



Getting Started

Setting up a Meru Controller

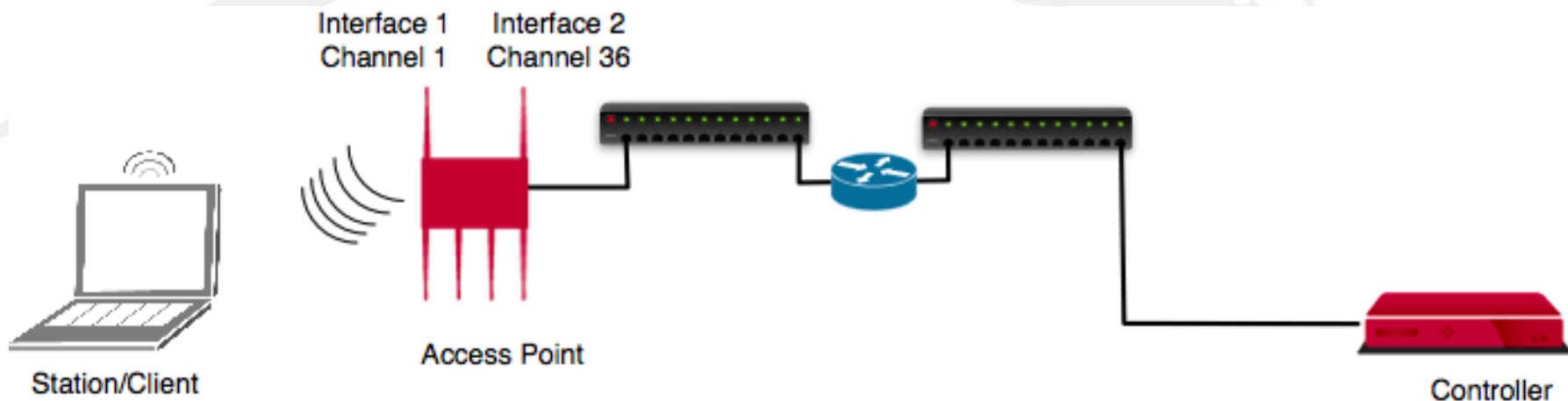
Skills Reviewed

There are some typical things you'll need to do with your network:

- >Set up a controller
- >Configure users
- >Add a License
- >Upgrade the system software

Terminology

- > Station / Client / Device / Supplicant
- > Access Point
 - Interface / Radio
- > Controller



AP addressing

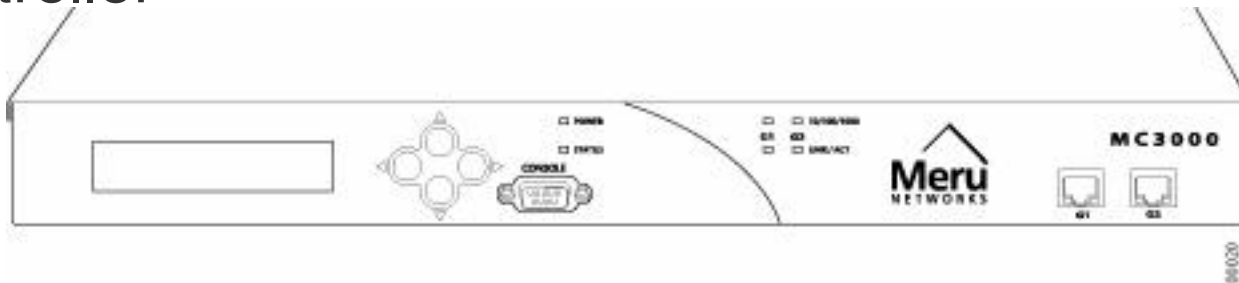
- > Each AP addressed only by index number
- > Each AP has one or two radio interfaces
 - Each radio interface addressed by index number
- > AP names are used in tables, but are not authoritative

Wireless Interface Configuration (5 entries)

<input type="checkbox"/>	AP ID	AP Name	Interface Index	AP Model	Administrative Status	Operational Status	Channel	Operating Channel	Short Preamble	RF Band Selection	AP Mode
Search:											
<input type="checkbox"/>	1	AP-1	2	AP320	Up	Enabled	36	36	Off	802.11an	Normal Mode
<input type="checkbox"/>	1	AP-1	1	AP320	Up	Enabled	6	6	On	802.11bgn	Normal Mode
<input type="checkbox"/>	2	AP-2	1	AP201	Up	Enabled	6	6	On	802.11bg	Normal Mode
<input type="checkbox"/>	3	AP-3	2	AP208	Up	Enabled	36	36	Off	802.11a	Normal Mode
<input type="checkbox"/>	3	AP-3	1	AP208	Up	Enabled	6	6	On	802.11bg	Normal Mode

