Configuration guide

HP MSR930 Verizon 4G-LTE/3G Router Series

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Introduction

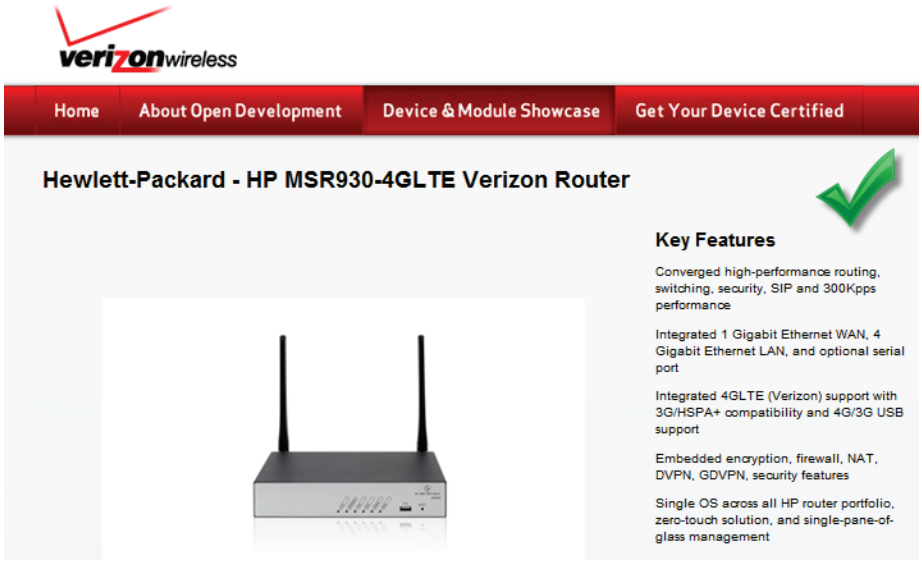
By providing 4G-LTE/3G connectivity, many enterprises are connecting branch offices and remote sites to services hosted in centralized data centers, which is also known as “cloud”. The HP Next-Gen MSR930 Router Series supports the ability to provide Internet and WAN access at these remote locations, as primary or backup connections, establishing IPsec or L2TP tunnels over 4G-LTE/3G, and connecting users to different VPN instances over 4G-LTE/3G DVPN or 4G-LTE/3G L2TP.

The HP Next-Gen MSR930 Router Series supports a Verizon Subscriber Identity Module (SIM).

This configuration guide describes how to configure a 4G-LTE/3G interface on an HP Next-Gen MSR930 4G-LTE/3G Router Series. The intended audience is HP Networking Solution Architects, HP Networking Technical Consultants, and HP Networking partner technical presales staff.

The MSR930-4G-LTE Verizon Router has been certified and available on the Verizon website.

Figure 1. MSR930-4G-LTE certified by Verizon



Background information

The purpose of this configuration guide is to describe how to get a 4G-LTE/3G interface working with an HP Next-Gen MSR930 Router Series.

It describes:

- How to initialize the interface with the 4G-LTE/3G SIM.
- How to configure the router to connect to the Internet via the 4G-LTE/3G interface as a dial-up interface.
- How to configure the router to use the 4G-LTE/3G interface as a backup to the primary route.
- How to configure the router to connect to the internet via the 4G-LTE/3G interface as a permanent interface.

Requirements

The following hardware is required:

- An MSR-supported 4G-LTE/3G SIM activated for 4G-LTE/3G service
- 8 RJ-45 CAT-5E Ethernet cables (quantity 1)
- Power strip with minimum 3 outlets (quantity 1)

The following software is required:

- HP MSR930 Router Series Comware software, version 5.20.106

The following tools are required:

- Windows® laptop with minimum 2 GB RAM (quantity 1)
- System console cable included with MSR
- USB to DB9 serial adapter cable tools for the laptop
- Terminal emulation application
- FTP client
- Figure 2 illustrates the connectivity of a laptop and an HP MSR930 Router Series when performing initial configuration
- A USB port on the laptop is connected to the system console port of the HP MSR Router Series using a USB to serial adapter (available at any electronics hardware store) and the HP MSR930 System Console Cable
- An Ethernet cable is connected between the Ethernet port on the laptop and the GE1 interface on the HP MSR930 Router Series

Network diagram

The diagram below illustrates the connectivity of an HP MSR930 4G-LTE/3G (CDMA) with a 4G-LTE interface that uses a 4G-LTE network as its primary connection to the WAN or Internet.

