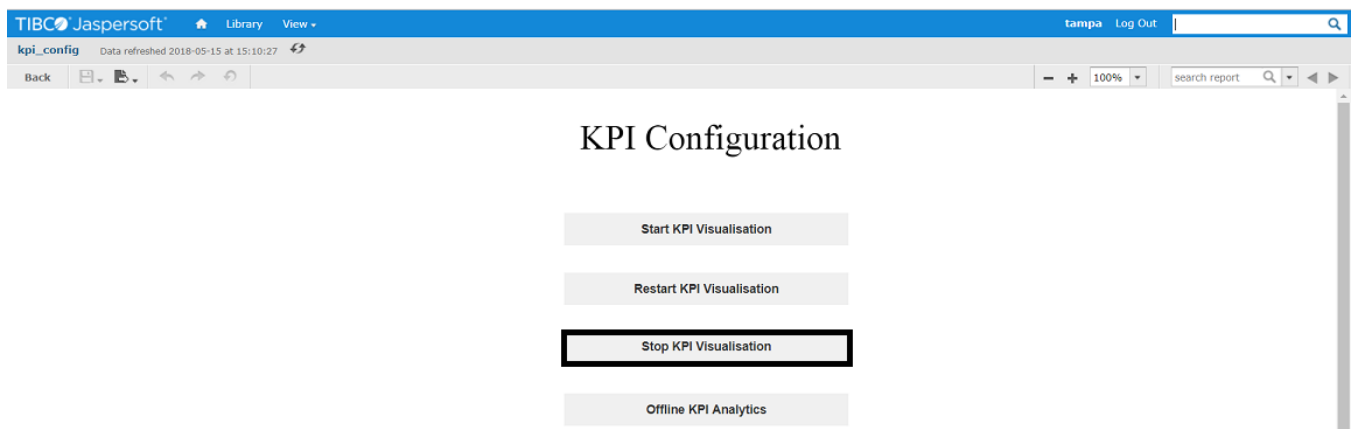
1. On the KPI Visualization home screen, click **KPI Configuration** tab.

FIGURE 14 KPI Configuration tab

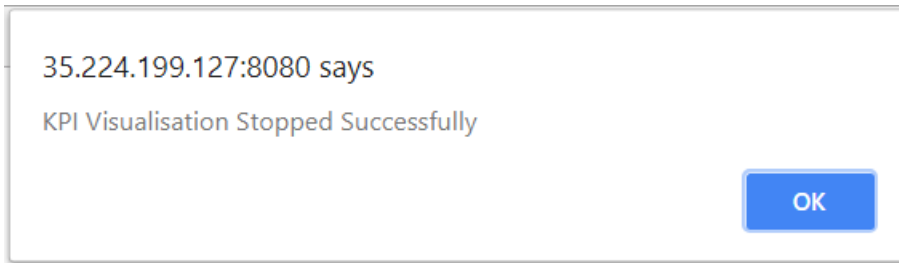


2. On the **KPI Configuration** screen, click **Stop KPI Visualization** tab.

FIGURE 15 Stop KPI Visualization tab



The following message appears.

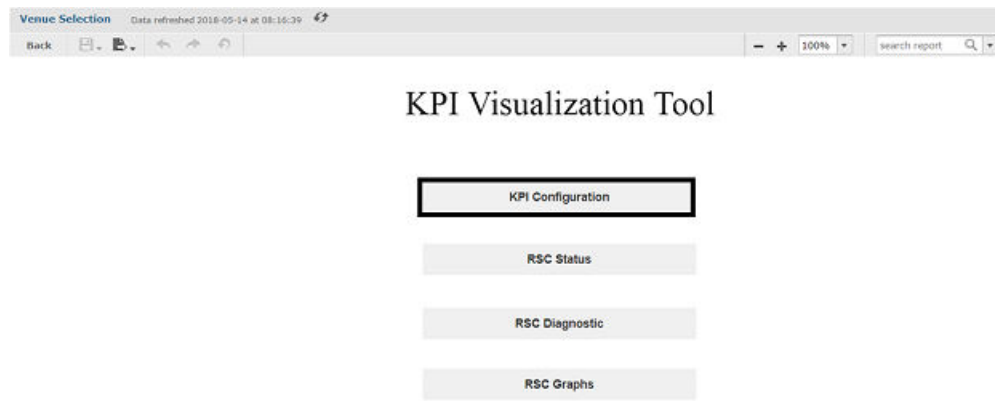


Restart KPI Visualization

To restart KPI visualization, i.e. to add LTE APs on runtime without deleting previous entries in database, perform the following steps.

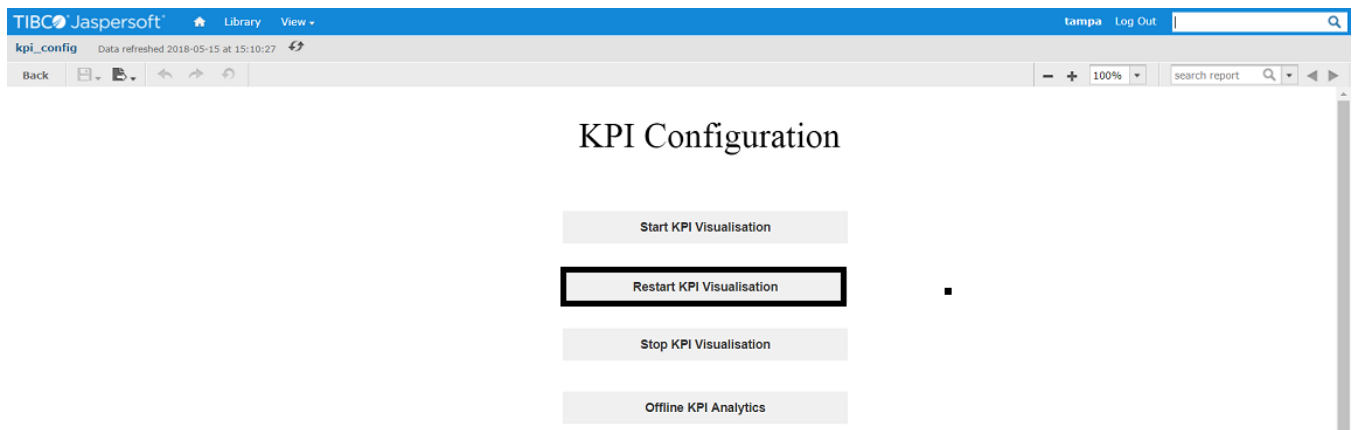
1. Update <venue>_floor_plan.csv to add serial number of newly added LTE APs.
2. On the **KPI Visualization** screen, click **KPI Configuration** tab.

FIGURE 16 KPI Configuration tab

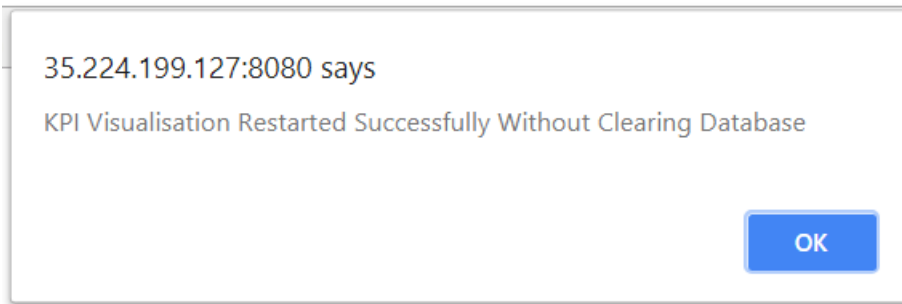


3. On the **KPI Configuration** screen, click **Restart KPI Visualization** tab.

FIGURE 17 Restart KPI Visualization tab



The following message appears.



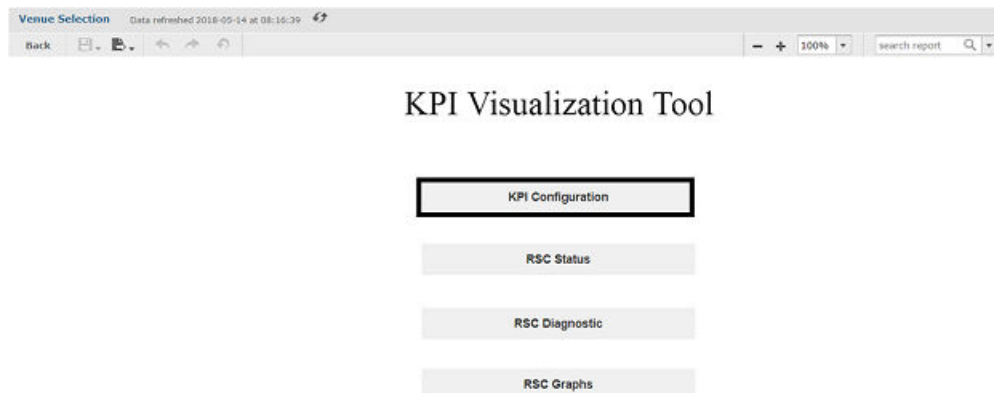
Offline KPI Analytics

Offline KPI Analytics is to load backup file older than a day. Data for maximum last 7 days can be loaded through Offline KPI Analytics.

To get offline KPI analytics, perform the following steps:

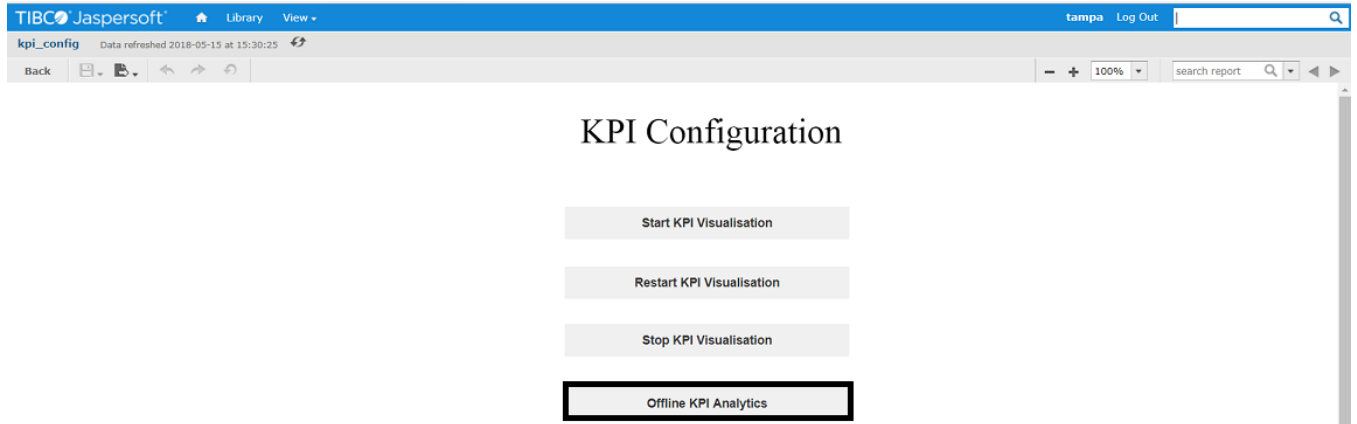
1. On the **KPI Visualization** screen, click **KPI Configuration** tab.

FIGURE 18 KPI Configuration tab

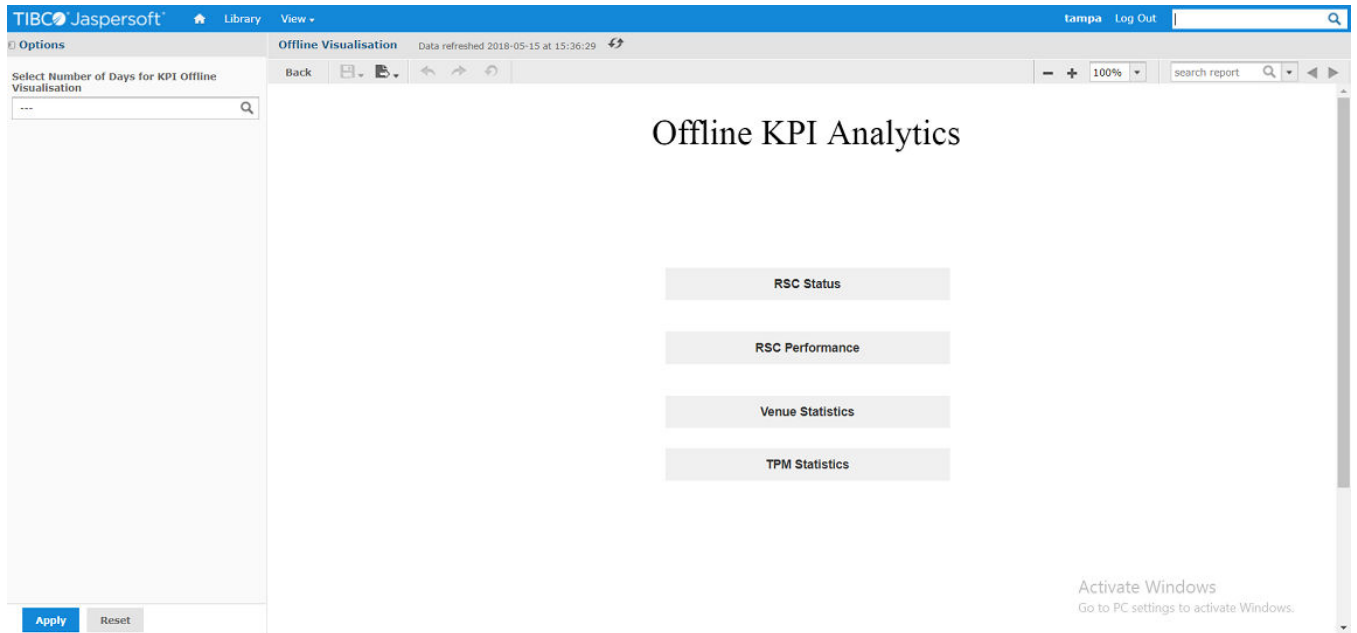


2. On the **KPI Configuration** screen, click **Offline KPI Analytics** tab.

FIGURE 19 Offline KPI Analytics tab



The **Offline KPI Analytics** screen appears.



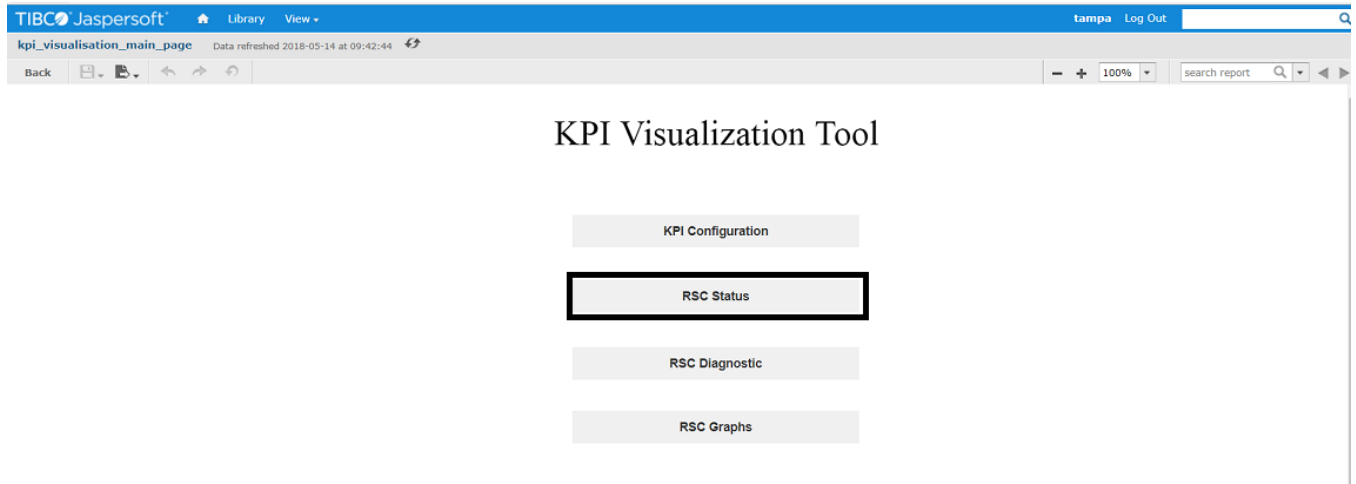
3. On the **Offline KPI Analytics** screen, select number of days for which you want to analyze offline data from the **Select Number of Days for KPI Offline Visualisation** field and click **Apply**.
4. Click one of the following tabs for which you want to view offline analytics.
 - RSC Status
 - RSC Performance
 - Venue Statistics
 - TPM Statistics
5. Select the options based on which the analytics will be represented and click **Apply**. For more information, refer [LTE AP Status](#) on page 53.

6. Click **Return to Main Page** to return to **Offline KPI Analytics** screen and select a different offline graph to be displayed.

LTE AP Status

1. On the KPI Visualization tool, click the **RSC Status** tab.

FIGURE 20 RSC Status tab

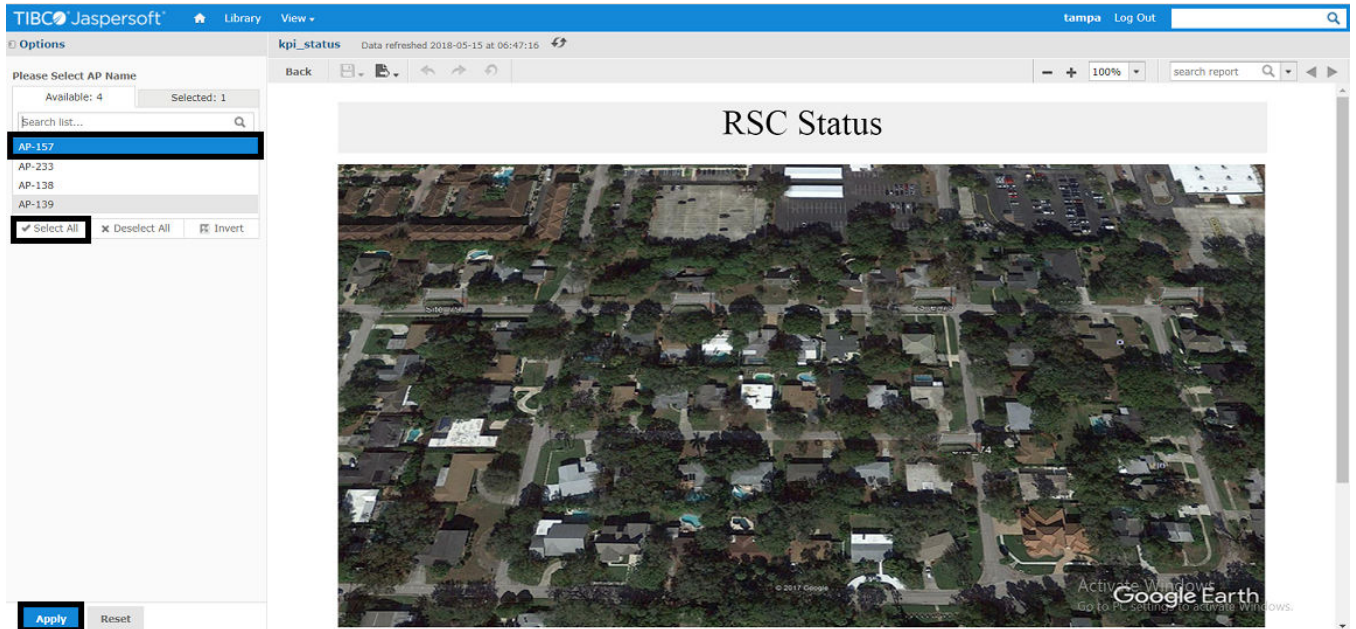


2. On the **RSC Status** screen, select the LTE AP for which you want to check the status and click **Apply**.

NOTE

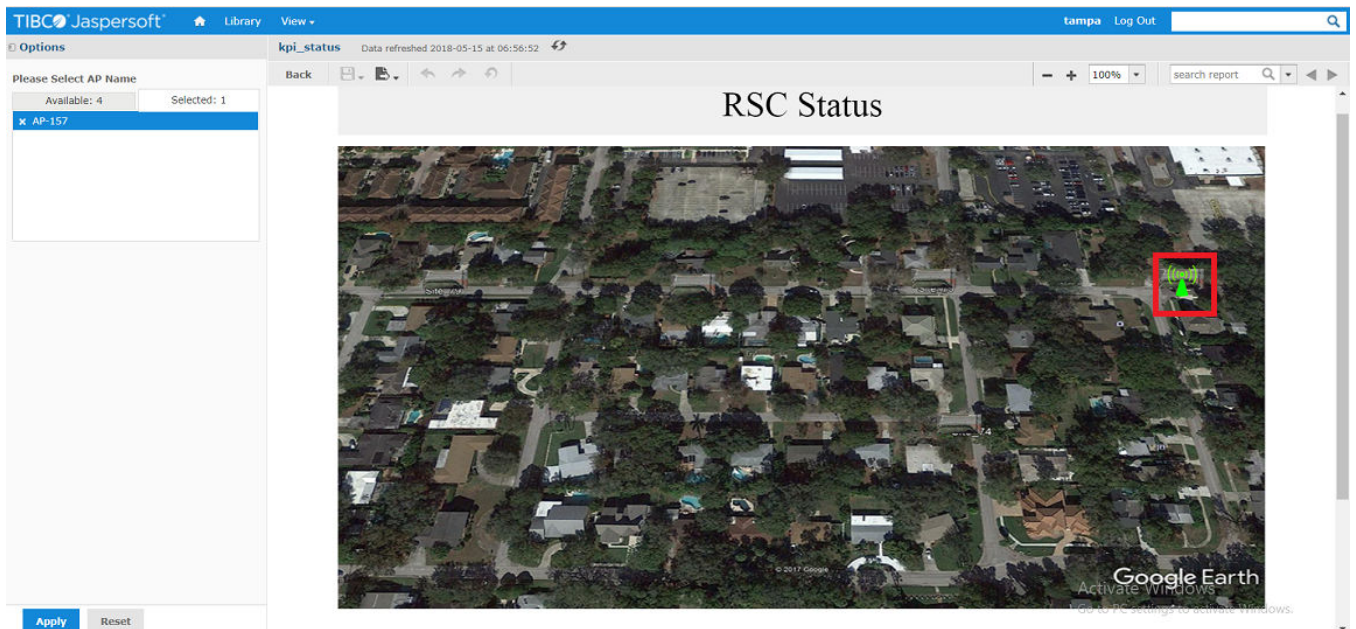
Click **Select All** if you want to check status of all the available LTE APs.

FIGURE 21 RSC Status screen



3. Hover the mouse over the selected LTE AP as shown below.

FIGURE 22 RSC Status screen (with selected LTE AP)

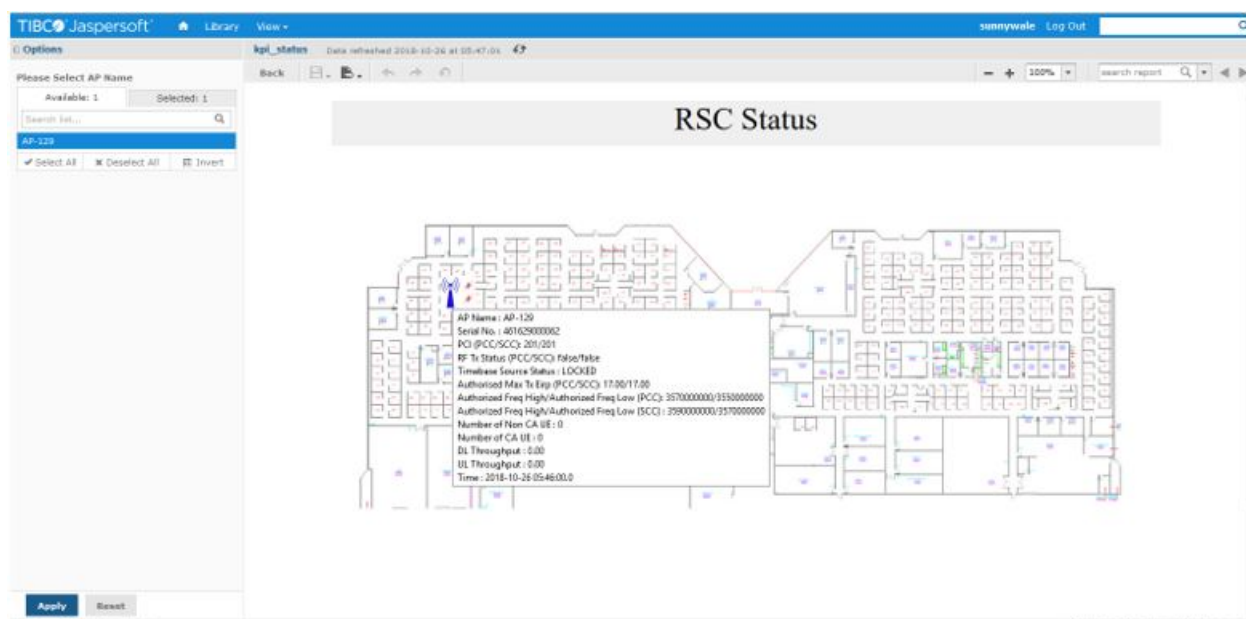


The following details appear.

