CONSTRUCTION KIT

Installing and Configuring

Configure Commotion

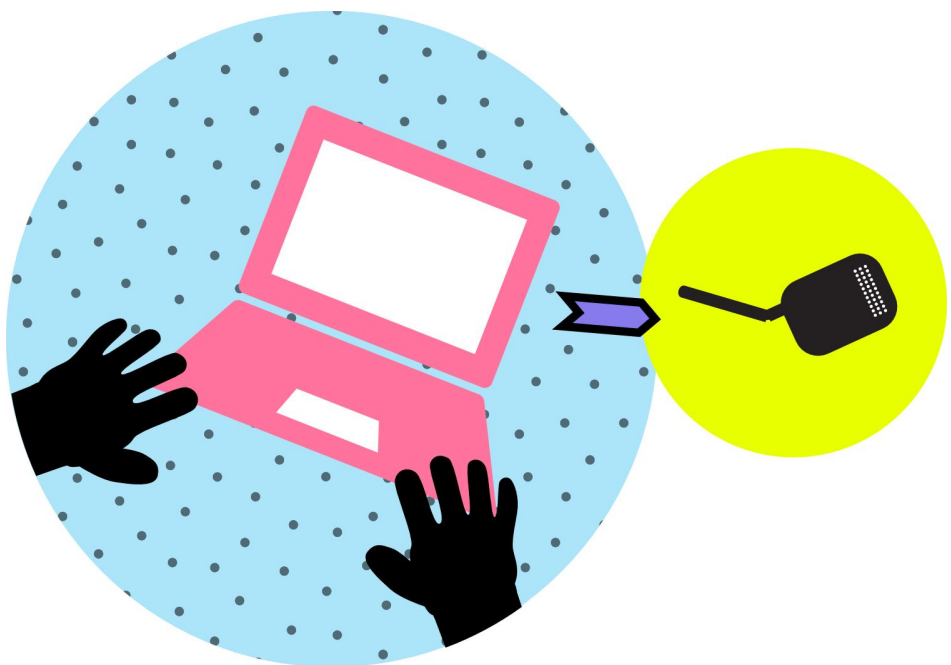
Introduction

This document contains instructions to configure a Commotion wireless node through the Commotion Setup Wizard and the administration interface. This is a vital part of deploying and adding nodes to a Commotion-based community wireless network, ensuring that new nodes are compatible with the network. If you have not installed Commotion on the router yet, see the installation documents in **Guides and How-tos** before using this guide. This document includes:

1. Gathering the information you need to configure your node
2. Running the Commotion Setup Wizard
3. Accessing the Commotion administration interface
4. Setting basic configuration options in the Commotion administration interface
5. Advanced Commotion configuration settings
6. A worksheet to help you record important information about your nodes and network and a “hands-on test” to become more familiar with important configuration settings

MATERIALS + SUPPLIES NEEDED

- A router with Commotion installed, plugged in to your computer’s Ethernet port.
- A copy of the worksheet at the end of this document, to keep track of settings.



Preparing for Configuration

If the new node will join an existing network, first gather that network's settings before you run the Commotion Setup Wizard on the router. You will need at least the mesh network name, wireless channel and the mesh encrytion password, if the mesh is encrypted. Then begin with the first section: Existing Network.

If you are starting a new network, you need to make a few decisions with your community before you run the Commotion Setup Wizard, so skip down to New Network.

Existing Network

Talk to a network organizer to get the following information:

1. Mesh Network Name (SSID), WiFi Channel, and Mesh Encryption Password (if used).

2. Access Point settings:
- Do the Access Points use a password?
- If so, does each node use its own password, or is there a shared password among all the nodes?
- Is there a system for generating/sharing passwords?

3. Node naming system—does the network have a way to name nodes, or can you name it anything you want?

4. Administration password—is this shared across the network, or can you set your own password? Skip to Run Commotion Setup Wizard.

New Network

First, you need to decide basic network information. Decide with your community:
- How will you name the network and your nodes?
- How will you name your Access Points? Will they be secure or open?
- How will you create and store passwords (admin, mesh link, and maybe AP)?

Move on to Run Commotion Setup Wizard after you decide how passwords will be set, and how nodes will be named.

Run the Setup Wizard

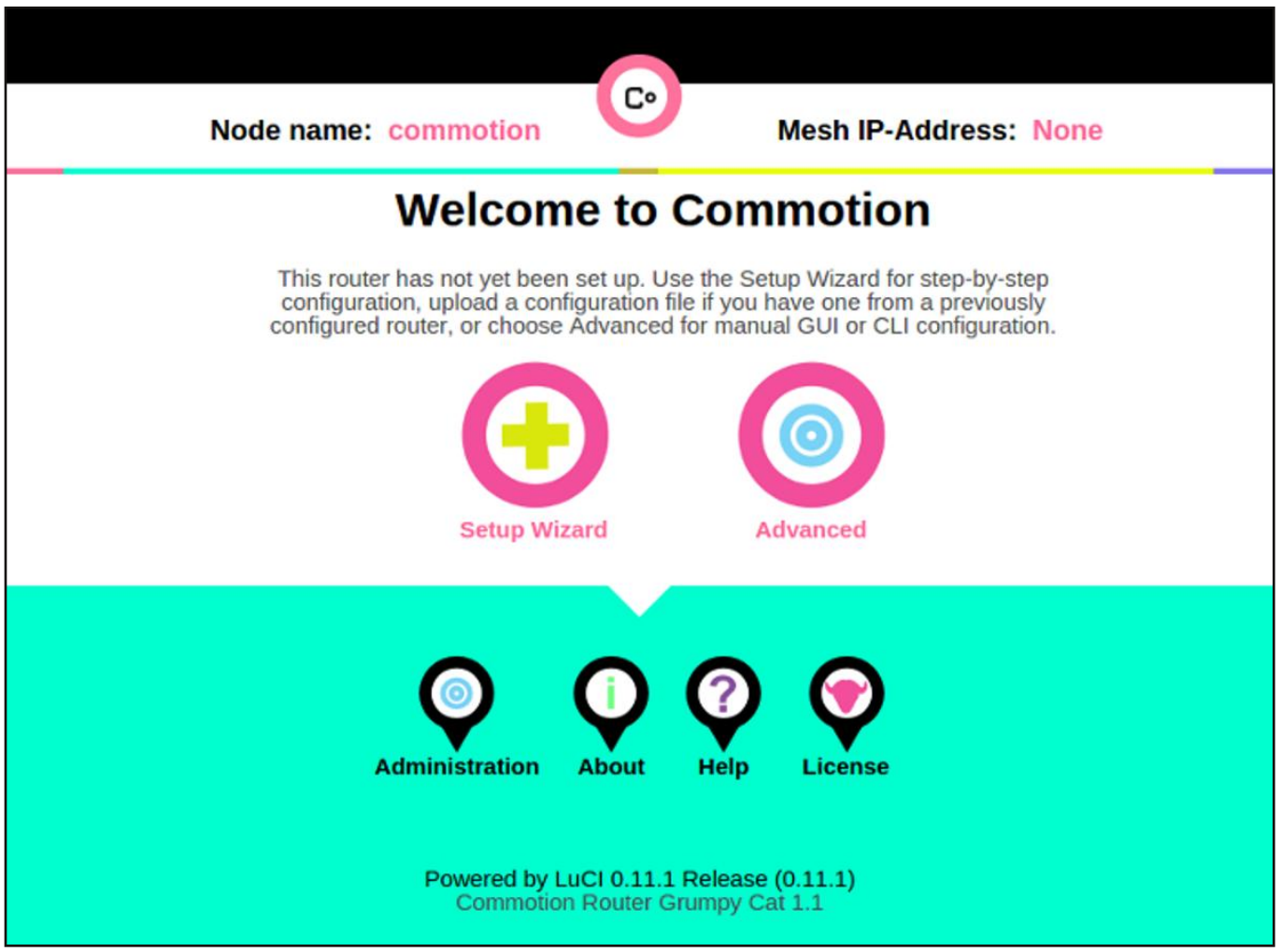
The Commotion Setup Wizard walks you through the basic steps to configure your router as a mesh node.

To start, turn off your computer's Wi-Fi, and connect it's Ethernet port to a newly setup node. The node will give your computer an IP address. Then browse to **http://thisnode** in your browser.

Make sure you record all the information you enter during the Setup Wizard:

- Node name
- Admininstration password
- Mesh Encryption Password
- Access Point password (if you set one).

1. Start Commotion Setup Wizard by clicking on the "+" link labeled **Setup Wizard**:

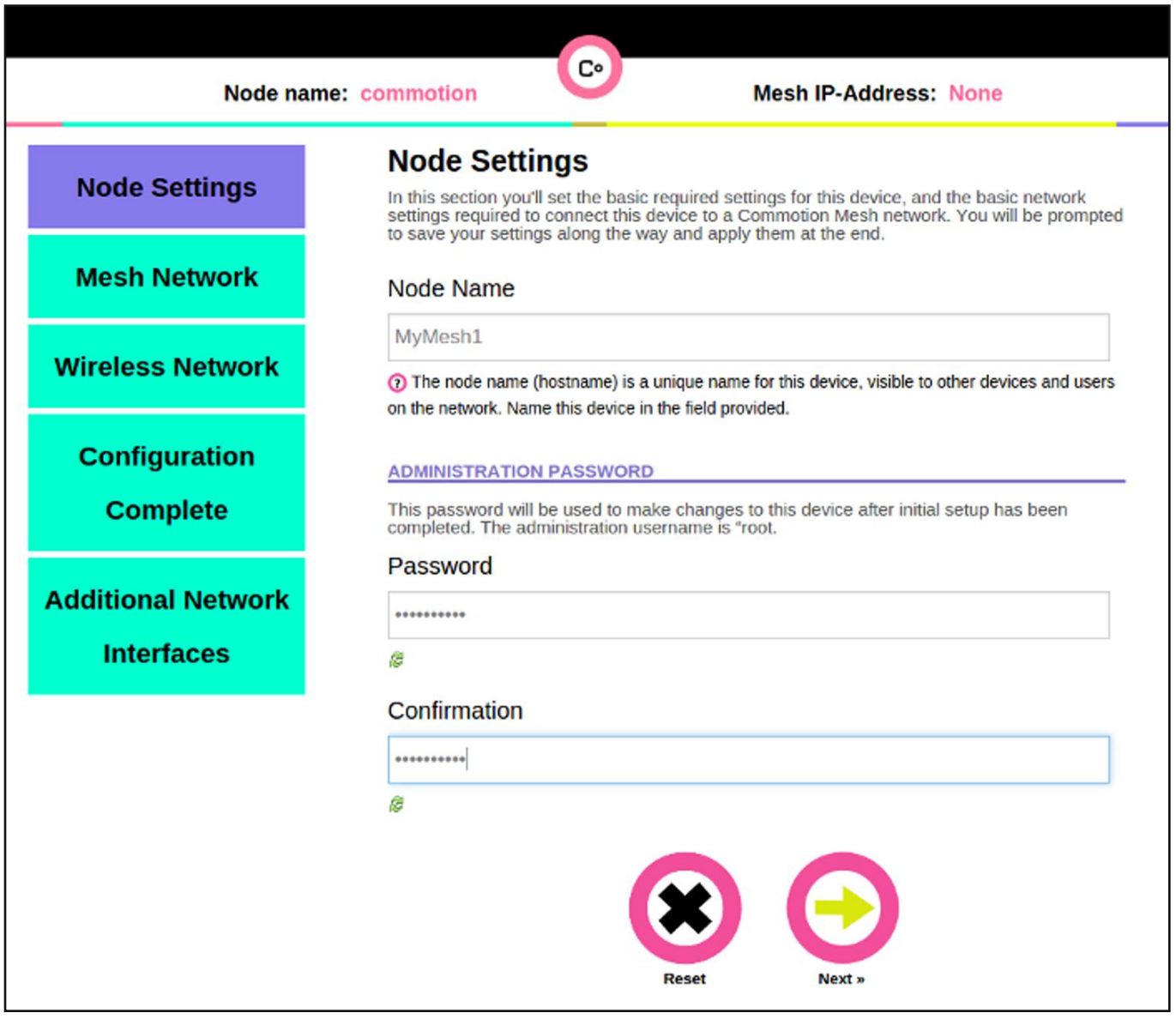


Tip: *Clicking the Advanced button will disable the Commotion Setup Wizard and allow you to configure your node manually.*

