



Data Center Solutions

**Delivering Solutions to
Maximize Data Center
Efficiencies**






Featured Brand



Belden – Meeting the Critical Needs of the Data Center

Belden solutions meet the primary challenges of today's Data Center:

-  Cooling
-  Power
-  Density

You are faced today with three major efficiency issues within the Data Center: the need to efficiently cool the IT load, manage the use of power, and optimize use of available space. The end goal is to increase your density of bandwidth, by maximizing your processing capacity while minimizing your Data Center's footprint, and reduce operational costs.

The challenge is that these efficiencies tend to work against each other. For example, as you increase your IT load with high-density active equipment, you also increase the system's power and cooling requirements – and your energy costs. Because these three issues are directly interrelated, complications can arise from each system being manufactured, installed and supported by different vendors. *You need a systems approach.*

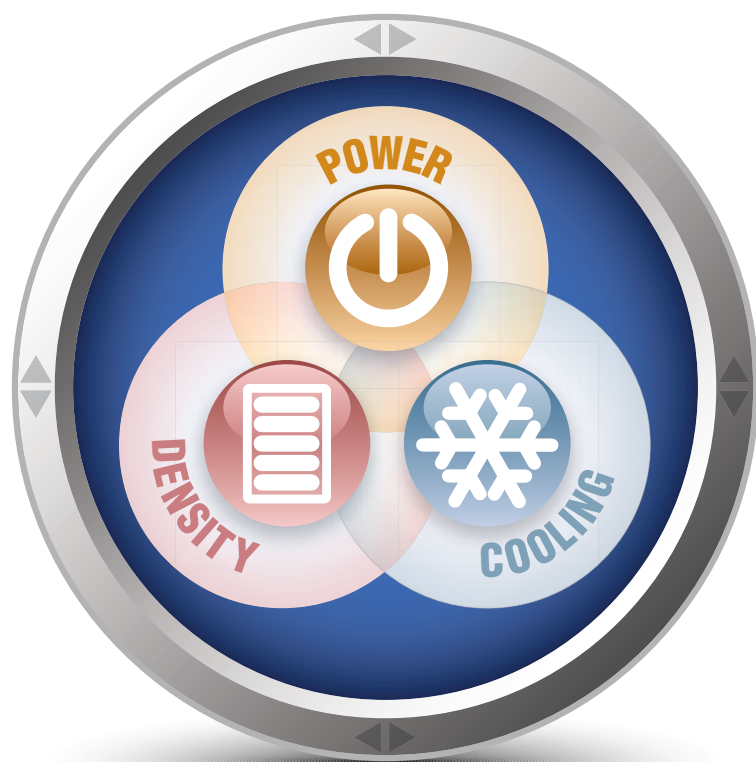
Belden can help you maximize these cooling-power-density opportunities because Belden has expertise in all three areas – delivering the solutions you need to build a highly efficient, optimally performing Data Center.

Belden solutions effectively deal with the cooling, power and density paradox at the rack/enclosure level:

- with air flow, power distribution, and power and climate monitoring devices that effectively help you contend with high-density computing environments and,
- with high-density racks, enclosures, cabling system components and cable management solutions that help offset the cooling-power dilemma.

As your Data Center Partner, Belden offers the consultative assistance you need – and the products you require – to create a properly balanced, optimized and efficient Data Center. Belden will:

- Review your Data Center in terms of performance and efficient operation.
- Create a balance between your power, cooling and density needs for optimum energy efficiencies and application/systems performance.
- Help you maximize the effectiveness of your cabling infrastructure to, in turn, maximize the output of your IT investment.



Belden understands the interplay between the three major issues facing today's Data Center: cooling, power and density – and can help you implement the right blend of technologies to maximize the efficiency of your Data Center in a manner that complements your system's performance requirements today and into the future.



Cooling, Power and Density



Cooling

The deployment of high-density IT equipment is pushing the average enclosure heat load into the 10-15Kw range, forcing a re-thinking of the hot aisle/cold aisle concept. Poor separation between the supply (cold) and return (hot) air has caused many Data Centers to be oversupplied with more than twice the amount of cold air than is necessary. Yet despite being vastly oversupplied, most Data Centers still experience "hot spot" issues. Cold air bypass and hot air recirculation — initiated by the lack of separation — are the cause.

Belden's Solution for Maximizing Cooling Efficiency

Belden Adaptive Enclosure Heat Containment (AEHC) Airflow Management System

- Eliminates hot spots throughout the Data Center by providing a high level of separation between supply and return air.
- Allows for 100 percent utilization of the existing cooling infrastructure, eliminating the oversupply of cold air.
- Allows the lowering of the oversupply ratio from a typical 2.5 to 1.2 range, optimizing the use of available cooling to allow the deployment of more IT equipment within the same footprint.
- Pressure-based control system provides for real-time balancing of supply and return air.

