REFERENCE GUIDE

Ruckus SmartZone 100 and Virtual SmartZone Essentials Hotspot WISPr Reference Guide

Supporting SmartZone 3.6

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Preface

Document Conventions

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

TABLE 1 Text conventions

Convention	Description	Example
`monospace`	Identifies command syntax examples.	`device(config)# interface ethernet 1/1/6`
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**.
italics	Publication titles	Refer to the *Ruckus Small Cell Release Notes* for more information

Notes, Cautions, and 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.

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.

Convention	Description
italic text	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, *member*[*member*...].
\	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: docs@ruckuswireless.com

When contacting us, please include the following information:

- Document title and release number
- Document part number (on the cover page)
- Page number (if appropriate)
- For example:
  - Ruckus Small Cell Alarms Guide SC Release 1.3
  - Part number: 800-71306-001
  - Page 88

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 documentation by product or perform a text search. Access to Release Notes requires an active support contract and Ruckus Support Portal user account. Other technical documentation content is available without logging into 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 Networks products, and customers and partners with active support contracts.

For product support information and details on contacting the Support Team, go directly to the 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. Request 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, and Asia Pacific, toll-free numbers are available at https://support.ruckuswireless.com/contact-us and Live Chat is also available.

Self-Service Resources

The Support Portal at https://support.ruckuswireless.com/contact-us 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/software
- 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 Guide

Overview

This SmartZone™ (SZ) 100 and Virtual SmartZone Essentials (vSZ-E) Hotspot WISPr Reference Guide describes the SZ-100/vSZ-E (collectively referred to as "the controller" throughout this guide) RESTful-like/JSON interfaces for external web portal servers.

This guide is written for service operators and system administrators who are responsible for managing, configuring, and troubleshooting Ruckus Wireless devices. Consequently, it assumes a basic working knowledge of local area networks, wireless networking, and wireless devices.

NOTE
If release notes are shipped with your product and the information there differs from the information in this guide, follow the instructions in the release notes.

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

Terminology

The table lists the terms used in this guide.

TABLE 2 Terms used in this guide

Terminology	Description
AP	Access Point
CP	Captive Portal
MSP	Managed Service Provider
NBI	Northbound Interface
SCG	Smart Cell Gateway
SSL	Secure Socket Layer
TCP	Transmission Control Protocol
UDI	User Define Interface
UE	User Equipment
UE-IP	User Equipment - IP Address
UE-MAC	User Equipment - MAC Address

Web Interface Configuration Overview

Overview

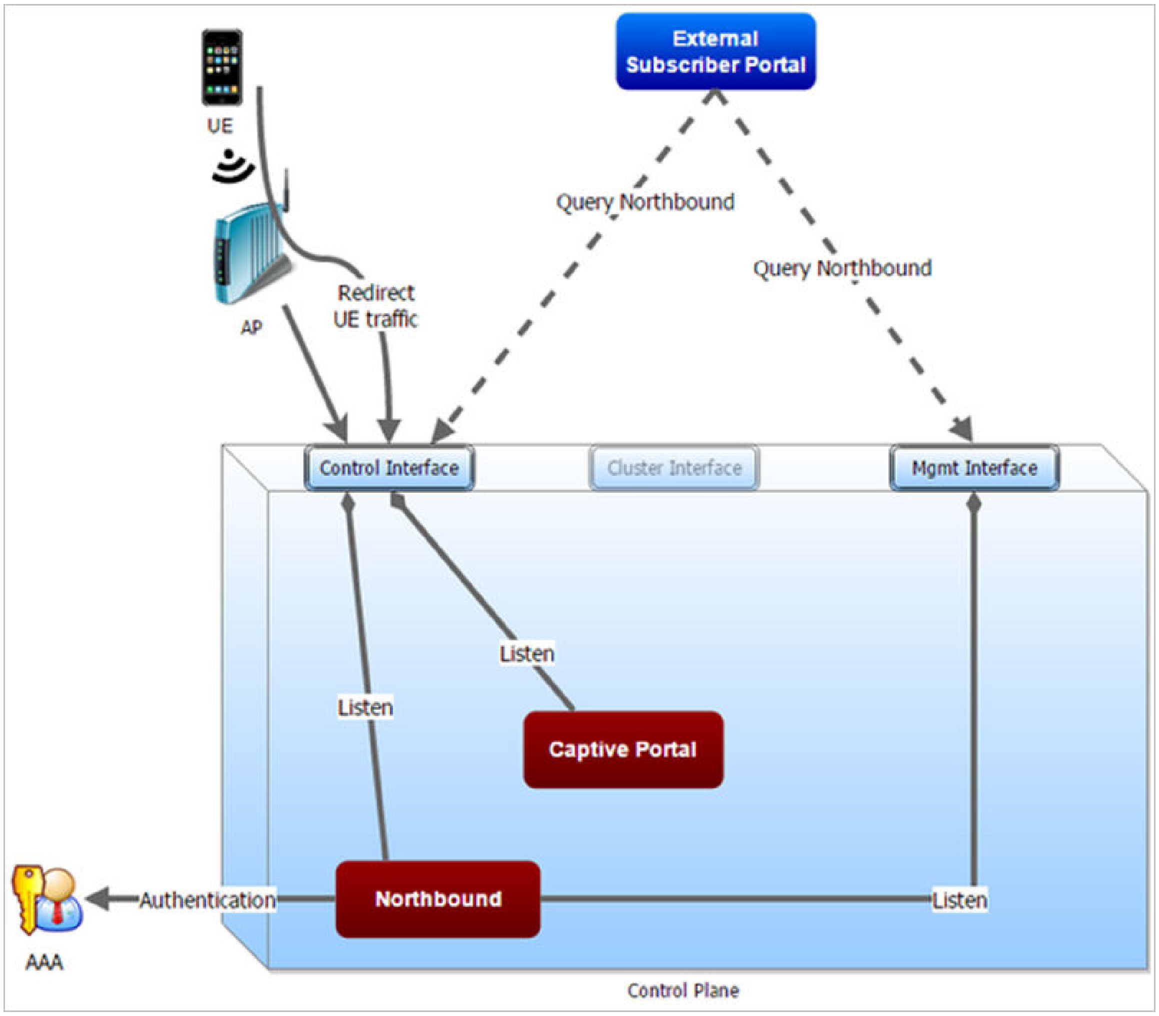
The controller provides Wi-Fi hotspot services in conjunction with external web portal servers. In most cases, an external web portal server provides the landing web pages with Wi-Fi hotspot usage instructions, terms and conditions, etc., while the end user submits his login ID and password directly to the AP for authentication. There are, however, some cases when an external web portal server requires total control of a user session by requesting authentication on the user's behalf as well as terminating user sessions. JSON interface defined in this reference guide provides a standard way for an external web portal server to communicate with the controller for this kind of usage.

The following are the hotspot components and their roles in the hotspot portal as seen in the figure below.

- Northbound: Listens on the control and management interface. It is responsible for handling requests from external subscriber portal and authenticates with the AAA server.
- Captive portal: Listens on the control interface or UDI. It is responsible for providing a wall garden for web-proxy UE. It blocks UEs, which uses user agents that are listed in the configured black-list and mainly handles high scalable redirecting UEs to the external subscriber portal.
- External subscriber portal: Is a Web service. The user sends his/her login credentials (username and password) through this portal. The authentication is performed through the northbound by user input credential. The external subscriber portal can reach the northbound depending on the type of interface it can reach such as control interface, management interface or both.
- AAA server: Is responsible for authenticating the UE through the UE's login credentials (username and password).

  NOTE
  Refer to appendix WISPr Portal Details Overview on page 37 for IPv4 and IPv6 protocol support for GRE tunnels.

FIGURE 1 Hotspot portal components



This reference guide describes the controller RESTful-like/JSON interfaces for external web portal servers.

Request Format

As defined in JSON commands, each request issued from an external web portal server is in JSON format.

