# Dynamic Designs for the Data Center

The heartbeat of today's organization or enterprise network is in its data center. Employees, partners or suppliers and customers rely on data center functions and services to create, collaborate and interact in an effective manner. Over the last decade, proliferating network-based and platform-independent technologies have made the data center more strategic than ever by improving productivity, enhancing business processes and accelerating change. Data centers are the strategic focus of Information Technology (IT) efforts to protect, optimize and grow a business profitably.

Data center designers and managers face several challenges in maintaining critical operations while expediting the migration to a more efficient converged platform of resources. Most enterprise data centers grew rapidly to meet the explosive economic growth of the previous decade. Consequently, applications commonly stand alone in under utilized, isolated environments. Each application is optimized for performance, yet a typical data center supports several operating systems, computing platforms and storage systems. The disparate infrastructures supporting different application "islands" are difficult to change and expensive to manage, integrate, secure and back up.

Common examples of these data center applications, systems and platforms are:

- E-commerce, email and in-house applications
- Supply chain management, enterprise resource planning and customer relationship management
- Storage systems –direct attached, network attached, storage area networks and tape back-up
- Computer clustering, mainframe systems and IP services

IT staff are driven to improve operational efficiency, optimize utilization of data center resources and release funds for innovative new IT projects that help generate revenue. The ultimate goal is an agile infrastructure that can incorporate ongoing improvements in computing, storage and application technologies, while empowering the enterprise to dynamically support changing business processes. There are widespread trends to improve data center operational efficiencies through data center, server and storage consolidation. Another trend is virtualization of computing and storage resources from monolithic systems into standardized components that can be grouped, assigned and accessed through an intelligent network. These trends provide the basis for emerging IT strategies, such as service-oriented architectures and automated or self-optimizing applications.

Clearly, data center networking has moved far past the stage of simply connecting servers and hubs together. As companies broaden their definition of the data center from "computer room" to "strategic corporate asset," the importance of data center optimization will rise. If strong new data centers are a measure of corporate health, a reliable, flexible and resilient network infrastructure is a must. We believe a physical layer infrastructure needs to be robust and versatile enough to support 24/7 availability

and monitoring, “5 nines” reliability, redundancy, security, fire prevention, environmental control, rapid deployment/rearrangements and business continuity management.

The good news for data center management is that global infrastructure standards organizations are now recognizing the daunting tasks IT personnel face and guidelines are being formulated with recommendations for preferred high performance cabling infrastructures. In the U.S., an infrastructure standard for data centers is covered by:

- Draft TIA/EIA-942 (SP-3-0092): Telecommunications Infrastructure Standard for Data Centers. It includes recognized cabling media
    - ANSI/TIA/EIA-568-B.2.1 CAT 6 cable
    - ANSI/TIA/EIA-568-B.3.1 Laser-optimized OM3 multimode cable
    - ANSI/TIA/EIA-568-B.3 Singlemode cable

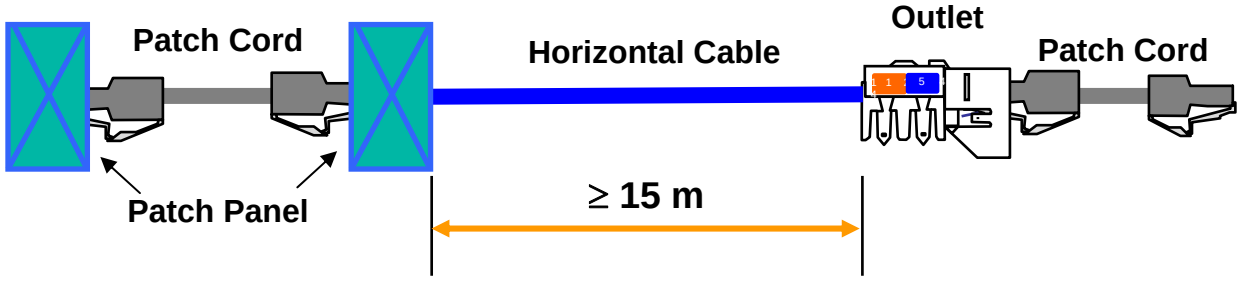
In Europe, the infrastructure standard for data centers is covered by:

- Draft EN 50173-5:200x: Information Technology – Generic Cabling Systems, Part 5: Data Centers

Choosing advanced cabling solutions that allow IT departments the freedom and flexibility to design the physical layer infrastructure to meet unique data center requirements is a key step toward successful convergence and consolidation. SYSTIMAX® Solutions provides data center customers with the flexible solutions that will extend the life of the cable plant, reduce obsolescence and efficiency, and offer a clear upgrade path to future applications.SYSTIMAX Solutions™ offers advanced end-to-end solutions developed by the world-renowned SYSTIMAX Labs that meet the needs and requirements that enhance most data center operations.
For Category 6/Class E installations in data centers, we believe the SYSTIMAX GigaSPEED® XL Solutions featuring VisiPatch™ System patching technology provides the ultimate design freedom and system performance.

For OM3 (LOMMF) fiber installations in data centers, the SYSTIMAX LazrSPEED® Solution featuring the new InstaPATCH™ System, modular and factory pre-terminated patching technology, provides rapid installation for today and an easy upgrade path for tomorrow.

