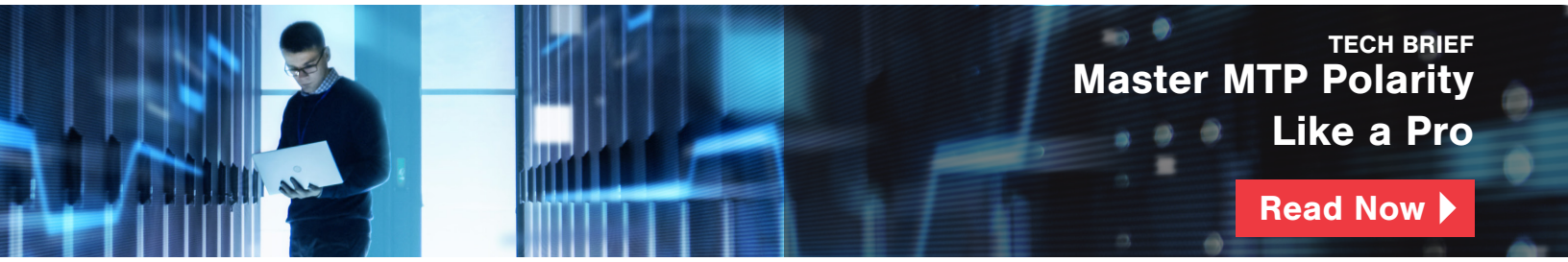
SIEMON™



Data Center eBook

Pro Tips and Best Practices: Physical Layer Strategies for Cloud/Managed Service Providers

In order to meet their clients' demands, successful Cloud Service Providers (CSPs) and Managed Service Providers (MSPs) need to be out in front of everything in their managed data center spaces – ensuring uptime, bandwidth, and operational/cost efficiency today, with the flexibility and scalability to adapt and expand on the fly. Physical infrastructure is the foundation on which those services are built, and choosing the right product solutions, topologies, and partners is a critical decision.

TECH BRIEF

New Norm Means New Opportunities for MSPs

With new digital applications and ever-increasing data and storage needs, millions of small-to-medium businesses increasingly entrust their IT to MSPs. In fact, prior to the global coronavirus pandemic, the global managed service provider (MSP) market was going strong at a compound annual growth rate of about 12.5%.

Like most businesses, MSPs too have been impacted by the pandemic, especially those focused on customers in the hospitality industry. It certainly doesn't appear that companies will be going back to business as usual any time soon (if at all), and as an MSP, you can't either. Fortunately, the "new norm" also means new opportunities and continued market growth for your essential services-as long as you have the right foundation.

Your Services are More Essential Than Ever

Whether you're focused on a specific technology or vertical market, or you provide a broad offering of IT services to a variety of business types, you likely experienced a wider range of requests from your customers as they scrambled to support work-from-home initiatives at the onset of the COVID-19 pandemic. With hundreds of remote employees spread out working from home, businesses suddenly had to deal with outdated home equipment, laptop shortages, hundreds of networks, and a greater need to protect data and maintain business continuity and application integrity. Remote working, furloughs and shelter-at-home orders due to the pandemic have also driven a global increase in data traffic with ecommerce sales at an all-time high.

While many may have turned to MSP services to achieve sufficient work-from-home functionality, businesses are now grasping the reality that this virus isn't going away anytime soon and just "functioning" is no longer enough. Many are therefore looking to reinvent the way they do business and fast-tracking the shift to a 100% digital approach, both internally and externally. With all these initiatives comes an increased demand for bandwidth, connectivity, VPNs/server refreshes, cybersecurity and cloud-based backup, collaboration, education and other business continuity tools.

Whilst the benefits of using managed services-streamlined IT processes, disaster recovery, improved network reliability, buying power, access to new technology, etc.-may have once seemed like a luxury for some businesses, more are now turning to MSPs to handle new-norm IT issues and digital transformation. In fact, 67% of companies say they are now more likely to explore MSPs to help ramp up their mobile workforce and remote IT capabilities. Make no mistake that this is an ideal opportunity to grow.

But Are You Up to the Challenge?

Of course, providing managed services to help customers survive and thrive in the new norm doesn't come without challenges-and MSPs need to remain strategic to remain profitable. If you haven't already, now is a good time to diversify your customer base to include markets that are experiencing growth during the pandemic (e.g., healthcare, biotech, food retail and delivery).