NBI is only accessible via the management, control and user defined interfaces. The following are the request formats.

HTTP Request

```
http://{sz_management_ip}:9080/portalintf
```

HTTPS Request

```
https://{sz_management_ip}:9443/portalintf
```

NOTE
The above URI is a fixed value and cannot be modified.

NOTE
You can download the log for northbound portal interface from the controller web interface by navigating to Diagnostics > Application Logs as all other applications.

The table lists the ports that must be opened on the network firewall to ensure that the controller and NBI can communicate with each other successfully.

TABLE 3 Portal Details

Port Number	Layer 4 Protocol	Source	Destination	Configurable from Web Interface?	Purpose
9080	HTTP	Any	Controller	No	Northbound Interface for Hotspot
9443	HTTPS	Any	Controller	No	Northbound Interface for Hotspot

Controller Web Interface Configuration

Each JSON request must be accompanied by a request password that is preconfigured on the controller, as well as on the external web portal server.

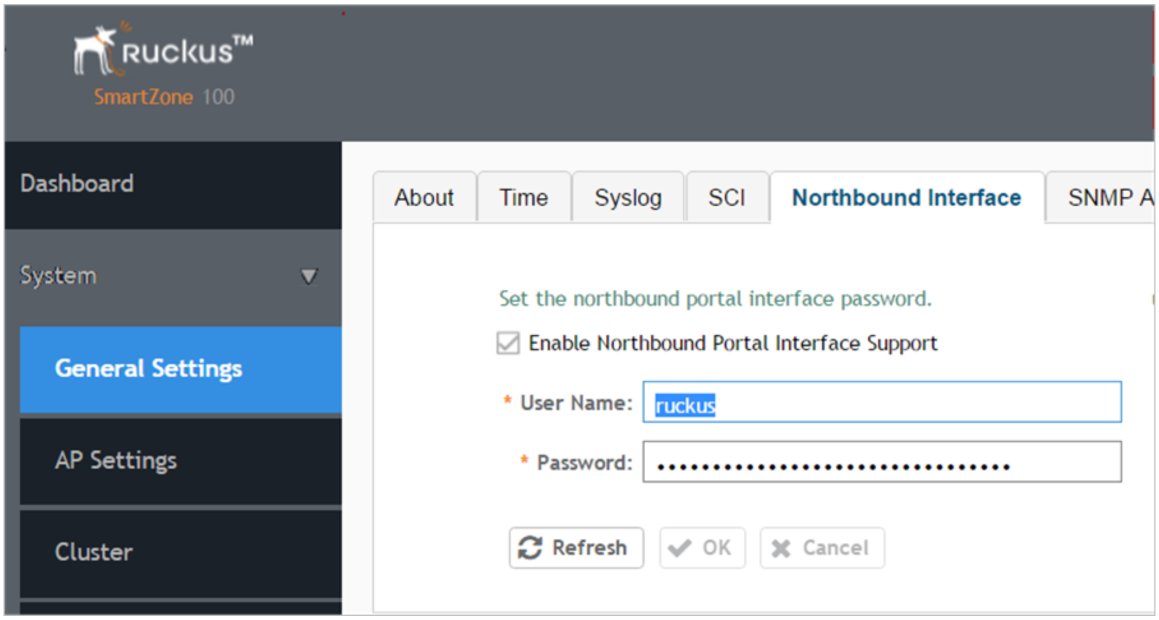
This helps ensure that only authorized web portal servers can access the northbound interface.

The northbound interface request password can be configured in the controller web interface by navigating to System > General Settings > Northbound Interface. See the figure below.

NOTE
The password in the figures is a token to ensure that the interface has the permission to get the services from the northbound interface. It must be included in all JSON request as *RequestPassword* sent to NBI.

A web portal server must use the POST command to issue JSON requests. The controller will not accept a request with the GET request command.

FIGURE 2 Enable Northbound Interface



Set the northbound portal interface password.

☑ Enable Northbound Portal Interface Support

* User Name: ruckus

* Password: ••••••••••••••••••••••••••••••

JSON Commands - User Online Control

Overview

The northbound portal interface supports the following JSON commands:

- Login
- Login Async
- Logout
- Status
- Disconnect
- Enrichment Info

These commands are used for user authentication, user status query, terminating user sessions and verifying that the enrichment information has the same content. For each command (JSON POST), both the UE-IP and UE-MAC may be included. Where both are present, the UE-MAC will be preferred.

The NBI decrypts the strings and returns the decrypted version within the response message. This is because the Captive Portal (CP) encrypts the IP and MAC address parameters in each redirection (See the table for the full list of these parameters) to the subscriber portal. The controller decrypts the UE-IP and UE-MAC address before returning the response, by using the Encrypt and Decrypt API described in JSON Responses - GetConfig on page 21 section.

> NOTE
> Northbound Interface (NBI) expects to receive encrypted UE-IP and UE-MAC address (For example, ENC12bc24c4777703327f2e0aabbf6b9f9e) when the request category is UserOnlineControl. In the GetConfig request category you do not need to encrypt UE-IP and UE-MAC address (For example: 172.21.134.87)

Request Authentication - Asynchronous Login

In the hotspot (WISPr) WLAN use case, an unauthorized user is redirected to an external web portal server by the controller.

Using the asynchronous login command (RequestType=LoginAsync), the external web portal server sends a request to the controller to authenticate the user using the authentication server. The external Web portal server receives the response - 202 Authentication pending, while the controller performs the authentication in the background. It is the responsibility of the Web portal to poll the controller and fetch the authentication result. This action is performed using the status command (RequestType=Status).

The following is an example of an asynchronous login request:

{ Vendor: “ruckus” RequestPassword: “myPassword”, APIVersion: “1.0”, RequestCategory: “UserOnlineControl”, RequestType: “LoginAsync”, UE-IP: “ENC12bc24c4777703327f2e0aabbf6b9f9e”, UE-MAC: “ENCCDD319C6A476FA7127DF1FB80A63CD30ADC5E47C3DBE2157”, UE-Proxy: “0”, UE-Username: “test”, UE-Password: “test” }

The table lists the controller responses to these authentication requests.

> NOTE
> The user account test (UE username) mentioned in the above example, is created as an external user in the authentication server. The hotspot portal does not provide an interface for manipulating user account information.

TABLE 4 Controller responses to authentication (asynchronous login) requests

Response Type	Possible Responses
Normal response	• 101, Client authorized: Response if the user is already authorized. • 202, Authentication pending: Authentication is in progress, portal server needs to check the result later.
Service error	• 300, Not found: Response if the lookup fails with given UE-MAC or UE-IP address. • 400, Internal server error: Response when the controller internal error occurs.
General error	• 302, Bad request: Response if the JSON request is not well-formed. • 303, Version not supported: Response if there is a version mismatch. • 304, Command not supported: Response if the request type is not supported. • 305, Category not supported: Response if the request category not supported. • 306, Wrong request password: Response if the request password is mismatched.

Using Asynchronous API

When using the asynchronous API (RequestType = LoginAsync), NBI will always return a response as *pending authentication*.

The client must send a status request (each X seconds/milliseconds) to check for the authentication result. This is useful when using a smart device. The application in a smart device can query the login status periodically. It stores the user credentials in the background thereby reducing the user driven actions.

Request Authentication - Synchronous Login

The controller also provides a synchronous login blocking command (RequestType=Login).

In a synchronous login command, the external Web portal must wait for the authentication process to complete, which is usually processed by the authentication server. This could result in a delayed response if the controller is unable to get a response from the authentication server.

The following is an example of this command.

{ Vendor: “ruckus” RequestPassword: “myPassword”, APIVersion: “1.0”, RequestCategory: “UserOnlineControl”, RequestType: “Login”, UE-IP: “ENC12bc24c4777703327f2e0aabbf6b9f9e”, UE-MAC: “ENCCDD319C6A476FA7127DF1FB80A63CD30ADC5E47C3DBE2157”, UE-Proxy: “0”, UE-Username: “test”, UE-Password: “test” }

The table lists the controller responses to the synchronous login command.