Belden Remote Climate Monitoring Devices

- Ascertain any environmental hazards related to temperature, air flow, humidity, dew point, door position, air pollution, smoke alarms and moisture, sending alarm notifications to designated cell phones and email addresses.

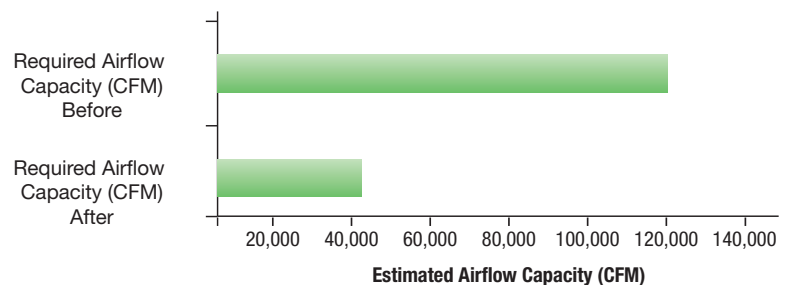


Use of Belden's AEHC Airflow Management System allows for 100% utilization of existing cooling capacity.

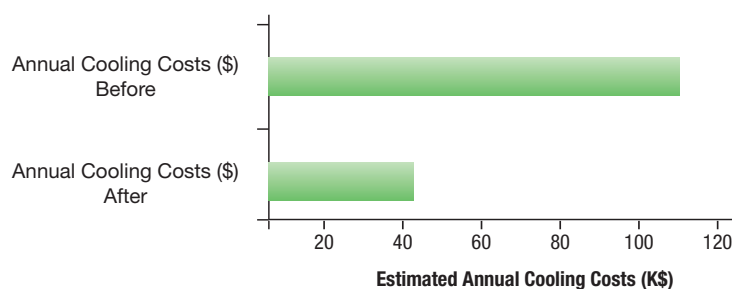


Effectively monitor the environment within your Data Center with Belden's Climate Monitoring Devices.

Estimated Savings in Airflow Capacity (CFM) by using AEHC



Estimated Savings in Annual Cooling Costs by using AEHC



Estimated savings and redeployable power amounts demonstrate parameters found in a typical Data Center. Talk to your Belden sales representative to discover the impact of Belden's cooling, power and density solutions within your Data Center.

Cooling, Power and Density (continued)

Belden is able to assess your cooling, power and density needs to help maximize your processing capacity.



Power

In the past, power usage has been applied to overhead as a necessary operating expense — like the cost of the space itself. But continually rising power costs have brought this issue to the forefront, and with good reason: EPA reports attribute approximately 2% of U.S. electricity consumption to enterprise Data Centers. On-going concerns for Data Center managers include power reliability, supply and capacity, as well as the effect the cooling system has on power efficiency. It is estimated that cooling accounts for up to 40 percent of a Data Center's total energy consumption.

A Power Usage Effectiveness (PUE) ratio is used by many organizations to assess Data Center energy performance. PUE is calculated as the total power supplied to the Data Center divided by the power consumed by the IT equipment. The target is to get this ratio to equal 1; typical Data Centers have a PUE of 2.5, best-in-class Data Centers have a PUE of 1.6.

A key step toward lowering energy cost is the ability to understand how power is allocated. Monitoring of the power draw at the cabinet level using power distribution units (PDUs) with a remote monitoring feature allows real-time assessment and the opportunity to quickly correct undesirable environmental changes.

Belden's Solutions to Promote Power Efficiency

Belden Adaptive Enclosure Heat Containment (AEHC) Airflow Management System

- Optimal air flow separation allows the supply air temperature to be raised, and for the more frequent use of air side economizers. This equates to a lower energy cost to run your Data Center and a better PUE.
- Provides up to a 50% reduction in electrical cooling costs.

Belden Power Distribution Units (PDUs)

- Basic PDUs offer simple, but highly reliable power distribution for equipment racks and other Data Center applications.
- Metered PDUs distribute power and provide real-time assessment of the current flow via a local display; allowing for the identification of current fluctuations and quick troubleshooting.
- Metered/Remote PDUs provide all the benefits of basic and metered PDU's, while also allowing remote monitoring of the current draw via an Ethernet IP connection. With these PDUs, alarms can be set to warn when conditions exceed pre-determined thresholds and facilitate the monitoring of a Data Center's power usage effectiveness (PUE).

