

Ether-Raptor Family of Layer 2/3/4 Ethernet Switches

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HARDWARE OVERVIEW

The Ether-Raptor families of switches are based on the same hardware and use the same software code base for management and configuration. The base format for the Ether-Raptor is a small, high-density, Gigabit Ethernet switching system with support for 10-Gigabit Ethernet switching in the backbone. In addition, Ether-Raptor allows for a unique “Distributed Switch Fabric” scenario using Raptor Adaptive Switch Technology (RAST).

This family of switches comprises a unique blend of logic modules and personality modules that provide a standalone or stackable solution. The base Ether-Raptor switch is designed to provide 24 ports of Gigabit Ethernet in a single-rack unit (RU) high format.

The Ether-Raptor switch consists of the basic component subassemblies as shown in Figure 1.

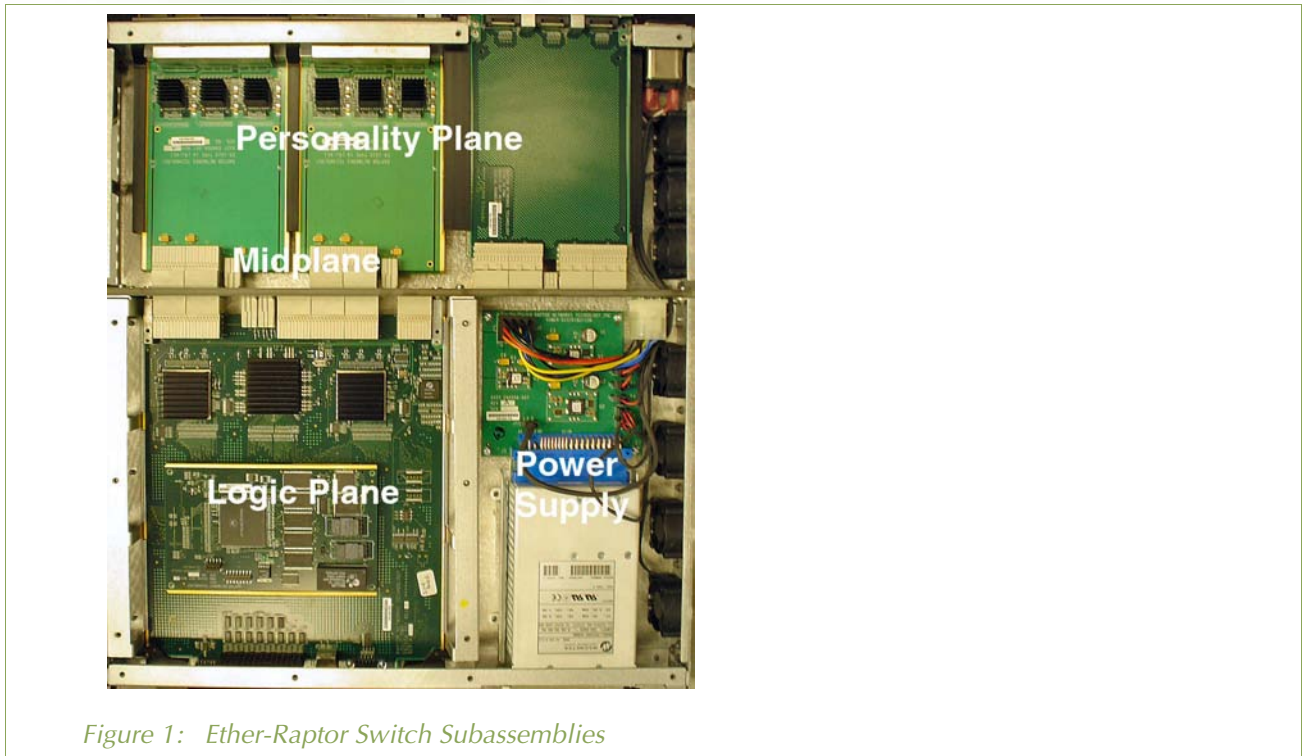


Figure 1: Ether-Raptor Switch Subassemblies

Logic Plane	Contains all switching logic, processor logic, and memory. The logic plane contains all logic to allow a single card type to perform in multiple product designations.
Midplane	Connects the logic plane to the personality plane. The midplane differs for each family member.
Personality Plane	Carries the cable connectivity “personality” of the switch. Copper connectors and fiber connectors reside on the personality plane. These personality modules support: <ul style="list-style-type: none"> • Gigabit Ethernet copper • Gigabit Ethernet fiber (fixed SX/LX, Bidirectional Optics, and Mini GBIC SFP modules) • 10Gbase (copper Raptor expansion ports and fiber XPAC Raptor expansion ports) • 10Gbase fiber (XFP modules) The personality plane allows Ether-Raptor to provide a unique rear cable access for this class of switch.
Power Supply	Each 1 RU Ether-Raptor 1010 family member contains a single or dual field-replaceable unit (FRU) power supply.

LOGIC PLANE

The logic plane contains the switching chipset, which is cross-connected together using RAST. The RAST connection is a 10-Gigabit (12.5-Gigabit raw) connector, which provides connectivity to the personality plane and other chipsets within the logic card.

The logic plane also contains the management processor, which performs the duties of Power-On Self Test (POST), initial configuration and setup, and enables the user to perform advanced configuration and management via a Command Line Interface (CLI), Web Graphical User Interface (GUI), SNMP V1/V2, and LDAP/V3 element managers.

The logic plane is an FRU that can be replaced by the system user. In the single-blade models, the logic board replacement will require the system to be rebooted after the unit is replaced.

MIDPLANE

The midplane is used to provide interconnectivity between the logic plane and the personality cards. The midplane is completely passive and has no active components in place.

PERSONALITY PLANE