TABLE 5 Controller responses to a synchronous login command

Response Type	Possible Responses
Normal response	• 101, Client authorized: Response if the user is already authorized. • 201, Login succeeded: Response if the login is accepted.
Service error	• 300, Not found: Response if the lookup fails with given UE-MAC or UE-IP address. • 301, Login failed: It will be replaced if the authentication reply message is returned. • 400, Internal server error: Response when an controller internal error occurs. • 401, Authentication server error: Response when an authentication connection error occurs or the connection request times out.
General error	• 302, Bad request: Response if the JSON request is not well-formed. • 303, Version not supported: Response if there is a version mismatch. • 304, Command not supported: Response if the request type is not supported. • 305, Category not supported: Response if the request category not supported. • 306, Wrong request password: Response if the request password is mismatched.

NOTE
If an authentication process has a result (not pending), the controller responds to it only once. For example, if the controller replies 301, Login failed to the web portal server, and the web portal server sends the same query, the response will be 100, unauthorized. If the controller replies 201, Login succeeded, and the web portal server queries again, the response will be 101, Authorized.

Querying a User Status

After the authentication request is issued, the external web portal server can query the user's authentication status.

The following is an example of the user status query command:

```
{
 Vendor: “ruckus”
 RequestPassword: “myPassword”,
 APIVersion: “1.0”,
 RequestCategory: “UserOnlineControl”,
 RequestType: “Status”,
 UE-IP: “ENC12bc24c4777703327f2e0aabbf6b9f9e”,
 UE-MAC: “ENCCDD319C6A476FA7127DF1FB80A63CD30ADC5E47C3DBE2157”
}
```

The table lists the controller responses to these user status query commands.

TABLE 6 Controller responses to user status query

Response Type	Possible Responses
If there is a pending authentication process for this client	• 201, Login succeeded.

TABLE 6 Controller responses to user status query (continued)

Response Type	Possible Responses
	- 202, Authentication pending: Authentication is in progress, portal server needs to check the result later.
If there is no pending authentication process for this client	- 100, Client unauthorized. or - 101, Client authorized.
Service error	- 300, Not found: Response if the lookup fails with given UE- MAC or UE-IP address. - 301, Login failed: It will be replaced if the authentication reply message is returned - 400, Internal server error: Response when an controller internal error occurs. - 401, Authentication server error: Response when a authentication connection error occurs or the connection request times out.
General error	- 302, Bad request: Response if the JSON request is not well-formed. - 303, Version not supported: Response if there is a version mismatch. - 304, Command not supported: Response if the request type is not supported. - 305, Category not supported: Response if the request category not supported. - 306, Wrong request password: Response if the request password is mismatched.

NOTE
If an authentication process has a result (not pending), the controller responds to it only once. For example, if the controller replies 301, Login failed to the web portal server, and the web portal server sends the same query, the response will be 100, unauthorized. If the controller replies 201, Login succeeded, and the web portal server queries again, the response will be 101, Authorized.

Terminating a User Session

After a user session is authorized, the external web portal server can terminate the user session by sending a JSON request to the controller. In this case, the Web portal changes the status of the client from authenticated, to unauthenticated, forcing the user to login again.

When un-authenticating a user, existing TCP sessions are not terminated and the UE is not disassociated from the AP. It only changes the status of the UE from authorized to unauthorized. The following is an example of terminating a user session command:

{ Vendor: “ruckus” RequestPassword: “myPassword”, APIVersion: “1.0”, RequestCategory: “UserOnlineControl”, RequestType: “Logout”, UE-IP: “ENC12bc24c4777703327f2e0aabbf6b9f9e”, UE-MAC: “ENCCDD319C6A476FA7127DF1FB80A63CD30ADC5E47C3DBE2157” }

Disconnect Command

The controller also provides a command for terminating user TCP (Transmission Control Protocol) connections from the AP (Access Point).

In other words, the disconnect command (RequestType=Disconnect) changes the status of the UE from authorized to unauthorized and also disassociates the UE from the AP.

{ Vendor: “ruckus” RequestPassword: “myPassword”, APIVersion: “1.0”, RequestCategory: “UserOnlineControl”, RequestType: “Disconnect”, UE-IP: “ENC12bc24c4777703327f2e0aabbf6b9f9e”, UE-MAC: “ENCCDD319C6A476FA7127DF1FB80A63CD30ADC5E47C3DBE2157” }

The table lists the controller response.

TABLE 7 Controller response to a disconnect command

Response Type	Possible Responses
Normal response	• 200, OK • 100, Client unauthorized: Response if the user is already unauthorized
Service Error	• 300, Not found: Response if the lookup fails with given UE- MAC or the UE-IP address. • 400, Internal server error: Response when an controller internal error occurs.
General error	• 302, Bad request: Response if the JSON request is not well-formed. • 303, Version not supported: Response if there is a version mismatch. • 304, Command not supported: Response if the request type is not supported. • 305, Category not supported: Response if the request category not supported. • 306, Wrong request password: Response if the request password is mismatched.

Querying Enrichment Information

The northbound interface provides the JSON command Enrichment Info for verifying that the enrichment information has the same content as HTML header *enrichment info* sent from the AP.

This allows the captive portal to obtain the enriched parameters in an SSL (Secure Sockets Layer) scenario or in other cases wherein the AP enrichment info is not available.

NOTE
The **EnrichmentInfo** command is only applicable for UEs connected to Ruckus APs and not for third party APs.

The following is an example of an *EnrichmentInfo* request:

{ Vendor: “ruckus” RequestPassword: “myPassword”, APIVersion: “1.0”, RequestCategory: “UserOnlineControl”, RequestType: “EnrichmentInfo”, UE-IP: “ENC12bc24c4777703327f2e0aabbf6b9f9e”, } The table lists the responses for enrichment information.

TABLE 8 Query enrichment

Response Type	Possible Responses
Normal response	• 102, Enrichment Information.
Service error	• 300, Not found: Response if the lookup fails with given UE- MAC or UE-IP address. • 400, Internal server error: Response when an controller internal error occurs.
General error	• 302, Bad request: Response if the JSON request is not well-formed. • 303, Version not supported: Response if there is a version mismatch. • 304, Command not supported: Response if the request type is not supported. • 305, Category not supported: Response if the request category not supported. • 306, Wrong request password: Response if the request password is mismatched.

JSON Responses

JSON Responses - GetConfig

The northbound interface supports the following JSON commands in the request category - GetConfig:

- Encrypt
- Decrypt

NOTE
It is recommended for new users to implement and use the new APIs - Encrypt and Decrypt. Existing users can continue using the legacy APIs - EncryptIP and DecryptIP provided; you have not made any changes to it during implementation on your portal server.

The following is an example of an Encrypt IP address command, which returns an encrypted IP address for direct access to the subscriber portal. By default the encryption is enabled. To disable the encryption, use the CLI command:

```
ruckus(config)# [no] encrypt-mac-ip
```

NOTE
Refer to the CLI examples given below for enabling and disabling the IP and MAC address encryption.

{ Vendor: “ruckus”, RequestPassword: “myPassword”, APIVersion: “1.0”, RequestCategory: “GetConfig”, RequestType: “Encrypt”, Data: “172.21.134.87” }

The following is an example of the success response:

{ Vendor: “ruckus”, ReplyMessage:”OK", ResponseCode:200, APIVersion:”1.0” Data: “ENC1234bfdbe5y5hbfdgh45y54ryt5y5th5” }

Another example is the decrypt command, which returns a decrypted value of IP address.

{ Vendor: "ruckus", RequestPassword: "myPassword", APIVersion: "1.0", RequestCategory: "GetConfig", RequestType: "Decrypt", Data: "ENC1234bfdbe5y5hbfdgh45y54ryt5y5th5" }

The success response:

{ Vendor:"ruckus", ReplyMessage:"OK", ResponseCode:200, APIVersion:"1.0" Data: "172.21.134.87" }

The following are examples of using the CLI command for enabling and disabling the IP address and MAC address encryptions.

