

Network Out-of-Band Management (OOBM) for the 6600 Switch

Contents

Concepts	J-2
Example	J-4
OOBM and Switch Applications	J-5
Tasks	J-6
OOBM Configuration	J-6
OOBM Context	J-6
OOBM Enable/disable	J-7
OOBM Port Enable/disable	J-8
OOBM Port Speed Control	J-9
OOBM IPv4 Address Configuration	J-10
OOBM IPv4 Default Gateway Configuration	J-10
OOBM Show Commands	J-11
Show OOBM	J-11
Show OOBM IP Configuration	J-12
Show OOBM ARP Information	J-12
Application Server Commands	J-13
Application Client Commands	J-14
Example	J-15

Concepts

Management communications with a managed switch can be:

- in band—through the networked data ports of the switch
- out of band—through a dedicated management port (or ports) separate from the data ports

Out-of-band ports have typically been serial console ports using DB-9 or specially wired 8-pin modular (RJ-style) connectors. Some recent HP ProCurve switches have added networked out-of-band management ports. The illustration below shows management connections for a typical switch.

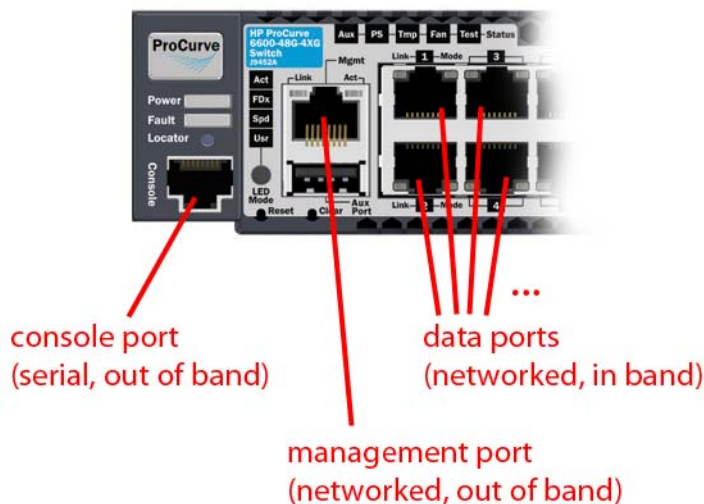


Figure J-1. Management ports

Out-of-band management (OOBM) operates on a “management plane” that is separate from the “data plane” used by data traffic on the switch and by in-band management traffic. That separation means that out-of-band management can continue to function even during periods of traffic congestion, equipment malfunction, or attacks on the network. In addition, it can provide

improved switch security: a properly configured switch can limit management access to the management port only, preventing malicious attempts to gain access via the data ports.

Network OOBM typically occurs on a management network that connects multiple switches. It has the added advantage that it can be done from a central location and does not require an individual physical cable from the management station to each switch's console port.

Of the switches covered by this manual, network OOBM is available on:

- HP ProCurve 6600-24XG switch (J9265A)
- HP ProCurve 6600-48G switch (J9451A)
- HP ProCurve 6600-48G-4XG switch (J9452A)

The table below summarizes the switch management ports.

Table J-1. Switch Management Ports

	In Band	Out Of Band	
	Networked	Directly connected	Networked
Management interface	command line (CLI), menu, Web	command line (CLI), menu	command line (CLI), menu
Communication plane	data plane	management plane	management plane
Connection port	any data port	dedicated serial or USB console port	dedicated networked management port
Connector type	usually RJ-45; also CX4, SFP, SFP+, and XFP	DB9 serial, serial-wired 8-pin RJ	RJ-45
Advantages	allows centralized management	not affected by events on data network, shows boot sequence	not affected by events on data network; allows centralized management; allows improved security
Disadvantages	can be affected by events on data network; does not show boot sequence	requires direct connection to console port (can be done via networked terminal server)	does not show boot sequence

Example

In a typical data center installation, top-of-rack switches connect servers to the data network, while the management ports of those switches connect to a physically and logically separate management network. This allows network administrators to manage the switches even if operation on the data network is disrupted.

In the illustration below, the switches face the hot aisle of the data center, allowing easy connection to the network ports on the backs of the servers.

