CASPER Memo: 10GbE Switch Configuration and Setup Guide

J. R. Manley

26 October 2007

1 Introduction

This document details the configuration used by the CASPER group for its 10 gigabit Ethernet switches. Five models are currently in use:

1. Fujitsu XG2000C 16 CX4 ports plus 4 XFP ports running firmware E11L10 Z02
2. Fujitsu XG700-CX4 12 CX4 ports running firmware E10L10 XF0073
3. Fujitsu XG600B 12 CX4 ports running firmware 1.00/03
4. Hewlett-Packard ProCurve 6400cl 6 Port CX4 plus 2 port CX4 running firmware M.08.109
5. Hewlett-Packard ProCurve 3400cl 24 port 1000baseT plus 2 Port CX4 running firmware M.08.74

The configuration for each switch will be broken into four parts:

Preparation By default, all the switches can only be managed through their serial interfaces. This section discusses port configuration requirements and login authentication.

Basic Switch configuration Covers how to enable the telnet command line interface for remote switch management, configuring static IP addresses etc. The newer Fujitsu XG700 and XG2000 switches use the same command-line interface (CLI), but the older XG600 has a menu-based system as well as an optional web interface. The HP switches both have a CLI and optionally a menu and/or web interface.

Enabling Jumbo Frames All models default to sensible settings. The only change CASPER requires is to enable jumbo frame support. Most switches support ethernet frames with a maximum transmission unit (MTU) of 1522 bytes. Packets larger than the MTU are dropped at the inbound port. Jumbo frame support increases the MTU in order to maximise data throughput. Jumbo frames are only supported on ports supporting 1GbE and faster (ie for 100Mbps Ethernet, maximum MTU is 1522 bytes). All models disable jumbo frame support by default. The HP switches allow for jumbo frames up to 9220 bytes (inbound, including a 4 byte VLAN header) and the Fujitsu models allow up to 16128 bytes.

Saving the Changes The running configuration and the startup configuration are different. Any changes made need to be saved so that they will be reapplied when the switch is rebooted.

2 Fujitsu XG2000C and XG700-CX4

2.1 Preparation

Initial connection to the switch requires an RS232 serial cable. The port is **9600 8N1** by default.

After connecting a serial cable and appropriately configuring the serial terminal, the user will be presented with a login screen. The default username is **admin** and password is **password**. Thereafter, the user will be presented with an *xg>* prompt.

At any stage, the command **?** will show which commands are available to the user. The **tab** key also enables auto-complete of the current command.

2.2 Initial Basic Configuration

xg>enable In order to perform administrative functions, the mode needs to be changed. The prompt will change from *xg>* to *xg#*.

xg# configure terminal Changes into configuration mode. Prompt will change from *xg#* to *xg(config)#*.

xg(config)# management-lan ip 192.168.0.x/24 Sets the IP address and subnet mask.

xg(config)# telnet-server Enables the telnet server for remote login.

xg(config)# exit Exit configuration mode. Prompt changes back to *xg#*.

xg# copy running-config startup-config Save the changes so that they are restored when the switch is rebooted.

2.3 Enabling Jumbo Frame Support

xg>enable In order to perform administrative functions, the mode needs to be changed. The prompt will change from *xg>* to *xg#*.

xg# configure terminal Changes into configuration mode. Prompt will change from *xg#* to *xg(config)#*.

xg(config)# bridge jumbo-frame 16128 Will enable jumbo frame support. The number 16128 represents the maximum size supported. Options are: 9216, 12288, 15360 or 16128.

At this stage support for jumbo frames are enabled. To confirm, use the *show bridge* command as follows:

xg(config)# exit Exit configuration mode. Prompt changes back to *xg#*.

xg# show bridge Will print out a table showing bridge configuration as follows:

```
Switch Basic Information                                    2007/10/31-14:11:46
================================================================================
Aging Time               : 300 (sec)
Cut-through Switching    : Disabled
Jumbo Frame Support      : Enabled  Max Frame Size: 16128 (byte)
Independent-vlan-learning: Disabled
DiffServ ToS             : Disabled
================================================================================
```

xg# copy running-config startup-config Save the changes so that they are restored when the switch is rebooted.