Enabling the IP address and MAC address encryption:

# show running-config encrypt-mac-ip

Disabling the IP address and MAC address encryption:

# config (config)# no encrypt-mac-ip Do you want to continue to disable (or input 'no' to cancel)? [yes/no] yes Successful operation

Confirming that the IP address and MAC address encryption is disabled:

(config)# do show running-config encrypt-mac-ip Encryption MAC and IP: Disabled

JSON Responses Definitions

The table lists the definitions of JSON responses from the northbound portal interface.

The following are the expansions for the abbreviations mentioned in the Used In column.

- UA: User Authenticate (includes LoginSync and LoginAsync)
- SQ: Status Query
- TU: Terminating User (Logout and Disconnect)
- EI: Enrichment Info
- GC: Get Config (Encrypt and Decrypt)

NOTE
Refer to Overview on page 15 for commands related to the responses mentioned above.

TABLE 9 JSON response definitions

Category	Code	Definition	Used In				
			UA	SQ	TU	EI	GC
Informational	100	Client unauthorized		•	•		
	101	Client authorized	•	•			
	102	Enrichment Info				•	
Success	200	OK			•		•
	201	Login succeeded		•			
	202	Authentication pending	•	•			
Client Error	300	Not found	•	•	•	•	
	301	Login failed	•	•			
	302	Bad request	•	•	•	•	•
	303	Version not supported	•	•	•	•	•
	304	Command not supported	•	•	•	•	•
	305	Category not supported	•	•	•	•	•
	306	Wrong request password	•	•	•	•	•
Server Error	400	Internal server error	•	•	•	•	•
	401	Authentication server error	•	•			

JSON Response Examples

This section provides the following examples of JSON responses defined in the Table (JSON Response Definitions)

Example: Client unauthorized

{ Vendor:"Ruckus", APIVersion:"1.0", ResponseCode:100, ReplyMessage:"Client unauthorized", UE-IP:"ENC323e79bf1bbd5ac4", UE-MAC:"ENCf6b7f49da92a45f8978c35966b95eeafc6451102af391592", AP-MAC:"00:11:22:AA:BB:CC", SSID:" hotspot-01", SmartClientInfo:"", GuestUser:"0", SmartClientMode:"none" }

Example: Client authorized

{ Vendor: "Ruckus", APIVersion: "1.0", ResponseCode: "101", ReplyMessage: "Client authorized", UE-IP: "ENC12bc24c4777703327f2e0aabbf6b9f9e", UE-MAC: "ENCCDD319C6A476FA7127DF1FB80A63CD30ADC5E47C3DBE2157", UE-Username: "user001", AP-MAC: "04:4f:aa:32:25:f0", SSID: "hotspot-01" SmartClientMode: "none", SmartClientInfo: "", GuestUser: "0", } Example: Enrichment information

```
{ Vendor: "Ruckus", APIVersion: "1.0", ResponseCode: "102", ReplyMessage: "Enrichment Information", UE-IP:
"ENC12bc24c4777703327f2e0aabbf6b9f9e", UE-MAC: "ENCCDD319C6A476FA7127DF1FB80A63CD30ADC5E47C3DBE2157", AP-
MAC: "04:4f:aa:32:25:f0", SSID: "hotspot-01", WLAN-ID: "1", Location: "a location", VLAN-ID: 1 }
```

Example: Success information

```
{ Vendor: "Ruckus", Version: "1.0", ResponseCode: "200", ReplyMessage: "OK" UE-IP: "ENC12bc24c4777703327f2e0aabbf6b9f9e", UE-
MAC: "ENCCDD319C6A476FA7127DF1FB80A63CD30ADC5E47C3DBE2157", SmartClientMode: "none", SmartClientInfo: "", GuestUser:
"0", }
```

Example: Login succeeded

```
{ Vendor: "Ruckus", APIVersion: "1.0", ResponseCode: "201", ReplyMessage: "Login succeeded", UE-IP:
"ENC12bc24c4777703327f2e0aabbf6b9f9e", UE-MAC: "ENCCDD319C6A476FA7127DF1FB80A63CD30ADC5E47C3DBE2157", UE-
Username: "user001", AP-MAC: "04:4f:aa:32:25:f0", SSID: "hotspot-01", SmartClientMode: "none", SmartClientInfo: "", GuestUser: "0",
UE-Proxy: "0" }
```

Example: Authentication pending

```
{ Vendor: "ruckus", APIVersion: "1.0", ResponseCode: "202", ReplyMessage: "Authentication pending", UE-IP:
"ENC12bc24c4777703327f2e0aabbf6b9f9e", UE-MAC: "ENCCDD319C6A476FA7127DF1FB80A63CD30ADC5E47C3DBE2157", UE-
Username: "user001", AP-MAC: "04:4f:aa:32:25:f0", SSID: "hotspot-01", SmartClientMode: "none", SmartClientInfo: "", GuestUser: "0", }
```

Example: Not found

```
{ Vendor: "Ruckus", APIVersion: "1.0", ResponseCode: "300", ReplyMessage: "Not found", }
```

Example: Login failed

```
{ Vendor: "Ruckus", APIVersion: "1.0", ResponseCode: "301", ReplyMessage: "Login failed", UE-IP:
"ENC12bc24c4777703327f2e0aabbf6b9f9e", UE-MAC: "ENCCDD319C6A476FA7127DF1FB80A63CD30ADC5E47C3DBE2157", AP-
MAC: "04:4f:aa:32:25:f0", SSID: "hotspot-01", SmartClientMode: "none", SmartClientInfo: "", GuestUser: "0", }
```

Example: Bad request

```
{ Vendor: "ruckus", APIVersion: "1.0", ResponseCode: "302", ReplyMessage: "Bad request", }
```

Example: Version not supported

```
{ Vendor: "ruckus", APIVersion: "1.0", ResponseCode: "303", ReplyMessage: "Version not supported" }
```

Example: Command not supported

```
{ Vendor: "ruckus", APIVersion: "1.0", ResponseCode: "304", ReplyMessage: "Command not supported", }
```

Example: Category not supported

```
{ Vendor: "ruckus", APIVersion: "1.0", ResponseCode: "305", ReplyMessage: "Category not supported", }
```

Example: Wrong request password

```
{ Vendor: "ruckus", APIVersion: "1.0", ResponseCode: "306", ReplyMessage: "Wrong request password", }
```

Example: Internal server error

```
{ Vendor: "ruckus", APIVersion: "1.0", ResponseCode: "400", ReplyMessage: "Internal server error", }
```

Example: Authentication server error

```
{ Vendor: "ruckus", APIVersion: "1.0", ResponseCode: "401", ReplyMessage: "Authentication server error", }
```

Example: Encrypt for MAC address

{ Vendor: “ruckus”, RequestPassword: “myPassword”, APIVersion: “1.0”, RequestCategory: “GetConfig”, RequestType: “Encrypt”, Data: “04:4f:aa:32:25:f0” } The success response: { Vendor: “ruckus”, ReplyMessage:”OK", ResponseCode:200, APIVersion:”1.0”, Data: "ENC4782689566f8eac8aa30e276aa907f332d0bf93f9f60a7d8" }

Example: Decrypt for MAC address

{ Vendor: "ruckus", RequestPassword: “myPassword”, APIVersion: "1.0", RequestCategory: "GetConfig", RequestType: "Decrypt", Data: "ENC4782689566f8eac8aa30e276aa907f332d0bf93f9f60a7d8" } The success response: { Vendor:"ruckus", ReplyMessage:"OK", ResponseCode:200, APIVersion:"1.0" Data: "04:4f:aa:32:25:f0" }

WISPr Support for ZoneDirector Login

WISPr Support for ZoneDirector Login Overview

The WISPr hotspot portal logon API supports existing customer’s external logon page (working with Zone Director (ZD)). Customers, who already have a ZD deployment and have implemented their own external logon page for hotspot WLAN, can use ZD's API (provided by Ruckus) for UE authentication. The controller provides the same API as that of ZD for customers to use their existing logon page.

