

High Performance Crosspoint Matrix Switches

Switch Fabric Models

- XH Switch Fabric Module (6.4 Gbps), a 16 x 16 crosspoint matrix switch supporting up to 16 slot controllers.
- XS Switch Fabric Module (2.8 Gbps), a crosspoint matrix switch supporting up to 7 slot controllers.
- XM Switch Fabric Module, a crosspoint matrix switch supporting up to 4 slot controllers.

Feature Highlights

- 6.4 Gbps switching capacity
- Low latency
- Non-blocking design
- Redundant operation
- Hardware multicast

Introduction and Intended Use

The heart of the Xedge switch is the Switch Fabric module a high-performance, single-stage, buffered, crosspoint matrix switch that supports switching operations at up to 6.4 Gbps. In the higher density Xedge switches (Xedge 6640, 6645, 6280 or 6160), the Xedge Switch Fabric modules plug into one or two dedicated slots at the front of the chassis: SF Main and SF Standby. In these switches, the Switch Fabric is responsible for transporting cells simultaneously to the resident slot controllers at 400 Mbit/s throughput in each direction.

Table 1 shows the capacity of the Switching Fabrics of the XM, XS and XH modules and their use with various Xedge chassis. Note that 1:1 Switching Fabric redundancy applications are support when the XH or XS modules are deployed in specific Xedge switch systems.

Theory of Operation

Each slot controller in an Xedge system has a dedicated, full duplex, 400 Mbps cell path connecting it to the Switching Fabric. The PCx controller and PCE controller occupy two I/O slots and thereby can use 800 (2 * 400) Mbps of traffic. Note that when a PCx is used in the Xedge 6280 or 6160 switch it must use the XH switch fabric module.

Cell routing through the fabric is accomplished by internally prepending a 3-byte tag to the ATM cell, and using a bit mask within the tag to determine the route through the matrix. This bit mask is calculated at each of the I/O Controllers and stored in the VCI/VPI routing table on each controller. In this way, each cell may be unicast to a single destination, or multi-cast/broadcast to multiple, or all, destinations in the fabric. Hardware multicast, performed in this fashion, is an extremely efficient method of multicasting ATM cells within the switch.

Table 1: Switching Fabric Usage in Xedge Chassis Systems

Chassis Type	No. of I/O Slots	Fabric Model	Switch Capacity	Redundancy
Xedge 6645	16	XH	up to 6.4 Gbps	YES
Xedge 6640	16	XH	up to 6.4 Gbps	YES
Xedge 6280	7	XS	up to 2.8 Gbps	YES
Xedge 6160	4	XM	up to 1.6 Gbps	NO

NOTE: For the 2-slot Xedge 6002 chassis, the P-series slot controller in slot-0 provides the operational switch fabric necessary. In those applications, switch capacity is up to 5 Gbps.

