Secure Remote Access (SRA)

Secure Tunnel Solution

A Bidirectional Communication Channel from a Network Operations Center (NOC) to a Remote Site

CLI Reference

Part Number 33839
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Intellectual Property

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For details on the Lantronix warranty policy, go to our web site at http://www.lantronix.com/support/warranty.

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Revision History

Date	Rev.	Notes
6/11/21	A	Initial release at SRA Software Version 1.0.3.
4/7/22	B	Initial Lantronix rebrand.

Contents

Product Description

The Lantronix Secure Remote Access (SRA) solution creates a secure tunnel to provide a bidirectional communication channel from a Network Operations Center (NOC) to a Remote Site. The solution generally does not require configuration changes to the Remote Site Firewall.

The Remote Access Device (RAD) is located at a Remote Site and initiates a connection with the Management Access Portal (MAP) located at the NOC or Host Site. Once the tunnel is established, the Network Administrator at the NOC can connect via VPN over the tunnel to devices in the same network as the Remote Access Device, or through Port Forwarding to any device the RAD can address.

SRA provides the capability for a Network Managed Services company or Integrator team to configure and monitor network devices at an end-user customer site with minimal interaction with the remote network. **Note** that when using VPN mode, the IP addresses at the Remote Site and the NOC or Host Site cannot overlap (i.e., must be on different networks (sub-networks)).

For More Information

For Lantronix Drivers, Firmware, etc. go to the Product Support webpage (logon required).
For Lantronix Manuals, Brochures, Data Sheets, etc. go to the Support Library (no logon required).
Related Manuals include:

- Secure Remote Access (SRA) Quick Start Guide, 33837
- Secure Remote Access (SRA) Install Guide, 33838
- Secure Remote Access (SRA) CLI Reference, 33839
- Release Notes (version specific)

SRA – Secure Remote Access for Configuration and Monitoring

SRA provides the capability for the Integrator team to configure and monitor network devices at an end user customer site with minimal interaction with the remote network.

- Uses a WebSocket tunnel over port 443 to provide a secure bidirectional communication channel.
- Does not require configuration changes to the Firewall as port 443 is open for https traffic.
- WebSocket Client at End Customer Site can either:
  - Initiate the connection to the WebSocket server at the host and keep the connection up, or:
  - Poll the WebSocket Server on the Appliance at the Integrator to see if it needs to communicate with the End customer network, then establish the WebSocket tunnel for as long as it is needed, then close the connection.
- Once the WebSocket tunnel is established, the Network Administrator can log into the VPN server on the appliance at the End customer site and manage the devices accessible in that network.
- VPN connection is made over the WebSocket, so it does not require configuration changes to the firewall.

Per IETF RFC 6455: the WebSocket Protocol enables two-way communication between a client running untrusted code in a controlled environment to a remote host that has opted-in to communications from that code. The security model used for this is the origin-based security model commonly used by web browsers.

Network Configuration Guidelines

System Requirements

- SRA devices must have one interface with a gateway that allows Internet access.
- You must have OpenVPN (Windows) client installed when using the VPN solution for the remote site, not necessary for Port Forwarding. Note that some versions of Windows allow only one active VPN client connection at a time.
- When using VPN mode, the IP subnet for the LAN1 interface on the MAP cannot overlap with the IP subnet being forwarded by any of its RADs.
- External IP (Internet facing IP) address with available port 443.
- IP address(es) for the MAP and RAD.
- Network setup details of remote sites.
- When connecting to the serial port on SRA units, use a null modem cable with a female DB9 connector, such as the CABLE-SRA-NMC available through Lantronix.

MAP Configuration Requirements

“MAP users" refers to users at headquarters/Network Operations Center (NOC) who are using SRA to access devices at remote sites. MAP requirements:

- The MAP requires Internet accessible port 443 available:
  - this will likely be forwarded from the firewall and it doesn't matter which interface is given port 443;
  - the interface receiving 443 should have a gateway providing Internet access.
- MAP users will access the Web UI via the LAN1 interface.
- The MAP must have Internet access to communicate with the RADs; to accomplish this one interface must have a gateway assigned statically or via DHCP.
- If both interfaces are in use, make sure only one has a gateway assigned.

With the requirements in mind, the simplest configuration would be to disable WAN1, statically assign an IP address with gateway on LAN1 and forward port 443 from an external IP Address on your firewall to this IP address.

DHCP can be used on LAN1 but it is expected that the IP Address does not change; be sure to configure your DHCP server to hand out a specific IP address to the LAN1 port.

If the MAP is to be on separate (tiered) networks, the WAN1 interface can be configured with DHCP, configuring the DHCP server to hand out a specific IP address to the WAN1 interface, or with a static IP Address and gateway while the LAN1 interface is given an IP address on the separate MAP users network. In this scenario, port 443 would be forwarded from the firewall to WAN1.

MAP Configuration: To configure a MAP, set its ID and External IP Address (the Internet facing IP Address that the RAD's can access):

```
sramap # configure terminal
sramap (config) # map id my_test_map
sramap (config) # map ext_ip 192.168.64.230
```

Make sure that if the MAP is behind a firewall that port 443 from the External IP Address is forwarded to one of the interfaces on the MAP.

On the internal network, users are expected to access the MAP via the LAN1 interface. The port forwards and VPN configuration files all use the IP Address of the LAN1 interface. It is ok to disable the WAN1 interface and use just the LAN1 interface, forwarding 443 from the External IP Address to LAN1's IP Address. **Note**: The MAP is not intended to be directly connected to the internet via its WAN port, but to sit behind a firewall / router which forwards in-bound port 443 (assuming default port config) from the internet to the MAP, and that the MAP's "Internet facing IP" is not the MAP's WAN IP, but the router's WAN IP which can be reached via the internet. The RADs will phone home to this Internet IP, and the port 443 traffic must be forwarded to the MAP via specific router / firewall config.

RAD Configuration Requirements

Requirements:

- The RAD requires Internet access
- The RAD requires access to devices/network that MAP users want to manage

Most RAD networks are a single (flat) network with DHCP servers available. For Port Forwarding, the simplest configuration is the default: WAN1 connected to this flat network, LAN1 not used. The RAD will use WAN1 both for internet access and to connect to the devices the MAP users must manage. Details on port forwarding are in the RAD Config section.

For VPN, WAN1 would be connected to the network with Internet access, likely using DHCP (the default setting on WAN1) or configured with an IP Address and gateway. For VPN, LAN1 would be configured for the separate network that is to be accessed by the MAP users.

Note: Note that RAD ID can include spaces and that disconnected RADs can be removed (RED status). A RAD ID can be modified while connected to MAP. Duplicate RAD IDs can exist; please avoid this if possible. If multiple RAD's are created with the same RAD ID, the matching ones must be disconnected and then all can be deleted from the MAP. While disconnected, the RAD IDs should be changed so they are all unique.

MAP Configuration

A RAD's MAP Configuration page lets you configure one or more MAPs on a RAD. The point of a RAD is to connect to a MAP and forward a connection of some sort to the MAP.

To configure the MAP, connect to the LAN1 port on the MAP using the default IP address 192.168.1.10.

Note: For LAN1 interface (Flat or Tiered topology), enter an IP Address. If LAN1 is attempted to be assigned with DHCP, the VPN configuration files won't have the correct IP Address and the VPN connection will fail.

Note: Set up unique RAD IDs when you deploy the RADs.

Note: Changing the Internet facing IP (External IP Address) will prevent previously deployed RAD's from connecting.

Next is the MAP Mode: <map_ip> **port_forward**|**provisioning**|**vpn**|**none**

Note that ***none*** is for the 'no mode' CLI command.

The remainder of the MAP Configuration depends on the Mode; ***vpn*** has one set of information and ***port_forward*** has a different set.

<map_ip> **add**|**delete**|**type**|**description** <args>

To add an IP Address/port combination to forward to MAP: <map_ip> add <ip_addr> <port>

To no longer forward an IP Address/port combination: <map_ip> delete <ip_addr> <port>

To set the type of port forward to http, https, none, or ssh (the only significance to the type is that the CLI or Web UI will construct a URL for the type specified):
<map_ip> type <ip_addr> <port> http|https|none|ssh

To set a description for the port: <map_ip> description <ip_addr> <port> “description text”

There can be multiple port forwards per MAP (no limit). There can be multiple MAPs. On a single RAD, if one of the MAPs is in port_forward mode, then all MAPs will be in port_forward mode.

Once the port forward has been added, a description can be set in response to a text prompt.

There is also a type. This is used on the MAP config page to give a link to the device. It auto detects ports 22, 80 and 443. This is configurable; you can run Web servers on port 8080 or other ports, with either https or http.

Setup

Caution: To avoid arcing on the DC jack, plug in the DC jack first, then plug the AC adapter into mains.
To operate the Secure Remote Access solution:

MAP Setup

1. Connect Cat5/6 cable from PC to LAN1 port on RAD.
2. Open web browser and go to 192.168.1.10.
3. Login using default username/password: admin/admin.
4. Go to MAP Configuration Tab and fill in MAP ID, Internet Facing IP, and Ext Port. Click Apply.
5. Go to Network Configuration tab.
6. Fill in network configuration information. Click Apply.
7. Change PC IP address to work with new MAP IP address.
8. Log back into the MAP.
9. Go to Network Info tab and verify network information is correct.

RAD Setup

1. Connect Cat5/6 cable from PC to LAN1 port on RAD.
2. Open web browser and go to 192.168.1.10.
3. Login using default username/password: admin/admin.
4. Go to Network Configuration tab.
5. Fill in network configuration information. Click Apply.
6. Change PC IP address to work with new RAD IP address.
7. Log back into the RAD.
8. Go to Network Info tab and verify network information is correct.
9. Go to Configurations tab and assign a Site ID and select Update ID.
10. Go to Configurations tab and select Configure VPN.
11. Fill in Mgmt IP, Client IP, and Client count. (Note: Leave VPN Mode as “Disabled”.)
12. Select Save VPN Config.
13. Go to Configurations tab and select Add MAP.
14. Fill in Internet facing IP, External Port, set Mode to VPN, set Status to Enabled in the order shown below.
15. Select Save MAP Config. You will now lose connection to the RAD unit.
16. Connect WAN1 and LAN1 into 192.168.2.0/24 network at the remote site.

RAD Configuration

Configurations > RAD-MAP Config

Note: duplicate RAD IDs can exist; please avoid this if possible. If multiple RAD's are created with the same RAD ID, the matching ones must be disconnected and then all can be deleted from the MAP. While disconnected, the RAD IDs should be changed so they are all unique.

Configure VPN

RAD VPN Config: Unlike Port Forwarding where each MAP has its own set of ports that are being forwarded, there is just one instance of OpenVPN running on the RAD. It shares the network as defined on the LAN1 interface. The show command displays some parameters that do not have a modification command. These fields come from the LAN1 configuration. The VPN commands require that LAN1 is configured.

Once the VPN is up and running, it is available at port 1194 on the loopback interface. From here, the VPN can be forwarded to any MAP. So only one VPN configuration is needed, and it doesn't need to be tied to a MAP. (Port 1194 is the official IANA assigned port number for OpenVPN. Newer versions of the program now default to that port. A feature in the 2.0 version allows for one process to manage several simultaneous tunnels, as opposed to the original "one tunnel per process" restriction on the 1.x series.)

The VPN is created as a valid default config using information from the LAN1 interface, with its mode set to disabled by default. You can delete this VPN config. If the LAN1 configuration has changed, you can create another valid default config and get new valid defaults.

The VPN Mode can be set to enable or disable. Setting the VPN Mode to enable lets the VPN be used by MAPs. VPN Mode = Disable should disconnect all MAPs in VPN mode. VPN config changes are only allowed when the VPN is disabled.

The IP Address must be inside the LAN1 network. The Management IP address is the IP address that ends up on the VPN interface. It must be outside the Client range. The VPN must allocate a set of IP Addresses to be handed to VPN clients so they can participate in the network. Each individual VPN client needs its own IP address.

sra_rad_vpn_client_cnt.sh is half of the Client IP Address range configuration. It is an integer (limited to 2-16 – future). **sra_rad_vpn_client_ip.sh** takes an IP Address as its only argument. This sets the starting point for the range of IP Addresses allocated to VPN Clients. The count above determines how many IP Addresses to use, starting with this one.

Deploy the RAD

To deploy the RAD, send it to the Managed Network site. Upon receipt:

For Tiered Deployment

1. Connect WAN1 port to network with internet access.
2. Connect LAN1 port to Managed network.
3. Power device.

For Flat Deployment

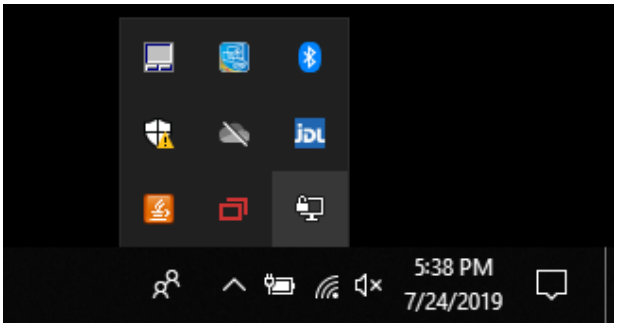
1. Connect WAN1 and LAN1 BOTH to public network.
2. Power Device.

Note: The RAD is not a switch so this will not create a loop in the network.

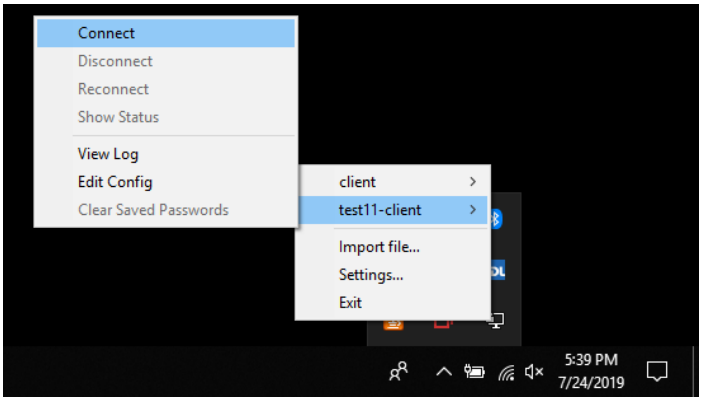
Get and Install OpenVPN Client2.4.7

Note: Only used for VPN configuration, not Port Forwarding. Note that some versions of Windows allow only one active VPN client connection at a time.

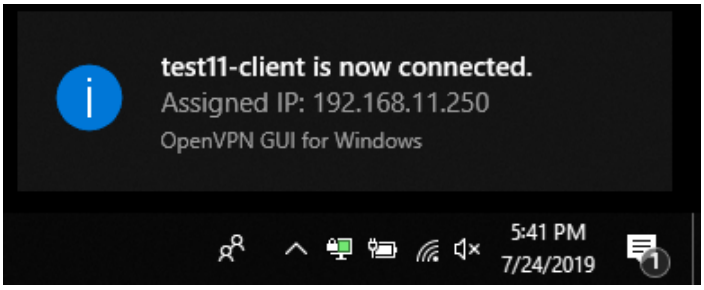
1. Download the correct installer for your operating system from https://openvpn.net/community-downloads/.
2. Save and open the file (e.g., openvpn-install-2.4.7-I607-Win7.exe).
3. Follow the Setup Wizard steps. See the OpenVPN Quick Start Guide.
4. Read the Readme file when done.
5. Find the OpenVPN in the Tray.



6. Right click the OpenVPN icon and select Connect the client.



7. The OpenVPN client is connected.

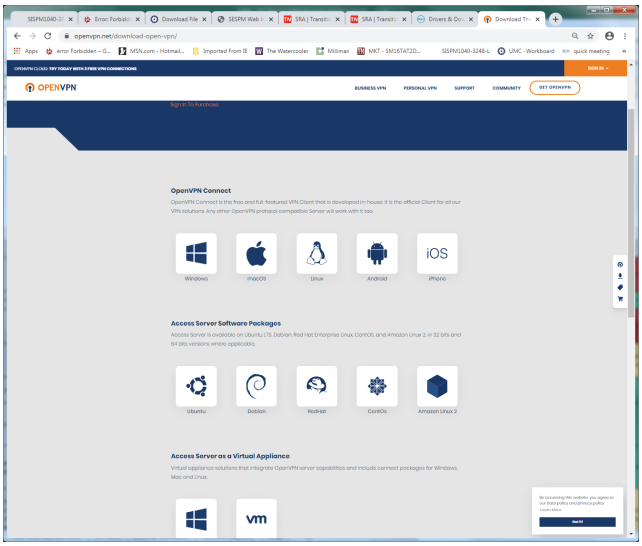


Get and Install OpenVPN Client 3.2.1

Note: Only used for VPN configuration, not Port Forwarding. Note that some versions of Windows allow only one active VPN client connection at a time.

Download and Install OpenVPN 3.2.1.1180

1. Go to https://openvpn.net/download-open-vpn/ . Several options display:

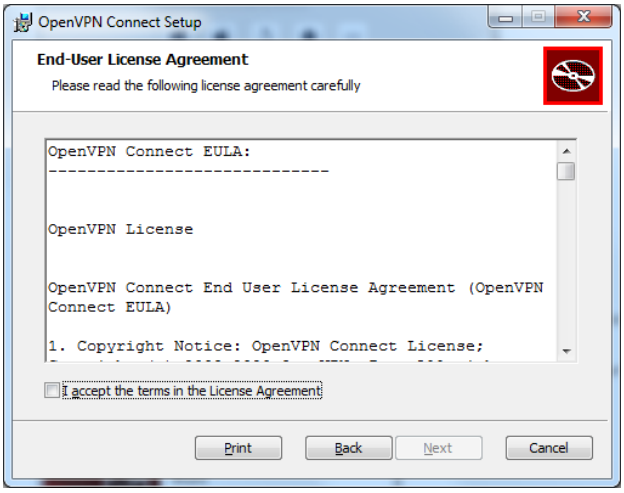


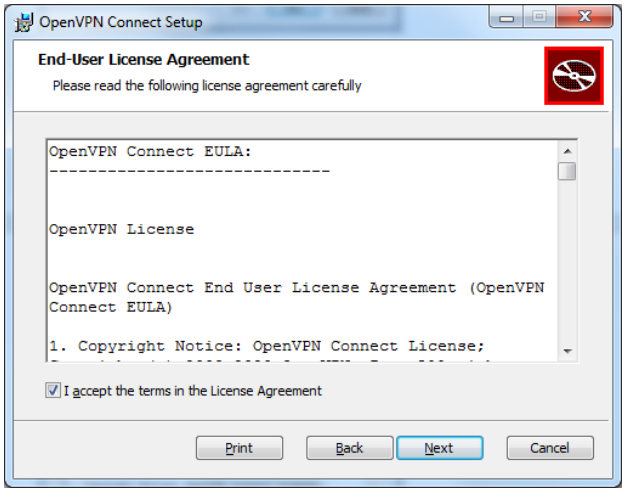
2. Select “OpenVPN Connect”. It states: “OpenVPN Connect is the free and full-featured VPN Client that is developed in-house. It is the official Client for all our VPN solutions. Any other OpenVPN protocol compatible Server will work with it too.”