> NOTE
>
> This new API is provided since controller's official portal integration using JSON requests does not support ZD login API. Ruckus Wireless recommends that the customer works with the JSON API as documented in this guide - Hotspot Portal Integration Interface.

Customer Login

Customers who already have ZD deployment with their own external portal must change their login/logout URLs to match the new supported API.

The external portal sends the login/logout request to the controller. The requests should include the parameters provided by controller's captive portal redirection

NOTE
See Captive Portal Attributes Overview on page 27 for details.

- Login - The login request path in the external portal to the controller should be changed:

  From:

  ```
  https://sip:9998/login
  ```

  To:

  ```
  https://sip:9998/SubscriberPortal/hotspotlogin
  ```

  NOTE
  The login request also supports HTTP with port number 9997.

  NOTE
  This login request should include the customer's login credentials such as the username and password parameters. It is expected that the customer's portal also sends the following parameters from Captive Portal's redirection -

- url - the original URL which the user tried to browse
- proxy - if the UE browser is set to Web proxy
- uip - UE IP address
- client_mac - UE MAC IP address

Customer Logout

This section describes customer logout.

The logout request path in the external portal to the controller should be changed:

From:

```
https://sip:9998/logout
```

To:

```
https://sip:9998/SubscriberPortal/hotspotlogout?uip=10.20.30.40
```

Captive Portal Attributes

Captive Portal Attributes Overview

The UE-IP and UE-MAC address parameters are decrypted at the beginning of each user online control request. This is because the Captive Portal (CP) encrypts the IP and MAC address parameters in each redirection to the subscriber portal. The controller decrypts the UE-IP and UE-MAC address before returning the response, by using the Encrypt and Decrypt API described in the JSON Responses on page 21 chapter.

> NOTE
> Apple CNA only works for HTTP redirect. It does not work if the external portal is in HTTPS.

Redirection Attributes

The table lists these parameters provided by controller's captive portal redirection.

> NOTE
> See WISPr Support for ZoneDirector Login on page 25 for login and logout details.

TABLE 10 Redirection attributes

Attributes	Description
client_mac	Encrypted UE Mac address. NOTE The format of the MAC Address is defined in the Hotspot (WISPr) Portal configuration.
dn	The domain name.
lid	AP application identifier. For example: isocc=us, cc=1,ac=408,network=ACMEWISP_Newark_Airport
loc	AP location name. For example: ACMEWISP,Gate_14_Terminal_C_of_Newark_Airport
mac	AP Mac address.
proxy	The UE browser if it is set to the Web proxy.
reason	Reason for redirecting the WLAN. The value could either be: • Un-Auth-Captive – Regular unauthenticated UE redirected to Login Portal or • Un-Auth-SSL-Captive – In case of HTTPS, Captive Portal is performing a “double redirect”. Adding this value to identify this flow.
nbilp	The IP of SCG/SZ’s Northbound Interface.
sip	The value could either be the: • FQDN of the uploaded SCG/SZ Web UI certificate if the uploaded certificate’s common name is FQDN. • Concatenation of the SCG/SZ cluster name with the common name value after the wild card, if the uploaded certificate’s common name is not FQDN (meaning if it includes wild card). For example, if the common name is “*.ruckuswireless.com” and the cluster name is “Cluster_Node1”, then the sip will be “cluster_node1.ruckuswireless.com.”

TABLE 10 Redirection attributes (continued)

Attributes	Description
	• “scg.ruckuswireless.com”, which is the FQDN of the self-signed certificate which SCG/SZ is packaged with, if the certificate was not uploaded at all.
ssid	The broadcasted SSID name.
startUrl	The URL as per the Hotspot configuration, which is to be redirected after successful login.
uip	Encrypted UE IP address.
url	Original URL which the customer tries browsing.
vlan	VLAN which the customer is set to.
wlan	WLAN ID of the UE's associated to the WLAN.
wlanName	SSIDs configured WLAN name.
zoneId	In case of third party AP, this attribute will be included instead of WLAN and will include the zone ID where the SSID is configured in the controller.
zoneName	AP zone name of the UE's associated with the WLAN. The WLANs configured Zone name. This name is used for Kumo. The value is encrypted based on a special key.

The Smart Client

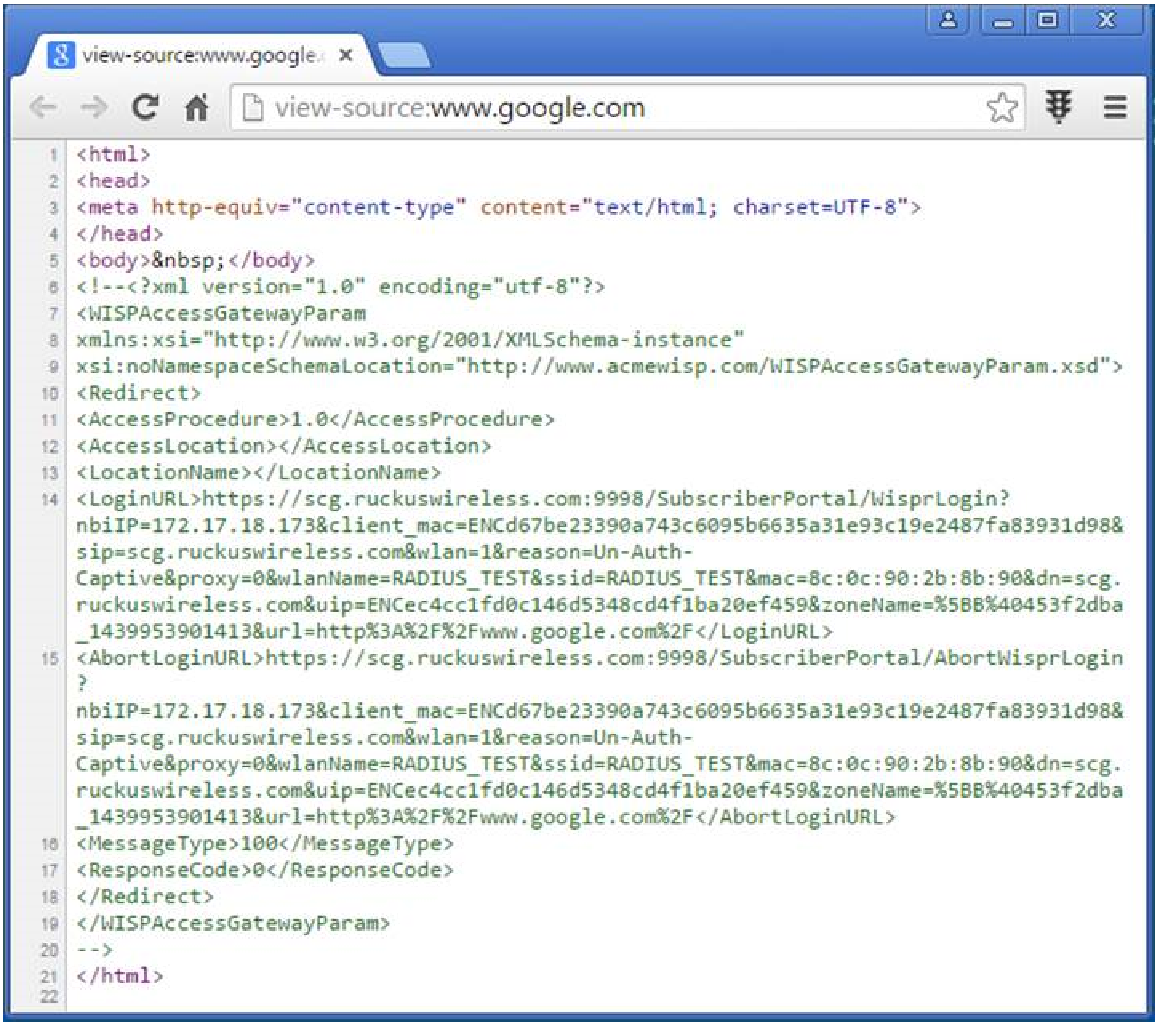
The Smart Client Overview

The Smart Client is a software solution which resides on the user’s access device that facilitates the user’s connection to Public Access Networks, whether via a browser, signaling protocol or other proprietary method of access.