Figure 2. Using 4G-LTE/3G as primary access to Internet

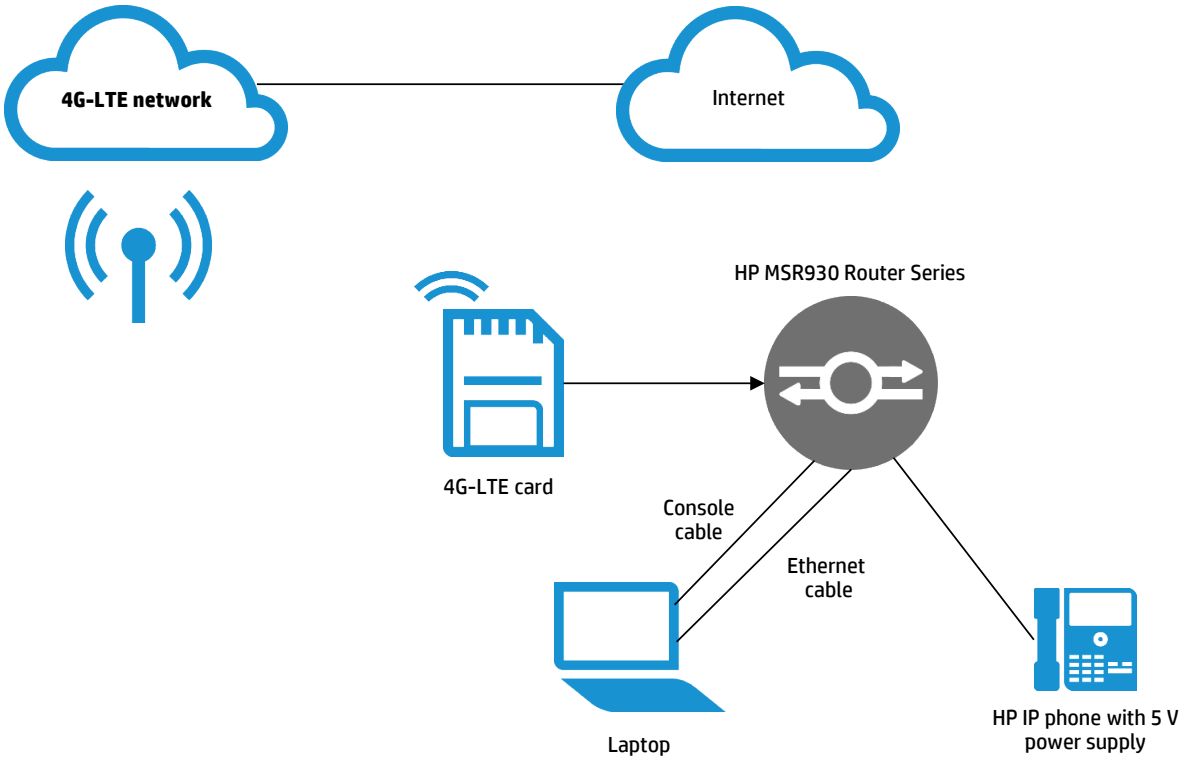
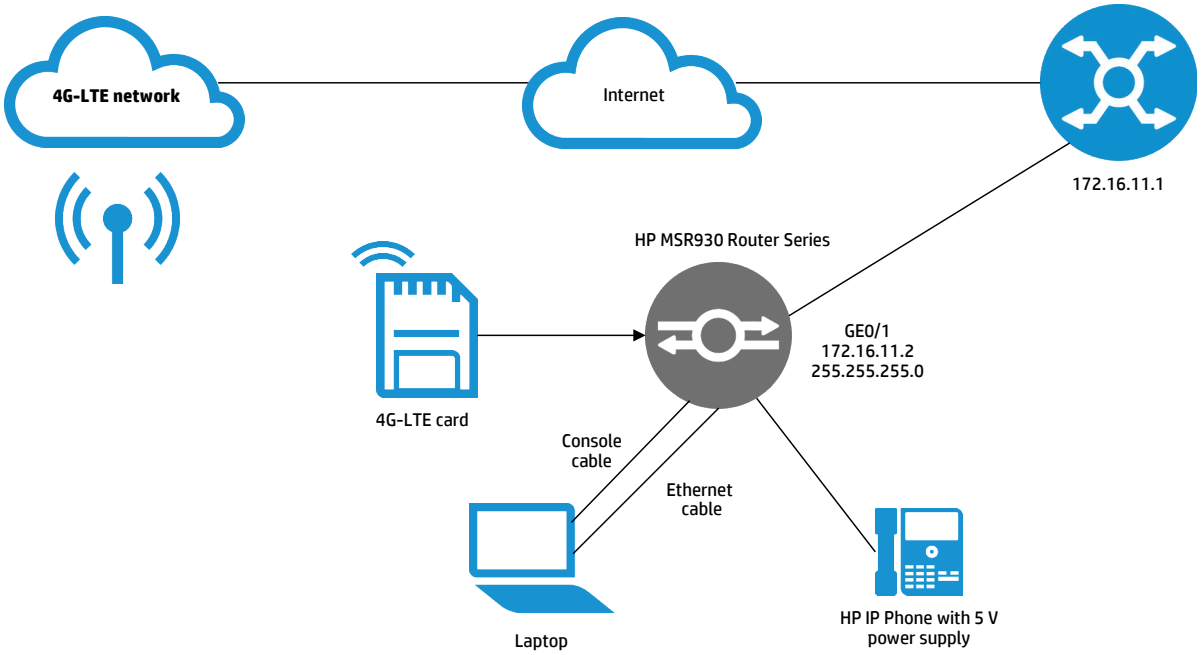