3. Select Windows. This downloads the file “openvpn-connect-3.2.1.1180_signed” to your PC.

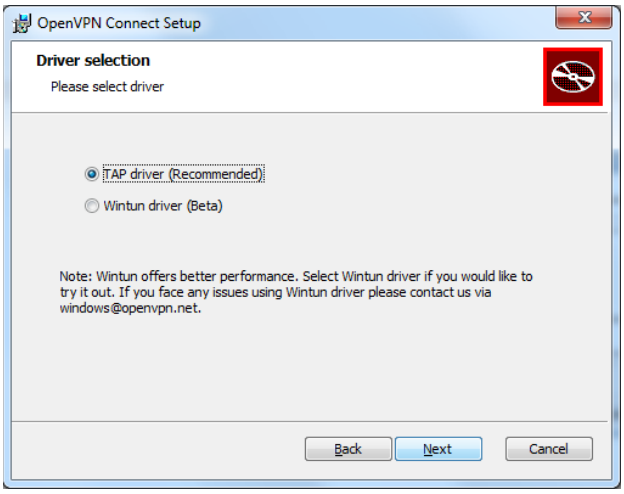
4. Double-click on the file to open the OpenVPN Connect Setup Wizard:

5. Click the Next button to display the License Agreement:

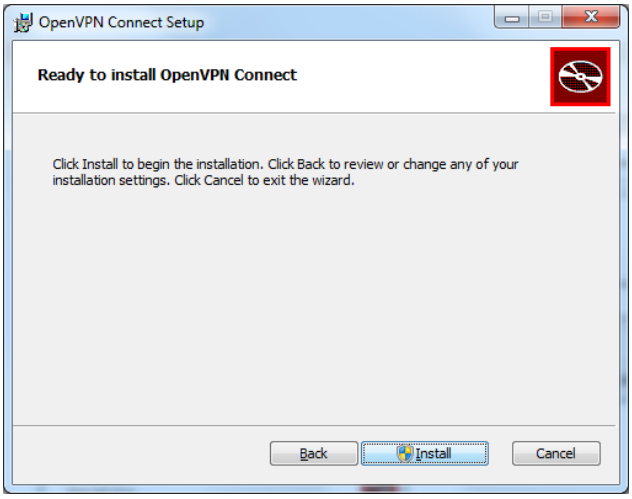




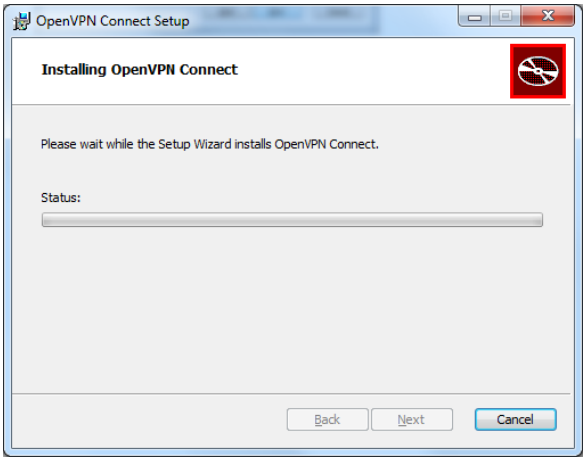
6. Read, Print, and Accept the EULA, then click Next. The Driver Selection displays:

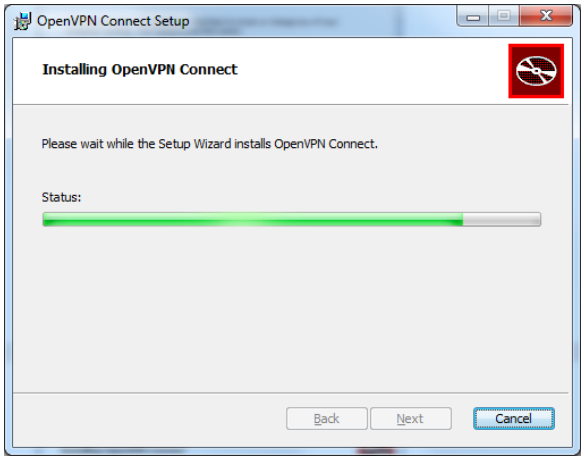


7. Select TAP driver (Recommended) and click Next. The Ready to Install displays:

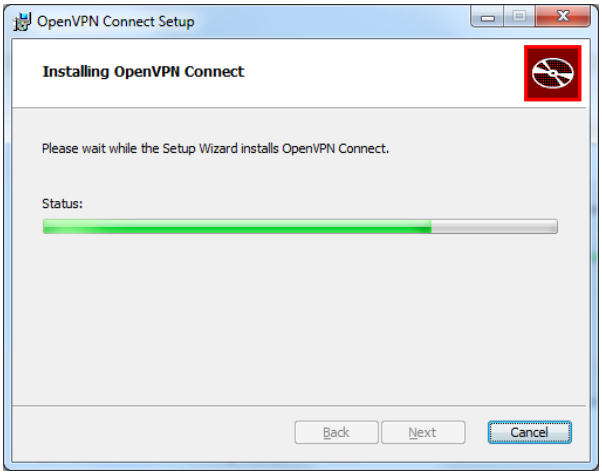


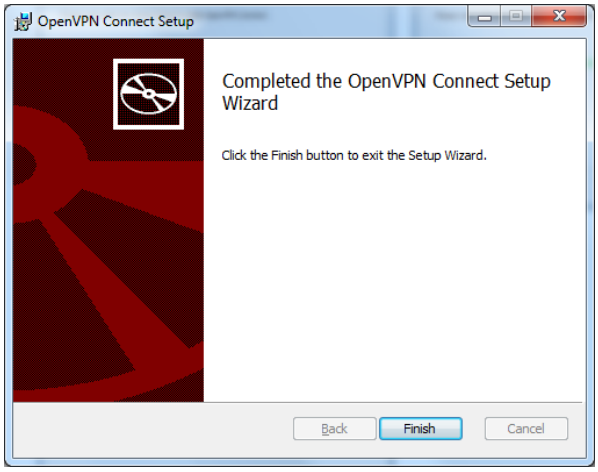
8. Click the Install button. The Installing .. Status displays:





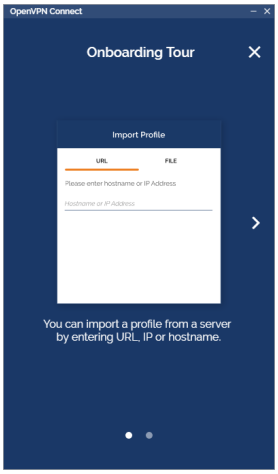
9. If a UAC dialog displays click Yes. If a Windows Security dialog displays click Install. Wait for the Install.





10. When complete click the Finish button.

11. Launch “OpenVPN Connect” (e.g., from the Windows Desktop). The initial OpenVPN Connect page displays:



12. Follow the OpenVPN Connect on-screen instructions.

Connect to Managed Network

Once the VPN is connected, you can connect to devices in the Managed Network as though you were there. The networks are now bridged, and you should have access to your managed devices.

CLI Commands

You can configure the Secure Remote Access solution via the Command Line Interface (CLI). **Note** that there are additional functions in the CLI that are not supported in the Web GUI. The additional functions are noted with an asterisk (*) next to the command description.

Switch Configuration via CLI

The serial port is a male DE-9 connector (commonly called *DB-9*).

1. Use a Null modem cable to connect a terminal or PC/terminal emulator to the switch port to access the CLI.
2. Attach the DE-9 serial port on the switch front panel to the Null modem cable for CLI configuration.
3. Attach the other end of the DE-9 cable to a PC running a terminal emulation program such as HyperTerminal or TeraTerm.
4. At “Com Port Properties” menu, use Serial port settings: Speed: 115200, Parity: None, Data bits: 8, Stop bits: 1, HW Flow Control: No, and SW Flow Control: No as console port settings. Do not use the serial cable to update the firmware. You can use CABLE-SRA-NMC (optional USB to DB9F Serial Null Modem Cable, or supply a female to female DB9 null modem cable (or a female null modem adapter that converts to USB).
5. After powering up the switch for the first time, you can perform the initial switch configuration using the CLI (Command Line Interface).

Login

The command-line interface (CLI) is a text-based interface. You can access the CLI through either a direct serial connection to the device or an SSH session (Default IP address: 192.168.1.10). The default username and password to login are:

Username = admin
Password = admin

After you log in successfully, the prompt displays as “`sramap->`“ or “`srarad->`”. It means you are an administrator and have full privileges for configuring the switch.

CLI Controls

Control	Function
?	Question mark: displays the definition of the command.
_?	Space character question mark: displays the set of sub-commands available.
<tab>	Displays the available sub-commands in tabular format.

Connection Information

Network ports on both MAP and RAD, from left to right are: WAN1 LAN1.

Currently, the extra ports on the MAP are unused (RADs with only 2 ports lack lan2 and prog1.). SRA units are not Ethernet switches; the network ports are individual Ethernet interfaces. There can be one and only one route defined on an SRA unit. A gateway, set by DHCP or added statically with the ip command, must only be set on one interface.

Default Network Configuration:

```
WAN1: DHCP
LAN1: 192.168.1.10/24
```

Default Login:

```
username: admin
password: admin
```

Serial Port – Null Modem:

```
Baud Rate: 115200
Data Bits: 8
Parity: Odd
Stop Bits: 1
Hardware Flow Control: None
Software Flow Control: None
```

SRA Configuration takes place in Config mode:

```
sramap # configure terminal
sramap (config) #
```

To select an interface to configure:

WAN1:

```
sramap (config) # interface WAN1
sramap (config-if-WAN1) #
```

LAN1:

```
sramap (config) # interface LAN1
sramap (config-if-LAN1) #
```

The LAN1 and WAN1 interfaces have the same configuration commands available.

To set a port with DHCP:

```
sramap (config-if-WAN1) # ip address dhcp
```

To set an IP address with gateway:

```
sramap (config-if-WAN1) # ip address 192.168.0.100 netmask 255.255.255.0 gw 192.168.0.1
```

To set an IP address:

```
sramap (config-if-WAN1) # ip address 192.168.0.100 netmask 255.255.255.0
```

Note that disabling a port brings the link down on the port (SRA units are not switches, for now we are stacking functionality). To **disable** a port:

```
sramap (config-if-WAN1) # no ip address
```

Login

Login is the same for both MAP and RAD commands (admin/admin):

```
login as: admin
admin@10.0.4.221's password:
Linux srarad 4.19.0-9-amd64 #1 SMP Debian 4.19.118-2+deb10u1 (2020-06-07) x86_64

The programs included with the Debian GNU/Linux system are free software;
the exact distribution terms for each program are described in the
individual files in /usr/share/doc/*/copyright.

Debian GNU/Linux comes with ABSOLUTELY NO WARRANTY, to the extent
permitted by applicable law.
Last login: Thu Feb 14 10:14:15 2019 from 192.168.93.28
```

Command Modes

MAP and RAD command modes each has sub-commands available. Both modes start up in Exec mode.

MAP Commands

Command Modes: Exec mode, Config mode, WAN 1 mode, and LAN 1 mode.

Command Prompts:

Exec Mode prompt: `sramap #`

Config Mode prompt: `sramap (config) #`

SraMap WAN 1 mode prompt: `sramap (config-if-WAN1) #`

SraMap LAN 1 mode prompt: `sramap (config-if-LAN1) #`

RAD Commands

Command Modes: Exec, Config, Map, and Map Port forward modes.

Command prompts:

Exec Mode prompt: `srarad #`

Config Mode prompt: `srarad (config) #`

RAD Config Map Mode: `srarad (map(10.0.4.220)) #`

RAD MAP Port Forward prompt: `srarad (map-pf(1.2.3.4:3400=>10.0.4.220)) #`

MAP Command Descriptions

MAP Exec Mode Commands

!	Comments
alarm	Alarm commands
backup	Create a backup of current configuration
configure	Enter configuration mode
exit	Exit from the CLI
firmware	Install new firmware
noping	ncurses oping utility to monitor up to 8 hosts
ping	Send messages to network hosts
reboot	Halt and perform a cold restart
reload	Reload a configuration
show	Show live information
traceroute	Print the route packets trace to network host

The MAP Exec mode commands are described below.

Command: **!**
Description: Comments
Mode: MAP Exec Mode
Parameters: Arguments ignored comment text
<cr>
Example:

```
sramap # ! A
sramap #
```

Command: **alarm**

Description: Alarm commands

Mode: MAP Exec Mode

Parameters:

ack	Acknowledge an alarm
clear	Clear (remove) an alarm from the alarms list
history	View the most recent 20 alarm history events
watch	Watch a live view of the most recent alarms
all	Acknowledge all alarms
mapseq	Acknowledge the alarm identified by MAP sequence number
Unsigned integer	MAP sequence number
all	Clear (remove) all alarms
mapseq	Clear (remove) the alarm identified by MAP sequence number
before	View alarm history events that occurred before the specified date
date	View alarm history events that occurred on the specified date
rows	View the most recent alarm history events
since	View alarm history events that occurred on or after the specified date
site	View alarm history events for the specified site name
Date	Date in YYYY-MM-DD format.
Number	Number of rows to show.
String	Site name.
interval	Watch a live view of the most recent alarms
rows	Watch a live view of the most recent alarms
Unsigned integer	Number of seconds between screen updates.
rows	Number of rows to show, integer from 1-60.
Number of table rows to show	Number of rows to show, integer from 1-60.

Example:

```
sramap # alarm history
Showing the 20 most recent alarm history events...

tail: cannot open ‘/var/log/sra_alarm_hist.log’ for reading: No such file or directory
MAP_Seq  Time                      Site                            Device IP        Event
Severity         Ack  RAD_Seq Variables
sramap #
sramap # alarm watch interval 3 rows 9
Showing the 9 most recent active alarms...

MAP_Seq  Time                      Site                            Device IP
      Event                           Severity         Ack  RAD_Seq Variables

sramap # alarm ack mapseq 1
sramap # alarm clear mapseq 1
sramap # alarm clear all
sramap #
```

Messages: *sed: can’t read /usr/local/etc/sra/sra_alarms: No such file or directory*

tail: cannot open ‘/var/log/sra_alarm_hist.log’ for reading: No such file or directory

Command: **backup**

Description: Create a backup of current configuration. It can be restored later using the Config mode “restore” command.

Mode: MAP Exec Mode

Parameters:

scp	Create a backup of current configuration and upload it via scp
url	Create a backup of current configuration and upload it to an URL
String	scp url in format user@host:path/to/file
backup_filename	Optional name (will be appended with .tar.xz) for backup file
port	port for scp
String	Optional filename valid characters are [a-z 0-9 - _] must start and end with letter or number
TCP Port	port for scp (1..65535). SCP runs over TCP port 22 by default.
String	URL in format proto://host/upload/path if uploading to a directory, URL must end with /
<cr>	

Example:

```
sramap # backup scp url backup_filename aaaabbbb123 port 22
sramap #
```

Command: **configure**

Description: Enter Configuration mode; see the Config Mode Commands section for the command set.

Mode: MAP Exec Mode

Parameters:

terminal	Configure from the terminal

Example:

```
sramap # configure terminal
sramap (config) #
```

Command: **exit**

Description: In Exec mode exit from the CLI.

Mode: MAP Exec Mode

Parameters: None

Example:

```
sramap # exit <cr>
```

Command: **firmware**
Description: Install new firmware
Mode: MAP Exec Mode
Parameters:

update	Install new firmware
type	Install new firmware
scp	Install file retrieval via scp
url	Install file retrieval via URL
usb	Install file from USB stick (only 1 USB stick should be inserted)
String	scp url in format user@host:path/to/file
port	port for scp
Unsigned integer	port for scp
String	url in format proto://host/path/to/file proto can be http, tftp, ftp
String	Name of file in top-level directory on USB stick
partition_number	Number of partition on USB Stick with the install file
partition_number	Number of partition on USB Stick with the install file

Example 1: FW Upgrade via URL:

```
sramap # firmware update type url tftp://192.168.101.3/sra_sec-0.9.0.tar.xz
  % Total    % Received % Xferd  Average Speed   Time        Time  Current
                                 Dload  Upload   Total   Spent    Left  Speed
100 36.8M  100 36.8M    0     0  1918k      0  0:00:19  0:00:19 --:--:-- 1882k
100 36.8M  100 36.8M    0     0  1917k      0  0:00:19  0:00:19 --:--:-- 1917k
>>> Firmware download successful.  Initiating upgrade...
sramap #
```

Example 2: FW Upgrade via USB:

```
sramap # firmware update type usb sra_sec-0.9.2.tar.xz
mkdir: cannot create directory ‘/mnt/usb’: File exists
>>> Found sra_sec-0.9.2.tar.xz.  Initiating upgrade...
>>> Successfully unmounted USB stick, USB stick can be safely removed now
sramap # show firmware version
Version               0.9.2
Build ID              dev_branch
Build Date            2020-06-11 10:32:35-05:00
Build Host            20imezo
sramap #
```

FW Upgrade Messages:

bad port “port”

**** Error: scp failed error code 255*

Warning: Transient problem: timeout Will retry in 1 seconds. 3 retries left.

**** Error: device not found, please make sure USB Stick in in unit and that the correct partition was specified*

Command: **noping**

Description: The ncurses oping (noping) command can be used to monitor up to 8 hosts. The oping command uses ICMP ECHO_REQUEST packets to measure a host's reachability and the network latency. In contrast to the original ping utility, oping can send ICMP packets to multiple hosts in parallel and wait for all ECHO_RESPONSE packets to arrive.

Mode: MAP Exec Mode

Parameters: A.B.C.D IP Address to ping
<cr>

Example:

```
sramap # noping 2.3.4.5 4.4.4.44 10.0.4.221 10.0.4.220

--- 2.3.4.5 ping statistics ---
20 packets transmitted, 0 received, 100.00% packet loss, time 0.0ms

--- 4.4.4.44 ping statistics ---
20 packets transmitted, 0 received, 100.00% packet loss, time 0.0ms

--- 10.0.4.221 ping statistics ---
20 packets transmitted, 20 received, 0.00% packet loss, time 3.3ms
RTT[ms]: min = 0, median = 0, p(95) = 0, max = 0

--- 10.0.4.220 ping statistics ---
20 packets transmitted, 20 received, 0.00% packet loss, time 1.5ms
RTT[ms]: min = 0, median = 0, p(95) = 0, max = 0
sramap #
```

Command: **ping**

Description: Send messages to network hosts

Mode: MAP Exec Mode

Parameters:

ip	Send ICMP Ipv4 messages to network hosts (default)	
ipv6	Send ICMP Ipv6 messages to network hosts	
arp	Send ARP requests to a I host	
String	Hostname or IP-address to ping	
source	Source IP-address (ip) or interface (ip and arp)	
repeat	Requests to send count, default is 5	
resolve	Resolve names	
broadcast	Ping broadcast address	
size	Packet size	
interval	The time interval between packets, default is 1	
flood	Flood ping	
String	Source IP-address (ip) or interface name (ip and arp)	
Unsigned integer	Requests count	
Unsigned integer	Number of data bytes to send	
String	Interval between packets	
duplicate-detect	Duplicate address detection mode	
<cr>		

Example 1: Ping with Ipv4:

```
sramap # ping ip 8.8.8.8
PING 8.8.8.8 (8.8.8.8) 56(84) bytes of data.
64 bytes from 8.8.8.8: icmp_seq=1 ttl=52 time=21.8 ms
64 bytes from 8.8.8.8: icmp_seq=2 ttl=52 time=20.9 ms
64 bytes from 8.8.8.8: icmp_seq=3 ttl=52 time=22.3 ms
64 bytes from 8.8.8.8: icmp_seq=4 ttl=52 time=20.6 ms
64 bytes from 8.8.8.8: icmp_seq=5 ttl=52 time=23.9 ms

--- 8.8.8.8 ping statistics ---
5 packets transmitted, 5 received, 0% packet loss, time 11ms
rtt min/avg/max/mdev = 20.594/21.884/23.892/1.186 ms
sramap #
```

Example 2: Ping with Ipv6:

```
sramap # ping ipv6 fe80::3c6a:2137:cc22:f66b
PING fe80::3c6a:2137:cc22:f66b(fe80::3c6a:2137:cc22:f66b) 56 data bytes
64 bytes from fe80::3c6a:2137:cc22:f66b%LAN1: icmp_seq=1 ttl=64 time=0.447 ms
64 bytes from fe80::3c6a:2137:cc22:f66b%LAN1: icmp_seq=2 ttl=64 time=0.288 ms
64 bytes from fe80::3c6a:2137:cc22:f66b%LAN1: icmp_seq=3 ttl=64 time=0.334 ms
64 bytes from fe80::3c6a:2137:cc22:f66b%LAN1: icmp_seq=4 ttl=64 time=0.314 ms
64 bytes from fe80::3c6a:2137:cc22:f66b%LAN1: icmp_seq=5 ttl=64 time=0.311 ms

--- fe80::3c6a:2137:cc22:f66b ping statistics ---
5 packets transmitted, 5 received, 0% packet loss, time 98ms
rtt min/avg/max/mdev = 0.288/0.338/0.447/0.060 ms
sramap #
```

Example 3: Ping with ARP:

```
sramap # ping arp 192.168.101.1
arping: libnet_init(LIBNET_LINK, <null>): libnet_open_link(): UID/EUID 0 or capability CAP_NET_RAW required
arping: you may need to run as root
sramap #
```

Command: **reboot**
Description: Halt and perform a cold restart
Mode: MAP Exec Mode
Parameters: None
Example:

```
sramap # reboot
Connection to 192.168.101.2 closed by remote host.
Connection to 192.168.101.2 closed.
PuTTY (inactive)
```

Command: **reload**
Description: Reload default configuration
Mode: MAP Exec Mode
Parameters:

defaults	Reload the default configuration
keep_ip	Reload the default configuration, maintaining current IP address settings for all interfaces

Example:

```
sramap # reload defaults keep_ip
sramap # reload defaults
rm: cannot remove ‘/opt/etc/sra/map/map.conf’: No such file or directory
sramap #
```

Command: **show**
Description: Show live information; see MAP Exec Mode Show Commands on page 77.
Mode: MAP Exec Mode
Parameters:

alarms	Show list of all alarms
clock	Show current time
dns	Display current DNS settings. Note that current settings may have been set via DHCP and not match configured settings.
firmware	Display firmware information
interface	Ethernet Interface status
ip	IP information
map	SRA MAP configuration
rads	Connected RAD Status
system	Show system information
timezone	Show current set timezone
uprecords	Show uptime records and current uptime
uptime	Show current uptime
version	Show firmware version