- AP Name
- Serial Number

- PCI (PCC/SCC)
- RF Tx Status (PCC/SCC)
- Timebase Source Status
- Authorized Max Tx Eirp (PCC/SCC)
- Authorized Freq High / Authorized Freq Low (PCC)
- Authorized Freq High / Authorized Freq Low (SCC)
- Number of non-CA UEs
- Number of CA UEs
- DL throughput
- UL throughput

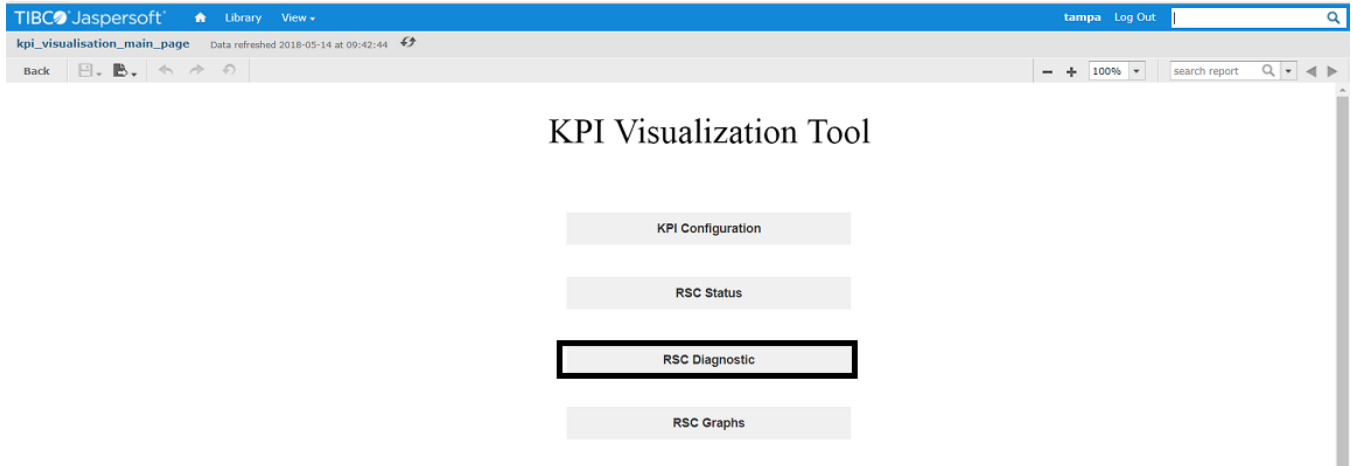
FIGURE 23 LTE AP Status Details



LTE AP Diagnostics

1. On the KPI Visualization Tool screen, click the **RSC Diagnostic** tab.

FIGURE 24 RSC Diagnostic tab



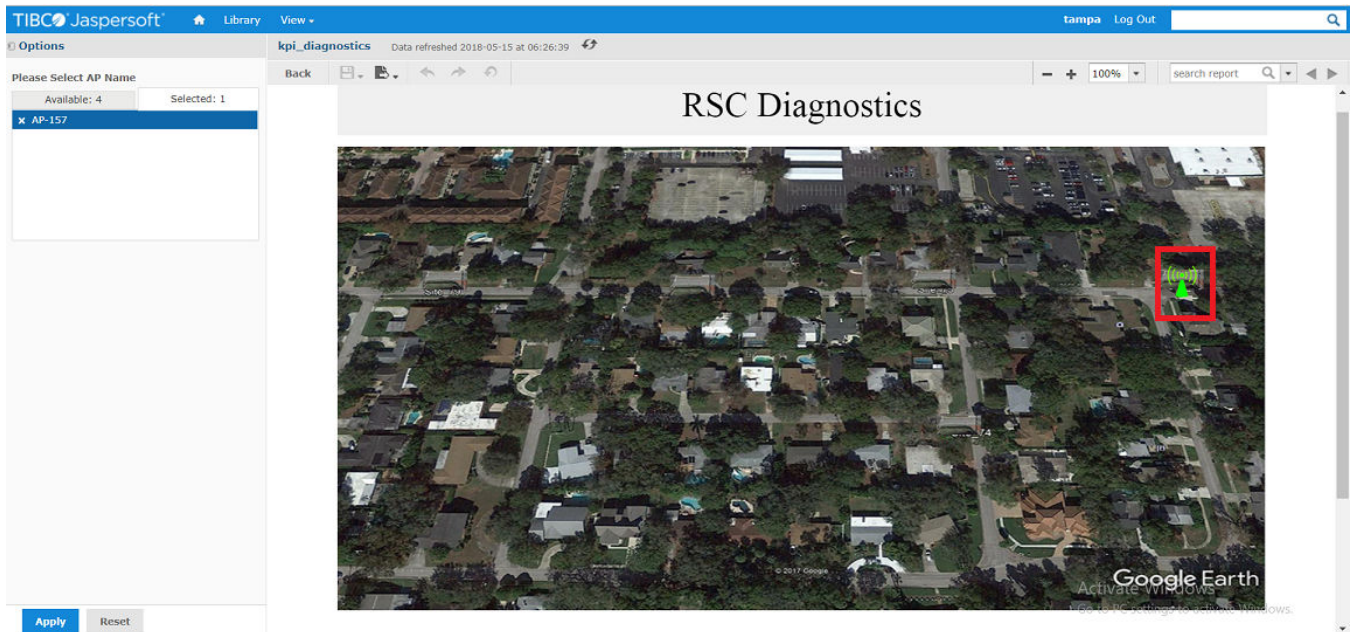
The **RSC Diagnostics** screen appears.

2. On the **RSC Diagnostics** screen, select the LTE AP(s) for which you want to check the performance and click **Apply**.

NOTE

You can click **Select All** button to check performance of all LTE APs.

FIGURE 25 RSC Diagnostics screen



The **RSC Diagnostics** screen displays the selected LTE AP.

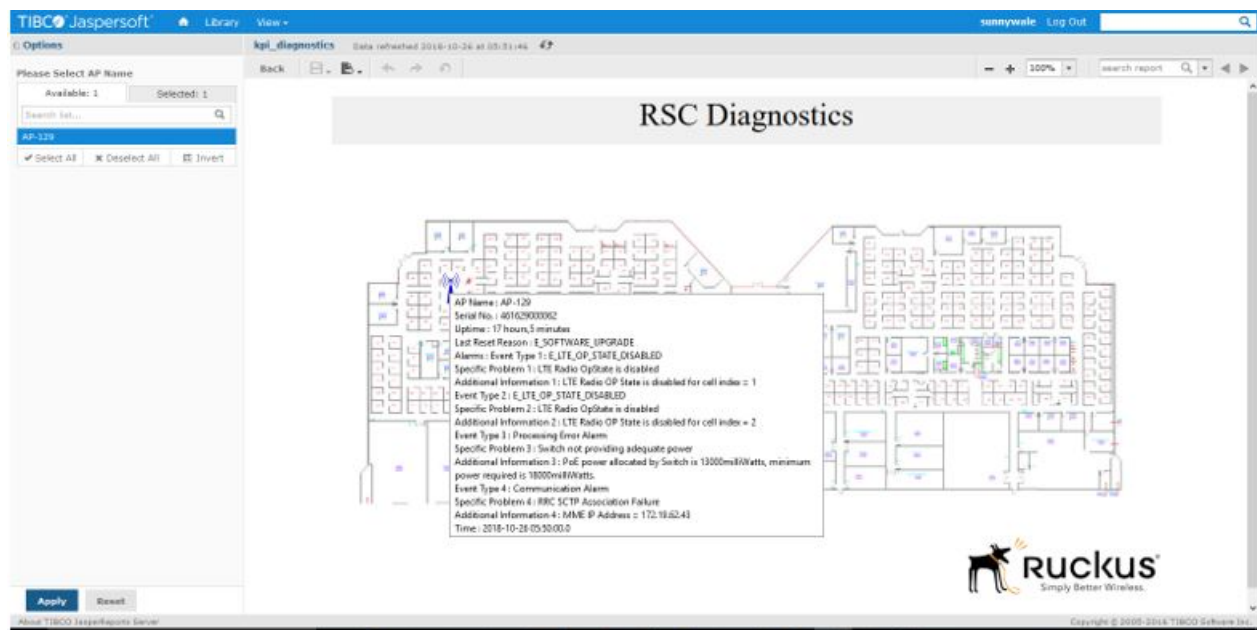
3. Hover the mouse over the selected LTE AP to check the data as shown below.
 - AP Name
 - Serial Number

- Uptime
- Last Reset Reason
- Alarms
 - Event Type
 - Specific Problem
 - Additional information

Alarms might be multiple with the set of event, specific problem, and additional information.

- Time

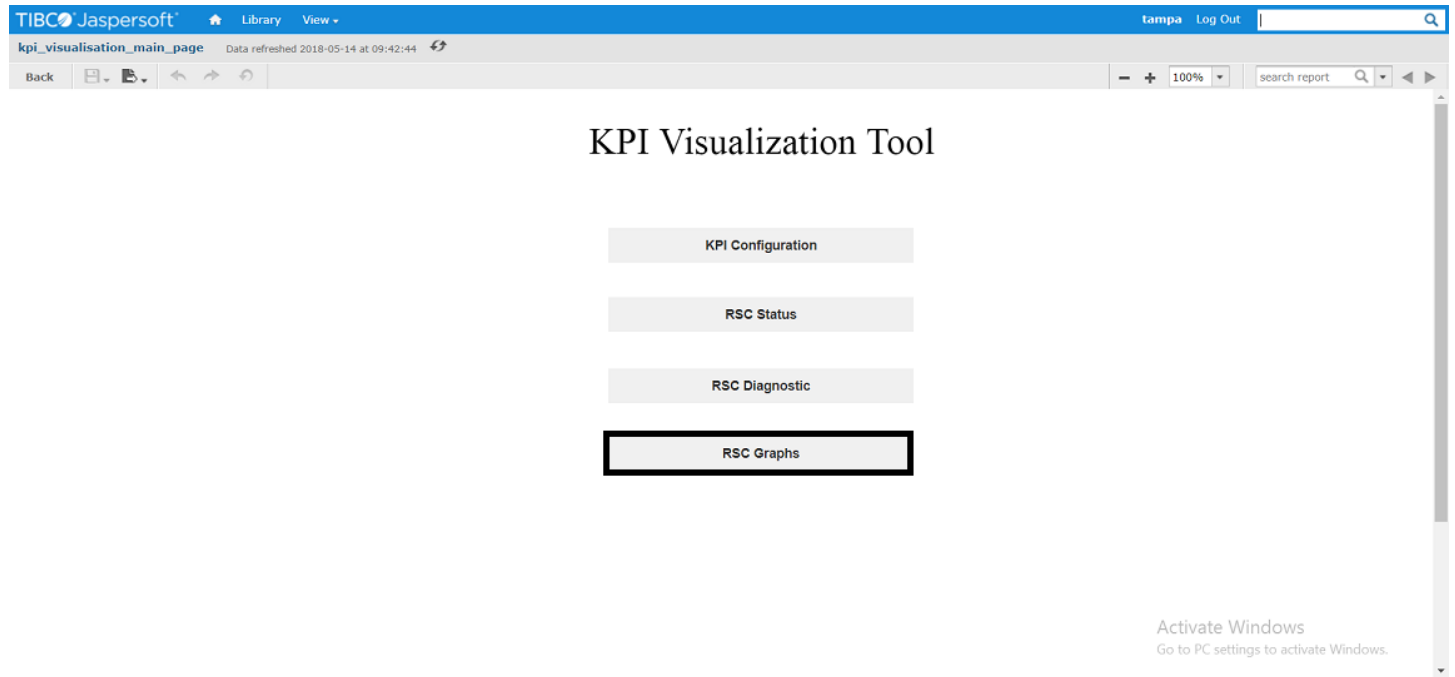
FIGURE 26 LTE AP Diagnostics Details



LTE AP Graphs

On the KPI Visualization Tool screen, click **RSC Graphs** tab.

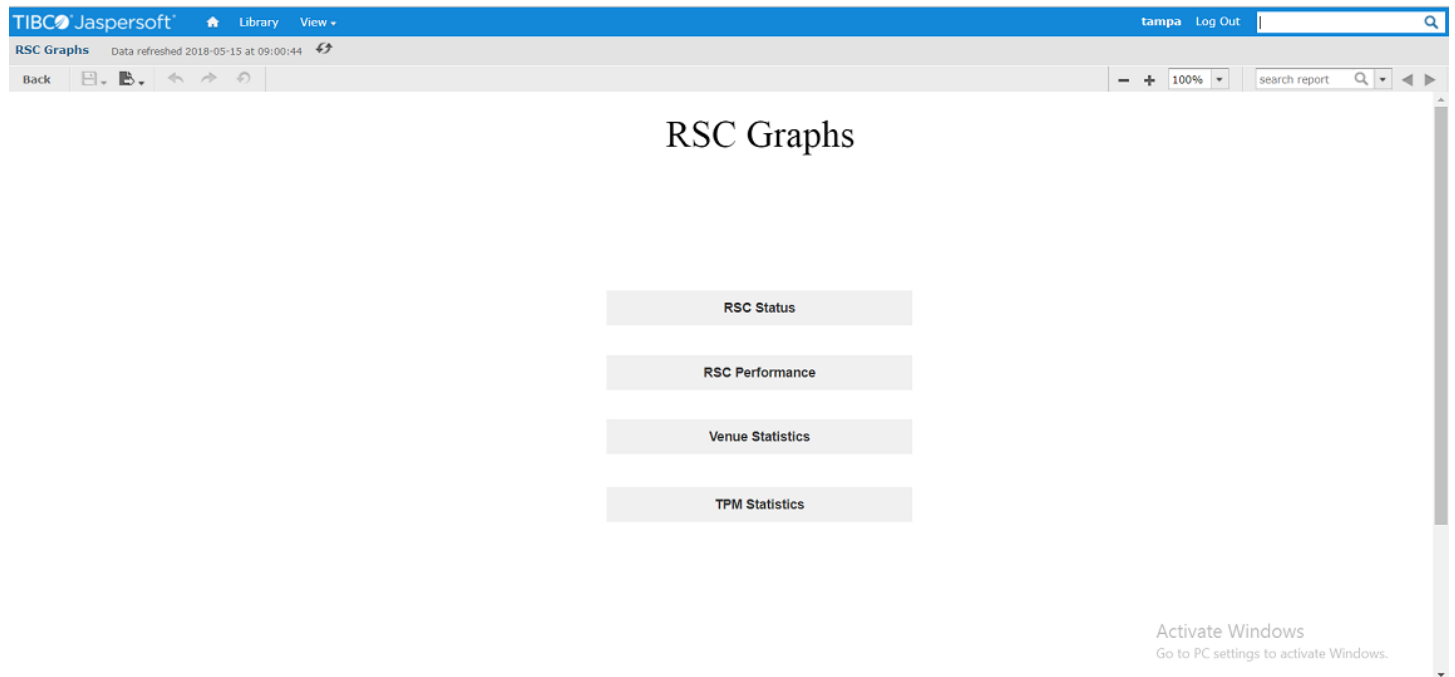
FIGURE 27 RSC Graphs tab



The RSC Graphs screen appears showing the following tabs.

- RSC Status
- RSC Performance
- Venue Statistics
- TPM Statistics

FIGURE 28 RSC Graphs screen

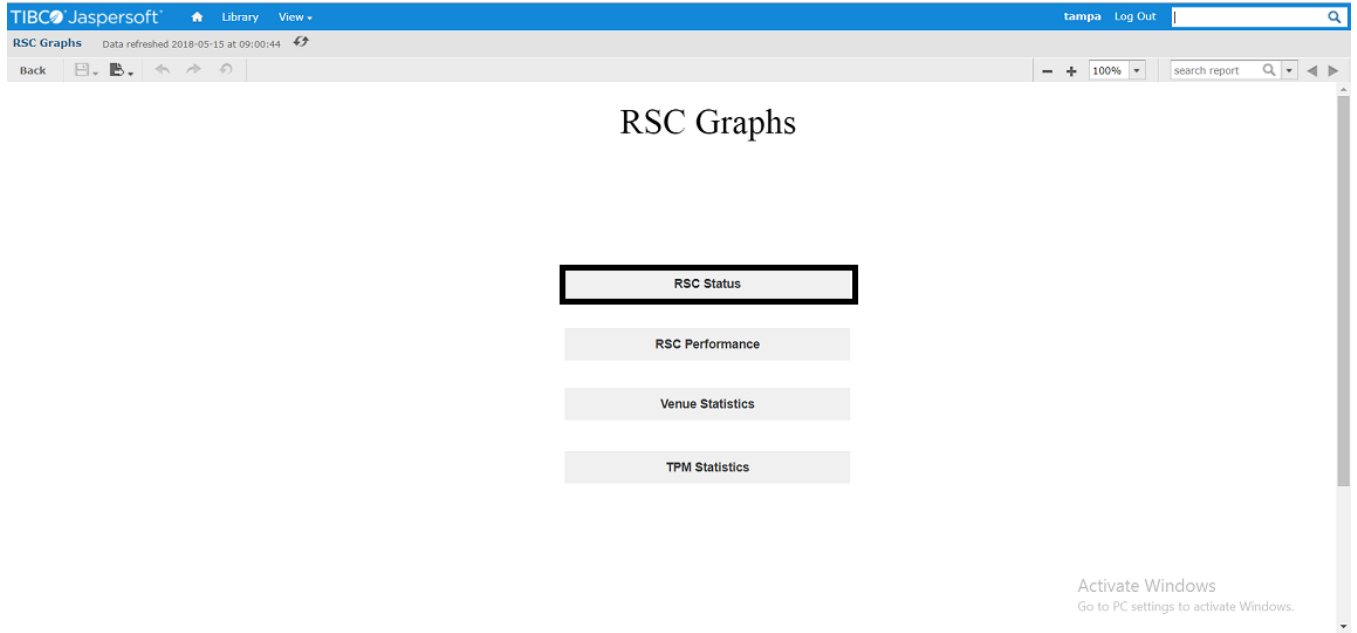


LTE AP Status

Following four graphs are available under the **RSC Status** tab on RSC Graphs Page.

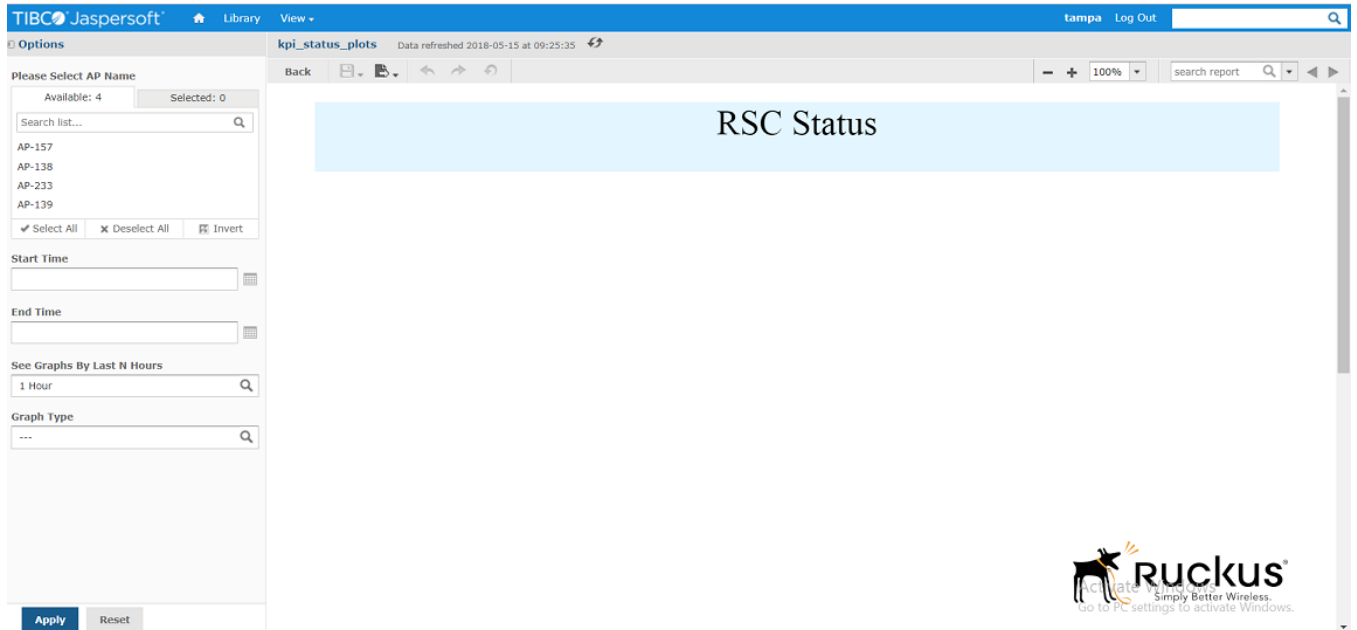
- Rf-Tx Status (PCC/SCC)
 - SAS Authorized Low Frequency (PCC/SCC)
 - Uptime
 - Timebase Source Status
1. On the **RSC Graphs** screen, click **RSC Graphs** tab.

FIGURE 29 RSC Status tab



The **RSC Status** screen appears.

FIGURE 30 RSC Status screen



2. Select LTE AP(s) for which you want to view the graph from the **Please Select AP Name** field.
3. Enter the start date and time for which you want to view the graph from the **Start Time** field.

NOTE

You can also select the date and time by clicking the **Calendar** icon

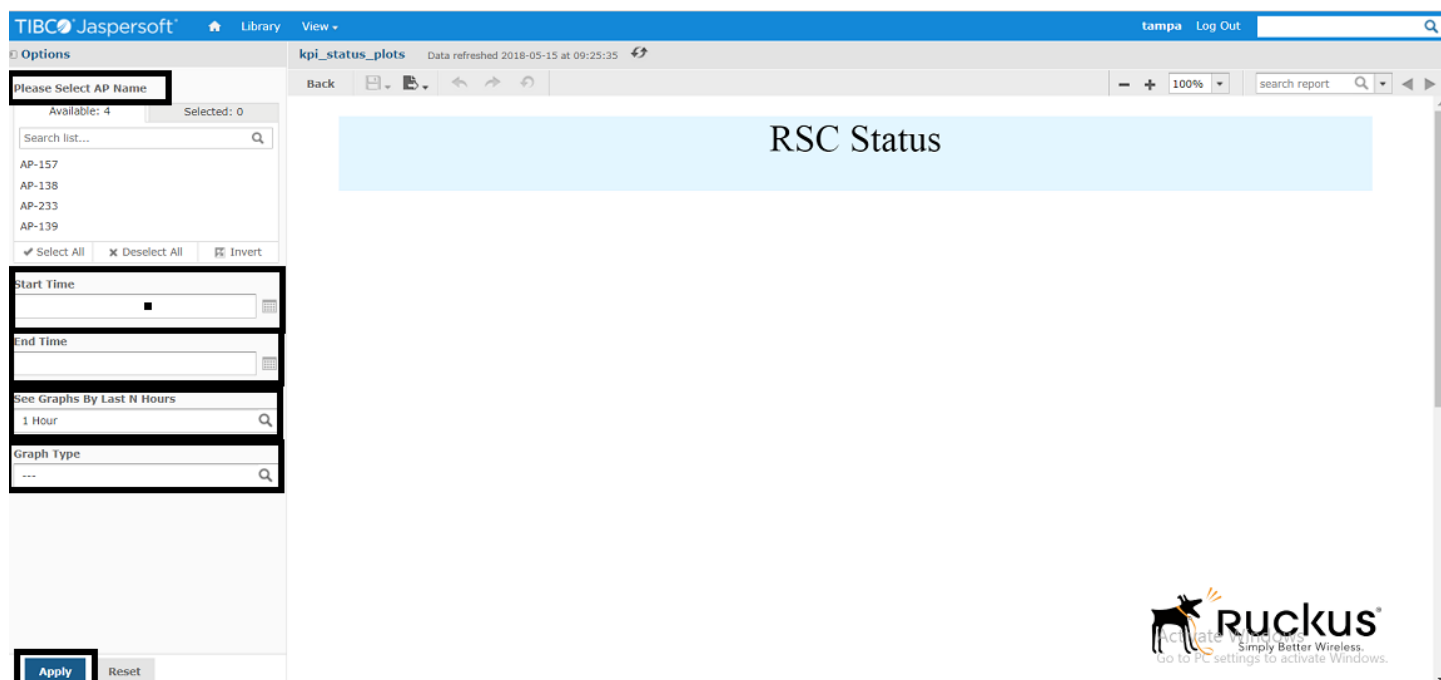
4. Enter the end date and time for which you want to view the graph from the **Start Time** field.