Setup Wizard continued

2. Use the information you gathered or decided on to fill in the fields in the Commotion Setup Wizard. The Setup Wizard has four required pages and one optional page. The values you enter are saved as you navigate between pages, and are applied on the Configuration Confirmation page.

Setup Wizard, page 1 - Node settings

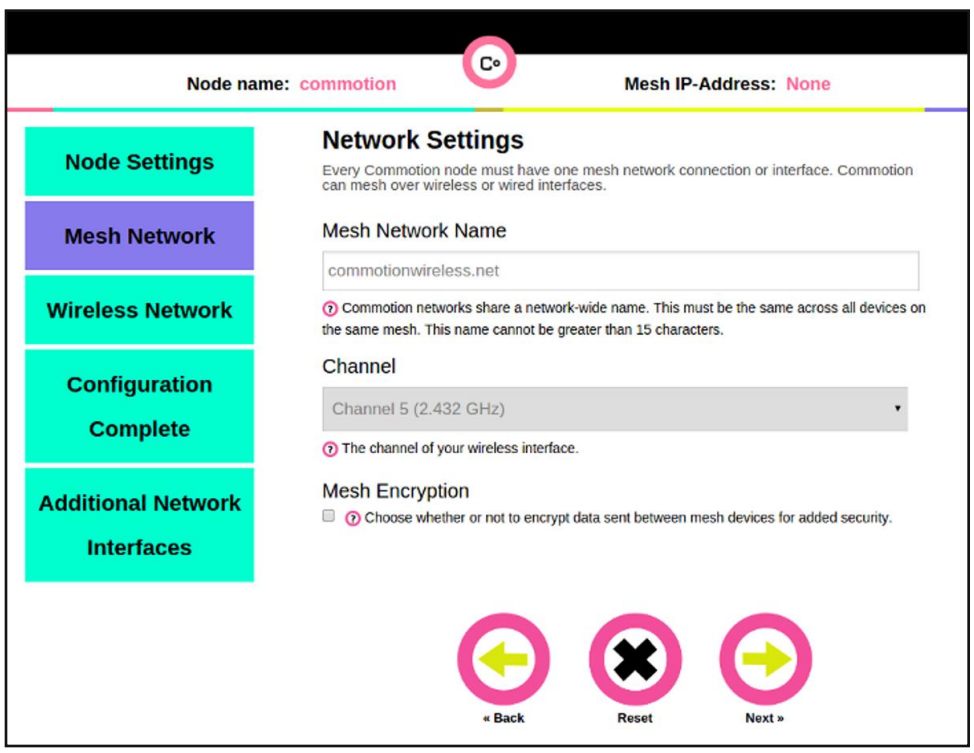


Enter the Node Name and Administration Password.

Setup Wizard continued

Setup Wizard, page 2 - Network settings

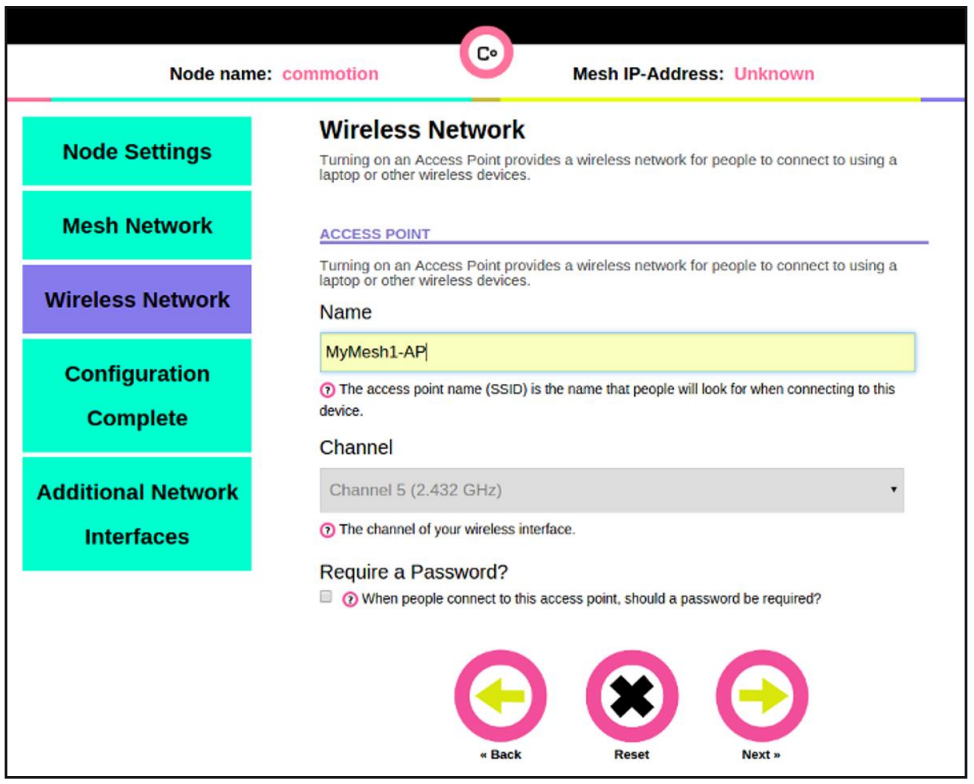
Enter the Mesh Network Name and select the Channel. If your mesh network should encrypt traffic between mesh devices, check the appropriate box and enter the Mesh Encryption Password.



Setup Wizard, page 3 - Wireless Network

If desired, configure an Access Point (AP) to provide wireless network access through this node. Enter the Access Point Name and provide a Password that people should be required to use to connect.

Note: If you configure an AP on the node, it **must** use the same channel as the Mesh network.



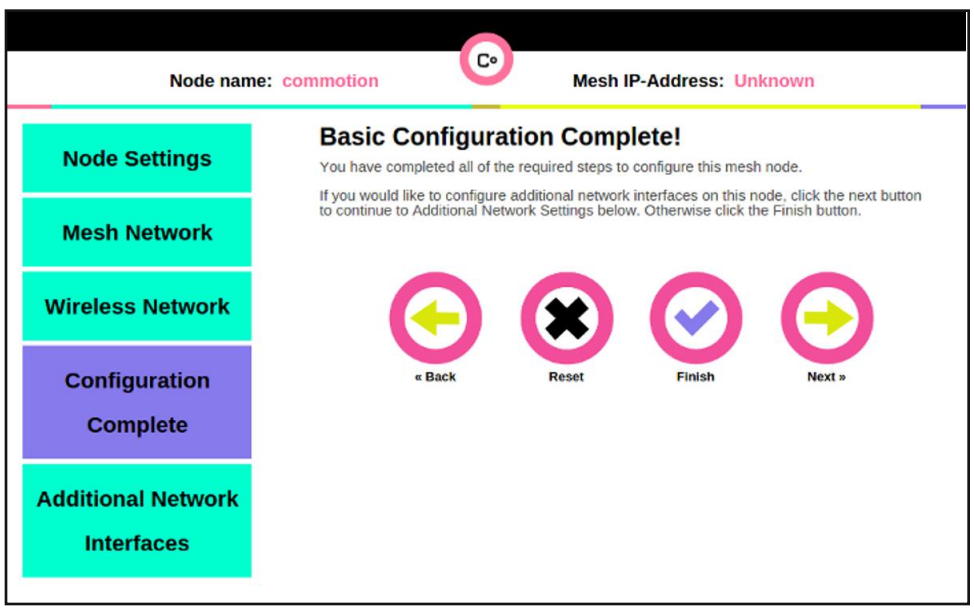
Setup Wizard continued

Setup Wizard, page 4 - Configuration Complete

You have now completed all the required steps to configure your mesh node.

- If you are done, click Finish to review and apply your settings.
- If you want to start over, click Reset.

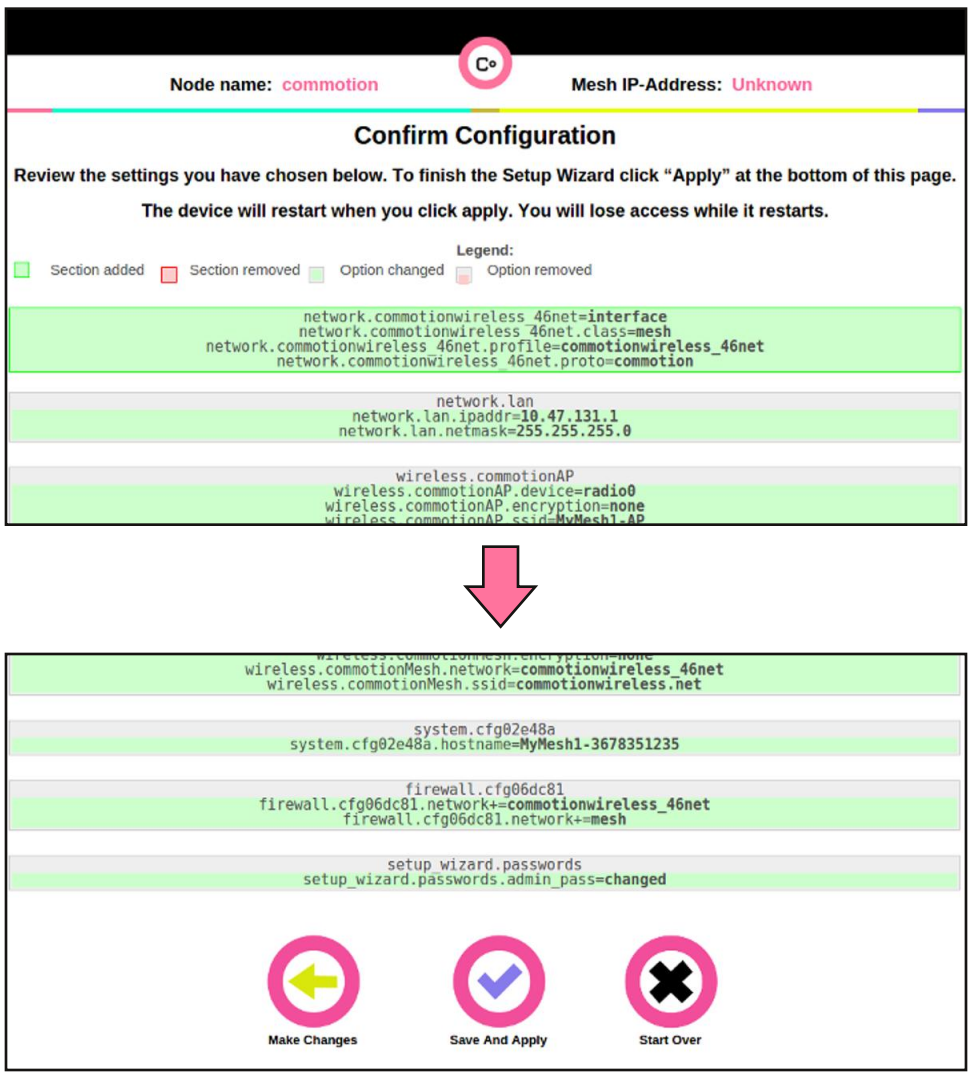
Optionally, if you want to set additional options for how the wired WAN (Ethernet) port behaves, see **Advanced Configuration** options below.