Also increasing your range of services to support demand for secure high-bandwidth connectivity and new work-from-home initiatives can better position you for growth in the new-norm economy. Businesses around the world are seeking hosted collaboration and VoIP solutions, virtual desktops, replication and remote access services, equipment upgrades and enhanced cybersecurity. And as 5G continues to roll out, both the public and private sectors will also be looking to leverage these faster cellular networks to support new and enhanced product offerings that help them thrive in a digital world (think virtual events, remote learning, online gaming, telemedicine, artificial intelligence, augmented reality). As an MSP, you need to be ready to help customers deploy these new technologies.

Whilst the importance of MSPs has never been clearer, it takes the right foundation to achieve continued growth and success during these challenging times. As an MSP, you need the ability to quickly and efficiently expand services without worrying that your network infrastructure can't perform and scale without risk.

High-bandwidth network availability is more critical than ever, and your infrastructure must deliver maximum performance, reliability, flexibility and manageability. Through a combination of high-performance network and data center solutions and renowned technical services, logistics and global network of technology partners, Siemon supports MSPs like you to deliver worry-free, on-time and cost-effective infrastructure that allows you shift your focus away from the day-to-day and concentrate on growing your business.

Next: Point-to-Point: High Speed Interconnects in the Data Center >

TECH BRIEF

Point-to-Point: High Speed Interconnects in the Data Center

Today's data centers contain three types of High Speed Interconnects; Direct Attach Copper Cables (DAC), Active Optical Cables (AOC) and transceiver/fiber cable assemblies, which connects active equipment within the racks. All contain strengths and weaknesses that significantly impact the overall goals of a new deployment or build out of an existing data center.

As the demand for access to information continues to grow and increase in speed, so does the importance of network engineers' understanding of the proper application of these High Speed Interconnects within their architecture designs. Opportunities are commonly overlooked that could provide significant lower initial and long term cost reductions such as; future-proofing, reduced install times, intuitive use of colored jackets and even reduced cooling costs.

Working with cabling specialists can create savings far beyond than just a lower cost per meter. An experienced application engineer offering quality cabling products can easily walk you through the selection process and reduce the risk of downstream issues.

Connections

Larger data centers including hyperscale, cloud and colocation venues; as well as, enterprise data centers often rely on top-of-rack topologies, where one switch in each rack connects to servers within that rack.

Newer data center topologies are using very dense end-of-row switches for high speed connections to several rows of cabinets filled with compute. To make these connections, today's network architects rely on high speed interconnects (HSI), 'point-to-point' cables that directly connect two pieces of active network equipment; such as: switch-to-server, switch-to-storage or switch-to-switch applications.

This is because point-to-point cables are faster to deploy and provide the agility to meet rapidly expanded data needs. To ensure these integral components of the data center provide optimal performance, several key points should be considered during the selection process.

Breadth and Depth

When choosing a point-to-point cable manufacturer, an important aspect to consider is the breadth and depth of their product line.

Typically, there are two types of point-to-point cable deployed on a regular basis:

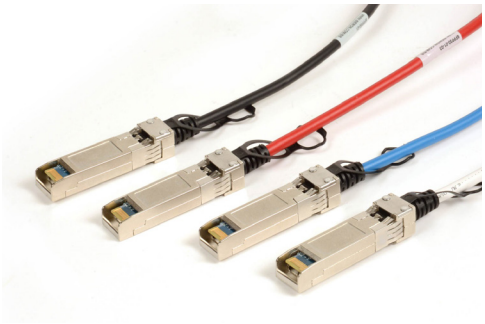
- Direct Attach Cable (DAC)
- Active Optical Cable (AOC)

DACs are the most cost-effective solution and provide the broadest range of lengths and jacket colors. AOC's on the other hand are complete fiber assemblies offered in lengths of up to 100 meters. AOC's are generally priced higher than DACs but less expensive than transceivers, which require a passive fiber jumper cable with a transceiver on each end.

Availability of different speeds from 10G to 100G will ensure that facilities are sufficiently supported when updating network equipment. In addition, a variety of available cable lengths, breakout options and a range of jacket colors can play an important role in choosing the right cable manufacture for your network needs.

It is recommended to tailor lengths to the nearest half meter to allow for better cable management for unobstructed airflow and efficient cooling. Further, maintaining different colors makes it easier to identify, which cables are connected to the network after the systems are deployed. This is because the cables look similar for next gen cables 10G/40G to 25G/100G.