Command: **traceroute**

Description: Print the route packets trace to network host

Mode: MAP Exec Mode

Parameters:

ip	Ipv4
ipv6	Ipv6
String	Hostname or IP-address to trace the route
resolve	Resolve names
source	with Source IP-address
interface	Source interface
String	IP-address
String	Interface name

Example 1: Traceroute with Ipv4:

```
sramap # traceroute ip 10.0.4.221
traceroute to 10.0.4.221 (10.0.4.221), 30 hops max, 60 byte packets
 1  10.0.4.221  0.312 ms  0.324 ms  0.209 ms
sramap # traceroute ip 1.2.3.4
traceroute to 1.2.3.4 (1.2.3.4), 30 hops max, 60 byte packets
 1  10.0.4.1  0.217 ms  0.178 ms  0.145 ms
 2  74.202.111.126  0.246 ms  0.235 ms  0.293 ms
 3  * 50.236.7.109  1.251 ms *
 4  68.86.232.237  0.600 ms *  0.573 ms
 5  * * 68.86.233.9  2.111 ms
 6  * * *
 7  * * *
 8  * * *
 9  * * *
10  * * *
11  *^Csramap #
```

Example 2: Traceroute with Ipv6:

```

```

Example 3: Traceroute with Ipv4 and Resolve names and Source IP-address:

```
sramap # traceroute ip 10.0.4.221 source 10.0.4.220
traceroute to 10.0.4.221 (10.0.4.221), 30 hops max, 60 byte packets
 1  10.0.4.221  0.230 ms  0.221 ms  0.190 ms
sramap # traceroute ip 10.0.4.221 source 10.0.4.220 resolve interface WAN1
traceroute to 10.0.4.221 (10.0.4.221), 30 hops max, 60 byte packets
 1  * * *
 2  * * *
 3  * * *
 4  * * *
 5  * * *
 6  * * *
 7  * * *
 8  * * *
 9  * * *
10  * * *
11  * *^Csramap #
sramap # traceroute 10.0.4.221 source 1.2.3.4
traceroute to 10.0.4.221 (10.0.4.221), 30 hops max, 60 byte packets
bind: Cannot assign requested address
sramap #
```

Messages:

setsockopt SO_BINDTODEVICE: No such device

Xxxxx: Name or service not known

Cannot handle “host” cmdline arg `BoBb’ on position 1 (argc 2)

connect: Network is unreachable

MAP Exec Mode Show Commands

alarms	Show list of all alarms
clock	Show current time
dns	Display current DNS settings. Note that current settings may have been set via DHCP and not match configured settings.
firmware	Display firmware information
interface	Ethernet Interface status
ip	IP information
map	SRA MAP configuration
rads	Connected RAD Status
system	Show system information
timezone	Show current set timezone
uprecords	Show uptime records and current uptime
uptime	Show current uptime
version	Show firmware version

Command: **alarms**
Description: Show list of all alarms
Mode: MAP Exec Mode Show
Parameters:

before	View active alarms that occurred before the specified date
date	View active alarms that occurred on the specified date
rows	Show list of the most recent alarms
since	View active alarms that occurred on or after the specified date
site	View active alarms for the specified site name
Date	Date in YYYY-MM-DD format.
Rows	Number of table rows to show, integer from 1-60.
String	Site name.
<cr>	

Example:

```
sramap # show alarms date 2020-06-25
Showing active alarms that occurred on 2020-06-25...

MAP_Seq  Time                      Site                            Device IP        Event
Severity         Ack  RAD_Seq Variables
sramap #
```

An error message displays if you enter 'show alarms' but alarms have not been enabled.

Command: **clock**
Description: Show current time
Mode: MAP Exec Mode Show
Parameters: None
Example:

```
sramap # show clock
2020-08-31 15:55:40+00:00
sramap #
```

Command: **dns**
Description: Display current DNS settings. Note that current settings may have been set via DHCP and not match configured settings.
Mode: MAP Exec Mode Show
Parameters:

domain	Display configured domain
nameserver	Display configured nameserver(s)
search	Display configured search domain(s)

Example:

```
sramap # show dns
nameserver 8.8.8.8
sramap # show dns domain
                                    domain  not set
sramap # show dns nameserver
                                nameserver  8.8.8.8
sramap # show dns search
                           search domain(s)  not set
sramap # show dns
search BobB
nameserver 8.8.8.8
nameserver 1.2.3.4
```

Command: **firmware**
Description: Display firmware information
Mode: MAP Exec Mode Show
Parameters:

update	Display most recent firmware update status
version	Show current firmware version
install	Display most recent firmware installation status
log	Display firmware installation log
status	Display most recent firmware installation status

Example 1:

```
sramap # show firmware version
SW Version            0.9.94
SW Build ID           6570c3c4b611a925f06c9b270bbdb798c90ad695
SW Build Date         2020-09-09 09:12:55-05:00
SW Build Host         27imezo
sramap # show firmware install status
No installs since boot
sramap #
```

Example 2:

```
sramap # show firmware update log
   Install inititated at:  2020-08-31 14:15:15+00:00
    Install completed at:  2020-08-31 14:15:41+00:00
       Install file name:  sra_sec-0.9.28.tar.xz
  Install file sha256sum:  a44fe40c699fe91aec221f999ee4bf00ede54a8f6cbcf6d09f24d6620fc03d07
          Install status:  Installation of sra_sec-0.9.28.tar.xz complete

   Install inititated at:  2020-09-02 19:26:48+00:00
    Install completed at:  2020-09-02 19:27:15+00:00
       Install file name:  sra_sec-0.9.29.tar.xz
```

```
  Install file sha256sum:  546cc3060b406cc06d98adfeea8b6d2e1e3b46a9e397c0c46af623bd173ee494
          Install status:  Installation of sra_sec-0.9.29.tar.xz complete

   Install inititated at:  2020-09-03 16:29:59+00:00
    Install completed at:  2020-09-03 16:30:26+00:00
       Install file name:  sra_sec-0.9.30.tar.xz
  Install file sha256sum:  11784eab9f3981d6c069bdb2685c8f50be8123a99f758229931ea6f33aa162d3
          Install status:  Installation of sra_sec-0.9.30.tar.xz complete

   Install inititated at:  2020-09-03 21:06:20+00:00
    Install completed at:  2020-09-03 21:06:46+00:00
       Install file name:  sra_sec-0.9.31.tar.xz
  Install file sha256sum:  40750bee225fe8722ecb44473955424f423e40df4c438f49360b82accbd9c8f8
          Install status:  Installation of sra_sec-0.9.31.tar.xz complete

   Install inititated at:  2020-09-09 04:55:50+00:00
    Install completed at:  2020-09-09 04:56:19+00:00
       Install file name:  sra_sec.tar.xz
  Install file sha256sum:  2cb8d6cd8291d3f05652afa567c2b4d881931d4e58f05f33d4b7a4ea9d82cee6
          Install status:  Installation of sra_sec.tar.xz complete

   Install inititated at:  2020-09-09 06:01:13+00:00
    Install completed at:  2020-09-09 06:01:41+00:00
       Install file name:  sra_sec.tar.xz
  Install file sha256sum:  8df77d5999043b6608f935c61379702545cbffb59a6eb07db6c9e026c82df8de
          Install status:  Installation of sra_sec.tar.xz complete

   Install inititated at:  2020-09-09 18:55:06+00:00
    Install completed at:  2020-09-09 18:55:33+00:00
       Install file name:  sra_sec-0.9.32.tar.xz
  Install file sha256sum:  bfbd7a04647abb23839800b27c31b662e3bbbeb6752c0d885932b35e1cb8bc66
          Install status:  Installation of sra_sec-0.9.32.tar.xz complete
sramap #
```

Command: **interface**
Description: Show Ethernet Interface status/statistics
Mode: MAP Exec Mode Show
Parameters:

	Interface Name	Interface to show information for (WAN1/LAN1)
	status	Display current interface status
	statistics	Display cumulative interface statistics (status/statistics)

Example:

```
sramap # show interface WAN1 status
Settings for WAN1:
        Supported ports: [ TP ]
        Supported link modes:   10baseT/Half 10baseT/Full
                                100baseT/Half 100baseT/Full
                                1000baseT/Full
        Supported pause frame use: Symmetric
        Supports auto-negotiation: Yes
        Supported FEC modes: Not reported
        Advertised link modes:  10baseT/Half 10baseT/Full
                                100baseT/Half 100baseT/Full
                                1000baseT/Full
        Advertised pause frame use: Symmetric
        Advertised auto-negotiation: Yes
        Advertised FEC modes: Not reported
        Speed: Unknown!
        Duplex: Unknown! (255)
        Port: Twisted Pair
        PHYAD: 1
        Transceiver: internal
        Auto-negotiation: on
        MDI-X: off (auto)
        Supports Wake-on: pumbg
        Wake-on: g
        Current message level: 0x00000007 (7)
                               drv probe link
        Link detected: no
sramap #
```

```
sramap # show interface LAN1 statistics
NIC statistics:
     rx_packets: 471653
     tx_packets: 5372
     rx_bytes: 43122891
     tx_bytes: 1840081
     rx_broadcast: 466444
     tx_broadcast: 18
     rx_multicast: 359
     tx_multicast: 18
     multicast: 359
     collisions: 0
/////////////////////////////////////////////
     tx_heartbeat_errors: 0
     tx_queue_0_packets: 4275
     tx_queue_0_bytes: 1500742
     tx_queue_0_restart: 0
     tx_queue_1_packets: 1097
     tx_queue_1_bytes: 292069
```

```
     tx_queue_1_restart: 0
     rx_queue_0_packets: 471653
     rx_queue_0_bytes: 41236279
     rx_queue_0_drops: 0
     rx_queue_0_csum_err: 0
     rx_queue_0_alloc_failed: 0
     rx_queue_1_packets: 0
     rx_queue_1_bytes: 0
     rx_queue_1_drops: 0
     rx_queue_1_csum_err: 0
     rx_queue_1_alloc_failed: 0
sramap #
```

Command: **ip**
Description: Show IP interface and route information
Mode: MAP Exec Mode Show
Parameters:

	interface	IP interface status
	route	IP routing table
	brief	IP interface status and configuration

Example:

```
sramap # show ip interface brief
Interface        Address               Method    Status
---------------  --------------------  --------  --------
WAN1             --                    Off       DOWN
LAN1             10.0.4.220/24         Manual    UP
sramap # show ip route
default via 10.0.4.1 dev LAN1 onlink
10.0.4.0/24 dev LAN1 proto kernel scope link src 10.0.4.220
sramap #

sramap # show ip interface brief
Interface        Address               Method    Status
---------------  --------------------  --------  --------
WAN1             10.0.4.221/24         Manual    DOWN
LAN1             10.0.4.220/24         Manual    UP
sramap # show ip route
default via 10.0.4.1 dev LAN1 onlink
10.0.4.0/24 dev LAN1 proto kernel scope link src 10.0.4.220
10.0.4.0/24 dev WAN1 proto kernel scope link src 10.0.4.221 linkdown
sramap #
```

Command: **map**
Description: Display SRA MAP configuration
Mode: MAP Exec Mode Show
Parameters: None
Example:

```
sramap # show map
MAP Internet Facing IP  MAP Internet Facing Port  MAP ID
----------------------  ------------------------  ------
10.0.4.220              1111                      1
sramap #
sramap # sramap # show map
MAP not configured.  Please create MAP with ‘map add <map_ip>’
sramap #
```

Command: **rads**

Description: Display connected RAD Status; see below.
Green in GUI matches CLI ←→
Yellow in GUI matches CLI <-~~->
Red in GUI matches CLI <-XX->

Mode: MAP Exec Mode Show

Parameters: None

Example:

```
sramap # show rads
RAD ID                          Status     Description  Forwarded IP:Port      URL/Port Information/VPN
------------------------------- ------ _______________  _________________      ________________________
1-Rad                           ←→
                                  1-Rad ssh Management  127.0.0.1:22           ssh -p 15000 10.0.4.220
                                 1-Rad http Management  127.0.0.1:80           http://10.0.4.220:15001
sramap #

sramap # show rads
RAD ID                          Status     Description  Forwarded IP:Port      URL/Port Information/VPN
------------------------------- ------ _______________  _________________      ________________________
1-Rad                           <-XX->
                                  1-Rad ssh Management  127.0.0.1:22           ssh -p 15000 10.0.4.220
                                 1-Rad http Management  127.0.0.1:80           http://10.0.4.220:15001
sramap #
```

Status: In firmware v0.9.x the MAP no longer has a 'sitelist' command; the connection status is now reported by the 'show rads' command when run from the MAP, and 'show maps' command when run from the RAD.

The "**←→**" is equivalent to the green dot in the GUI, meaning the RAD and MAP are currently successfully communicating with each other.

The "**<-xx->**" is equivalent to the red dot in the GUI, meaning the communication between the RAD and MAP is currently broken.

The status "**<-~~->**" is equivalent to a yellow status in the GUI.

The MAP and RAD communicate at 30s intervals, and the **~~** symbols mean one of the two last attempted communications passed and the other failed. And if two or more consecutive communication attempts fail, then the status goes to red, and if 2 or more consecutive communication attempts work, the status goes green.
Note: currently there is a lag of up to 2 minutes between when a given condition begins to occur and when the MAP/RAD correctly indicate that condition via this status.

Description: e.g., ssh Management or http Management.

Forwarded IP:Port : The forwarded IP address and Port number (e.g., 127.0.0.1:22).

URL/Port Information/VPN: to reach that RAD-side device from the MAP, use the URL listed.

Command: **system**
Description: Show system information
Mode: MAP Exec Mode Show
Parameters: info Show system information
Example:

```
sramap # show system info
Memory                Total(3929MB) Free(3635MB) Active(120MB)
CPU                   User(0.00%) System(0.50%) Idle(99.75%)
CPU Temperature       67.750C
Serial #              1418296
MAC Address WAN1      00:0d:b9:56:91:e0
MAC Address LAN1      00:0d:b9:56:91:e1
System Date           2020-10-13 16:16:16+00:00
System Uptime         1 hour, 11 minutes
sramap #
```

Command: **timezone**
Description: Show current set timezone
Mode: MAP Exec Mode Show
Parameters: None
Example:

```
sramap # show timezone
UTC
sramap # show timezone
America
sramap #
```

Command: **uprecords**
Description: Show uptime records and current uptime
Mode: MAP Exec Mode Show
Parameters: None
Example:

```
sramap # show uprecords
     #               Uptime | System                                          Boot up
----------------------------+-------------------------------------------------
     1     9 days, 16:25:57 | Linux 4.19.0-9-amd64      Mon Aug  3 17:36:38 2020
     2     7 days, 17:43:48 | Linux 4.19.0-9-amd64      Thu Jul  2 22:35:45 2020
     3     6 days, 22:49:31 | Linux 4.19.0-9-amd64      Tue Jul 14 19:36:37 2020
     4     6 days, 18:49:30 | Linux 4.19.0-9-amd64      Mon Aug 24 15:41:17 2020
     5     5 days, 18:03:48 | Linux 4.19.0-9-amd64      Tue Aug 18 21:35:38 2020
     6     5 days, 08:10:22 | Linux 4.19.0-9-amd64      Fri Jul 24 13:27:04 2020
     7     5 days, 07:49:08 | Linux 4.19.0-9-amd64      Thu Sep  3 21:07:14 2020
     8     5 days, 00:27:21 | Linux 4.19.0-9-amd64      Thu Aug 13 21:01:12 2020
     9     4 days, 18:43:12 | Linux 4.19.0-9-amd64      Fri Jun 26 23:05:51 2020
    10     4 days, 18:34:58 | Linux 4.19.0-9-amd64      Wed Jul 29 21:39:19 2020
----------------------------+-------------------------------------------------
->  24     0 days, 03:02:53 | Linux 4.19.0-9-amd64      Wed Sep  9 18:56:01 2020
----------------------------+-------------------------------------------------
1up in     0 days, 00:02:15 | at                        Wed Sep  9 22:01:09 2020
t10 in     4 days, 15:32:06 | at                        Mon Sep 14 13:31:00 2020
no1 in     9 days, 13:23:05 | at                        Sat Sep 19 11:21:59 2020
    up    75 days, 21:16:49 | since                     Thu Jun 25 18:00:59 2020
  down     0 days, 06:41:06 | since                     Thu Jun 25 18:00:59 2020
   %up               99.634 | since                     Thu Jun 25 18:00:59 2020
sramap #
```

Command: **uptime**
Description: Show current uptime
Mode: MAP Exec Mode Show
Parameters: None
Example:

```
sramap # show uptime
 17:39:15 up  4:38,  1 user,  load average: 0.00, 0.00, 0.00
sramap #
sramap # show uptime
 23:26:04 up 6 days, 50 min,  1 user,  load average: 0.13, 0.03, 0.01
sramap #
```

Command: **version**
Description: Show firmware version
Mode: MAP Exec Mode Show
Parameters: None
Example:

```
sramap # show version
SW Version            1.0.3
SW Build ID           f80e8d13d6c5688c72f41a96aeee5eac355c7a76
SW Build Date         2021-04-03 09:56:29-05:00
SW Build Host         35imezo
sramap #
```

MAP Config Mode Commands

From Exec mode, use the configure terminal command to enter Config mode:

```
sramap # configure terminal
sramap (config) #
```

MAP Config Mode Commands

!	Comments
dns	DNS settings
do	To run exec commands in config mode
exit	Exit from configure mode
hostname	Set system's network name
interface	Ethernet interface configuration
map	MAP Configuration Commands
no	Negate a command or set its defaults
restore	Restore a backed-up configuration
show	Display Information
site_alarms	Enable SNMP Trap Forwarding
timezone	Configure timezone
user	User configuration commands

Command: **!**
Description: Comments
Mode: MAP Exec Config Mode
Parameters: Arguments ignored comment text
<cr>
Example:

```
sramap (config) # ! ssssssss text
sramap (config) #
```

Command: **dns**
Description: Set DNS parameters
Mode: MAP Exec Config Mode
Parameters:

domain	Set domain
nameserver	Add nameserver
search	Set search domain(s)
String	domain
A.B.C.D	IP address of nameserver
String	search domain(s) in a comma separated list (no spaces)

Example:

```
sramap (config) # dns domain BobB
sramap (config) # dns nameserver 1.2.3.4
sramap (config) # dns search BobB
sramap (config) # dns search BobB
sramap (config) #
```

Command: **do**

Description: To run Exec mode commands in Config mode

Mode: MAP Exec Config Mode

Parameters:

alarm	Alarm commands
backup	Create a backup of current configuration
configure	Enter configuration mode
firmware	Install new firmware
no	Negate or restore defaults
noping	ncurses oping utility to monitor up to 8 hosts
ping	Send messages to network hosts
reboot	Halt and perform a cold restart
reload	Reload a configuration
defaults	Reload the default configuration
keep_ip	Reload the default configuration, maintaining current IP address settings for all interfaces
show	Show live information
traceroute	Print the route packets trace to network host
ack	Acknowledge an alarm
clear	Clear (remove) an alarm from the alarms list
history	View the most recent 20 alarm history events
watch	Watch a live view of the most recent alarms
all	Acknowledge all alarms
mapseq	Acknowledge the alarm identified by MAP sequence number
Unsigned integer	MAP sequence number
update	Install new firmware
type	Install new firmware via type
scp	Install file retrieval via scp
url	Install file retrieval via URL
usb	Install file from USB stick (only 1 USB stick should be inserted)
String	scp url in format user@host:path/to/file
String	url in format proto://host/path/to/file proto can be http, tftp, ftp
String	Name of file in top-level directory on USB stick
partition_number	Number of partition on USB Stick with the install file
A.B.C.D	IP Address to ping
alarms	Show list of all alarms
clock	Show current time
firmware	Display firmware information
interface	Ethernet Interface status
ip	IP information
map	SRA MAP configuration
rads	Connected RAD Status
system	Show system information
uprecords	Show uptime records and current uptime

uptime	Show current uptime
version	Show firmware version
before	View active alarms that occurred before the specified date
date	View active alarms that occurred on the specified date
rows	Show list of the most recent alarms
since	View active alarms that occurred on or after the specified date
site	View active alarms for the specified site name
Date	Date in YYYY-MM-DD format.
Number	Number of rows to show, integer from 1-60.
String	Site name.
install	Display most recent firmware installation status
version	Show firmware version
Interface	Name Interface to show information for (WAN1/LAN1)
status	Display current interface status
statistics	Display cumulative interface statistics (status/statistics)
ip	Ipv4 traceroute
ipv6	Ipv6 traceroute
String	Hostname or IP-address to trace the route
resolve	Resolve names
source	Source IP-address
interface	Source interface
String	IP-address
<cr>	