Setup Wizard - Confirm settings

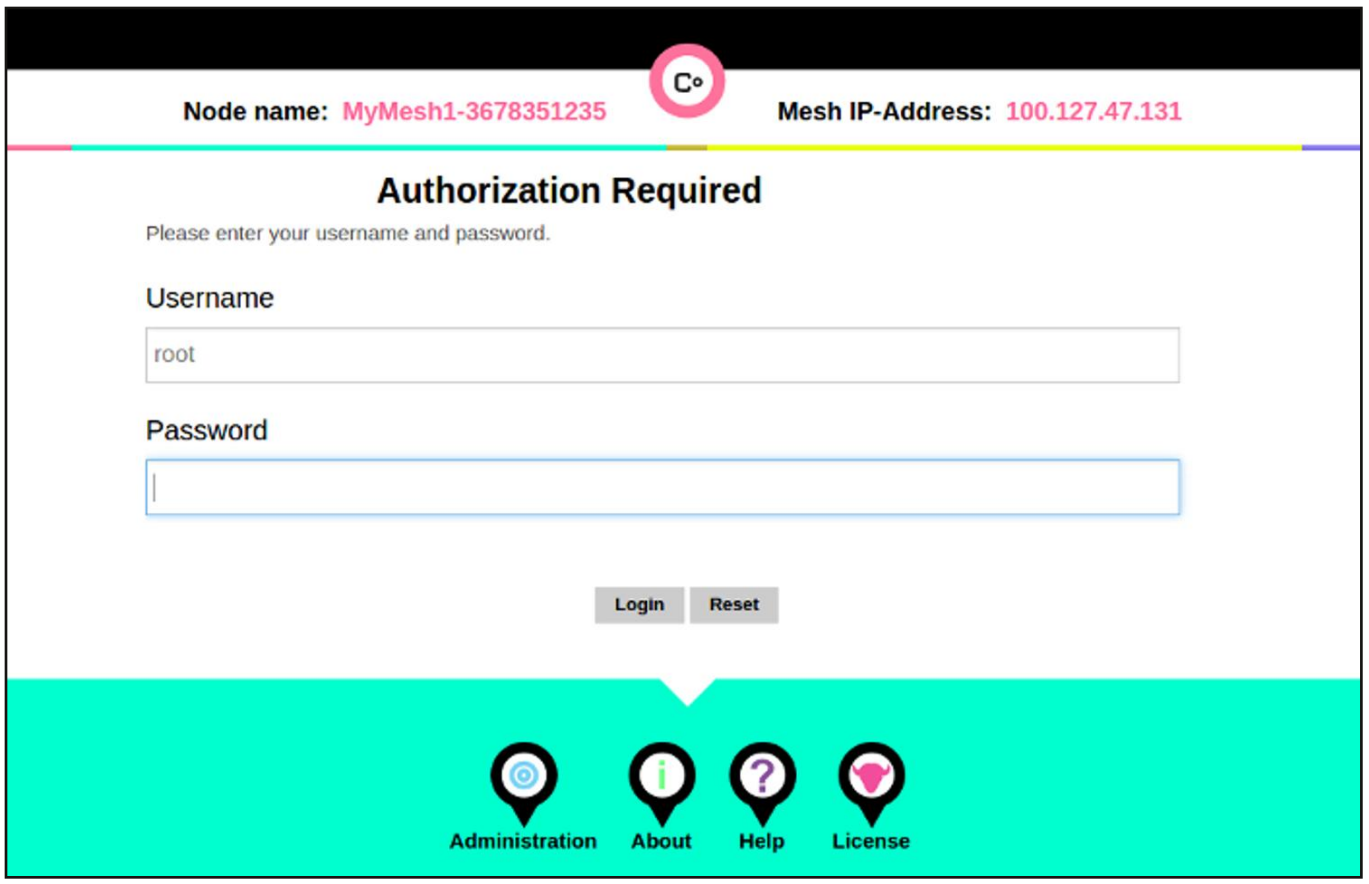
You will be presented with a screen summarizing all of your settings. Skim through the settings, then scroll down and hit **Save and Apply**.

When you finish the Commotion Setup Wizard, the node will reset. This will take a couple minutes—be patient. When the node starts up again, it will automatically connect to other mesh nodes in the area with matching mesh link information.



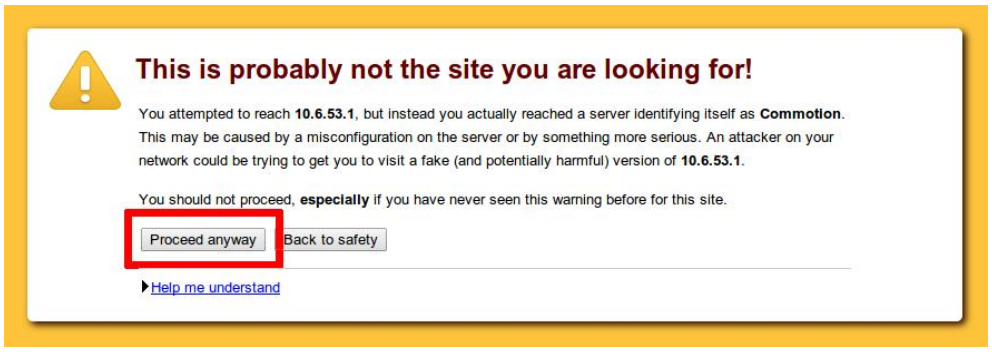
The Administration Interface

After the Setup Wizard, your browser should take you to the admin page automatically. If it does not, type **http://thisnode** into your browser's URL bar and press "Enter". Now click on the Administration button at the bottom of the page.



You will be prompted for a username and password. The administration username is always "root" - enter it if necessary. You set the administrator password during the Setup Wizard, enter it and hit the "Login" button.

Tip: *You will now be making a secure connection to your node (note the "https" in the address bar of your browser -- the "s" stands for secure). You will encounter a certificate warning here because the node's certificate that is used to create the secure connection was not signed by a "certificate authority" and so the browser cannot verify the node's identity. You should be cautious when you see these warnings because they often mean that your secure connection to a website may be insecure, but in this case it simply means the node's certificate was self-signed. Understanding why you got this warning, you can now proceed..*



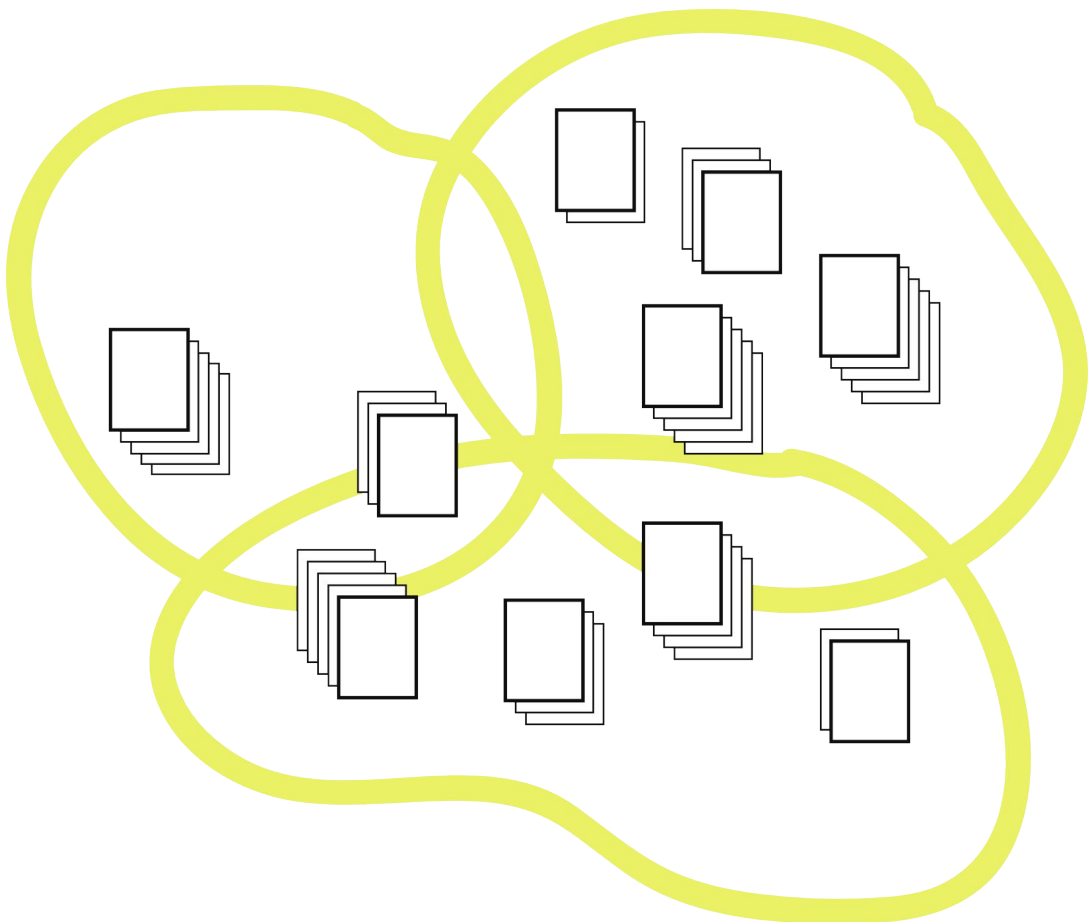
Common Configuration Options

The basic settings for your node were set during the Commotion Setup Wizard, but you might want to know how to change settings.