Performance



Contrary to popular belief, short reach copper cables offer the lowest latency and highest performance. This is because passive copper cables pass through the data with no latency delays created when converting electrical signals to optical signals and back to electrical signals again. In addition, short reach copper cables do not require FEC.

Forward Error Correction (FEC) is used in high speed connections to detect and correct errors. A DAC's gauge (AWG) can help in overcoming the need for FEC. Also, since passive copper cables do not have any active chips there is less heat in the overall system. However, you can't completely overcome FEC. For example, passive copper cables have a limitation in lengths. In longer reach connections FEC is required in both copper and AOC applications.

Keep in mind not all copper cables are created equally. It is important to work with a consistent proven high quality OEM partner. All Siemon cables are designed for optimal performance and have proven quality in volume. In addition, Siemon does 100% factory testing on all cables.

Active Equipment Manufacturers Bundle Play

High speed connections are often offered by network equipment manufacturers. This is because network engineers are concerned about 'compatibility' as many equipment manufacturers have unique EEPROM's for their products. OEM specific EEPROM's send warning messages if a third-party cable is connected. Although these manufacturers do not advertise this, the warning message only alerts the user that a cable from a different manufacturer is in use – it does not mean performance is affected. With this in mind, the recommendation is for customers to partner with cable manufacturers whose cords are fully compatible with the active equipment gear.

For example, cables labeled as "Cisco compatible" will fully function with Cisco equipment without triggering warning messages. In reality, OEM specific EEPROM's are unnecessary as all reputable manufacturers of high-speed interconnects and transceivers meet the standards that IEEE and SFF have established for high speed.

Let's Connect

When reviewing manufacturers for high-speed interconnects, customers need to take all factors into consideration, not just the initial cost. Considering factors such as equipment compatibility, the range of products offered, proven performance and quality are important aspects that should not be taken lightly.

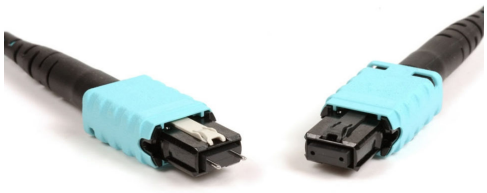
Siemon is a trusted supplier partner to many tier 1 end users in mission critical applications like finance and healthcare. Siemon is committed to supporting data centers with high speed interconnects and works hard to fine tune the high-speed roadmap that includes next gen cables like 400G and beyond.

Next: Master MTP Polarity Like a Pro >

TECH BRIEF

Master MTP Polarity Like a Pro

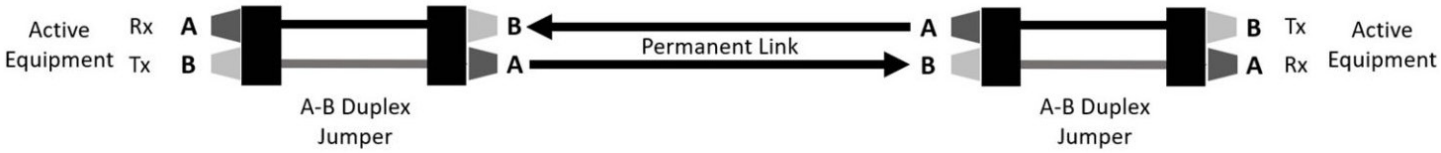
Multi-fiber push-on (MPO) connectors like the superior MTP with either 8 or 12 fibers are commonly used in the data center to either connect fiber panels in duplex applications or in end-to-end parallel optic applications like 40, 100, 200 and 400 Gbps that transmit and receive using 8 fibers (4 transmitting and 4 receiving at 25, 50 or 100 Gb/s). Regardless of the application, there is one thing that most data center designers and operators can agree on—MTP gender and polarity can be confusing.



When it comes to gender, each MTP is either male with pins or female without pins to ensure proper alignment when mating two connectors. Since an MTP interface on active equipment is always male, what you plug into it must always be female. That's the easy part. Polarity on the other hand can be a bit more confusing.

What is Polarity?

Proper polarity is required to ensure that the transmit signal at one end of a channel matches the corresponding receiver at the other end. The concept is fairly easy to grasp by reviewing a duplex application as shown in the graphic—A-B polarity for duplex jumpers maintains a straight-through connection so that B (transmit) at one end always corresponds with A (receive) at the other.

