CONSTRUCTION KIT

Installing and Configuring

Common Hardware Setups

Introduction

When planning and building a network, you will need to install the wireless node or nodes that make the most sense for each site. In most cases, a single wireless node on a rooftop or in a window will connect to nearby neighbors and form a mesh. In some cases, this wireless node may be connected by Ethernet cable to a gateway connection to the Internet, sharing it with those neighbors. In other cases, the node will be connected by Ethernet cable to one or more computers inside the building, some of which may be sharing local applications. In almost all cases, rooftop or window wireless nodes will have Access Points enabled to allow people to connect to the network wirelessly.

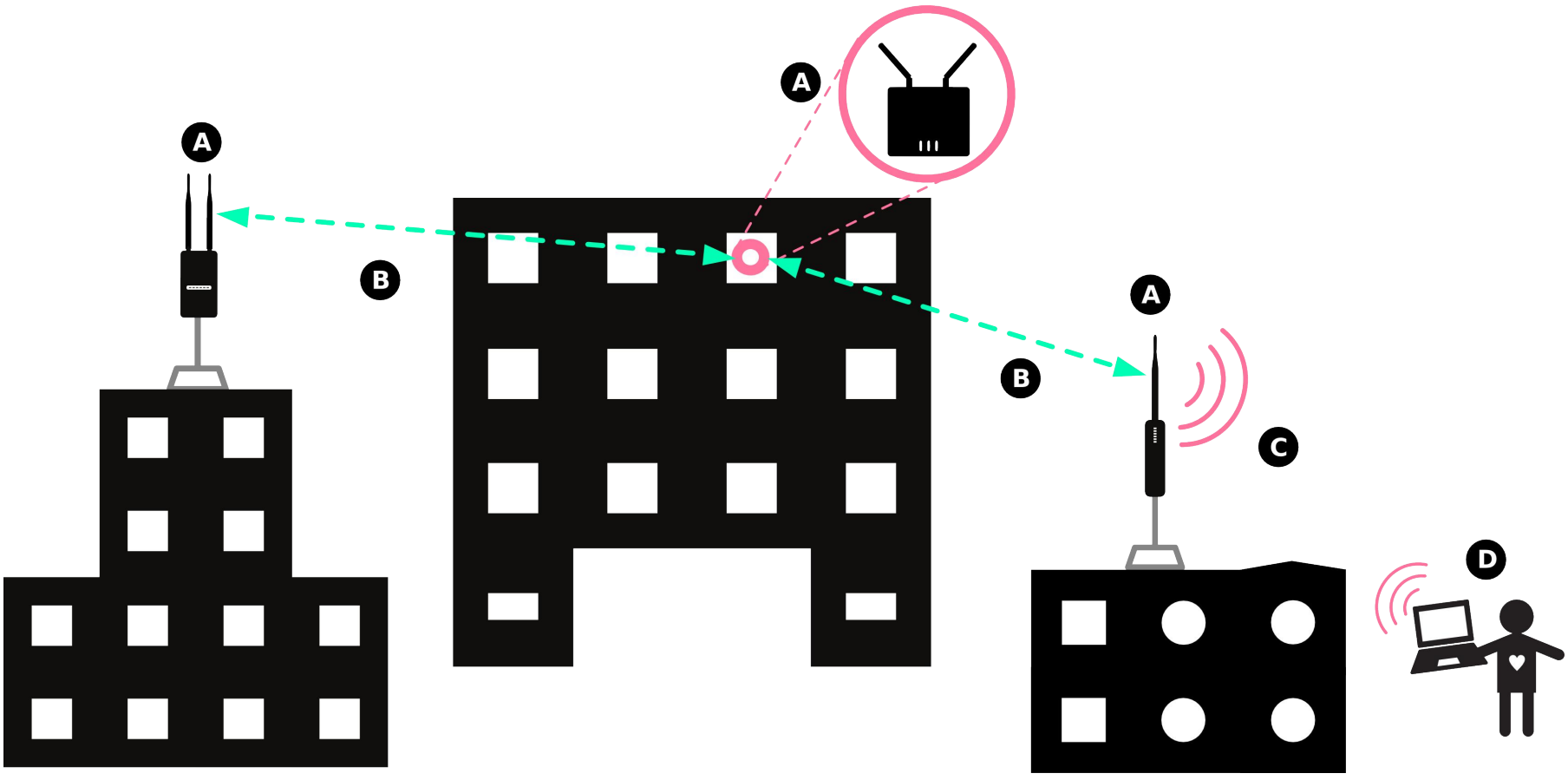
The instructions below are designed to show you how to configure and install the hardware in these different ways. Each configuration listed below describes the settings you should change to make the network work according to your plans. These are the three most common configurations of Commotion nodes - if you have more complex needs or want to install multiple nodes at a single site, please consult the **Advanced Hardware Setups** guide.

MATERIALS + SUPPLIES NEEDED

- A printout of the configuration you need, including specific information for the node you are working on.
- Information about the configuration for other nodes in the network.

Nodes meshing wirelessly

The most common configuration of wireless nodes is made up of the nodes themselves, the mesh links between nodes, and any users connected to the network. It involves two or more wireless nodes, installed with the Commotion software. The nodes in the example below are an assortment of omnidirectional nodes, but the specific type doesn't matter as long as they are within wireless range of each other.



In the diagram above:

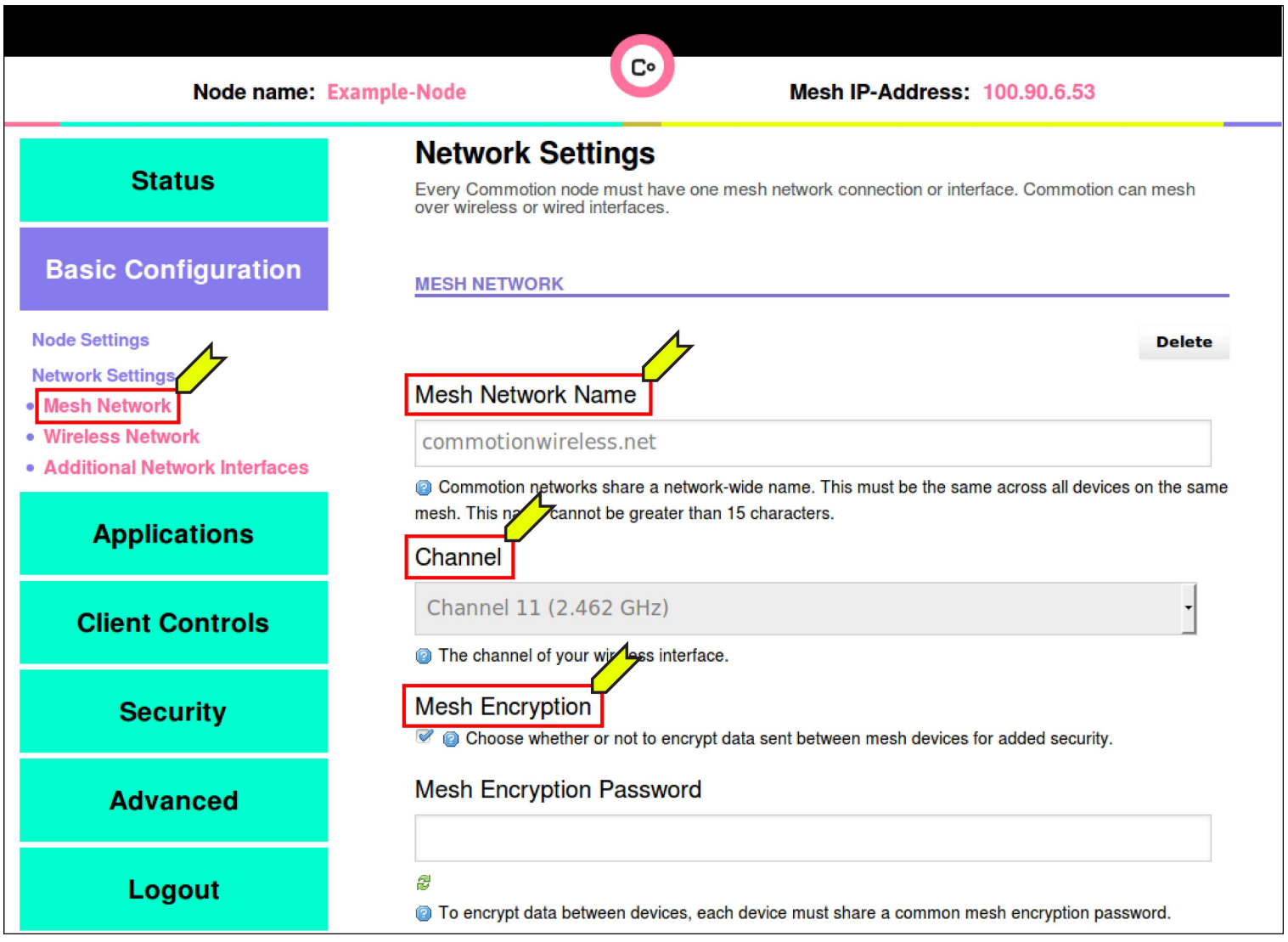
- **(A)** Represents wireless nodes running the Commotion software.
- **(B)** Represents the wireless mesh links between the nodes.
- **(C)** Represents the Access Point generated by the Commotion node for users to connect to.
- **(D)** Represents a person using a laptop, connected to a rooftop node's Access Point.

Steps to Configure:

The Commotion nodes should mesh wirelessly after running the Setup Wizard on the first boot, as long as the nodes were configured with the same:

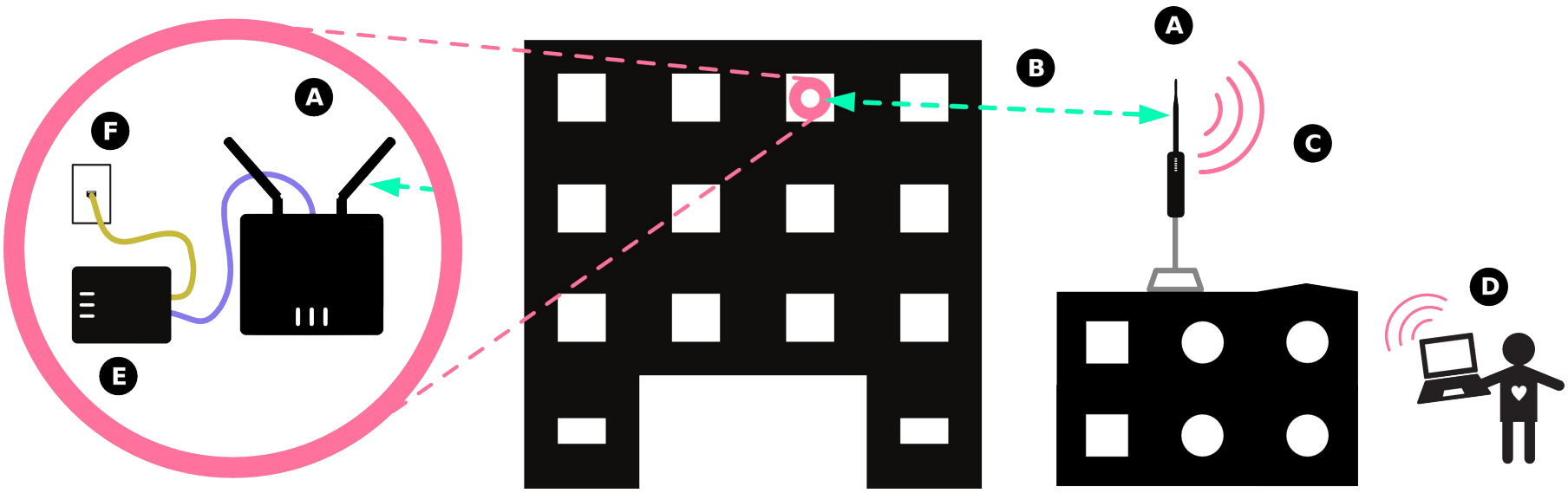
- **Mesh network name.** By default, this is set to commotionwireless.net.
- **Wireless channel.** By default, this is 11 for 2.4GHz wireless devices.
- **Mesh encryption password.** The passwords must match across the network. You can also disable encryption across the network.

After the initial configuration with the Setup Wizard, these settings are all visible and editable in the **Basic Configuration -> Network Settings -> Mesh Network** menu in the Administration panel of your wireless node. If any nodes are not meshing, check that the mesh settings are identical across all the nodes, and the nodes are in wireless range of each other. For a guide on accessing and changing these settings, see the Configure Commotion document.



Nodes connected to a gateway

Most networks are designed to provide services, with a connection to the global Internet being the most popular! Commotion is designed to share services across the entire mesh network by default, and will attempt to detect a gateway connection to the Internet when a node boots up. If the wireless node receives an IP address via DHCP on the wired Ethernet port, it will set itself up as a gateway.

