

Brocade and Smartoptics Solutions

HIGHLIGHTS

- Provides open-line networking data center connectivity solutions
- Leverages embedded xWDM transceivers to reduce network complexities and cost
- Handles all 10/1 Gbps Ethernet and 16/8 Gbps Fibre Channel protocols on the same system
- Provides Gen 6 (32 Gps Fibre Channel) support
- Enables D_Port testing (electrical loopback [E-Wrap], optical loopback [O-Wrap]), link traffic test, and link latency and distance measurement
- Requires no specific DWDM configurations: R_RDY mode not required, standard Brocade SFP commands can be used
- Helps reduce power and cooling costs by 40 to 60 percent
- Reduces rack space footprint by 80 percent
- Does not require in-depth DWDM transmission knowledge to deploy or manage

Enabling Simple Fibre Channel Data Center Connectivity with Embedded WDM

Smartoptics provides CWDM and DWDM connectivity solutions and 4/8/16 Gbps Fibre Channel transceivers certified on all the latest Brocade[®] Fibre Channel switches, including those running Brocade Fabric OS[®] (FOS). These simple and cost-effective open-line connectivity solutions enable organizations to transition to modern systems, freeing themselves of the complexity and expense of telecom-grade platforms.

The Brocade and Smartoptics Solution

Smartoptics embedded WDM solutions enable long-distance CWDM/DWDM transceivers to be connected directly into Brocade Fibre Channel switches, rather than through a traditional transponder-based DWDM platform. This design uses a single passive optical multiplexer to generate up to 16 Coarse Wavelength Division Multiplexing (CWDM) or 80 Dense Wavelength Division Multiplexing (DWDM) channels through a single pair of fibers that supports distances up to 160 km.

Through this approach, CapEx and OpEx are significantly reduced compared to using active DWDM networking platforms. In addition, the switch does not need to be run in R_RDY mode, so no features are lost. System capacity is exactly the same, but with far fewer elements at risk of failure. Reduced power, cooling, and space requirements result in the ultimate green data center solution.

For longer distance connectivity, the Smartoptics innovative M-Series platform is an intelligent 1U DWDM open-line networking appliance with multiplexer/demultiplexer (mux/demux), amplification, dispersion compensation, and monitoring features. It works with any combination of embedded DWDM transceivers and transponders to extend distances up to 160 km, point to point. Longer distances can be achieved by setting the device in repeater mode.

Simplified Operations, Reduced Costs

More than ever, companies are planning for disaster recovery scenarios. This often entails distributing data centers across multiple geographic locations in an effort to minimize disruptions should disaster strike. Organizations often use dark fiber to connect these locations, and with the growing quantity of data being transferred, many are turning to WDM to maximize the throughput of these dark fiber connections.

In the past, telecom-grade DWDM systems were the go-to solution for data center connectivity. Yet they typically accounted for 50 percent or more of the total site connectivity project cost due to their complexity and significant rack space, power, and cooling requirements. Brocade and Smartoptics now offer organizations an alternative—an innovative embedded WDM solution that meets their disaster recovery requirements while simplifying operations and reducing expenses.

System simplicity is just one benefit of the passive, embedded WDM approach

enabled by Smartoptics and Brocade. Deploying embedded WDM transceivers with a multiplexer keeps things simple and cost-effective, allowing organizations to allocate more budget to core SAN/IP equipment. This approach also enables Brocade to offer a full end-to-end connectivity solution that minimizes yearly service fees while enabling a faster customer ROI. Moreover, as it is plug-and-play, no extensive telecom knowledge is required. If admins can plug a transceiver into a Fibre Channel or Ethernet switch, they can run an embedded WDM system.

This solution also offers valuable benefits from a technical perspective. Fewer active components means fewer potential points of failure. It is a completely passive solution, requiring no additional power, emissions, or noise. Installation requires only simple plug-and-play, and management does not require any additional equipment.

Approved Solutions

The combined Brocade and Smartoptics solution is ideal for organizations that need to deploy one or more remote data centers and implement disaster recovery between geographically separate sites. It offers the simplest design and installation solution with no compromise on distance or channel count. As a purely passive solution, it means significant overall reductions in power, noise, and emissions, while simultaneously assuring the utmost reliability. For longer distance connectivity, an intelligent M-Series multiplexer handles all traffic connectivity up to 200 km between sites.