Figure 3 illustrates the connectivity of an HP MSR930 4G-LTE/3G (CDMA) with a 4G-LTE interface that uses a 4G-LTE network as a backup to the primary connection.

Figure 3. Using 4G-LTE/3G as backup access to Internet



Configure

Initial device setup

For initial setup, use the system console port and a terminal emulation program to get connected to the device:

- Connect to the device via system console
- Power on the laptop and login to the laptop
- Power on the HP MSR Router Series
- Notes on connecting your laptop to the device:
  - Make sure your laptop has the USB-to-serial interface software driver installed and working with the USB-to-serial adapter cable that will be used
  - To find the COM port associated with the USB serial adapter:
  - On Windows laptops, click on Start→right click on Computer→click on Properties→
  - Click on Device Manager→expand Ports
- Connect the system console cable of HP MSR Router Series to the USB-to-serial adapter cable
- Connect the USB-to-serial adapter cable and system console cable to the laptop via a USB port on the laptop
- Connect the system console cable RJ-11 connector to the HP MSR Router Series console port
- Use a terminal emulation program running on the laptop such as PuTTY to connect the laptop to the system console port of the router
  - Use serial port configuration of “9600/8/1/N” at the terminal emulation program to connect to the system console port of any HP MSR Router Series
  - In the terminal emulation program window, press Enter

Login to router using CLI

With PuTTY running and connected to the HP MSR Router Series, you should see text being displayed.

- Press Enter once to display a “username:” prompt
- The default username/password for new HP MSR Router Series is “admin” with no password
- The default username/password for HP MSR Router Series that may have been previously configured in the HP FlexBranch demo environment is “admin” with a password of “admin”
- Enter the username and press Enter
- Enter the password and press Enter
- Monitor<prompt> mode is enabled

Save current configuration

If you have a device with a previous configuration, it is recommended to save the current configuration with a different file name other than “startup.cfg” and then reset to factory defaults. Then you can begin your configuration knowing that the previous configuration will not conflict with the new configuration.

- Save the device configuration:

```
save

Save configuration? y
```

Backup configuration

Backup the current configuration, follow these steps:

- From the device system console, where “clean.bak” is an example:

```
rename startup.cfg clean.bak
```

Reset to factory defaults or previously saved configuration

Start from a factory defaults condition to prevent interference of other features under test.

- From the device system console in monitor mode <prompt>:
- Reset the device to factory defaults:

```
reset saved-configuration

The saved configuration file will be erased. Are you sure? [Y/N]: y
```

- Alternatively, to set the device to a previously saved configuration:

```
rename clean.bak startup.cfg
```

- Or you can enter (for example):

```
startup saved-configuration demo.cfg
```

- Display the current startup configuration:

```
display startup
```

- Reboot the device:

```
reboot

This command will reboot the device. Current configuration will be lost, save
current configuration? [Y/N]: n

This command will reboot the device. Continue? [Y/N]: y
```

Setup basic device attributes

This section describes how to setup basic device attributes for an HP MSR Router Series. This section is applicable for both routers used in the configuration.