Connecting to the Controller

- > Serial connectivity required for initial configuration
 - Null-modem serial cable with DB9 (MC500, 1000, 3000, 4100) or RJ-45 (MC1500, MC5000) connector
 - 115200 bps, 8 bits, no parity, 1 stop bit, no flow control
- > Have Ethernet link established before powering up controller



setup script

- > Simple way to set basic controller parameters
 - Hostname
 - Admin password – Change to a strong and unguessable string
 - Guest password – Change to a strong and unguessable string
 - IP address
 - Static vs. DHCP
 - Timezone
 - Controller index
- > Then, administration can be performed through:
 - SSH
 - Web (using https)

Turning Off the Controller

> Issue the command:

poweroff controller

- Unmounts files gracefully

> After System halted/Power down message appears on console, turn the power switch off.

WEB Interface Overview

Logging into the WEB Interface

- △ To login to the Web Interface, type the following in a web browser:

`http://controller_interface_address`

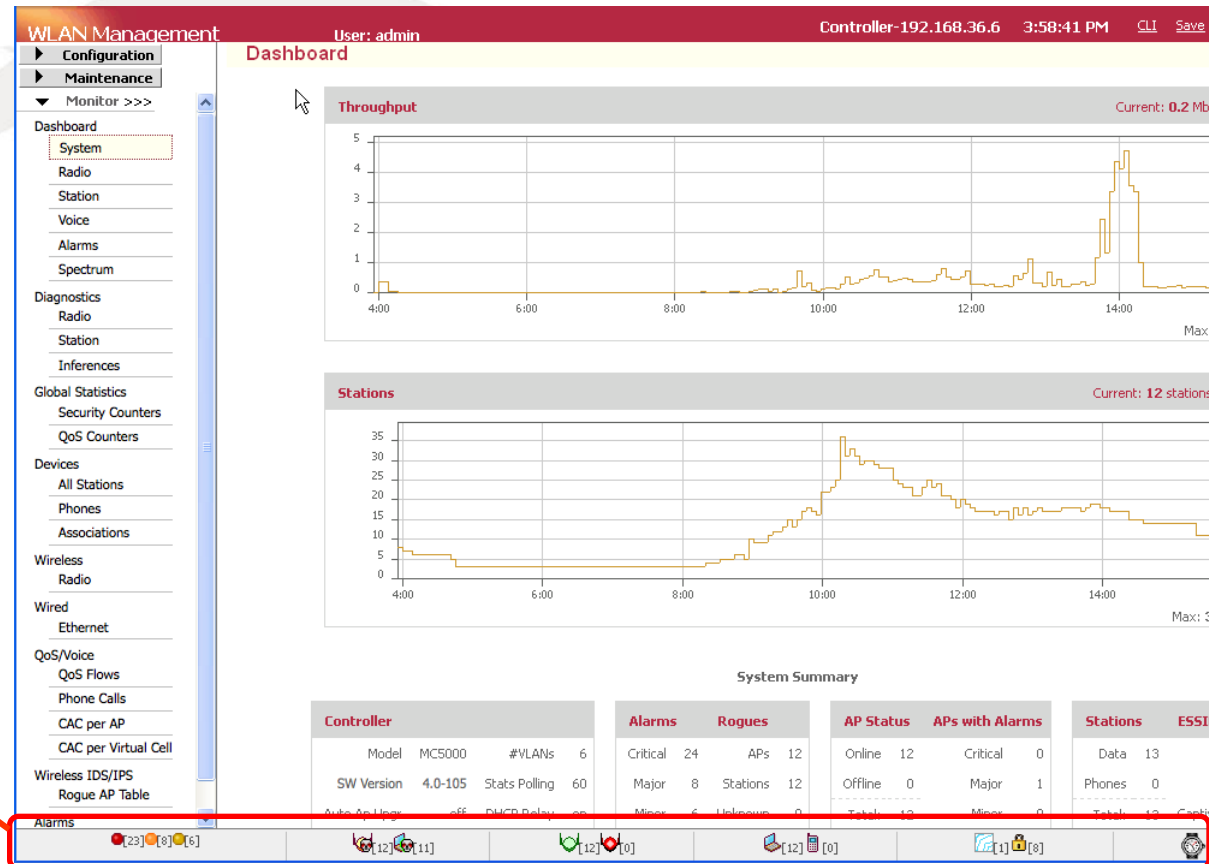
- △ Click “Yes” to proceed at the security alert



- △ At the username & password login prompt enter “admin” as the username and your current admin account password (default is “admin”).