16 Gbps ELWL (0 to 40 km) CWDM (0 to 40 km) DWDM (0 to 120 km)	16G-ER-Dxxx-BR1 (without D_Port capability)	Gen 5: Brocade DCX® 8510 with Brocade FC16-32 and FC16-48 blades; Brocade 6505, 6510, and 6520; Brocade 7840 Gen 6: Brocade G620, Brocade SX6, Brocade FC32-48 Brocade FOS 7.3.1 (Brocade 7840 = Brocade FOS 7.4.0)
	16G-ER-Dxxx-BR2 (with D_Port capability)	Gen 5: Brocade DCX 8510 with Brocade FC16-32 and FC16-48 blades; Brocade 6505 and 6510; Brocade 7840 Gen 6: Brocade G620, Brocade SX6, Brocade FC32-48 Brocade FOS 8.0.2 or higher

8 Gbps ELWL (0 to 70 km) CWDM (0 to 70 km) DWDM (0 to 160 km)	8G-ZR-Cxx-BR1	Brocade 300, 5100, VA-40FC, 5300, 54XX, 7800, 7840; Brocade DCX-4S, DCX Brocade FOS 7.1.1 (Brocade 7840 = Brocade FOS 7.3.0b)
	8G-ER-Dxxx-BR1	Brocade DCX 8510 with Brocade FC16-32 and FC16-48 blades; Brocade 6505, 6510, and 6520; Brocade 7840 Brocade FOS 7.3.1 (Brocade 7840 = Brocade FOS 7.4.0)
	8G-ZR-Dxxx-BR1	Brocade DCX 8510 with Brocade FC16-32 and FC16-48 blades; Brocade 6505 and 6510; Brocade 7840 Brocade FOS 8.0.2 or higher

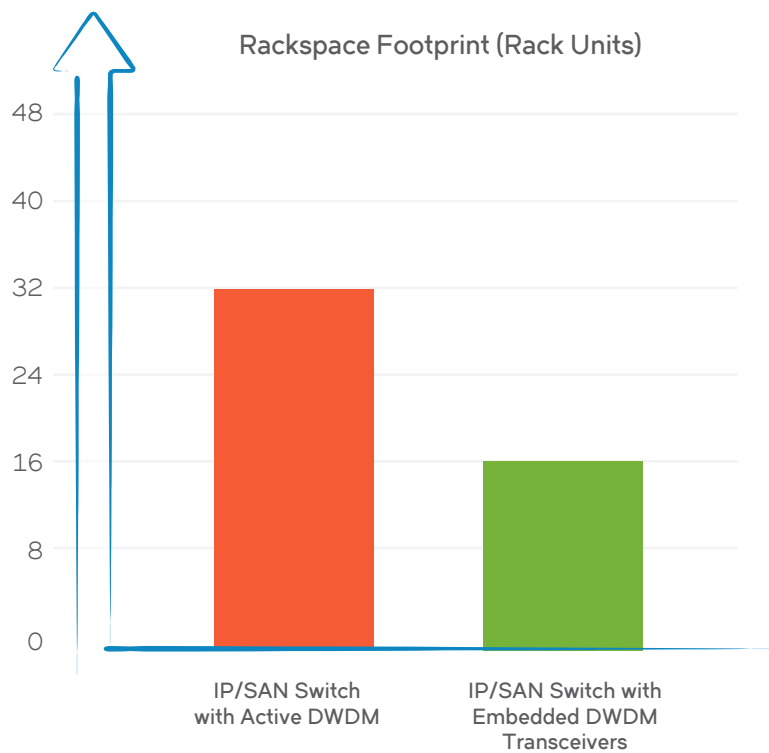


Figure 1: Reduced data center footprint.

8-Channel 16 Gbps Fibre Channel Embedded WDM System Investment (first 3 years)

1 × embedded DWDM system \$68,000

Capital Expenditure (CapEx): \$68,000

Continual operational costs for three years

Fiber leasing costs: \$36,000

Operational Expenditure (OpEx): \$36,000

Total cost (3 years) \$104,000

8-Channel 16 Gbps Fibre Channel Active DWDM System Investment (first 3 years)

1 × active DWDM system \$114,600

Capital Expenditure (CapEx): \$114,600

Continual operational costs for three years

Fiber leasing costs: \$36,000

SLA and SW licensing: \$36,000

Operational Expenditure (OpEx): \$72,000

Total cost (3 years) \$186,600

Figure 2: An 8-channel 16 Gbps Fibre Channel active versus passive WDM networking comparison. (Source: Smartoptics)

About Brocade

Brocade networking solutions help organizations achieve their critical business initiatives as they transition to a world where applications and information reside anywhere. Today, Brocade is extending its proven data center expertise across the entire network with open, virtual, and efficient solutions built for consolidation, virtualization, and cloud computing. Learn more at www.brocade.com.

About Smartoptics

Smartoptics is a leading provider of optical network solutions for WDM networks worldwide. Based in Oslo, Norway, with deployments worldwide, their innovative products allow data centers and network and storage service providers to build simple, cost-effective WDM-based solutions that maximize infrastructure capacity while reducing complexity. With their team of engineers and international partners, Smartoptics is revolutionizing the way WDM networks are built throughout USA, Europe, and Asia. Learn more at www.smartoptics.com.

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