Commotion's administrative pages have two displays: Basic Config and Advanced. **Toggle between Basic and Advanced modes using the bottom button of the blue menu.** The most common settings will be available to change in the Basic Configuration menus, but some settings will only be available in the Advanced menus.

Below is a list of commonly changed settings and how to change them. Click below or scroll down.

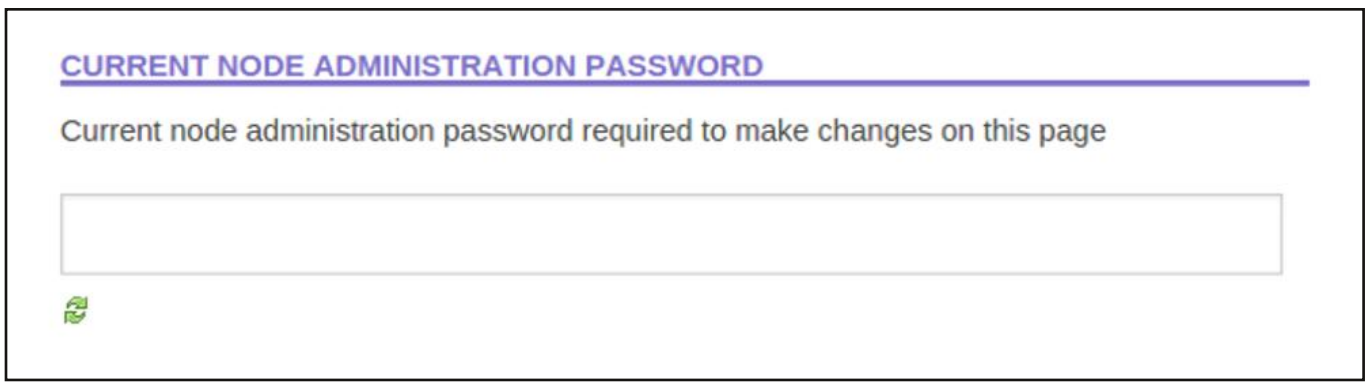
- Changing the Administrator Password
- Changing the Hostname
- Changing the mesh connection settings
- Changing the Access Point Information
- Changing the Welcome Page Information
- Setting Bandwidth Limits and Quality of Service settings
- How to get your node's mesh IP address
- See the connections on the mesh network
- Setting up a Gateway node
- Upgrading to new Commotion software



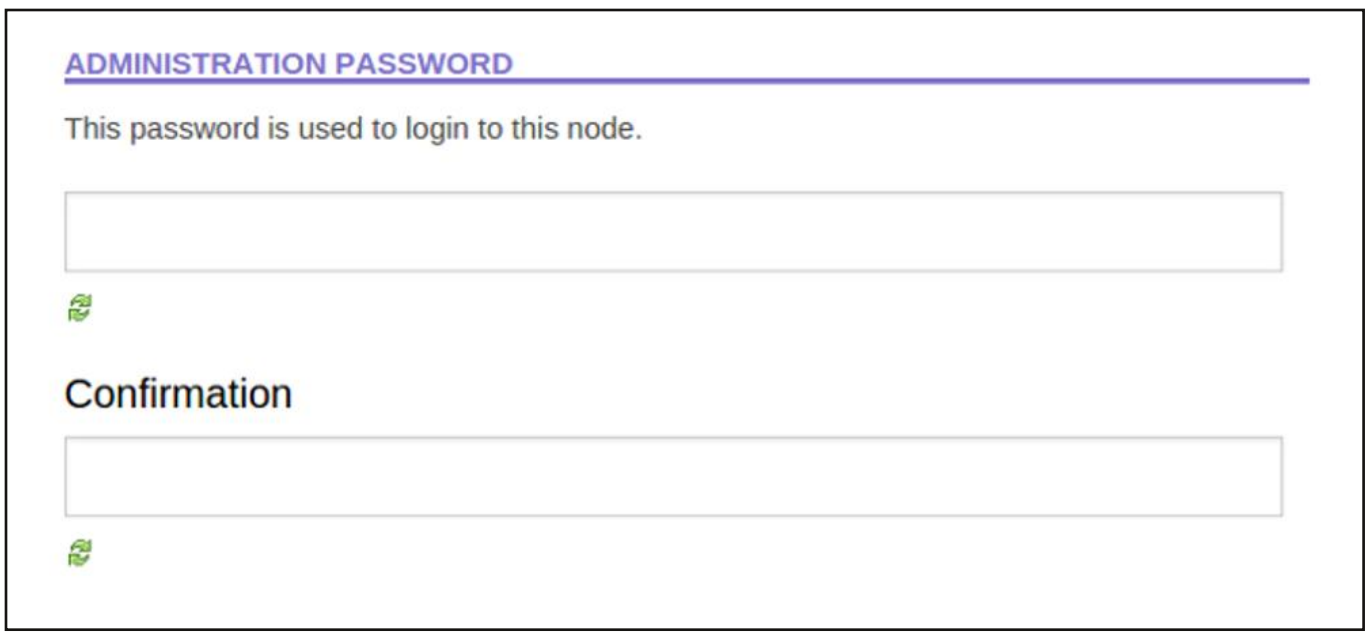
Changing the Administrator Password

This password is for the “root” administrator on the system, and is required to access the Administration interface and to change any other settings. You set this during the Setup Wizard.

1. Navigate to **Basic Config -> Security -> Passwords**.
2. Enter the existing Administration password in the field at the top of the page labeled "Current Password".



3. Under the “Administration Password” section, enter the new password in both “Password” and “Confirmation” fields.

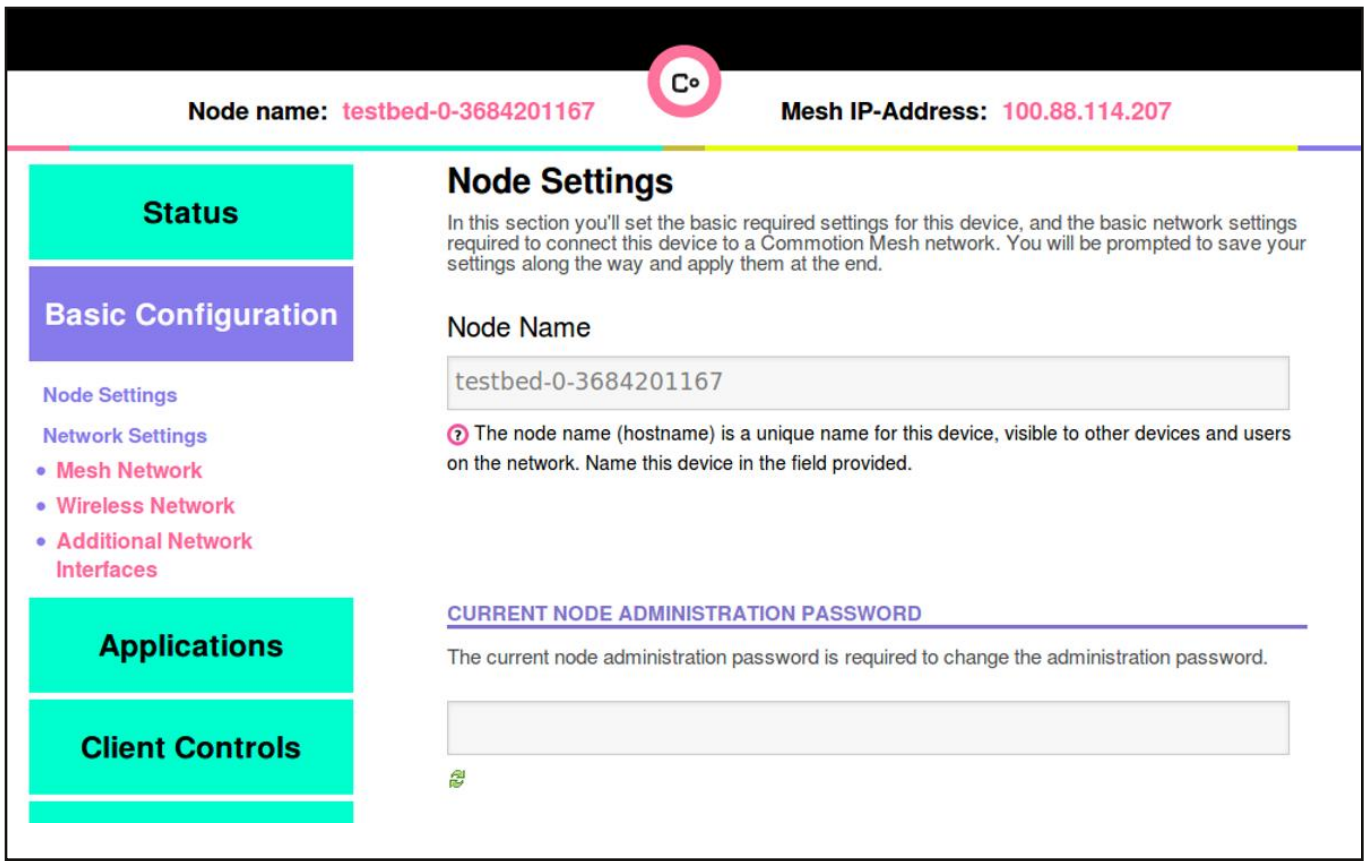


4. Scroll down to the bottom of the page and click “Save & Apply”.
5. Wait for the system to update. This can take up to two minutes, be patient!

Changing the Hostname

This changes the system identification of the node on the network, not the Access Point name.

1. Navigate to Basic Config -> Node Settings.
2. Under the “System Properties” section, enter the new name for the node in the “Hostname” field.
3. Scroll down to the bottom of the page, click “Save & Apply”.
4. Wait for the system to update.