Belden Remote Climate Monitoring Devices

- Ascertain changes in the static state, avoiding the potential power draw needed to correct variances in the Data Center's environment.

Vertical Mount PDU



Power Meter



Remote Current Monitoring





Cooling, Power and Density (continued)



Density

To increase processing capability in limited space, Data Centers are increasingly employing high-density IT equipment. Increased densities within the enclosure/racks, however, can lead to "hot spots," potential harm to valuable IT equipment, and an increased power draw if the right blend of density, power and cooling is not employed.

Belden's Solutions to Promote Density/Space Efficiency

High-density/Space-efficient Cabling Components

- Ultra High-density Copper Patch Panels feature unique connector technology to enable double the port density of a traditional patch panel – 48 ports in 1U rack space.
- AngleFlex™ Patch Panels utilize angled inserts that eliminate the need for horizontal cable management devices – a 27% space savings per rack.
- 10GX® Pre-terminated Cabling Systems feature the only Category 6A RJ45 Coupler in the market and small, flexible cable assemblies that require considerably less space in the cable pathways. Components provide an optimal plug-and-play deployment capability and are 100% reusable for an especially long product lifecycle.

Pre-terminated Cabling Systems offer the added benefit of an up to 90% reduction in labor cost with easy-installation components.

The 3600 Pre-Terminated System is available for Category 6 applications.

- 10GX and GigaBIX IDC Systems are high-performance, space-efficient, modular connection systems with the flexibility to accommodate large, wall- and rack-mounted cross connects and interconnect systems – saving up to 45% of the floor space.
- FiberExpress® Ultra Patch Panels provide ultra high-density and trouble-free installation and maintenance. They can accommodate up to 96 fibers in a 1U space, or be wall-mounted to maximize floor space-savings.
- FiberExpress Pre-terminated Cable Assemblies include high-density multi-fiber assemblies and MPO cables. Reliability is assured with factory termination and testing and the assemblies can be re-deployed for a longer lifecycle investment.

High-density/Space-efficient Cable Management Components

- High-density Modular Racking System provides unmatched density, allowing for optimal use of precious Data Center floor space (up to a 60% reduction in floor space requirements). Combining the High-density Racking System with Belden's Ultra High-density or AngleFlex Patch Panels, delivers a density of 864 Category 6A ports per rack, without compromising the ability for easy deployment and future moves, adds and changes. Other combinations of density and manageability are possible, including configurations up to 1152 ports in a single rack.
- Drawing from our cable and connectivity expertise, Belden Rack and Enclosure Systems allow for hosting of servers and switches while maintaining best-in-class cable management features.

Belden's in-house design and manufacturing allows for quick turnaround on custom designed Enclosures/Racks in various footprints that can be easily configured with a variety of doors, security access systems, side panels, mounting rails, top panels, fans, etc., including a complete line of accessories.



Belden —
Your Single-Source Infrastructure Solutions Provider

Belden provides fully integrated end-to-end infrastructure solutions to meet the special needs of the Data Center and beyond.

From the demarcation point in the entrance room, to the cross connect, to the equipment rack, and all the cabling in between, Belden solutions for the Data Center seamlessly integrate functional areas while maximizing efficiencies in cooling, power and density.

