MOTOROLA SOLUTIONS
Government and Public Safety
1301 E. Algonquin Road
Schaumburg, IL. 60196

DATE: November 9, 2012

MOTOTRBO Linked Capacity Plus (LCP) - HP MSR 20-20 Router Configuration Guide

MOTOTRBO

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This document is intended as a configuration guide to assist with the programming conventions and commands used in the HP MSR 20-20 routers. This document does not provide detailed information on the basics of IP networking or the basics of programming code plugs for Linked Capacity Plus.

MOTOTRBO Linked Capacity Plus (LCP) was released in the MOTOTRBO firmware R01.09.

The following pages are to be used as an example only. This is a 2-site system example, however, it can be extended to multiple sites by inserting user specific network topology information in the areas marked in red color text. Items in the example which the user will have to specify based upon his IP address ranges and network topology will be clearly marked in red color text.

Specific Configurations Needs for this Router (the router will NOT work directly out of the box):

1. Must configure router to have “Network Address Translation”.
2. Must configure Master Router in Linked Capacity Plus to have a static IP configuration.
   NOTE: The example configures all routers with static IP addresses.
3. Must configure routers for “Port Forwarding”.
   NOTE: For the MSR 20-20 router, port forwarding rules enable NAT-Loopback to occur.
4. Router settings, other than what is described here, are not validated by Motorola Solutions, Inc.

Example Notes:

1. Each site should have a different LAN IP address and subnet.
2. Each repeater should have a different UDP port number. The convention used in the example below is: 500*XY*, where *X* is the site number and *Y* is the repeater number.
3. Each Rest Channel/Site IP should have a different UDP port number. The convention used in the example below is 5500*X*, where *X* is the site number.
4. The following documentation is the example for programming the router at Site 1. The router at every site must also be configured using each site’s specific details.
5. Command line reference documentation may be downloaded at: http://www.h3c.com/
6. Configuration was tested with the following versions:

    a. **Repeater Firmware: R01.09.11**
    b. **Router Software / Firmware / Hardware: CMW520-R2209P15-SI / 3.13 / 3.0**

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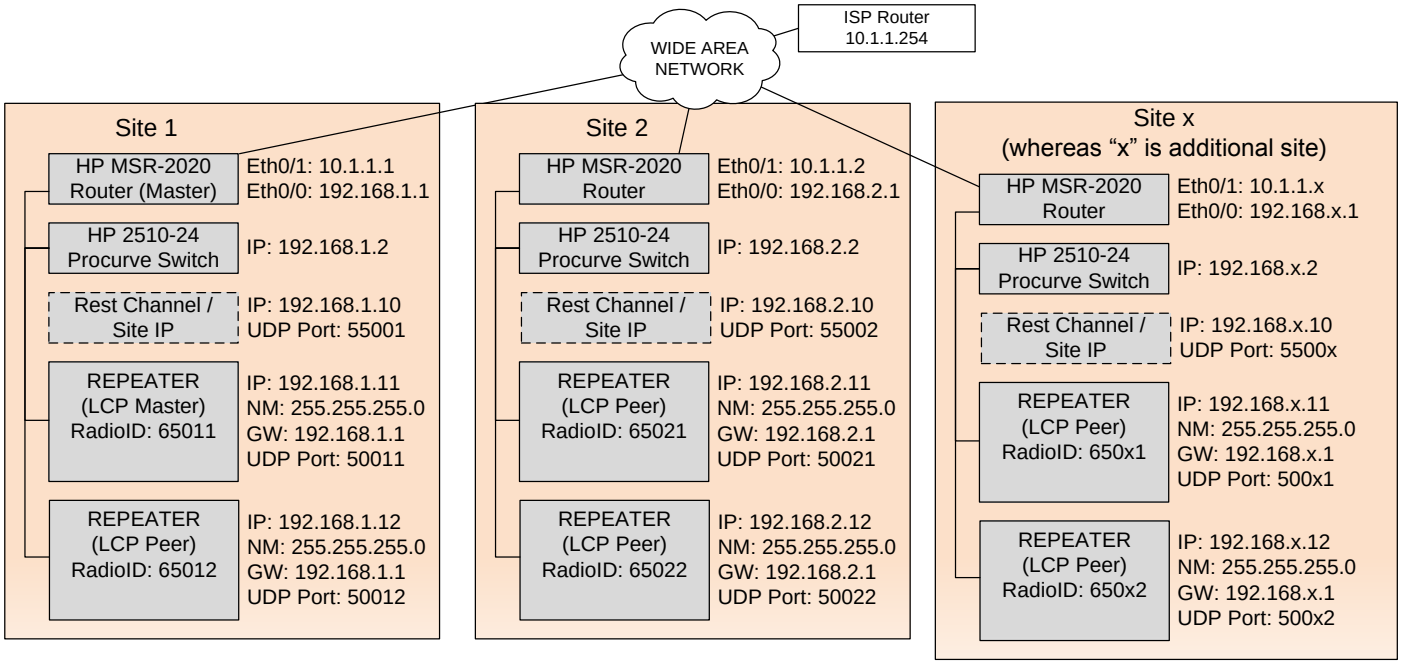

Configuration method using the HP MSR 20-20 Web Interface, for the example configuration above:

The default IP address for interface ethernet0/0 is 192.168.1.1
(if this is not the case then use the CLI to determine the IP address with **`system-view`** `and` **`display interface ethernet brief`** `commands`).