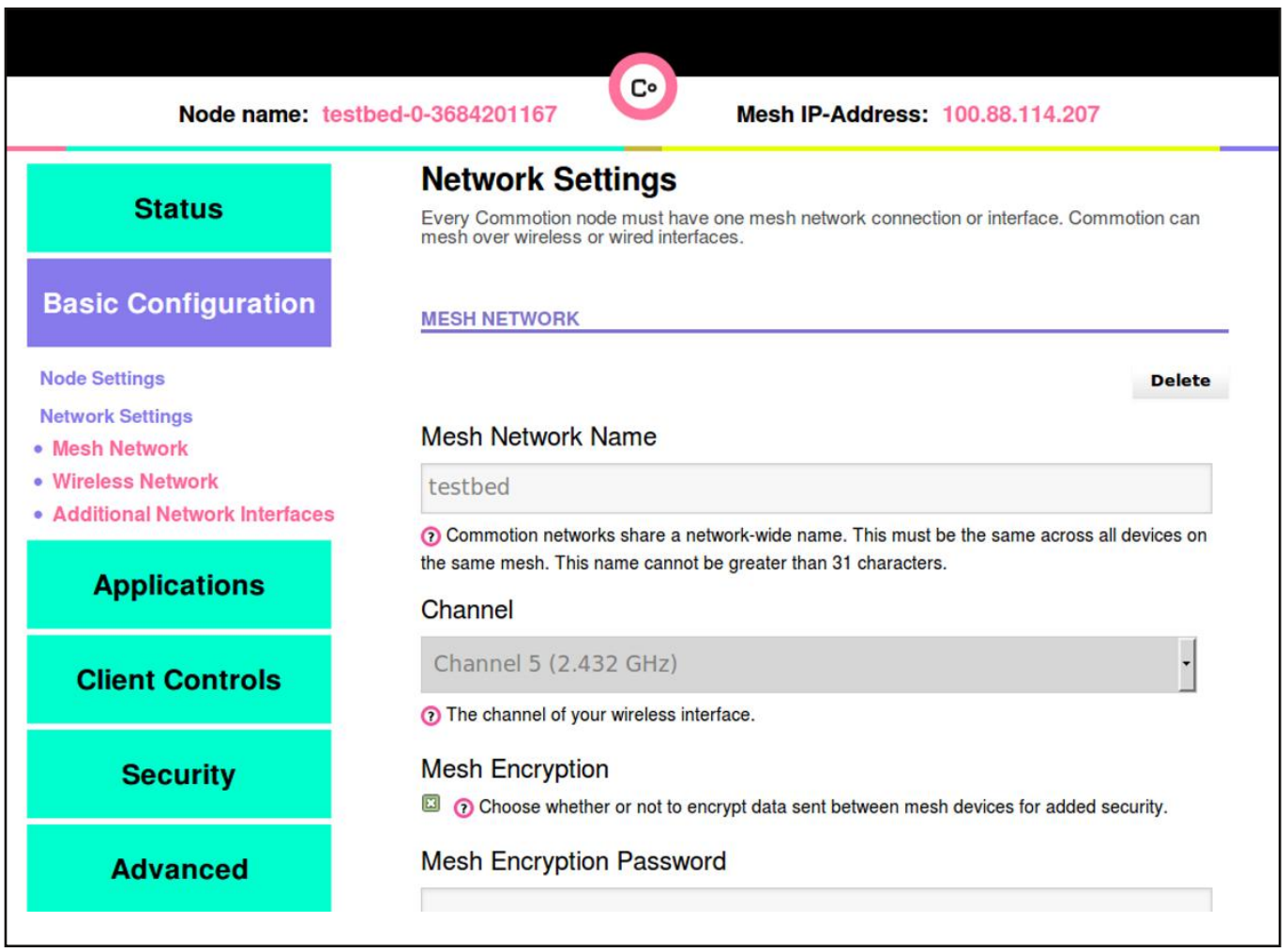


Tip: *Make sure that you don’t re-use or duplicate hostnames, it will cause problems!*

Changing Mesh Configurations

You can change the mesh link settings at any time. You might do this to create a separate network, to change the name of the mesh connection, or to change the mesh encryption key.

1. Navigate to **Basic Config -> Network Settings -> Mesh Network**
2. Select the Wi-Fi channel your network will use: either “2GHz Channel” or “5GHz Channel” depending on the capabilities of your wireless node. This channel must be the same across the entire network.
3. In the “Mesh SSID” field, enter the name of your network. This name must be the same for every node on the network.



Tip: *If you are changing mesh link settings, this will break existing mesh connections. Remember that all settings (mesh name, Wi-Fi channel, and encryption password) must match for nodes to mesh!*

Changing Access Point Information

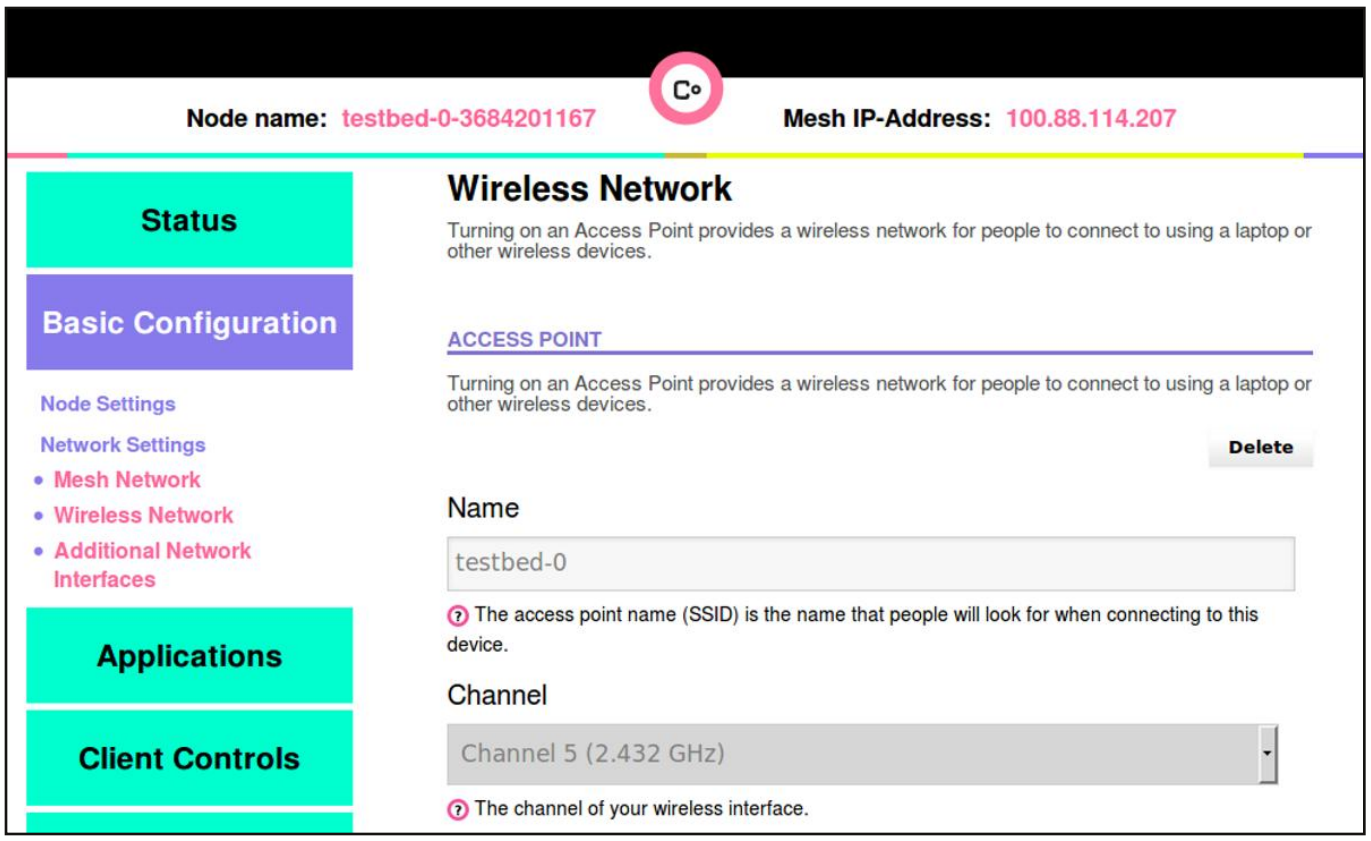
There are three common settings for the Access Point (AP) on a Commotion node: whether the Access Point is on or off, the name of the AP (SSID), and the security (whether the AP is password-protected, and if so, the password).

You can change most Access Point settings in the Basic Config menus:
- Access Point Name
- Turn a password on or off
- Set or change the password for the Access Point
- Add or Delete an Access Point

Navigate to **Basic Config -> Network Settings -> Wireless Network** for Basic Menu settings.

Additionally in the Advanced menus you can:
- Enable/Disable an existing Access Point
- Also configure the settings above

Navigate to **Advanced -> Network -> WiFi** for Advanced menu settings.



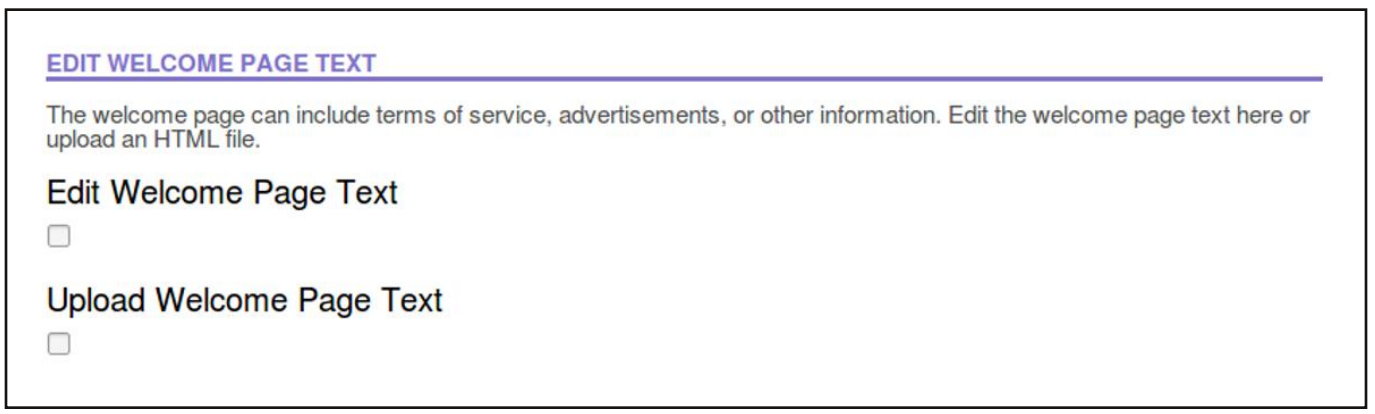
Changing the Welcome Page information

When users connect to the Access Point, they can be directed to a Welcome Page (also called splash page or captive portal). You can turn this on or off, customize the text on this screen, and set the number of hours before a user has to re-accept the Welcome Page terms. To start, navigate to **Basic Config -> Client Controls -> Welcome Page**

To change the text displayed on the Welcome page:

1. Click “Edit Welcome Page text”, at the top of the page
2. Change the HTML code in the large text field to display the information you want such as network name and contacts.
3. Scroll down to the bottom of the page, click “Submit”.
4. Wait for the system to update.

You may also click "Upload" to upload an HTML file from your computer to use for the Welcome Page text.