Commands at the CLI can be generally be abbreviated with three letters as in these examples:

sys= system

dis cur= display current

dis this=display this

Setup system name

- To set the system name, enter manage mode [prompt]:
  ```
  system
  ```
- Central site router system name:
  ```
  sysname HP-MSR930
  ```

Setup administrator permissions

The local-user “admin” is added and configured with a password of “admin” and “manage level” permissions.

- Set admin user attributes with these commands:
  ```
  local-user admin password simple admin
  authorization-attribute level 3
  ```

Setup services

Next, we will start the Telnet and FTP services that are used to administer and manage the router. Setup of the SSH server allows an administrator to login to the device securely using SSH login. This includes creating a public key and enabling the SSH server. The SSH server uses SSHv2 by default.

- Follow these steps to setup services for local-user admin:
  ```
  local-user admin service-type ftp
  service-type ssh telnet terminal
  quit
  ```
- Use these commands to setup the SSH server:
  ```
  public-key local create rsa
  Press Enter for 1024
  ```
- Use these commands to enable services:
  ```
  telnet server enable
  ftp server enable
  ssh server enable
  ssh user admin service-type all authentication-type password
  ```

Setup SNMP

- Setup the SNMP configuration using these commands:
  ```
  snmp sys-info version all
  snmp community read public
  snmp community write private
  ```

(Optional)

```
snmp sys-info location(your location)
```

- To send traps to your SNMP management system, such as IMC, add these commands

```
snmp target-host trap address udp-domain <x.x.x.x/host name> params securityname
private
snmp target-host trap address udp-domain <x.x.x.x/host name> params securityname
public
```

Setup terminal access permissions

- These commands setup permissions for accessing the AUX interface: Use authentication options if you want to use password via console connection.

```
system-view
user-interface aux 0 authentication-mode password
set authentication password {cipher/simple}password authentication-mode scheme
authorization-attribute level 3
```

Save configuration

- It is highly recommended to save the router configuration before you exit.

```
save
The current configuration will be written to the device. Are you sure? [Y/N}: Y
Please input the file name (to leave the existing filename unchanged, press
ENTER): cfa0:/startup.cfg exists, overwrite? [Y/N}: y
```

You can keep the name “startup.cfg” so that it will be the configuration that loads with the next reboot of the router. You should save the configuration with a different name other than “startup.cfg” when you have a known good configuration for archival and backup purposes.

Dial-up Internet access via 4G-LTE/3G interface

This configuration describes how to configure an HP Next-Gen MSR930 Router Series to provide dial-up Internet access via a 4G-LTE/3G interface.

Follow these steps to configure the 4G-LTE/3G interface:

- After performing initial setup, save the configuration
- If SIM card is not already installed, power off the router
- Insert the SIM into the slot at the bottom of the HP Next-Gen MSR930 Router Series
- Power on the router
- Login to the router via system console, Telnet, or SSH

```
system
```

Configure the 4G-LTE/3G interface

If interface Cellular-Ethernet 1/0 is not displayed, but rather Cellular 0/0 and Cellular 0/1 are the only two Cellular options displayed, change the mode of Cellular 0/1 with the following commands.

This changes the Cellular 0/1 from PPP to Ethernet

```
sys
Card-mode slot 1 ethernet
#
interface Cellular-Ethernet1/0
ip address cellular-allocated
dialer enable-circular
dialer-group 1 dialer number *99#
nat outbound 3000
quit
```

Access SIM card data

Use the display cellular-Ethernet 1/0 all command within the cellular-Ethernet interface. If the account is not activated, you can use this information to give to Verizon. Information in bold is what the carrier would require.