2.4 Other useful changes

By default, the switch will auto-logout a user after a period of inactivity. This can be frustrating if you wish to remain logged-in to view traffic statistics over an extended period. To disable the auto-logout, login as normal and proceed as follows:

xg>enable Enter administrator level in order to make configuration changes. The prompt will change from *xg>* to *xg#*.

xg# configure terminal Changes into configuration mode. Prompt will change from *xg#* to *xg(config)#*.

xg(config)# terminal timeout console 0 Sets the console timeout to 0 minutes (disabled)

xg(config)# terminal timeout vty 0 Sets the virtual console (telnet sessions) timeout to 0 minutes (disabled)

xg(config)# exit Exit configuration mode. Prompt changes back to *xg#*.

xg# copy running-config startup-config Save the changes so that they are restored when the switch is rebooted.

2.5 Port statistics and error reporting

xg# show bridge mac-address-table dynamic Displays the MAC addresses learnt for each port.

xg# monitor dataflow current Displays the current traffic through each port.

xg# monitor dataflow total Displays the total number of packets sent/received on each port.

xg# monitor error current Counts the number of errors on each port (CRC / misalignment / fragmentation etc.) Note that the *Rx & Tx Over* field will report errors for any packets received that are over 1522 bytes, irrespective of the jumbo frame setting. That is to say, it will report errors, but still forward those packets if jumbo frames are enabled.

xg# monitor error total Counts the total number of errors on each port since last reboot.

3 Fujitsu XG600

3.1 Preparation

The XG600 has a menu-based telnet or serial interface, and also optionally a web-interface. As with the XG2000 and XG700, initial configuration must be done through a serial link (**9600 8N1** by default.)

After connecting a serial cable and appropriately configuring the serial terminal, the user will be presented with a login screen. Only a password is required (the default is **password**). Thereafter, the user will be presented with a menu.

3.2 Initial Basic Configuration and Enabling Jumbo Frame support

Both of these tasks can be completed on two setup screens.

Navigate to *Configuration* → *Configure IP Address* to setup the IP address and select *APPLY* when done.

Next, navigate to *Configuration* → *Configure Switch* to enable the telnet server (*Telnet Status: Enable*), and optionally, management by web pages. In addition, you can enable jumbo frame support (*Jumbo Frame Forwarding: Enable*)

Choose *SAVE* when done to write changes to flash memory.

4 Hewlett-Packard Configuration

4.1 Preparation

Initial connection to the switch requires an RS232 serial cable. The port is auto-baud, so any speed setting will work. We use 115200 8N1 by default. A few characters must be sent first in order for the speed to be detected.

After connecting a serial cable, press return a few times for the switch to lock onto the cable speed. Thereafter, the user will be presented with a login screen and either a CLI interface or a menu interface, depending on the set preference (default is CLI). No password authentication is required by default, however, one can be set (not covered by this document).

The user can change between the CLI and menu interfaces easily, by entering the command **menu** to load the menu from the CLI, or select item 5 in the menu, **Command Line (CLI)**, to access the command line interface.

4.2 Initial Basic Configuration

This section will assume use of the command line interface. Some configuration is done in an ncurses-type text screen. For these screens, use the **tab** or the up/down keys to navigate to new fields, and space to toggle its value. Press return when finished editing which will move the cursor to the **Actions** section at the bottom of the interface. Use the arrow keys to navigate to the required action (eg *Cancel*, *Apply*, *Save* etc) and press **return** to apply.

ProCurve# setup This command loads a screen for basic switch configuration. Assign an IP address by changing toggling the DHCP field to *manual*. This will unlock the two fields following it, enabling you to assign an IP address and subnet mask.

4.3 Enable Jumbo Frames

Jumbo frames are only supported through VLANs on the HP switches. By default, all ports are members of the *DEFAULT_VLAN* VLAN. Thus, to enable

jumbo frames on all ports, we simply need to enable support on that VLAN:

ProCurve# configure Enters configuration mode

ProCurve (configure)# vlan DEFAULT_VLAN jumbo Enables jumbo frame support on DEFAULT_VLAN. This can be confirmed by typing:

ProCurve# show vlan DEFAULT_VLAN Should return a screen as follows:

```
Status and Counters - VLAN Information - Ports - VLAN 1

  802.1Q VLAN ID : 1
  Name : DEFAULT_VLAN
  Status : Port-based
  Voice : No
  Jumbo : Yes

  Port Information Mode     Unknown VLAN Status
  ---------------- -------- ------------ ----------
  1                Untagged Learn        Down
  2                Untagged Learn        Down
  3                Untagged Learn        Down
  4                Untagged Learn        Down
  5                Untagged Learn        Down
  6                Untagged Learn        Down
  7                Untagged Learn        Down
  8                Untagged Learn        Down
```

Ensure that the *Jumbo* field now reads *YES*.

4.4 Saving the Changes

ProCurve# write memory Saves the current configuration. This enables the configuration to be restored at startup.