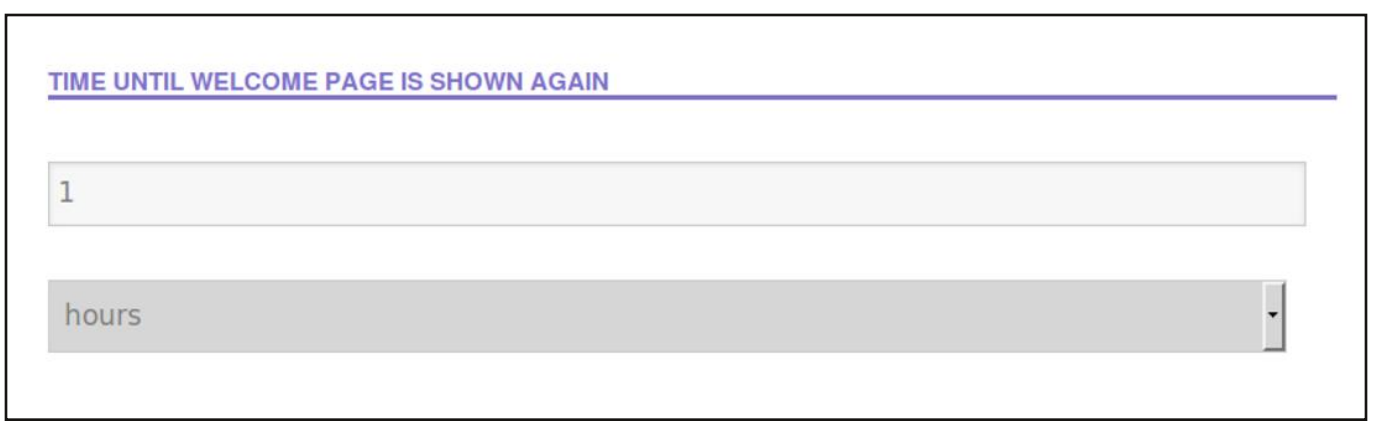


```
<h2> <a id="content" name="content"><%:Welcome!%></a> </h2>
<p>
<%:You are now connected to a%> <a
href="https://commotionwireless.net">Commotion</a> <%:community wireless
network.%>
</p>

<p>
<strong><%:Access to the Internet%></strong> <%:may be provided by people
donating connectivity to the network. Everyone on the network has to share,
so please be aware and behave yourself accordingly:%>
<ul>
<li><%:Please%> <strong><%:avoid large downloads and excessive filesharing.%>
</strong></li>
<li><%:Please%> <strong><%:no illegal activities.%></strong></li>
</ul>
</p>

<p><%:If you like the network, please consider contributing!%></p>
```

Welcome Page changes continued

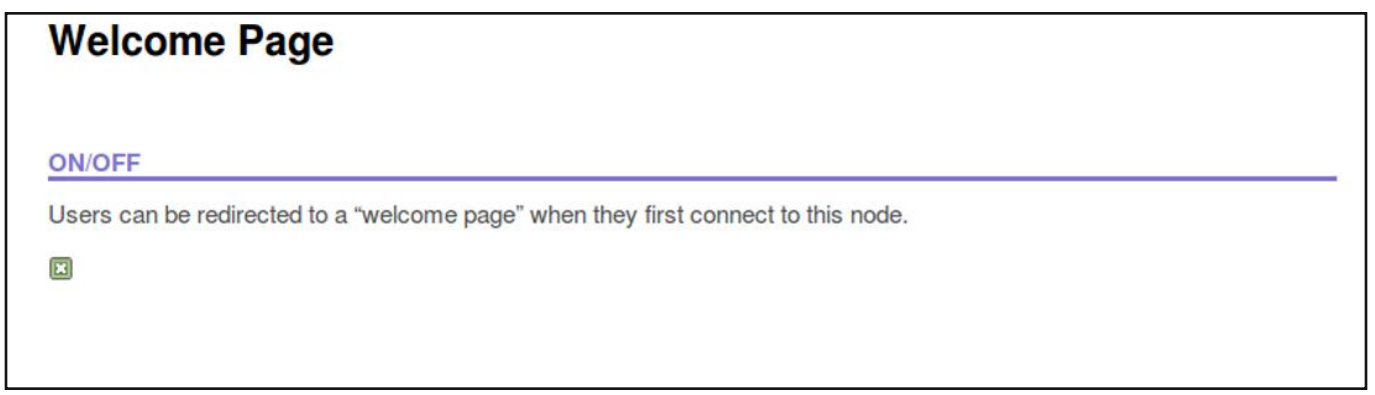
To change the time before a user must re-connect via the Welcome Page:

1. First, select the increment of time you want to use in the pull down menu. "Hours" is recommended.
2. Next, enter the number of hours (or days, if you selected that increment) in the text box.
3. Scroll down to the bottom of the page, click “Save & Apply”.
4. Wait for the system to update.



To turn the Welcome Page on or off:

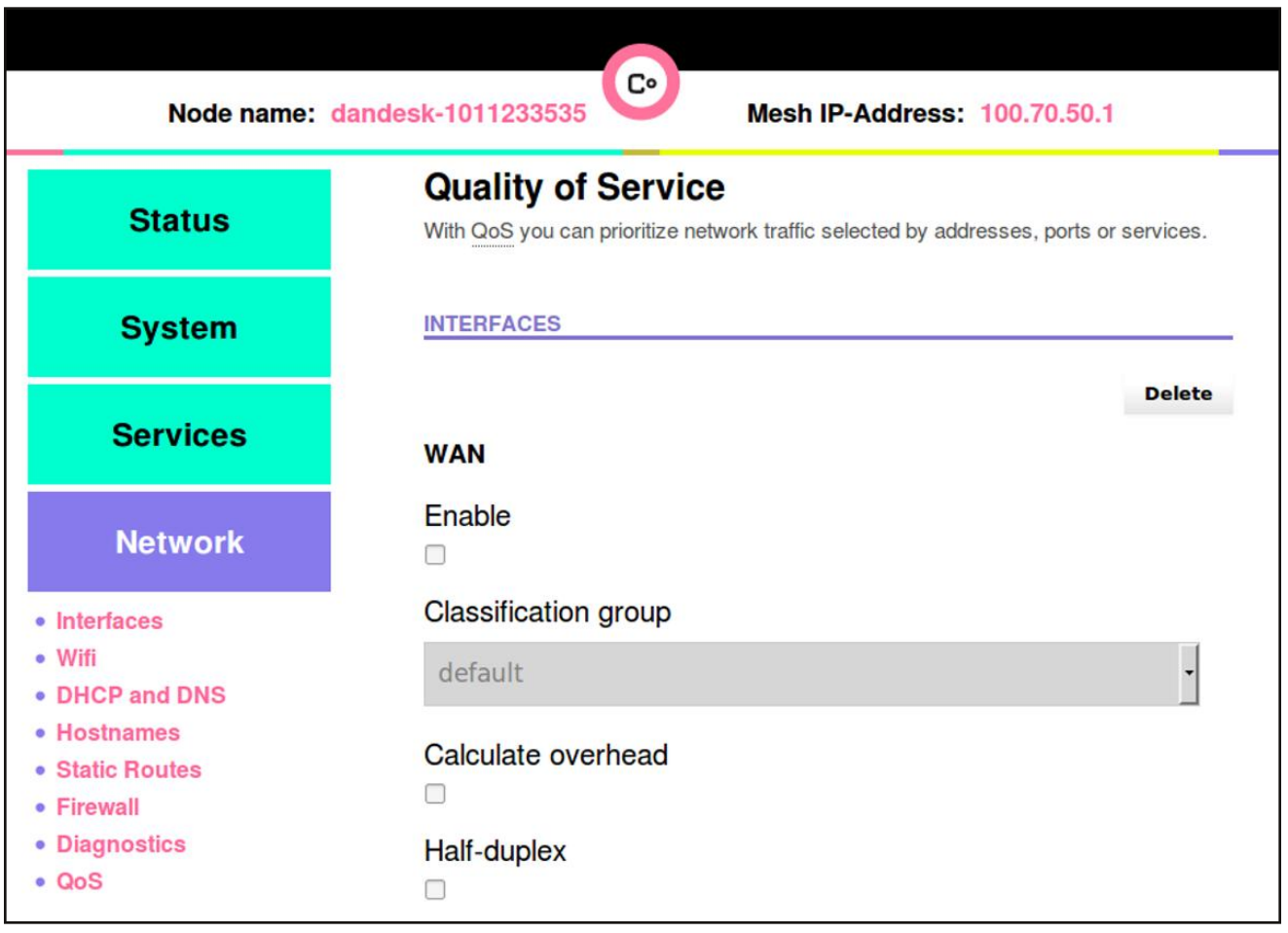
1. Turn the Welcome page on or off by selecting or deselecting the checkbox at the top of this page.
2. Scroll down to the bottom of the page, click “Save & Apply”.
3. Wait for the system to update.



Setting Bandwidth Limits and Quality of Service

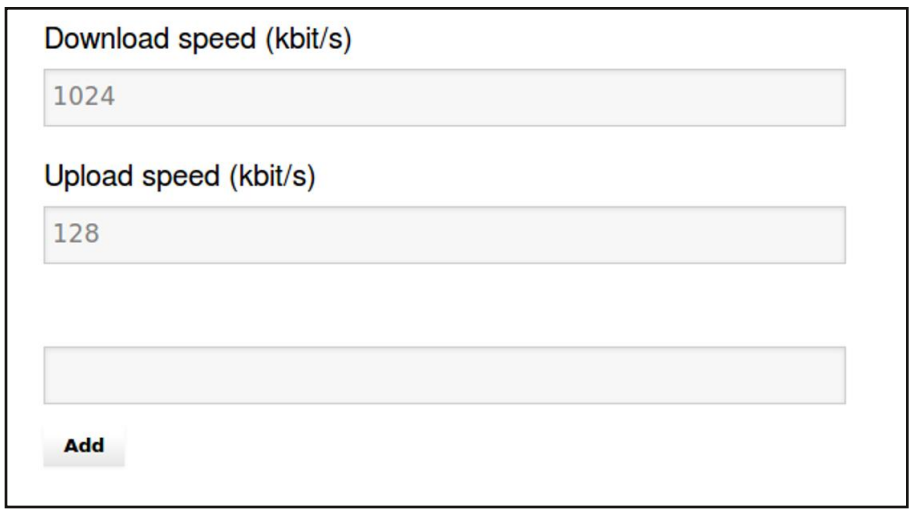
If you are hosting a Gateway node (sharing Internet with the rest of the network), you can limit the total amount of bandwidth allowed for the rest of the network, using Quality of Service (QoS). First, navigate to **Advanced ->Network -> QoS**. Follow these steps:

1. Select the “Enable” and “Calculate Overhead” checkboxes.



2. In the “Download Speed” field, enter the total download bandwidth to deliver to the mesh (in kilobits per second—for approximately 5 Mbps, enter 5000).

3. In the “Upload Speed” field, enter the total upload bandwidth to deliver to the mesh (in kilobits per second—for approximately 1 Mbps, enter 1000).



