

Modular Solutions Meet Vital Data Center Objectives

By Herb Congdon

With expanding optical networks, reduced cost of bandwidth and increased concern for disaster recovery, data center needs are receiving much attention. The network cabling requirements for data centers differ from that of traditional structured cabling networks with their own unique set of standards and objectives. Making the right decisions and investment can save time, money and frustration at startup and minimize disruption and unnecessary costs in the long run.

Defining a Data Center

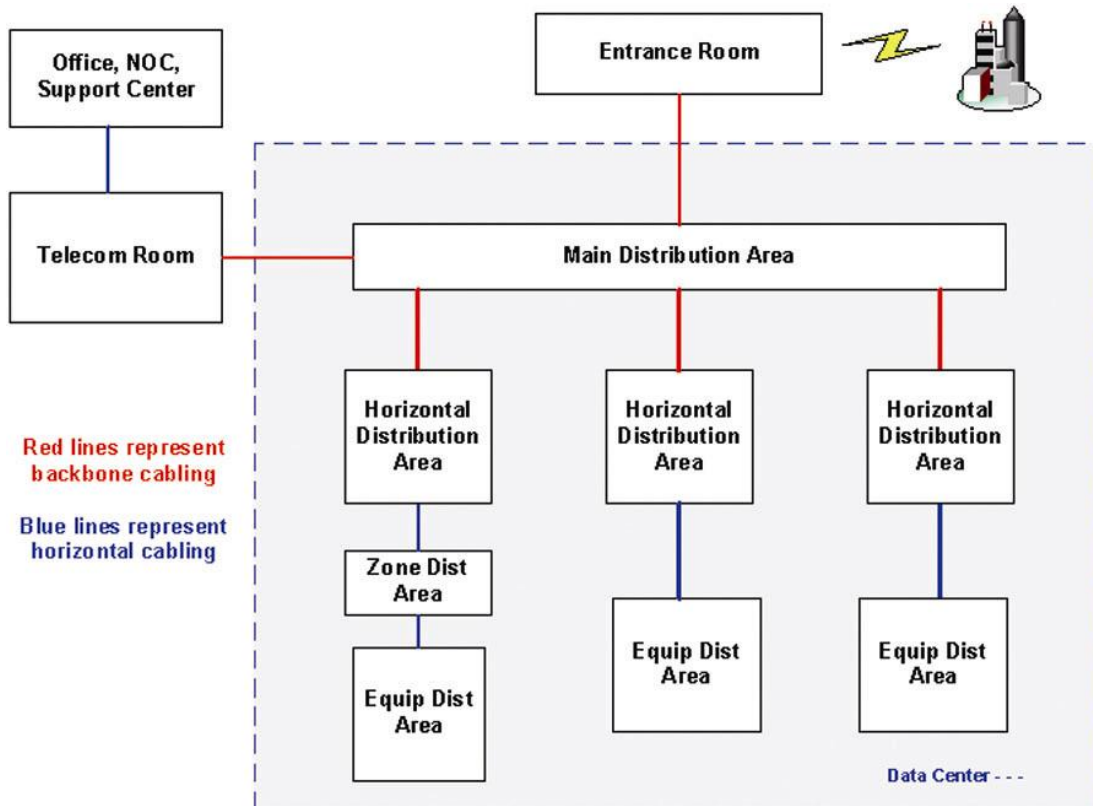
A data center is a centralized location for the storage, management, processing and exchange of data that exists within a specific enterprise or a specialized facility. Every company – small and large, public and private – has a data center.

In general, data centers can be broken down into three types – enterprise data center, Internet data center and storage area network (SAN). An enterprise data center is the central data processing facility for an enterprise's computer network. An Internet data center is a facility that provides data and Internet services for other companies. A SAN is a network of interconnected storage devices and data servers usually located within an enterprise data center or as an off-site facility offering leased storage space.

