DATA CENTERS

A holistic view of the data center and the opportunities to enhance its infrastructure to meet current and future demands

Chapter 9

Designing for fiber TAPs

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Real-time network monitoring with no service interruptions

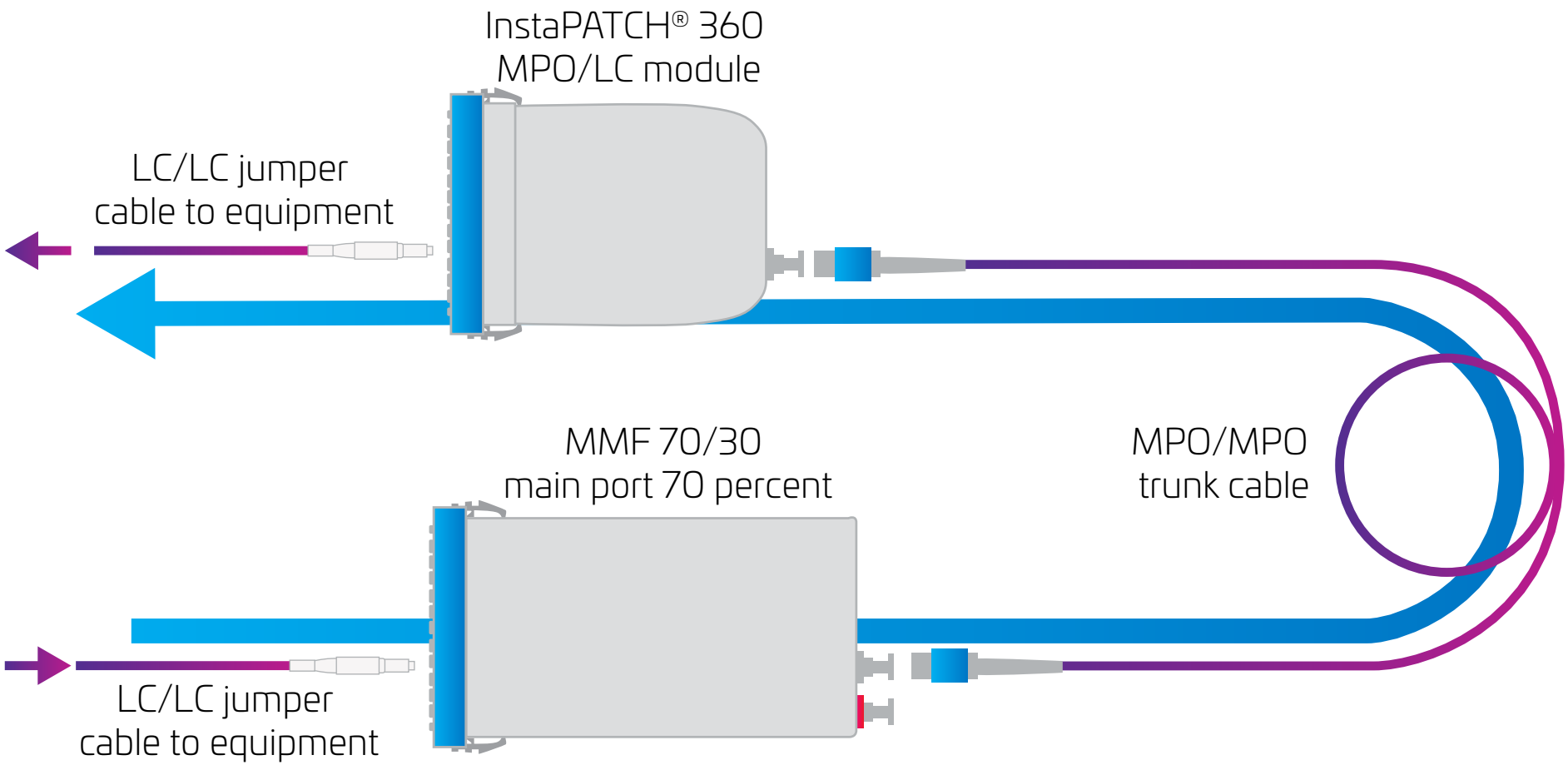
The need for real-time network traffic monitoring in today's data center has become compelling. Data center network administrators need to gain better visibility of their networks to optimize the performance of mission-critical applications and keep their networks secure.

In fiber-optic data center networks, a traffic access point (TAP) is a critical tool for data center monitoring and management. A TAP module can be integrated into the fiber cabling infrastructure to enable network traffic monitoring from the physical layer (layer 1) and above in real time—without interrupting network service.