The XML is embedded in the HTML source code as a comment block as the following:

```
<html>
< head>
< meta http-equiv="content-type" content="text/html; charset=UTF-8">
< /head>
< body></body>
<!--<?xml version="1.0" encoding="utf-8"?>
{{{ The Embedded XML }}}
-->
</html>
```

FIGURE 3 Smart Client Example



```
<html>
<head>
<meta http-equiv="content-type" content="text/html; charset=UTF-8">
</head>
<body>&nbsp;</body>
<!--<?xml version="1.0" encoding="utf-8"?>
<WISPAccessGatewayParam
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:noNamespaceSchemaLocation="http://www.acmewisp.com/WISPAccessGatewayParam.xsd">
<Redirect>
<AccessProcedure>1.0</AccessProcedure>
<AccessLocation></AccessLocation>
<LocationName></LocationName>
<LoginURL>https://scg.ruckuswireless.com:9998/SubscriberPortal/WisprLogin?
nbiIP=172.17.18.173&client_mac=ENCd67be23390a743c6095b6635a31e93c19e2487fa83931d98&
sip=scg.ruckuswireless.com&wlan=1&reason=Un-Auth-
Captive&proxy=0&wlanName=RADIUS_TEST&ssid=RADIUS_TEST&mac=8c:0c:90:2b:8b:90&dn=scg.
ruckuswireless.com&uip=ENCec4cc1fd0c146d5348cd4f1ba20ef459&zoneName=%5BB%40453f2dba
_1439953901413&url=http%3A%2F%2Fwww.google.com%2F</LoginURL>
<AbortLoginURL>https://scg.ruckuswireless.com:9998/SubscriberPortal/AbortWisprLogin
?
nbiIP=172.17.18.173&client_mac=ENCd67be23390a743c6095b6635a31e93c19e2487fa83931d98&
sip=scg.ruckuswireless.com&wlan=1&reason=Un-Auth-
Captive&proxy=0&wlanName=RADIUS_TEST&ssid=RADIUS_TEST&mac=8c:0c:90:2b:8b:90&dn=scg.
ruckuswireless.com&uip=ENCec4cc1fd0c146d5348cd4f1ba20ef459&zoneName=%5BB%40453f2dba
_1439953901413&url=http%3A%2F%2Fwww.google.com%2F</AbortLoginURL>
<MessageType>100</MessageType>
<ResponseCode>0</ResponseCode>
</Redirect>
</WISPAccessGatewayParam>
-->
</html>
```

Extract the embedded XML as the following.

```
<?xml version="1.0" encoding="utf-8"?>
<WISPAccessGatewayParam xmlns:xsi="http://www.w3.org/2001/
XMLSchema-instance"xsi:noNamespaceSchemaLocation=
"http://www.acmewisp.com/WISPAccessGatewayParam.xsd">
    <Redirect>
        <AccessProcedure>1.0</AccessProcedure>
        <AccessLocation></AccessLocation>
        <LocationName></LocationName>
        <LoginURL>https://scg.ruckuswireless.com:9998/
        SubscriberPortal/WisprLogin?nbiIP=172.17.18.173&client_mac
        =ENCd67be23390a743c6095b6635a31e93c19e2487fa83931d98&sip
        =scg.ruckuswireless.com&wlan=1&reason=Un-Auth-Captive&proxy
        =0&wlanName=RADIUS_TEST&ssid=RADIUS_TEST&mac
        =8c:0c:90:2b:8b:90&dn=scg.ruckuswireless.com&uip
        =ENCec4cc1fd0c146d5348cd4f1ba20ef459&zoneName
        =%5BB%40453f2dba_1439953901413&url=http%3A%2F%2Fwww.google.com%2F
        </LoginURL><AbortLoginURL>
        https://scg.ruckuswireless.com:9998/SubscriberPortal/
        AbortWisprLogin?nbiIP=172.17.18.173&client_mac
        =ENCd67be23390a743c6095b6635a31e93c19e2487fa83931d98&sip
        =scg.ruckuswireless.com&wlan=1&reason=Un-Auth-Captive&proxy
        =0&wlanName=RADIUS_TEST&ssid=RADIUS_TEST&mac=8c:0c:90:2b:8b:90&dn
        =scg.ruckuswireless.com&uip=ENCec4cc1fd0c146d5348cd4f1ba20ef459&zoneName
        =%5BB%40453f2dba_1439953901413&url=http%3A%2F%2Fwww.google.com%2F
        </AbortLoginURL>
        <MessageType>100</MessageType>
        <ResponseCode>0</ResponseCode>
    </Redirect>
```

Example: Information on the redirection page

```
<?xml version="1.0" encoding="utf-8"?>
<WISPAccessGatewayParam xmlns:xsi
="http://www.w3.org/2001/XMLSchema-instance"
xsi:noNamespaceSchemaLocation
="http://www.acmewisp.com/WISPAccessGatewayParam.xsd">
<Redirect>
<AccessProcedure>1.0</AccessProcedure>
<AccessLocation></AccessLocation>
<LocationName></LocationName>
<LoginURL>https://sip:9998/SubscriberPortal/WisprLogin?nbiIP=<nbiIP>
{& ... other Redirection attributes in Table 11}</LoginURL>
<AbortLoginURL>
https://sip:9998/SubscriberPortal/AbortWisprLogin?nbiIP=<nbiIP>
</AbortLoginURL>
<MessageType>100</MessageType>
<ResponseCode>0</ResponseCode>
</Redirect>
</WISPAccessGatewayParam>
```

NOTE
To do authentication. An HTTP POST request must be sent to the <LoginURL> with the `UserName` and `Password` fields.

NOTE
The content type of request must be "application/x-www-form-urlencoded".

Example: Authentication Request (HTTP)

```
POST /SubscriberPortal/WisprLogin?nbiIP=<nbiIP>
HTTP/1.1
Host: sip:9998
Content-Type: application/x-www-form-urlencoded
UserName=<UserName>&Password=<Password>
```

Example: Authentication Reply

```
<?xml version="1.0" encoding="UTF-8"?>
<WISPAccessGatewayParam xmlns:
xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:noNamespaceSchemaLocation
="http://www.acmewisp.com/WISPAccessGatewayParam.xsd">
<AuthenticationReply>
<MessageType>120</MessageType>
<ResponseCode>201</ResponseCode>
<ReplyMessage>Authentication pending</ReplyMessage>
<LoginResultsURL>
https://sip:9998/SubscriberPortal/WisprStatus?nbiIP=<nbiIP>
</LoginResultsURL>
</AuthenticationReply>
</WISPAccessGatewayParam>
```

Example: Authentication Result (Login succeeded)

```
<?xml version="1.0"encoding="UTF-8"?>
<WISPAccessGatewayParam xmlns:
xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:noNamespaceSchemaLocation
="http://www.acmewisp.com/WISPAccessGatewayParam.xsd">
<AuthenticationPollReply>
<MessageType>140</MessageType>
<ResponseCode>50</ResponseCode>
<ReplyMessage>Login succeeded</ReplyMessage>
<LogoffURL>
https://sip:9998/SubscriberPortal/WisprLogout?nbiIP=<nbiIP>
&UserName=<UserName>&Password=<Password></LogoffURL>
</AuthenticationPollReply>
</WISPAccessGatewayParam>
```

Example: Authentication Result (Login failed)

```
<?xml version="1.0" encoding="UTF-8"?>
<WISPAccessGatewayParam xmlns:
xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:noNamespaceSchemaLocation
="http://www.acmewisp.com/WISPAccessGatewayParam.xsd">
<AuthenticationPollReply>
<MessageType>140</MessageType>
<ResponseCode>100</ResponseCode>
<ReplyMessage>Login failed</ReplyMessage>
</AuthenticationPollReply>
</WISPAccessGatewayParam>
```

Example: Logoff Reply

```
<?xml version="1.0" encoding="UTF-8"?>
<WISPAccessGatewayParam xmlns:
xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:noNamespaceSchemaLocation
="http://www.acmewisp.com/WISPAccessGatewayParam.xsd">
<LogoffReply>
<MessageType>130</MessageType>
<ResponseCode>150</ResponseCode>
</LogoffReply>
</WISPAccessGatewayParam>
```

User Defined Interface

User Defined Interface Overview

AP uses the control interface to communicate with the controller regarding its configuration.