The personality plane provides all “external” connectivity for the logic plane. The logic plane carries all of the switch and MAC chipsets for Gigabit Ethernet copper, 10-Gigabit Ethernet copper, serial copper management, and 10/100/1000 copper Ethernet management ports. The personality plane carries:

- All magnetic decoupler chips for the copper Gigabit Ethernet interfaces
- Connectors for RJ-45, serial connectivity (including 10-Gigabit Raptor expansion ports)
- All optoelectronic chipsets such as SFP or XFP modules that support Optical Gigabit and 10-Gigabit Ethernet connections.

The personality plane is also an FRU that can be replaced by the system user and is hot-swappable. Replacing a personality module causes a loss of connectivity on the interfaces being exchanged, but does not affect other personality modules.

POWER SUPPLIES

The main power supply bay (1010 family) provides a single or dual power unit for the entire unit. The dual power supply bay provides redundant power support internally.

RAPTOR ADAPTIVE SWITCH TECHNOLOGY (RAST)

RAST is employed whenever a RAST-compatible switch is connected to another RAST-compatible switch using either the copper cable or the fiber (XFP) cable. RAST allows these individual switches to become a single-switch fabric even when separated by distances allowed by fiber-optic technology.¹ The effect of this is that higher switch functions such as Class Of Service (CoS) designations, Port Mirroring, VLANs, and Link Aggregation trunks are automatically transported over these RAST links, intact, directly to the egress switch elements.

1. Currently the technology allows distance up to 120 km.

Benefits of using RAST include:

- VLANs can be created in a single switch, but shared over the entire Distributed Switch Fabric.
- A single port (which is part of a complete campus-wide switch set) can be designated as a monitor port, and any port that is part of the Distributed Switch Fabric can be mirrored to that port.
- Unlike a standard chassis switch, link aggregation trunks can be connected over the distributed Switch Fabric and appear at another switch unit much as it can in a standard chassis type switch, but at distances limited only by fiber-optic technology².
- When switch units are connected into the distributed switch fabric using two or more 10-Gigabit links, these links will perform an automatic, load-balanced, redundant link with automatic failover to the existing link.
- A single IP address can be used to manage all switches in a Distributed Switch Fabric, greatly reducing management complexity.
- On all switch units, full layer 2/3/4 facilities exist. With the addition of a layer 2–4 classification and management upgrade, complex packet lookup and actions that include functions that can perform If/Then classifications where a condition exists and can lead to a change to QoS (DIFFserv), CoS (802.1p), and VLAN (802.1Q) designations is allowed.