Interface cellular-Ethernet 1/0

[MSR930-Cellular-Ethernet1/0] dis cellular-ethernet 1/0 all Modem State:

Hardware Information

==========

Model = MC7750

Manufacturer = Sierra Wireless, Incorporated

Modem Firmware Version = SWI9600M_03.05.10.09ap r5700 carmd-en-10527 2013/03/12 10:37:48

Modem Boot Version = SWI9600M_03.05.10.09bt r5700 carmd-en-10527 2013/03/12 10:35:44

PRI Version = 9901456 00.01

Electronic Serial Number (ESN) = 80E0E353

Preferred Roaming List (PRL) Version = 0

International Mobile Equipment Identity (IMEI) = 990000561093016

International Mobile Subscriber Identity (IMSI) = 311480012153505

Mobile Equipment Identifier (MEID) = 99000056109301

Hardware Version = 10

Modem Status = Online

Profile Information

==========

Profile index = 1

PDP Type = IPv6, Header Compression = OFF

Data Compression = OFF

Access Point Name (APN) = vzwims

Authentication = NONE

Username =

Profile index = 2

PDP Type = IPv4v6, Header Compression = OFF

Data Compression = OFF

Access Point Name (APN) = vzwadmin

Authentication = NONE

Username =

```
Profile index = 3
PDP Type = IPv4v6, Header Compression = OFF
Data Compression = OFF
Access Point Name (APN) = VZWINTERNET
Authentication = NONE
Username =
* - Default profile

Profile index = 4
PDP Type = IPv4v6, Header Compression = OFF
Data Compression = OFF
Access Point Name (APN) = vzwapp
Authentication = NONE
Username =

Profile index = 9
PDP Type = IPv6, Header Compression = OFF
Data Compression = OFF
Access Point Name (APN) = vzwims
Authentication = NONE
Username =

Profile index = 10
PDP Type = IPv4v6, Header Compression = OFF
Data Compression = OFF
Access Point Name (APN) = vzwadmin
Authentication = NONE
Username =

Profile index = 11
PDP Type = IPv4v6, Header Compression = OFF
Data Compression = OFF
Access Point Name (APN) = VZWINTERNET
Authentication = NONE
Username =
```

```
Profile index = 12
PDP Type = IPv4v6, Header Compression = OFF
Data Compression = OFF
Access Point Name (APN) = vzwapp
Authentication = NONE
Username =

Profile index = 13
PDP Type = IPv4, Header Compression = OFF
Data Compression = OFF
Authentication = NONE
Username =

Network Information
====================
Current Service Status = Service Available
Registration Status = Registered
Current Service = Packet-switched
Current Roaming Status = Home
Current Data Bearer Technology = LTE
Network Selection Mode = Automatic
Mobile Network Name = Verizon Wireless
Mobile Country Code (MCC) = 311
Mobile Network Code (MNC) = 480
Location Area Code (LAC) = 65534
Tracking Area Code(TAC) = 30720
Cell ID = 30880259

Radio Information
====================
Technology Preference = CDMA AUTO
Technology Selected = LTE

HDR (1xEVDO) related info
------------------
Current RSSI = No Signal
Current ECIO = -2 dBm
Current IO = -106 dBm
```

```
LTE related info
------------------
Current RSSI = -61 dBm
Current RSRQ = -9 dB
Current RSRP = -89 dBm
Current SNR = 9 dB
Tx Power = -3276 dBm
Active Band = E-UTRA Operating Band 13

Modem Security Information
====================
PIN Verification = Disabled
PIN Status = PIN Requirement Disabled
Number of PIN Retries Remaining = 0
Number of PUK Retries Remaining = 0
UIM Status = OK
```

Route all traffic to the 4G-LTE/3G interface:

```
ip route-static 0.0.0.0 0.0.0.0 Cellular-Ethernet1/0
```

- Configure a dialer rule:
  ```
  dialer-rule 1 ip permit
  ```
- Configure DHCP:
  ```
  dhcp server ip-pool test
  network x.x.x.x mask 255.255.255.0
  gateway-list x.x.x.x
  dns-list x.x.x.x dhcp enable
  ```
- Configure DNS:
  ```
  dns resolve
  dns proxy enable
  ```

Maintain a permanent connection via 4G-LTE/3G interface

To maintain a permanent connection through the 4G-LTE/3G interface, use the NQA function to send packets periodically on the link:

```
nqa entry admin 4g type icmp-echo data-size 56
description keep-4g-interface-active (Google™) destination ip 74.125.227.196
frequency 60000 quit
nqa schedule admin 4g start-time now lifetime forever
```

Now the Cellular-Ethernet1/0 interface will remain connected as long as the NQA schedule is active.