NOTE

You can also select the date and time by clicking the **Calendar** icon

5. Select the last hour(s) for which you want to view the graph from the **See Graphs By Last N Hours** field.
6. Select graph type from the **Graph Type** field.
7. Click **Apply**.

FIGURE 31 RSC Status Graph

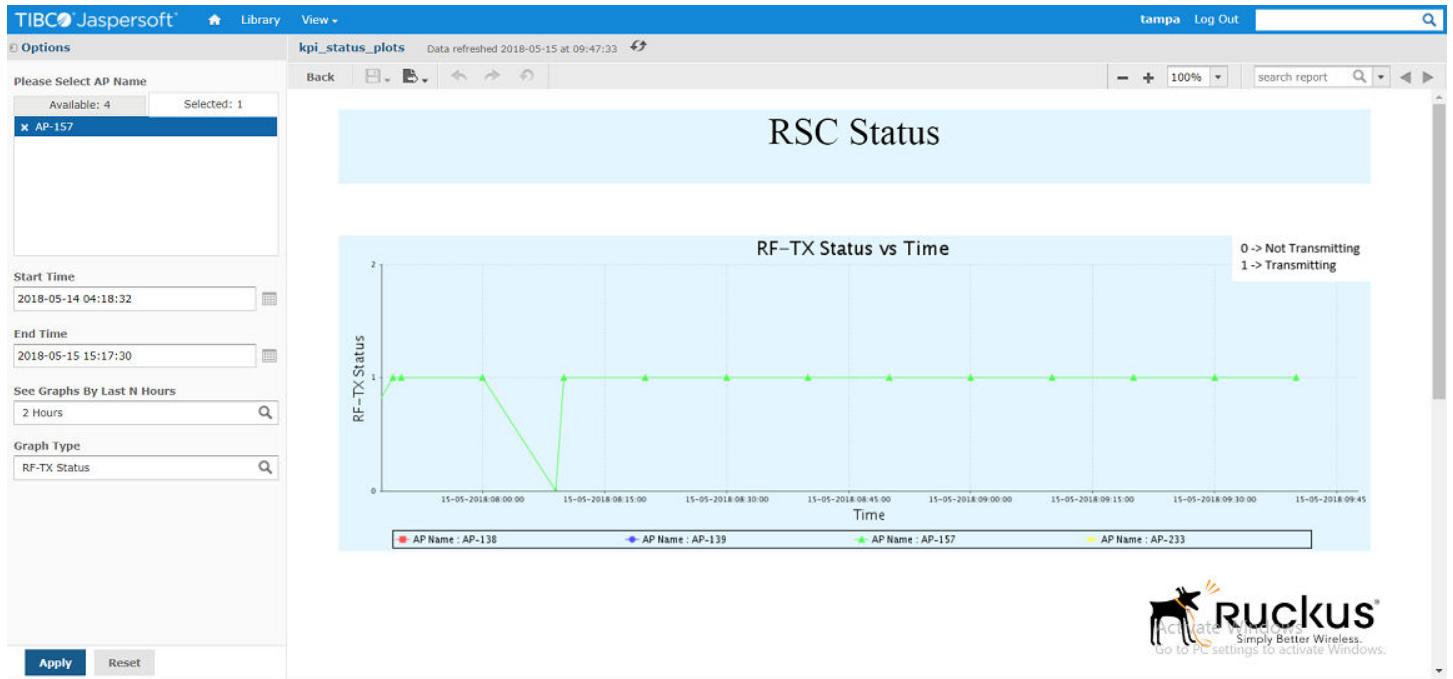


Different types of graphs are mentioned below.

Rf-Tx Status (PCC/SCC)

This graph is drawn between Rf-Tx Status and Time.

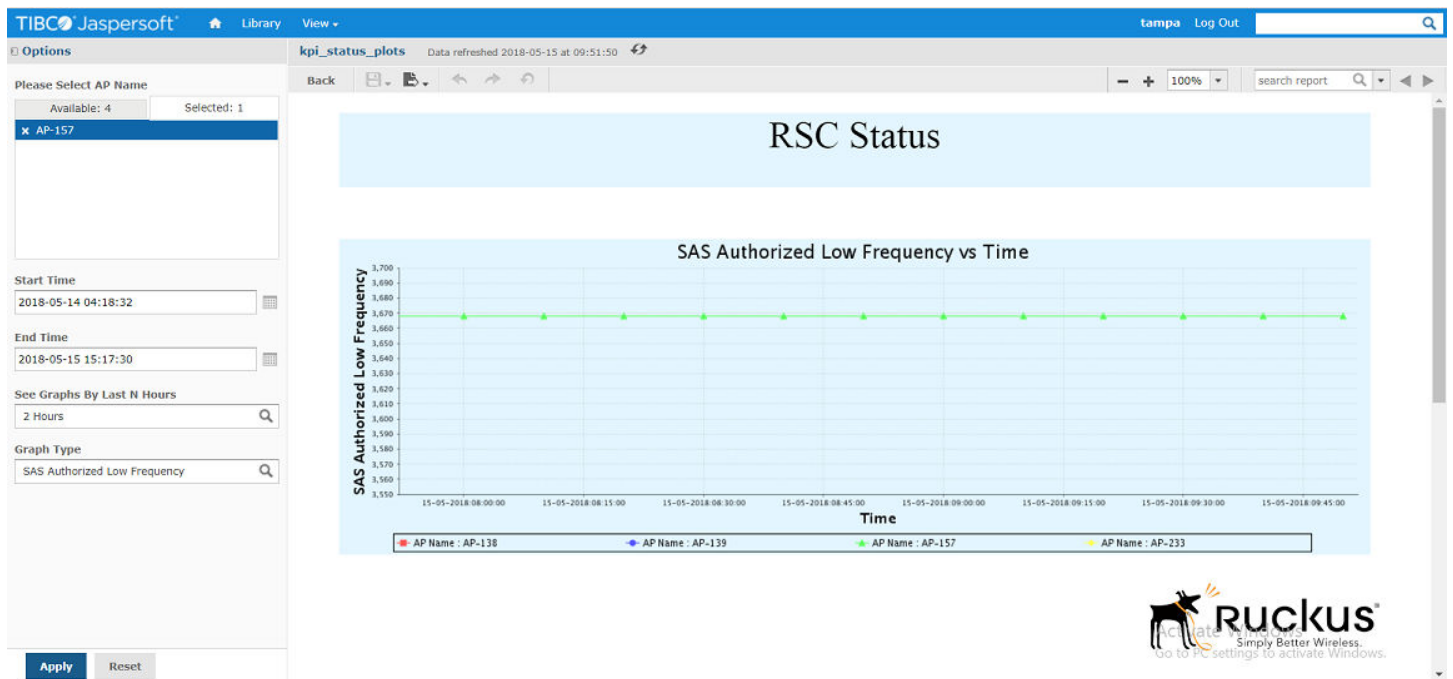
FIGURE 32 RF-Tx Status



SAS Authorized Low Frequency (PCC/SCC)

This graph is drawn between SAS Authorized Low Frequency and Time.

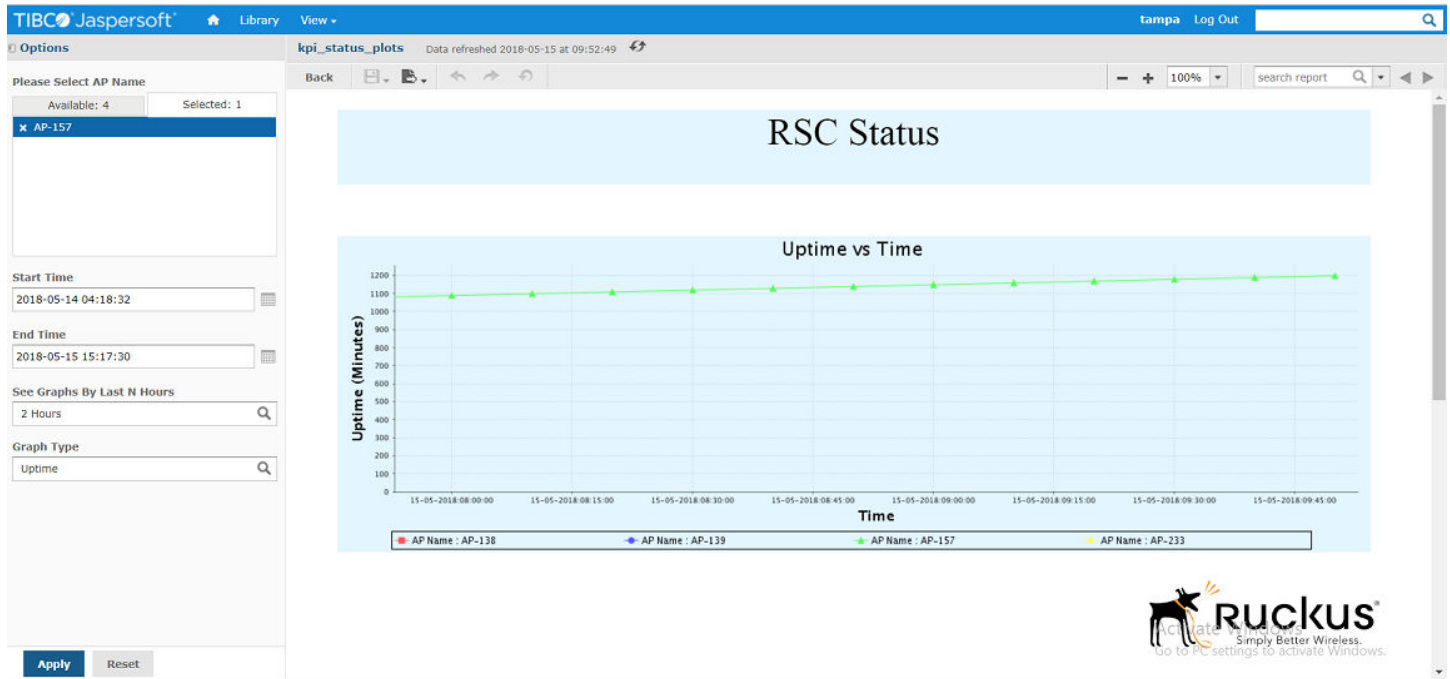
FIGURE 33 SAS Authorized Low Frequency



Uptime

This graph is drawn between Uptime and Time.

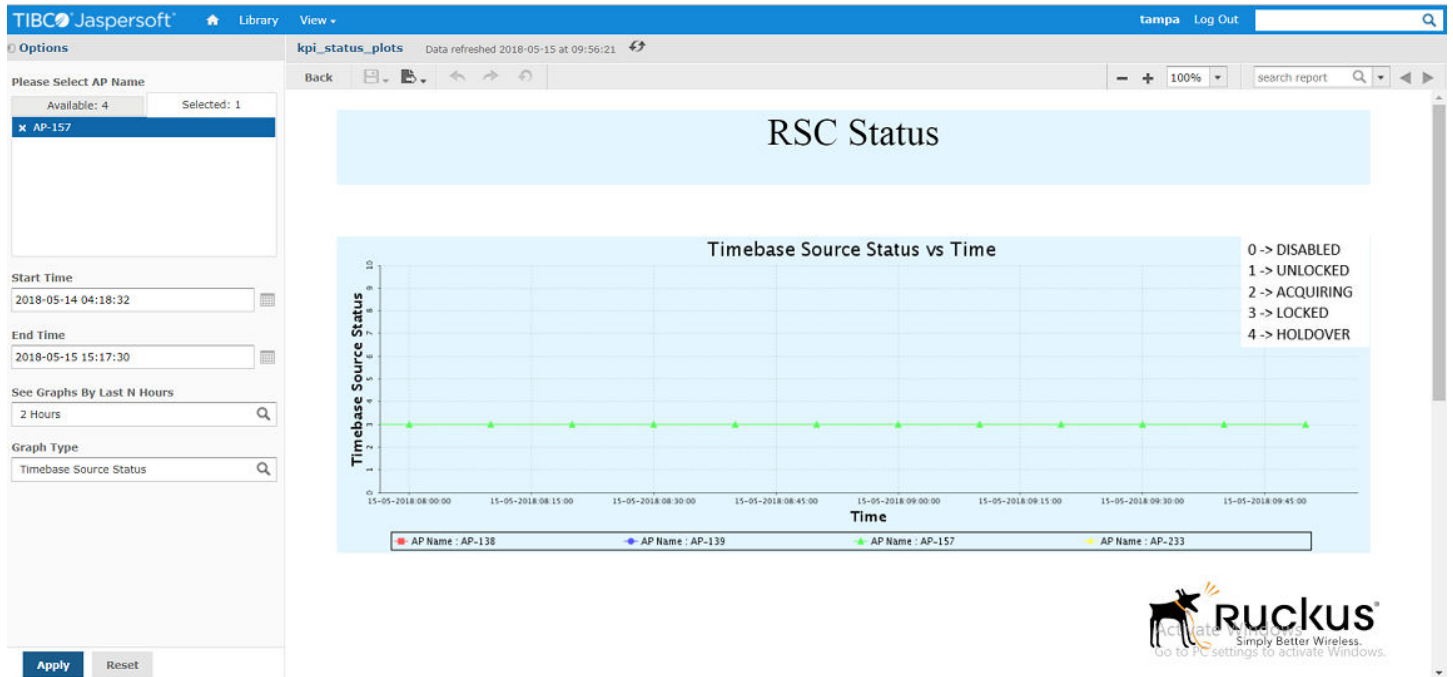
FIGURE 34 Uptime



Timebase Source Status

This graph is drawn between Timebase Source Status and Time.

FIGURE 35 Timebase Source Status



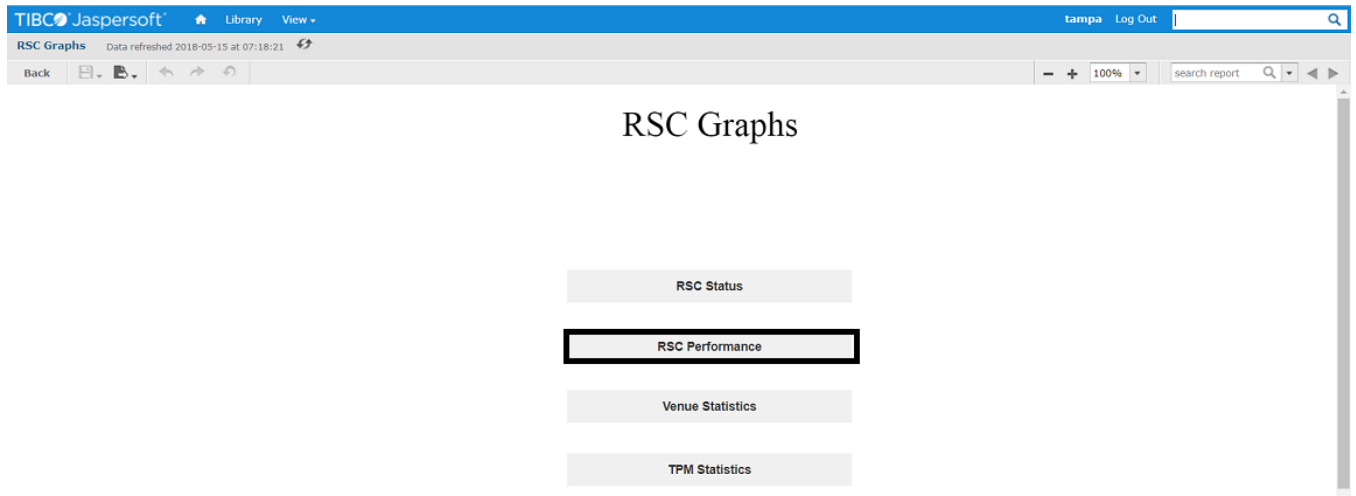
LTE AP Performance

Following graphs are available under the **RSC Performance** tab.

- DL Throughput
- UL Throughput
- NumofEutranHoFail
- Number of Active UEs (PCC/SCC)
- RrcConnEstabFailSum
- Reference Signal Power Selected (PCC/SCC)
- txPowerReqDBm (PCC/SCC)

1. On the **RSC Graphs** screen, click **RSC Performance** tab.

FIGURE 36 RSC Performance tab



The **RSC Performance** screen appears.

2. On the **KPI Performance** screen, select LTE AP(s) for which you want to check the performance.
3. Enter start time in the **Start Time** field.

NOTE

You can also select the start time by clicking the **Calendar** icon.

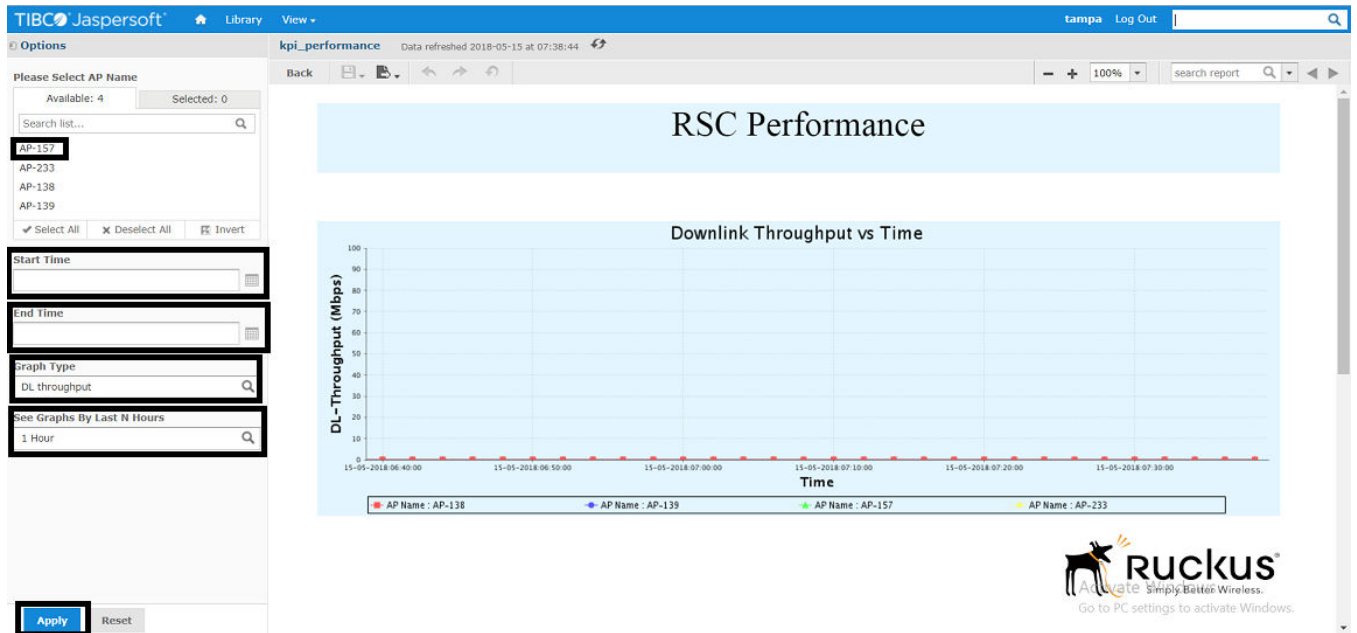
4. Enter end time in the **End Time** field.

NOTE

You can also select the end time by clicking the **Calendar** icon.

5. Select graph type (any one) from the **Graph Type** field.
6. Select the time for which you want to view the graph from the **See Graphs by Last N Hours** field.
7. Click **Apply**.

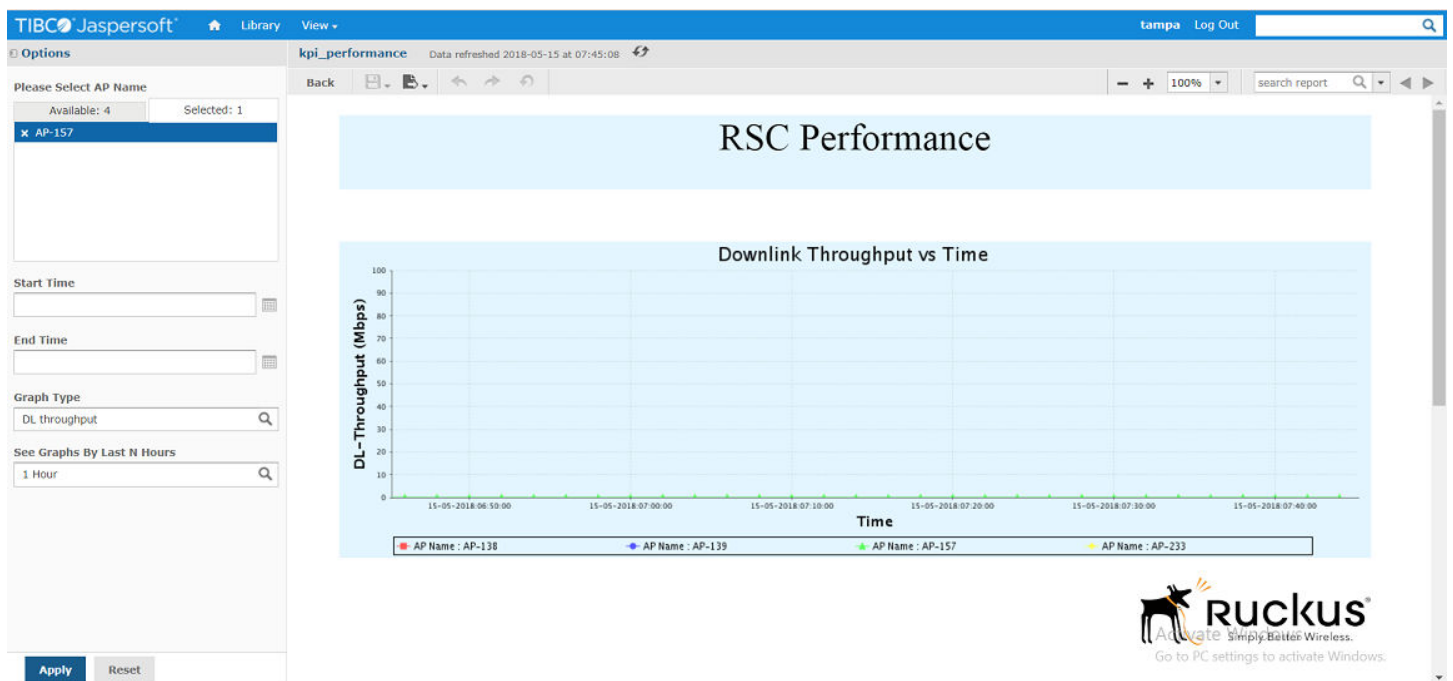
FIGURE 37 KPI Performance screen



DL Throughput

This graph is drawn between Downlink Throughput and Time.

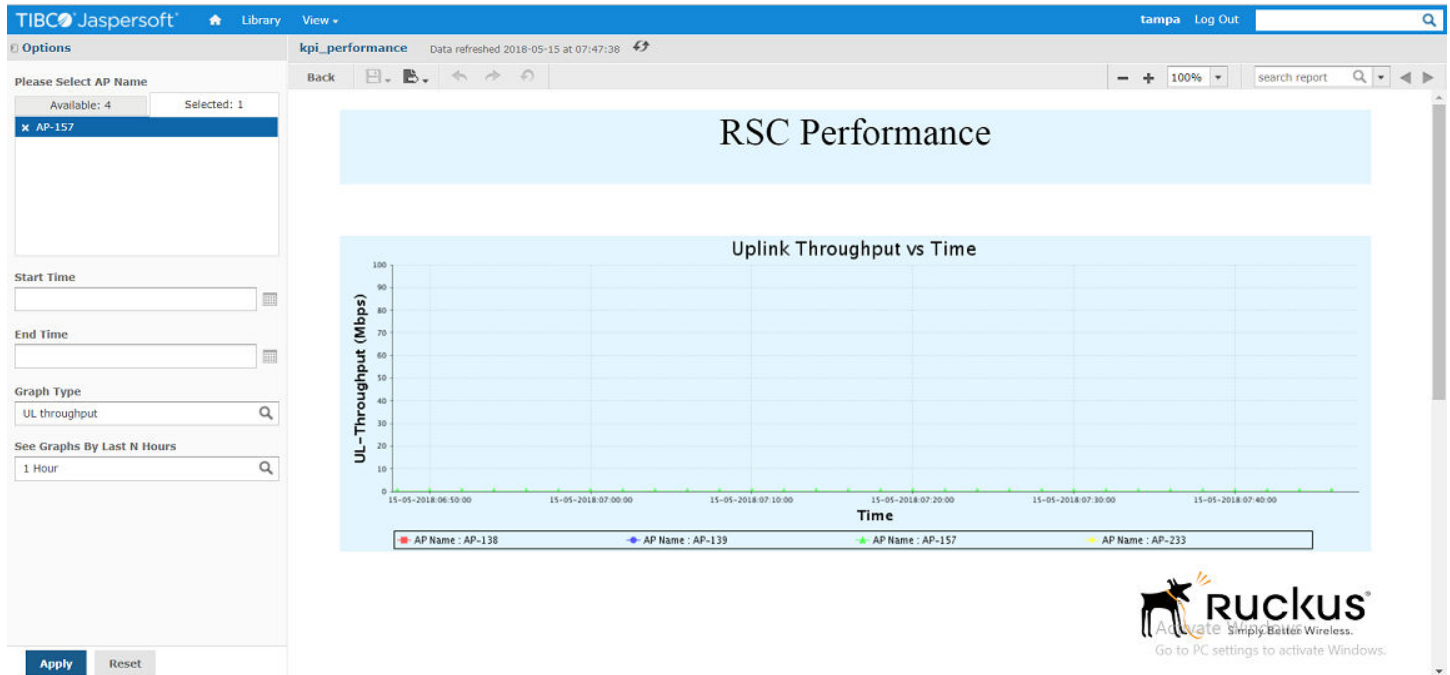
FIGURE 38 DL Throughput



UL Throughput

This graph is drawn between Downlink Throughput and Time.

