CBA750 Best Practices

Executive Summary:

This document is intended to assist users in configuring a CradlePoint CBA750B in IP Passthrough Mode to act as a transparent bridge and provide the carrier's IP address to an internal router, firewall (Cisco, Juniper, etc…) or computer. The Cradlepoint CBA750B does have NAT capabilities, but is not designed to function as a NAT router.

Hardware Requirements:

•CradlePoint CBA750B
•Modem with SIM card provisioned by a cellular network provider (Verizon, AT&T, Sprint, etc..) – we recommend the enterprise grade Cradlepoint MC200 modem cap.
•Internal router, firewall or computer

Firmware Version:

The firmware version that was used for the preparation of this document was 4.4.2

Initial Configuration

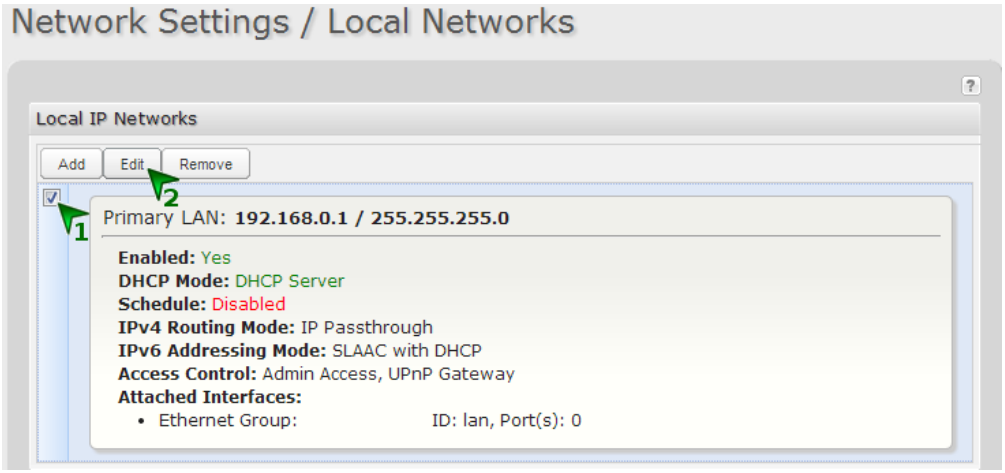
1.Connect the modem to the USB1 port of the CBA750B, then apply power to the CBA750B using the included power supply or a Power-over-Ethernet switch (Cradlepoint implements the 802.1af PoE specification). Connect a computer to the CBA750B's Ethernet port.

2.The CBA750B will attempt to connect using the modem. When the CBA750B's USB1 LED turns solid green, this indicates the modem has connected. If the USB1 LED continues to flash and does not go solid, you should verify with your carrier that the SIM Card or Modem has been provisioned before calling CradlePoint Support for assistance. If you have a static IP address and the modem is not connecting, try setting the APN (http://http://knowledgebase.cradlepoint.com/articles/Support/APN-on-a-Series-3-CradlePoint)

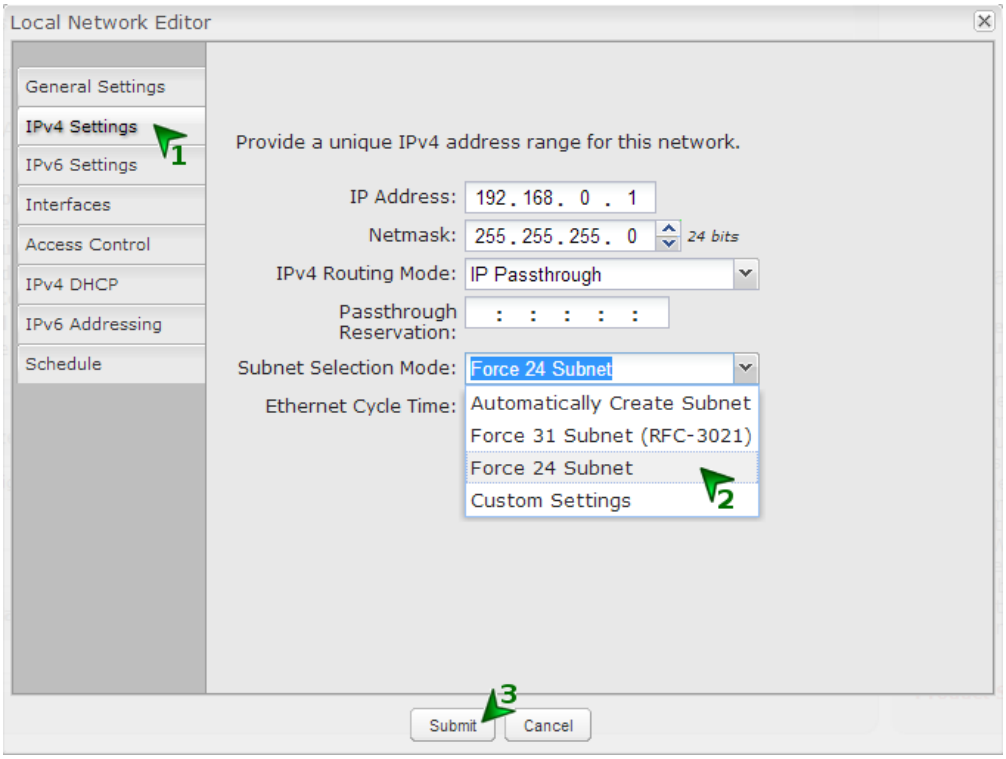
3.From the computer connected to the CBA750B, open a browser (we recommend Chrome or Firefox) and access the Administration Pages at http://192.168.0.1. Log in to the CBA750B using the default administrator password (the last 8 characters of the CBA750B's MAC Address).