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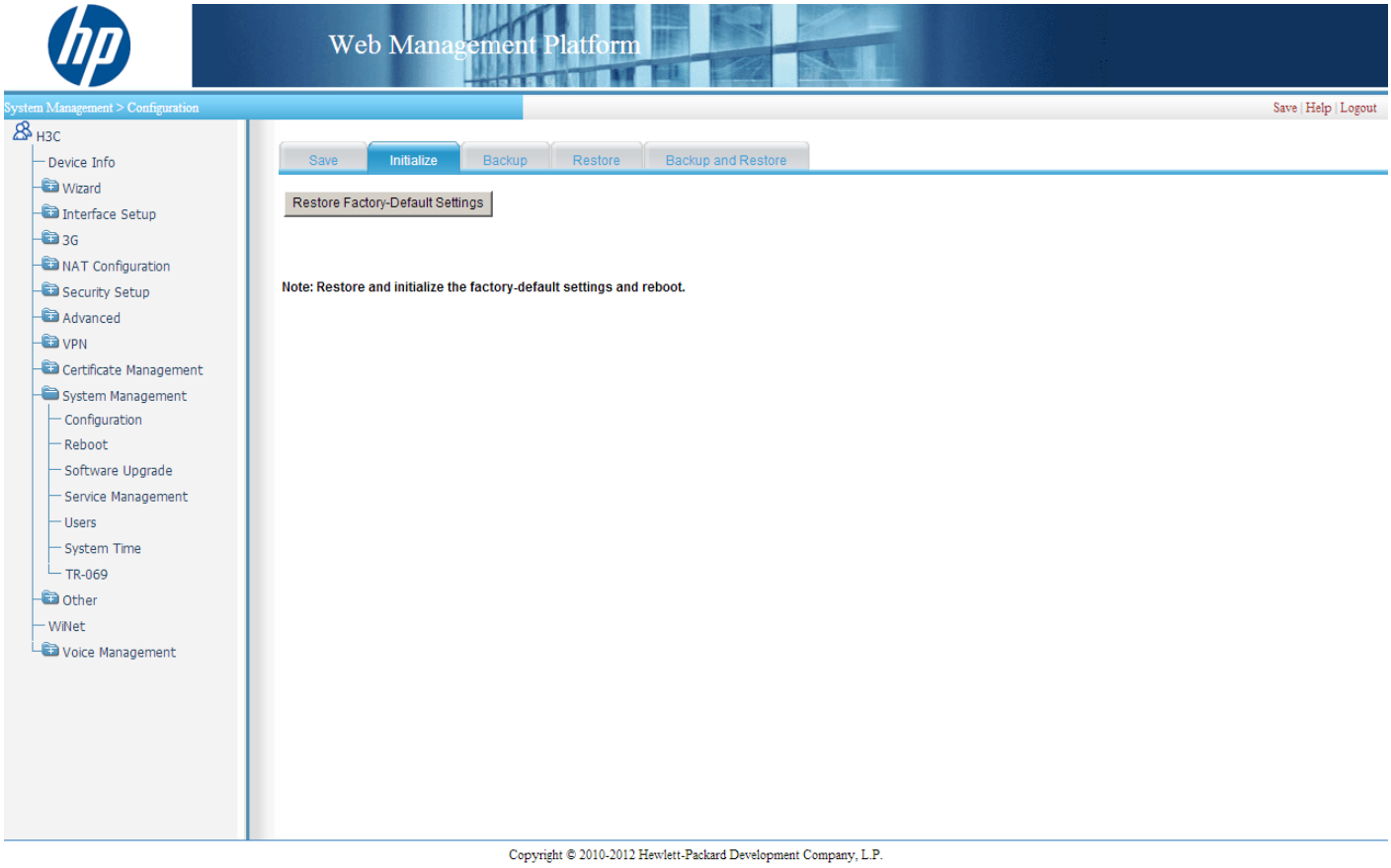
Important Note: Before configuring a router, reset the router to factory default setting using following step.