System Dashboard

- △ First page that is displayed after login is the System “Dashboard”.
- △ Use this page as graphical reference of overall network health.
- △ Graphs display
 - △ Throughput
 - △ Number of stations
- △ Moving cursor over graph pops up data on a per-minute basis
- △ Current access point statistics available
- △ Bottom frame lists current status



Status Icons

> These icons show you, at a glance, data about your network.



Alarms

Rogues

APs

Stations

ESSes

WEB Interface Overview

- > Click on the “Configuration” button to get to configuration options
- > Most administrative functions are available through this Web interface

WLAN Management

Monitor

Maintenance

Configuration

System Config

Quick Start

Security

Profile

Radius

Captive Portal

Guest Users

Mac Filtering

Wireless IDS/IPS

Rogue APs

Air Shield

IDS

Wired

VLAN

GRE

Wireless

Radio

ESS

QoS

System Settings

Devices

System Settings

Controller

APs

Antennas

Redirect

SNMP

Setup

Certificate Management

User: admin

Controller-192.168.1.15 12:11:11 AM CLI Save Help

MCRT

Creating Profiles for Your WLAN - Update

Creating Profiles for Your WLAN

VLAN

Security Profile

ESS profile

Radius profile

Captive Portal

Step 1

Click the VLAN tab to create a VLAN

Each ESS profile in your WLAN should map onto a unique VLAN. This allows the client traffic in each SSID to be kept secure and separate from clients in other SSIDs. Pick a name for the VLAN that represents the traffic that the VLAN will carry. Assign a unique IP address and subnet mask to the VLAN. The wireless clients in the VLAN will need an IP address within the VLAN's subnet for the network to operate properly. As well, to use DHCP for this VLAN, enter the IP address of the VLAN's DHCP server.

Step 2

Click the Security Profile tab to create a Security Profile

A security profile defines the security requirements for the ESS. For guest networks, you may want to retain the default profile, which provides non-encrypted traffic (the Clear setting). To create a secure network, enable one of the security protocols offered, in the order of most to least secure: WPA2 with CCMP-AES, WPA with TKIP, 802.1X, WPA-PSK, and static WEP keys. For help with the configuration steps for WPA2, WPA, and 802.1X, open the online Help in the Security Profile - Add or refer to the Getting Started Guide.

Step 3

Click the ESS Profile tab to create an ESS profile

As you create an ESS profile, assign the Security Profile and VLAN created in Steps 1 and 2. The rest of the values may be left with the default values. These setting ensure that the ESS will be operational on all of the APs in the WLAN, and the system will optimize performance for your wireless resources.

Step 4 (Optional)

Click the Radius Profile tab to create a RADIUS Profile

Name the profile, set the RADIUS server IP address and the secret.

Step 5 (Optional)

Click the Captive Portal tab to create a Captive Portal

Be sure you have enabled Captive Portal in the Security Profile and select the Radius server you created step 4 to Authenticate users.