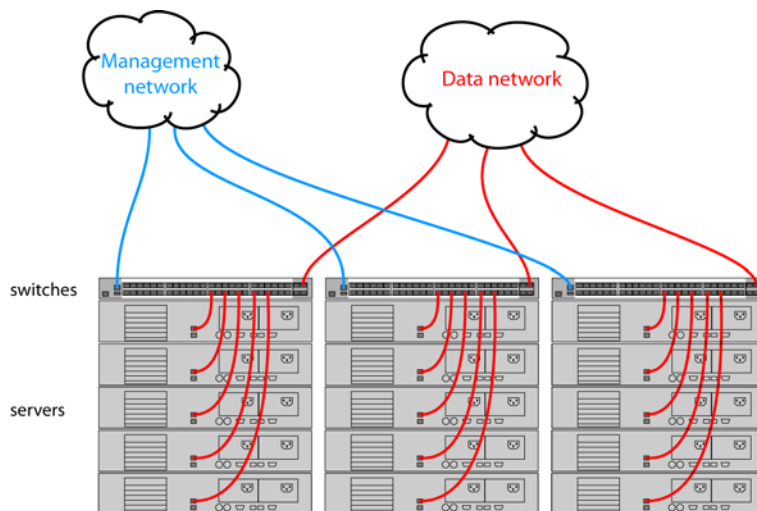


Figure J-2. Network out-of-band management in a data center

For even more control, the serial console ports of the switches could be connected to the management network through a serial console server (essentially, a networked serial switch), allowing the network administrators to view the CLI activity of each switch at boot time and to control the switches through the console ports (as well as through the management ports).

OOBM and Switch Applications

The table below shows the switch applications that are supported on the OOBM interface as well as on the data interfaces. In this list, some applications are client-only, some are server-only, and some are both.

Application	Inbound OOBM (server)	Outbound OOBM (client)	Inbound Data Plane (server)	Outbound Data Plane (client)
Telnet	yes	yes	yes	yes
SSH	yes	n/a	yes	n/a
SNMP	yes	yes*	yes	yes
TFTP	yes	yes	yes	yes
HTTP	yes	n/a	yes	n/a
SNTP	n/a	yes	n/a	yes
TIMEP	n/a	yes	n/a	yes
RADIUS	n/a	yes	n/a	yes
TACACS	n/a	yes	n/a	yes
DNS**	n/a	yes	n/a	yes
Syslog	n/a	yes	n/a	yes
Ping	yes***	yes	yes***	yes
Traceroute	yes***	yes	yes***	yes
n/a = not applicable * = SNMP client refers to SNMP traps as they originate from the switch. ** = DNS has a limit of two servers — primary and secondary. Either can be configured to use the OOBM interface. *** = Ping and Traceroute do not have explicit servers. Ping and Traceroute responses are sent by the host stack.				

For applications that have servers, **oobm/data/both** options have been added to listen mode. There is now a **listen** keyword in the CLI commands to allow selection of those options. Default value is **both** for all servers. See the Application Server Commands (page J-13) in the “Tasks” section below for details of the new command syntax.

Tasks

OOBM Configuration

OOBM Context

OOBM configuration commands can be issued from the global configuration context (`config`) or from a specific OOBM configuration context (`oobm`). To enter the OOBM configuration context from the general configuration context, use the **oobm** command.

Syntax: `oobm`

Enters the OOBM context from the general configuration context.

For example:

```
ProCurve (config)# oobm
ProCurve (oobm)#
```

OOBM Enable/disable

To enable or disable network OOBM, use the **enable** or **disable** command. Network OOBM is enabled by default.

Syntax:

From the OOBM context:

```
enable  
disable
```

From the general configuration context:

```
oobm enable  
oobm disable
```

Enables or disables networked out-of-band-management on the switch.

OOBM is not compatible with either a management VLAN or stacking. If you attempt to enable OOBM when a management VLAN is enabled or when stacking is enabled, the command will be rejected and you will receive an error message.

If an OOBM IP address exists and you disable OOBM, the OOBM IP address configuration is maintained. If you enable OOBM and there is a pre-existing OOBM IP address, it will be reinstated.

Examples:

```
ProCurve (oobm)# enable  
ProCurve (oobm)# disable  
ProCurve (config)# oobm enable  
ProCurve (config)# oobm disable
```

OOBM Port Enable/disable

The OOBM **interface** command enables or disables the OOBM interface (the OOBM port, as opposed to the OOBM function).

Syntax:

From the OOBM context:

```
interface [enable | disable]
```

From the general configuration context:

```
oobm interface [enable | disable]
```

Enables or disables the networked OOBM interface (port).

For example:

```
ProCurve (oobm)# interface enable
```

```
ProCurve (config)# oobm interface disable
```

OOBM Port Speed Control

The OOBM port operates at 10 Mbps or 100 Mbps, half or full duplex. These can be set explicitly or they can be automatically negotiated using the **auto** setting. Set the port speed using the **interface** command.