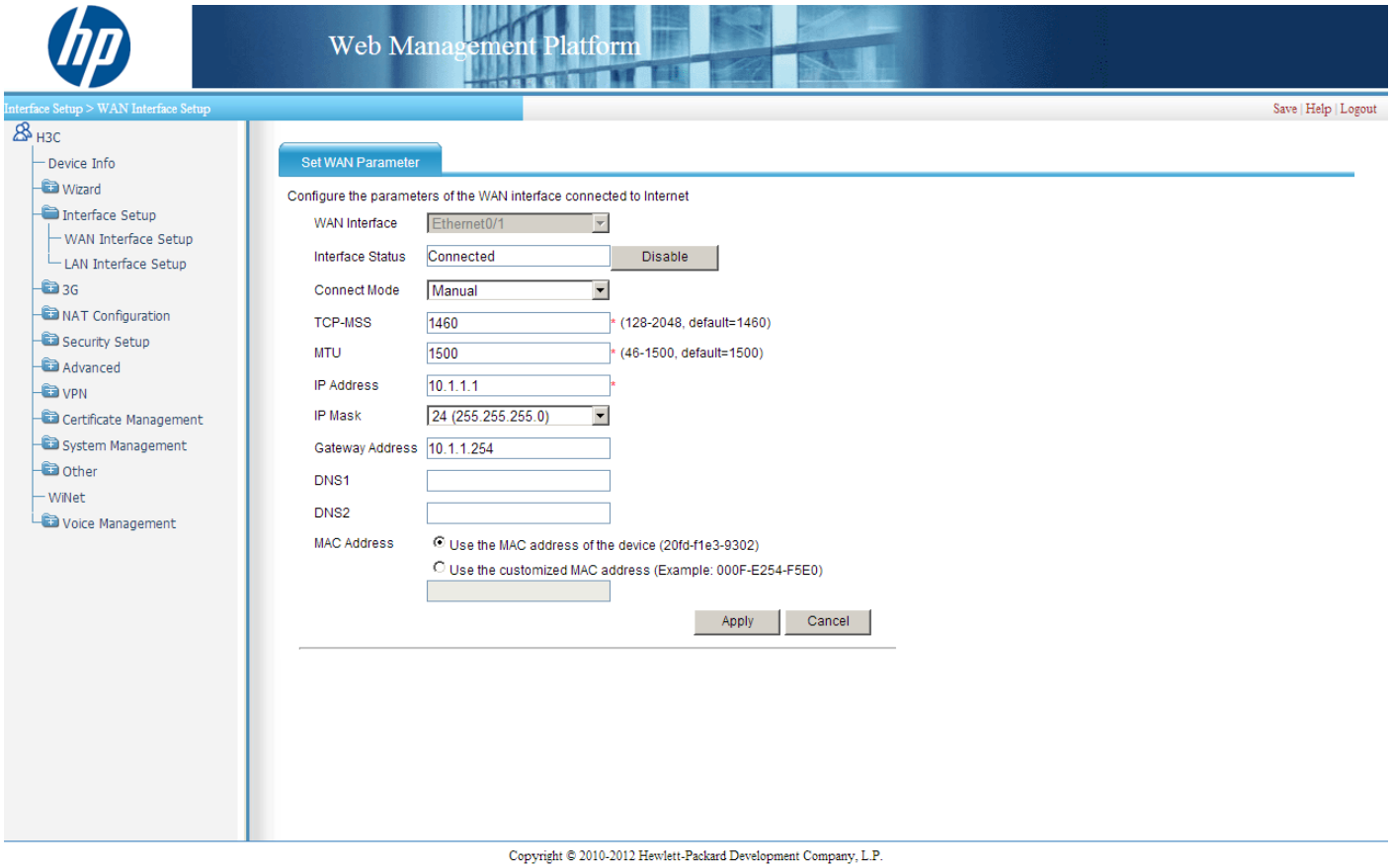
Reset the router to factory settings:

1. *System Management* > *Configuration* > *Initialize* tab
2. Click button, “Restore Factory-Default Settings”



Change the IP address of the ethernet interfaces:

1. *Interface Setup* > *WAN Interface Setup*
2. Click the icon on the right-hand side in the Operation column.
3. Edit the fields shown below. (Ethernet0/1 interface is shown)
    a. If a Gateway Address is entered, the static route is automatically added.
4. Click Apply to accept changes.
5. Click Save in the top right-hand side to commit changes.