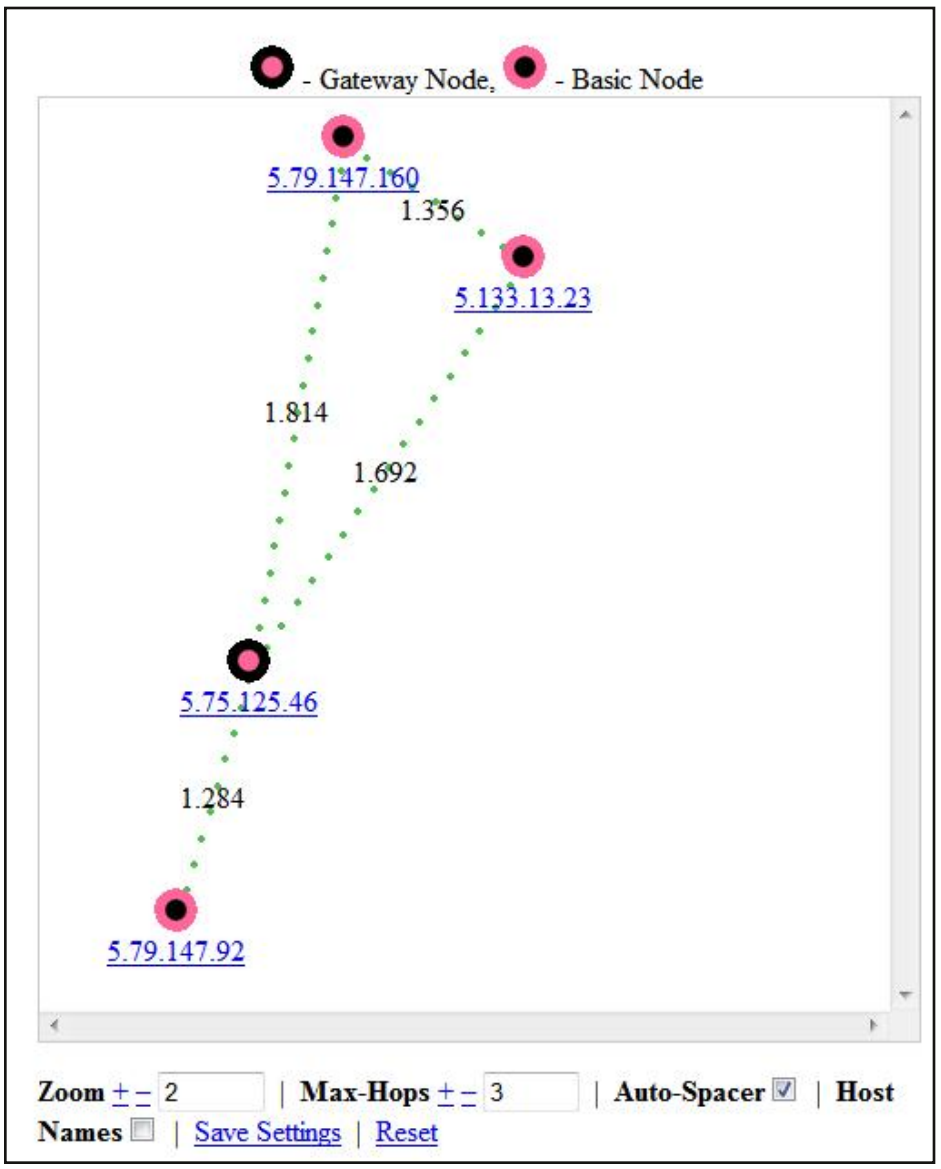
4. Scroll down to the bottom of the page, click “Save & Apply”.

5. Wait for the system to update.

See connections on the Mesh Network

You can see if the node has successfully connected to other mesh nodes by viewing the mesh visualizer.

Navigate to the **Status** page and click on **Nearby Mesh Devices**.



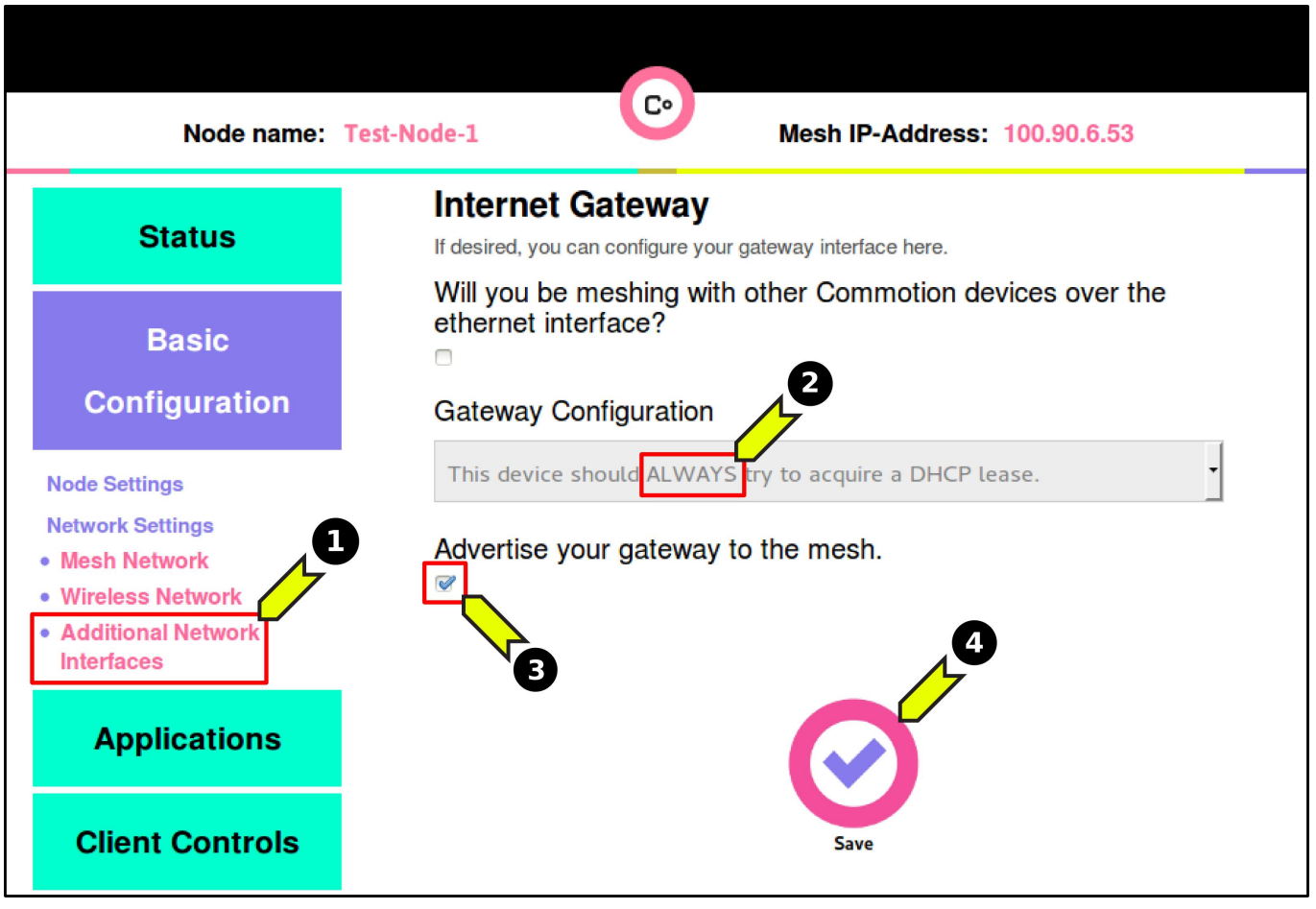
Set up a Gateway to the Internet on your node

If you would like to share bandwidth with the network, you can make your node a Gateway. You may want to finish other setup before completing these steps, such as Quality of Service, above.

1. Plug the LAN port on the Power over Ethernet adapter, or the WAN port on your router into your Internet-connected router or modem.
2. Navigate to the **Basic Configuration -> Network Settings -> Additional Network Interfaces** menu.
3. In the “Gateway Configuration” pull-down menu, select “This device should ALWAYS try to acquire a DHCP lease”.
4. Make sure “Advertise your gateway to the mesh” is checked.
5. Save and apply these settings.
6. Navigate to **Advanced -> System -> Reboot** to reboot the node.
7. Click “Perform Reboot” and wait for the node to restart.

At this point, the node will automatically configure itself as a Gateway and provide bandwidth to the network when it is back online. To check the Gateway status, navigate to the Status page. If this node is providing a Gateway, it will be indicated here in the top menu bar. Additional details can be found in **Advanced -> Status -> OLSR**.

For more detailed information on setting up Gateways to the Internet, please see the document **Common Hardware Setups**.



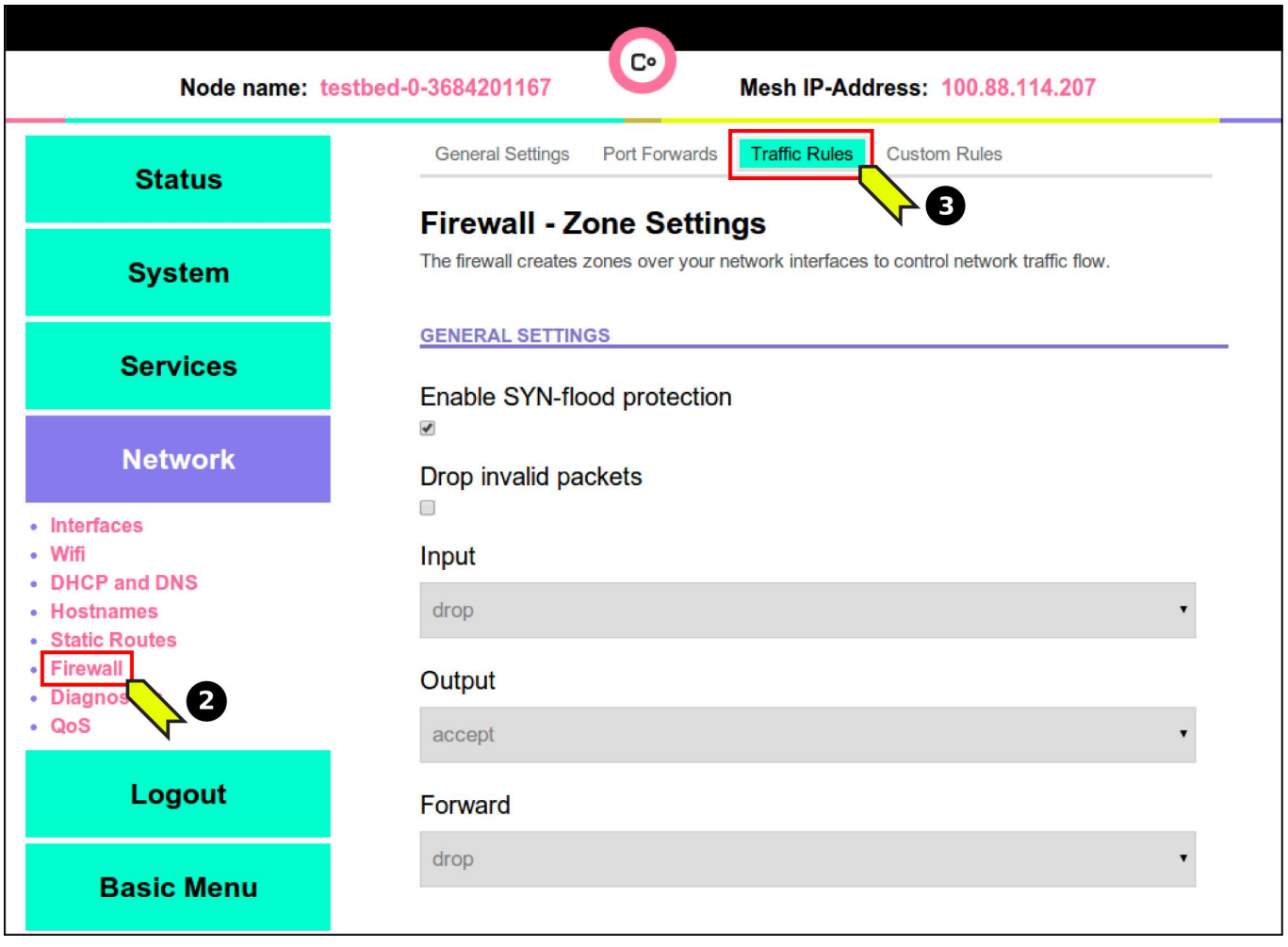
Opening the Firewall for remote administration

By default, Commotion prevents access to the administration web interface from a node's Ethernet port, because sometimes this port will be connected directly to the Internet. Preventing access to the admin portal from the Internet helps keep unwanted intruders from damaging the node and other parts of the network.