Pages display data or allow changes

Refresh

Settings

View Details

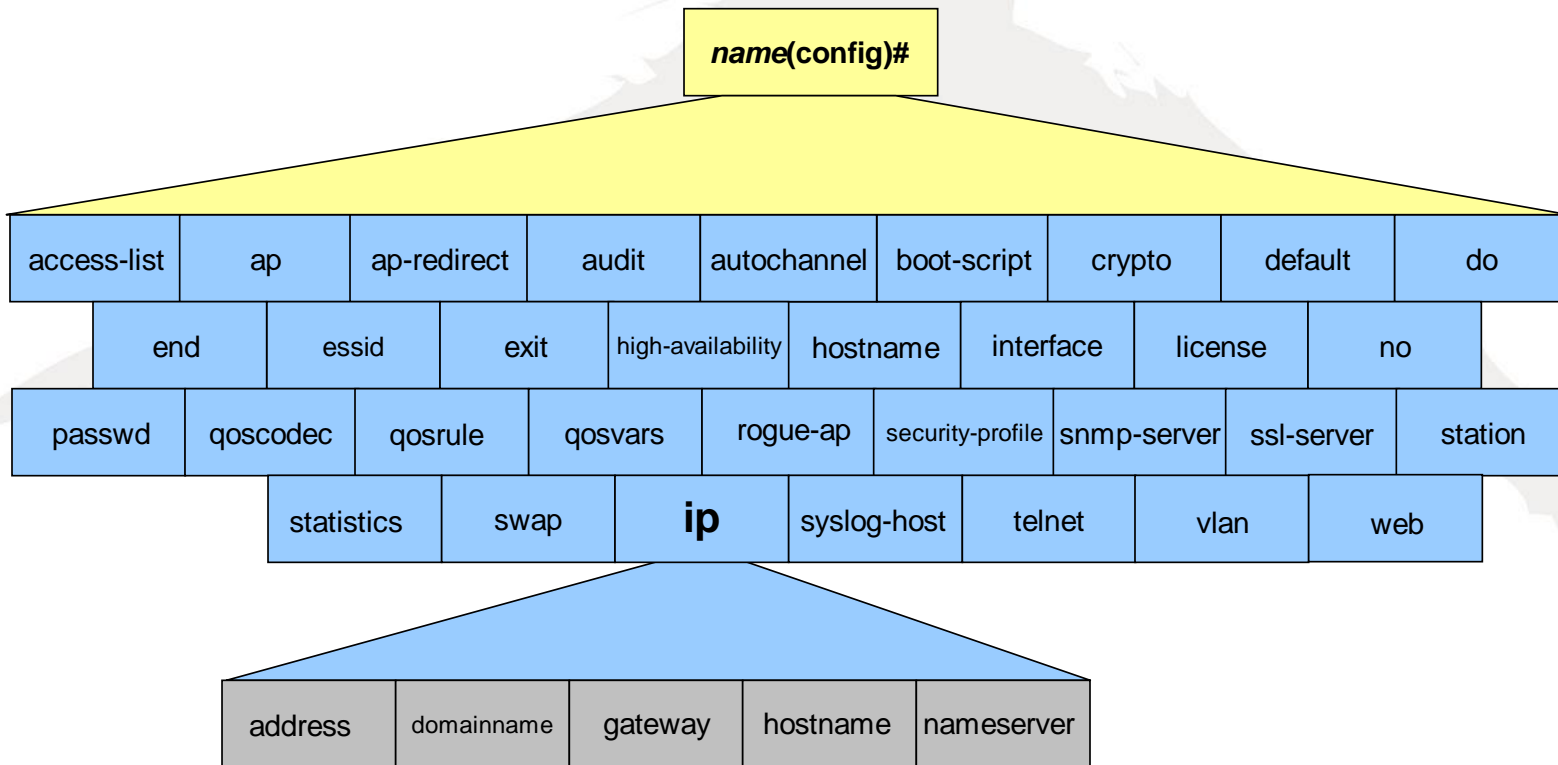
Click buttons to access different functions

Click hyperlinks in left navigation bar to go to the topic

CLI Shortcut

The CLI Command Tree

- > The Command Line Interface (CLI) is the command shell used to centrally configure, manage and troubleshoot the WLAN system.



- > It provides a reasonable number of choices at each point.
- > Some commands take you to levels of choices

CLI Syntax

- > CLI commands at top level have the format
 - [no] *action target* [parameter value] [parameter value] ...
 - For example:
 - *name# show essid*
- > In some cases, the *action* will take you to another level of the CLI, indicated by a prompt change
- > CLI commands in config modes have the format
 - [no] *parameter (value)*
 - For example:
 - *name(config)# rogue-ap detection*
- > The `exit` and `end` commands are different:
 - **exit** [saves and] returns you to the previous config mode
 - **end** [saves and] returns you to exec mode
 - Control-C exits without saving changes

Useful CLI Navigation Tips

- > **help** or **?** – displays list of available commands
- > **Tab** – displays list of commands in columns
- > **command ?** – displays list of parameters
 - For example: **show a?** displays all the commands beginning with “a” for which the **show** command will work
- > **Command completion**
 - Tab key to complete command
 - If the command is not unique, you are prompted with choices
- > **Command history (and editing)**
 - Up arrow key to review
 - Left arrow key to move cursor
 - Backspace key to erase (to the left)
 - Type to insert text
 - Enter key to rerun the displayed (or edited) command
- > **Text search**
 - `show argument | grep text`

