DATA CENTERS

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

Chapter 5

Multisource agreements

Multisource agreements

Bringing options to a changing environment

The data center is a complex environment, comprising a wide range of equipment and technology manufactured by many different companies. Ever-increasing bandwidth and line rates have led to optical fiber being the preferred technology to enable higher speeds. To ensure proper operation and maximum efficiency of the data center networks, optical transceivers of the same type must be interchangeable and interoperable so replacements and upgrades can be performed quickly and easily, without the need to replace or modify other network equipment.

The solution is a multisource agreement (MSA)—an agreement among multiple manufacturers to make equipment consistent and interchangeable by defining a common physical form for various devices and components. In the case of data center connectivity, there are MSAs that cover both the specification and implementation of the optical transceivers made by various manufacturers.

The phenomenal growth in data, voice and video has triggered the need for higher and higher speeds in the data center and across data centers. This has driven the standards bodies to develop higher application speeds, which in turn have driven the need for new MSAs. Per the latest version of the Ethernet Roadmap, there are currently seven new applications in progress—most of which involve fiber optics.

There are now many different MSAs reflecting the variety of applications we see in the data center:

10G, 25G, 40G, 50G, 100G, 200G, singlemode, multimode, and others.

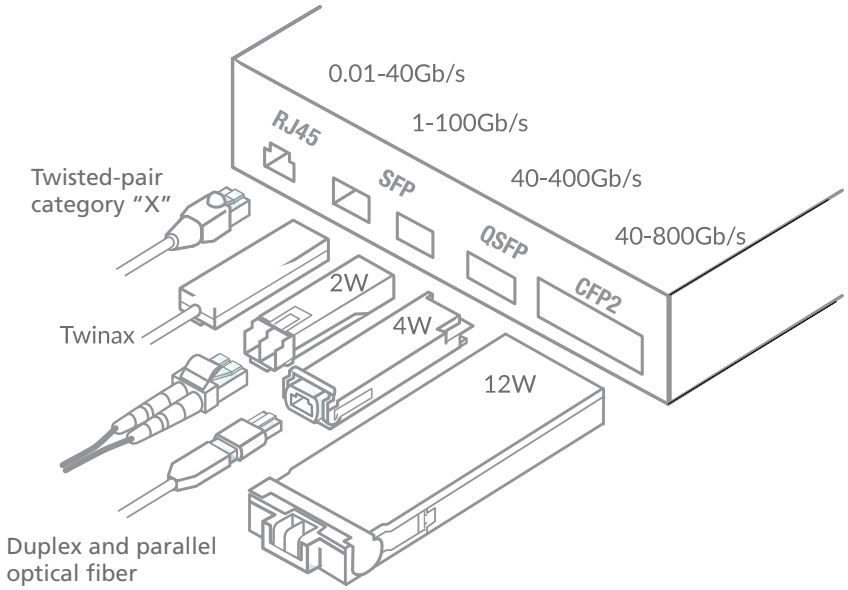
Examples of optical MSAs

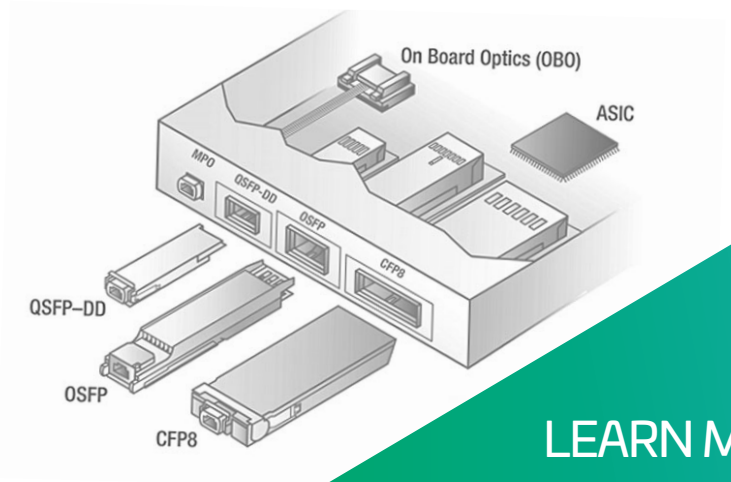
The optical transceiver multisource agreement (MSA) environment is very dynamic, with numerous MSAs—too many to list in this publication. These MSAs cover everything from form factor, application (standard, prestandard or proprietary), maximum power consumption, fiber connector type, strand count, wavelength and cable reach. Examples of current and future MSAs are shown below:

TODAY'S INTERFACES

TOMORROW'S POSSIBLE INTERFACES

Images Courtesy of the Ethernet Alliance





LEARN MORE about tomorrow's possible interfaces on the next page >>>

5 | Multisource agreements

QSPF-DD

QSFP-DD—"Quad Small Factor Pluggable—Double Density."

The smallest 400 Gbps module will provide backwards compatibility to 40GbE and 100GbE QSFP modules. Will support Ethernet, FibreChannel or InfiniBand protocols.

Designed to support:

- 200 Gbps or an aggregate of 400 Gbps, using 25 Gbps NRZ modulation per lane or 50 Gbps PAM4 per lane

OBO

OBO, or Consortium for On-Board Optics (COBO)

Eliminates the E/O function traditionally performed by transceivers, meaning the bandwidth density at the faceplate can be dramatically increased. Data applications to be supported by OBO are currently to be defined, but this technology is primarily targeted at data rates from 400 Gbps to more than 800 Gbps.