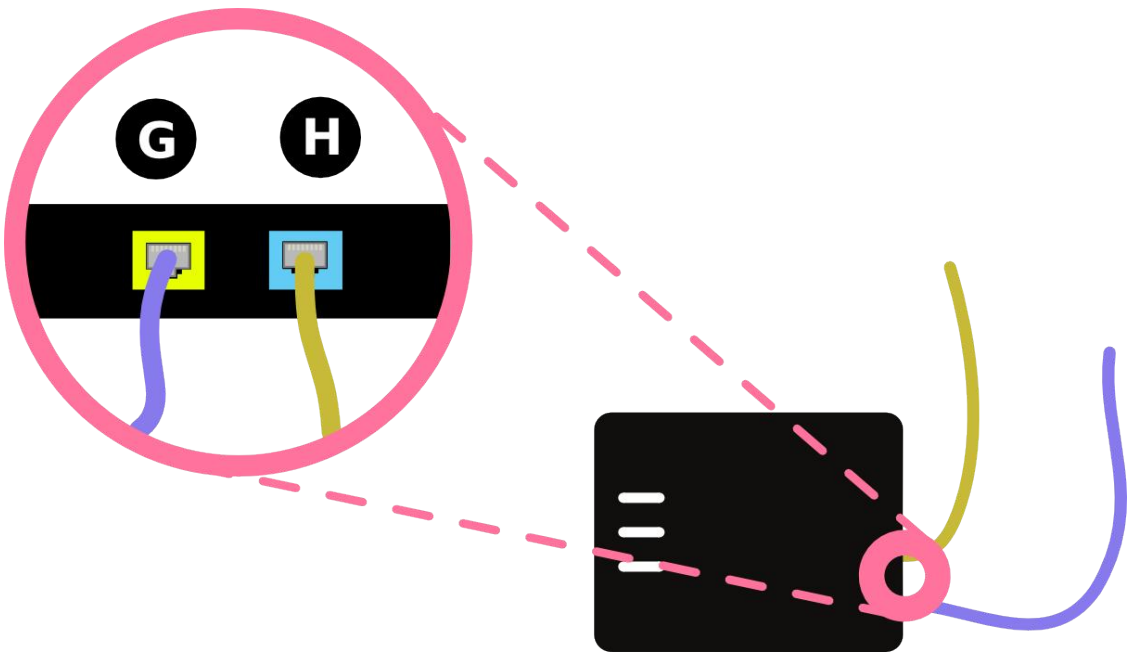


In the diagram above:

- **(A)** Represents the nodes running the Commotion software.
- **(B)** Represents the wireless mesh links between the nodes.
- **(C)** Represents the Access Point generated by the Commotion node for users to connect to.
- **(D)** Represents a user's laptop, connected to the second node's access point.
- **(E)** Represents the modem or router from the Internet Service Provider (ISP), connected to the Internet. It provides IP addresses on the local port with DHCP.
- **(F)** Represents the connection to the Internet.

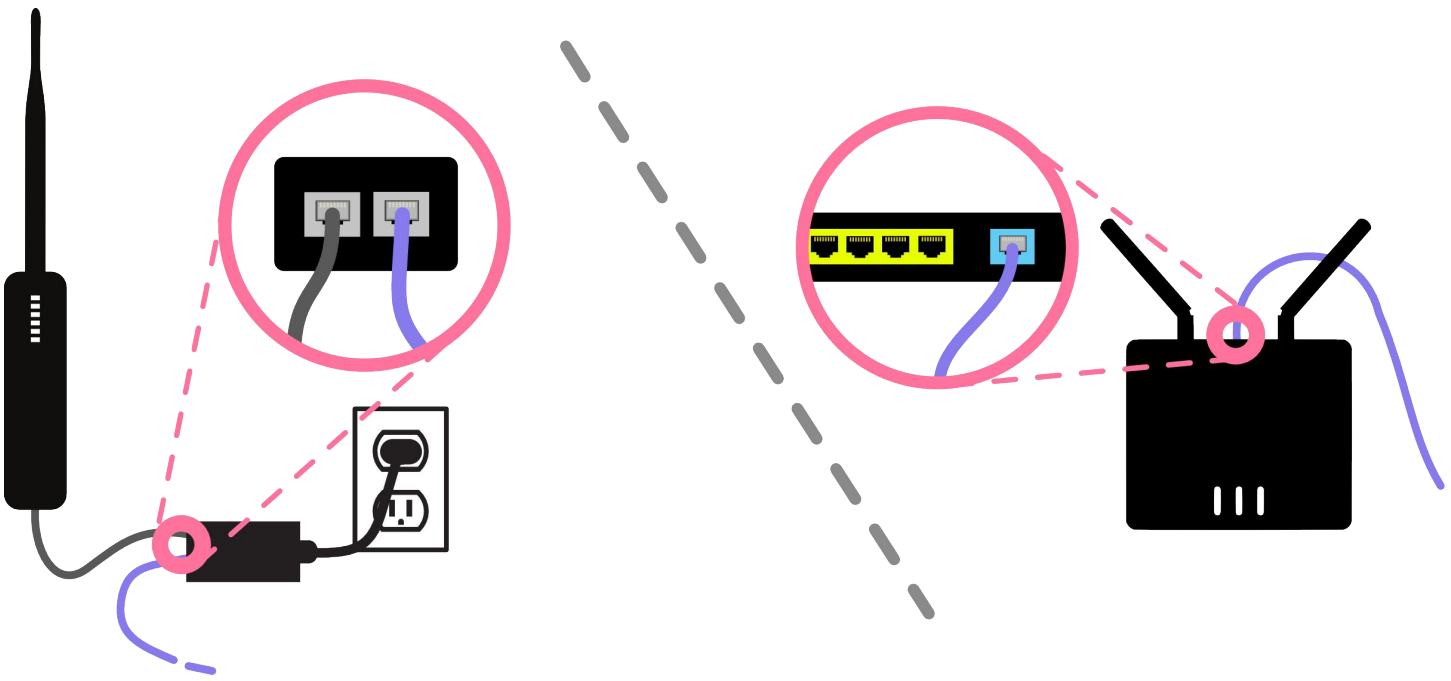
Ports and connections:

The type of modem will vary depending on the Internet Service provider, but it should have at least two ports:



- **(G)** Shows the modem LAN port, which is connected to the Commotion WAN port. There may be multiple LAN ports on the modem or router, any should work fine.
- **(H)** Shows the modem connection to the Internet - via DSL, cable, 3G USB adapter, or other type.