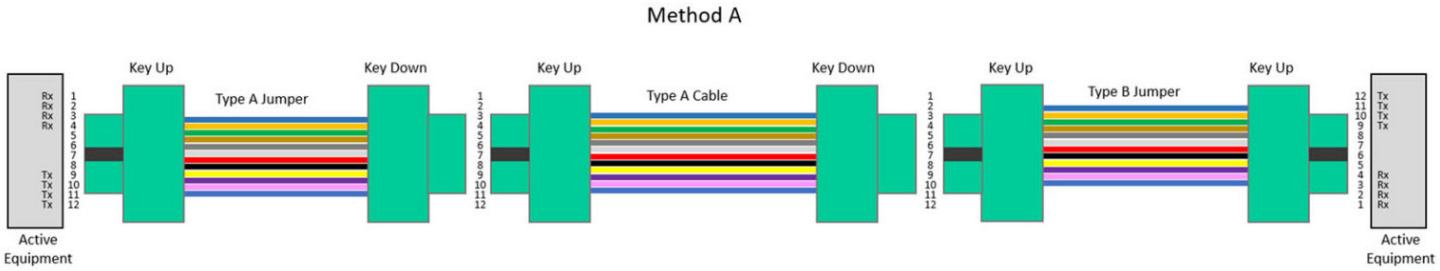


But polarity gets a bit tricky with MTPs where we now need to ensure that multiple fibers correspond correctly. All MPO connectors, including the MTP, features a key and an indicator (typically a white dot) to designate the location of the first fiber. The orientation of this key is essential to polarity. To add to the confusion, there are also three polarity methods available—Method A, Method B and Method C. Once you select a method, you need to stick with it throughout the channel.

Let's take a closer look.

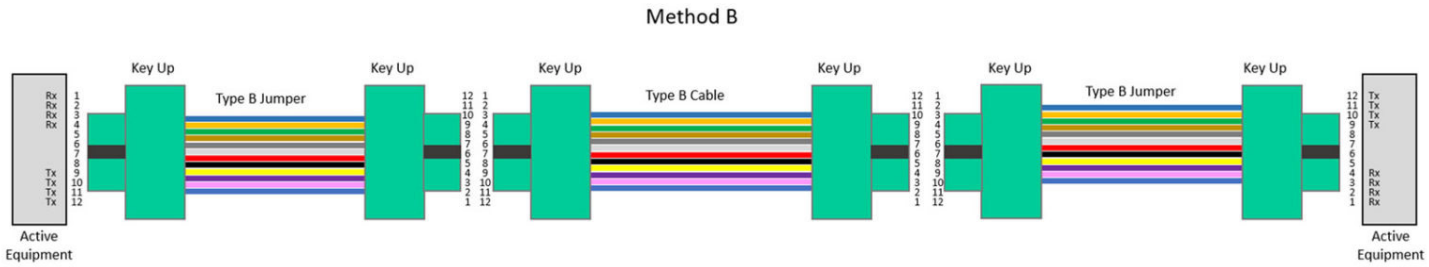
Method A

Method A uses Type A MTP trunk assemblies, which is a straight through connection where position 1 at one end of the assembly lines up with position 1 at the other end, and position 12 lines up with position 12, and so on. To accomplish this, one end of the assembly has the MTP in a key up position and the other has the MTP in a key down position.



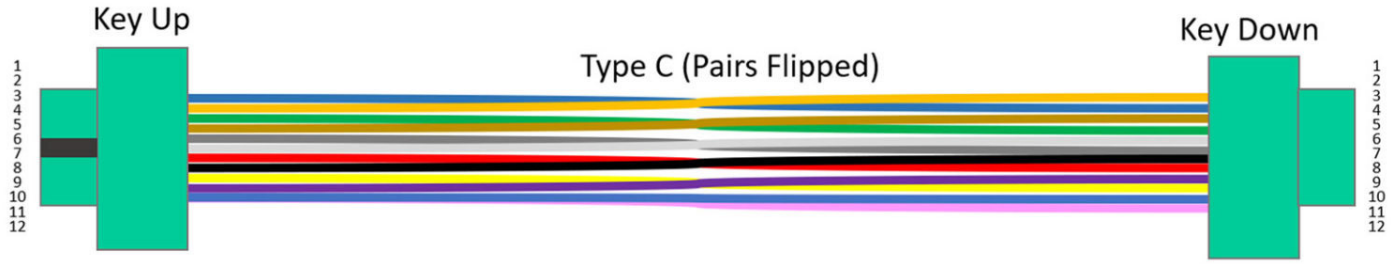
Method B

Method B uses Type B trunk cables (key up/key up) and Type B jumpers on both ends to make the corresponding transmit-receive connection throughout the channel. Because Method B uses the same type of components throughout, including both jumpers at either end, this is the most recommended method and the least likely to cause problems when used throughout the data center—if you don't have any Type A components on hand, you don't risk plugging them into your Method B channel.