Syntax:

From the OOBM context:

```
interface speed-duplex [10-half | 10-full | 100-half | 100-full | auto]
```

From the general configuration context:

```
oobm interface speed-duplex [10-half | 10-full | 100-half | 100-full | auto]
```

Enables or disables the networked OOBM interface (port).

Available settings are:

10-half	10 Mbps, half-duplex
10-full	10-Mbps, full-duplex
100-half	100-Mbps, half-duplex
100-full	100-Mbps, full-duplex
auto	auto negotiate for speed and duplex

For example:

```
ProCurve (oobm)# interface speed-duplex auto
```

OOBM IPv4 Address Configuration

Configuring an IPv4 address for the OOBM interface is similar to VLAN IP address configuration, but it is accomplished within the OOBM context.

Syntax:

From the OOBM context:

```
[no] ip address [dhcp-bootp | ip-address/mask-length]
```

From the general configuration context:

```
[no] oobm ip address [dhcp-bootp | ip-address/mask-length]
```

Configures an IPv4 address for the switch's OOBM interface.

You can configure an IPv4 address even when global OOBM is disabled; that address will become effective when OOBM is enabled.

For example:

```
ProCurve (oobm)# ip address 10.1.1.17/24
```

OOBM IPv4 Default Gateway Configuration

Configuring an IPv4 default gateway for the OOBM interface is similar to VLAN default gateway configuration, but it is accomplished within the OOBM context.

Syntax:

From the OOBM context:

```
[no] ip default-gateway ip-address
```

From the general configuration context:

```
[no] oobm ip default-gateway ip-address
```

Configures an IPv4 default gateway for the switch's OOBM interface.

For example:

```
ProCurve (oobm)# ip default-gateway 10.1.1.1
```

OOBM Show Commands

The **show** commands for OOBM are similar to the analogous commands for the data plane. Note that you must always include the **oobm** parameter to see the information for the OOBM interface, regardless of the context. For instance, even from the OOBM context the **show ip** command displays the IP configuration for the data plane; to see the IP configuration of the OOBM interface you need to use **show oobm ip**.

Show OOBM

This command shows the global OOBM and OOBM port configurations.

Syntax: show oobm

Summarizes OOBM configuration information. This command displays the global OOBM configuration (enabled or disabled), the OOBM interface status (up or down) and the port status (enabled/disabled, duplex, and speed).

You can issue this command from any context.

For example:

```
ProCurve# show oobm
```

```
Global Configuration
OOBM Enabled           : Yes
OOBM Port Type         : 10/100TX
OOBM Interface Status  : Up
OOBM Port              : Enabled
OOBM Port Speed        : Auto
```

Show OOBM IP Configuration

Use **show oobm ip** to see the IP configuration of the OOBM interface.

Syntax: show oobm ip

Summarizes the IP configuration of the OOBM interface. This command displays the status of IPv4 (enabled/disabled), the IPv4 default gateway, and the IPv4 address configured for the interface.

You can issue this command from any context.

For example:

```
ProCurve# show oobm ip
```

Show OOBM ARP Information

Use **show oobm arp** to see the ARP table entries for the OOBM interface.

Syntax: show oobm arp

Summarizes the ARP table entries for the OOBM interface.

You can issue this command from any context.

```
ProCurve# show oobm arp
```

Application Server Commands

Application servers (as described in OOBM and Server Applications in the Concepts section above) have added a **listen** keyword with **oobm|data|both** options to specify which interface(s) is(are) active.

Default value is **both** for all servers.

For example:

Telnet: **telnet-server [listen <oobm | data | both>]**
Management and Configuration Guide, page 7-6

SSH: **ip ssh [listen <oobm | data | both>]**
Access Security Guide, page 8-18

SNMP: **snmp-server [listen <oobm | data | both>]**
Management and Configuration Guide, page 14-33

TFTP: **tftp server [listen <oobm | data | both>]**
Management and Configuration Guide, page A-10

HTTP: **web-management [listen <oobm | data | both>]**
Management and Configuration Guide, page 7-8

In all cases, **show running-config** will display the server configurations.