4.The First Time Setup Wizard is optional – for the purpose of this document, we recommend skipping this step.

5.If you have a static IP address, navigate to **Network Settings > Local Networks** and select the **Primary LAN** and click **Edit**.



6.Select the **IPv4 Settings** tab and set the Subnet Selection Mode to “Force 24 Subnet” and click **Submit**.

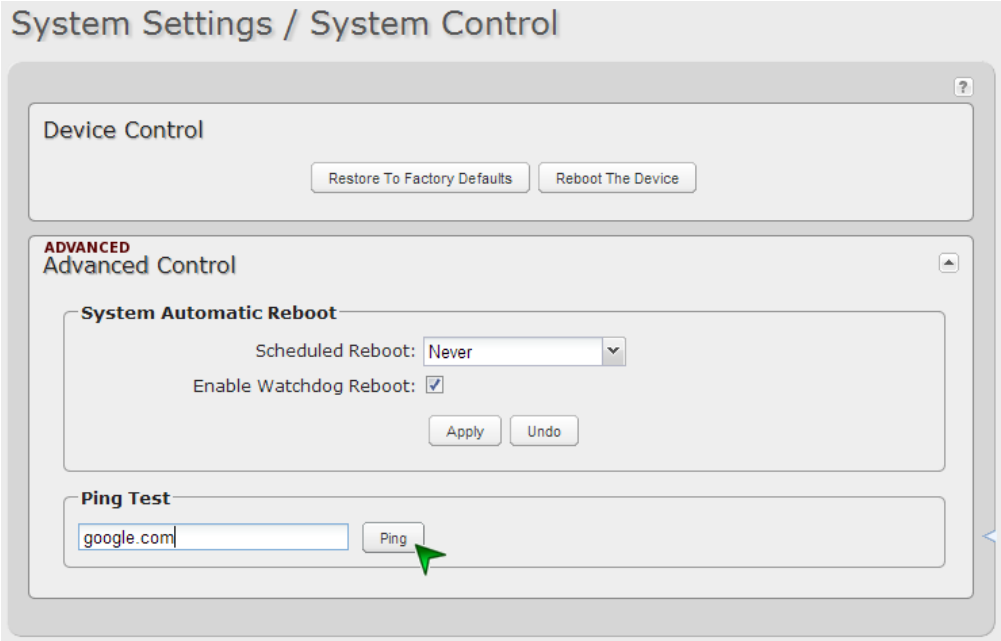


7.Check the modem’s signal strength by going to **Status > Internet Connections**. Make note of the *Service Display*, *RSSI,* and *SINR, CINR,* or *EC/IO* which are dependent on connection type as to whether they are displayed. (Information regarding signal values can be located here – http://knowledgebase.cradlepoint.com/articles/Support/Modem-Signal-Strength-and-Signal-Quality).
If you have a static IP address, verify that the correct IP address is listed.

Service Display	LTE
RSSI	-60 dBm
SINR	-3.4 dB

IPv4 Information	
IP Address	166.241.162.155

8.Once the modem is connected with good signal, go to **System Settings > System Control > Advanced Ping Test** and run the ping test to a URL (e.g. google.com) to verify connectivity.



9.You can now disconnect your computer and connect your CBA750B to your router or firewall.

Additional Configuration Options

Subnet Selection Mode (from Initial Configuration step 6):

This option overrides the subnet mask that is assigned to the modem from the carrier. In some cases, you may be assigned static IP addresses in the same network at multiple locations, or a subnet mask that would designate that the IP address is a non-usable network or broadcast address and cause the internal router to reject it.
In these cases, it is necessary to force a different subnet mask.

“Force 24 Subnet” – this setting will alleviate the issue where you are assigned IP addresses in the same network at multiple locations, or an IP address and subnet mask combination that designates the IP address as a non-usable network or broadcast address and is rejected by an internal router.

“Force 31 Subnet” – this setting is used when you have two CBA750Bs with IP addresses in the same network connected to the same internal router, which would cause overlapping routes. This option also requires that the internal router supports the /31 subnet mask.

“Custom Subnet” – this setting is used to specify a subnet mask of your choice. One example would be to use a /30 mask if your internal router does not support the /31 mask.

Design Recommendations

PoE:
Power-over-Ethernet allows you to place the CBA750B in a location where you are able to get optimal signal and not have to worry about an available power outlet. It also eliminates the power cabling, providing for a cleaner installation. Cradlepoint implements the 802.1af PoE specification.

IP Passthrough Switch:
There is a physical switch located on the side of the CAB750B. It was added as a convenience for switching the router from IP Passthrough mode to Config mode. We recommend not using this switch unless absolutely necessary as it does make changes to the configuration that may not be desirable, such as setting the Subnet Selection Mode to “auto”.

Troubleshooting

If after following the instructions on the previous page, you are unable to maintain an internet connection, please review the following information.
LTE spec defines the MTU at 1428. As a best practice you will need to avoid excessive fragmentation for efficient application data traffic flow. It is recommended that you follow the MTU\MSS design guide to avoid fragmentation:

http://knowledgebase.cradlepoint.com/articles/Support/MTU-MSS-Design-Considerations

Additionally, IP Source Violations (where the source IP packet is not the IP issued by the cellular carrier) will cause the carrier to briefly disconnect the modem. This disconnect in most cases is quick to recover and has been labeled “structured packet loss” . Since the CBA750B is a transparent bridge you are required to NAT all traffic to the IP address assigned by your carrier on your network hardware. The most common offender of IP source violation is ancillary traffic source directly from the router like NTP, SNMP, TACACS, and Syslog.