Example:

```
sramap (config) # do alarm ack mapseq 1
sramap (config) # do firmware update type usb upme.img
sramap (config) # do ping 1.2.3.4
Executing command: ping -n -I 1 -c 5 1.2.3.4
PING 1.2.3.4 (1.2.3.4) 56(84) bytes of data.

--- 1.2.3.4 ping statistics ---
5 packets transmitted, 0 received, 100% packet loss, time 80ms
sramap (config) # do show clock
2020-06-25 18:13:34-05:00
sramap (config) # do show firmware version
Version               0.9.18
Build ID              d350b9523de5a70ea687255b294b56e0d57f427b
Build Date            2020-07-28 03:21:17-05:00
Build Host            sra
sramap (config) # do traceroute ip BobB resolve source 1.3.5.7
BobB: Name or service not known
Cannot handle “host” cmdline arg `BobB’ on position 1 (argc 3)
sramap (config) #
sramap (config) # do reboot

sramap (config) #
```

Command: **exit**
Description: Exit from Config mode to Exec mode
Mode: MAP Exec Config Mode
Parameters: None
Example:

```
sramap (config) # exit
sramap #
```

Command: **hostname**
Description: Set system's network name
Mode: MAP Exec Config Mode
Parameters: String This system's network name – any character, may be a letter; first character may not be a number, interior –'s are allowed.
Example:

```
sramap (config) # hostname abc12345
abc12345 (config) #
```

Command: **interface**
Description: Enter Ethernet interface configuration mode. **Note**: The MAP's WAN1 cannot be on the same subnet as LAN1, but the RAD's WAN1 can be on the same subnet as the RAD's LAN1.
Mode: MAP Exec Config Mode
Parameters: Interface Name Ethernet interface (WAN1/LAN1)
Example:

```
Mstr26 (config) # interface LAN1
Mstr26 (config-if-LAN1) # exit
Mstr26 (config) # interface WAN1
Mstr26 (config-if-WAN1) # ?
  !          Comments
  exit       Exit from interface configuration mode
  ip         Interface Internet Protocol config commands
  no         Negate a command or set its defaults
  show       Ethernet Interface Configuration

Mstr26 (config-if-WAN1) #

sramap (config) # interface LAN1
sramap (config-if-LAN1) # ?
  !     Comments
  exit  Exit from interface configuration mode
  ip    Interface Internet Protocol config commands
  no    Negate a command or set its defaults

sramap (config-if-LAN1) # ip address ?
  dhcp     Set interface to use DHCP
  A.B.C.D  IP Address

sramap (config-if-LAN1) # exit
sramap (config) #
```

Command: **map**
Description: MAP Configuration mode commands
Mode: MAP Exec Config Mode
Parameters:

	ext_ip	Configure MAP Internet facing IP (External IP) Address. If already set, changing this will affect all connected RADs.
	ext_port	Configure MAP External Port – please see manual before setting this.
	id	Set MAP ID
	A.B.C.D	Internet facing IP (External IP) Address of MAP
	External Port	MAP External Port – valid values are 1024-9999 MAP External Port
	String	MAP ID – a text string identifying this MAP

Example:

```
sramap (config) # map ext_ip 1.2.3.4
sramap (config) # map id MAP-4
sramap (config) # map ext_port 3499
sramap (config) # do show map
MAP IP           MAP External Port  MAP ID
---------------  -----------------  ------
1.2.3.4          3499               MAP-4
sramap (config) #

sramap (config) # map id 4444
mv: replace ‘/opt/etc/sra/map/map.conf’, overriding mode 0664 (rw-rw-r--)?
```

Messages: *MAP External IP Address needs to be set before ID can be set, please run ‘map ext_ip’ first*

Command: **no**
Description: Negate a command or set its defaults
Mode: MAP Exec Config Mode
Parameters:

	dns	Clear DNS settings
	hostname	Set default system network name
	map	Negate a command or set its defaults
	site_alarms	Disable SNMP Trap Forwarding
	timezone	Clear timezone
	ext_ip	Remove MAP Configuration; a MAP is defined by its Internet facing (External IP) Address; removing it will remove all MAP configurations.
	ext_port	Reset MAP External Port to 443
	id	Remove MAP ID
	domain	Remove configured domain
	nameserver	Remove configured nameservers
	search	Remove configured search domain

Example:

```
Mstr26 (config) # no hostname
sramap (config) # no map ext_ip
sramap (config) # no map ext_port
sramap (config) # no dns search
sramap (config) # no timezone
sramap (config) #
```

Command: **restore**

Description: Restore a backed-up configuration file.

Mode: MAP Config Mode

Parameters:

	scp	Restore a configuration downloaded via scp
	url	Restore a configuration from a URL (ftp, tftp, or http)
	String	url in format proto://host/path/to/file proto can be http, tftp, ftp
	String	scp url in format user@host:path/to/file
	keep_ip	Do not modify current network settings
	port	port for scp
	TCP Port	port for scp (1..65535)

Example:

```
sramap (config) # restore url http keep_ip
sramap (config) # restore scp jkllp port 22 keep_ip
Command args: (jkllp 22 keep_ip)
cp: cannot stat ‘jkllp’: No such file or directory
*** Error: scp failed error code 1
sramap (config) # restore url 11.22.33.44
  % Total    % Received % Xferd  Average Speed   Time    Time     Time  Current
                                 Dload  Upload   Total   Spent    Left  Speed
  0     0    0     0    0     0      0      0 --:--:--  0:00:16 --:--:--     0^C
sramap (config) # restore scp s port 444 keep_ip
>>> Restore download successful.  Initiating restore...
/opt/usr/local/bin/sra_includes: line 172: TMP_DIR: unbound variable
sramap (config) #
```

Command: **show**

Description: Display Information

Mode: MAP Config Mode

Parameters:

	interface	Ethernet Interface Configuration
	site_alarms	Display Site Alarms State
	Interface Name	Ethernet interface (WAN1/LAN1)

Example:

```
sramap (config) # interface WAN1
sramap (config-if-LAN1) # exit
sramap (config) # show site_alarms
State
enable
sramap (config) #
```

Command: **site_alarms**

Description: Enable SNMP Trap Forwarding. **Note**: site alarms must be enabled.

Mode: MAP Config Mode

Parameters: None

Example:

```
sramap (config) # site_alarms
sramap (config) #
```

Command: **timezone**

Description: Configure major/minor timezone. Use the <tab> key to display minor timezones.

Mode: MAP Exec Config Mode

Parameters: String Timezone – Major areas are Africa, America, Antarctica, Arctic, Asia, Atlantic, Australia, Europe, and Pacific. Each Major timezone area has a set of minor areas. For example:

Africa/Abidjan Africa/Accra Africa/Addis_Ababa Africa/Algiers
Africa/Asmara Africa/Asmera Africa/Bamako Africa/Bangui
Africa/Banjul Africa/Bissau Africa/Blantyre Africa/Brazzaville
Africa/Bujumbura Africa/Cairo Africa/Casablanca Africa/Ceuta
Africa/Conakry Africa/Dakar Africa/Dar_es_Salaam Africa/Djibouti
Africa/Douala Africa/El_Aaiun Africa/Freetown Africa/Gaborone
Africa/Harare Africa/Johannesburg Africa/Juba Africa/Kampala
Africa/Khartoum Africa/Kigali Africa/Kinshasa Africa/Lagos
Africa/Libreville Africa/Lome Africa/Luanda Africa/Lubumbashi
Africa/Lusaka Africa/Malabo Africa/Maputo Africa/Maseru
Africa/Mbabane Africa/Mogadishu Africa/Monrovia Africa/Nairobi
Africa/Ndjamena Africa/Niamey Africa/Nouakchott Africa/Ouagadougou
Africa/Porto-Novo Africa/Sao_Tome Africa/Timbuktu Africa/Tripoli
Africa/Tunis Africa/Windhoek

Example:

```
sramap (config) # do show timezone
UTC
sramap (config) # timezone America
sramap (config) # do show timezone
America
sramap (config) # timezone Pacific <tab>
Pacific/Apia          Pacific/Auckland      Pacific/Bougainville Pacific/Chatham
Pacific/Chuuk         Pacific/Easter        Pacific/Efate        Pacific/Enderbury
Pacific/Fakaofo       Pacific/Fiji          Pacific/Funafuti     Pacific/Galapagos
Pacific/Gambier       Pacific/Guadalcanal   Pacific/Guam         Pacific/Honolulu
Pacific/Johnston      Pacific/Kiritimati    Pacific/Kosrae       Pacific/Kwajalein
Pacific/Majuro        Pacific/Marquesas     Pacific/Midway       Pacific/Nauru
Pacific/Niue          Pacific/Norfolk       Pacific/Noumea       Pacific/Pago_Pago
Pacific/Palau         Pacific/Pitcairn      Pacific/Pohnpei      Pacific/Ponape
Pacific/Port_Moresby  Pacific/Rarotonga     Pacific/Saipan       Pacific/Samoa
Pacific/Tahiti        Pacific/Tarawa        Pacific/Tongatapu    Pacific/Truk
Pacific/Wake          Pacific/Wallis        Pacific/Yap
sramap (config) # timezone Pacific/
```

Command: **user**

Description: User configuration commands

Mode: MAP Interface Config Mode

Parameters:

	add	Create new user
	group	Set group for user
	password	Set password for user
	username	Change username for user
	username	New user's username
	password	Password for user
	String	Password for user
	group	Group for user
	User group	Group for user (admin/user)

Example:

```
sramap (config) # user add Art password admin group user
sramap (config) #

sramap (config) # user add CarlC password admin group user

sramap (config) # show users
admin 2000
CarlC 2001
sramap (config) #
```

MAP Interface Config Mode Commands

Command Set for Interface Name Ethernet interface (both WAN1 and LAN1):

! Comments
exit Exit from interface configuration mode
ip Interface Internet Protocol config commands
no Negate a command or set its defaults
show Ethernet Interface Configuration

Command: **!**
Description: Comments
Mode: MAP Interface Config Mode
Parameters:
Example:

```
sramap (config-if-LAN1) # ! ccld
sramap (config-if-LAN1) #
```

Command: **exit**
Description: Exit from interface configuration mode
Mode: MAP Interface Config Mode
Parameters: None
Example:

```
sramap (config-if-LAN1) # exit
sramap (config) #
```

Command: **IP**
Description: Interface Internet Protocol config commands
Mode: MAP Interface Config Mode
Parameters: dhcp Set interface to use DHCP
A.B.C.D IP Address

Example 1: WAN 1 IP address via DHCP:

```
sramap (config-if-WAN1) # ip address dhcp
sramap (config-if-WAN1) # do show ip interface brief
Interface        Address               Method    Status
---------------  --------------------  --------  --------
WAN1             --                    DHCP      DOWN
LAN1             192.168.101.2/24      DHCP      UP
sramap (config-if-WAN1) #
```

Example 2: IP address via IP:

```
sramap (config-if-WAN1) # ip address 10.10.10.10 netmask 255.255.255.0 gw 10.10.10.1
sramap (config-if-WAN1) # do show ip interface brief
Interface        Address               Method    Status
---------------  --------------------  --------  --------
WAN1             --                    Manual    DOWN
LAN1             192.168.101.2/24      DHCP      UP
sramap (config-if-WAN1) #
```

Command: **no**
Description: Negate a command or set its defaults
Mode: MAP Interface Config Mode
Parameters: <hostname> <ip> <map> <site_alarms>
Example:

```
sramap (config-if-LAN1) # no ip address
sramap (config-if-WAN1) #
```

Command: **show**
Description: Ethernet Interface Configuration
Mode: MAP Interface Config Mode
Parameters: None
Example:

```
sramap (config-if-WAN1) # show
Interface  Mode                  IP Address       Subnet Mask      Gateway
---------  --------------------  ---------------  ---------------  ---------------
WAN1       IP Address/Gateway    10.0.4.220       255.255.255.0    10.0.4.1
sramap (config-if-WAN1) #

sramap (config-if-LAN1) # show
Interface  Mode                  IP Address       Subnet Mask      Gateway
---------  --------------------  ---------------  ---------------  ---------------
LAN1       IP Address/Gateway    10.0.4.220       255.255.255.0    10.0.4.1
sramap (config-if-LAN1) #
```

RAD Command Descriptions

RAD Exec Mode Commands

!	Comments
backup	Create a backup of current configuration and upload it
configure	Enter configuration mode
exit	Exit from the CLI
firmware	Install new firmware
no	Negate or restore defaults
noping	ncurses oping utility to monitor up to 8 hosts
ping	Send messages to network hosts
reboot	Halt and perform a cold restart
reload	Reload a configuration
show	Show live information
traceroute	Print the route packets trace to network host

Command: **!**
Description: Comments
Mode: RAD Exec Mode
Parameters: Arguments ignored comment text
<cr>
Example:

```
srarad # ! SmnBLP12
srarad #
```

Command: **backup**
Description: Create a backup of the current configuration and upload it. It can be restored with the MAP "restore" command.
Mode: RAD Exec Mode
Parameters:

scp	Create a backup of current configuration and upload it via scp
url	Create a backup of current configuration and upload it to a URL (ftp, tftp, or http)
backup_filename	Optional name (will be appended with .tar.xz) for backup file
port	port for scp
String	Optional filename valid characters are [a-z A-Z 0-9 - _] must start and end with letter or number
TCP Port	port for scp (1..65535)
String	URL in format proto://host/upload/path if uploading to a directory, URL must end with /

Example 1:

```
srarad # backup scp Bob@BobB:cc/to/xx.txt port 456 backup_filename sam
ssh: Could not resolve hostname bobb: Name or service not known
lost connection
*** Error: Failed to copy backup to Bob@BobB:cc/to/xx.txt
srarad #
```

Example 2:

```
srarad # backup url proto://host/upload/path
Created backup file: srarad-vpn_test_rad-20200812234627.tar.xz
curl: (1) Protocol “proto” not supported or disabled in libcurl
*** Error: Failed to copy backup to proto://host/upload/path
srarad #
```

Messages: *Error: backup not generated*
Meaning: The backup failed to generate and exited with a return code of 1.
Recovery: Check the parameter entries and try the backup again.

Command: **configure**
Description: Enter Config mode from Exec mode. See the RAD Config Mode Commands on page 60.
Mode: RAD Exec Mode
Parameters: None
Example:

```
srarad # configure terminal
srarad (config) #
```

Command: **exit**
Description: Exit from the CLI
Mode: RAD Exec Mode
Parameters: None
Example:

```
srarad # configure terminal
srarad (config) # exit
srarad #
```

Command: **firmware**
Description: Install new firmware
Mode: RAD Exec Mode
Parameters:

update	Install new firmware
type	Install new firmware from this type
scp	Install file retrieval via scp
url	Install file retrieval via URL
usb	Install file from USB stick (only 1 USB stick should be inserted)
String	scp url in format user@host:path/to/file
String	url in format proto://host/path/to/file proto can be http, tftp, ftp
String	Name of file in top-level directory on USB stick
port	port for scp
Unsigned integer	port for scp
partition_number	Number of partition on USB Stick with the install file
<cr>	

Example:

```
srarad # firmware update type usb text.txt partition_number 1
*** Error: device not found, please make sure USB Stick in in unit and that the correct partition was
specified
srarad #
srarad # firmware update type scp user@host:path/to/file port 4
bad port “port”

*** Error: scp failed error code 255
srarad #
```

Command: **no**
Description: Negate or restore defaults
Mode: RAD Exec Mode
Parameters:

firmware	Firmware related commands
update	firmware update related commands
log	Remove firmware update log

Example:

```
srarad # no firmware update log
srarad # show firmware update log
No installs.
srarad #
```

Command: **noping**

Description: ncurses oping utility to monitor up to 8 hosts. The ncurses oping (noping) command can be used to monitor up to 8 hosts. The oping command uses ICMP ECHO_REQUEST packets to measure a host's reachability and the network latency. In contrast to the original ping utility, oping can send ICMP packets to multiple hosts in parallel and wait for all ECHO_RESPONSE packets to arrive.

Mode: RAD Exec Mode

Parameters: A.B.C.D IP Address to ping

Example:

```
srarad # noping 1.2.3.4
echo reply from 1.2.3.4 (1.2.3.4): icmp_seq=13 timeout
echo reply from 1.2.3.4 (1.2.3.4): icmp_seq=14 timeout
echo reply from 1.2.3.4 (1.2.3.4): icmp_seq=15 timeout
echo reply from 1.2.3.4 (1.2.3.4): icmp_seq=16 timeout
////////////////////////////////////////////////////////////////////////////


lqqqq 1.2.3.4 ping statistics qqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqk
x 16 packets transmitted, 0 received, 100.00% packet loss, time 0.0ms          x
x                                                                              x
x                                                                              x
mqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqj

srarad # noping 1.2.3.4

--- 1.2.3.4 ping statistics ---
19 packets transmitted, 0 received, 100.00% packet loss, time 0.0ms
srarad #

srarad # noping 10.0.4.220

--- 10.0.4.220 ping statistics ---
192 packets transmitted, 192 received, 0.00% packet loss, time 77.5ms
RTT[ms]: min = 0, median = 0, p(95) = 0, max = 1
srarad #
```

Command: **ping**

Description: Send messages to network hosts

Mode: RAD Exec Mode

Parameters:

	ip	Send ICMP Ipv4 messages to network hosts (default)
	ipv6	Send ICMP Ipv6 messages to network hosts
	arp	Send ARP requests to a I host
	String	Hostname or IP-address to ping
	source	Source IP-address (ip) or interface (ip and arp)
	repeat	Requests to send count, default is 5
	resolve	Resolve names
	broadcast	Ping broadcast address
	size	Packet size
	interval	The time interval between packets; the default is 1
	flood	Flood ping
	String	Hostname or IP-address to ping
	Unsigned integer	Requests count

Example 1: Ping with Ipv4:

```
srarad # ping 10.0.4.221
Executing command: ping -n -I 1 -c 5 10.0.4.221
PING 10.0.4.221 (10.0.4.221) 56(84) bytes of data.
64 bytes from 10.0.4.221: icmp_seq=1 ttl=64 time=0.071 ms
64 bytes from 10.0.4.221: icmp_seq=2 ttl=64 time=0.047 ms
64 bytes from 10.0.4.221: icmp_seq=3 ttl=64 time=0.046 ms
64 bytes from 10.0.4.221: icmp_seq=4 ttl=64 time=0.053 ms
64 bytes from 10.0.4.221: icmp_seq=5 ttl=64 time=0.047 ms

--- 10.0.4.221 ping statistics ---
5 packets transmitted, 5 received, 0% packet loss, time 79ms
rtt min/avg/max/mdev = 0.046/0.052/0.071/0.013 ms
srarad #

srarad # ping arp 10.0.4.221 source robt repeat 3
Executing command: arping -I robt -c 3 10.0.4.221
arping: libnet_init(LIBNET_LINK, robt): libnet_check_iface() ioctl: No such device
srarad #
```

Example 2: Ping with ARP:

```
srarad # ping arp 192.168.102.1
Executing command: arping -c 5 192.168.102.1
ARPING 192.168.102.1
60 bytes from a0:04:60:91:f9:7f (192.168.102.1): index=0 time=274.172 usec
60 bytes from a0:04:60:91:f9:7f (192.168.102.1): index=1 time=248.932 usec
60 bytes from a0:04:60:91:f9:7f (192.168.102.1): index=2 time=269.270 usec
60 bytes from a0:04:60:91:f9:7f (192.168.102.1): index=3 time=248.023 usec
60 bytes from a0:04:60:91:f9:7f (192.168.102.1): index=4 time=274.806 usec

--- 192.168.102.1 statistics ---
5 packets transmitted, 5 packets received,   0% unanswered (0 extra)
rtt min/avg/max/std-dev = 0.248/0.263/0.275/0.012 ms
srarad #
```

Command: **reboot**
Description: Halt and perform a cold restart
Mode: RAD Exec Mode
Parameters: None
Example:

```
srarad # reboot
Connection to 192.168.102.2 closed by remote host.
Connection to 192.168.102.2 closed.
chris@B450-2700X:~$
```

Command: **reload**
Description: Reload a configuration
Mode: RAD Exec Mode
Parameters:

defaults	Factory default settings (default-config).
keep_ip	Reload the default configuration, maintaining current IP address settings for all interfaces
<cr>	

Example:

```
srarad # reload defaults keep_ip
srarad #
```

Command: **show**
Description: Show live information; see “RAD Exec Mode Show Commands” on page 53.
Mode: RAD Exec Mode
Parameters:

clock	Show current time
dns	Display current DNS settings. Note that current settings may have been set via DHCP and not match configured settings.
firmware	Display firmware information
interface	Ethernet Interface status
ip	IP information
maps	Display connected MAP information
rad	Display SRA RAD configuration
system	Show system information
timezone	Show current set timezone
uprecords	Show uptime records and current uptime
uptime	Show current uptime
version	Show firmware version

Example: See “RAD Exec Mode Show Commands” on page 53.