CLI Admin Users

- > Default Admin Login Account
 - Username – `admin`
 - Password – `admin`
 - `setup` script suggests change from default
- > Default guest account disabled for CLI in 4.0
- > Enable the guest account with
 - `administrator guest enable`

Adding Web UI Groups and Users

- > Add Group first
 - Add Group ID
 - Add Group Number
 - Set permissions at group level
 - Java applet may require additional OS permissions and/or confirmations
- > Add Users
 - Set User ID
 - Set password
 - Select Group ID

User Management

User Management Group Management

Groups

Configure user groups and privileges here

Group ID Group Number Privileges

Add Group

Group Information

Group ID (1 - 16 chars: lowercase alphanumeric, '-', and '_')

Group Number (700 - 799)

Privileges

Monitor

- Dashboard
 - ☒ All Dashboards and Diagnostics
- Global Statistics
 - ☐ Security Counters
 - ☐ QoS Counters
- Devices (monitor tab)
 - ☐ All Stations
 - ☐ Phones
 - ☐ Associations
- Wireless (monitor tab)
 - ☐ Radio (monitor tab)
- Wired (monitor tab)
 - ☐ Ethernet
- QoS/Voice

Select All Unselect All Apply Close

Refresh

Add...

Upgrading the System Software

- > Backup the configuration
- > Copy the upgrade package to the controller
- > Verify the date setting on the controller
- > Use the **upgrade system** command
 - This command reboots the controller after the upgrade is complete
- > Use the **downgrade system** command to revert

For installations with more than 100 APs, we recommend

- > Turn off auto AP upgrade feature
- > Use the **upgrade controller** command
- > **Warning: powering off a controller or AP during upgrade can “brick” the device.**
 - 4.0 software has flash recovery partition

Batch Upgrading APs

> Use `upgrade ap same range | all`

- *range* is a list of one or more AP indexes, separated by commas and dashes, in ascending order
- Upgrade about 100 APs at a time
- This command reboots the APs after the upgrade

> Relevant CLI commands

- `auto-ap-upgrade disable`
- `auto-ap-upgrade enable`

Uploading a License File

- > Have license file ready on ftp server (or scp, tftp)
- > Maintenance button
- > Import License link
- > Select Controller Type
- > Upload license file (locate through navigation)
- > Import License button

The screenshot displays the 'WLAN Management' web interface. The left sidebar contains a navigation menu with the following items: Monitor, Configuration, Maintenance, Reboot, Controller/APs, Captive Portal, Import File, Customization, AP Replacement, Settings, Syslog, View Syslog Files, Password, Change Password, Licensing, Licenses, Import License, Export License, View License, Large Tables, Max Page Size, Save, Save configuration, Technical Support, and Support Info. The 'Maintenance' button is circled in red. The 'Import License' link under the 'Licensing' section is also circled in red. The main content area is titled 'Import License' and shows a three-step process: Step 1: Select Controller Type, with radio buttons for 'Active' and 'Standby'; Step 2: Select a License File, with a 'Browse...' button; Step 3: Import the License, with an 'Import License' button. The 'Import License' button at the bottom right of the main content area is circled in red. The top of the interface shows the title 'WLAN Management', the IP address 'Controller-192.168.6.15', the time '8:31:00 AM', and buttons for 'Save' and 'Help'.

Deploy APs

- > Add location information
 - Name AP using location info
- > Select channel and virtualization setting
 - Bulk update
- > Select connectivity

AP Table - Update

AP Configuration	ESS-AP Table	Wireless Interface	Wireless Statistics	Ethernet Interface	Ethernet Statistics	Connectivity	Antenna Property
------------------	--------------	--------------------	---------------------	--------------------	---------------------	--------------	------------------

Summary Selection

AP ID		2
AP Name	<input type="text" value="AP-2"/>	Enter 1-63 chars., Required
Serial Number	<input type="text" value="00.0c.e6.04.79.d5"/>	
Location	<input type="text"/>	Enter 0-64 chars.
Building	<input type="text"/>	Enter 0-64 chars.