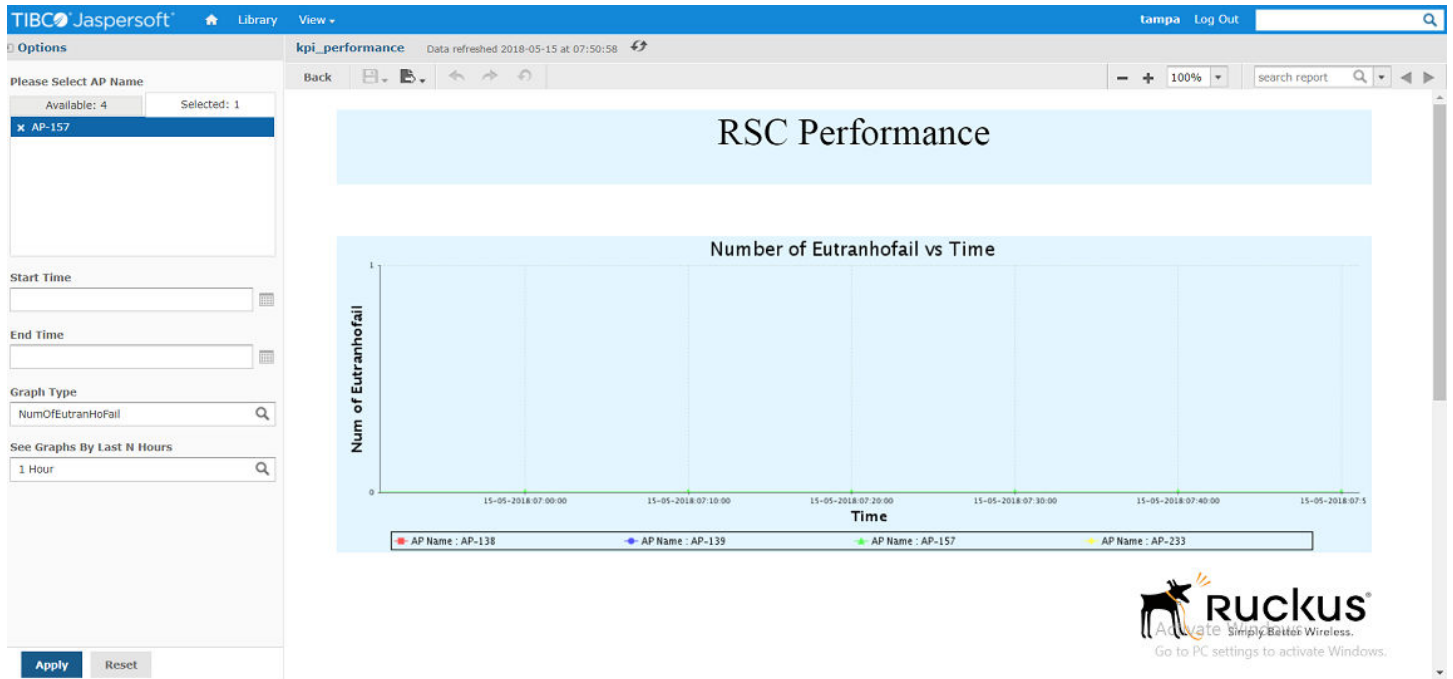
FIGURE 39 UL Throughput



NumofEutranHoFail

This graph is drawn between number of Eutran Handover Fail and Time.

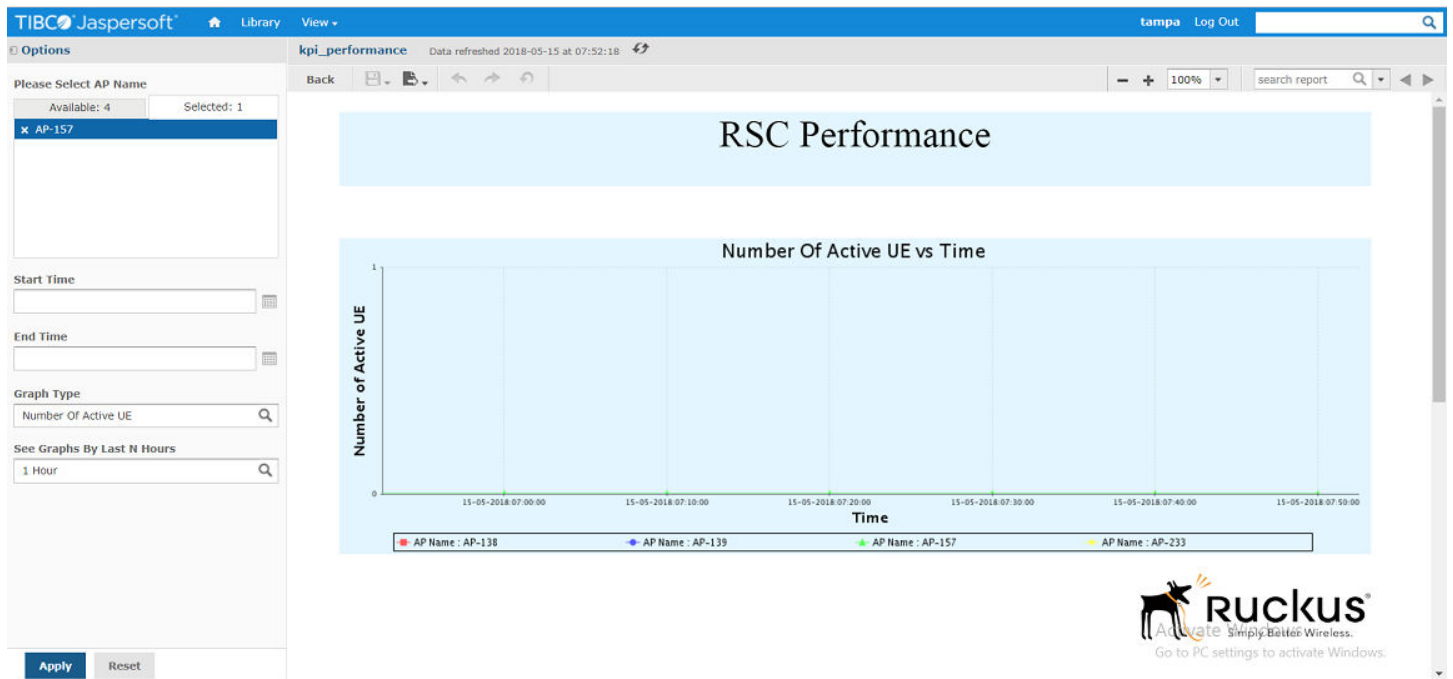
FIGURE 40 Number of Eutran Handover Failure



Active UEs (PCC/SCC)

This graph is drawn between number of active UEs and Time.

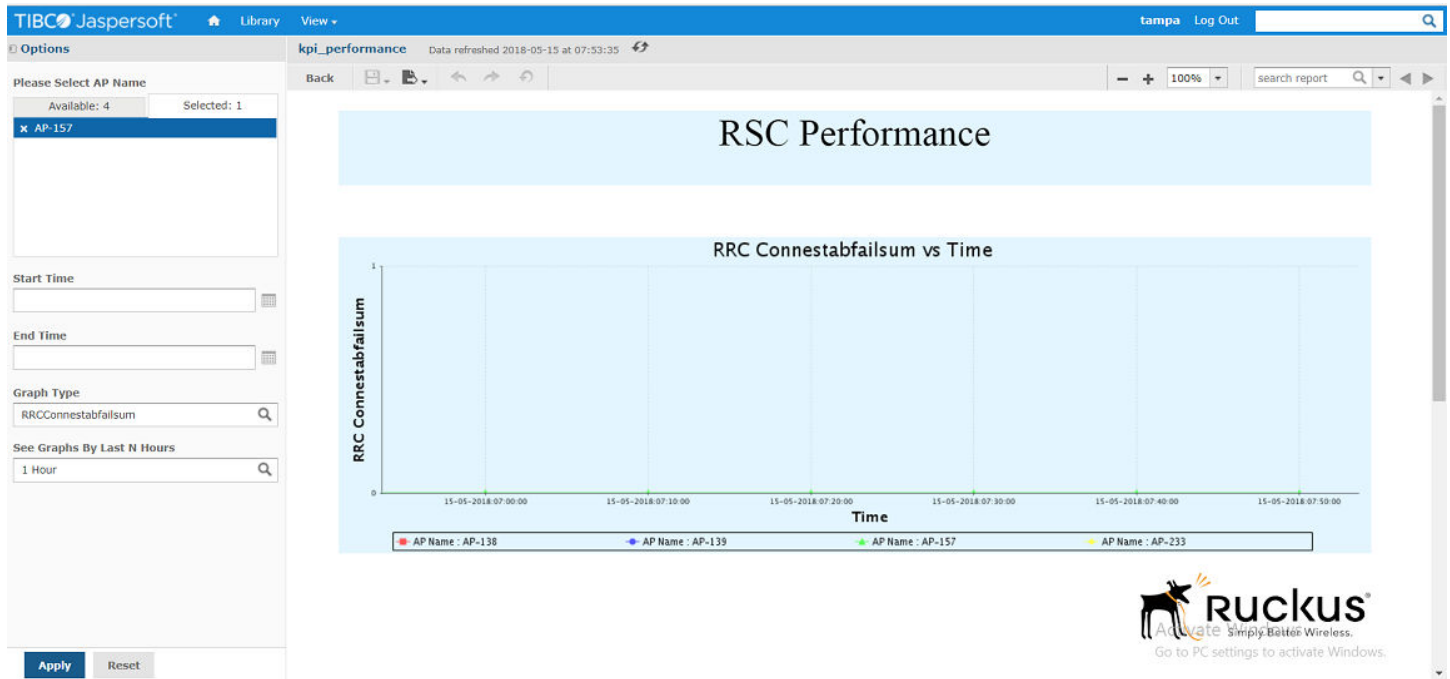
FIGURE 41 Number of Active UEs



RrcConnEstabFailSum

This graph is drawn between RRC Connection Establishment Failure and Time.

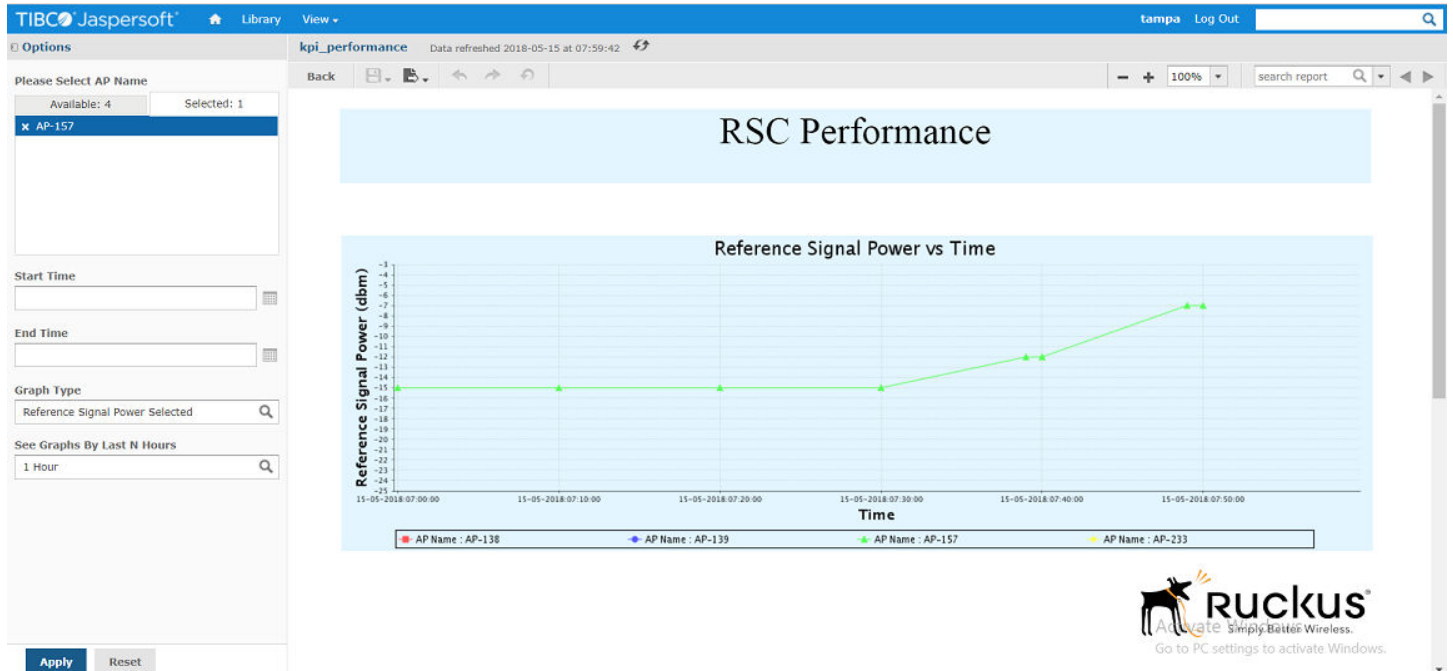
FIGURE 42 RRC Connection Establishment Failure Summary



Reference Signal Power Selected (PCC/SCC)

This graph is drawn between Reference Signal Power Selected and Time.

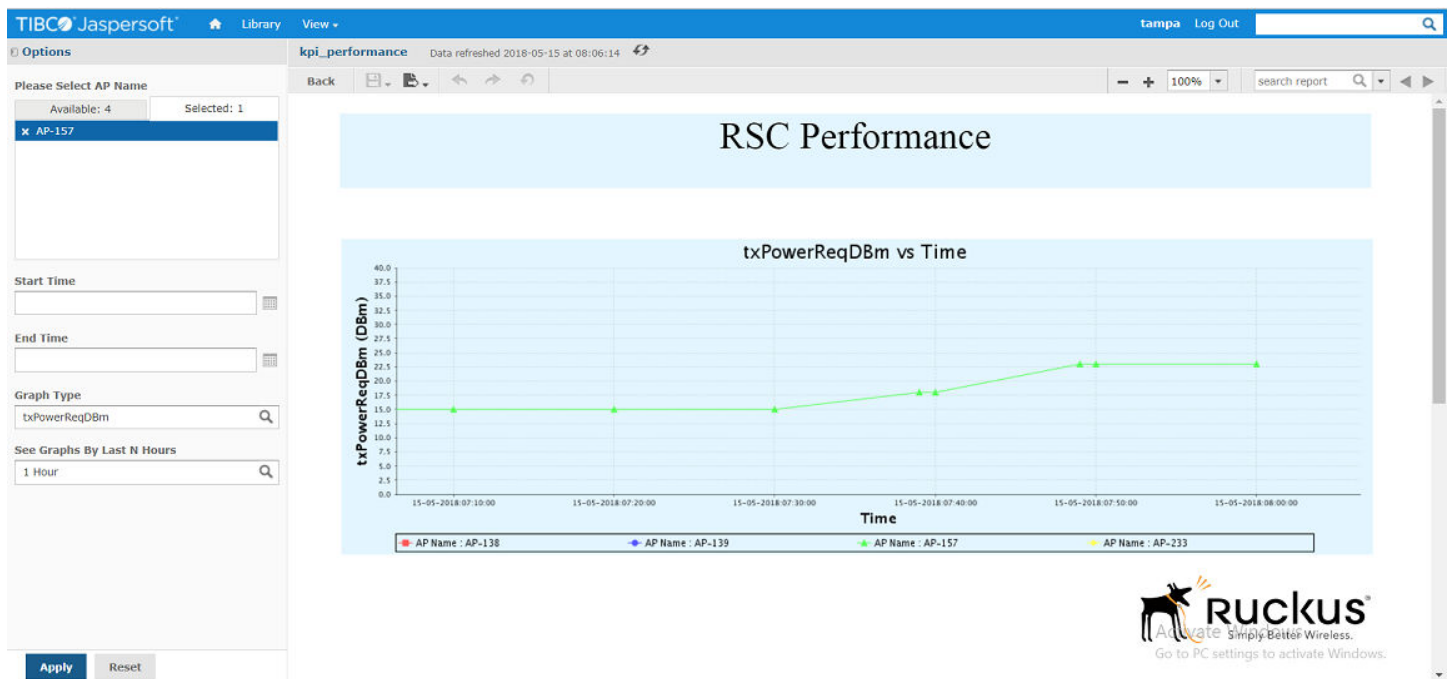
FIGURE 43 Reference Signal Power Selected



Tx Power Required DBM (PCC/SCC)

This graph is drawn between Tx Power Required DBM and time.

FIGURE 44 Tx Power Required DBM



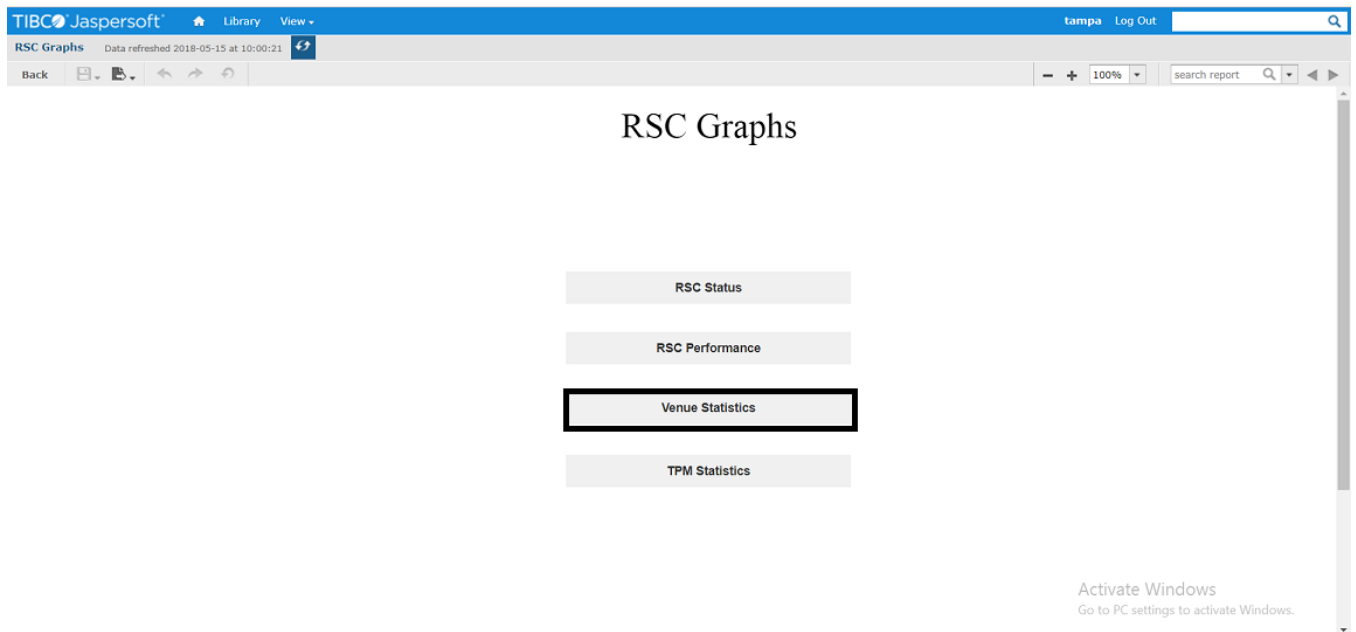
Venue Statistics

Following graphs are available under **Venue Statistics** tab.

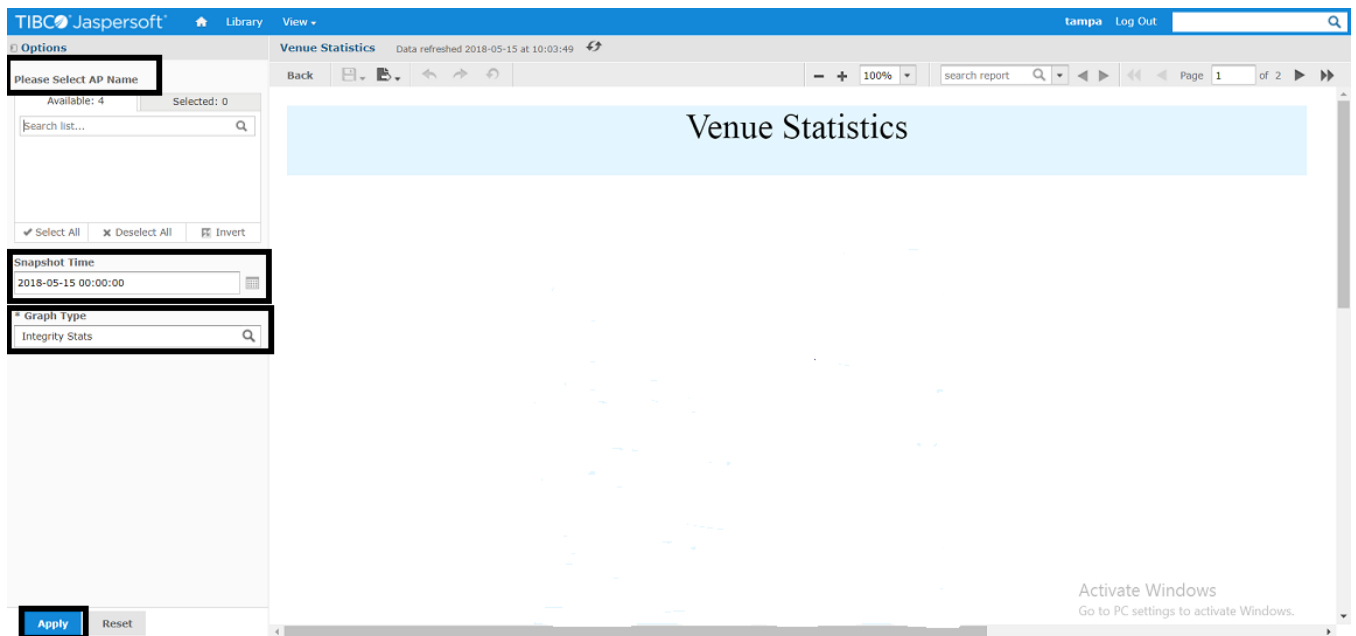
- Integrity Stats
- System Stats
- Accessibility Stats
- Availability Stats
- Mobility Stats
- Sync Stats
- RSC Level Statistics
- ANR Stats
- RSC Statistics

1. On **RSC Graphs** home screen, click **Venue Statistics** tab.

FIGURE 45 Venue Statistics tab



The **Venue Statistics** screen appears.



2. Select LTE AP(s) for which you want to know venue statistics from the **Please Select AP Name** field.
3. Select the snapshot time from the Snapshot Time field.

NOTE

You can also select the date and time by clicking the **Calendar** icon.