Method C

Method C is not recommended for parallel optic applications because Type C assemblies are cross-over assemblies that essentially flip the pairs within the cable so that position 1 arrives at position 2, position 2 arrives at position 1, and 3 to 4, 4 to 3, 5 to 6, 6 to 5, and so on. While this works well for duplex applications using Type A-B jumpers on both ends, it's still not recommended since some day you may need to migrate from duplex to parallel.



When Things Go Wrong

Most issues surrounding polarity and gender happen on the jumper end of the channel in data centers that have mixed A and B polarity methods, where someone miscalculated or ordered the wrong polarity jumper for the channel. Gender issues are less common but can happen anytime the gender doesn't allow you to connect to the active equipment (remember that active equipment is always male) or make the male-female connection at adapters. And when this happens, you're often stuck reordering and having to deal with additional expense, downtime or project delays.

While it's better to order the correct polarity and gender up front, and Siemon's technical services team can help you figure that out, there is another solution—the MTP Pro connector. Now available on all Siemon's Base 8 and Base 12 MTP trunk assemblies and hybrid MTP-to-LC assemblies, the MTP Pro offers the ability to change polarity and gender in the field using an innovative hand-held activation tool and pin exchangers.

So, if you mistakenly ordered only Type A jumpers for your Method A polarity when you need a Type B on one end, you can change the key up/key down Type A jumper to a key up/key up Type B and call it day. And if your jumper has a male connector on both ends and you need a female to connect your equipment, you can change that too. It should however be noted that the MTP Pro does not work to change polarity on cross-over Type C assemblies or on singlemode due to the angled endface of the fibers, but it does work for changing gender.

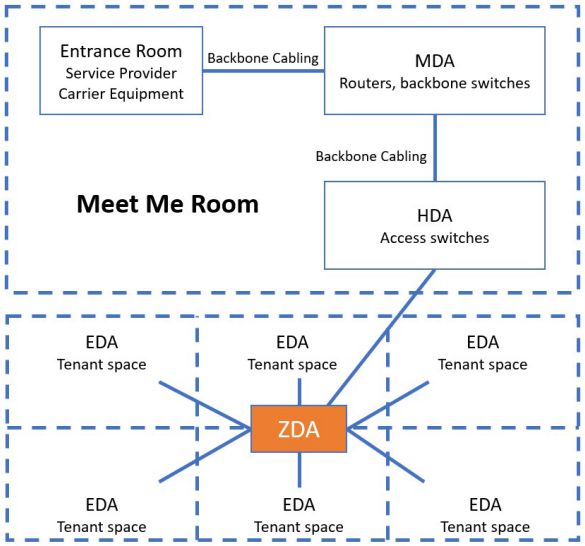
Learn more about Siemon's Base 8 and Base 12 plug-and-play fiber deployments with the MTP Pro option on all our MTP assemblies.

Next: Zone Cabling in the Colocation Data Center >

TECH BRIEF

Zone Cabling in the Colocation Data Center
for Rapid Deployments and Improved SLAs

Whether leasing space by the rack unit, cabinet, or cage, as a colocation facility, you need to provide the infrastructure for your tenants' equipment, including power, cooling, physical security and high-bandwidth connections to access providers (ISPs, LECs, etc.). Let's face it – deploying high-bandwidth cabling from the meet-me room (MMR) to the tenant space takes time, space and cost. Thankfully there is a design strategy colos can deploy that helps eliminate these challenges, delivering benefits for both the business and tenants alike.