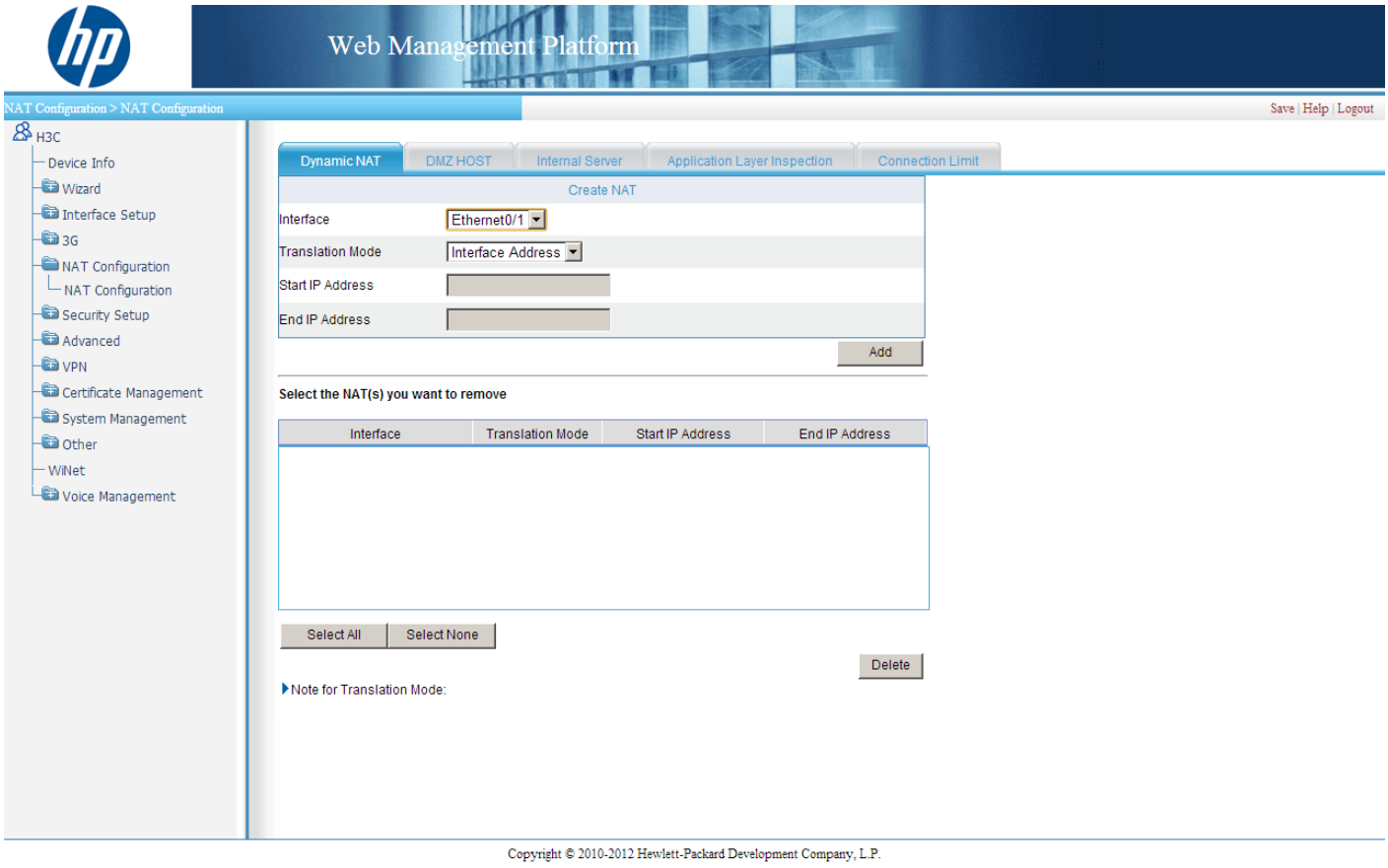


Configure Network Address Translation (NAT):

1. *NAT Configuration* > *NAT Configuration* > *Dynamic NAT* tab.
2. Select the following settings as shown below:
    a. Interface: **Ethernet0/1**
    b. Translation Mode: **Interface Address**
3. Click Add to accept entry.
4. Click Save in the top right-hand side to commit changes.

Notes:

- Previous versions of the configuration guide used the Translation Mode as “No-PAT”. The “No-PAT” setting causes the IP Repeater Programming (IRP) to fail. IRP may not work if CPS is in the same subnet as the repeaters.