NBI and UDI

To have a logical separation of UE traffic from the AP control traffic, the administrator can create an UDI (User Defined Interface).

In case the UDI (using control interface, physical interface and hotspot service as shown in the figure) is configured, the AP uses it to DNAT unauthorized UE requests to the controller's captive portal (otherwise the AP uses the control interface).

> NOTE
> UDI option is not available for vSZ-E.

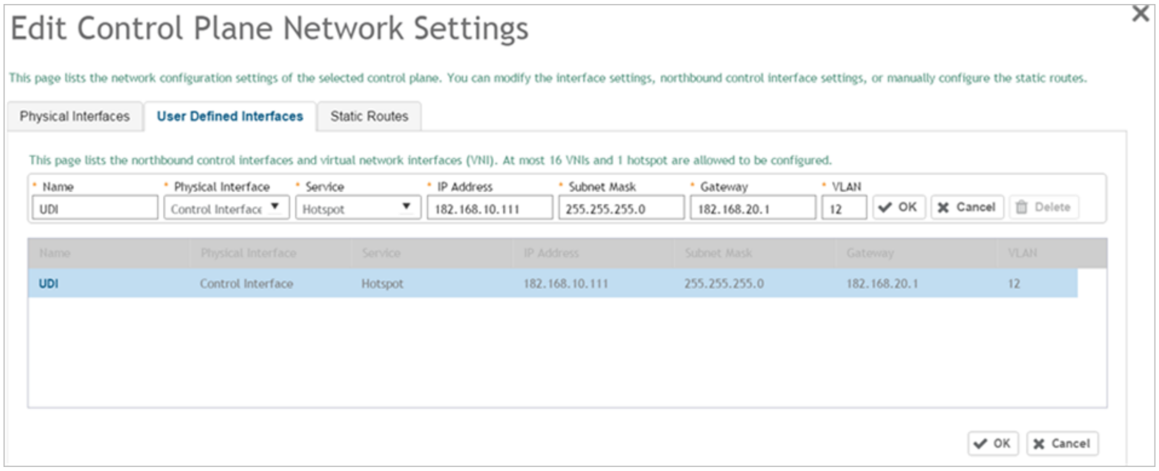
The controller's captive portal redirects the UE to the configured portal login page URL. When the UE triggers this portal URL request, the AP will let it go through (it will not DNAT to the controller's captive portal), as it is configured as ACL in the AP, direct to the external portal server.

The external portal communicates with the controller's NBI for status/login/logout requests. The interfaces external portal can communicate are the interfaces NBI listens to. NBI is bound by default to the controller's control and management interfaces.

In addition, the administrator can configure UDI interface, which NBI will bind as well. This UDI for NBI can be the same UDI which AP DNAT to the controller's captive portal, or others using control or management physical interfaces and whatever service (hotspot/not specified) as in the figure below. To define UDI on the controller’s web interface, navigate to System > Cluster > Select an existing Control Plane > Click on Configure > User Defined Interfaces. Enter the following details. Click on Add to add and on OK to save the configuration details.

- Name of the UDI
- Physical Interface
- Service
- IP Address
- Subnet Mask
- Gateway
- VLAN

FIGURE 4 Configuring UDI



Edit Control Plane Network Settings

This page lists the network configuration settings of the selected control plane. You can modify the interface settings, northbound control interface settings, or manually configure the static routes.

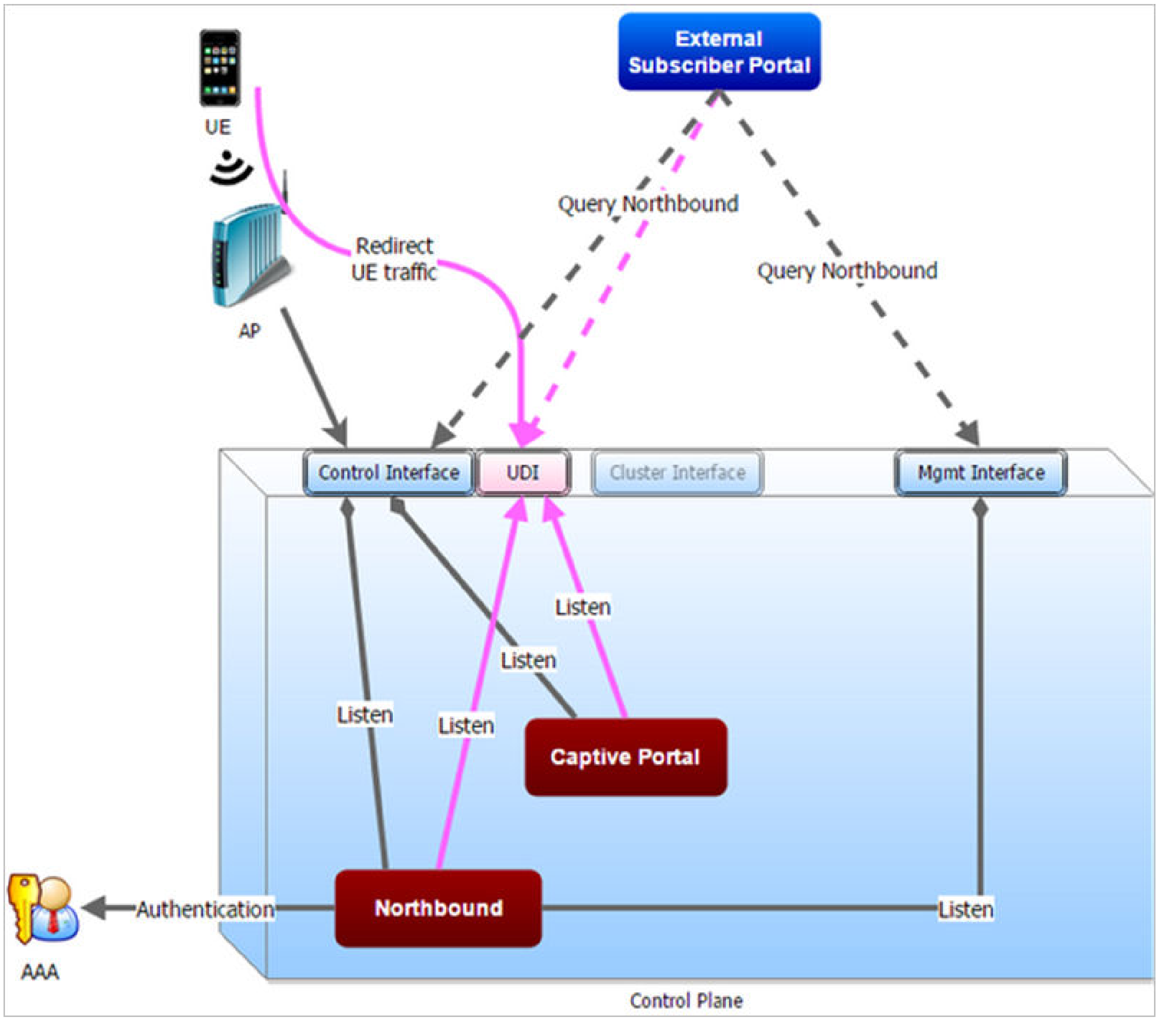
This page lists the northbound control interfaces and virtual network interfaces (VNI). At most 16 VNIs and 1 hotspot are allowed to be configured.