Command: **traceroute**
Description: Print the route packets trace to network host
Mode: RAD Exec Mode
Parameters:

ip	Ipv4
ipv6	Ipv6
String	Hostname or IP-address to trace the route
resolve	Resolve names
source	Source IP-address
interface	Source interface
String	IP-address
interface	Source interface
String	Interface name
<cr>	

Example:

```
srarad # traceroute 10.0.4.220
traceroute to 10.0.4.220 (10.0.4.220), 30 hops max, 60 byte packets
 1  10.0.4.220  0.321 ms  0.241 ms  0.213 ms
srarad # traceroute 10.0.4.221
traceroute to 10.0.4.221 (10.0.4.221), 30 hops max, 60 byte packets
 1  10.0.4.221  0.185 ms  0.028 ms  0.026 ms
srarad #

srarad # traceroute 10.0.4.220 resolve source 10.0.4.221 interface NNN
traceroute to 10.0.4.220 (10.0.4.220), 30 hops max, 60 byte packets
setsockopt SO_BINDTODEVICE: No such device
srarad #

srarad # traceroute ip 8.8.8.8
traceroute to 8.8.8.8 (8.8.8.8), 30 hops max, 60 byte packets
 1  192.168.101.1  0.341 ms  0.502 ms  0.437 ms
 2  192.168.0.1  2.425 ms  2.398 ms  2.428 ms
 3  * * *
 4  96.34.26.224  22.656 ms  22.663 ms  22.729 ms
 5  96.34.21.16  21.182 ms  21.541 ms  21.088 ms
 6  96.34.1.188  31.965 ms  24.552 ms  24.582 ms
 7  96.34.1.149  36.589 ms  29.566 ms  31.194 ms
 8  96.34.3.11  29.423 ms  20.027 ms  29.608 ms
 9  96.34.152.117  27.721 ms  25.593 ms 96.34.152.30  21.558 ms
10  * 108.170.243.225  25.119 ms 108.170.243.174  30.265 ms
11  216.239.51.117  28.326 ms 216.239.42.149  25.179 ms 8.8.8.8  25.398 ms
srarad #
```

RAD Exec Mode Show Commands

clock	Show current time
dns	Display current DNS settings. Note that current settings may have been set via DHCP and not match configured settings.
firmware	Display firmware information
interface	Ethernet Interface status
ip	IP information
maps	Display connected MAP information
rad	Display SRA RAD configuration
system	Show system information
timezone	Show current set timezone
uprecords	Show uptime records and current uptime
uptime	Show current uptime
version	Show firmware version

Command: **clock**
Description: Show current time and date
Mode: RAD Config Mode
Parameters: None
Example:

```
srarad # show clock
2020-09-09 23:00:58+00:00
srarad #
```

Command: **dns**
Description: Display current DNS settings. Note that current settings may have been set via DHCP and not match configured settings.
Mode: RAD Exec Mode
Parameters:

domain	Display configured domain
nameserver	Display configured nameserver(s)
search	Display configured search domain(s)

Example:

```
srarad # show dns
domain BobB
search Ttim
nameserver 4.4.4.44
nameserver 2.3.4.5
srarad # show dns search
                      search domain(s)  Ttim
srarad # show dns domain
                                 domain  BobB
srarad # show dns nameserver
                            nameserver  4.4.4.44
                            nameserver  2.3.4.5
srarad #
```

Command: **firmware**
Description: Display firmware information
Mode: RAD Exec Mode
Parameters:

	update	Display most recent firmware update status
	version	Show firmware version
	log	Display firmware installation log
	status	Display most recent firmware installation status

Example 1:

```
srarad # show firmware update log
No installs.
srarad # show firmware update status
No installs since boot
srarad #
```

Example 2:

```
srarad # show firmware version
SW Version            0.9.94
SW Build ID           75244463a8b8fd72b9568e667fd1ae87a4cd1154
SW Build Date         2020-09-18 13:00:06-05:00
SW Build Host         54imezo
srarad #
```

Example 3:

```
srarad # show firmware update log
   Install inititated at:  2020-08-31 11:09:37+00:00
    Install completed at:  2020-08-31 11:10:10+00:00
       Install file name:  sra_sec.tar.xz
  Install file sha256sum:  9d70401f4e9791daeaa4363de73104f101e5259d744bb42c5a7e40891824ae81
          Install status:  Installation of sra_sec.tar.xz complete

   Install inititated at:  2020-08-31 11:17:49+00:00
    Install completed at:  2020-08-31 11:18:21+00:00
       Install file name:  sra_sec.tar.xz
  Install file sha256sum:  9d70401f4e9791daeaa4363de73104f101e5259d744bb42c5a7e40891824ae81
          Install status:  Installation of sra_sec.tar.xz complete

   Install inititated at:  2020-08-31 14:15:26+00:00
    Install completed at:  2020-08-31 14:15:59+00:00
       Install file name:  sra_sec-0.9.28.tar.xz
  Install file sha256sum:  a44fe40c699fe91aec221f999ee4bf00ede54a8f6cbcf6d09f24d6620fc03d07
          Install status:  Installation of sra_sec-0.9.28.tar.xz complete
srarad # show firmware install log
No installs.
srarad #
```

Command: **interface**

Description: Display Ethernet Interface status / statistics

Mode: RAD Exec Mode

Parameters:		
	Interface Name	Interface to show information for (WAN1/LAN1)
	status	Display current interface status
	statistics	Display cumulative interface statistics (status/statistics)

Example:

```
srarad # show interface WAN1 status
Settings for WAN1:
        Supported ports: [ TP ]
        Supported link modes:   10baseT/Half 10baseT/Full
                                100baseT/Half 100baseT/Full
                                1000baseT/Full
        Supported pause frame use: Symmetric
        Supports auto-negotiation: Yes
        Supported FEC modes: Not reported
        Advertised link modes:  10baseT/Half 10baseT/Full
                                100baseT/Half 100baseT/Full
                                1000baseT/Full
        Advertised pause frame use: Symmetric
        Advertised auto-negotiation: Yes
        Advertised FEC modes: Not reported
        Speed: 1000Mb/s
        Duplex: Full
        Port: Twisted Pair
        PHYAD: 1
        Transceiver: internal
        Auto-negotiation: on
        MDI-X: on (auto)
        Supports Wake-on: pumbg
        Wake-on: g
        Current message level: 0x00000007 (7)
                               drv probe link
srarad # show interface WAN1 statistics
NIC statistics:
     rx_packets: 2524078
     tx_packets: 20585
     rx_bytes: 210931888
     tx_bytes: 1690598
     rx_broadcast: 2510135
     tx_broadcast: 276
     rx_multicast: 1082
     tx_multicast: 26
     multicast: 1082
     collisions: 0
     rx_crc_errors: 0
     rx_no_buffer_count: 0
     rx_missed_errors: 0
     tx_aborted_errors: 0
     tx_carrier_errors: 0
     tx_window_errors: 0
     tx_abort_late_coll: 0
     tx_deferred_ok: 0
     tx_single_coll_ok: 0
     tx_multi_coll_ok: 0
```

```
     tx_timeout_count: 0
     rx_long_length_errors: 0
     rx_short_length_errors: 0
     rx_align_errors: 0
     tx_tcp_seg_good: 0
     tx_tcp_seg_failed: 0
     rx_flow_control_xon: 0
     rx_flow_control_xoff: 0
     tx_flow_control_xon: 0
     tx_flow_control_xoff: 0
     rx_long_byte_count: 210931888
     tx_dma_out_of_sync: 0
     tx_smbus: 0
     rx_smbus: 0
     dropped_smbus: 0
     os2bmc_rx_by_bmc: 0
     os2bmc_tx_by_bmc: 0
     os2bmc_tx_by_host: 0
     os2bmc_rx_by_host: 0
     tx_hwtstamp_timeouts: 0
     tx_hwtstamp_skipped: 0
     rx_hwtstamp_cleared: 0
     rx_errors: 0
     tx_errors: 0
     tx_dropped: 0
     rx_length_errors: 0
     rx_over_errors: 0
     rx_frame_errors: 0
     rx_fifo_errors: 0
     tx_fifo_errors: 0
     tx_heartbeat_errors: 0
     tx_queue_0_packets: 16907
     tx_queue_0_bytes: 1040738
     tx_queue_0_restart: 0
     tx_queue_1_packets: 3678
     tx_queue_1_bytes: 355906
     tx_queue_1_restart: 0
     rx_queue_0_packets: 2524078
     rx_queue_0_bytes: 200835576
     rx_queue_0_drops: 0
     rx_queue_0_csum_err: 0
     rx_queue_0_alloc_failed: 0
     rx_queue_1_packets: 0
     rx_queue_1_bytes: 0
     rx_queue_1_drops: 0
     rx_queue_1_csum_err: 0
     rx_queue_1_alloc_failed: 0
srarad #
```

Command: **ip**
Description: Display IP information
Mode: RAD Config Mode
Parameters:

	interface	IP interface status
	route	IP routing table
	brief	IP interface status and configuration

Example:

```
srarad # show ip interface brief
Interface        Address               Method    Status
---------------  --------------------  --------  --------
WAN1             10.0.4.221/24         Manual    UP
LAN1             192.168.1.10/24       --        DOWN
srarad # show ip route
default via 10.0.4.1 dev WAN1 onlink
10.0.4.0/24 dev WAN1 proto kernel scope link src 10.0.4.221
192.168.1.0/24 dev LAN1 proto kernel scope link src 192.168.1.10 linkdown
srarad # show ip interface brief
Interface        Address               Method    Status
---------------  --------------------  --------  --------
WAN1             10.0.4.221/24         Manual    UP
LAN1             1.2.3.4/24            Manual    DOWN
srarad # show ip route
default via 10.0.4.1 dev WAN1 onlink
1.2.3.0/24 dev LAN1 proto kernel scope link src 1.2.3.4 linkdown
10.0.4.0/24 dev WAN1 proto kernel scope link src 10.0.4.221
srarad # show ip interface brief
Interface        Address               Method    Status
---------------  --------------------  --------  --------
WAN1             10.0.4.221/24         Manual    UP
LAN1             1.2.3.4/24            Manual    br0
srarad #
```

Command: **maps**
Description: Display connected MAP information
Mode: RAD Exec Mode
Parameters: None
Example:

```
srarad # show maps
MAP IP            Status  Status Info
----------------  ------  -----------
192.168.0.101     <-XX->  MAP not enabled
192.168.64.230    <-XX->  Attempting to retrieve MAP configuration
srarad #
```

Messages:
Attempting to retrieve MAP configuration
Synchronizing configuration with MAP
Connecting to MAP for configuration...
MAP not enabled
Synchronizing mgmt conn configuration with MAP

Command: **rad**
Description: Display SRA RAD configuration
Mode: RAD Exec Mode
Parameters: None
Example:

```
srarad # show rad
RAD not configured, use ‘rad id <rad_id’ to configure
srarad #
srarad # show rad
         RAD ID:  RAD-1
srarad #
```

Command: **system**
Description: Show system information
Mode: RAD Exec Mode
Parameters: info Show system information
Example:

```
srarad # show system info
Memory                Total(1868MB) Free(1530MB) Active(163MB)
CPU                   User(0.50%) System(0.25%) Idle(99.50%)
CPU Temperature       60.750C
Serial #              1322544
MAC Address WAN1      00:0d:b9:50:b9:c0
MAC Address LAN1      00:0d:b9:50:b9:c1
System Date           2020-10-13 16:16:16+00:00
System Uptime         39 minutes
srarad #
```

Command: t**imezone**
Description: Show current time zone setting
Parameters: None
Example:

```
srarad # show timezone
UTC
srarad #
```

Command: **uprecords**
Description: Show uptime records and current uptime
Mode: RAD Exec Mode
Parameters: None
Example:

```
srarad # show uprecords
     #               Uptime | System                                    Boot up
----------------------------+-------------------------------------------------
     1     9 days, 16:25:14 | Linux 4.19.0-9-amd64      Thu Feb 14 10:11:50 2019
     2     6 days, 17:52:34 | Linux 4.19.0-9-amd64      Mon Aug 24 16:38:02 2020
     3     6 days, 01:03:22 | Linux 4.19.0-9-amd64      Tue Aug 18 15:32:27 2020
     4     5 days, 07:45:13 | Linux 4.19.0-9-amd64      Thu Sep  3 21:11:26 2020
     5     3 days, 21:16:57 | Linux 4.19.0-9-amd64      Fri Aug 14 18:13:16 2020
     6     2 days, 05:19:53 | Linux 4.19.0-9-amd64      Mon Aug 31 14:18:15 2020
     7     1 day , 08:06:04 | Linux 4.19.0-9-amd64      Thu Aug 13 10:04:59 2020
     8     0 days, 20:53:46 | Linux 4.19.0-9-amd64      Wed Sep  2 19:40:24 2020
     9     0 days, 14:38:34 | Linux 4.19.0-9-amd64      Wed Jul  1 17:51:26 2020
    10     0 days, 12:51:55 | Linux 4.19.0-9-amd64      Wed Sep  9 06:04:18 2020
----------------------------+-------------------------------------------------
->  13     0 days, 04:20:48 | Linux 4.19.0-9-amd64      Wed Sep  9 18:58:27 2020
----------------------------+-------------------------------------------------
1up in     0 days, 00:12:01 | at                        Wed Sep  9 23:31:15 2020
t10 in     0 days, 08:31:08 | at                        Thu Sep 10 07:50:22 2020
no1 in     9 days, 12:04:27 | at                        Sat Sep 19 11:23:41 2020
    up    38 days, 07:05:44 | since                     Thu Feb 14 10:11:50 2019
  down   535 days, 06:01:41 | since                     Thu Feb 14 10:11:50 2019
   %up               6.677 | since                     Thu Feb 14 10:11:50 2019
srarad #
```

Command: **uptime**
Description: Show current uptime
Mode: RAD Exec Mode
Parameters: None
Example:

```
srarad # show uptime
 15:19:50 up 1 day,  2:49,  2 users,  load average: 0.00, 0.02, 0.00
srarad #
```

Command: **version**
Description: Show firmware version
Mode: RAD Exec Mode
Parameters: None
Example:

```
srarad # show version
SW Version            1.0.93
SW Build ID           f80e8d13d6c5688c72f41a96aeee5eac355c7a76
SW Build Date         2020-10-13 09:56:29-05:00
SW Build Host         59imezo
srarad #
```

RAD Config Mode Commands

!	Comments
dns	DNS settings
do	To run exec commands in config mode
exit	Exit from configure mode
hostname	Set system's network name
id	Set RAD ID
interface	Ethernet interface configuration
map	Configure MAP
no	Negate a command or set its defaults
restore	Restore a configuration
show	Display current configuration
site_alarms	Enable SNMP Trap Forwarding
timezone	Configure timezone
user	User configuration commands
vpn	Enter VPN configuration mode, creating VPN with default values if it doesn't already exist
vpn_map_enable	Enable both the vpn and maps configured for vpn in a single command to preserve the management connection

Command: **!**
Description: Comments
Mode: RAD Config Mode
Parameters:

!	Comments	
Arguments	ignored comment text	
<cr>		

Example:

```
srarad (config) # ! ignore this text xxx NeverMind
srarad (config) #
```

Command: **dns**
Description: DNS settings
Mode: RAD Config Mode
Parameters:

domain	Set domain
nameserver	Add nameserver
search	Set search domain(s)
String	domain
A.B.C.D	IP address of nameserver
String	search domain(s) in a comma separated list (no spaces)

Example:

```
srarad (config) # dns domain sssss
srarad (config) # dns nameserver 1.2.3.4
srarad (config) # dns search mmmmm
srarad (config) #
```

Command: **do**

Description: To run exec commands in config mode

Mode: RAD Config Mode

Parameters:

backup	Create a backup of current configuration
configure	Enter configuration mode
firmware	Install new firmware
no	Negate or restore defaults
noping	ncurses oping utility to monitor up to 8 hosts
ping	Send messages to network hosts
reboot	Halt and perform a cold restart
reload	Reload a configuration
show	Show live information
traceroute	Print the route packets trace to network host
update	Install new firmware
type	Install new firmware
scp	Install file retrieval via scp
url	Install file retrieval via URL
usb	Install file from USB stick (only 1 USB stick should be inserted)
String	scp url in format user@host:path/to/file
String	url in format proto://host/path/to/file proto can be http, tftp, ftp
String	Name of file in top-level directory on USB stick
partition_number	Number of partition on USB Stick with the install file
A.B.C.D	IP Address to ping
ip	Send ICMP Ipv4 messages to network hosts (default)
ipv6	Send ICMP Ipv6 messages to network hosts
arp	Send ARP requests to a I host
String	Hostname or IP-address to ping
source	Source IP-address (ip) or interface (ip and arp)
repeat	Requests to send count, default is 5
resolve	Resolve names
broadcast	Ping broadcast address
size	Packet size
interval	The time interval between packets, default is 1
flood	Flood ping
Unsigned integer	Requests count
Unsigned integer	Number of data bytes to send
String	Interval between packets
duplicate-detect	Duplicate address detection mode
clock	Show current time
firmware	Display firmware information
interface	Ethernet Interface status
ip	IP information
maps	Display connected MAP information
rad	Display SRA RAD configuration
system	Show system information

uprecords	Show uptime records and current uptime
uptime	Show current uptime
version	Show firmware version
vpn	Display SRA VPN configuration
install	Display most recent firmware installation status
version	Show firmware version
Interface Name	Interface to show information for (WAN1/LAN1)
interface	IP interface status
route	IP routing table
info	Show system information
scp	Create a backup of current configuration and upload it via scp
url	Create a backup of current configuration and upload it to an URL
String	scp url in format user@host:path/to/file
String	URL in format proto://host/upload/path if uploading to a directory, URL must end with /
backup_filename	Optional name (will be appended with .tar.xz) for backup file
port	port for scp
TCP Port	port for scp (1..65535)
String	Optional filename valid characters are [a-z A-Z 0-9 - _] must start and end with letter or number
defaults	Reload the default configuration
keep_ip	Reload the default configuration, maintaining current IP address settings for all interfaces
log	Display firmware installation log
status	Display most recent firmware installation status

Example:

```
srarad (config) # do firmware update type usb filename partition_number 2
srarad (config) # do noping 1.2.3.4

--- 1.2.3.4 ping statistics ---
7 packets transmitted, 0 received, 100.00% packet loss, time 0.0ms
srarad (config) # do ping ip 10.0.4.220 source int repeat 4 resolve broadcast size 8 interval 9 flood
Executing command: ping -b -s 8 -I 9 -f -I int -c 4 10.0.4.220
ping: SO_BINDTODEVICE: No such device
srarad (config) # do show clock
2020-06-26 16:06:58-05:00
srarad (config) # do show maps
MAP IP            Status  Status Info
----------------  ------  -----------
srarad (config) # do show uptime
 16:10:39 up 1 day,  3:40,  2 users,  load average: 0.00, 0.00, 0.00
srarad (config) # do reboot
Connection to 192.168.101.5 closed by remote host.
Connection to 192.168.101.5 closed.
chris@B450-2700X:~$
srarad (config) # do reload defaults keep_ip
^Csrarad (config) #
srarad (config) #
```

Command: **exit**
Description: Exit from Config mode back to Exec mode
Mode: RAD Config Mode
Parameters: None
Example:

```
srarad (config) # exit
srarad #
```

Command: **hostname**
Description: Set system's network name
Mode: RAD Config Mode
Parameters: String This system's network name – any char may be a letter, first char may not be a number, interior –'s are allowed
Example:

```
srarad (config) # hostname Host-BobB
srarad (config) #
srarad (config) # hostname abc123
srarad (config) #
abc123 (config) #
```

Command: **id**
Description: Set RAD ID
Mode: RAD Config Mode
Parameters: String RAD ID – a text string identifying this RAD
Example:

```
Host-BobB (config) # id RAD-1
srarad (config) # do show rad
         RAD ID:  RAD-1

abc123 (config) # id rad123
abc123 (config) # do show rad
         RAD ID:  rad123
abc123 (config) #
```

Command: **id**
Description: Modify RAD ID
Mode: RAD Config Mode
Parameters: String RAD ID – a text string identifying this RAD
Example:

```
office-portfw-rad (config) # id office-portfw-rad
>>> RAD ID modified, please reboot RAD to have new RAD ID show on MAP
```

Note that you can set the RAD ID to match the host but that is not necessary. The RAD ID is what shows up in the RAD listing on the MAP to inform MAP users so you can quickly identify the RAD you are looking for.

As for duplicate RAD ID's, there shouldn't be duplicates. Each RAD connecting to a MAP is intended to have a unique RAD ID. It is up to the user to give each RAD a unique RAD ID. If multiple RADs with the same RAD ID end up connected to a single MAP, the RADs with matching RAD IDs should all be disconnected and then use the 'remove disconnected-rad' CLI command in Configure mode on the MAP to remove the matching RAD IDs.