The cable from the modem LAN port should run to the WAN port on the Commotion node. On most outdoor routers, there will be a single port on the unit's PoE power supply. On routers with multiple ports, the WAN port will typically be labeled, and is often a different color - usually blue. These examples are shown below:



Steps to configure:

The Commotion nodes should mesh wirelessly after running the Setup Wizard on the first boot, as long as the nodes were configured with the same:

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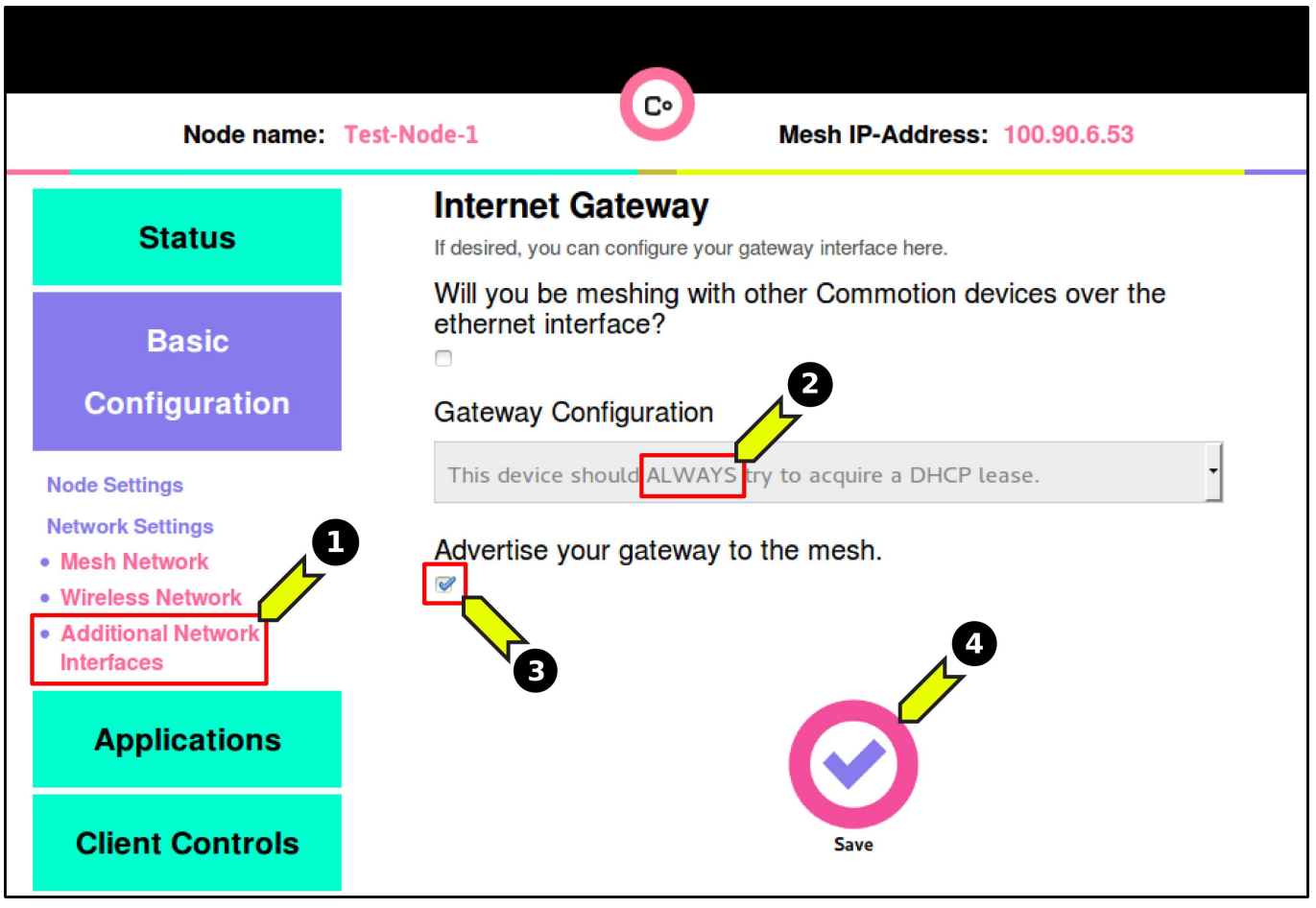
- **Wireless channel.** By default, this is 11 for 2.4GHz wireless devices.
- **Mesh encryption password.** The passwords must match across the network. You can also disable encryption across the network.

The first Commotion node connected to the modem should receive an IP address and configure itself as a gateway. It will advertise this on the network by default, as long as the "Advertise your gateway to the mesh" is checked in the Additional Network Interfaces menu. At this point, the user connecting with the laptop on a mesh node can access the Internet.