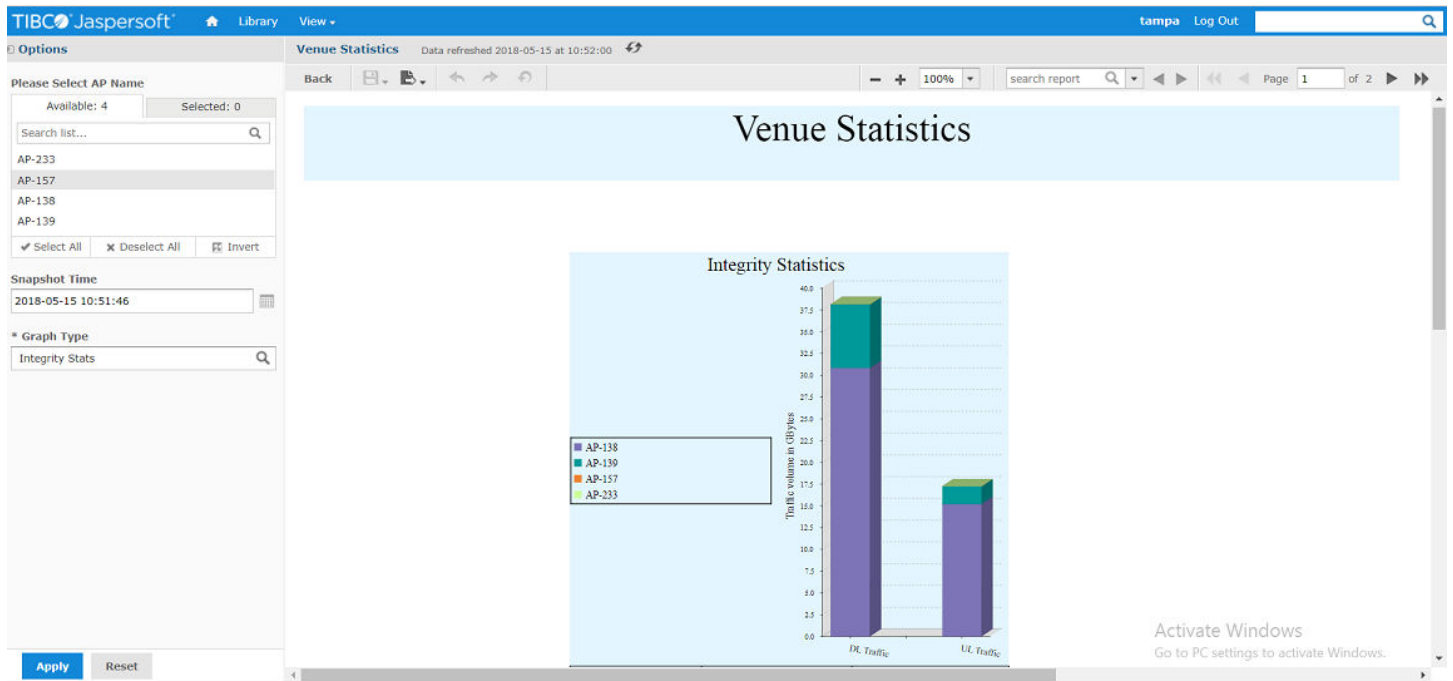
4. Select graph type from the **Graph Type** field. It is a mandatory field.
5. Click **Apply**.

You can view the following graphs.

Integrity Statistics

The graph is drawn for Integrity statistics, i.e. UL and DL Traffic Volume.

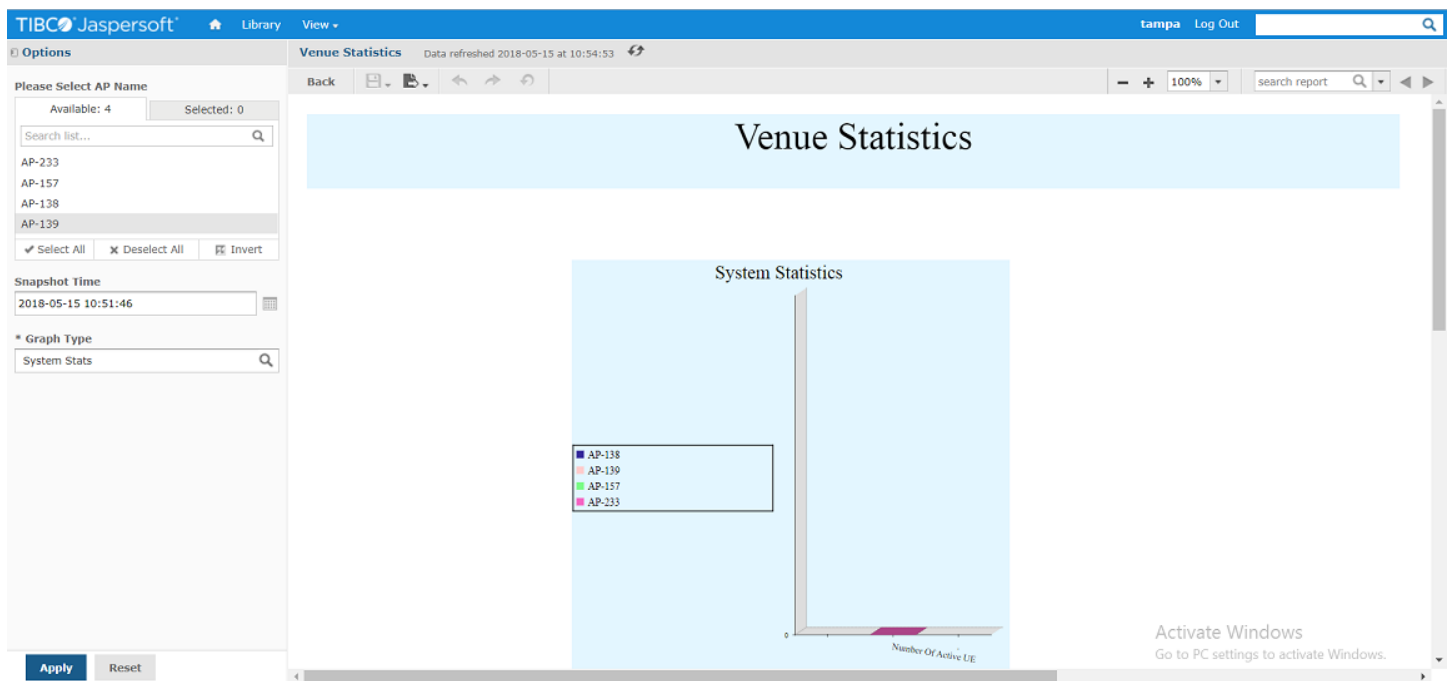
FIGURE 46 Integrity Statistics



System Statistics

The graph is drawn for System Statistics, i.e. number of active UEs.

FIGURE 47 System Statistics



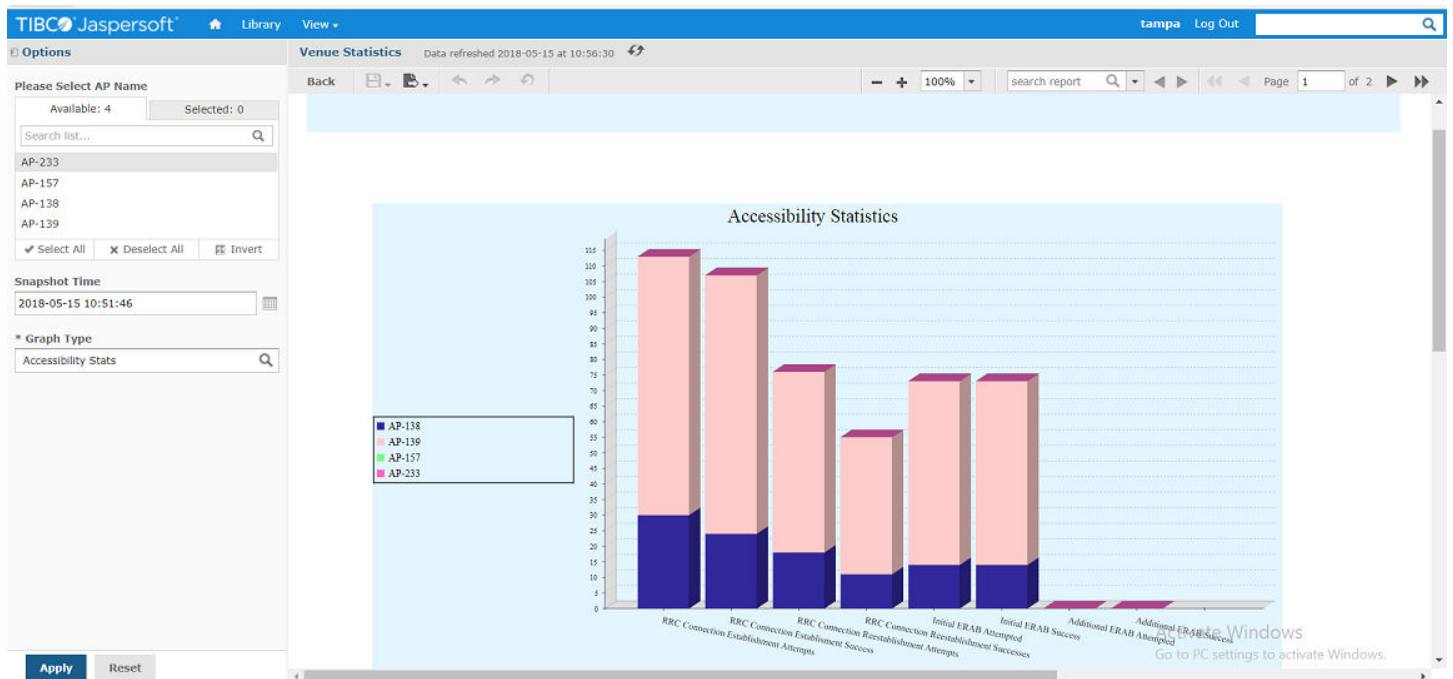
Accessibility Statistics

The graph is drawn for Accessibility statistics.

Following statistics are added in the graph:

- RRC Connection Establishment Attempts
- RRC Connection Establishment Success
- RRC Connection Reestablishment Attempts
- RRC Connection Reestablishment Success
- Initial ERAB Attempted
- Initial ERAB Success
- Additional ERAB Attempted
- Additional ERAB Success
- Number of SCell Add Attempt
- Number of SCell Add Success
- Number of SCell Add Fail
- Number of SCell Release Attempt
- Number of SCell Release Success
- Number of SCell Release Fail

FIGURE 48 Accessibility Statistics



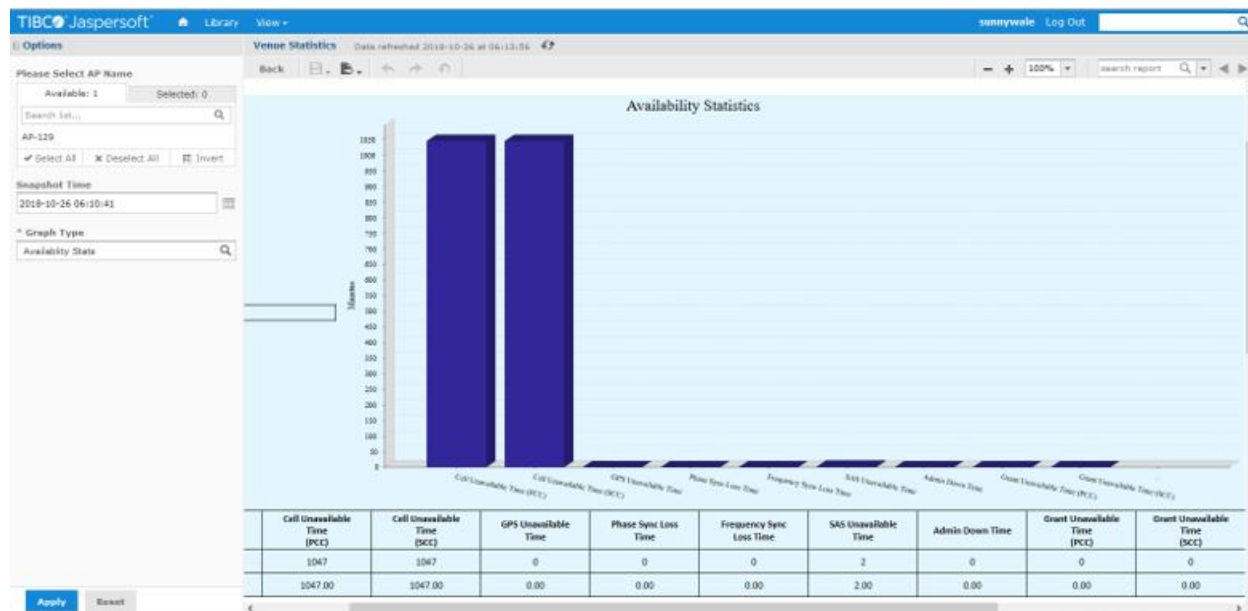
Availability Statistics

The graph is drawn for Availability statistics.

Following statistics are added in the graph:

- Cell Unavailable Time (PCC): The amount of time for which a primary cell is not available, i.e. Opstate or Rf-tx state is down for PCC.
- Cell Unavailable Time (SCC): The amount of time for which a secondary cell is not available, i.e. Opstate or Rf-tx state is down for SCC.
- GPS Unavailable Time: Number of seconds elapsed between last GPS/GNSS unavailability until GPS availability.
- Phase Sync Loss Time: Number of seconds elapsed between last PTP phase sync loss until PTP phase sync lock.
- Frequency Sync Loss Time: Number of seconds elapsed between last PTP frequency sync loss until PTP frequency sync lock.
- SAS Unavailable Time: The amount of time for which SAS is unavailable. This counter is updated whenever CBSD does not receive a response from SAS due to unreachability. Timer keeps incrementing until SAS becomes reachable again.
- Admin Downtime: The amount of time for which RSC Admin State is down.
- Grant Unavailable Time (PCC): The amount of time for which primary cell grant is unavailable. This timer will increment if grantEnable/Registration Enable is true but Ruckus LTE AP is unable to acquire grant due to SAS unreachability or SAS errorCodes.
- Grant Unavailable Time (SCC): The amount of time for which secondary cell grant is unavailable. This timer will increment if grantEnable/Registration Enable is true but Ruckus LTE AP is unable to acquire grant due to SAS unreachability or SAS errorCodes
- Cell Unavailable due to IAP pending (PCC): The amount of time for which a primary cell is down due to IAP pending. This counter is updated whenever LTE AP receives IAP pending in HB response and the cell goes down. The counter keeps on incrementing unless the cell starts transmitting again after successful HB response.
- Cell Unavailable due to IAP pending (SCC): The amount of time for which a secondary cell is down due to IAP pending. This counter is updated whenever LTE AP receives IAP pending in HB response and the cell goes down. The counter keeps on incrementing unless the cell starts transmitting again after successful HB response.

FIGURE 49 Availability Statistics



Mobility Statistics

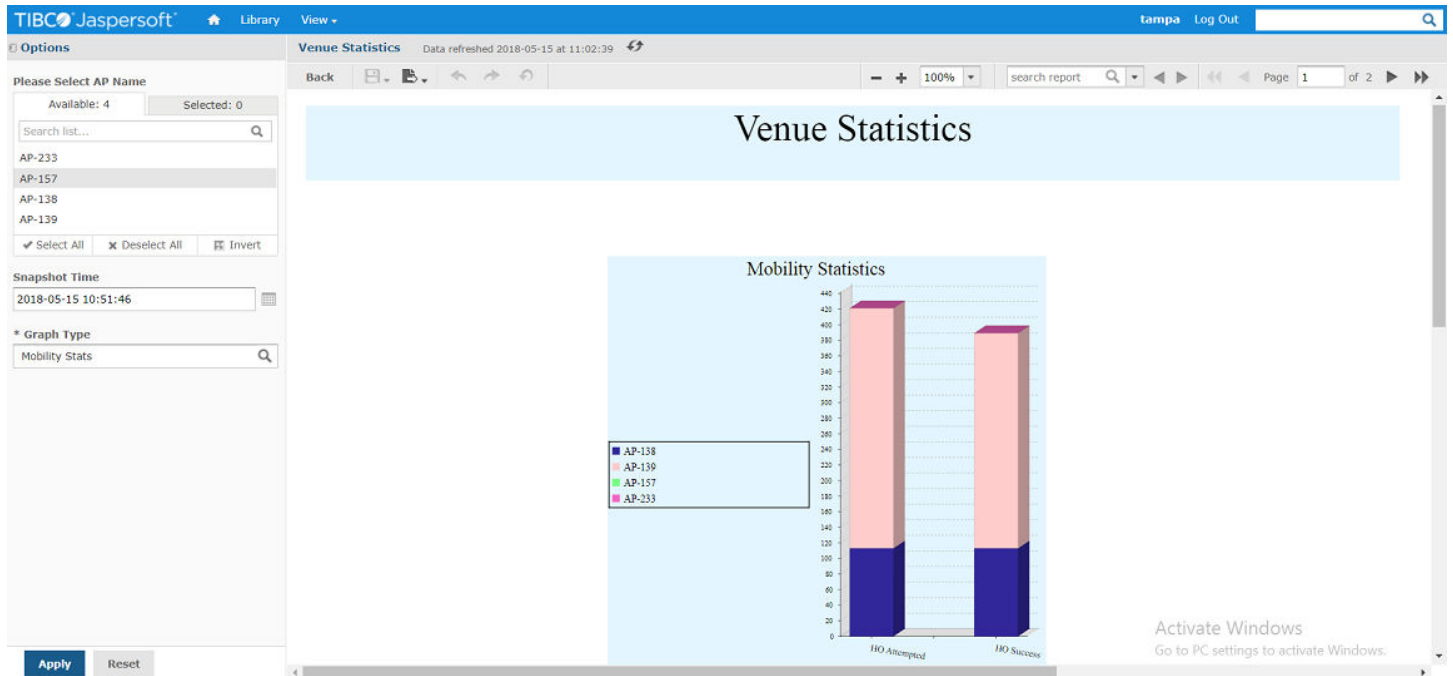
The graph is drawn for Mobility statistics.

Following statistics are added in the graph:

- HO Attempted

- HO Success

FIGURE 50 Mobility Statistics



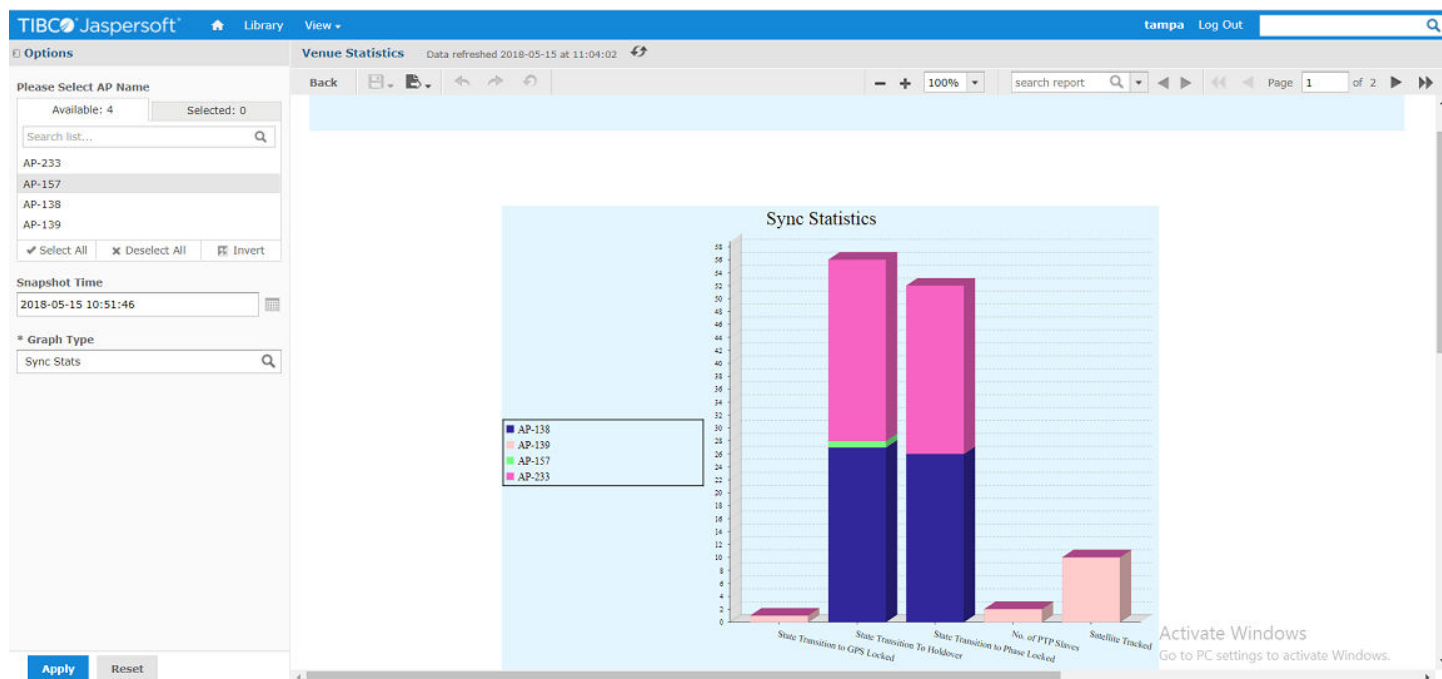
Sync Statistics

The graph is drawn for Sync statistics.

Following statistics are added in the graph:

- State Transition to GPS Locked
- State Transition to Phase Locked
- State Transition to Holdover
- Number of PTP Slaves
- Satellites Tracked

FIGURE 51 Sync Statistics



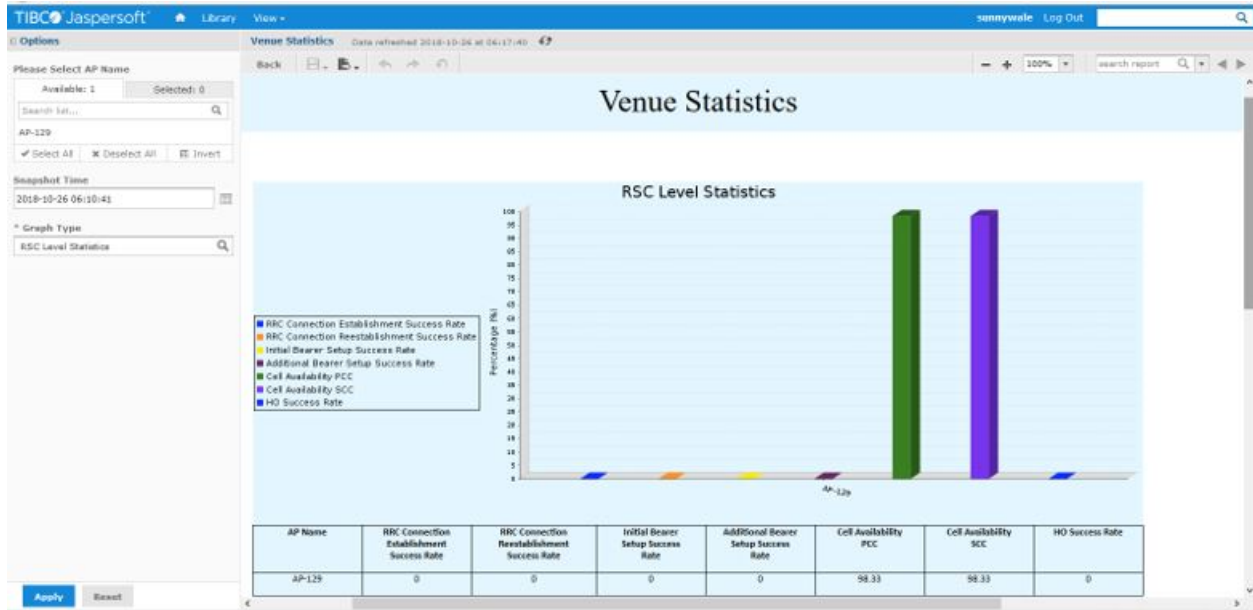
RSC Level Statistics

The graph is drawn for RSC Level statistics.