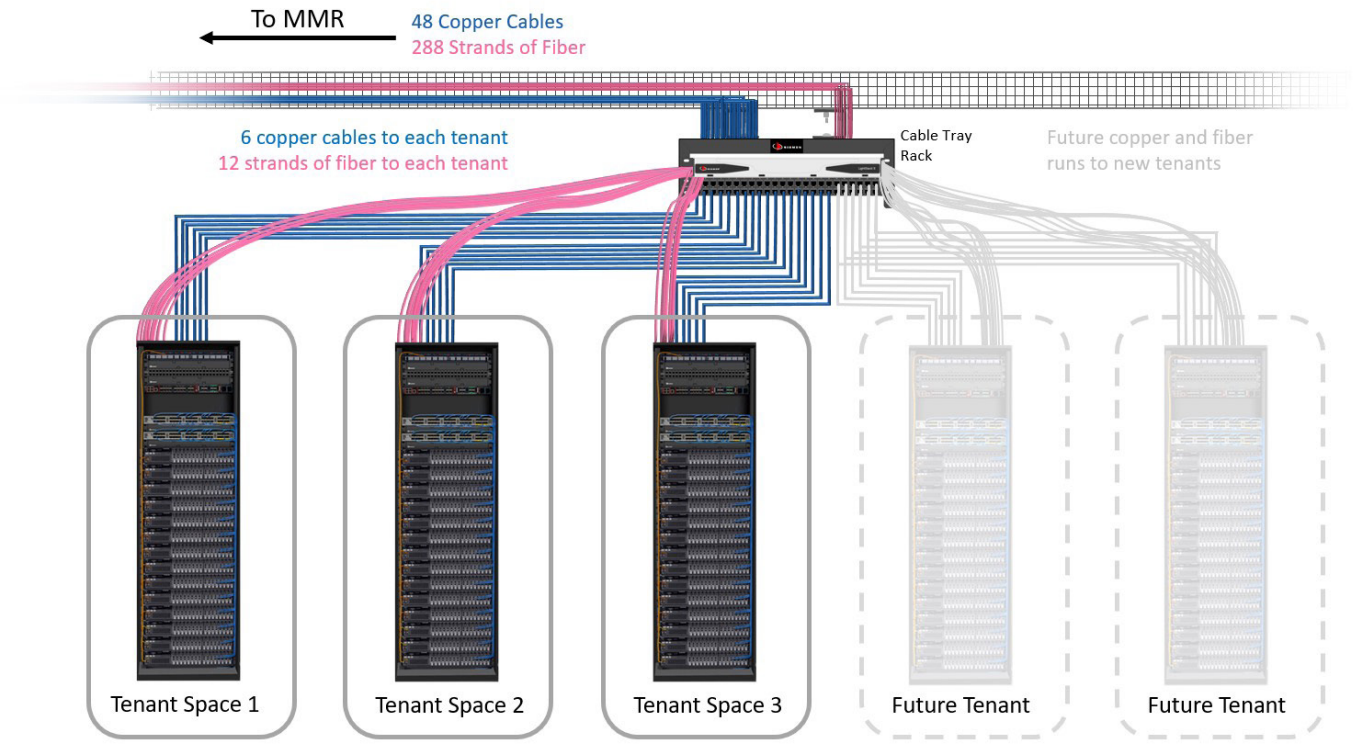
As referenced by industry standards like ANSI/TIA-942-A and ISO/IEC 24764, a typical enterprise data center includes functional areas, including the main distribution area (MDA), horizontal distribution area (HDA) and equipment distribution area (EDA). Colocation data centers are no different – the MMR houses the MDA or HDA, and each tenant space could be considered an EDA. While uncommon in enterprise data centers, optional zone distribution areas (ZDAs) between the MMR and tenant spaces can help colos speed deployment, save space and accommodate growth.

- ZDAs can be located to serve a specific area or number of tenants
- ZDAs can be fully cabled with permanent links from the MMR
- Short links from the ZDA deliver services to tenant spaces
- Spare ports within the ZDA are allocated for future tenants

An ideal Zone Solution

Part of WheelHouse® Advanced Data Center Solutions, Siemon's Cable Tray Rack is the ideal solution for housing ZDAs in a colocation data center. Designed to mount directly to overhead ladder rack or cable tray, the Cable Tray Rack can be mounted above tenant spaces and utilized to house fiber and/or copper patch panels for interconnection from the MMR.

- Robust 12-gauge steel construction with a 60 lb. load rating
- Provides 2U, 4U or 6U of 19-inch rack mount space
- Flexible mounting below, flush or above cable tray
- High-capacity ¼-turn twist lock cable managers
- Ideal for use with pre-terminated copper and fiber to further speed deployment



In the example above, Siemon's Cable Tray Rack houses a 48-port copper patch panel and a 1U high-density fiber enclosure, which are fully cabled from the MMR via 48 copper cables and 288 strands. From the Cable Tray Rack, short strands of copper and fiber deliver services to each of the tenant spaces, and spare ports are allocated for future tenant spaces. Delivering new services requires only short links from the Cable Tray Rack in the ZDA for fast, easier deployment. Tenant connections can also be easily reconfigured at the Cable Tray Rack.