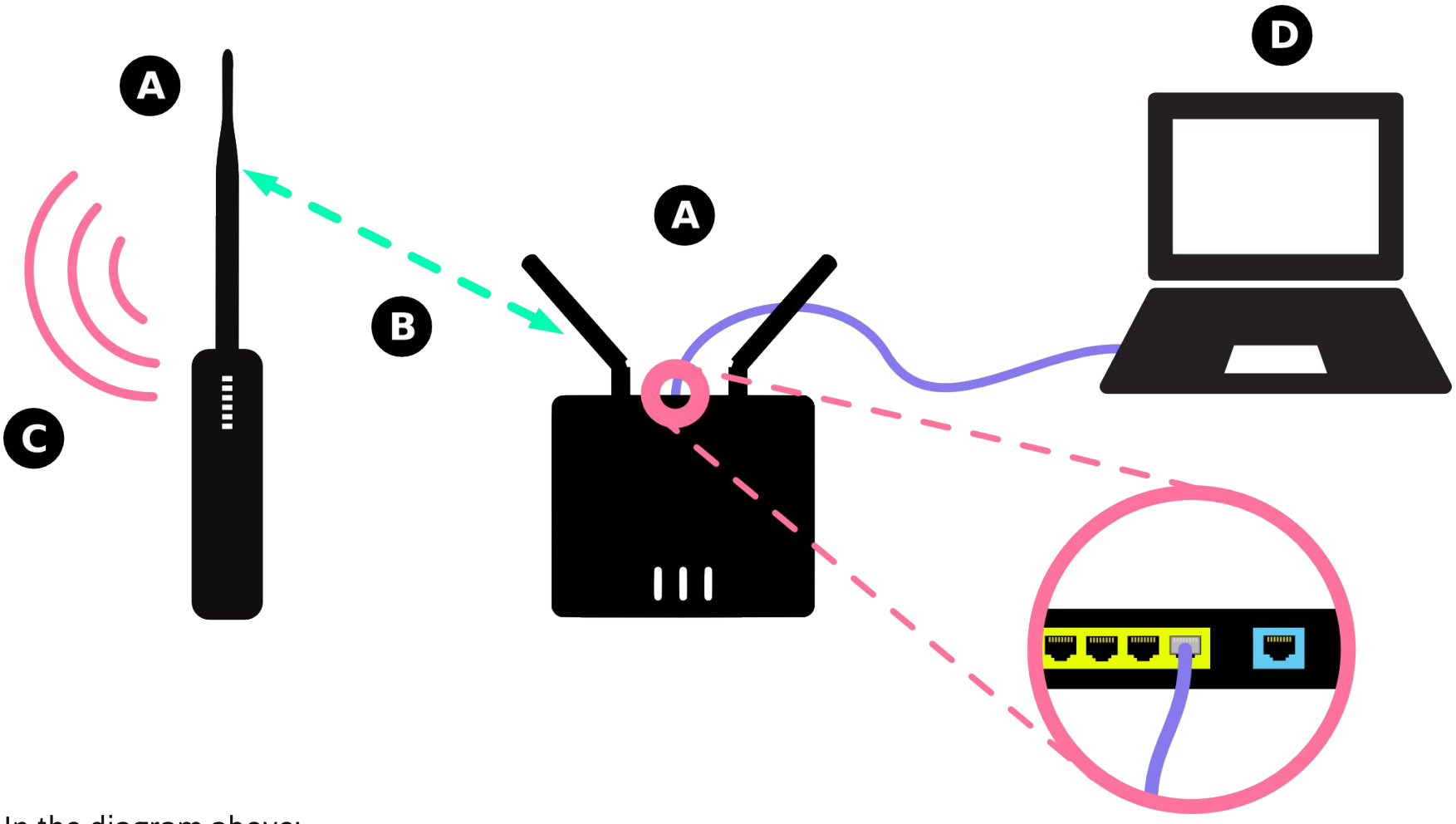
After running the Setup Wizard, you can set the node to "gateway only" mode:



1. In the Administration panel, browse to the **Basic Configuration -> Network Settings -> Additional Network Interfaces** menu.
2. In the "Gateway Configuration" pull-down menu, select "This device should ALWAYS try to acquire a DHCP lease".
3. Make sure "Advertise your gateway to the mesh" is checked.
4. Save and apply these settings.

Node connected to a local application server

You have a web server hosting a community blog on your computer, and you want to share it with the neighborhood network. Connect the computer to the mesh node using the wired Ethernet port. The laptop will receive an IP address on the mesh, and you can use Commotion's application portal to add an entry for the blog, which will be advertised to the users on the mesh via the splash page on all the nodes.

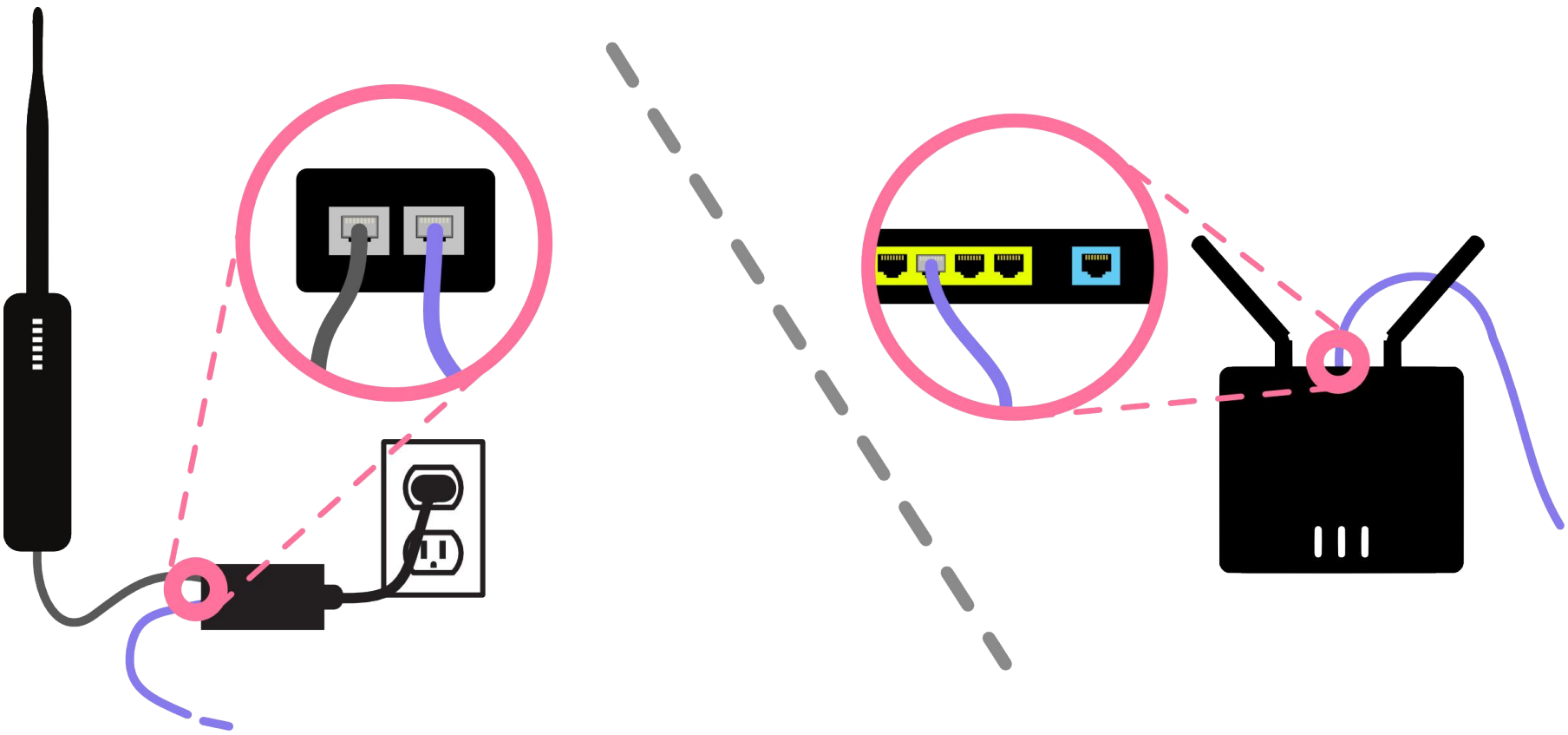


In the diagram above:

- **(A)** Represents a node running the Commotion software.
- **(B)** Represents the wireless mesh links between the nodes.
- **(C)** Represents the Access Point generated by the Commotion node for users to connect to.
- **(D)** Represents a laptop set up as a server, connected to a node's wired Ethernet port. In this case, one of the LAN ports.