RAST copper connections interconnect up to 15 feet between switch units forming a single, distributed switch fabric. RAST fiber connections using XFP fiber pluggable modules perform the distributed switch fabric capability for up to 120 km (present optical driver limits), but can also operate at virtually unlimited distances over Dense Wavelength Division Multiplexing (DWDM) circuits.

SOFTWARE OVERVIEW

RaptorWare software operates all the features of the Ether-Raptor switch family. All switching is carried out within the hardware with software assistance for unknown route look up etc. Layer 2 Management support software allows configuration of all port settings, and mapping of IEEE 802.1p CoS to individual ports.

Layer 2 management software also covers VLAN support, with support for port-based, MAC address based, protocol-based and subnet-based VLAN classification. Port Mirroring (ingress or egress) is available within a single switch unit or when using the RAST ports to connect to other Ether-Raptor switch units (in a Distributed Switch Fabric).

Layer 3/4 switching allows switch decisions to be made on IP flows using Layer 3-4 information to perform these decisions. Enhanced DIFFserv support is available to control QoS, which includes per-hop behavior as specified in the RFC.

Layer 2–7 classification allows the user to make 802.1Q VLAN selection, 802.1p Priority assignment, and Layer 3-4 DIFFserv assignment, based on any data available in Layer 2 to Layer 7 of the packet.

Example: All X.11 traffic could be assigned to a specific VLAN dynamically without designation of ingress port prior to receiving the data streams.

Example: Most DOS attack ports can be shunted into a VLAN dynamically.

Ether-Raptor Management consists of:

- Command Line Interface (CLI)
- Web-Based Management
- SNMP Standard MIBs (including support for HP Openview)
- Web-Based Client/Server Element Manager for all Raptor products (Future)

2. Currently the present optical driver limit is 120 km.

PRODUCT DESIGNATIONS

ETHER-RAPTOR 1010 AND 1010E (RAST-COMPATIBLE)

A Layer2/3/4, 24-port 1000BaseX switch with six 10Gbase ports, 1 RU high.

Personality cards for ER-1010 and 1010e

- 12-port SFP 1000 BaseX fiber
- 12-port RJ-45 1000 BaseTX over Category 5 cable
- 3-port 10-Gigabit copper RAST module
- 3-port 10-Gigabit Fiber (XFP) RAST module
- 3-port 10Gbase XFP fiber port
- 3-port 10Gbase copper CX4

OVI-RAPTOR OR-1048

The OR-1048 Gigabit Ethernet Switch is an intelligent switch with 48 10/100/1000BASE-T ports, four of which are combination ports that are shared with four SFP transceiver slots, and 2 optional expansion slots on the rear panel for 10GBASE modules. There is also an SNMP-based management agent embedded on the main board. This agent supports both in-band and out-of-band access for managing the switch.

ETHER-RAPTOR OR-1448 (RAST-COMPATIBLE) AVAILABLE 2008

A Layer 2/3/4 switch with 48 ports of Gigabit Ethernet fiber and four ports of 10 GbE/RAST. All 10-Gigabit ports can be 10-Gigabit Ethernet or RAST. This switch will perform distributed switch fabric interconnections between other RAST-compatible switches.

ETHER-RAPTOR ER-12400 (RAST-COMPATIBLE) AVAILABLE 2008

A 1 RU single-board Layer 2/3/4 wire-speed switch with 24 ports of 10-Gigabit Ethernet/RAST fiber. All ports can be 10 GbE or RAST.

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