"As a growing colocation, every time we acquired a new tenant, we had to pull cable from the meet-me room to the tenant space for access to the local exchange. Not only was it labor-intensive, but it was always a rush to get it done – the faster we could bring a new tenant on line, the faster we grew revenue.

We were skeptical about consolidating cabling at zone distribution areas due to additional components and potential performance issues associated with another connection point. Siemon's low-loss preterminated fiber solutions solved the performance concerns, and once we realized how quickly and easy it was to deploy short links from the Cable Tray Rack to bring a new tenant online, we were sold. We now use this solution throughout our colocation facility, strategically placing the Cable Tray Racks to serve groups of tenant spaces. The time required to bring a new tenant on line has been virtually cut in half!"

- Colcation Data Center Owner

WheelHouse™
Advanced Data Center Solutions

Next: Managed Service Provider Data Center Solutions >

APPLICATION GUIDE

Managed Service Provider Data Center Solutions

Optimizing Digital Business Infrastructure

Managed service providers (MSPs) should not have to worry about their digital business living or dying by the quality of their data center infrastructure. Their focus should be on meeting the high expectations of clients by being both fast and adaptable. Furthermore, successful MSPs should be able to concentrate on a specific vertical like healthcare or finance, incorporating cloud services or helping existing clients leverage new technologies. Today's MSPs and their technology partners need the ability to expand services, platforms, and capabilities quickly and efficiently - without unexpected infrastructure limitations, cost and reliability issues

Siemon's WheelHouse™ Advanced Data Center Solutions are specifically designed to support cost-effective, rapid deployment and scalability, while ensuring the performance, reliability and future proofing that lets today's MSPs concentrate their efforts on delivering advanced applications and services to grow their business.

WheelHouse™

Advanced Data Center Solutions

Infrastructure You Can Trust

MSPs undertake a wide range of IaaS and SaaS service levels, from pure-play network management and backup/disaster recovery, to data security, analytics and complete 24/7 out-sourcing. Data center infrastructures must have the flexibility and agility to cater to the exclusive and ever-changing needs of many different clients, while providing top-level service with near 100% uptime. To ensure those results, it takes an infrastructure built on Siemon's breadth of best-in-class, easy-to-deploy solutions that support the latest applications and those yet to come.

The Siemon Advantage

Superior Performance and Reliability

Improves uptime, reduces latency and ensures bandwidth for emerging technologies and hyperconverged virtualized environments

Rapid Deployment and Scalability

Enables bringing new services on line as quickly as possible for achieving maximum revenue and meeting client expectations and SLAs

Operational Efficiency and Sustainability

Avoids deficiencies and reduces complexity and inconsistent service quality through robust future proofing, quality solutions and value-added support

Reduced Risk and Cost Control

Prevents unexpected day 2 costs and manages and protects critical data center assets with real-time visibility, security and ease of moves, adds and changes

Value You Can Leverage

Reducing Risk & Preventing Unexpected Cost

- Intelligent Infrastructure Management
- Advanced Cable Management
- Easy-access, High-density Fiber Solutions

Achieving Operational Efficiency & Lower OpEX

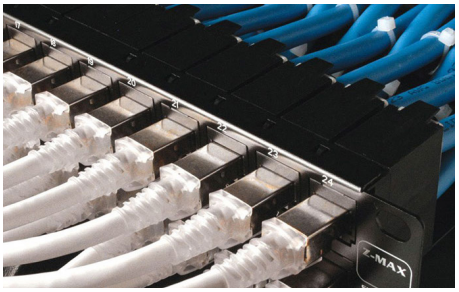
- One-stop Shop to Minimize Vendor Setup
- Local Distribution & Logistics Support
- Global Network of Technology Partners

Ensuring Low Latency, Performance & Reliability

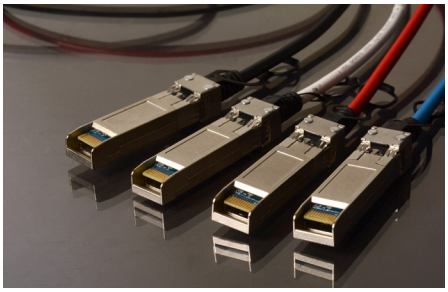
- High-performance, Low-loss Fiber Solutions
- Active Optical Interconnects
- Low Latency SFP and QSFP Copper Interconnects