Following statistics are added in the graph:

- RRC Connection Establishment Success Rate = $(rrc_conn_estab_succ_sum / rrcconnestabattsum) * 100$
- RRC Connection Reestablishment Success Rate = $(rrc_conn_reestab_succ_sum / rrc_conn_reestab_att_sum) * 100$
- Initial Bearer Setup Success Rate = $(erab_estab_init_succ_nbr_sum / erab_estab_init_att_nbr_sum) * 100$
- Additional Bearer Setup Success Rate = $(erab_estab_add_succ_nbr_sum / erab_estab_add_att_nbr_sum) * 100$
- Cell Availability (PCC) = $((Uptime - cell_unavailable_time) * 100) / Uptime$
- Cell Availability (SCC) = $((Uptime - cell_unavailable_time\ c2) * 100) / Uptime$
- HO Success Rate = $(eutrantoeutran_ho_out_succ_target_sum / eutrantoeutran_ho_out_att_target_sum)$

FIGURE 52 RSC Level Statistics



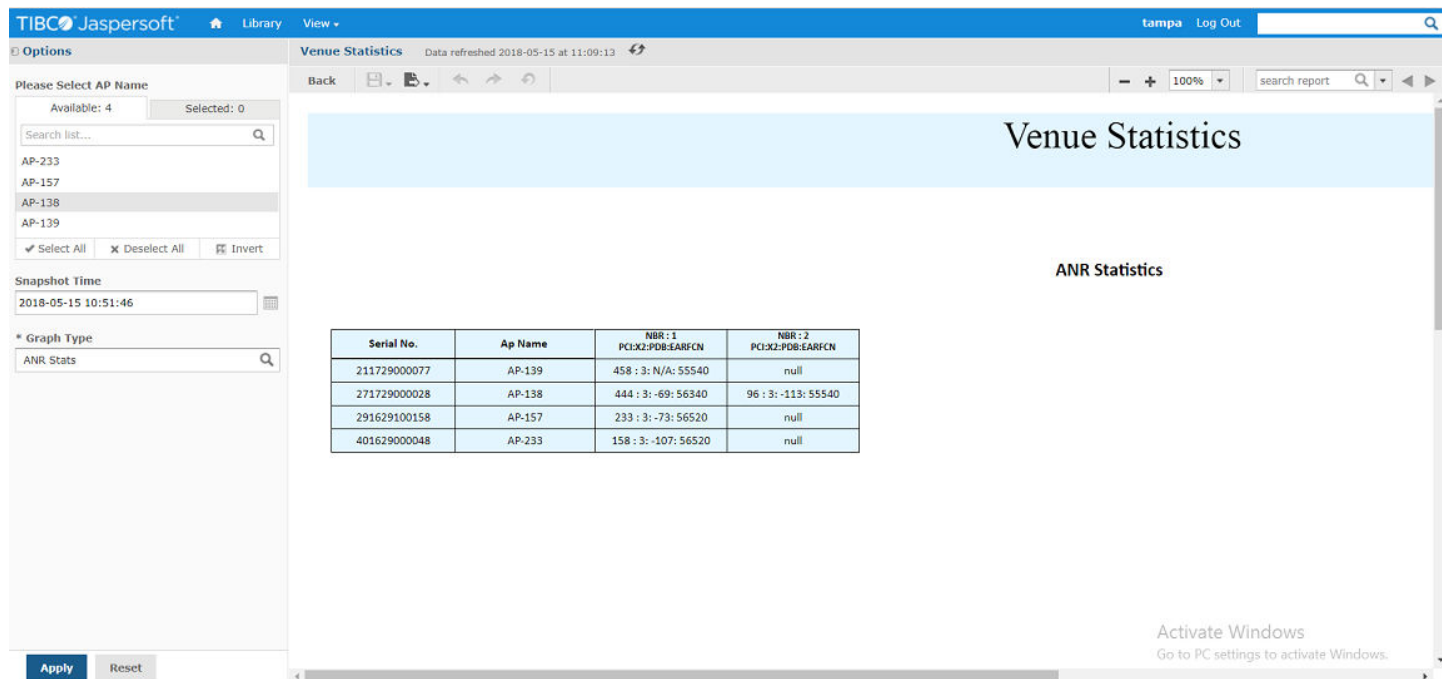
ANR Statistics

The graph displays ANR statistics for x2HOStatus == 3 and PDB > -85.

Following statistics are added in the graph:

- PCI
- X2
- PDB
- EARFCN

FIGURE 53 ANR Statistics



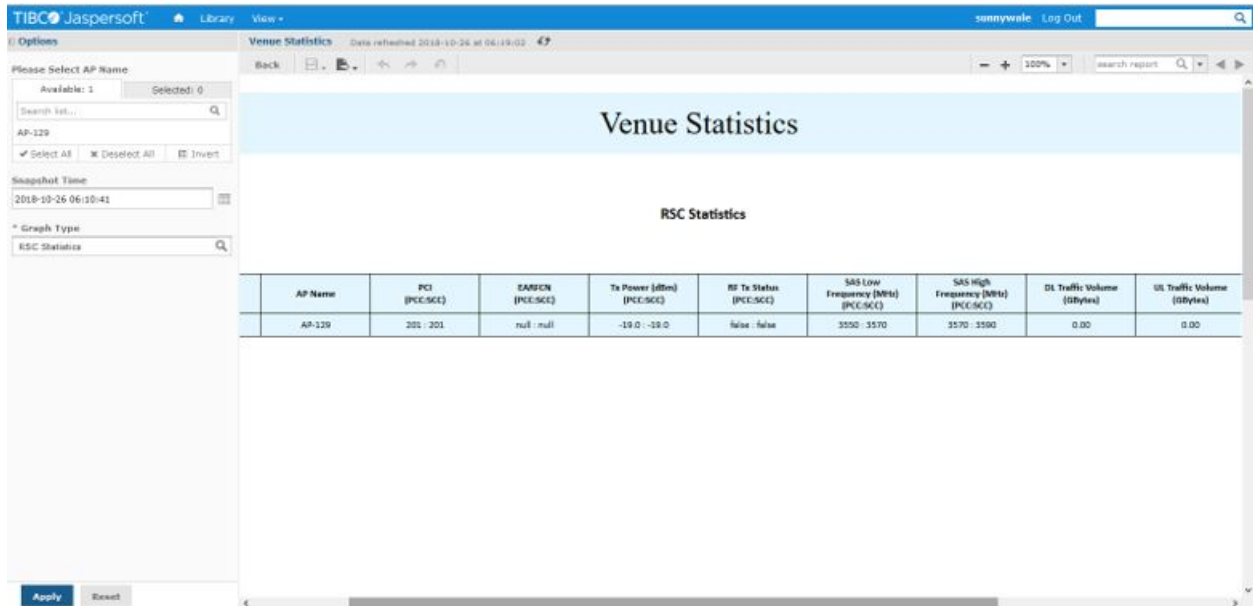
RSC Statistics

The graph is drawn for LTE AP statistics. The graph displays statistics for both primary and secondary cell (in case of CA).

Following statistics are added in the graph:

- Serial No.
- AP Name
- PCI (PCC/SCC)
- EARFCN (PCC/SCC)
- TxPower (PCC/SCC)
- RF Tx status (PCC/SCC)
- SAS Low Frequency (PCC/SCC)
- SAS High Frequency (PCC/SCC)
- DL Traffic volume
- UL Traffic volume

FIGURE 54 RSC Statistics



Venue Level Statistics

Following derived KPIs are available under Venue Level Statistics.

- RRC Connection Establishment Success Rate
- RRC Connection Reestablishment Success Rate
- Initial Bearer Setup Success Rate
- Additional Bearer Setup Success Rate
- ERAB Release Rate
- HO Success Rate
- SAS Availability

To get venue level statistics, perform the following steps.

1. On the Jasper Login screen, enter the following credentials to log in to Venue Statistics.

Username: venuestat

Password: venuestat

FIGURE 55 Jasper Login screen



User ID:

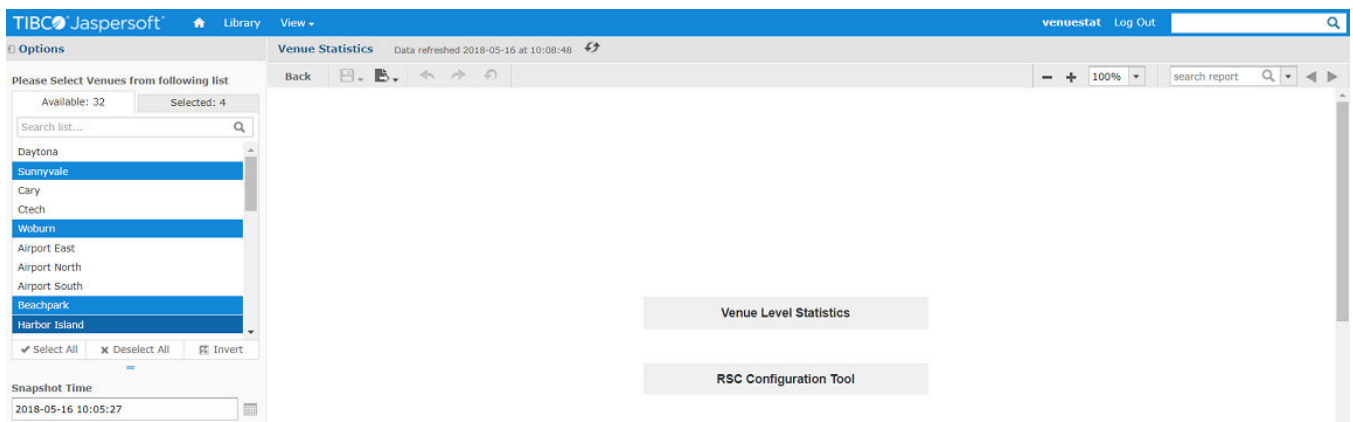
Password:

Show locale & time zone

Login

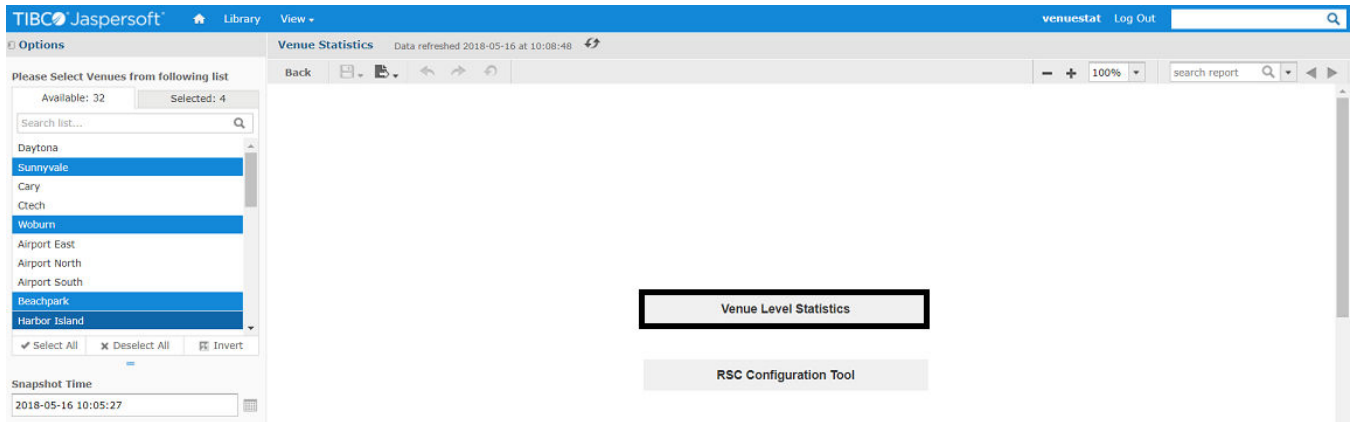
[Need help logging in?](#)

The Venue Statistics screen appears.



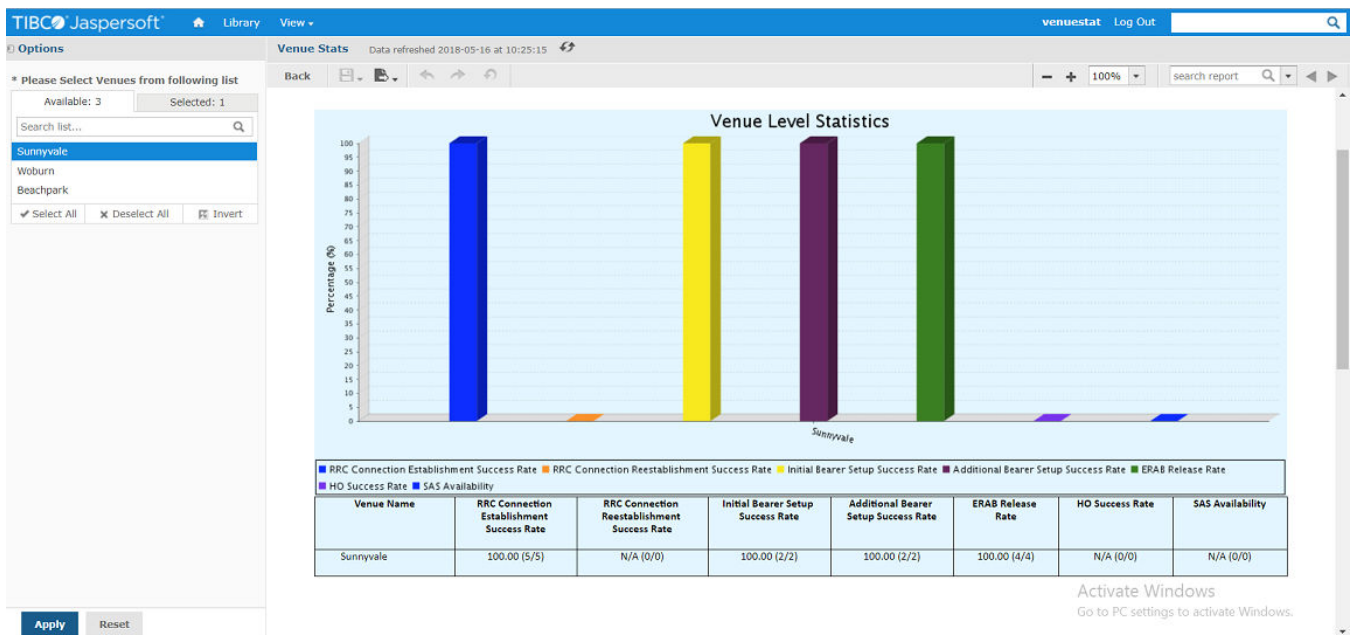
2. Select venues and Snapshot time, and click **Venue Level Statistics** tab.

FIGURE 56 Venue Level Statistics tab



The **Venue Level Statistics** screen appears showing the graph for selected venues.

FIGURE 57 Venue Level Statistics screen



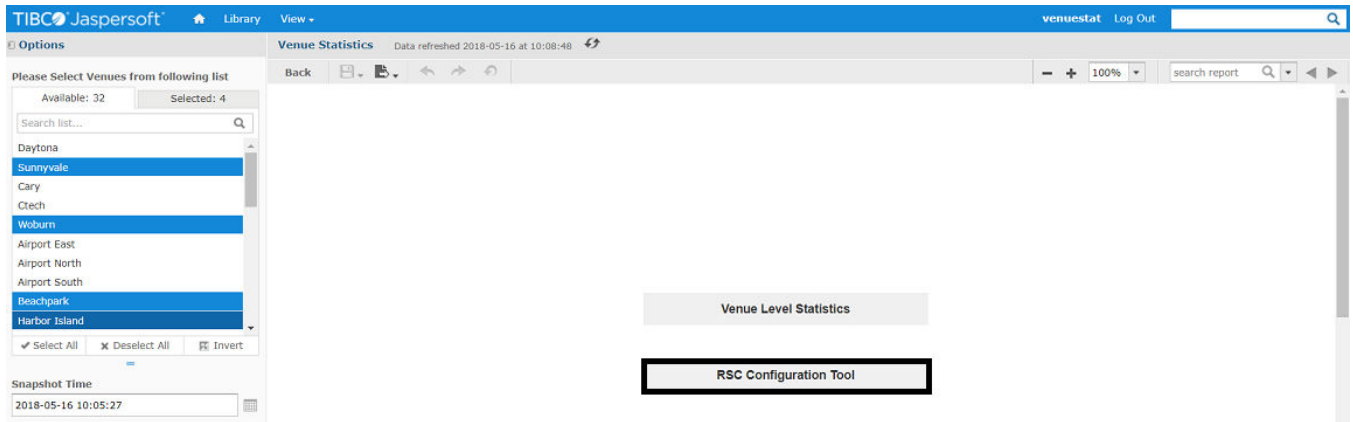
RSC Configuration Tool

RSC Configuration Tool can be used to perform Set Commands available on RSC_CLI.

1. On the **Venue Statistics** screen, select a venue(s) from the drop-down list and click **Apply**

The Venue Statistics screen displays **RSC Configuration Tool** tab.

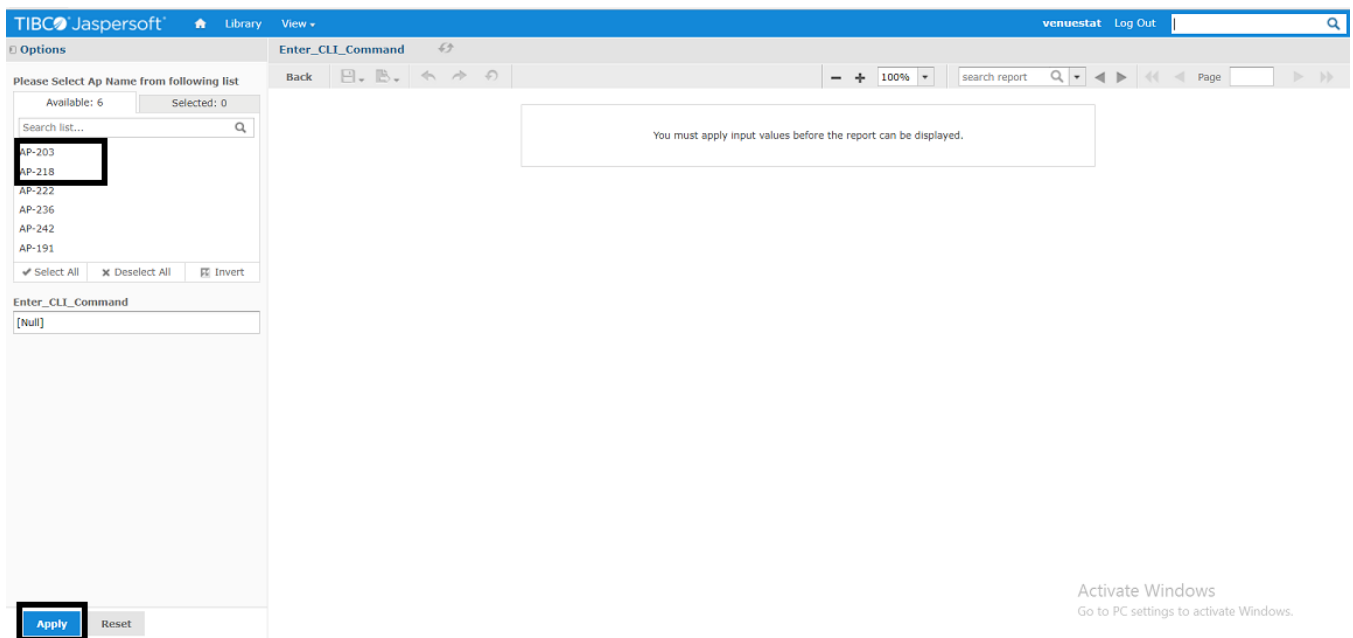
FIGURE 58 RSC Configuration Tool tab



2. Click **RSC Configuration Tool** tab.

The Enter_CLI_Command screen appears.

FIGURE 59 Enter CLI Command screen



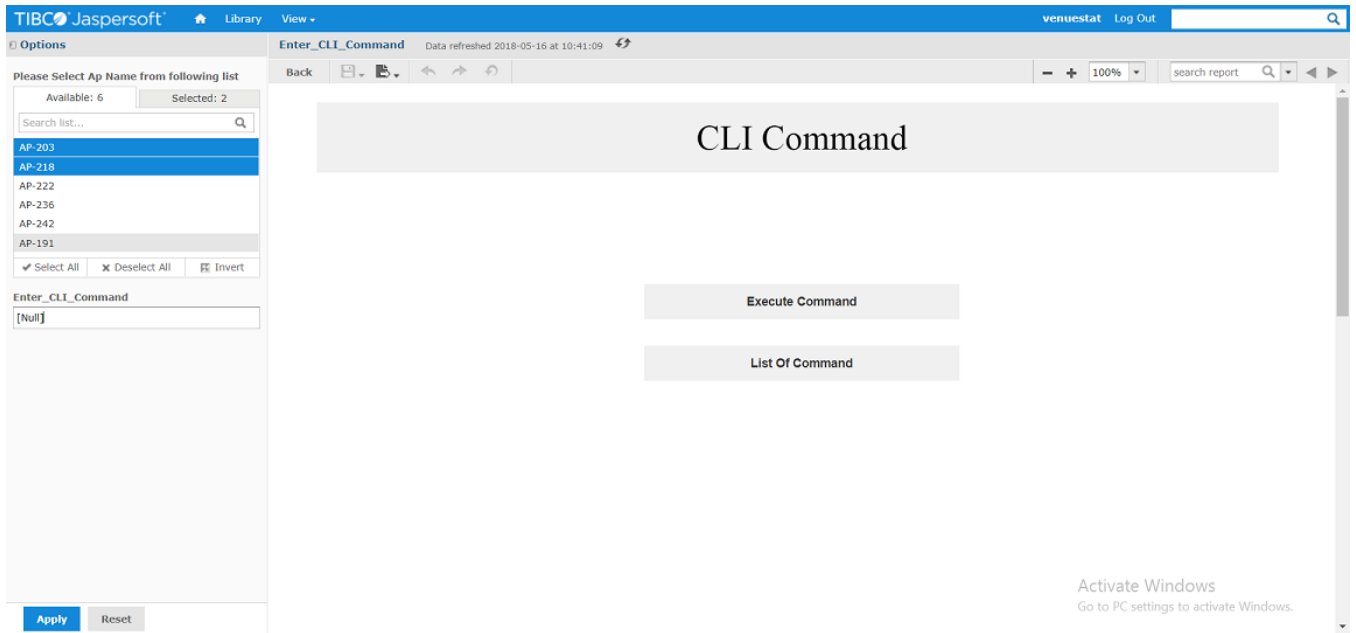
3. Select Access Points from the list and click **Apply**.

NOTE

You can also select all the Access Points by clicking **Select All**.

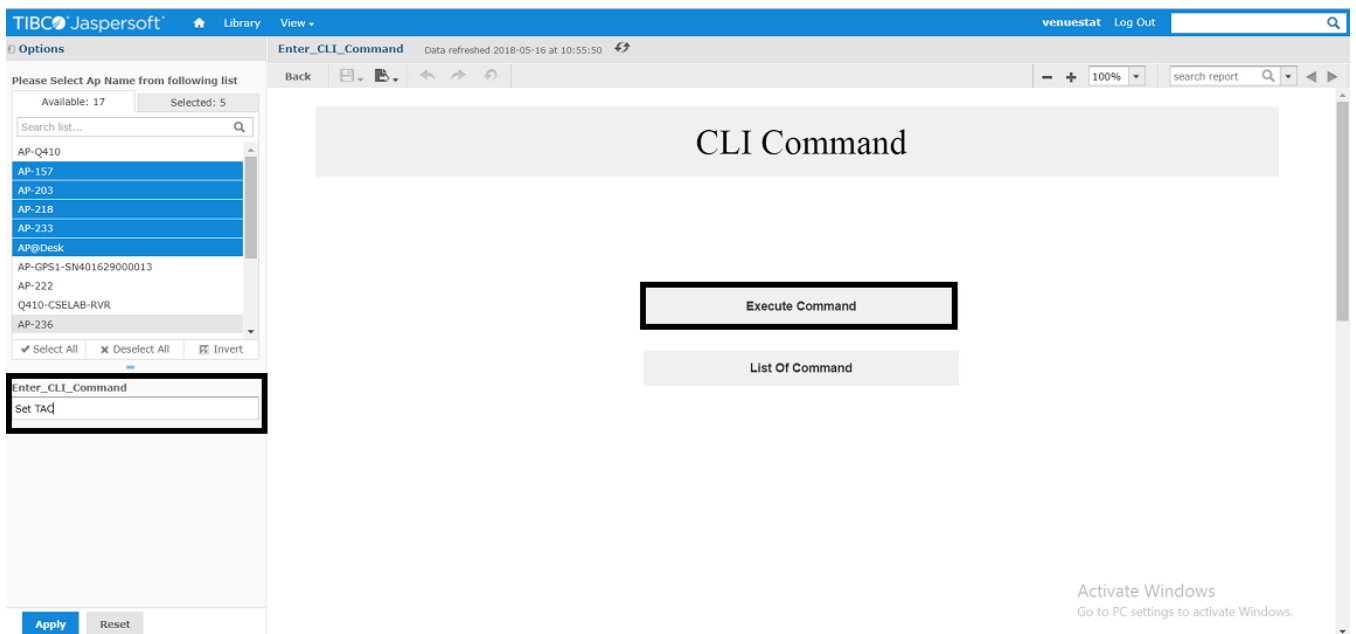
The CLI Command screen appears.

FIGURE 60 CLI Command screen



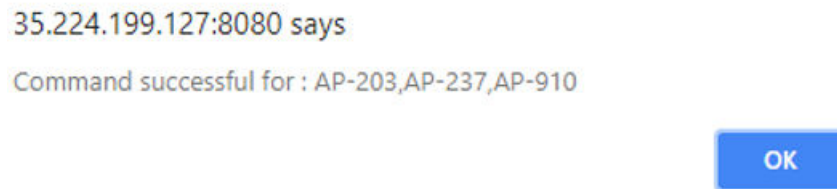
4. Enter the CLI command in the Enter_CLI_Command field and click **Execute Command** tab.