Command: **id**
Description: Remove matching RAD IDs
Mode: MAP Config Mode
Parameters: String RAD ID – a text string identifying this RAD
Example:

```
remove disconnected-rad
```

Command: **interface**
Description: Ethernet interface configuration
Mode: RAD Config Mode
Parameters: Interface Name Ethernet interface (WAN1/LAN1)
Example 1:

```
srarad (config) # interface WAN1
srarad (config-if-WAN1) # ?
  !          Comments
  exit       Exit from interface configuration mode
  ip         Interface Internet Protocol config commands
  no         Negate a command or set its defaults
  show       Ethernet Interface Configuration

srarad (config-if-WAN1) #

srarad (config) # interface LAN1
srarad (config-if-LAN1) # ?
  !          Comments
  exit       Exit from interface configuration mode
  ip         Interface Internet Protocol config commands
  no         Negate a command or set its defaults
  show       Ethernet Interface Configuration

srarad (config-if-LAN1) #
```

Example 2: Show LAN 1 IP address via DHCP:

```
srarad (config-if-LAN1) # ip address dhcp
srarad (config-if-LAN1) # client_loop: send disconnect: Broken pipe
chris@B450-2700X:~$ ssh admin@192.168.101.5
admin@192.168.101.5's password:
Linux srarad 4.19.0-9-amd64 #1 SMP Debian 4.19.118-2 (2020-04-29) x86_64

The programs included with the Debian GNU/Linux system are free software;
the exact distribution terms for each program are described in the
individual files in /usr/share/doc/*/copyright.

Debian GNU/Linux comes with ABSOLUTELY NO WARRANTY, to the extent
permitted by applicable law.
Last login: Thu Jun 25 13:19:28 2020 from 192.168.101.4
srarad # show ip interface brief
Interface        Address               Method    Status
---------------  --------------------  --------  --------
WAN1             --                    DHCP      DOWN
LAN1             192.168.101.5/24      DHCP      UP
srarad #
```

Command: **map**

Description: Configure MAP. **Note**: Requires equivalent change on MAP itself.

Mode: RAD Config Mode

Parameters:

mv	Move existing MAP to a new Internet facing (External) IP address. Requires equivalent change on MAP itself. Change the external IP address of a MAP defined on a RAD. If you already set a new external IP address on the MAP itself, run this command from Config mode on a RAD to make the corresponding change on RADs. Some coordination is needed; all connected RADs must be changed first and then the MAP can be changed (not expected to happen often).
current_map_ip	The current Map IP address (change from this IP address).
new_map_ip	The new Map IP address (change to this IP address).
A.B.C.D	IP Address of MAP to create, if it doesn't already exist, and configure.
A.B.C.D	External (internet-facing) IP Address of existing MAP
A.B.C.D	New Internet facing (External) IP Address of MAP

Example:

```
srarad (config) # map mv 1.2.3.4 5.6.7.8
srarad (config) # map 192.168.1.77
srarad (map(192.168.1.77)) #
```

Messages:

/opt/usr/local/sbin/sra_rad_map_ext_ip.sh: line 49: /opt/etc/sra/rad/rad_maps/4.4.4.44/map.conf: No such file or directory

/opt/usr/local/sbin/sra_rad_map_ext_ip.sh: line 51: MAP_STATE: unbound variable

Command: **no**

Description: Negate a command or set its defaults

Mode: RAD Config Mode

Parameters:

dns	Clear DNS settings
hostname	Set default system network name
id	Remove RAD ID - this will disable this RAD
map	Remove MAP
site_alarms	Disable SNMP Trap Forwarding
timezone	Clear timezone
user	Remove user
vpn	Clear VPN configuration
A.B.C.D	IP Address of MAP to remove
domain	Remove configured domain
nameserver	Remove configured nameservers
search	Remove configured search domain

Example:

```
srarad (config) # no map 1.2.3.99
MAP 1.2.3.99 does not exist
srarad (config) # no map 1.2.3.4
srarad (config) # no hostname
srarad (config) # no site_alarms
srarad (config) # no vpn
```

```
sraraad (config) # no timezone
sraraad (config) #
```

Command: **restore**

Description: Restore a configuration

Mode: RAD Config Mode

Parameters:

	scp	Restore a configuration downloaded via scp
	url	Restore a configuration from an URL
	String	scp url in format user@host:path/to/file
	String	url in format proto://host/path/to/file proto can be http, tftp, ftp
	port	port for scp
	keep_ip	Do not modify current network settings
	TCP Port	port for scp (1..65535)
	<cr>	

Example:

```
sraraad (config) # restore scp user1@host1:path/to/file port 567 keep_ip
ssh: Could not resolve hostname host1: Name or service not known
*** Error: scp failed error code 1
sraraad (config) #
sraraad (config) # restore url http:/host/path/to/file
  % Total    % Received % Xferd  Average Speed   Time    Time     Time  Current
                                 Dload  Upload   Total   Spent    Left  Speed
  0     0    0     0    0     0      0      0 --:--:-- --:--:-- --:--:--     0Warning: Transient problem:
timeout Will retry in 1 seconds. 3 retries left.
  0     0    0     0    0     0      0      0 --:--:--  0:00:04 --:--:--     0Warning: Transient problem:
timeout Will retry in 2 seconds. 2 retries left.
  0     0    0     0    0     0      0      0 --:--:-- --:--:-- --:--:--     0^Csraraad (config) #
sraraad (config) # restore url http://path/to/file keep_ip
Usage: sra_restore_url_downloader.sh <url> [keep_ip]
sraraad (config) #
sraraad (config) # restore url 10.0.4.220 keep_ip
Usage: sra_restore_url_downloader.sh <url> [keep_ip]
sraraad (config) #
```

Messages:

ssh: Could not resolve hostname host1: Name or service not known

**** Error: scp failed error code 1*

Warning: Transient problem: timeout Will retry in 2 seconds. x retries left.

cp: cannot stat 'a/b/c/d': No such file or directory

Command: **show**
Description: Display current configuration
Mode: RAD Config Mode
Parameters:

group	Display group for user
interface	Ethernet Interface Configuration
maps	Display current MAP configurations
port_forwards	Display current Port Forward configurations
site_alarms	Display Site Alarms State
users	Display users
vpn	Display SRA VPN configuration
user	Display group for user
username	User for which to display group
all	Ethernet Interface Configuration
Interface Name	Interface for which to display configuration (WAN1/LAN1)

Example:

```
sradad (config) # show interface all
Interface  Mode                    IP Address       Subnet Mask      Gateway
---------  ----------------------  ---------------  ---------------  ---------------
WAN1       IP Address/Gateway      10.0.4.221       255.255.255.0    10.0.4.1
LAN1       IP Address/Gateway      2.3.4.5          255.255.255.0    2.3.4.0
sradad (config) # show maps
MAP External IP  MAP External Port  Mode          Alarms    State     MAP ID
---------------  -----------------  ------------  --------  --------  ------
10.0.4.220       443                provisioning  disable   enable    not yet contacted
10.0.4.222       443                provisioning  disable   enable    not yet contacted
sradad (config) # show port_forwards
MAP              Forwarded IP     Forwarded Port  Type      Description
---------------  ---------------  --------------  --------  -------------
sradad (config) # show site_alarms
State
--------
enable
sradad (config) # show vpn
sradad (config) # show group user admin
sra_admin
sradad (config) # show interface all
Interface  Mode                    IP Address       Subnet Mask      Gateway
---------  ----------------------  ---------------  ---------------  ---------------
WAN1       IP Address/Gateway      10.0.4.221       255.255.255.0    10.0.4.1
LAN1       IP Address/Gateway      2.3.4.5          255.255.255.0    2.3.4.0
sradad (config) #
sradad (config) # show interface WAN1
Interface  Mode                    IP Address       Subnet Mask      Gateway
---------  ----------------------  ---------------  ---------------  ---------------
WAN1       IP Address/Gateway      10.0.4.221       255.255.255.0    10.0.4.1
sradad (config) # show interface LAN1
Interface  Mode                    IP Address       Subnet Mask      Gateway
---------  ----------------------  ---------------  ---------------  ---------------
LAN1       IP Address/Gateway      2.3.4.5          255.255.255.0    2.3.4.0
sradad (config) # show users
admin 2000
```

```
test2 2001
srarad (config) # show group user test1
*** Error: user test1 not found
Usage: get_user_groups <user>
srarad (config) # show group user test2
sra_user
srarad (config) # show users
admin1 2000
srarad (config) #
```

Command: **site_alarms**
Description: Enable SNMP Trap Forwarding
Mode: RAD Config Mode
Parameters: None
Example:

```
srarad (config) # show site_alarms
State
--------
disable
srarad (config) # site_alarms
srarad (config) # show site_alarms
State
--------
enable
srarad (config) #
```

Command: **timezone**
Description: Configure timezone
Mode: RAD Config Mode
Parameters: String Timezone - Major areas are Africa, America, Antarctica, Arctic, Asia, Atlantic, Australia, Europe, and Pacific.
Example:

```
srarad (config) # do show timezone
UTC
srarad (config) # timezone America
srarad (config) # do show timezone
America
srarad (config) #
```

Command: **user**

Description: User configuration commands

Mode: RAD Config Mode

Parameters:

add	Create new user
group	Set group for user
password	Set password for user
username	Change username for user
username	New user's username
password	Password for user
String	Password for user
group	Group for user
User group	Group for user (admin/user)
username	User for which to set username
String	New password for user

Example:

```
srarad (config) # user add test2 password admin2 group user
srarad (config) # user group New1 group user
*** Error: non-existant user New1 or already in group sra_user
Usage: change_group <user> <new_group>
srarad (config) # user password test2 password admin
srarad (config) #
```

Command: **vpn**

Description: Enter VPN configuration mode, creating VPN with default values if it doesn't already exist.

Mode: RAD VPN Config Mode

Parameters:

!	Comments
client_range_begin	Set the base IP address of the range for Client IP Addresses
client_range_count	Set the size of the IP address range for Client IP Addresses
enable	Start VPN for MAPs configured in VPN Mode
description	Set the VPN's description
enable	Legacy placeholder command - please use 'vpn_map_enable' from configure view
exit	Exit from interface configuration mode
mgmt	Set the IP address of the VPN Management Interface
no	Negate a command or set its defaults
show	Ethernet Interface Configuration
vpn_enable	Enable vpn override - only use this with direct access to the RAD as management connection will likely be lost
Arguments	ignored comment text
ip	Set the base IP address of the range for Client IP Addresses
A.B.C.D	Base IP Address for Client IP Address range
How many VPN Client IP Addresses to allocate	How many Client IP Addresses to allocate (2-16) (2..16)
enable	Stop VPN for MAPs configured in VPN Mode

Example:

```
srarad (config) # interface LAN1
srarad (config-if-LAN1) # ip address 1.2.3.4 netmask 255.255.255.0
srarad (config-if-LAN1) # vpn
srarad (vpn) # client_range_begin ip 1.2.3.4
srarad (vpn) # client_range_count 4
srarad (vpn) # mgmt ip 1.2.3.99
srarad (vpn) # enable
srarad (vpn) # exit
srarad (config) # show vpn
VPN State                              enable
VPN Management IP Address              1.2.3.99
VPN Maximum Simultaneous Client Count  4
VPN Client IP Address Range            1.2.3.4-1.2.3.7
VPN Management IP Address (CIDR)       1.2.3.99/24
VPN Management Network                 1.2.3.0/24
srarad (config) #
```

Messages:

*** Error: LAN1 interface has to be configured for VPN

*** Error: LAN1 interface has to be configured with an IP Address and netmask, no gateway or DHCP

*** Error: Attempting to set Management IP address that overlaps with current Client IP address range:

New Management IP Address 1.2.3.4

Client IP Address Range 1.2.3.4-1.2.3.7

*** Error: Management IP 10.0.4.220 is out of bounds for LAN1's ip address range:
New Management IP Address 10.0.4.220
LAN1 IP Address Range 1.2.3.1-1.2.3.254
sh: 0: getcwd() failed: No such file or directory
shell-init: error retrieving current directory: getcwd: cannot access parent directories: No such file or directory
*** Error: LAN1 interface has to be configured with an IP Address and netmask, no gateway or DHCP

Command: **vpn_map_enable**
Description: Enable both the vpn and map's configured for vpn in a single command to preserve the management connection
Mode: RAD Config Mode
Parameters:
Example:

```
srarad (config) # vpn_map_enable
*** Error: no map has been configured for vpn
srarad (config) #
```

Messages:

**** Error: vpn has not been created*

**** Error: no map has been configured for vpn*

sh: 0: getcwd() failed: No such file or directory

shell-init: error retrieving current directory: getcwd: cannot access parent directories: No such file or directory

RAD Config Interface Mode Commands

For Ethernet interfaces Wan1 and Lan1:

!	Comments
exit	Exit from interface configuration mode
ip	Interface Internet Protocol config commands
no	Negate a command or set its defaults
show	Ethernet Interface Configuration

Command: **!**
Description: Comments
Mode: RAD Config Interface Mode
Parameters: ! Comments
Arguments ignored comment text
<cr>
Example:

```
srarad (config) # interface ?
  Interface Name  Ethernet interface (WAN1/LAN1)

srarad (config) # interface WAN1

srarad (config-if-WAN1) # ! aaaaa bbbb cccc
srarad (config-if-WAN1) #
```

Messages: *sh: 0: getcwd() failed: No such file or directory*

Command: **exit**
Description: Exit from interface configuration mode
Mode: RAD Config Interface Mode
Parameters: None
Example:

```
srarad (config-if-WAN1) # exit
srarad (config) #
```

Command: **ip**
Description: Interface Internet Protocol config commands
Mode: RAD Config Interface Mode
Parameters:

address	Set the IP address of an interface
dhcp	Set interface to use DHCP
A.B.C.D	IP Address
address	Set the IP address of an interface
netmask	Subnet Mask for IP Address
A.B.C.D[/mask]	Subnet Mask for IP Address
gw	Gateway for interface
A.B.C.D	Gateway for interface
<cr>	

Example:

```
srarad (config-if-LAN1) # ip address 2.3.4.5 netmask 255.255.255.0 gw 2.3.4.0
srarad (config-if-LAN1) #
```

Command: **no**
Description: Negate a command or set its defaults
Mode: RAD Config Interface Mode
Parameters:

ip	Interface Internet Protocol config commands
address	Set interface to down state
<cr>	

Example:

```
srarad (config-if-WAN1) # no ip address ?
  <cr>

srarad (config-if-WAN1) # no ip address
```

Command: **show**
Description: Ethernet Interface Configuration
Mode: RAD Config Interface Mode
Parameters:
Example:

```
srarad (config-if-WAN1) # show
Interface  Mode                  IP Address       Subnet Mask      Gateway
---------  --------------------  ---------------  ---------------  ---------------
WAN1       IP Address/Gateway    10.0.4.221       255.255.255.0    10.0.4.1
srarad (config-if-LAN1) # show
Interface  Mode                  IP Address       Subnet Mask      Gateway
---------  --------------------  ---------------  ---------------  ---------------
LAN1       IP Address/Gateway    2.3.4.5          255.255.255.0    2.3.4.0
srarad (config-if-LAN1) #
```

RAD Config Map Mode Commands

!	Comments
alarms	Send received alarms to this MAP - only one MAP can receive alarms
enable	RAD will connect to this MAP - Note: cannot modify configuration while connected
exit	Exit from interface configuration mode
ext_port	Set the external port of the MAP - See manual before changing this. Requires equivalent change on MAP itself
map_enable	Override map enable for vpn configured map's - RAD will connect to this map
mode	Set connection mode for this MAP
Available MAP Modes	Available map modes are port_forward, provisioning, and vpn (port_forward/provisioning/vpn)
no	Negate a command or set its defaults
port_forward	Create a Port Forwarding IP/Port pair
show	Display current MAP settings

Command: **!**
Description: Comments
Mode: RAD Config Map Mode
Parameters:
Example:

```
srarad (config) # map 10.0.4.220
srarad (map(10.0.4.220)) # ! xxxxxxxx A
srarad (map(10.0.4.220)) #

srarad (config) # map 4.5.6.7
sh: 0: getcwd() failed: No such file or directory
sh: 0: getcwd() failed: No such file or directory
shell-init: error retrieving current directory: getcwd: cannot access parent directories: No such file or
directory
chdir: error retrieving current directory: getcwd: cannot access parent directories: No such file or
directory
sh: 0: getcwd() failed: No such file or directory
sh: 0: getcwd() failed: No such file or directory

srarad (map(4.5.6.7)) # map_enable

srarad (map(4.5.6.7)) # mode port_forward
sh: 0: getcwd() failed: No such file or directory
sh: 0: getcwd() failed: No such file or directory
shell-init: error retrieving current directory: getcwd: cannot access parent directories: No such file or
directory
chdir: error retrieving current directory: getcwd: cannot access parent directories: No such file or
directory
*** Error: MAP modes need to be synchronized.  MAP 4.5.6.7 is currently enabled.
               Please use 'no enable' from map view before changing configuration
sh: 0: getcwd() failed: No such file or directory
sh: 0: getcwd() failed: No such file or directory
srarad (map(4.5.6.7)) #
```

Command: **alarms**

Description: Send received alarms to this MAP - only one MAP can receive alarms. **Note**: site_alarms must be enabled at Configure view; site_alarms is the backend service which forwards the alarms, and alarms in MAP view is only to select which MAP to forward the alarms to.

Mode: RAD Config Map Mode

Parameters:

Example:

```
srarad (map(4.4.4.44)) # alarms
srarad (map(4.4.4.44)) #
```

Command: **enable**

Description: RAD will connect to this MAP. **Note**: You cannot modify configuration while connected.

Mode: RAD Config Map Mode

Parameters: None

Example:

```
srarad (map(2.3.4.5)) # mode ?
  Available MAP Modes  Available MAP Modes are port_forward, provisioning, and vpn
(port_forward/provisioning/vpn)
srarad (map(2.3.4.5)) # mode port_forward
srarad (map(2.3.4.5)) # enable
srarad (map(2.3.4.5)) #
```

Messages:

**** Set MAP Mode before trying to connect! ****

**** Error: MAP 4.4.4.44 is in VPN mode but the VPN has not been configured. Please create VPN using 'vpn' command from config view, configure the VPN and enable it before enabling MAP in VPN mode*

Command: **exit**

Description: Exit from interface configuration mode

Mode: RAD Config Map Mode

Parameters: None

Example:

```
srarad (map(10.0.4.220)) # exit
srarad (config) #
```

Command: **ext_port**

Description: Set the external port of the MAP - See manual before changing this. Requires equivalent change on MAP itself.

Mode: RAD Config Map Mode

Parameters: External Port External Port of MAP - valid values are 1024-9999.
<cr>

Example:

```
srarad (map(10.0.4.221)) # ext_port 3200
srarad (map(10.0.4.221)) #
```

Command: **map_enable**
Description: Override map enable for vpn configured map's - RAD will connect to this map
Mode: RAD Config Map Mode
Parameters: None
Example:

```
srarad (map(10.0.4.220)) # map_enable
srarad (map(10.0.4.220)) #
```

Command: **mode**
Description: Set connection mode for this MAP. You must set MAP Mode (enable command) before trying to connect.
Mode: RAD Config Map Mode
Parameters:

Available MAP Modes	Available MAP Modes are port_forward, provisioning, and vpn:
port_forward	There can be multiple port forwards per MAP (no limit). There can be multiple MAPs. On a single RAD, if one of the MAPs is in port_forward mode, all MAPs will be in port_forward mode.
provisioning	Usual operation is a RAD selects what to forward (a network via VPN or a set of TCP ports using port forwarding mode) and then it connects to a MAP and forwards what was selected. Provisioning mode is for initial deployment. There would be a MAP that has configurations for several RAD's predefined. A RAD would not have any port forwarding or VPN configuration, instead it would be in provisioning mode. It would connect to the MAP, get its configuration (basically a restore operation), load the new configuration and connect to its MAP, likely a different one from the provisioning one. This could be used by customers with lots of RADs and multiple MAPs to ease deployment. **Note** that provisioning mode is not implemented in v 1.0.x releases.
vpn	Virtual Private Network mode. For VPN, WAN1 would be connected to the network with internet access, likely using dhcp (the default setting on WAN1) or configured with an IP Address and gateway. For VPN, LAN1 would be configured for the separate network that is to be accessed by the MAP users.
ip	IP Address: TCP Port pair to be forwarded from the RAD's local network.