Ports and connections:

The cable will run from the Commotion nodes' LAN port. On most outdoor routers, there will be a single port on the unit's PoE power supply. On routers with multiple ports, the LAN ports will typically be labeled, and are often a different color - usually yellow. These examples are shown below:

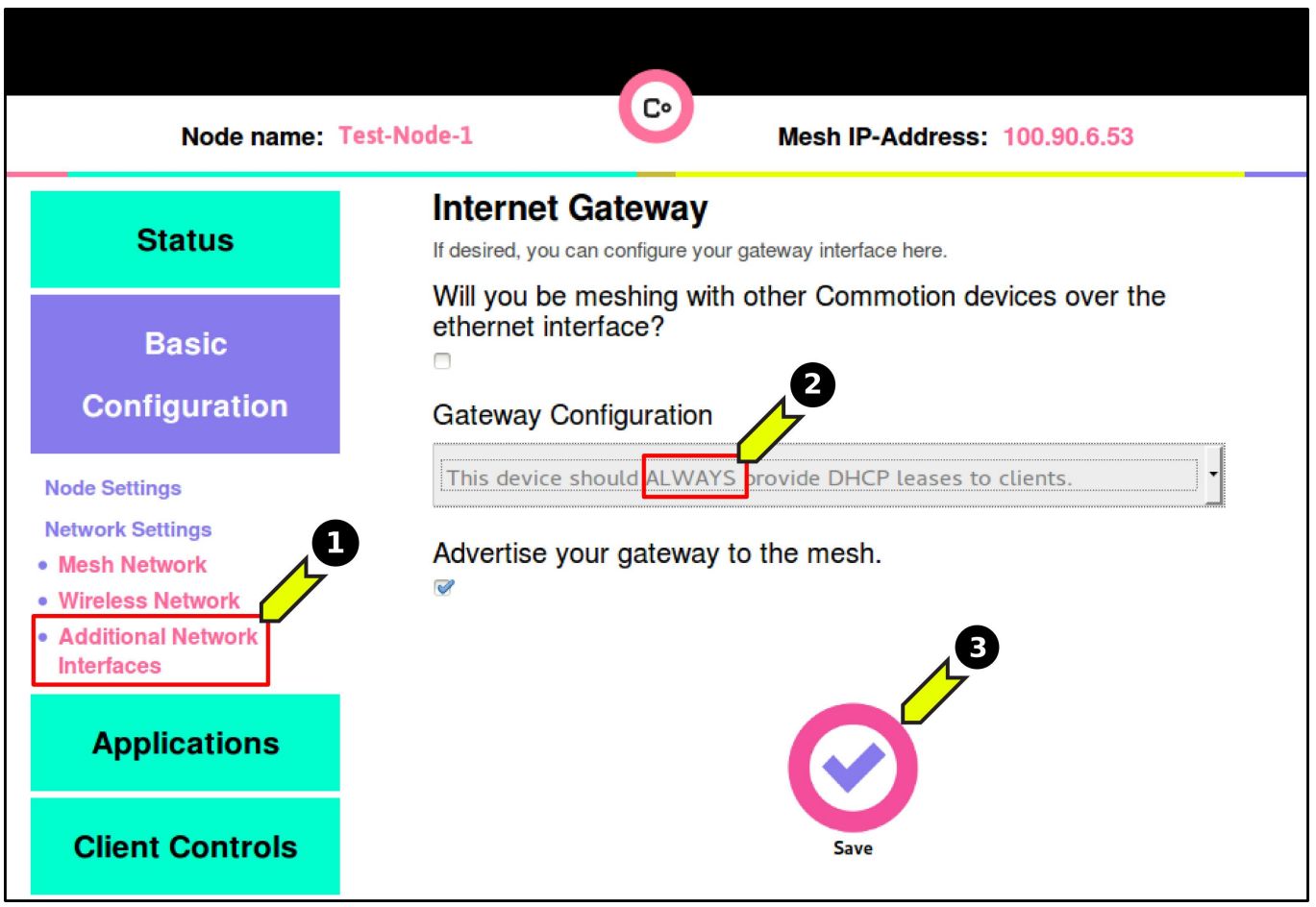


Steps to configure:

The Commotion nodes should mesh wirelessly after running the Setup Wizard on the first boot, as long as the nodes were configured with the same:

- **Mesh network name.** By default, this is set to commotionwireless.net.
- **Wireless channel.** By default, this is 11 for 2.4GHz wireless devices.
- **Mesh encryption password.** The passwords must match across the network. You can also disable encryption across the network.