FIGURE 61 Execute Command tab



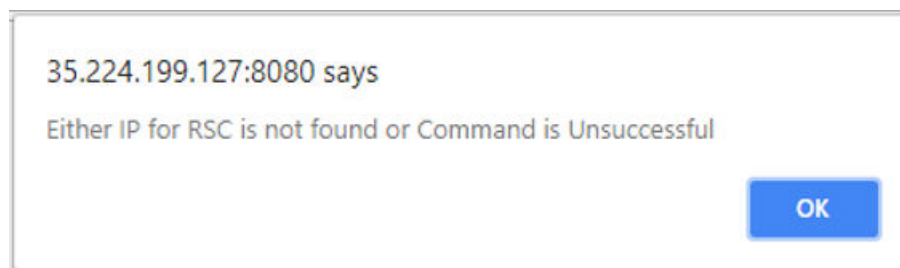
On successful execution of the command, the following pop-up window appears.

FIGURE 62 Successful Execution of CLI Command



On unsuccessful execution of the command, the following pop-up window appears.

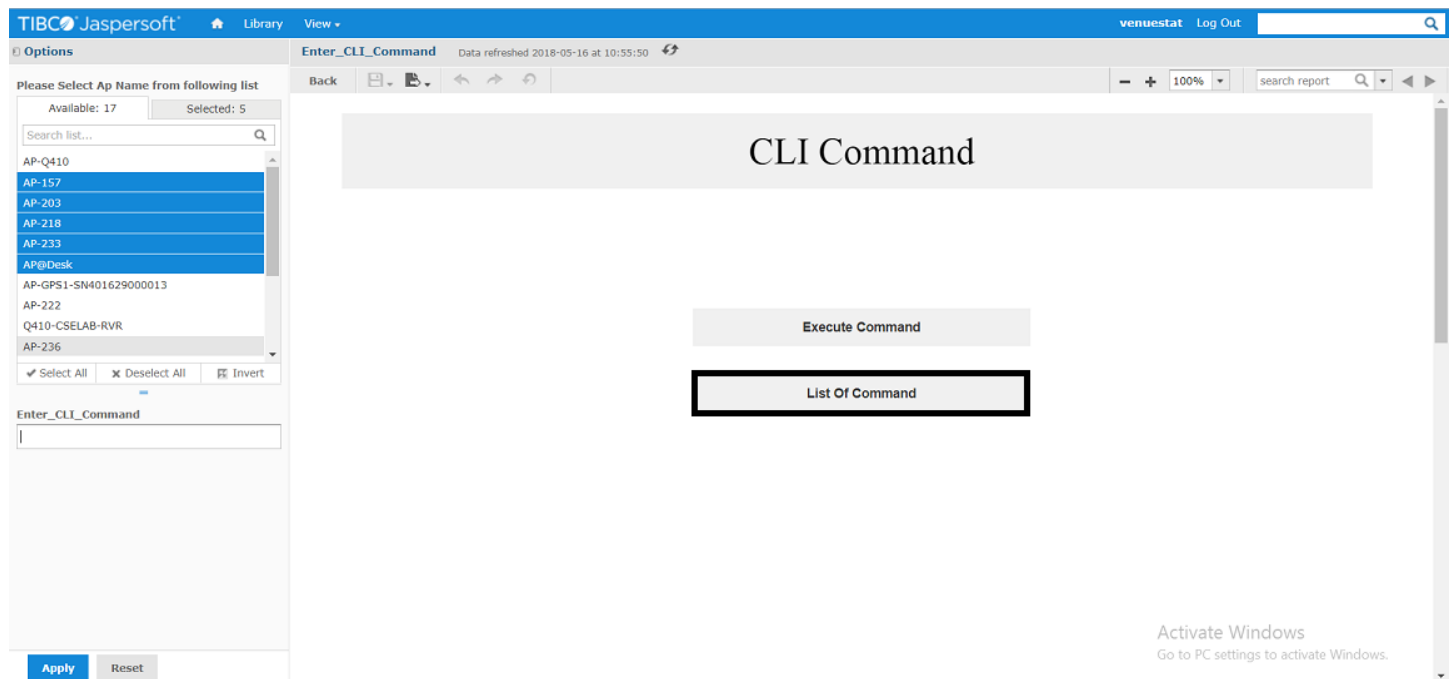
FIGURE 63 Unsuccessful Execution of CLI Command



NOTE

To check the list of all CLI commands, click **List of Command** tab.

FIGURE 64 List of Command tab



List of KPIs Supported

Following table provides information of supported KPIs.

TABLE 20 KPIs Supported

S.No.	KPI/Counter	Supporting DM Object	TR Name
1	rrcConnEstabAttSum	rrcConnectionPms [id=0x0d140002]	InternetGatewayDevice.Services.FAPService.{i}.CellConfig.{i}.LTE.X_QUALCOMM_LTE_STATS.KpiRrcConnectionStats
2	rrcConnEstabSuccSum	rrcConnectionPms [id=0x0d140002]	InternetGatewayDevice.Services.FAPService.{i}.CellConfig.{i}.LTE.X_QUALCOMM_LTE_STATS.KpiRrcConnectionStats
3	rrcConnReEstabAttSum	rrcConnectionPms [id=0x0d140002]	InternetGatewayDevice.Services.FAPService.{i}.CellConfig.{i}.LTE.X_QUALCOMM_LTE_STATS.KpiRrcConnectionStats
4	rrcConnReEstabSuccSum	rrcConnectionPms [id=0x0d140002]	InternetGatewayDevice.Services.FAPService.{i}.CellConfig.{i}.LTE.X_QUALCOMM_LTE_STATS.KpiRrcConnectionStats
5	erabEstabInitAttNbrSum	eRabSetupPms [id=0x0d140003]	InternetGatewayDevice.Services.FAPService.{i}.CellConfig.{i}.LTE.X_QUALCOMM_LTE_STATS.KpiRrcErabSetupStats.UeCategoryType.{i}
6	erabEstabInitSuccNbrSum	eRabSetupPms [id=0x0d140003]	InternetGatewayDevice.Services.FAPService.{i}.CellConfig.{i}.LTE.X_QUALCOMM_LTE_STATS.KpiRrcErabSetupStats.UeCategoryType.{i}
7	erabEstabAddAttNbrSum	eRabSetupPms [id=0x0d140003]	InternetGatewayDevice.Services.FAPService.{i}.CellConfig.{i}.LTE.X_QUALCOMM_LTE_STATS.KpiRrcErabSetupStats.UeCategoryType.{i}
8	erabEstabAddSuccNbrSum	eRabSetupPms [id=0x0d140003]	InternetGatewayDevice.Services.FAPService.{i}.CellConfig.{i}.LTE.X_QUALCOMM_LTE_STATS.KpiRrcErabSetupStats.UeCategoryType.{i}
9	erabRelEnbNbrSum	eRabReleasePms [id=0x0d140004]	InternetGatewayDevice.Services.FAPService.{i}.CellConfig.{i}.LTE.X_QUALCOMM_LTE_STATS.KpiRrcErabReleaseStats.UeCategoryType.{i}
10	eutranToEutranHoOutAttTargetSum	eutranToEutranHoPms [id=0x0d0400e0]	InternetGatewayDevice.Services.FAPService.{i}.CellConfig.{i}.LTE.X_QUALCOMM_LTE_STATS.KpiRrcNeighborHandoverStatsByEnbid.GlobalEnbidPlmnIdentity.{i}.CellIdentity.{i}.CellType.{i}.TaiPlmnIdentity.{i}.TrackingAreaCode.{i}.UeCategoryType.{i}
11	eutranToEutranHoOutSuccTargetSum	eutranToEutranHoPms [id=0x0d0400e0]	InternetGatewayDevice.Services.FAPService.{i}.CellConfig.{i}.LTE.X_QUALCOMM_LTE_STATS.KpiRrcNeighborHandoverStatsByEnbid.GlobalEnbidPlmnIdentity.{i}.CellIdentity.{i}.CellType.{i}.TaiPlmnIdentity.{i}.TrackingAreaCode.{i}.UeCategoryType.{i}
12	dITrafficVolume	egtpuProtocolStats [id=0x0d480000]	InternetGatewayDevice.Services.FAPService.{i}.X_QUALCOMM_ENB_STATS.EgtpuProtocolStats
13	ulTrafficVolume	egtpuProtocolStats [id=0x0d480000]	InternetGatewayDevice.Services.FAPService.{i}.X_QUALCOMM_ENB_STATS.EgtpuProtocolStats
14	sASUnavailableTime	Installation_param_info [id=0x6606f003]	InternetGatewayDevice.Services.FAPService.{i}.FAPControl.LTE.X_001392_CBSD.SASAccount.{i}
15	gpsUnavailableTime	NA	InternetGatewayDevice.FAP.X_001392_Timebase.Stats.GpsUnavailableTime
16	cellUnavailableTime	rrmPms [id=0x0d0400d2]	InternetGatewayDevice.Services.FAPService.{i}.CellConfig.LTE.X_QUALCOMM_LTE_STATS.KpiRrmStats
17	phaseSyncLossTime	NA	InternetGatewayDevice.FAP.X_001392_Timebase.Stats.PhaseSyncLossTime
18	numOfTfcsStateTransToGpsLocked	NA	InternetGatewayDevice.FAP.X_001392_Timebase.Stats.PrimarySyncSourceGNSSCounter

TABLE 20 KPIs Supported (continued)

S.No.	KPI/Counter	Supporting DM Object	TR Name
19	numOfTfcsStateTransToHoldover	NA	InternetGatewayDevice.FAP.X_001392_Timebase.Stats.NumOfHoldover
20	numOfTrackedSatellites	NA	InternetGatewayDevice.FAP.GPS.NumberOfSatellites
21	numOfPtpSlaves	NA	InternetGatewayDevice.FAP.X_001392_PTP.NumClients
22	numOfTfcsStateTransToPhaseLocked	NA	InternetGatewayDevice.FAP.X_001392_Timebase.Stats.PTPPhaseLockCounter
23	lastresetreason	somc_last_reset_reason_t [id=0x6606200f]	InternetGatewayDevice.DeviceInfo
24	eventtype	somc_am_current_alarm_info_t [id=0x66064002]	InternetGatewayDevice.FaultMgmt.CurrentAlarm.{i}
25	specificproblem	somc_am_current_alarm_info_t [id=0x66064002]	InternetGatewayDevice.FaultMgmt.CurrentAlarm.{i}
26	rftxstatus	somc_notify_adminstate_info_stat_t [id=0x66062001]	InternetGatewayDevice.Services.FAPService.{i}.FAPControl.LTE
27	tfcsptplockstate	tfcsPtpLockState [id=0x0b040008]	InternetGatewayDevice.FAP.X_001392_Timebase
28	timebasesourcestatus	tfcsTimebaseSourceStat [id=0x0b040005]	InternetGatewayDevice.FAP.X_001392_Timebase.Source
29	authorizedmaxtxeirp	somc_cbsd_grant_info [id=0x6606f001]	InternetGatewayDevice.Services.FAPService.{i}.FAPControl.LTE.X_001392_CBSD.Grant.{i}
30	authorizedfreqhigh	somc_cbsd_grant_info [id=0x6606f001]	InternetGatewayDevice.Services.FAPService.{i}.FAPControl.LTE.X_001392_CBSD.Grant.{i}
31	authorizedfreqlow	somc_cbsd_grant_info [id=0x6606f001]	InternetGatewayDevice.Services.FAPService.{i}.FAPControl.LTE.X_001392_CBSD.Grant.{i}
32	numberofactiveue	l2RlcStats [id=0x0d0800c2]	InternetGatewayDevice.Services.FAPService.{i}.CellConfig.{i}.LTE.X_QUALCOMM_LTE_STATS.L2RlcStats.UeCategoryType.{i}
33	frequencysynclosstime	RecordTfcsUnavailabeTime	InternetGatewayDevice.FAP.X_001392_Timebase.Stats.FrequencySyncLossTime
34	chswchswitchcountsuccessful	chswChSwitchStats [id=0x0d0800fd]	InternetGatewayDevice.Services.FAPService.{i}.LTE.X_QUALCOMM_LTE_STATS.SonStats.ChswStats.ChswChSwitchStats
35	chswchswitchcountattempted	chswChSwitchStats [id=0x0d0800fd]	InternetGatewayDevice.Services.FAPService.{i}.LTE.X_QUALCOMM_LTE_STATS.SonStats.ChswStats.ChswChSwitchStats
36	chswchsuspendcountattempted	chswChSwitchStats [id=0x0d0800fd]	InternetGatewayDevice.Services.FAPService.{i}.LTE.X_QUALCOMM_LTE_STATS.SonStats.ChswStats.ChswChSwitchStats
37	chswchsuspendcountsuccessful	chswChSwitchStats [id=0x0d0800fd]	InternetGatewayDevice.Services.FAPService.{i}.LTE.X_QUALCOMM_LTE_STATS.SonStats.ChswStats.ChswChSwitchStats
38	chswtpmnumneighborsdetected	chswChSwitchStats [id=0x0d0800fd]	InternetGatewayDevice.Services.FAPService.{i}.LTE.X_QUALCOMM_LTE_STATS.SonStats.ChswStats.ChswChSwitchStats

TABLE 20 KPIs Supported (continued)

S.No.	KPI/Counter	Supporting DM Object	TR Name
39	chswtpmstrongestnbrsrp	chswChSwitchStats [id=0x0d0800fd]	InternetGatewayDevice.Services.FAPService. {i}.LTE.X_QUALCOMM_LTE_STATS.SonStats.ChswStats.ChswChSwitchStats
40	chswtpmclosestnbrpathloss	chswChSwitchStats [id=0x0d0800fd]	InternetGatewayDevice.Services.FAPService. {i}.LTE.X_QUALCOMM_LTE_STATS.SonStats.ChswStats.ChswChSwitchStats
41	chswtpmselectedrstp	chswChSwitchStats [id=0x0d0800fd]	InternetGatewayDevice.Services.FAPService. {i}.LTE.X_QUALCOMM_LTE_STATS.SonStats.ChswStats.ChswChSwitchStats
42	chswtpmselectioncount	chswChSwitchStats [id=0x0d0800fd]	InternetGatewayDevice.Services.FAPService. {i}.LTE.X_QUALCOMM_LTE_STATS.SonStats.ChswStats.ChswChSwitchStats
43	chswtpmapppliedcount	chswChSwitchStats [id=0x0d0800fd]	InternetGatewayDevice.Services.FAPService. {i}.LTE.X_QUALCOMM_LTE_STATS.SonStats.ChswStats.ChswChSwitchStats
44	chswtpminuserstp	chswChSwitchStats [id=0x0d0800fd]	InternetGatewayDevice.Services.FAPService. {i}.LTE.X_QUALCOMM_LTE_STATS.SonStats.ChswStats.ChswChSwitchStats
45	ssmchselchangeountinitialntriggered	ssmChSelectionStats [id=0x0d0800fc]	InternetGatewayDevice.Services.FAPService. {i}.LTE.X_QUALCOMM_LTE_STATS.SonStats.SsmStats.SsmChSelectionStats
46	ssmchselchangeountuetriggered	ssmChSelectionStats [id=0x0d0800fc]	InternetGatewayDevice.Services.FAPService. {i}.LTE.X_QUALCOMM_LTE_STATS.SonStats.SsmStats.SsmChSelectionStats
47	ssmchselchangeountoamtriggered	ssmChSelectionStats [id=0x0d0800fc]	InternetGatewayDevice.Services.FAPService. {i}.LTE.X_QUALCOMM_LTE_STATS.SonStats.SsmStats.SsmChSelectionStats
48	ssmchselchangeountperiodicntriggered	ssmChSelectionStats [id=0x0d0800fc]	InternetGatewayDevice.Services.FAPService. {i}.LTE.X_QUALCOMM_LTE_STATS.SonStats.SsmStats.SsmChSelectionStats
49	ssmchselchangeounttotal	ssmChSelectionStats [id=0x0d0800fc]	InternetGatewayDevice.Services.FAPService. {i}.LTE.X_QUALCOMM_LTE_STATS.SonStats.SsmStats.SsmChSelectionStats
50	phycellid	lteRanNeighborListInUse [id=0x0d0500ad]	InternetGatewayDevice.Services.FAPService. {i}.CellConfig.LTE.RAN.NeighborListInUse.LTECell.{i}.Blacklisted
51	eutracarrierarfcn	lteRanNeighborListInUse [id=0x0d0500ad]	InternetGatewayDevice.Services.FAPService. {i}.CellConfig.LTE.RAN.NeighborListInUse.LTECell.{i}.Blacklisted
52	pdb	ssmNLStats [id=0x0d0800fe]	InternetGatewayDevice.Services.FAPService. {i}.LTE.X_QUALCOMM_LTE_STATS.SonStats.SsmNLStats.Cell.{i}
53	x2hostatus	lteRanNeighborListInUse [id=0x0d0500ad]	InternetGatewayDevice.Services.FAPService. {i}.CellConfig.LTE.RAN.NeighborListInUse.LTECell.{i}.Blacklisted
54	plmnid	lteRanNeighborListInUse [id=0x0d0500ad]	InternetGatewayDevice.Services.FAPService. {i}.CellConfig.LTE.RAN.NeighborListInUse.LTECell.{i}.Blacklisted
55	totalcelltime	somc_cell_unavailable_time_stat_info [id=0x66062015]	NA
56	totalsastime	Installation_param_info [id=0x6606f003]	NA
57	txpower	rfTxPathState [id=0x0a050011]	NA
58	earfcn	rfTxPathState [id=0x0a050011]	NA
59	bandwidth	rfTxPathState [id=0x0a050011]	NA

TABLE 20 KPIs Supported (continued)

S.No.	KPI/Counter	Supporting DM Object	TR Name
60	dlthroughput	egtpuProtocolStats [id=0x0d480000]	InternetGatewayDevice.Services.FAPService.{i}.X_QUALCOMM_ENB_STATS.EgtpuProtocolStats
61	ulthroughput	egtpuProtocolStats [id=0x0d480000]	InternetGatewayDevice.Services.FAPService.{i}.X_QUALCOMM_ENB_STATS.EgtpuProtocolStats
62	grantUnavailable	[id=0x6606f007]	InternetGatewayDevice.Services.FAPService.{i}.FAPControl.LTE.X_001392_CBSD.GrantInternalStatus.GrantUnavailableTime

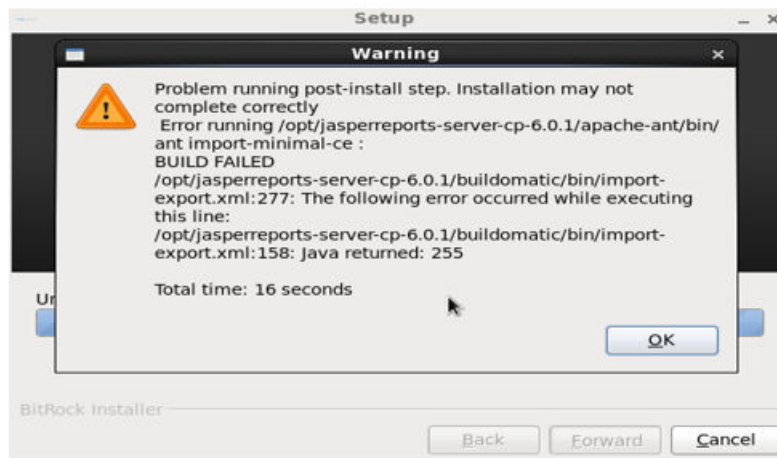
Troubleshooting Tips for Jasper Installation

This section contains the possible error messages that may appear while installing Jasper server. These errors may occur on executing different commands.

Build Failure

In case the Build Failed error appears, perform the following steps.

FIGURE 65 Build Failed by Java Returned 255



1. Check hostname from command line by using the command, **hostname**.
2. Check whether the output is present in **/etc/hosts** file. If not, then add the hostname in the file.
3. Reinstall Jasper server.

For example: If output of hostname is unison-3, then **/etc/hosts** file should be as follows.

```
127.0.0.1    localhost localhost.localdomain localhost4 localhost4.localdomain4 unison-3
::1        localhost ip6-localhost ip6-loopback localhost.localdomain localhost6
localhost6.localdomain6
```

Expect not Found

If an error appears like the following:

```
expect: command not found
```

then install expect with the following command:

```
apt-get install expect
```

Time Synchronization Issue

All LTE APs have time expressed in UTC time zone. Hence, ensure that server time is synchronized with LTE AP time. This is because on the Performance page, the end time displayed is that of remote server. If time is not synchronized between server and LTE APs, user needs to select a time in future to see Performance graphs.

Troubleshooting

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Introduction

This section provides troubleshooting tips for resolving common issues while working with LTE Access Point (AP). All AP models have common software modules that can be used interchangeably. The document is valid for all the models.

After successful setup and commissioning, these APs are capable of transmitting 20 MHz bandwidth TDD-LTE and providing wireless coverage to relevant LTE devices.

Purpose of this document is to help users debug any setup and performance issues encountered during routine operation of the AP.

Each AP is powered by a managed PoE+ switch or a PoE injector (PoE+ desirable), or DC power adaptor (for Q710 AP) whichever is available.

APs are configured to send dhcp requests by default upon successful bootup. These rely on an external dhcp server to provide each AP, a routable IP address that will enable it to route and send connection requests to EMS (Ruckus Cloud), Network (EPC), Timing Master, and SAS.

Each AP can be configured to

- obtain its timing information from the GPS satellites, and assume the role of a Master PTP source for other APs in the network.
- assume a PTP slave role and obtain its timing information from another AP that is the designated Master (that's IP reachable) for that venue.

In the current system implementation, each venue can only have one AP assuming Timing Master source role. There can be a maximum of up to 32 devices acting as timing slaves per master. In addition, there may be multiple APs with timing source set as GPS satellites and can obtain their timing information directly via GPS satellites (if capable).

For an AP to obtain timing via GPS and/or function as Master timing source, place the AP such that it has direct line-of-sight view with open sky or as close to the outside facing windows or doors.

NOTE

The terms Ruckus LTE AP and LTE AP imply the same meaning and may be used interchangeably throughout the sections.

Reporting an Issue

Customers with a valid support contract can submit a support ticket request for further assistance to Technical Support through the Ruckus Support website:

<https://support.ruckuswireless.com/contact-us>

When reporting an issue, please provide the following information:

- AP model
- Description of the client device that has issues connecting or accessing the AP model

- Specific steps that led to the situation

In most cases, the Master AP's Debug info (saved from Administer >Diagnostics) would be helpful for problem analysis.

Initial Setup Issues

Q: I have installed my LTE AP, how do I configure the AP on Ruckus LTE AP Management environment?

The Management switch powers on the AP via PoE/power adapter and the AP obtains an IP address from the DHCP server. You must ensure that a DHCP server is configured to provide an IP address to the AP, and is reachable by the AP.

After powering on, Ruckus LTE AP seeks management platform environment connectivity. Ensure that this AP is added to the specific Venue and Network is applied to it on the management platform. For information on how to add an AP to a venue, refer to [#unique_70](#).

By default, LTE AP Management initiates the following actions after an LTE AP connects:

- Checks the LTE AP software build version, and upgrade to most current version.
- Applies basic configuration (venue and network configuration, SAS Provider, and synchronization) to the LTE AP.
- Reports any alarms or events that occurred on the LTE AP.

Q: What is the sequence of AP bootup and various states of LTE AP indicated by LED illumination?

The following is the setup sequence for each AP:

PWR > EMS > SYNC > EPC > LTE

Review the following table to understand the different LTE AP states indicated by LED illumination and its approximate duration in each state along with any recommended corrective actions based on LED patterns observed during the initial AP/venue setup stage.

TABLE 21 LED Labels

LED Label	Time Duration	LED Color/Behavior	Corrective Action
PWR	Until corrective action is executed.	OFF: AP is not powered on.	Check the AP power source.
	Less than 5 minutes.	RED: Boot up in process. The LED remains red if AP does not successfully boot and begin operation.	If longer than 5 minutes, check adequate power is supplied (PoE+/ 802.3at), toggle the power source connection, check cables. If the LED is still RED, contact Ruckus support.
	Until corrective action is executed	AMBER: AP does not have sufficient Power levels	Check adequate power is provided through appropriate PoE cables.
	Few minutes. Until corrective action is executed.	Slow-flashing GREEN: AP does not have a routable IP address (IP address has not been allocated from a DHCP server).	If slow-flashing green is non-stop, check the DHCP settings as the LTE AP is unable to obtain an IP address.
	Perpetual (until default)	SOLID GREEN: AP has booted successfully and obtained a routable IP address.	No action is required.