Configuring APs for Controller Discovery

> L2/L3: Use AP Redirect

- APs can be “assigned” to a specific controller

> L3: Configure APs for L3 discovery while on L2 subnet

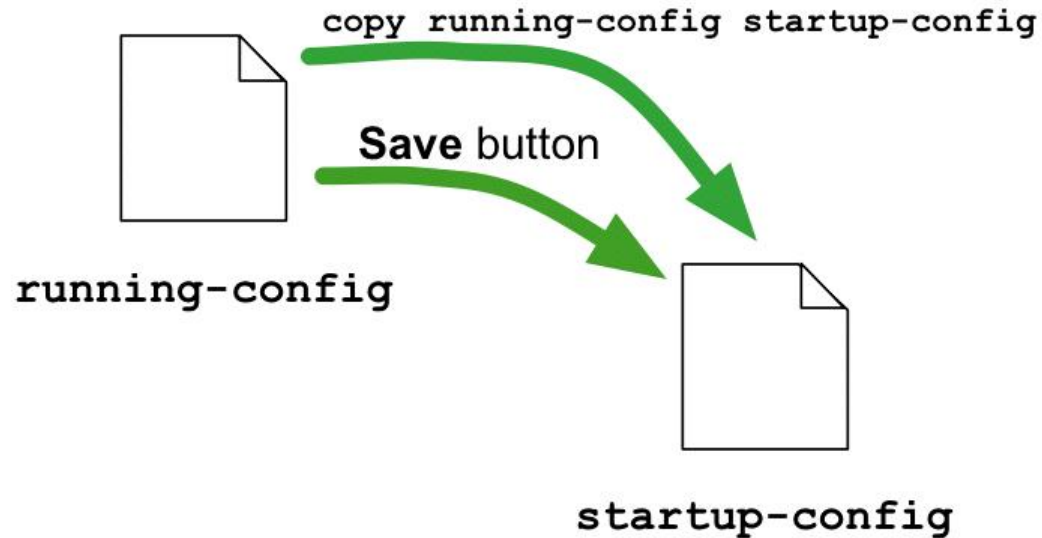
- IP address, or
- DNS name (wlan-controller)


AP Network Connectivity configuration (1 entry)

AP Configuration	ESS-AP Table	Wireless Interface	Wireless Statistics	Ethernet 1
<u>Summary Selection</u>				
AP ID	1			
IfIndex	1			
IP Configuration		DHCP		
Static IP Address		0 . 0 . 0 . 0		
Static IP Netmask		0 . 0 . 0 . 0		
Static Default Gateway		0 . 0 . 0 . 0		
Primary DNS Server		0 . 0 . 0 . 0		
Secondary DNS Server		0 . 0 . 0 . 0		
AP Host Name		ap		Enter 0-63 chars.
Discovery Protocol		L2 preferred		
Controller Address		0 . 0 . 0 . 0		
Controller Host Name		wlan-controller		Enter 0-63 chars.
Controller Domain Name				Enter 0-256 chars.
Show Detail Info...				

Saving Your Work

- > Current operational parameters are stored in **running-config**
- > Boot-up parameters are viewable in **startup-config**
- > Changes to the **running-config** file must be saved to be persistent across rebooting
 - Use **copy** command
 - Use **Save** link



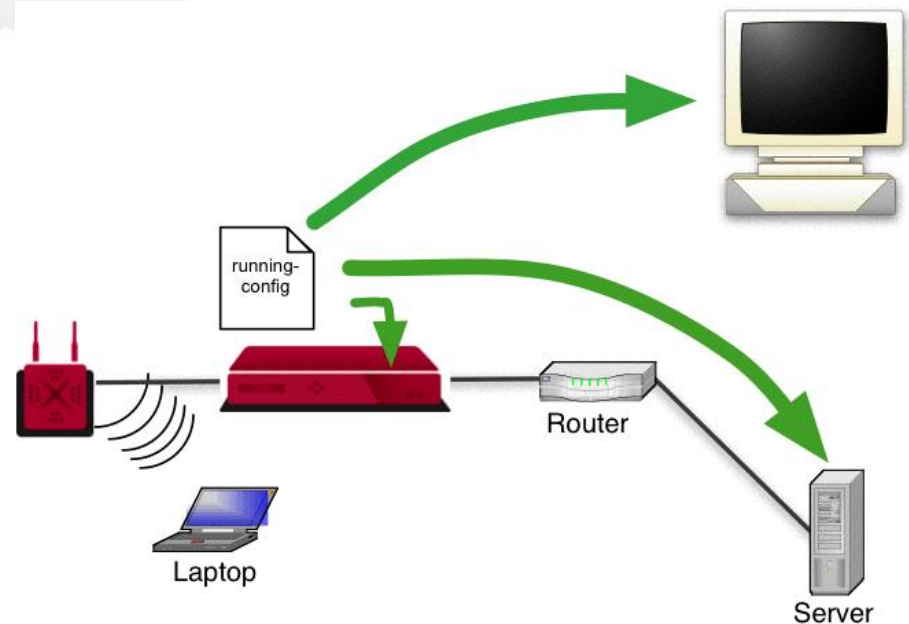
Controller-192.168.6.15 8:35:46 AM [Save](#) [Help](#) 