Example:

```
srarad (map(10.0.4.221)) # mode port_forward
srarad (map(10.0.4.221)) # mode provisioning
srarad (map(10.0.4.221)) # mode vpn
srarad (map(10.0.4.221)) #
```

Messages: **** Error: MAP modes need to be synchronized. MAP 2.3.4.5 is currently enabled.*
Please use 'no enable' from map view before changing configuration

Command: **no**

Description: Negate a command or set its defaults

Mode: RAD Config Map Mode

Parameters:

alarms	Do not send alarms to this MAP
enable	RAD will disconnect from this MAP allowing configuration changes
ext_port	Set the External Port back to 443
map_enable	Override map disable for vpn configured map's - RAD will connect to this map
mode	Clear MAP Mode
port_forward	Remove a Port Forwarding IP/Port pair
ip	IP Address of IP Address: TCP Port pair to be removed
A.B.C.D	IP Address of IP Address: TCP Port pair to be removed
tcp_port	TCP Port of IP Address: TCP Port pair to be removed
TCP Port	TCP Port of IP Address: TCP Port pair to be removed (1..65535)

Example:

```
srarad (map(192.168.1.77)) # no ext_port
srarad (map(192.168.1.77)) # no port_forward ip 192.168.1.77 tcp_port 3060
srarad (map(192.168.1.77)) # no map_enable
srarad (map(192.168.1.77)) # no mode
srarad (map(192.168.1.77)) #
```

Messages: **** Error: MAP modes need to be synchronized. MAP 10.0.4.220 is currently enabled.*

Please use 'no enable' from map view before changing configuration

Command: **port_forward**

Description: Create a Port Forwarding IP/Port pair and enter "RAD MAP Port Forward Command" mode; see RAD MAP Port Forward Commands on page 81 below.

Mode: RAD Config Map Mode

Parameters:

	ip	IP Address of IP Address: TCP Port pair to be forwarded from the RAD's local network
	A.B.C.D	IP Address of IP Address: TCP Port pair to be forwarded from the RAD's local network
	tcp_port	TCP Port of IP Address: TCP Port pair to be forwarded from the RAD's local network
	TCP Port	TCP Port of IP Address: TCP Port pair to be forwarded from the RAD's local network (1..65535)

Example 1:

```
srarad (map(10.0.4.221)) # port_forward ip 1.2.3.4 tcp_port 4400
srarad (map-pf(1.2.3.4:4400=>10.0.4.221)) #

srarad (map(10.0.4.220)) # port_forward ip 1.2.3.4 tcp_port 3400
srarad (map-pf(1.2.3.4:3400=>10.0.4.220)) # ?
  !            Comments
  configure    Enter configuration mode
  description  Set a description for this Port Forwarding pair
  exit         Exit from interface configuration mode
  no           Negate a command or set its defaults
  show         Display current Port Forwarding pair settings
  type         Set connection type to allow MAP UI to generate proper URL

srarad (map-pf(1.2.3.4:3400=>10.0.4.220)) #
```

Example 2:

```
srarad (map(1.2.3.4)) # port_forward ip 2.3.4.5 tcp_port 3070
srarad (map-pf(2.3.4.5:3070=>1.2.3.4)) # show
Forwarded IP        Forwarded Port      Type   Description
------------------  ------------------  -----  --------------
2.3.4.5             3070                none   -
srarad (map-pf(2.3.4.5:3070=>1.2.3.4)) #
```

Command: **show**

Description: Display current MAP settings

Mode: RAD Config Map Mode

Parameters: None

Example 1:

```
srarad (map(10.0.4.220)) # show
MAP IP           Mode          State     MAP ID
---------------  ------------  --------  ------
10.0.4.220       -             disable   not yet contacted
srarad (map(10.0.4.220)) #
```

Example 2:

```
srarad (map(4.4.4.44)) # port_forward ip 3.3.3.33 tcp_port 777
srarad (map-pf(3.3.3.33:777=>4.4.4.44)) # show
Forwarded IP        Forwarded Port      Type   Description
------------------  ------------------  -----  --------------
3.3.3.33            777                 none   -
srarad (map-pf(3.3.3.33:777=>4.4.4.44)) #
```

RAD MAP Port Forward Commands

!	Comments
description	Set a description for this Port Forwarding pair
exit	Exit from interface configuration mode
no	Negate a command or set its defaults
show	Display current Port Forwarding pair settings
type	Set connection type to allow MAP UI to generate proper URL

Command: **!**
Description: Comments
Mode: RAD MAP Port Forward Mode
Parameters: ! Comments
Arguments ignored comment text
<cr>
Example:

```
srarad (map-pf(1.2.3.4:3400=>10.0.4.220)) # ! ABC123 Arg
srarad (map-pf(1.2.3.4:3400=>10.0.4.220)) #
```

Command: **description**
Description: Set a description for this Port Forwarding pair
Mode: RAD MAP Port Forward Mode
Parameters: String Description for this Port Forwarding pair
Example:

```
srarad (map-pf(1.2.3.4:3500=>1.2.3.4)) # description PfPair11
srarad (map-pf(1.2.3.4:3500=>1.2.3.4)) # description PfPair22
srarad (map-pf(1.2.3.4:3500=>1.2.3.4)) #
```

Command: **exit**
Description: Exit from interface configuration mode
Mode: RAD MAP Port Forward Mode
Parameters: None
Example:

```
srarad (map-pf(1.2.3.4:3500=>1.2.3.4)) # exit
srarad (map(1.2.3.4)) #
```

Command: **no**
Description: Negate a command or set its defaults
Mode: RAD MAP Port Forward Mode
Parameters: description Clear description for this Port Forwarding pair
type Clear connection type (sets it to none)
Example:

```
srarad (map-pf(1.2.3.4:3060=>1.2.3.4)) # no description ?
  <cr>
srarad (map-pf(1.2.3.4:3060=>1.2.3.4)) # no type ?
  <cr>
srarad (map-pf(1.2.3.4:3060=>1.2.3.4)) #
```

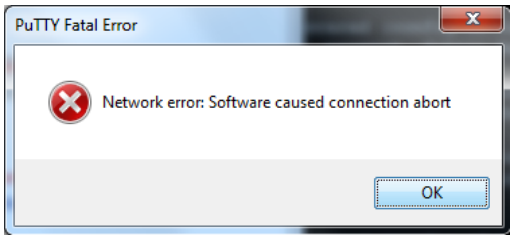
Command: **show**
Description: Display current Port Forwarding pair settings
Mode: RAD MAP Port Forward Mode
Parameters: None
Example:

```
srarad (map-pf(1.2.3.4:3060=>1.2.3.4)) # show
Forwarded IP        Forwarded Port      Type   Description
------------------  ------------------  -----  --------------
1.2.3.4             3060                none   -
srarad (map-pf(1.2.3.4:3060=>1.2.3.4)) #
```

Command: **type**
Description: Set connection type to allow MAP UI to generate proper URL
Mode: RAD MAP Port Forward Mode
Parameters: Available PF connection types Available Port Forwarding connection types are http, https, none, and ssh (http/https/none/ssh)
Example:

```
srarad (map-pf(1.2.3.4:3060=>1.2.3.4)) # type ssh
srarad (map-pf(1.2.3.4:3060=>1.2.3.4)) # type none
srarad (map-pf(1.2.3.4:3060=>1.2.3.4)) # type https
srarad (map-pf(1.2.3.4:3060=>1.2.3.4)) # type http
srarad (map-pf(1.2.3.4:3060=>1.2.3.4)) # show
Forwarded IP        Forwarded Port      Type   Description
------------------  ------------------  -----  --------------
1.2.3.4             3060                http   -
srarad (map-pf(1.2.3.4:3060=>1.2.3.4)) #
```

CLI Messages



Message:

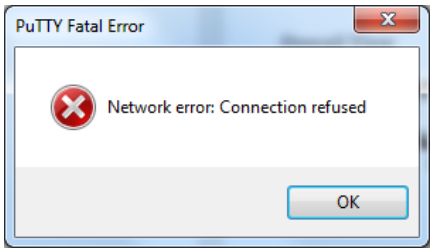
Network error: Software caused connection abort

Network error: Connection refused.

Meaning: A Telnet/SSH client fatal error occurred.

Recovery:

1. Click the OK button to clear the message.
2. Check the client software Help file and/or website.
3. Re-try the CLI command.
4. Verify proper operation of your Telnet/SSH client program.



Message: *Syntax error: The command is not completed*

Meaning: Not all command parameters are entered.

Recovery:

1. Enter the required parameters and continue operation.

Message: *Syntax error: Illegal command line*

Meaning: You entered an unsupported command parameter.

Recovery:

1. Review the command parameters. 2. Re-enter the command and continue operation.

Message: *Please reboot RAD to have new RAD ID show on MAP.*

Meaning: indicates the RAD must be rebooted after modifying RAD ID. Note that modifying the RAD ID is not something that should be happening regularly.

Recovery: 1. Verify that this is what you want to do. 2. After changing the RAD ID, reboot the RAD. 3. Continue operation.

CLI Troubleshooting

The most common mistake is not using a null-modem cable: If you have a multimeter, check that the pins 2 and 3 are crossed. Do NOT use gender changers!

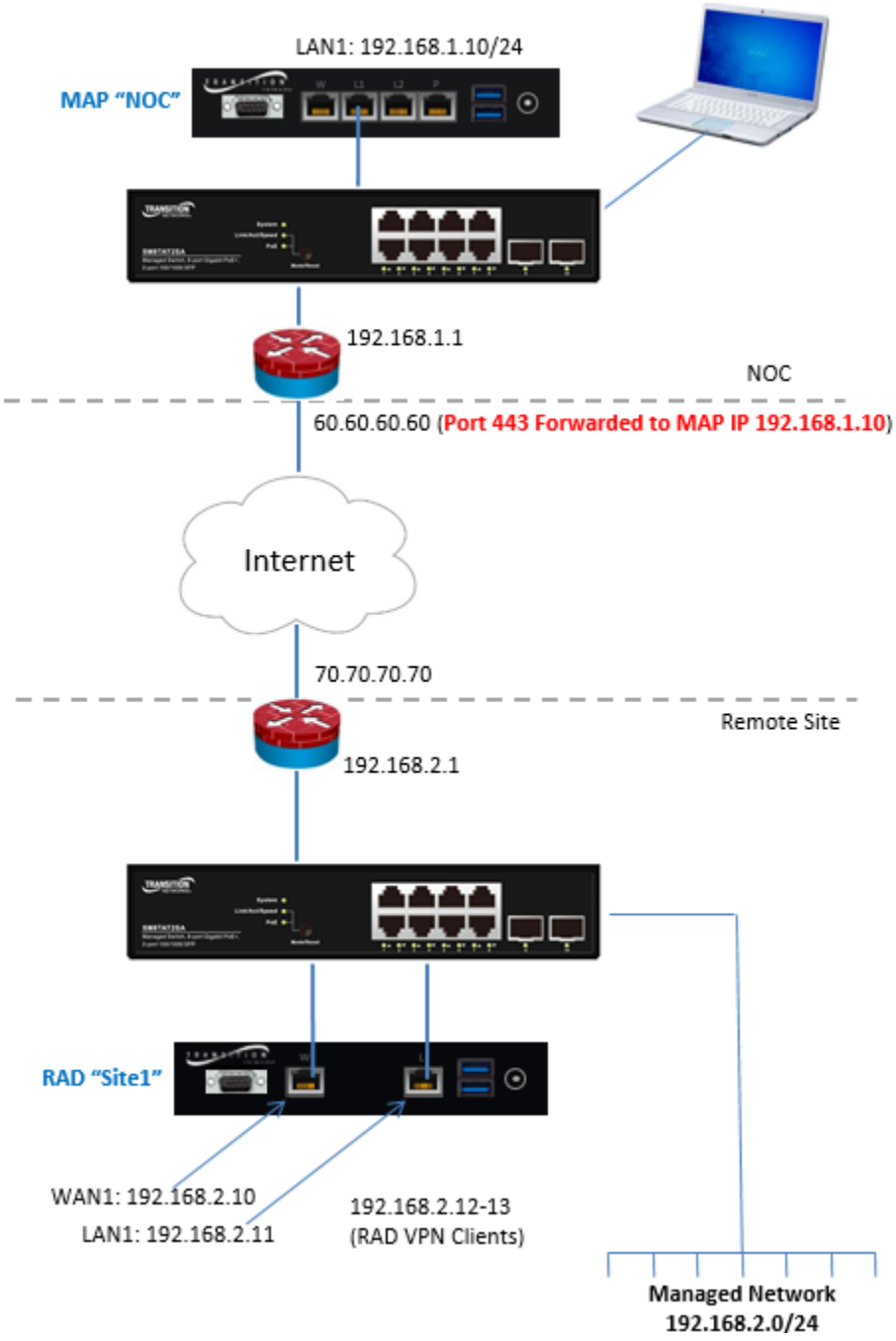
Use Serial port settings: Speed=115200, Parity=None, Data bits=8, Stop bits=1, HW Flow Control=No, and SW Flow Control=No as console port settings. Do not use the serial cable to update the firmware. You can use CABLE-SRA-NMC (optional USB to DB9F Serial Null Modem Cable, or supply a female to female DB9 null modem cable (or a female null modem adapter that converts to USB).

The recommended terminal emulation program for any platform is PuTTY.
See http://www.chiark.greenend.org.uk/~sgtatham/putty/download.html

Configuration Examples

VPN Flat / Flat Network Configuration Using CLI

VPN - Flat NOC / Flat Remote Site



Configure MAP Using CLI

1. Connect to DB9 serial port (115200, 8,n,1) or connect to LAN1 and telnet to the default IP address of 192.168.1.10.
2. Login using default username/password: admin/admin.

CONFIGURE MAP WAN1 INTERFACE

```
sramap # configure terminal
sramap (config) # interface WAN1
sramap (config-if-WAN1) # no ip address
sramap (config-if-WAN1) # exit
```

CONFIGURE MAP LAN1 INTERFACE

```
sramap # configure terminal
sramap (config) # interface LAN1
sramap (config-if-LAN1) # ip address 192.168.1.10 netmask
                          255.255.255.0 gw 192.168.1.1
sramap (config-if-LAN1) # exit
sramap (config) # exit
```

SHOW MAP IP INTERFACES

```
sramap # show ip interface brief
Interface        Address               Method    Status
---------------  --------------------  --------  --------
WAN1             --                    Off       DOWN
LAN1             192.168.1.10/24       Manual    UP
```

SET MAP INTERNET FACING IP

```
sramap # configure terminal
sramap (config) # map ext_ip 60.60.60.60
```

SET MAP ID

```
sramap # configure terminal
sramap (config) # map id NOC
```

SHOW MAP INTERNET FACING IP, INTERNET FACING PORT, ID

```
sramap # show map
MAP Internet Facing IP  MAP Internet Facing Port  MAP ID
----------------------  ------------------------  ------
60.60.60.60             443                       NOC
```

Configure RAD Using CLI

1. Connect to DB9 serial port (115200, 8,n,1) or telnet to default IP address of 192.168.1.10.
2. Login using default username/password: admin/admin.

CONFIGURE RAD WAN1 INTERFACE

```
srarad # configure terminal
srarad (config) # interface WAN1
srarad (config-if-WAN1) # ip address 192.168.2.10 netmask
                          255.255.255.0 gw 192.168.2.1
srarad (config-if-WAN1) # exit
srarad (config) # exit
```

CONFIGURE RAD LAN1 INTERFACE

```
srarad # configure terminal
srarad (config) # interface LAN1
srarad (config-if-LAN1) # ip address 192.168.2.11 netmask
                          255.255.255.0
srarad (config-if-LAN1) # exit
srarad (config) # exit
```

SHOW RAD IP INTERFACES

```
srarad # show ip interface brief
Interface        Address                Method    Status
---------------  ---------------------  --------  --------
WAN1             192.168.2.10/24        Manual    UP
LAN1             192.168.2.11/24        Manual    UP
```

SET RAD ID

```
srarad # configure terminal
srarad (config) # id Site1
srarad (config) # exit
srarad # show rad
         RAD ID:  Site1
```

CONFIGURE RAD VPN

```
srarad # configure terminal
srarad (config) # vpn
srarad (vpn) # mgmt ip 192.168.2.11
srarad (vpn) # client_range_begin ip 192.168.2.12
srarad (vpn) # client_range_count 2
```

Configure RAD Using CLI (cont.)

SHOW RAD VPN CONFIGURATION

```
sradad (vpn) # show
VPN State                                disable
VPN Management IP Address                192.168.2.11
VPN Maximum Simultaneous Client Count    2
VPN Client IP Address Range              192.168.2.12-192.168.2.13
VPN Management IP Address (CIDR)         192.168.2.11/24
VPN Management Network                   192.168.2.0/24
```

CONFIGURE MAP ON RAD

```
sradad (config) # map 60.60.60.60
sradad (map(60.60.60.60)) # mode vpn
sradad (map(60.60.60.60)) # exit
```

SHOW MAP CONFIGURATION

```
sradad (config) # show maps
MAP Internet Facing IP  MAP Internet Facing Port  Mode   Alarms    State     MAP ID
----------------------  ------------------------  ------ --------  --------  ------
60.60.60.60             443                       vpn    disable   disable   NOC
```

ENABLE MAP AND VPN

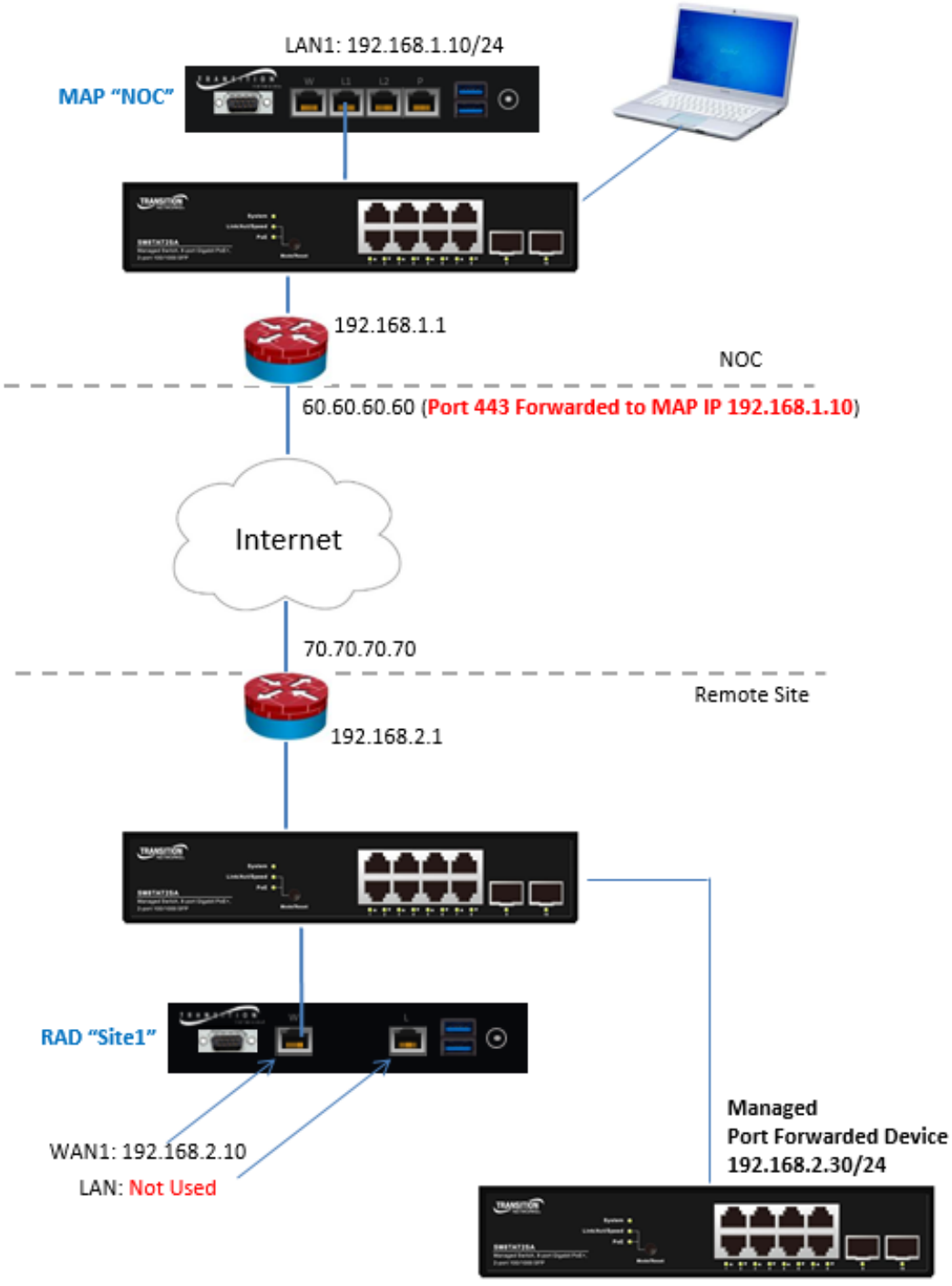
```
sradad (config) # vpn_map_enable
Successfully enabled vpn
Waiting for network reconfiguration (approximately 10 seconds)
Successfully enabled vpn map 60.60.60.60
vpn_map_enable complete
```

SHOW MAP VPN STATUS

```
sradad # show maps
MAP Internet Facing IP  Status  Status Info
----------------------  ------  -----------
60.60.60.60             <---->  Connected in VPN mode - forwarding to port 14999
```

Port Forwarding Flat / Flat Network Configuration Using CLI

Port Forwarding - Flat NOC / Flat Remote Site



Configure MAP Using CLI

1. Connect to DB9 serial port (115200, 8,n,1) or connect to LAN1 and telnet to the default IP address of 192.168.1.10.
2. Login using default username/password: admin/admin

CONFIGURE MAP WAN1 INTERFACE

```
sramap # configure terminal
sramap (config) # interface WAN1
sramap (config-if-WAN1) # no ip address
sramap (config-if-WAN1) # exit
```

CONFIGURE MAP LAN1 INTERFACE

```
sramap # configure terminal
sramap (config) # interface LAN1
sramap (config-if-LAN1) # ip address 192.168.1.10 netmask
                          255.255.255.0 gw 192.168.1.1
sramap (config-if-LAN1) # exit
sramap (config) # exit
```

SHOW MAP IP INTERFACES

```
sramap # show ip interface brief
Interface        Address                Method    Status
---------------  ---------------------  --------  --------
WAN1             --                     Off       DOWN
LAN1             192.168.1.10/24        Manual    UP
```

SET MAP INTERNET FACING IP

```
sramap # configure terminal
sramap (config) # map ext_ip 60.60.60.60
```

SET MAP ID

```
sramap # configure terminal
sramap (config) # map id NOC
```

SHOW MAP INTERNET FACING IP, INTERNET FACING PORT, ID

```
sramap # show map
MAP Internet Facing IP  MAP Internet Facing Port  MAP ID
----------------------  ------------------------  ------
60.60.60.60             443                       NOC
```

Configure RAD Using CLI

1. Connect to DB9 serial port (115200, 8,n,1) or telnet to default IP address of 192.168.1.10.
2. Login using default username/password: admin/admin.