A data center includes an entrance room that contains service provider demarcation points and equipment, a main distribution area (MDA) that houses core switches and serves as the central connection point, and one or more horizontal distribution areas (HDAs) that connect to equipment distribution areas (EDAs) that house electronic equipment. For added flexibility, a zone distribution area (ZDA) acts as a consolidation point to serve the equipment distribution area.

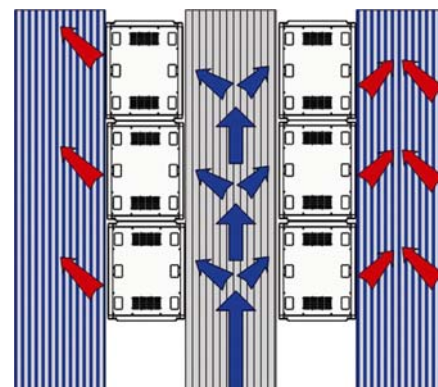
Understanding Data Center Standards

Recently approved for publication, TIA-942 *Telecommunications Infrastructure Standards for Data Centers* specifies requirements and guidelines for infrastructure of data centers. Based on existing cabling standards, TIA-942 covers cabling distances, pathways and labeling requirements, but also covers site selection, demarcation points, building security and electrical considerations. As the first standard to specifically address data centers, TIA-942 is a valuable tool for the proper design, installation and management of data center cabling.



The standard provides specifications for pathways, spaces and cabling media, recognizing copper cabling, multimode and single-mode fiber, and 75-ohm coaxial cable. However, much of TIA-942 deals with facility specifications. For each space within a data center, the standard defines equipment planning and placement based on a hierarchical star topology for backbone and horizontal cabling. The standard also includes specifications for arranging equipment and racks in an alternating pattern to create “hot” and “cold” aisles, which helps airflow and cooling efficiency.

To assist in the design of a new data center and to evaluate the reliability of an existing data center, TIA-942 incorporates a tier classification. Each tier level has guidelines for equipment, power, cooling and redundant components and ties those guidelines to expectations for the data center to maintain service without interruption.



Hot and Cold Aisle Diagram

Identifying Data Center Cabling Objectives

When it comes to cabling a data center, there are four main objectives that owners and operators strive to meet:

- Reliable, fast transmission to handle data and future bandwidth requirements
- High-density solutions to save space and reduce real estate costs
- Easy-to-install components for quick initial deployment and upgrades
- Low initial investment and long-term cost effectiveness

In data centers, large amounts of information have to move from collection source to the storage media – and no one can afford delays or downtime. With daily system backups becoming routine, downloading information must be done as quickly as possible. Data center cabling systems must provide fast data rates and reliably handle the streaming of data while enabling migration to higher data rates when necessary. Pre-terminated components from reliable sources help ensure consistent performance and eliminate the risk of system degradation or failure due to field termination.

Some data center installations may require more than 1,000 square feet of rack space just to house storage devices. Some turn to remote storage locations, but any environmentally controlled real estate is expensive. Higher density cabling components can help reduce the amount of floor space, rack space and associated costs.

Revenue is too valuable—particularly for start-up companies—to wait weeks, days or even hours for data center equipment to be up and running. Simplified installation and upgrades reduce the need for bidding, quoting and relying on labor that often must be scheduled well in advance. Cabling components that are modular and simple to use without tool kits, consumables, field termination and training offer the fastest startup time, better cable management flexibility and easier moves, adds and changes.

Data centers are immediate revenue-generating opportunities, but cabling the entire facility at start-up represents a huge investment. Implementing data centers in phases on an as-needed basis lets owners and operators invest revenue from one installation phase into subsequent phases. Components that are easy to order, inventory, replace and connect enable installation in phases, resulting in reduced initial investment and long-term cost-effectiveness.

Evaluating Modular Cabling Components

The traditional cabling process of pulling in cables, connectorizing the cables, populating patch panels, testing and troubleshooting introduces delays and uncertainties that can make or break the start up of a data center.