4G-LTE/3G interface provides backup to primary connection

This configuration describes how to make the 4G-LTE/3G interface a backup to the Gigabit Ethernet interface 1:

```
interface gigabitethernet 0/1 port link-mode route
ip address 10.10.1.3 24
standby interface Cellular-Ethernet1/0 standby timer delay 10 10
quit
ip route-static 0.0.0.0 0.0.0.0 gigabitethernet0/1 10.10.1.1
```

Connect an Ethernet cable from the HP MSR930 Router Series GE0/1 port to the device with a connection to the Internet (GW 10.10.1.1).

Verify

Verify 4G-LTE/3G interface as a primary dial-up connection:

- From system console, enter: “ping www.google.com”
  - You should get replies from Cellular-Ethernet1/0 interface. Verify 4G-LTE/3G interface as backup connection
- Disconnect primary connection
- From system console, enter: “ping www.google.com”
  - You should get replies from Cellular-Ethernet 1/0 interface. Verify 4G-LTE/3G interface with permanent connection
- Do not enter anything on the HP MSR930 Router Series system console for a period longer than the “dialer timer idle xxx” command
- The Cellular-Ethernet 1/0 interface remains with a status of up
- From system console, enter: “ping www.google.com”
  - You should get replies from Cellular-Ethernet 1/0 interface

Troubleshoot

Determine software revision

The next thing to do is to make sure the device is having the latest supported software release. In this procedure, you will compare the software revision that is shown on the device against the latest supported software revision.

Determine the current release running on the device:

```
display version
```

Determine the latest supported release of the device:

Use your laptop connected to a network with Internet access, go to the HP Customer Care—Product Support website

In the box that says “Enter your product number”: For example, enter “MSR30”.

Expand “Networking”, and click on the model you have Click on “Downloads and software”.

Click on the arrows under “Select” for the model you have.

The latest supported software revision is the version with a status of “Current”. If the latest supported software revision is newer than the version currently running on the device you are using, we recommend that you upgrade the device.

Click on the arrows under “Select” for the version with a status of “Current” Save the zip file to your laptop.

The zip file will contain the software .bin file for the router and the release notes.

Upgrade software

Before starting the configuration, upgrade the HP MSR Router Series to the software required for this demo configuration. There are two options you can use to copy the device software to the device:

- Copy the device software to a USB stick, then copy it from the USB storage device to the router or switch:
  - Insert the USB storage device into the laptop using any free USB port
  - Copy the software .bin file from the laptop to a USB storage device
  - Use the Windows function to “safely remove hardware and eject media”
  - Remove the USB storage device from the laptop
  - Insert the USB storage device into HP MSR Router Series USB port 0
  - Copy the software .bin file from the USB storage device to the HP MSR Router Series
  - copy usba0:/<filename.bin>.
  - Remove the USB storage device from the HP MSR Router Series
- Setup a temporary management IP address and download it using FTP:
  - Connect the laptop to the demo HQ data VLAN using DHCP or give your laptop a static IP address when it is used standalone (for example, the laptop IP address can be 10.10.10.60/24)
- Use your laptop ftp client and connect to the HP MSR Router Series GE 0/0 IP address:
  - Login as user admin, password admin
  - Put software .bin file from laptop to the HP MSR Router Series
- After the software .bin file has been transferred to the HP MSR Router Series, use the system console to assign the new software .bin file as the main file, which will cause the router to boot using this new software:

```
dir

boot-loader file <filename> main

save

reboot
```

Additional links

Go to hp.com/networking/flexbranch for information on how the HP FlexBranch Networking Solution helps transform the branch experience.

- Click on the “Products” tab for information on the HP MSR Router Series and other HP FlexBranch products

For more information on the HP MSR Router Series and other HP FlexBranch content, refer to information available on the HP Networking Resource Finder Technical Documentation tab and selecting “FlexBranch” under products, solutions, and industries.

At the HP Customer Care—Product Support website, use one of the model names of the HP MSR Router Series, for example “MSR3044” in the HP product name field, for these resources:

- Refer to the product manuals for details on supported commands and configurations
  - Click “Knowledge Base”, then “Manuals” in the pull-down menu
- Refer to the release notes for details on supported features, software and hardware versions, limitations, and known issues
- Find software

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4AA5-6006ENW, January 2015