Use the **no** form of the command to prevent the server from running on either interface. For example:

Telnet: **no telnet-server**

SSH: **no ip ssh ...**

SNMP: **no snmp-server ...**

TFTP: **no tftp server**

HTTP: **no web-management ...**

The **show servers** command shows the listen mode of the servers.

```
ProCurve# show servers
```

```
Server listen mode
```

Server	Listen mode
Telnet	both
Ssh	both
Tftp	both
Web-management	both
Snmp	both

Application Client Commands

CLI commands for client applications have added the **oobm** keyword to allow you to specify that the outgoing request be issued from the OOBM interface. If you do not specify the **oobm** keyword, the request will be issued from the appropriate in-band data interface. Command syntax is:

Telnet: **telnet <ip-address> [oobm]**

Management and Configuration Guide, page 7-7

TFTP: **copy tftp ... <ip-address> <filename> ... [oobm]**

Management and Configuration Guide, page A-4 and following

SNTP: **[no] sntp server priority <priority> <ip-address> [oobm] [version]**

Management and Configuration Guide, page 9-13

TIMEP: **[no] ip timep <dhcp | manual <ip-address> [oobm] > [...]**

Management and Configuration Guide, page 9-32

RADIUS: **[no] radius-server host <ip-address> [oobm]**

Access Security Guide, page 4-18, page 6-15, page 13-26

TACACS+: **[no] tacacs-server host <ip-address> [oobm]**

Access Security Guide, page 5-19

DNS: **[no] ip dns server-address priority <priority> <ip-address> [oobm]**

Management and Configuration Guide, page C-91

Syslog: **[no] logging <ip-address> [control-descr] | [oobm]**

Management and Configuration Guide, page C-54

Ping: `ping [...] [source <ip-address | vlan-id | oobm>]`
Management and Configuration Guide, page C-65

Traceroute: `traceroute [...] [source <ip-address | vlan-id | oobm>]`
Management and Configuration Guide, page C-67

Example

This example shows setup and use of network OOBM using the commands described above.

Assume that the figure below describes how you want to set up your data center.

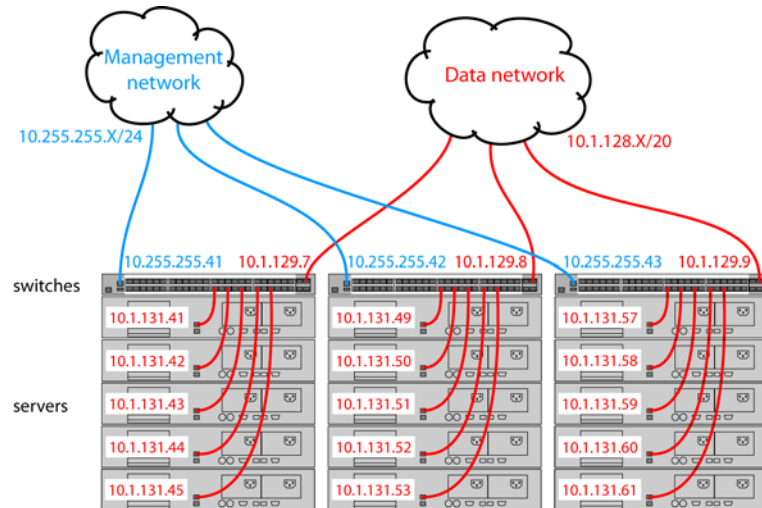


Figure J-3. Example data center

Assume that you are configuring the switch in the left-hand rack to communicate on both the data and management networks. You might do the following:

- Configure an IP address on the data network.
- Verify that out-of-band management is enabled. (It is enabled by default.)
- Configure an IP address on the management network.
- Verify that the switch can communicate on both networks.

Network Out-of-Band Management (OOBM) for the 6600 Switch Tasks

The CLI commands that follow would accomplish those tasks. (The first time through the process you might easily make the omission shown near the end of the example.)

```
Switch 41# config
Switch 41(config)# vlan 1
Switch 41(vlan-1)# ip address 10.1.129.7/20
Switch 41(vlan-1)# end
Switch 41# show oobm
```

Set up IP address on data network.
Exit back to manager context.
Look at default OOBM configuration.

```
Global Configuration
OOBM Enabled           : Yes
OOBM Port Type        : 10/100TX
OOBM Interface Status : Up
OOBM Port             : Enabled
OOBM Port Speed       : Auto
```

Defaults look appropriate.

```
Switch 41# config
Switch 41(config)# oobm
Switch 41(oobm)# ip address 10.255.255.41/24
Switch 41(oobm)# ip default-gateway 10.255.255.1
Switch 41(oobm)# end
Switch 41# ping 10.1.131.44
10.1.131.44 is alive, time = 19 ms
Switch 41# ping 10.1.131.51
10.1.131.51 is alive, time = 15 ms
Switch 41# ping 10.255.255.42
The destination address is unreachable.
Switch 41# ping source oobm 10.255.255.42
10.255.255.42 is alive, time = 2 ms
Switch 41#
```

Go to OOBM context and
add IP address and
default gateway.
Exit back to manager context.
Ping server in this rack (on data network).
Ping server in adjacent rack.
Ping switch in adjacent rack.
Oops! It's on the management network.
Go through the management port
and it works fine.