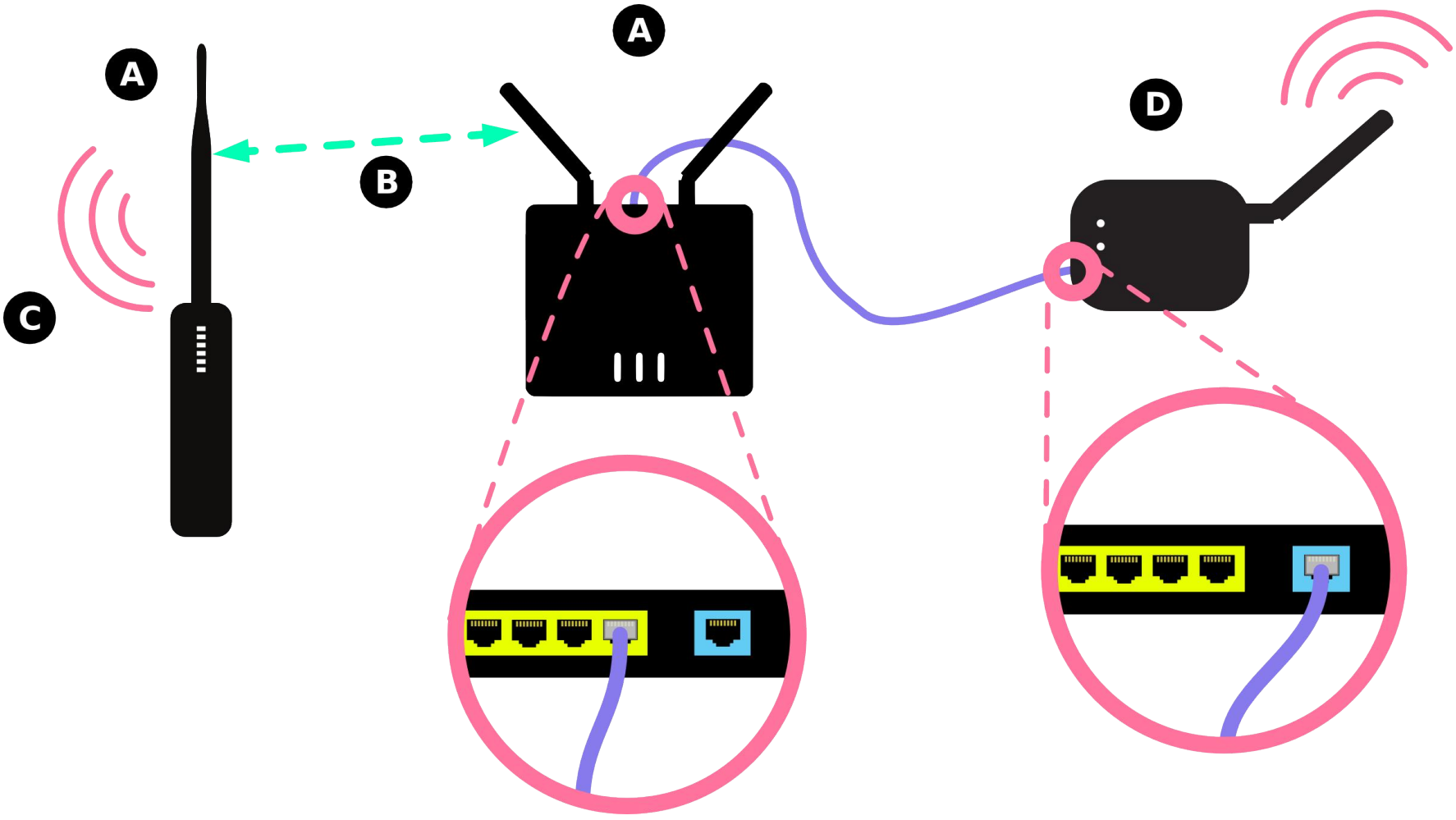
The Commotion node should provide an IP address to the connected computer. To make sure this is always the case, set the node to “DHCP server only” mode:



1. In the Administration panel, browse to the **Basic Configuration -> Network Settings -> Additional Network Interfaces** menu.
2. In the “Gateway Configuration” pull-down menu, select “This device should ALWAYS provide DHCP leases to clients”.
3. Save and apply these settings.

Node connected to an external AP or router

If there is no Internet connection inside a building, you can connect to the rooftop mesh network to provide access. Connect an indoor Access Point or router with a wireless AP to the wired Ethernet port of the Commotion node on the roof. The node will provide any users connecting to the AP with wireless devices such as smartphones and laptops with IP addresses on the mesh. These non-Commotion routers and Access Points can add wireless coverage to areas not covered by the outdoor mesh nodes. By connecting to these indoor APs, users can access the services and gateways that are on the mesh. Since Commotion isn't compatible with every router, this method allows you to use routers and Access Points you might already have.