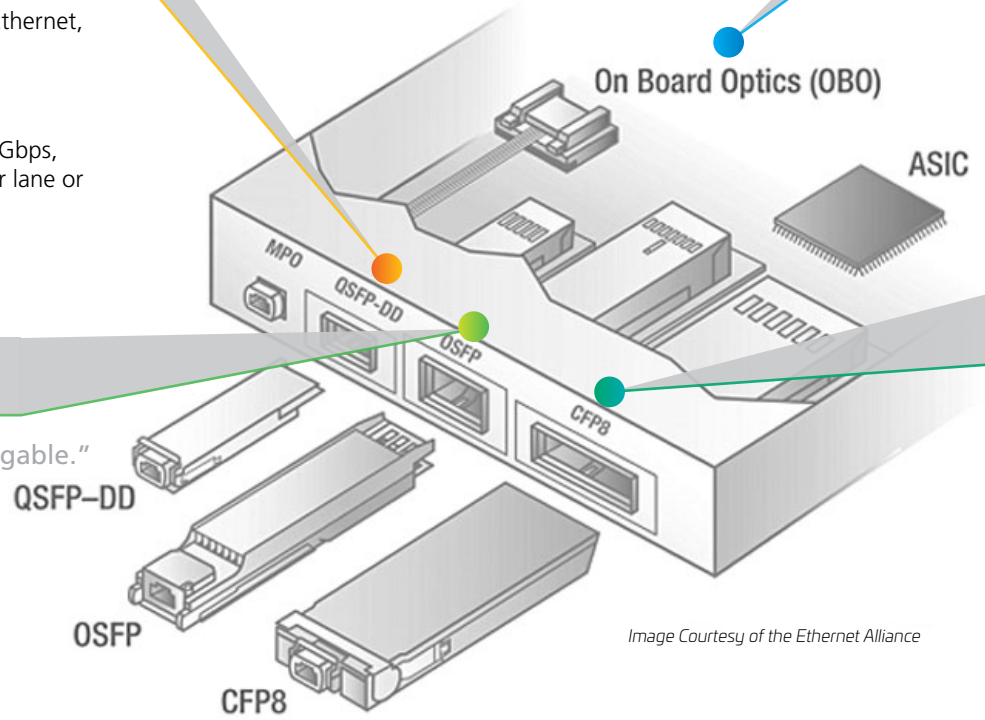


Image Courtesy of the Ethernet Alliance

OSPF

OSFP—"Octal Small Factor Pluggable."

The smallest 400 Gbps module will provide backwards compatibility to 40GbE and 100GbE QSFP modules. Will support Ethernet, FibreChannel or InfiniBand protocols.

Designed to support:

- 400GBASE-DR4 parallel SMF (4x100G PAM4)
- 400GBASE-SR8 parallel MMF (8x50G PAM4)
- 400GBASE-FR4 duplex SMF (4x100G PAM4 WDM)
- 400GBASE-FR8/LR8 duplex SMF (8x50G PAM4 WDM)
- 2x200GBASE-FR4 parallel SMF
- 2x100GBASE-CWDM4 parallel SMF

CFP8

CFP8—"C Form Factor Pluggable"

Primarily aimed at supporting 400 Gbps with a claim to offer a path to support 800 Gbps in the future.

Designed to support:

- 400GBASE-SR16 parallel MMF (16x25G NRZ)
- 400GBASE-FR8/LR8 duplex SMF (8x50G PAM4 WDM)
- 400GBASE-DR4 parallel SMF (4x100G PAM4)

A networking technology may come to market with multiple choices or generations of optical transceivers. The market will eventually identify the winning solution based on cost, size, power consumption, vendor support and other factors.

IMPLICATIONS FOR FIBER CABLING INFRASTRUCTURE DESIGN

The clear trend in the development of new multisource agreements (MSAs) has been toward both higher speeds and increased densities. Higher speeds are the result of new applications standards that specify higher line rates. Higher densities have been driven largely by technology advances that enable the transceiver to make use of lower power, which allows for smaller packaging. As shown, the physically larger MSAs are designed to accommodate higher power transceivers, while reduced power transceivers can make use of smaller MSAs for more ports or higher density communication hardware.

Fortunately, each of the data center cabling standards (TIA 942, ISO/IEC 11801-5 and CENELEC 50173-5) has standardized on two optical connectors for use in the data center: the LC for single or duplex applications and the MPO for applications requiring more than two fibers. This has simplified the fiber connectivity as the MSAs that are relevant in the data center environment also have made use of the LC and MPO connectors. And, while the standardization of connectors has helped simplify cabling, it has also become very important to provide very flexible, agile connectivity that can accommodate the ever-increasing speeds and the higher densities that are being driven by higher densities at the equipment faceplate.

Standards:

Multisource agreements

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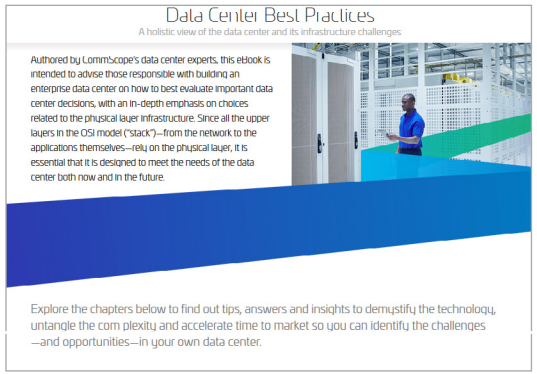

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