In addition, traditional cabling components do not provide high-density options for space savings. Selecting MPO fiber optic and MRJ 21 copper pre-terminated trunk cables, breakout cassettes and cable assemblies is an ideal solution to meeting data center objectives.



MPO trunk cables

Trunk cables are pre-terminated and tested at the factory for consistent, reliable performance. Each fiber trunk cable terminates optical fibers in MPO connectors, similar in size to one SC simplex connector but housing 12 fibers each – not just one fiber. This means that a terminated cable can be placed into cable trays or pulled through conduit without requiring a large cross-



MPO breakout cassettes



MRJ 21 copper trunk cables

section of pathway to allow for a connector bundle. Once in place, the cable is connected to twelve fibers at a time so installation is quick and easy with no tool kits, consumables, field termination or training. Since future rack placement is typically determined in advance, trunk cables of predetermined lengths can be ordered in advance and stored until needed to enable cost-effective installation in phases and easy upgrades with minimal downtime.



MRJ 21 breakout cassettes

Most network equipment is not equipped with an MPO interface, however, but with existing MT-RJ, LC, ST or SC type interfaces. Modular cassettes transition the 12 fibers of an MPO connector by routing each fiber of the MPO connection on the back of the cassette to the appropriate interface port on the front. Cassettes fit into existing patch panels and enclosures, and standard patch cords are used to connect ports on the front of the cassette to network equipment interfaces. MPO cassettes can also be purchased and stored until needed.

MRJ 21 high-density copper connectivity solutions also include pre-terminated and tested trunk cables. The trunk cables are high performance 25-pair cables terminated with MRJ 21 connectors, which offer much higher port density than the common RJ45 interface. The MRJ 21 connector plugs into the back of high-density RJ45 panel-mounted cassettes or into a fixed-port and straight 1U patch panels or into equipment with the MRJ 21 connector interface. The modular setup of eight pluggable MRJ 21 connections instead of 48 individual RJ45 terminations significantly reduces on-site labor, increases system uptime, and offers better cabling efficiencies. Connecting equipment using the MRJ 21 solution is about six times faster than with standard 4-pair wiring.

Making the Right Decision

Cabling is often overlooked or taken for granted. But even electronics vendors capturing the majority of the data center market will be the first to tell you that all of their devices are useless if the cabling is incapable of supporting the applications. Understanding the data center standards,

identifying cabling objectives and choosing the right components will go a long way towards ensuring reliable performance and operation of a data center.

As owners and operators strive to meet their cabling objectives, MPO fiber optic and MRJ 21 copper connectivity solutions are ideal components for providing reliable transmission, reduced real estate costs, quick deployment and upgrades, low investment and long-term cost effectiveness. It's a decision that can save time, money and frustration – now and in the future.

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Herb Congdon, director, fiber products, is with Tyco Electronics. Tyco Electronics, a business segment of Tyco International Ltd., is the world's largest passive electronic components manufacturer; a world leader in cutting-edge wireless, active fiber optic and complete power systems technologies; and a provider of premise wiring components and systems. Tyco Electronics provides advanced technology products from over forty well-known and respected brands, including Agastat, Alcoswitch, AMP, AMP NETCONNECT, Buchanan, CII, CoEv, Critchley, Elcon, Elo TouchSystems, M/A-COM, Madison Cable, OEG, Potter & Brumfield, Raychem, Schrack, Simel and TDI Batteries.

The AMP NETCONNECT business unit of Tyco Electronics develops, manufactures, and supplies a comprehensive range of communications infrastructure products and systems for customers in government, education, healthcare, finance, manufacturing and technology markets. Having established itself as the preeminent provider of commercial premises structured cabling systems for optical fiber and twisted-pair copper technologies, Tyco Electronics has broadened its AMP NETCONNECT product portfolio to include a complete line of residential cabling solutions. Coupling this spectrum of industry-standard offerings with its superior customer service, the AMP NETCONNECT business unit is well positioned as a single-source system provider to meet the disparate communications infrastructure needs of commercial and residential customers.