However, in some advanced network configurations, you'll need to access the administration web interface over a node's Ethernet port. This may be the case if the node is configured to mesh over Ethernet, or when the node is attached to a common Ethernet switch with other nodes.

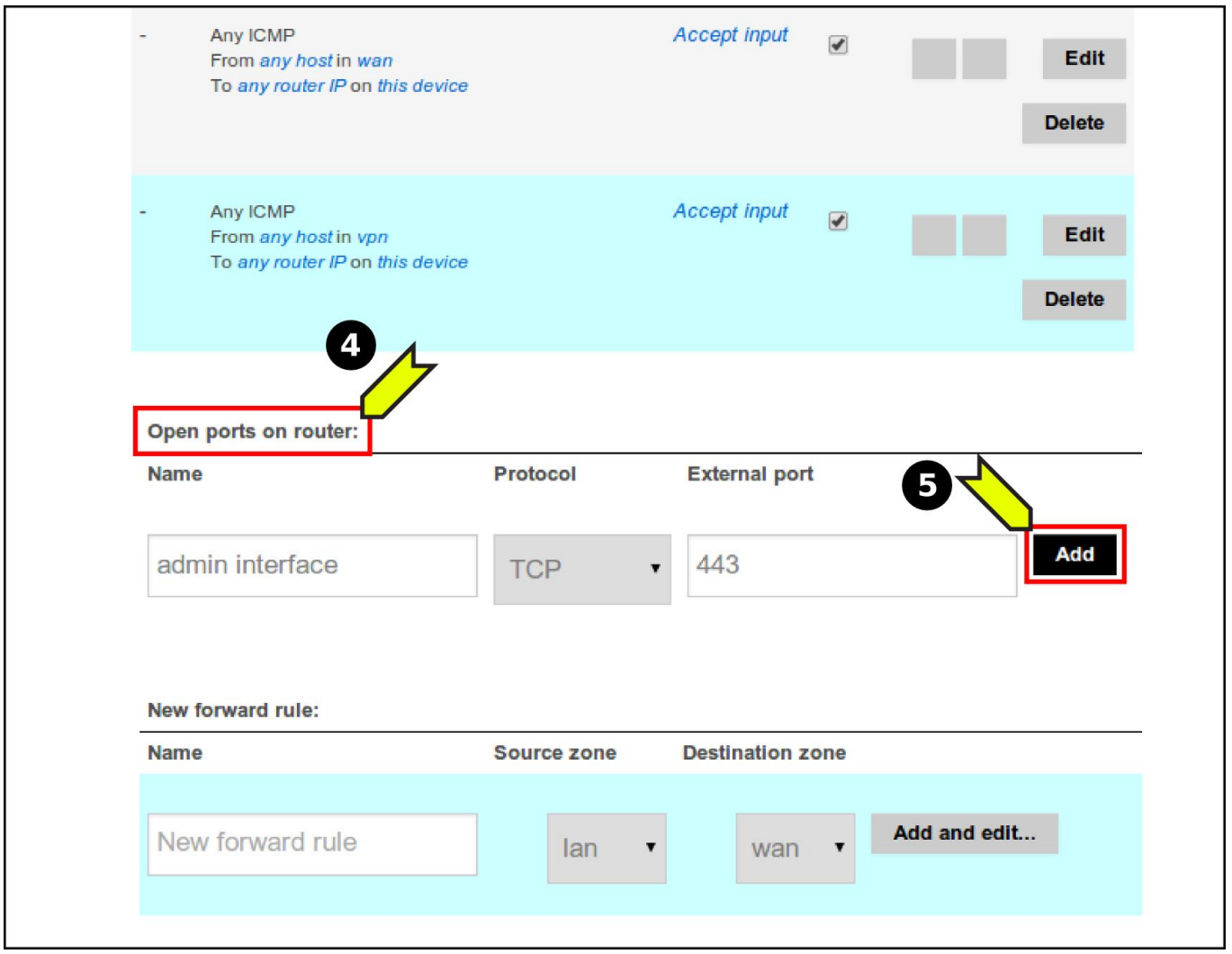
If this is the case, you can add a rule to the node's firewall in order to access the admin portal over the node's Ethernet interface. You'll begin by connecting to the node's wireless access point, and going to **http://thisnode** in your browser.

1. Click on the Administration button on the bottom of the page.
2. Go to **Advanced -> Network -> Firewall**.
3. At the top of the page, click on the "Traffic Rules" tab.



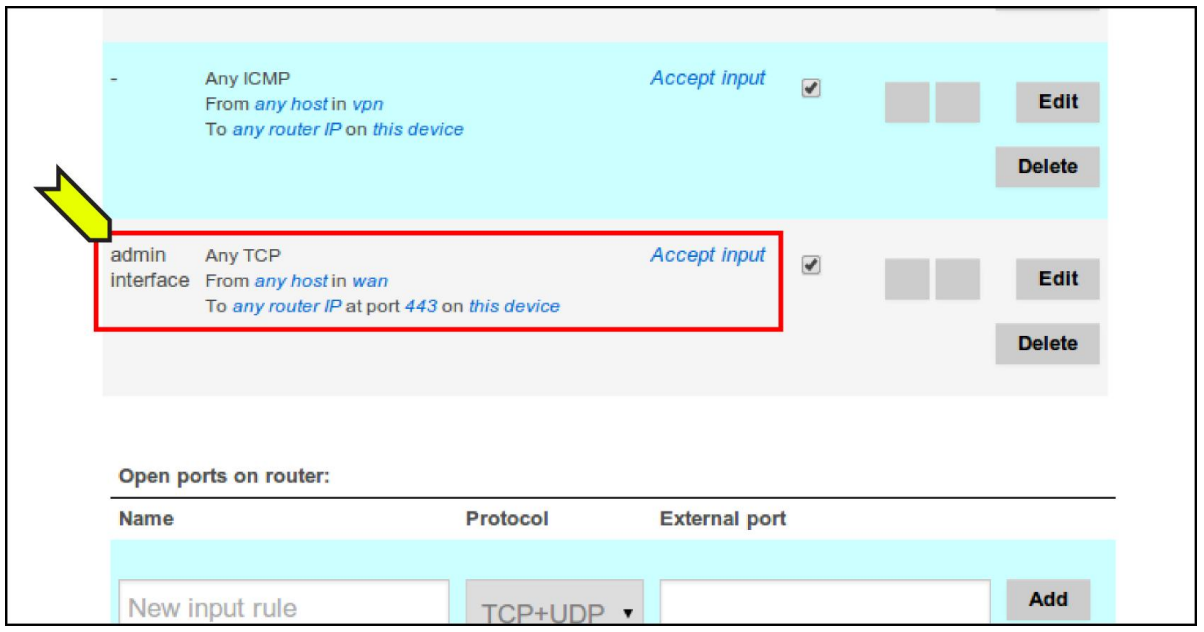
Firewall changes continued

4. Under the "Open ports on router" section, you'll fill in the following values:
a. Name: "Admin interface" **b.** Protocol: "TCP" **c.** External port: 443
5. Click the "Add" button next to the fields you just filled out.



6. Click on "Save & Apply" at the bottom of the page.

After you click "Save and Apply", the changes will be made and you will see the new entry in the Firewall rules:



Finishing up

When you are done configuring, disconnect the Ethernet cable from the computer. If you wish to host a Gateway (share Internet with the mesh network), plug the Commotion node into your Gateway router or modem, and reboot the node.

For further information on various types of hardware setups, please see **Common Hardware Setups**. For more complicated hardware configurations, see **Advanced Hardware Setups**.

If you are having issues with your Commotion node or configuration, see **Troubleshoot your Wireless Node**.

Definitions

AP (Access Point)
A device that allows wireless devices to connect to a wired network using Wi-Fi or related standards

BSSID (Basic Service Set Identifier)
The address used to identify a specific mesh network. It is used by the wireless mesh link device.

DHCP: Dynamic Host Configuration Protocol
It assigns IP addresses to client devices, such as desktop computers, laptops, and phones, when they are plugged into Ethernet or connect to Wireless networks.

Ethernet
A type of networking protocol - it defines the types of cables and connections that are used to wire computers, switches, and routers together. Most often Ethernet cabling is Category 5 or 6, made up of twisted pair wiring similar to phone cables.

Gateway
A connection to another network, usually the Internet. One or more nodes on a mesh network can be Gateways.

Hostname
The name of a node. A nickname that corresponds to the address of a device connected to a network. It can be the same, similar to, or different than the SSID of the Access Point.

IP Address
A numerical label assigned to each device (e.g., computer, printer, router) participating in a network that uses the Internet Protocol for communication.

Router
A device that determines how messages move through a computer network.

Node
An individual device in a mesh network.

MAC Address
A unique hardware identifier assigned to network interfaces.

Mesh Network
A type of network where each node in the network may act as an independent router, and can connect to many nodes at once.

OLSR (Optimized Link State Routing Protocol)
An IP routing protocol optimized for mobile ad hoc networks.

Root
A user account used for system administration.

Splash Page or Captive Portal
A web page that appears when users first attempt to connect to the network via an Access Point. It usually requires accepting terms of service to reach the Internet.

SSID (Service Set Identifier)
A name that uniquely identifies a wireless local area network. Most often it is the name of an Access Point. It can be a human-readable name, and can be up to 32 characters long.

WAN: Wide Area Network
Signifies the connection to the global Internet or a different, typically larger, network.