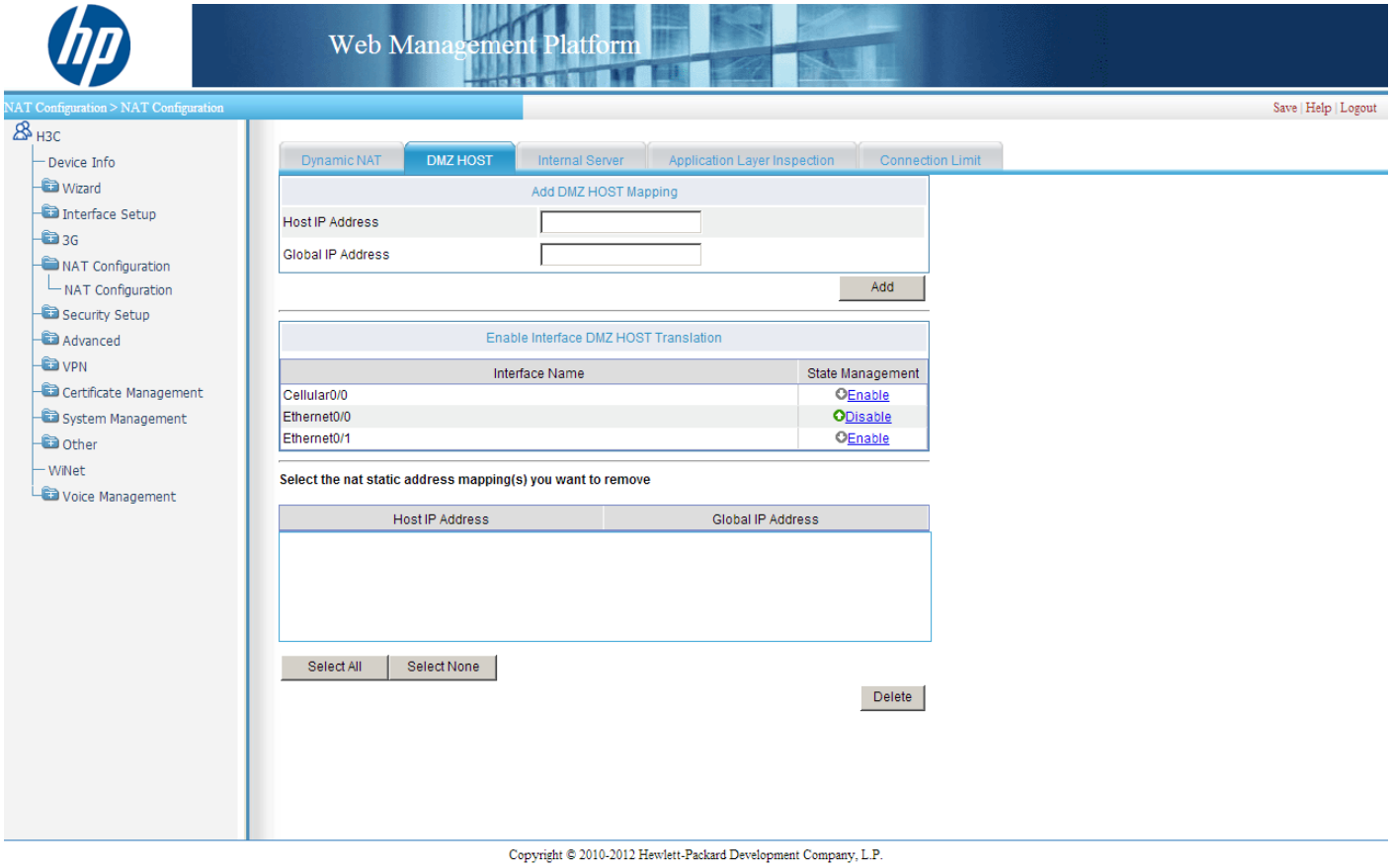


Enable Ethernet0/0 with a Static Outbound NAT:

1. *NAT Configuration* > *NAT Configuration* > *DMZ HOST* tab.
2. Click Enable on the Ethernet0/0 row.
3. Confirm that the Ethernet0/0 interface is enabled (Green Up-Arrow).
4. Click Save in the top right-hand side to commit changes.

Notes:

- Location is *NAT Configuration* > *NAT Configuration* > *One-to-One NAT* on earlier router firmware.
- This step is required because some router firmware versions do not properly configure this automatically.



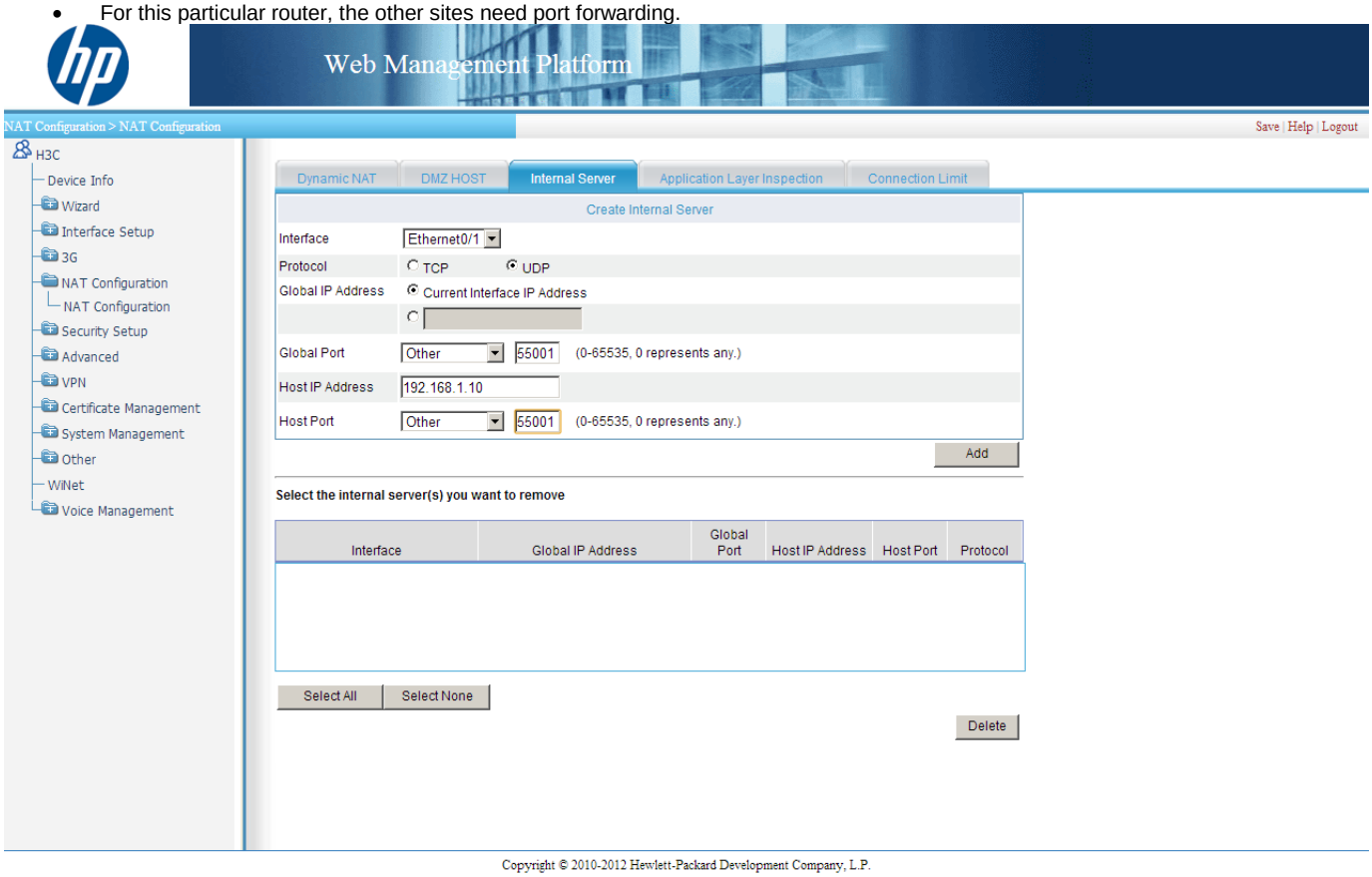
In case the web interface does not support this configuration then use Command Line Interface to reflect interface Ethernet 0/0 if it is "NAT outbound static.