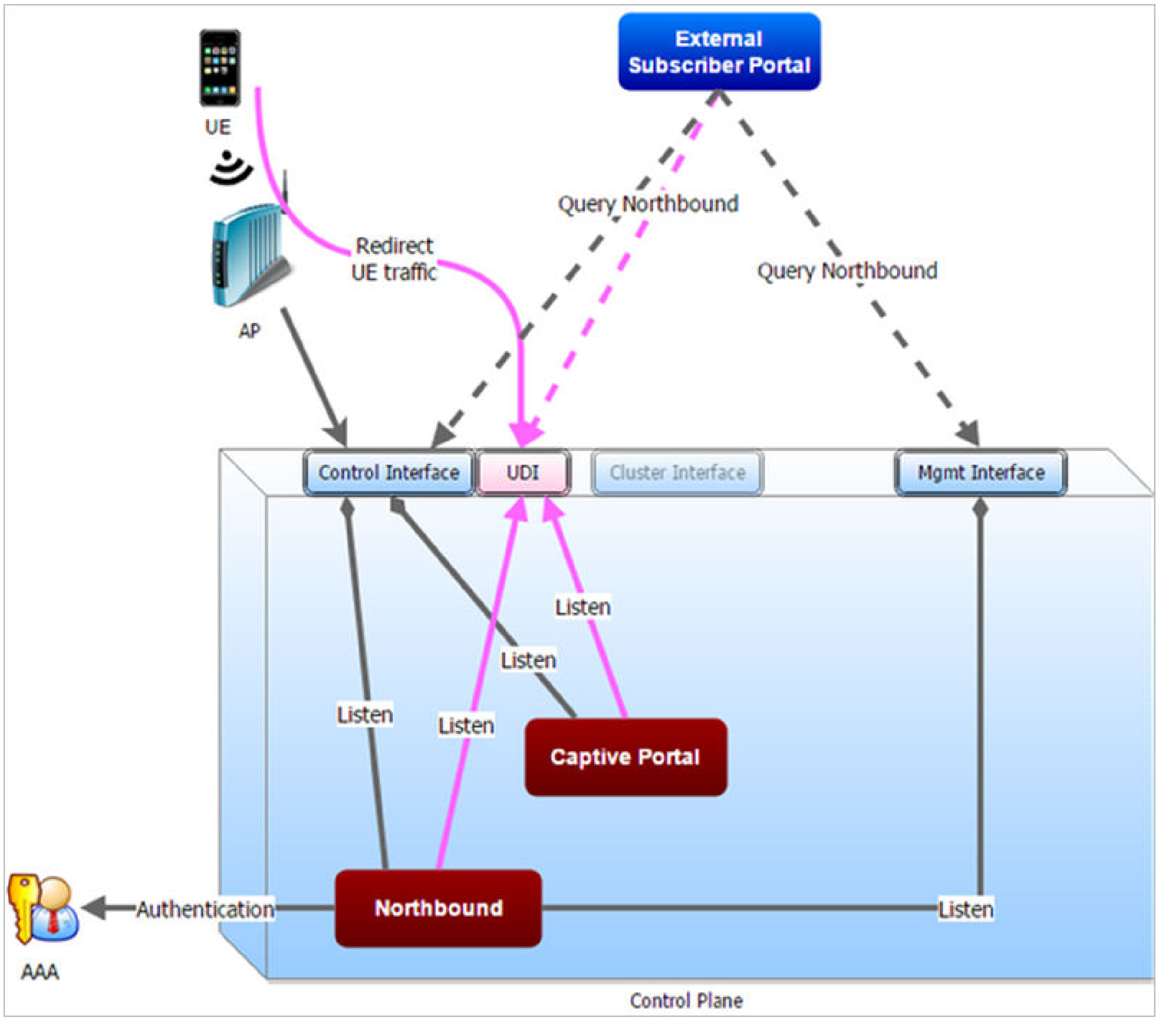
* Name	* Physical Interface	* Service	* IP Address	* Subnet Mask	* Gateway	* VLAN
UDI	Control Interface	Hotspot	182.168.10.111	255.255.255.0	182.168.20.1	12

Name	Physical Interface	Service	IP Address	Subnet Mask	Gateway	VLAN
UDI	Control Interface	Hotspot	182.168.10.111	255.255.255.0	182.168.20.1	12

The figure below describes the request flows per interface.

FIGURE 5 Request flows per interface




External
Subscriber Portal
UE
AP
Redirect
UE traffic
Query Northbound
Query Northbound
Control Interface
UDI
Cluster Interface
Mgmt Interface
Listen
Listen
Listen
Listen
Captive Portal
Northbound
Authentication
Listen
AAA
Control Plane

WISPr Portal Details

WISPr Portal Details Overview

The following are the WISPr portal details for GRE tunnels.

Non GRE Tunnel

The below table lists the WISPr details for non GRE tunnel.

TABLE 11 Non GRE tunnel

Non GRE Tunnel		IPv4	IPv6
Non WISPr Client	IPv4	Supported	Supported
	IPv6	Supported	Supported

TABLE 12 Non GRE tunnel and internal portal

Non GRE Tunnel		IPv4	IPv6
WISPr Client	IPv4	Supported	Supported
	IPv6	Not supported	Not supported

TABLE 13 Non GRE tunnel and external portal

Non GRE Tunnel		IPv4	IPv6
WISPr Client	IPv4	Supported	Supported (This portal is IPv4)
	IPv6	Not supported	Not supported

Ruckus GRE Tunnel

The below table lists the WISPr details for Ruckus GRE tunnel.

TABLE 14 Non GRE tunnel

Non GRE Tunnel		IPv4	IPv6
Non WISPr Client	IPv4	Supported	Not supported
	IPv6	Not supported	Not supported

TABLE 15 Non GRE tunnel and internal portal

Non GRE Tunnel		IPv4	IPv6
WISPr Client	IPv4	Supported	Not supported
	IPv6	Not supported	Not supported

TABLE 16 Non GRE tunnel and external portal

Non GRE Tunnel		IPv4	IPv6
WISPr Client	IPv4	Supported	Not supported

TABLE 16 Non GRE tunnel and external portal (continued)

Non GRE Tunnel		IPv4	IPv6
	IPv6	Not supported	Not supported

Certificate Warning

Certificate Warning Overview

Certificate warning when end users are redirecting with HTTPS request.

When a CA-signed certificate is imported to SZ certificate store and applied to Hotspot (WISPr), SZ captive portal and internal portal page use the imported certificate. However, if an end user enters a HTTPS URL through the browser manually, one certificate warning message is still expected to be seen in the UE browser.

SZ captive portal need to complete the SSL handshake before sending 302 redirect response to UE. Since the FQDN(common name) in the certificate is impossible to match the URL that UE tries to visit, the browser will display a certificate warning.

To avoid certificate warning messages, major operating systems already have built in mechanisms to detect captive network and sending HTTP requests (not HTTPS), so that users can be redirected to a portal page automatically without any certificate error.

- Apple iOS CNA (captive network assistant) sends HTTP requests to some static URLs to detect captive portal.
- Android devices detected it by sending HTTP requests to http://clients3.google.com/generate_204.
- Window 7 sends HTTP requests to http://www.msftncsi.com/ncsi.txt to detect captive portal.

  NOTE
  URL may vary based on different software releases.

In either case, user devices pop up a window and redirect users to the portal page with HTTP requests instead of HTTPs requests. No certificate warning will be shown if the UE is redirected automatically by the operating system.

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