CONFIGURE RAD WAN1 INTERFACE

```
srarad # configure terminal
srarad (config) # interface WAN1
srarad (config-if-WAN1) # ip address 192.168.2.10 netmask
                          255.255.255.0 gw 192.168.2.1
srarad (config-if-WAN1) # exit
srarad (config) # exit
```

CONFIGURE RAD LAN1 INTERFACE

```
srarad # configure terminal
srarad (config) # interface LAN1
srarad (config-if-LAN1) # no ip address
srarad (config-if-LAN1) # exit
srarad (config) # exit
```

SHOW RAD IP INTERFACES

```
srarad # show ip interface brief
Interface        Address                Method    Status
---------------  ---------------------  --------  --------
WAN1             192.168.2.10/24        Manual    UP
LAN1             --                     Off       DOWN
```

SET RAD ID

```
srarad # configure terminal
srarad (config) # id Site1
srarad (config) # exit
srarad # show rad
         RAD ID:  Site1
```

CONFIGURE RAD PORT FORWARDING

```
srarad # configure terminal
srarad (config) # map 60.60.60.60
srarad (map(60.60.60.60)) # mode port_forward
srarad (map(60.60.60.60)) # port_forward ip 192.168.2.30 tcp_port 80
srarad (map-pf(192.168.2.30:80=>60.60.60.60)) # description "HTTP to 192.168.2.30"
srarad (map-pf(192.168.2.30:80=>60.60.60.60)) # exit
srarad (map(60.60.60.60)) # enable
```

Configure RAD Using CLI (cont.)

SHOW RAD PORT FORWARDING CONFIGURATION

```
sradad (map(60.60.60.60)) # show
MAP Internet Facing IP MAP Internet Facing Port Mode         Alarms
State    MAP ID     Description Type  Forwarded IP    Forwarded Port
-------------------- ---------------------- ------------ --------
-------- -----> <_____________ _____ _____________ _____________
60.60.60.60            443                  port_forward disable
enable   NOC  HTTP to 192.168.2.30 http  192.168.2.30    80
192.168.2.0/24
```

SHOW MAP CONFIGURATION

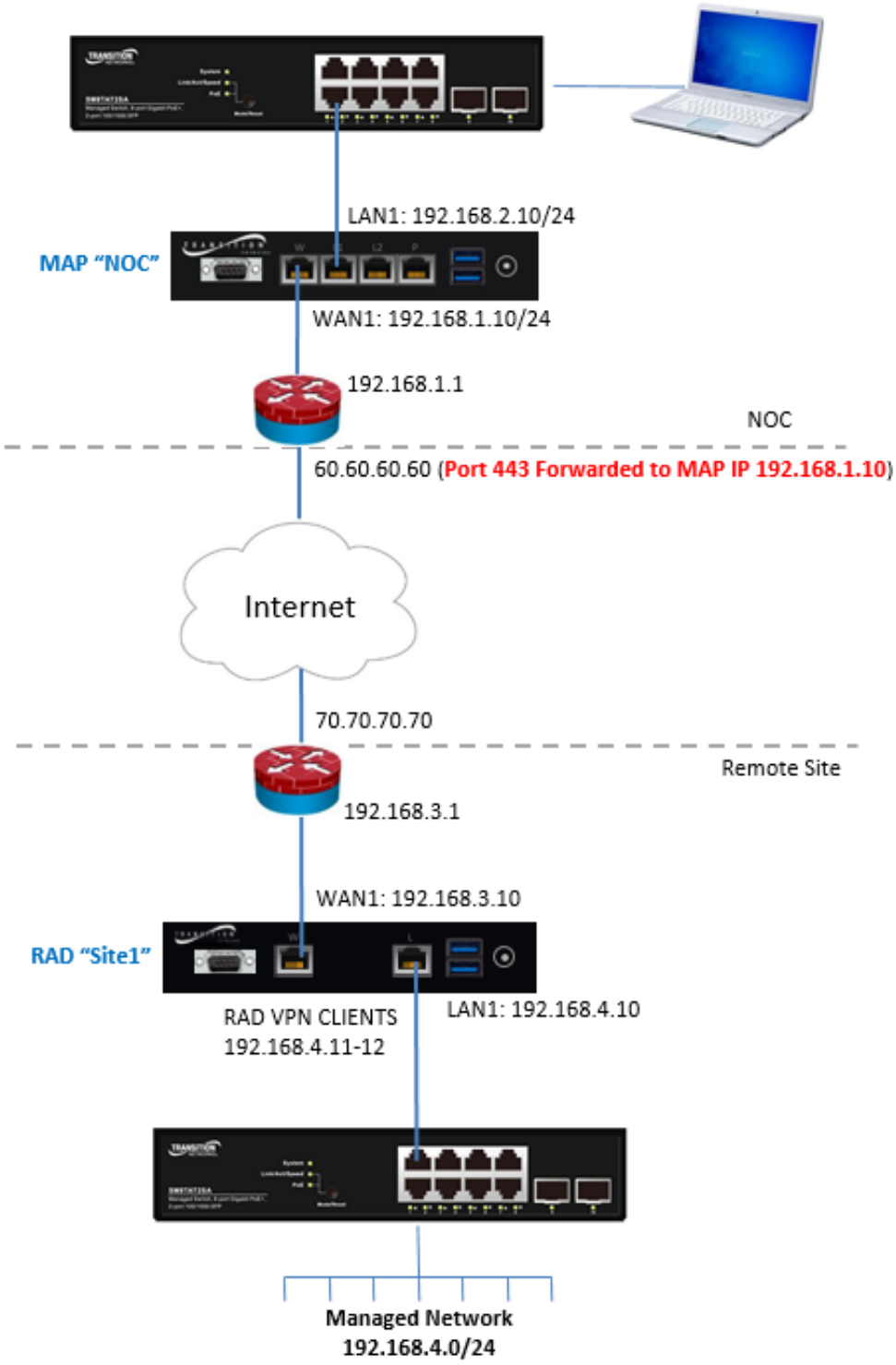
```
sradad (config) # show maps
MAP Internet Facing IP  MAP Internet Facing Port  Mode          Alarms    State     MAP ID
--------------------  ----------------------  ------------  --------  --------  ------
60.60.60.60             443                     port_forward  disable   enable    NOC
```

SHOW MAP STATUS

```
sradad # show maps
MAP Internet Facing IP  Status  Status Info
----------------------  ------  -----------
60.60.60.60             <---->  Connected in Port Forwarding mode
```

VPN Tiered / Tiered Network Configuration Using CLI

VPN - Tiered NOC / Tiered Remote Site



Configure MAP Using CLI

1. Connect to DB9 serial port (115200, 8,n,1) or connect to LAN1 and telnet to the default IP address of 192.168.1.10.
2. Login using default username/password: admin/admin.

CONFIGURE MAP WAN1 INTERFACE

```
sramap # configure terminal
sramap (config) # interface WAN1
sramap (config-if-WAN1) # ip address 192.168.1.10 netmask
                          255.255.255.0 gw 192.168.1.1
sramap (config-if-WAN1) # exit
sramap (config) # exit
```

CONFIGURE MAP LAN1 INTERFACE

```
sramap # configure terminal
sramap (config) # interface LAN1
sramap (config-if-LAN1) # ip address 192.168.2.10 netmask
                          255.255.255.0
sramap (config-if-LAN1) # exit
sramap (config) # exit
```

SHOW MAP IP INTERFACES

```
sramap # show ip interface brief
Interface        Address                Method    Status
---------------  ---------------------  --------  --------
WAN1             192.168.1.10/24        Manual    UP
LAN1             192.168.2.10/24        Manual    UP
```

SET MAP INTERNET FACING IP

```
sramap # configure terminal
sramap (config) # map ext_ip 60.60.60.60
```

SET MAP ID

```
sramap # configure terminal
sramap (config) # map id NOC
```

SHOW MAP INTERNET FACING IP, INTERNET FACING PORT, ID

```
sramap # show map
MAP Internet Facing IP  MAP Internet Facing Port  MAP ID
----------------------  ------------------------  ------
60.60.60.60             443                       NOC
```

Configure RAD Using CLI

1. Connect to DB9 serial port (115200, 8,n,1) or telnet to default IP address of 192.168.1.10.
2. Login using default username/password: admin/admin.

CONFIGURE RAD WAN1 INTERFACE

```
srarad # configure terminal
srarad (config) # interface WAN1
srarad (config-if-WAN1) # ip address 192.168.3.10 netmask
                          255.255.255.0 gw 192.168.3.1
srarad (config-if-WAN1) # exit
srarad (config) # exit
```

CONFIGURE RAD LAN1 INTERFACE

```
srarad # configure terminal
srarad (config) # interface LAN1
srarad (config-if-LAN1) # ip address 192.168.4.10 netmask
                          255.255.255.0
srarad (config-if-LAN1) # exit
srarad (config) # exit
```

SHOW RAD IP INTERFACES

```
srarad # show ip interface brief
Interface        Address                Method    Status
---------------  ---------------------  --------  --------
WAN1             192.168.3.10/24        Manual    UP
LAN1             192.168.4.10/24        Manual    UP
```

SET RAD ID

```
srarad # configure terminal
srarad (config) # id Site1
srarad (config) # exit
srarad # show rad
         RAD ID:  Site1
```

CONFIGURE RAD VPN

```
srarad # configure terminal
srarad (config) # vpn
srarad (vpn) # mgmt ip 192.168.4.10
srarad (vpn) # client_range_begin ip 192.168.4.11
srarad (vpn) # client_range_count 2
```

Configure RAD Using CLI (cont.)

SHOW RAD VPN CONFIGURATION

```
sradad (vpn) # show
VPN State                                disable
VPN Management IP Address                192.168.4.10
VPN Maximum Simultaneous Client Count    2
VPN Client IP Address Range              192.168.4.11-192.168.4.12
VPN Management IP Address (CIDR)         192.168.4.10/24
VPN Management Network                   192.168.4.0/24
```

CONFIGURE MAP ON RAD

```
sradad (config) # map 60.60.60.60
sradad (map(60.60.60.60)) # mode vpn
sradad (map(60.60.60.60)) # exit
```

SHOW MAP CONFIGURATION

```
sradad (config) # show maps
MAP Internet Facing IP  MAP Internet Facing Port  Mode   Alarms    State     MAP ID
----------------------  ------------------------  ------ --------  --------  ------
60.60.60.60             443                       vpn    disable   disable   NOC
```

ENABLE MAP AND VPN

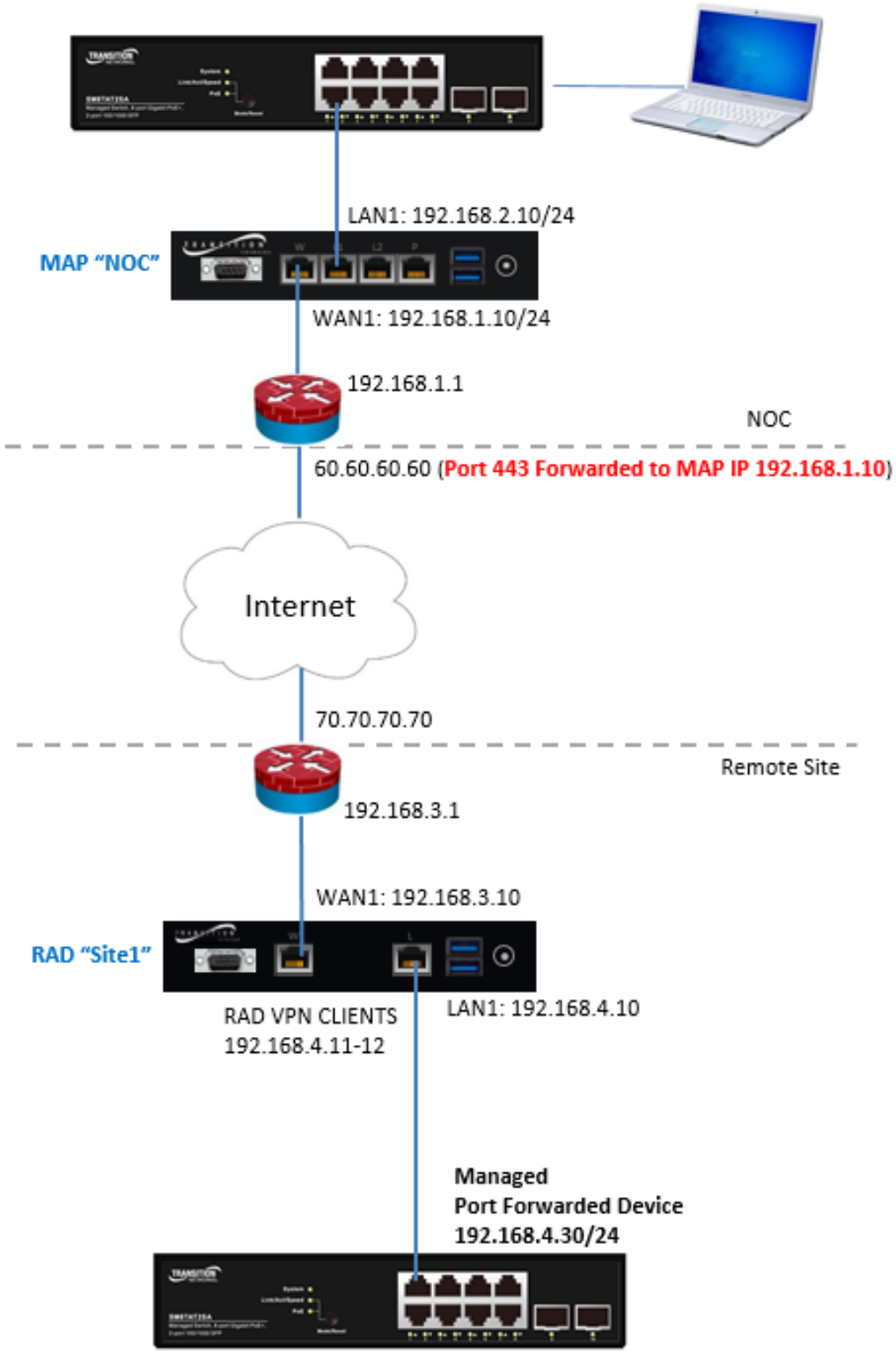
```
sradad (config) # vpn_map_enable
Successfully enabled vpn
Waiting for network reconfiguration (approximately 10 seconds)
Successfully enabled vpn map 60.60.60.60
vpn_map_enable complete
```

SHOW MAP VPN STATUS

```
sradad # show maps
MAP Internet Facing IP  Status  Status Info
----------------------  ------  -----------
60.60.60.60             <---->  Connected in VPN mode - forwarding to port 14999
```

Port Forwarding Tiered / Tiered Network Configuration Using CLI

Port Forwarding - Tiered NOC / Tiered Remote Site



Configure MAP Using CLI

1. Connect to DB9 serial port (115200, 8,n,1) or connect to LAN1 and telnet to the default IP address of 192.168.1.10.
2. Login using default username/password: admin/admin.

CONFIGURE MAP WAN1 INTERFACE

```
sramap # configure terminal
sramap (config) # interface WAN1
sramap (config-if-WAN1) # ip address 192.168.1.10 netmask
                          255.255.255.0 gw 192.168.1.1
sramap (config-if-WAN1) # exit
sramap (config) # exit
```

CONFIGURE MAP LAN1 INTERFACE

```
sramap # configure terminal
sramap (config) # interface LAN1
sramap (config-if-LAN1) # ip address 192.168.2.10 netmask
                          255.255.255.0
sramap (config-if-LAN1) # exit
sramap (config) # exit
```

SHOW MAP IP INTERFACES

```
sramap # show ip interface brief
Interface        Address                Method    Status
---------------  ---------------------  --------  --------
WAN1             192.168.1.10/24        Manual    UP
LAN1             192.168.2.10/24        Manual    UP
```

SET MAP INTERNET FACING IP

```
sramap # configure terminal
sramap (config) # map ext_ip 60.60.60.60
```

SET MAP ID

```
sramap # configure terminal
sramap (config) # map id NOC
```

SHOW MAP INTERNET FACING IP, INTERNET FACING PORT, ID

```
sramap # show map
MAP Internet Facing IP  MAP Internet Facing Port  MAP ID
----------------------  ------------------------  ------
60.60.60.60             443                       NOC
```

Configure RAD Using CLI

1. Connect to DB9 serial port (115200, 8,n,1) or telnet to default IP address of 192.168.1.10.
2. Login using default username/password: admin/admin.

CONFIGURE RAD WAN1 INTERFACE

```
srarad # configure terminal
srarad (config) # interface WAN1
srarad (config-if-WAN1) # ip address 192.168.3.10 netmask
                          255.255.255.0 gw 192.168.3.1
srarad (config-if-WAN1) # exit
srarad (config) # exit
```

CONFIGURE RAD LAN1 INTERFACE

```
srarad # configure terminal
srarad (config) # interface LAN1
srarad (config-if-LAN1) # ip address 192.168.4.10 netmask
                          255.255.255.0
srarad (config-if-LAN1) # exit
srarad (config) # exit
```

SHOW RAD IP INTERFACES

```
srarad # show ip interface brief
Interface        Address                Method    Status
---------------  ---------------------  --------  --------
WAN1             192.168.3.10/24        Manual    UP
LAN1             192.168.4.10/24        Manual    UP
```

SET RAD ID

```
srarad # configure terminal
srarad (config) # id Site1
srarad (config) # exit
srarad # show rad
         RAD ID:  Site1
```

CONFIGURE RAD PORT FORWARDING

```
srarad # configure terminal
srarad (config) # map 60.60.60.60
srarad (map(60.60.60.60)) # mode port_forward
srarad (map(60.60.60.60)) # port_forward ip 192.168.4.30 tcp_port 80
srarad (map-pf(192.168.4.30:80=>60.60.60.60)) # description "HTTP to
192.168.4.30"
srarad (map-pf(192.168.4.30:80=>60.60.60.60)) # exit
srarad (map(60.60.60.60)) # enable
```

Configure RAD Using CLI (cont.)

SHOW RAD PORT FORWARDING CONFIGURATION

```
sradad (map(60.60.60.60)) # show
MAP Internet Facing IP MAP Internet Facing Port Mode          Alarms   State
MAP ID     Description Type  Forwarded IP    Forwarded Port
---------------------- ----------------------- ------------ -------- -------- --
---> <_____________ _____ _____________ _____________
60.60.60.60            443                    port_forward disable  enable
NOC  HTTP to 192.168.4.30 http  192.168.4.30    80
```

SHOW MAP CONFIGURATION

```
sradad (config) # show maps
MAP Internet Facing IP  MAP Internet Facing Port  Mode          Alarms    State     MAP ID
----------------------  ------------------------  ------------  --------  --------  ------
60.60.60.60             443                       port_forward  disable   enable    NOC
```

SHOW MAP STATUS

```
sradad # show maps
MAP Internet Facing IP  Status  Status Info
----------------------  ------  -----------
60.60.60.60             <---->  Connected in Port Forwarding mode
```

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