A TAP module is a compact package of fiber-optic couplers or splitters that passively diverts a fixed percentage of light energy away from main transportation channels to monitor the traffic status or content without disrupting the main channel traffic. The optical couplers or splitters inside a TAP module split the light energy from the input port into two output ports according to a designed split percentage—usually diverting from 10 to 50 percent to the TAP.

Because TAPs continuously pass all traffic running between the endpoint network devices with zero latency—while duplicating that exact same traffic to the monitor ports simultaneously—they are one of the most efficient ways to monitor traffic and network link quality in data center networks.

TAP modules help improve managers' understanding of how applications perform and how to measure their performance, and ensure that it meets the required standard. They are also being used to meet compliance or legal requirements that require a business to deploy reasonable tools to secure the data center network.



Fiber TAP with 70/30 split

Designing a TAP solution to mitigate insertion loss

By diverting network traffic for monitoring, traffic access points (TAPs) can introduce additional insertion loss into the network. While industry standards for Ethernet and Fibre Channel are not expressly designed to support the added loss of TAPs, with pre-engineering and the use of high-performance cabling systems it is possible to deploy TAPs and retain useful channel topologies.

As shown below, the evolution of higher-speed applications includes reduced loss budgets—underscoring the need for low-loss components and engineering guidelines.

db link loss for transmission				
Year	Application	Data rate	Standard	Loss budget (dB)
1982	Ethernet	10 Mbps	IEEE 802.3	12.5
1991	Fast Ethernet	100 Mbps	IEEE 802.3	11.0
1998	Short wavelength fast Ethernet	10/100 Mbps	TIA/EIA-785	4.0
2000	1G Ethernet	1,000 Mbps	IEEE 802.3z	3.56
2004	8 FC and 10 G Ethernet	10,000 Mbps	IEEE 802.3ae	2.60
2010	16 GFC and 40 G Ethernet	40,000 Mbps	IEEE 802.3ba	1.9
2010	100 G Ethernet	100,000 Mbps	IEEE 802.3ba	1.5
2015	32 GFC	28.800 Mbps	INCITS BSR 512-2015	1.86 OM4

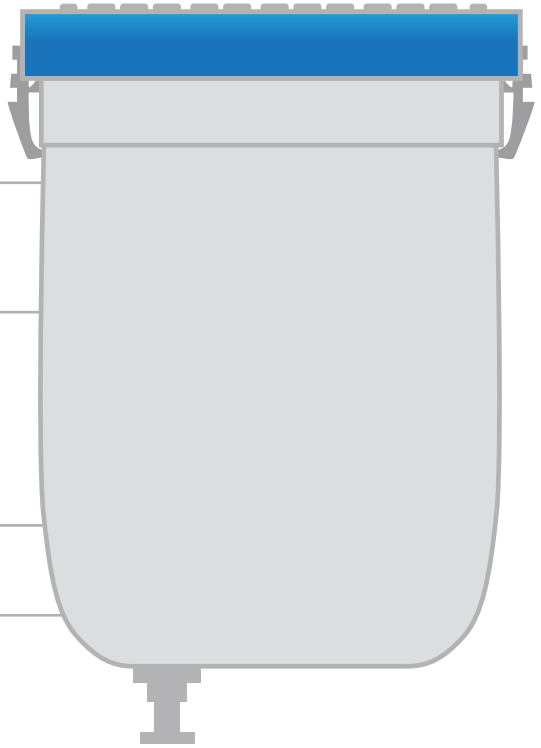
When designing a traffic access point (TAP) solution for a particular application, many factors need to be taken into consideration, including:

1 Loss created by the selected TAP splitter

2 Length and number of connections within the main and two monitor channels

3 Intended application (for example, 8G Fibre Channel or 10G Ethernet)

1 Loss created by the selected TAP splitter



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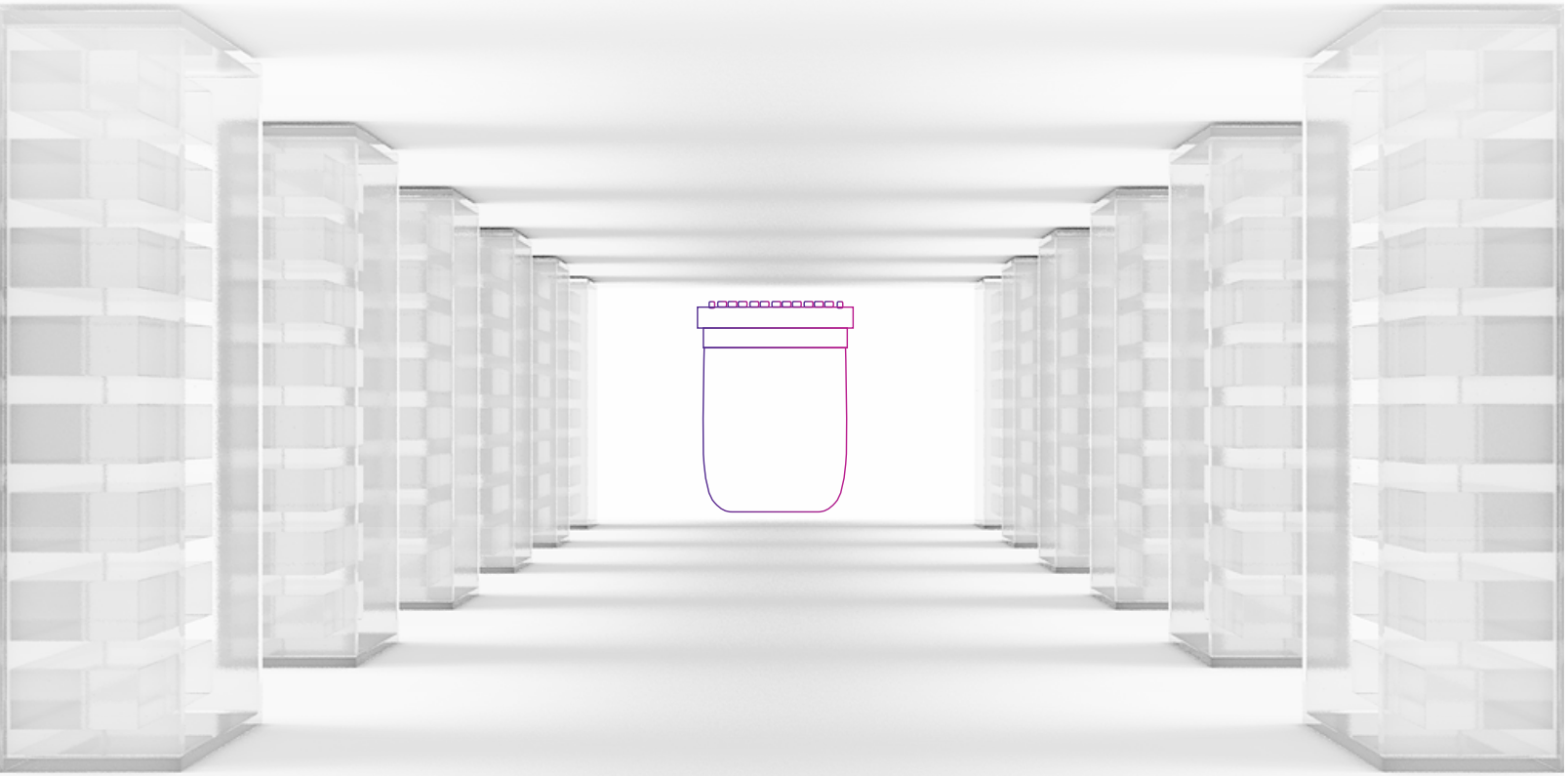

Using TAPs in high-speed fiber links can be complicated—
especially in a do-it-yourself retrofit application.
Instead of trial and error, today's best practice is to design and deploy an engineered solution
in the data center. Designing TAPs into the data center from the start enables the addition of monitoring
capability when it is needed in the future, while proving the operational links to be reliable and solid on day one.

Design guide:

SYSTIMAX® InstaPATCH® 360
traffic access point (TAP)
solution design guide

Calculator:

Fiber performance
(link loss)
calculator

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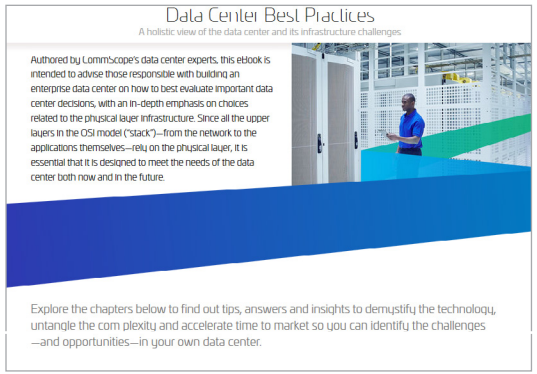

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