Rapid Deployment, Scalability & Future Proofing

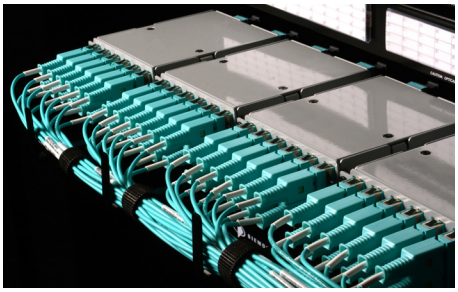
- Plug & Play Multimode and Singlemode Fiber
- Preconfigured Custom Solutions
- Data Center Design Services



Category 6A Shielded System



SFP+ High Speed Interconnects



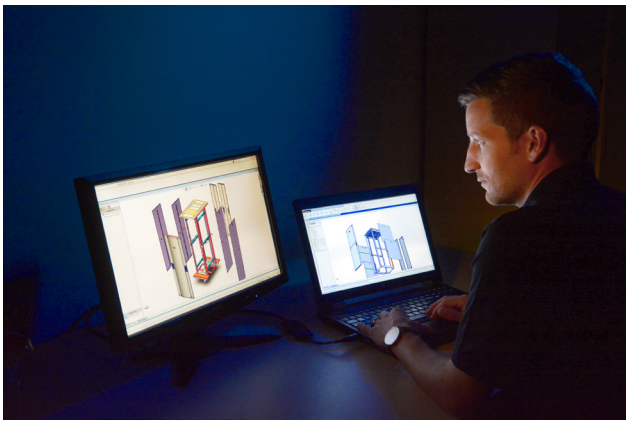
Base 8 Plug and Play

Siemon Solutions

- Full range of fiber, high speed interconnects and copper systems to support 10 to 400 Gigabit applications and beyond
- Standards-exceeding performance margins, strict quality control and innovative designs for reliable low-latency transmission
- Installer-friendly and scalable connectivity solutions with superior density, port access and cable management to ease expansion
- Intelligent infrastructure solutions with real-time tracking and reporting for improved security, asset management and compliance

Infrastructure You Can Trust

- Siemon's renowned technical service, logistics and global network of technology partners together deliver the worry-free infrastructure that best meets the MSP model and budget, while ensuring on-time project deliverables and value, from design through implementation and delivery.
- Value-added Data Center Design Services for expert support, infrastructure design, custom product development and preconfigured solutions
- Global network of Siemon Certified Installers, integrators and colocation providers to deliver consistent, reliable infrastructure
- Excellent supply chain leveraging global manufacturing and distribution to ensure local, economical on-time material delivery and future moves, adds and changes support
- Esteemed company values and industry leadership with a global customer base of public and private organizations, including many Fortune 500 companies



Online Interactive Guide for Today's Data Center Challenges

The Wheelhouse™ Interactive Data Center Guide takes you through a data center space where you can zoom in and learn about the common challenges associated with that space and how to solve them.

Discover how to deploy and scale data centers to optimize performance, reliability and operating costs.

View the guide here.

WheelHouse™

Advanced Data Center Solutions

Contact us now to learn more about how Siemon's WheelHouse Advanced Data Center Solutions can help you succeed in the diverse and growing MSP market.

Backed by Industry Leadership

Established in 1903, the Siemon brand stands for technology leadership, world-class quality, innovative services and solutions, and environmental stewardship. The world's leading organizations specify Siemon.

- Leading participation in industry standards and dedication to understanding and supporting the needs of the market
- Significant investment in R&D with more than 400 patents
- ISO 9001 and ISO 14001 certified vertically integrated manufacturing and automation
- Greenest physical layer manufacturer—global 179% carbon negativity and zero-landfill status

A Strong Partner Network

Siemon's WheelHouse Advanced Data Center Solutions include a partner ecosystem that brings together superior infrastructure products and value-added services with a variety of data center technology partners to deliver total turn-key solutions to today's MSPs.

- Global network of installers and integrators with data center deployment expertise
- Partnerships with complementary manufacturers of data center solutions, from active equipment and storage solutions, to cooling and security
- Solutions provider with leading retail and wholesale colocation businesses

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