Non-traditional network designs utilized in data centers are commonplace today. Multiple connection points in close proximity, such as those found between switch-to-switch or switch-to–server, are prevalent due to space limitations. Yet, globally recognized standards continue to support the traditional network architecture without considering the evolving needs surfacing in today’s data centers. The traditional standards call for two connectors on each end of a cabling channel with at least 15 meters of cable in between in order to reduce the effects of unwanted energy coupling between connectors, thus “the 15-meter rule.”



The SYSTIMAX GigaSPEED XL Solutions help customers design their networks to meet their needs with up to six connection points in any channel distance or configuration up to 100 meters in length with guaranteed performance up to 400% better than the standard. Thus, data centers using GigaSPEED XL Solutions are no longer forced into bulk storage of excess cable due to the 15-meter rule.

Coupled with the GigaSPEED XL Solutions, another excellent fit to support flexibility of design and space density is the VisiPatch System patching technology. This industry-leading patching system is unique with its reserve patching design, clean cordless appearance, patch plug labeling option and superior patch cord management. In addition, the VisiPatch System has 15% or more density than modular patching alternatives while being 25 to 30% less expensive.

These two copper-based solutions provide clear benefits in meeting data center requirements for high performance and reliability, flexibility of design, high density, and speed and ease of installation. In addition, we believe the cabling design and development expertise of SYSTIMAX Labs ensures top quality from a proven leader in connectivity solutions.

When the IT department needs rapid deployment or re-arrangements combined with the ability to support high density fiber-based duplex applications today AND parallel applications in the future, we believe the SYSTIMAX InstaPATCH System featuring LazrSPEED OM3 fiber technology is the optimal choice. SYSTIMAX Labs designed the new InstaPATCH System to support locations such as data centers that require space-saving applications coupled with time and labor savings.

The InstaPATCH System features a high-density, factory-terminated and tested, modular fiber connectivity solution that allows installers to connect system components together simply and quickly. The system is comprised of shelves, panels, modules, and trunk cables with 12-fiber Multi-fiber Push On (MPO) connectors providing instant terminations and LazrSPEED multimode fiber technology capable of delivering 10G support.
This modular approach enables 96 fibers to be ready for service in about 10 minutes, or the same time it takes to make a single fiber connection with other systems. Traditional field termination would take 16 hours (two man-hour days) for 96 fibers.

InstaPATCH pre-terminated hardware is offered in two series: High-Density and Modular. The High-Density series features pre-terminated, one unit (1U) height LC and SC shelves with twice the density of traditional shelves. The pull-out shelf enhances fiber patch cord installation and moves.

The Modular series features interchangeable 12-fiber (LC, SC, ST), 24-fiber LC, and MPO-only modules in two distinct mounting arrangements, 1U and 4U designs, which provide design and service flexibility.
InstaPATCH pre-terminated trunk cables are offered in customer-specified lengths with LazrSPEED 150 or LazrSPEED 300 fiber in a 12-fiber or 2x12-fiber ribbon cable construction.
12-, 24-, and 72-fiber cables are also available in a round cable construction with pre-terminated 12-fiber ribbon ends. These new fiber counts improve the speed of installation of the InstaPATCH System by providing more fibers per pull. These new constructions also match well to the fiber counts available in the high-density shelves and modular panels. There is also a “pulling eye” option to all InstaPATCH trunk cables to improve the installation process even more. LazrSPEED 550 patch cords complete the optical network installation.
SYSTIMAX Labs engineers conceived the InstaPATCH System specifically with long-term network reliability in mind. Benefits for data center designers were considered by incorporating ease of installation for today while providing a simple cost effective migration path for higher bandwidth in the future. Current deployment involves serial array connectivity utilizing trunk cables with multi-duplex fan-outs that maintain polarity between send and receive signals via keyed mated connections. However, tomorrow’s mainstream application will move to full parallel and deliver increased bandwidth over multiple channels. The InstaPATCH System is engineered to anticipate this transition. There are no non-standard components and the system is designed with an odd number of components to ensure correct polarity every time. To move from serial to full parallel, it is a simple thing to remove the duplex modules, insert the MPO-only modules and attach additional trunk cables to the network equipment. The InstaPATCH System currently supports many serial and parallel applications that are covered in comprehensive guidelines provided by SYSTIMAX Labs.

The SYSTIMAX InstaPATCH Modular Fiber System featuring LazrSPEED multimode fiber technology more than meets the optical requirements of today’s evolving data centers. Other key requirements this technology fulfills include high density and reliability, high performance, high quality in an engineered system that offers a flexible design and ease of installation and use. It also allows for a simple migration to parallel channels delivering increased bandwidth.

Data center designers and managers are facing several challenges in maintaining critical operations while implementing strategies for evolving to a more efficient converged platform of resources. Global infrastructure standards are now addressing the need for a uniform topology that will benefit the IT staff. SYSTIMAX Solutions has a comprehensive portfolio of advanced cabling solutions that allow IT departments the freedom and flexibility to deploy dynamic designs for their physical layer infrastructures to meet unique data center requirements.