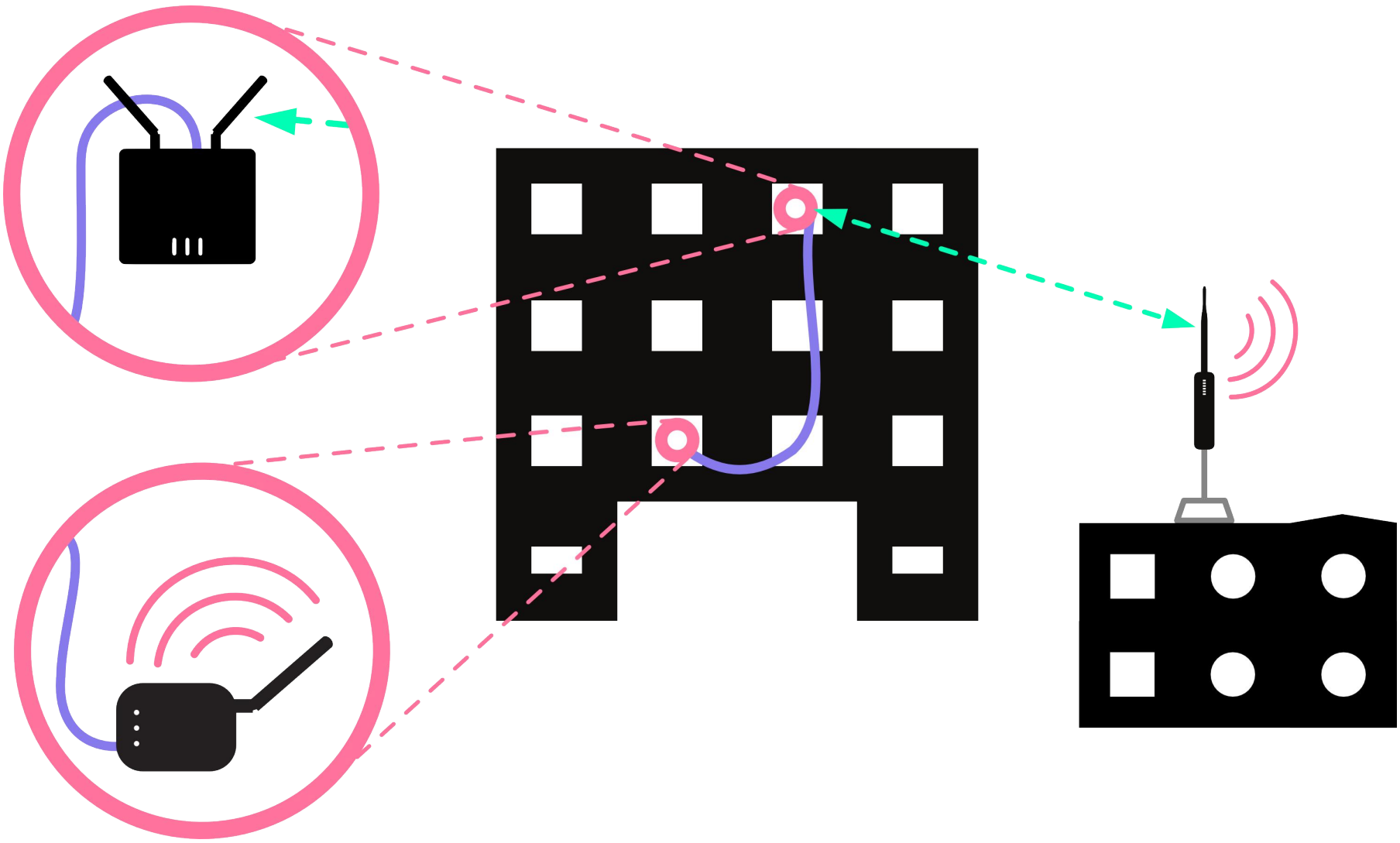


In the diagram above:

- **(A)** Represents a node running the Commotion software.
- **(B)** Represents the wireless mesh links between the nodes.
- **(C)** Represents the Access Point generated by the Commotion node for users to connect to.
- **(D)** Represents an external Access Point or router, not running Commotion. This is connected to the second node's wired Ethernet LAN port.

Access points inside a building:

The diagram below demonstrates what this would look like with equipment installed on and in a building:



Steps to configure:

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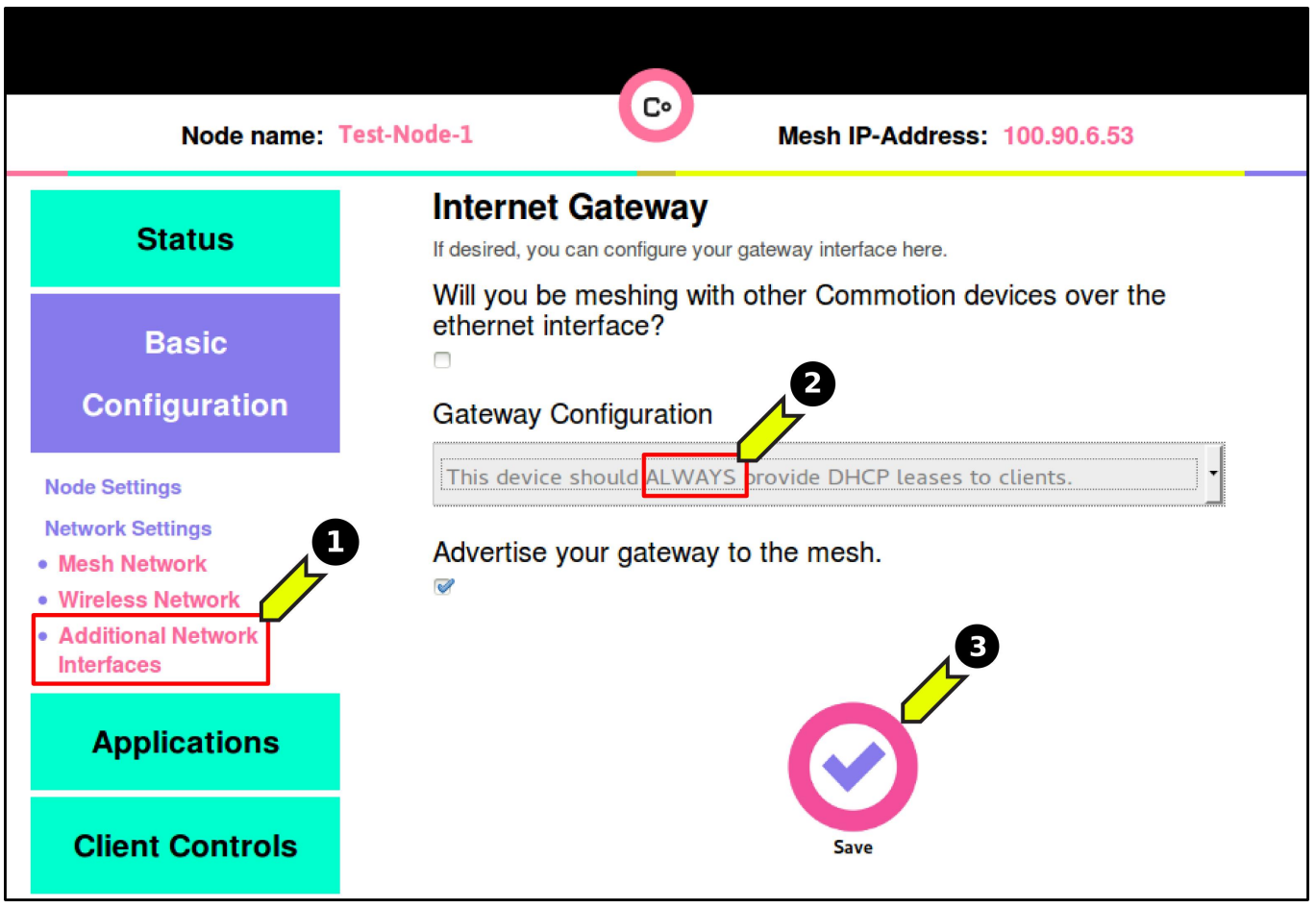
- **Wireless channel.** By default, this is 11 for 2.4GHz wireless devices.
- **Mesh encryption password.** The passwords must match across the network. You can also disable encryption across the network.

Make sure that the Commotion node's LAN port is plugged into the "WAN" port of the Access Point or router. The WAN port is the "incoming" connection port, where you would plug in a modem for access to the Internet. The Commotion node should provide an IP address to the AP and any users that connect. To make sure this is always the case, after running the Setup Wizard, you can set the node to "DHCP server only" mode:



1. In the Administration panel, browse to the **Basic Configuration -> Network Settings -> Additional Network Interfaces** menu.
2. In the "Gateway Configuration" pull-down menu, select "This device should ALWAYS provide DHCP leases to clients".
3. Save and apply these settings.

Definitions

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

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.

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

Node
An individual device in a mesh network.

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

Related Information

This module is intended to help you immediately after configuring one or more Commotion nodes. Use it to determine the best way to set up nodes for different scenarios. If you have more complicated scenarios, check the **Advanced Hardware Setups** guide. It describes how to configure Commotion to mesh over wired Ethernet, and how to set up multiple nodes on or in a single building.