Security Profile Name	SSID Broadcast	Tunnel Interface Type
utah1-clear	On	Configured VLAN Only
utah1-wvp	On	No Tunnel

Backing Up Controller Configurations

> Use the CLI

- Copy to local (controller) file
- Copy to remote (client) file through `ftp` or `scp` protocols with `copy` command

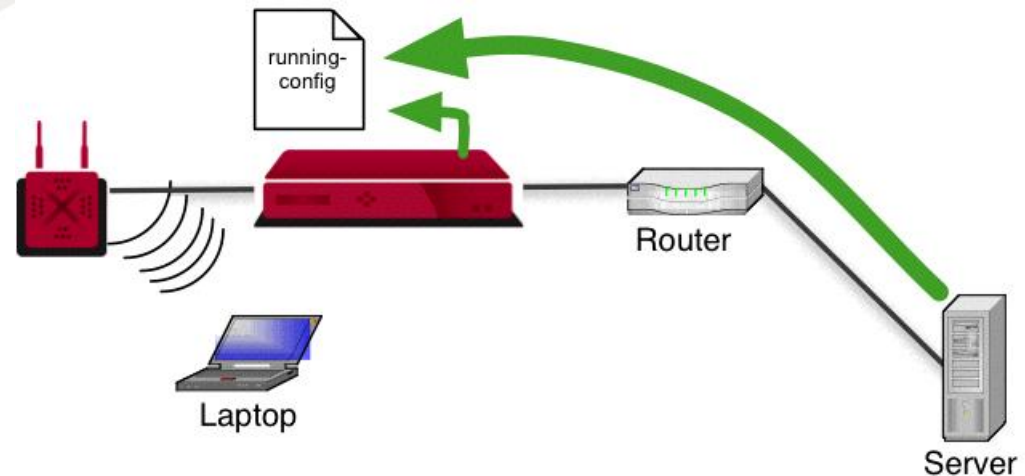


```
copy running-config ftp://anonymous@192.168.1.2/file.cg
```

Restoring Controller Configurations

> Use the CLI

- Copy from remote file to `running-config` with `copy` command
- Reload (reboot) the controller
- Save changes when asked (part of the `reload` command)



```
copy ftp://anonymous@192.168.1.2/file.cg tempfile
copy tempfile running-config
reload controller
```


Rebooting

- > Reboot Controller
 - `reload controller`
- > Reboot AP
 - `reload ap [n]`
- > Restore defaults
 - Used *only* in the rare case of corrupted `startup-config` files.
 - `reload default`

WLAN Management User: admin Controller-192.168.1.53 3:48:01 AM CLI Save Help MCRU

Monitor
Configuration
Maintenance

Reboot
Controller/APs
Captive Portal
Import File
Customization
Custom CP
AP Deployment

☐ Reboot All ☐ Reboot Controller

Select APs for Reboot (2 entries)

<input type="checkbox"/>	AP ID	AP Name	Serial Number	Uptime	Operational State	Availability Status	Runtime Image Version	Connectivity Layer	AP Model
Search:						Online			
<input checked="" type="checkbox"/>	4	AP-4	00:0c:e6:06:71:4d	00d:00h:00m:52s	Enabled	Online	4.0-105	L3	AP320
<input checked="" type="checkbox"/>	9	AP-9	00:0c:e6:06:71:66	00d:00h:00m:51s	Enabled	Online	4.0-105	L3	AP320

Lab Preview

- > Lab instructions
- > Lab handouts
 - Not a list of tasks, but support for the instructions in your books.
 - Enter parameters in **bold type**, skip ones in light type
- > Lab Checklists

LAB Break

- > Setup your system
 - setup
- > Set up an additional group and user
- > Upgrade your software
- > Set up AP parameters
- > Backup your system
 - Locally
 - Remotely

Demonstration:

Setting up a system (setup script)

Adding a group, with permissions

Copying a file