Configure Internal Servers (Port Forwarding):

1. *NAT Configuration* > *NAT Configuration* > *Internal Server* tab.
2. Select the following settings for the Rest Channel/Site IP:
    a. Interface: **Ethernet0/1**
    b. Protocol: **UDP**
    c. Global IP Address: **Current Interface IP Address**
    d. Global Port: **Other & <Rest Channel Port Number>** (For this example, 55001)
    e. Host IP Address: **<Rest Channel/Site IP Address>** (For this example, 192.168.1.10)
    f. Host Port: **Other & <Rest Channel Port Number>** (For this example, 55001)
    g. Click Add to accept entry.
3. Select the following settings for each repeater at the site:
    a. Interface: **Ethernet0/1**
    b. Protocol: **UDP**
    c. Global IP Address: **Current Interface IP Address**
    d. Global Port: **Other & <Repeater Port Number>** (For this example, 50011)
    e. Host IP Address: **<Repeater IP Address>** (For this example, 192.168.1.11)
    f. Host Port: **Other & <Repeater Port Number>** (For this example, 50011)
    g. Click Add to accept entry.
4. Click Save in the top right-hand side to commit changes.

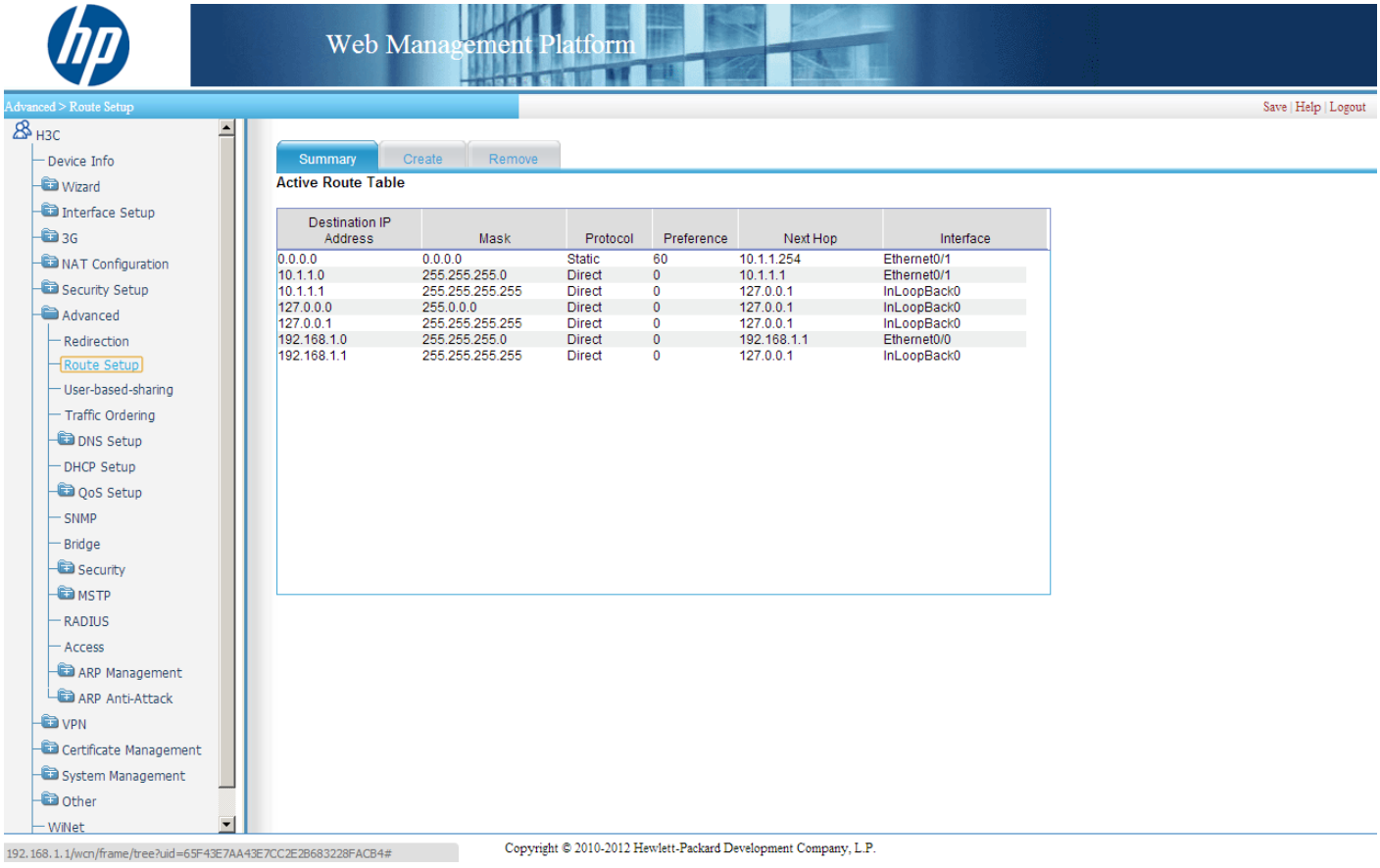
NOTES:

- At the Master Repeater site, the Rest Channel/Site IP Address requires port forwarding to obtain the local peers' IP addresses.
- The Master Repeater IP Address needs port forwarding to obtain the peers' IP addresses as seen by the Master Repeater.
- For this particular router, the other sites need port forwarding.



Confirm the static route:

1. *Advanced* > *Route Setup* > *Summary* tab.
2. Confirm that for the destination of 0.0.0.0, the Next Hop is the **Gateway Address** (10.1.1.254).



Alternate configuration method using the HP MSR 20-20 Terminal Interface

Document and Example Conventions:

`Text as displayed in the command line interface.`
`Command line text for the user to enter.`
`<Command line text that is router or site specific>`

1. Connect the device and PC via the supplied console cable.
2. Configure the terminal emulation program on PC (example: Procomm Plus, Tera Term Pro)
    a. 9600, data bits to 8, parity to none, stop bit to 1, and flow control to none
3. Enter the Command Line Interface (CLI) of the device
4. Configure the device using the bold command listed below. Note: the setting below are for configuring the router at site 1 follow the system IP plan for the additional sites.

Configure the name of the router.

<Sysname> **system-view**	Enters into configuration editing mode.
[Sysname] **sysname *<sysname>***	Name the device, which can be a string of 1 to 30 characters. It replaces “Sysname” with the text of your choice. It is a convenient reference while working on multiple routers. For this example, the command is: `[Sysname] sysname Site1`
[Site1] **save**	Saves the current configuration.

Configure the ethernet interface IP addresses.

[Site1] **interface ethernet 0/0**	Enter interface ethernet 0/0 parameter view. Of the two ethernet ports on the rear of the chassis, 0 is the bottom port.
[Site1-Ethernet0/0] **ip address *<LAN IP address> <LAN Subnet Mask>***	Configure the LAN interface IP address and subnet mask. Use the IP address and mask that was decided for the site. For this example, the command is: `ip address 192.168.1.1 255.255.255.0`
[Site1] **interface ethernet 0/1**	Enter interface 0/1 parameter view. Of the two ethernet ports on the rear of the chassis, 1 is the top port.
[Site1-Ethernet0/1] **ip address *<WAN IP address> <WAN Subnet Mask>***	Configure the WAN interface IP address and subnet mask. This WILL be specific from the network provider, and may be the ISP Static IP address. For this example, the command is: `ip address 10.1.1.1 255.255.255.0`
[Site1-Ethernet0/1] **save**	Save the configuration
[Site1-Ethernet0/1] **quit**	Moves to the command tree root.
[Site1] **display interface ethernet brief**	Shows details of the ethernet interfaces including current IP addresses. Both should show the state as UP. For this example, the command should show:

	The brief information of interface(s) under route mode: Link: ADM - administratively down; Stby -Standby Protocol: (s) - spoofing Interface Link Protocol Main IP Eth0/0 UP UP 192.168.1.1 Eth0/1 UP UP 10.1.1.1