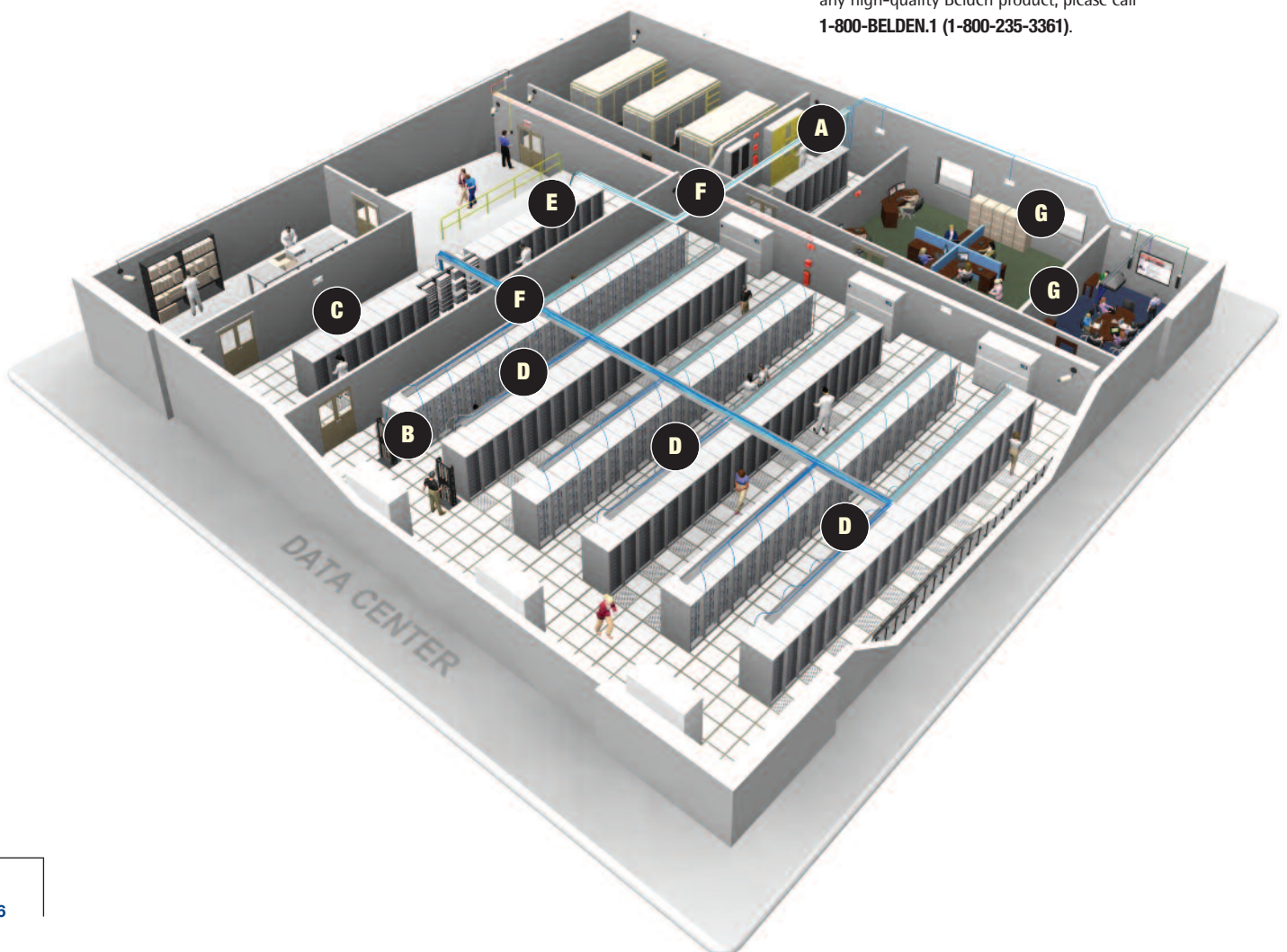
Belden is your single-source supplier for Data Center infrastructure solutions:

- Airflow Management Systems
- Power Distribution Units
- Climate/Power Monitoring Devices
- Copper & Fiber Cabling Systems
- Racks, Enclosures and Cable Management

But Belden doesn't stop there. Beyond the Data Center, Belden offers total copper, fiber and wireless networking solutions to deliver voice and data to the office, meeting space or cafeteria. Our high-definition video and speaker cables deliver the best picture and sound to the network operation centers. Belden's specialty cables for CCTV, access control, building automation and fire alarm systems ensure safety, security and comfort throughout any facility.

With thousands of products available, Belden meets all your signal transmission needs for the Data Center and beyond.

For more information on the exceptional Data Center solutions presented here, or on any high-quality Belden product, please call **1-800-BELDEN.1 (1-800-235-3361)**.



KEY

- = Cooling Products
- = Power Products
- = Density Products



A Entrance/Telecommunications Room (TR)

The entrance room of the Data Center is the location for access provider equipment, demarcation points and interface with other campus locations. The TIA-942 standard recommends locating the entrance room outside of the computer room for security purposes. Specific Belden products found in the entrance room include:

- FiberExpress Ultra Cassettes and Patch Cords
- FiberExpress Brilliance® Fiber Connectors
- 10GX and GigaBIX IDC Systems
- 735 and 734 Series Coax Cables
- High-density 2- and 4-post Racking Systems
- Enclosures
- Power Distribution Units (PDUs)

Connected to the Data Center MDA through backbone cabling, TRs are spaces for housing equipment, cable terminations and cross connects that serve office areas on specific floors. In addition to voice, data, and wireless systems, TRs can house equipment for life safety/fire systems, security, and building automation systems. Belden offers a variety of products to support all of these systems within the TR:

- Wireless LAN Switch
- 10GX Pre-term Coupler Patch Panels and Cable Assemblies
- 10GX Patch Panels and Modular Cords
- 3600 Pre-term Coupler Patch Panels and Cable Assemblies
- CAT 6+ Patch Panels and Modular Cords
- FiberExpress Ultra Pre-term System
- FiberExpress Ultra Panels and Patch Cords
- FiberExpress Brilliance Fiber Connectors
- Equipment Cable Harnesses
- High-density 2- and 4-post Racking Systems
- Enclosures
- Power Distribution Units (PDUs)

B Zone Distribution Area (ZDA)

The optional ZDA acts as a consolidation point within the horizontal cabling run between the HDA and Equipment Distribution Area. The ZDA allows frequent reconfiguration and provides additional flexibility. Belden products typically deployed in the ZDA include the following:

- 10GX Ultra High-density Patch Panels and Cords
- CAT 6+ Ultra High-density Patch Panels and Cords
- 10GX and GigaBIX IDC Systems

C Main Distribution Area (MDA) & Horizontal Distribution Area (HDA)

The MDA houses the main cross connect and the core routers and switches. The HDA houses cross-connects and active equipment (switches) for connecting to the equipment distribution area and storage area network (SAN). Per the TIA-942 standard, both the MDA and HDA require separate racks for fiber, UTP and coax cable. Several Belden products provide maximum performance, density and management in the MDA and HDA, including:

- 10GX Pre-term Coupler Patch Panels and Cable Assemblies
- 10GX Patch Panels and Modular Cords
- 3600 Pre-term Coupler Patch Panels and Cable Assemblies
- CAT 6+ Patch Panels and Modular Cords
- FiberExpress Ultra Pre-term System
- FiberExpress Ultra Panels and Patch Cords
- FiberExpress Brilliance Fiber Connectors
- Equipment Cable Harnesses
- High-density 2- and 4-post Racking Systems
- Switch enclosures
- Side-to-side airflow managers
- Enclosure power distribution units with monitoring
- Climate monitoring solutions

D Equipment Distribution Area (EDA)

The EDA is where equipment enclosures and racks house the servers and where the horizontal cabling from the HDA is terminated at patch panels. In the EDA, racks and cabinets should be arranged in a hot aisle/cold aisle configuration along with airflow systems that maintain proper separation of supply (cold) and exhaust (hot) air. Belden offers a variety of products for the EDA, including our high-end freestanding enclosures that help provide optimal airflow and ease of management:

- 10GX Pre-term Coupler Patch Panels and Cable Assemblies
- 10GX Patch Panels and Modular Cords
- 3600 Pre-term Coupler Patch Panels and Cable Assemblies
- CAT 6+ Patch Panels and Modular Cords
- FiberExpress Ultra Pre-term System
- FiberExpress Ultra Panels and Patch Cords
- FiberExpress Ultra Cassettes and Patch Cords
- FiberExpress Brilliance Fiber Connectors
- Server Enclosures
- Airflow Management Systems
- Enclosure power distribution units with monitoring
- Climate monitoring solutions

E Storage Area Network (SAN)

The SAN houses all data storage devices such as disk arrays, tape libraries and high-capacity optical disk libraries for applications like video surveillance. The use of a separate SAN eliminates the need to store data directly on servers, which provides better network capacity. Access to stored data must be fast, requiring high-speed connections from the HDA. Belden products for the SAN include:

- FiberExpress Ultra Pre-term System
- FiberExpress MPO Cables
- FiberExpress Patch Cords
- High-density 2- and 4-post Racking Systems
- Enclosures
- Power Distribution Units (PDUs)
- Airflow Management Systems

F Backbone Cabling & Horizontal Cabling

The backbone cabling within the Data Center provides the critical connections between the entrance room, MDA and HDA. The backbone cabling in many of today's Data Centers supports 10 Gigabit transmission speeds for current and future applications. The horizontal cabling within the Data Center provides the connection between the HDA and EDA and SAN, including the optional ZDA. Belden products for the backbone and horizontal cabling include:

- 850 nm Laser-optimized 50/125µm multimode OM3 and OM4 FiberExpress Cables
- 10 Gigabit 4-pair UTP Belden 10GX Cables
- Belden IBDN Category 6 Cables
- FiberExpress MPO Cables

G Support Offices and Open Areas

Whether it's cubicles, conference rooms, hallways or cafeterias, there are many areas throughout a facility or campus where people conduct day-to-day activities. From wired and wireless voice and data systems to fire alarm and security surveillance, Belden offers a variety of products that deliver these systems to where it matters most.

- KeyConnect Workstation Outlets and MediaFlex Outlets
- Belden IBDN Cables
- Wireless Access Points
- Surveillance (CCTV) Camera Cables
- Door Access (Access Control) Cables
- 2-hour EVAC Systems Cables
- Wall-mount Racks and Enclosures

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