TABLE 21 LED Labels (continued)

LED Label	Time Duration	LED Color/Behavior	Corrective Action
EMS	Until PWR LED turns Solid Green.	OFF: AP is not being managed by an EMS (Ruckus LTE AP Management).	After PWR LED is in solid green, the EMS LED either starts fast-flashing green autonomously, or solid green immediately. If not, check the reachability of the LTE AP IP to the AP Management.
	Until IP reachability is resolved for LTE AP IP.	Slow-flashing GREEN: AP is unable to communicate with LTE AP Management/ EMS' SecGW.	Check the IP reachability to the Internet and LTE AP Management. Make sure that the AP is accurately created and added to a venue on LTE AP Management.
	Usually less than ~ 10-15 minutes.	Fast-flashing GREEN: AP is being managed by the EMS and is receiving a configuration or a firmware update.	Until the time required to download firmware or configuration. Depends on internet connection speed, do NOT unplug or change anything as this might corrupt the Ruckus Cloud LTE software and needs factory reset.
	Perpetual.	SOLID GREEN: AP is being managed by the EMS. For example, AP successfully connected to AP management.	EMS-AP connection should be always ON.
EPC	May be up to 60 minutes.	OFF: AP is not configured with the Network (EPC) connectivity information.	Make sure that the network configuration is accurate and a Network is turned ON for the AP Venue. Also, check the PTP status under AP Details . If unknown/ link lost EPC connection is not attempted, wait until the PTP sync is acquired which takes up to 60 minutes.
	~ few moments after ptp sync obtained AND S1 parameters match else see Corrective Action.	Slow-flashing GREEN: AP is unable to connect to the EPC.	Check if SecGW configuration is accurate (if enabled). Attempting S1 connection to MME but unable connect. Check the reachability or even if reachable, S1 is failing to establish. Check the S1 parameters on network settings. Note that the MME IP, PLMNID, TAC, and Cell ID have to be unique per venue.
	Perpetual	SOLID GREEN: AP is connected to the EPC.	
SYNC	Perpetual	OFF: Timing source is VCTXO/standalone.	Stand-alone mode: Removes Timing dependency for operation. No action needed.
	Until Corrective Action is executed.	Slow-flashing GREEN: Not Timing synced and the AP is not receiving a GPS signal, a macro cell signal (NL) or a PTP signal.	Timing Master: Check the line-of-sight visibility to Timing satellites. Place the AP closer to a window or open sky. Timing Slave: Check the IP reachability between the Timing Slave and the Timing Master.
	May be up to ~ 2 hrs. or more; depends on weather conditions and AP placement.	Fast-flashing GREEN: AP is in the process of acquiring sync, but has not yet acquired sync lock. AP is receiving a GPS signal or a PTP signal.	The sync process is dependent on the GPS signal strength and precision so it takes up to 2 hours. Avoid changing anything during this phase.
	Perpetual until sync is lost.	GREEN: Time synchronization achieved.	If sync synchronization lost, debug the IP connectivity or any other local issues.
LTE	Perpetual or until corrective action is executed.	OFF: LTE transmitter is disabled.	AP service is set to OFF on LTE AP Management or a Grant is not received from SAS to transmit. If the later is true, check the SAS availability, CBSD Registration parameters (SAS URL, CBSD User ID, and so on) under AP Properties > More.
	Perpetual until at least one UE registers with AP.	AMBER: LTE transmission is ON, no UEs are attached.	No UE is registered, check UE settings.
	Perpetual until all UEs de-register from AP.	SOLID GREEN: LTE transmission is ON and one or more UEs are attached to the cell.	—

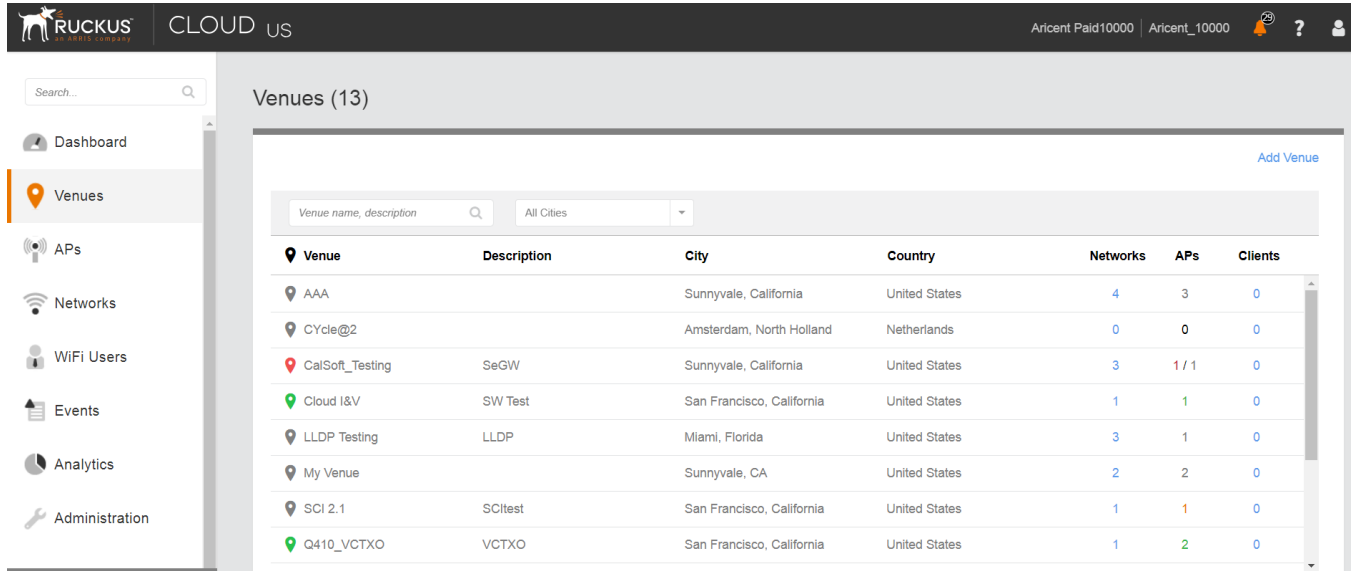
Venue Status Check using Alarms

Q: How can I check status of a venue using alarms?

1. To check current venue conditions, go to Menu options on the left side of the screen and click **Venues**.

The **Venue** screen appears displaying the list of venues.

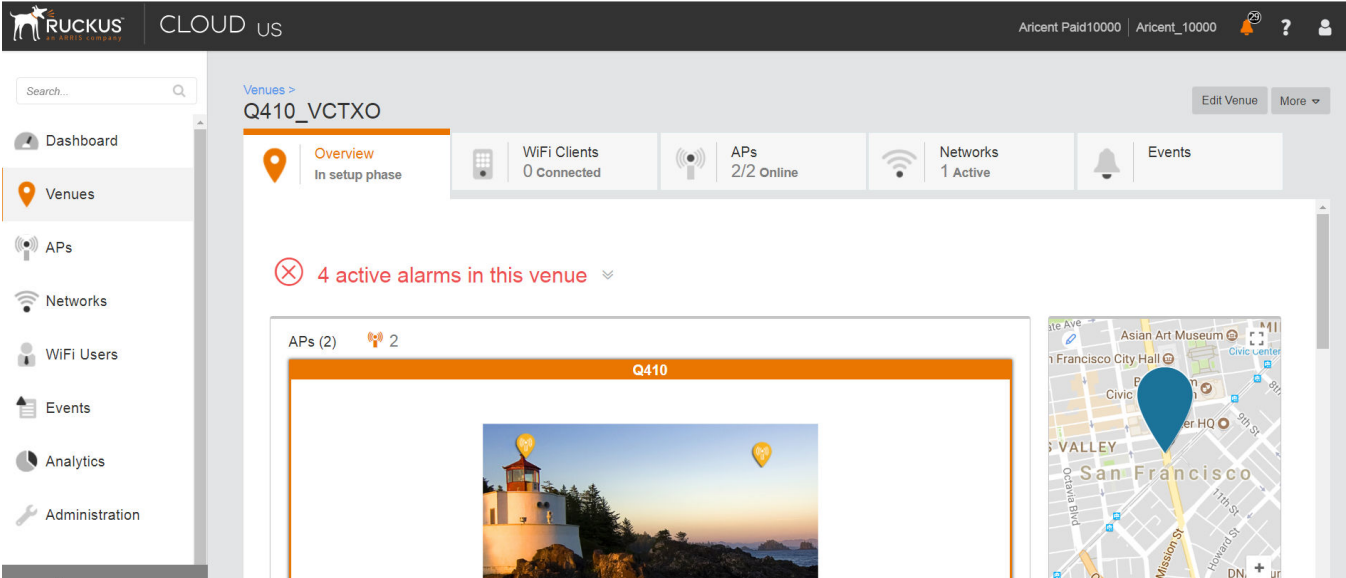
FIGURE 66 Venue screen



2. Click a specific venue for which you want to view the details.

The Overview screen appears displaying an informational message about the active alarms.

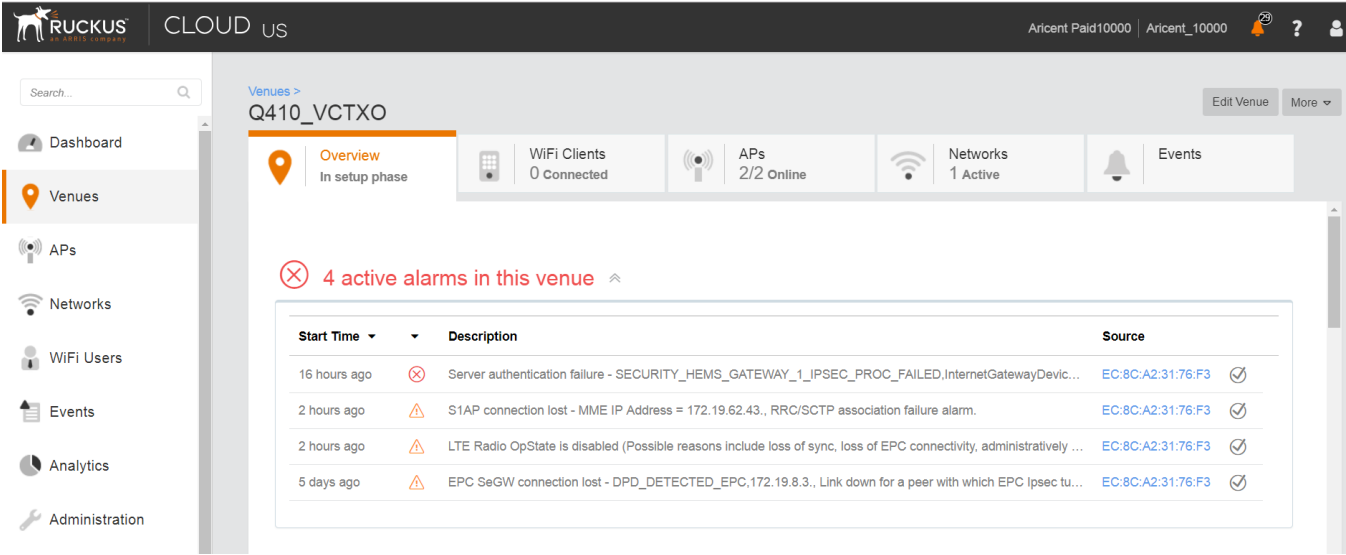
FIGURE 67 Venue screen showing number of active alarms



3. Click .

The screen displays details of all the active alarms in the venue.

FIGURE 68 Venue screen showing active alarms



Troubleshooting

Collecting LTE AP Logs via LTE AP Management Service

NOTE

If there are alarms that have occurred in past/or not critical to be addressed for normal AP functions (as indicated by Operational status); "All good" will be indicated under Overview. In such a case, you may choose to ignore the alarms or clear these from the drop-down menu option against each AP on the leftmost column.

- Check all the alarms per AP to identify any critical alarms that need to be addressed.
- Typical alarms will indicate the component.
- When a specific connectivity issue occurs, it will impact the corresponding functionality and this may also be reflected on the AP LEDs. If EPC IP is unreachable/S1 connection is failing to establish, the EPC LED will be blinking (For more information, see **Table: LED Labels**).
- Take corresponding action items to rectify the error mentioned on the alarms.

Collecting LTE AP Logs via LTE AP Management Service

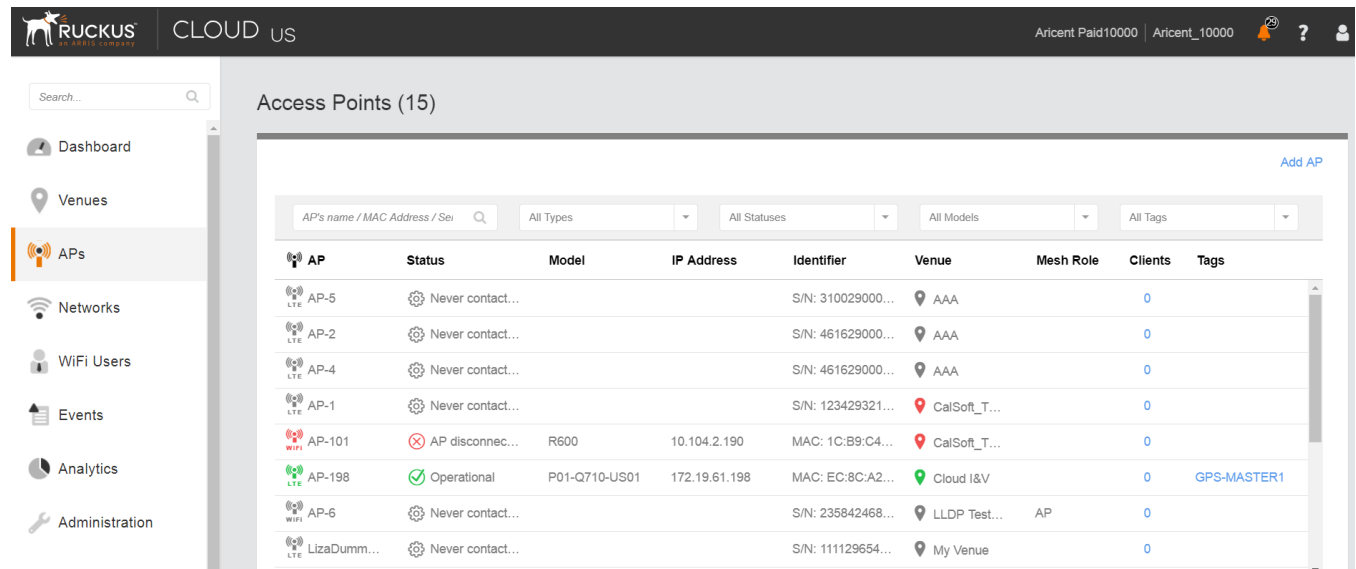
Q: How can I collect LTE AP logs through LTE AP Management Service?

To collect LTE AP logs through LTE AP Management Service, perform the following steps:

1. Log onto the LTE AP Managementscreen and click APs on the left side of the screen.

The Access Points screen appears showing the list of all APs.

FIGURE 69 Access Points screen

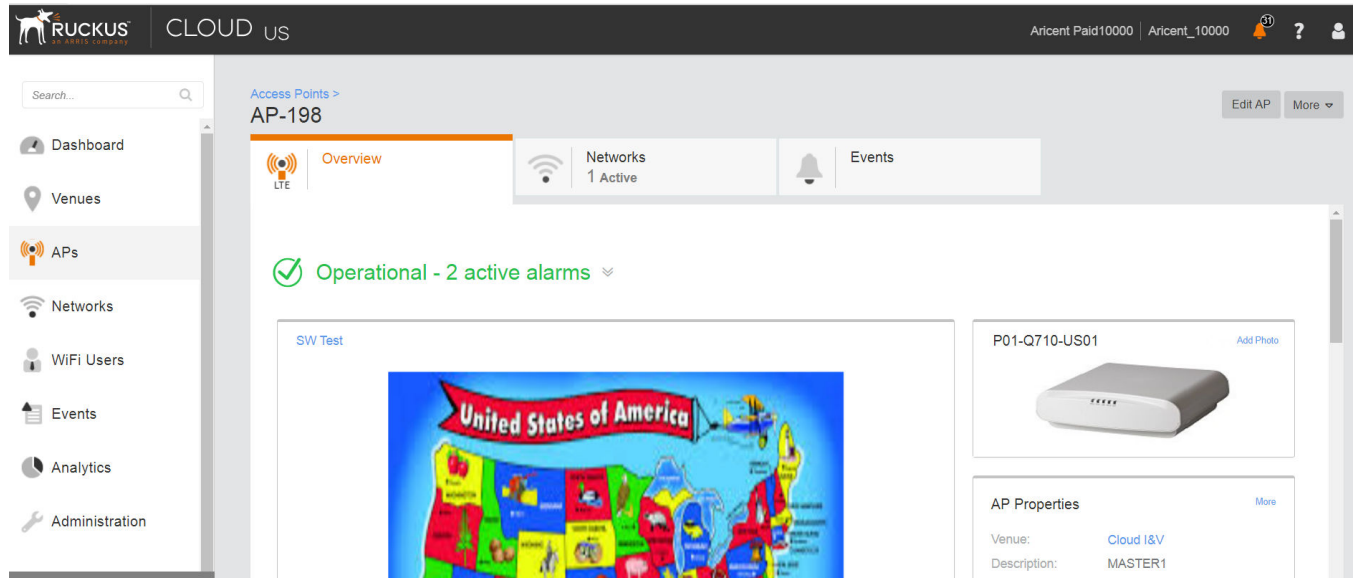


AP	Status	Model	IP Address	Identifier	Venue	Mesh Role	Clients	Tags
AP-5	Never contact...			S/N: 310029000...	AAA		0	
AP-2	Never contact...			S/N: 461629000...	AAA		0	
AP-4	Never contact...			S/N: 461629000...	AAA		0	
AP-1	Never contact...			S/N: 123429321...	CalSoft_T...		0	
AP-101	AP disconnec...	R600	10.104.2.190	MAC: 1C:B9:C4...	CalSoft_T...		0	
AP-198	Operational	P01-Q710-US01	172.19.61.198	MAC: EC:8C:A2...	Cloud I&V		0	GPS-MASTER1
AP-6	Never contact...			S/N: 235842468...	LLDP Test...	AP	0	
LizaDumm...	Never contact...			S/N: 111129654...	My Venue		0	

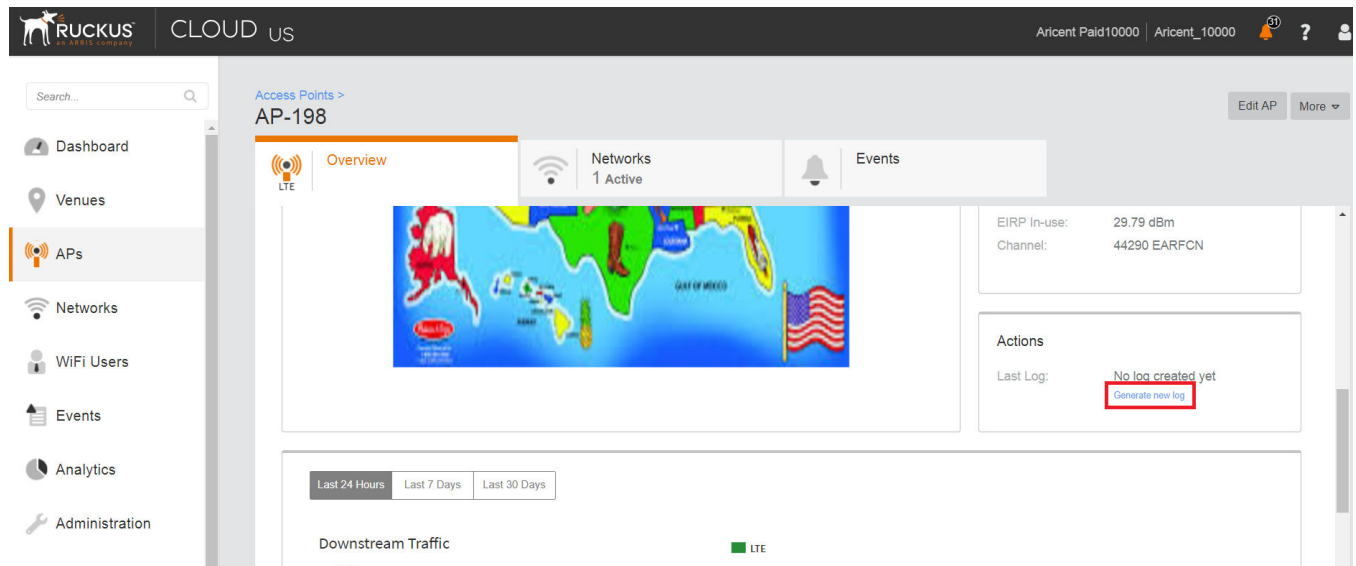
2. Click an AP from which you want to collect the logs.


The details of the selected AP appears.

FIGURE 70 Access Point Details



3. Scroll down and click **Generate new log** on the right hand side as shown below.



4. Once **Last Log:** appears with current date and time, click  to download a tar file to the local Downloads directory with all the relevant logs.

Debugging Performance Issues

Q: What are the commonly reported issues? (drop BAU)

Troubleshooting

AP States in LTE AP Management Service

After successfully provisioning LTE AP and enabling transmission, there may be some rare but typical scenarios that can cause some performance issues.

Below is a list of such typical performance issues and suggested corrective actions to be taken to mitigate:

TABLE 22 Performance Issues and Corrective Actions

ID	Issue	Details	Corrective Action
1	Poor data rate	Poor data rate measured in DL/UL or both directions compared to expected throughput.	<ol style="list-style-type: none">1. Check Backhaul capacity/throughput rating.2. Obtain RF logs and check sources of interference (RSRP/RSRQ values).3. Check for UE handing off multiple times (a.k.a ping-pong effect) between more than one LTE AP.
2	UE disconnects frequently from network.	UE connection is dropped frequently and reconnects after unplugging.	Check the ZTE dongle USB connection. There is a known issue with the dongle which causes frequent disconnects with MACs.
3	EPC connection down.	S1 connection disconnected after successful connection during initial setup.	<ol style="list-style-type: none">1. Check S1 status via get S1APConfigParam command to match EPC parameters.2. Check IP reachability (try pinging MME IP from AP).3. Capture Wireshark trace (or tcpdump) on the switch via port mirroring.4. Open the "S1AP" messages and follow the sequence to learn the reason for rejection/ setup failure.
4	AP not transmitting despite all connection are successful.	All LEDs are solid Green but LTE is dark - transmission stopped.	<ol style="list-style-type: none">1. Check whether the AP service button is ON.2. Check alarms to detect if there are any issues reported with SAS availability/ response.3. Check the statistics to obtain the CurrentGrant status.4. Check the logs for SAS-CBSD communication and check for any error codes reported.
5	Timing sync lost/ SYNC LED starts to blink.	Typically when a timing sync is lost, the SYNC LED is dark/ blinking indicating it is trying to regain connection with timing master/GPS.	<ol style="list-style-type: none">1. When in PTP-slave mode: Check connection with Timing Master AP via IP address.2. When in PTP-Master mode: Check visibility to satellites/ line of sight to open sky, and relocate to a new position as close to the window/ door as possible.

AP States in LTE AP Management Service

Q: What are the AP states in LTE AP Management Service?

Following are the AP states in the LTE AP Management Service:

- Never Contacted
- Contacted
- Connected
- Operational
- Disconnected

Q: Why does AP state shows Never Contacted in LTE AP Management Service?

Possible reasons for AP state to be Never Contacted are:

- AP IP unreachability to the Internet.
 - Make sure AP connected to IP network can reach the Internet and has DNS Server setup to reach the Internet (google.com/yahoo.com) to test it out.
 - Do DNS resolution to 'https://sc-registrar.ruckuswireless.com/api/v2/scr/action' and select a certificate' to ensure the AP can resolve it to 'sc-registrar.ruckuswireless.com'.
- IPsec ports are not open in firewall.
 - Open ports 4500, 50, 500, 443, 80...etc. in firewall to the Internet.
- AP is not in factory state.

If AP is not in factory state, it will not connect to SCR and get the AP Management Security GW and Management server as it is already holding some management configuration. Reset AP to factory settings using the Reset button behind the AP. Press and hold for 10 seconds to trigger factory reset.

Q: Why AP state is Contacted but not Connected/Operational?

Check the following:

- whether AP to Management SecGW connection is flapping.
- whether there are AP alarms/event in AP and check whether IPsec tunnel is up.
- whether HeMS connection is up (using show RSCStatus CLI command) in case IPsec tunnel to SecGW is up.

Q: Why does AP state shows Connected but not Operational?

The possible reasons for this are as follows:

- AP admin state is disabled.
 - Check whether AP has been administratively disabled from UI by clicking AP > More > Operation status Disable/Enable.
- AP lost sync.
 - If AP is GPS source, AP may have lost GPS satellite.
 - If AP is PTP source, AP may have lost to PTP master.
- AP to EPC connection is lost.
 - SCTP connection timeout to EPC.
 - AP-EPC connection is lost.
 - EPC is not reachable.
 - If there is SecGW before EPC, AP-SecGW connection is lost.
- AP lost the grant.
 - AP may have relinquished the Grant due to timing sync failure or lost connection to EPC.
 - AP-SAS heartbeat failed/Communication failed.
 - AP-SAS grant conflict.
 - AP-SAS registration error.
 - SAS revoked the grant.