Add Static Default Route

[Site1] **ip route-static 0.0.0.0 0.0.0.0 ethernet0/1 *<Gateway Address>***	This states that all traffic that doesn't have another static route should us the default gateway address. For this example, the command is: ip route-static 0.0.0.0 0.0.0.0 ethernet0/1 10.1.1.254
[Site1] **save**	Save the configuration
[Site1] **display ip routing-table**	Shows the routing table. The default static route, 0.0.0.0, should be in the list with the next hop as the gateway address. Routing Tables: Public Destinations : 7 Routes : 7 Dest/Mask Proto Pre Cost NextHop Interface 0.0.0.0/0 Static 60 0 10.1.1.254 Eth0/1 10.1.1.0/24 Direct 0 0 10.1.1.1 Eth0/1 10.1.1.1/32 Direct 0 0 127.0.0.1 InLoop0 127.0.0.0/8 Direct 0 0 127.0.0.1 InLoop0 127.0.0.1/32 Direct 0 0 127.0.0.1 InLoop0 192.168.1.0/24 Direct 0 0 192.168.1.1 Eth0/0 192.168.1.1/32 Direct 0 0 127.0.0.1 InLoop0

Add Network Address Translation (NAT)

[Site1] **interface ethernet 0/0**	Enter interface ethernet 0/1 parameter view.
[Site1-Ethernet0/1] **nat outbound static**	Enables NAT on the internal WAN interface, using the static IP addresses.
[Site1] **interface ethernet 0/1**	Enter interface ethernet 0/1 parameter view.
[Site1-Ethernet0/1] **nat outbound**	Enables NAT on the external WAN interface..
[Site1-Ethernet0/1] **nat server protocol udp global current-interface *<RC IP Port>* inside *<RC IP Address>* *<RC IP Port>***	Adds a port forwarding rule for the Rest Channel/Site IP address and port number. For this example, the command is: nat server protocol udp global current-interface 55001 inside 192.168.1.10 55001
[Site1-Ethernet0/1] **nat server protocol udp global current-interface *<Repeater UDP Port>* inside *<Repeater IP Address>* *<Repeater UDP Port>***	Adds a port forwarding rule for each repeaters IP address and port number. For this example, the two commands are: nat server protocol udp global current-interface 50011 inside 192.168.1.11 50011 nat server protocol udp global current-interface 50012 inside 192.168.1.12 50012

[Site1-Ethernet0/1] **save**	Save the configuration
[Site1-Ethernet0/1] **quit**	Moves to the command tree root.
[Site1] **display nat server**	For this example, the command should display: NAT server in private network information: There are currently 3 internal server(s) Interface: Ethernet0/1, Protocol: 17(udp) Global: 10.1.1.1 : 55001 Local : 192.168.1.10 : 55001 Interface: Ethernet0/1, Protocol: 17(udp) Global: 10.1.1.1 : 50011 Local : 192.168.1.11 : 50011 Interface: Ethernet0/1, Protocol: 17(udp) Global: 10.1.1.1 : 50012 Local : 192.168.1.12 : 50012

Display the current configuration

[Site1] **display current-configuration**	The current configuration is displayed. Below is the example configuration with the highlighted entries being those that were changed in commands listed above.

```
#
 version 5.20, Release 2209P15, Standard
#
 sysname Site1
#
 domain default enable system
#
 dar p2p signature-file cfa0:/p2p_default.mtd
#
 port-security enable
#
vlan 1
#
domain system
 access-limit disable
 state active
 idle-cut disable
 self-service-url disable
#
user-group system
 group-attribute allow-guest
#
local-user admin
 password cipher $c$3$40gC1cxf/wIJNa1ufFPJsjKAof+QP5aV
 authorization-attribute level 3
 service-type telnet
 service-type web
#
cwmp
 undo cwmp enable
#
interface Aux0
 async mode flow
 link-protocol ppp
#
interface Cellular0/0
 async mode protocol
 link-protocol ppp
#
interface Ethernet0/0
 port link-mode route
 nat outbound static
 ip address 192.168.1.1 255.255.255.0
#
interface Ethernet0/1
 port link-mode route
 nat outbound
 nat server 1 protocol udp global current-interface 55001 inside 192.168.1.10 55001
 nat server 2 protocol udp global current-interface 50011 inside 192.168.1.11 50011
 nat server 3 protocol udp global current-interface 50012 inside 192.168.1.12 50012
 ip address 10.1.1.1 255.255.255.0
#
interface NULL0
#
#
voice-setup
```

```
 #
 sip
 #
 sip-server
  #
  call-rule-set
  #
  call-route
 #
 dial-program
  default entity fax protocol standard-t38
  default entity fax protocol standard-t38 hb-redundancy 0
  default entity fax protocol standard-t38 lb-redundancy 0
 #
 aaa-client
 #
 gk-client
#
 ip route-static 0.0.0.0 0.0.0.0 Ethernet0/1 10.1.1.254
#
 load xml-configuration
#
 load tr069-configuration
#
user-interface con 0
user-interface tty 13
user-interface aux 0
user-interface vty 0 4
 authentication-mode scheme
#
Return
```