BELDEN
SENDING ALL THE RIGHT SIGNALS®

Capabilities Bulletin

Greening the Data Center

Belden is committed to the environmentally sound manufacturing of high-performance, innovative, end-to-end solutions that maximize space utilization, increase sustainability, and reduce environmental impact.

Belden Delivers Optimal Performance, Density and Manageability to the Green Data Center

- Reducing use of hazardous materials
- Improving energy efficiency
- Optimizing space savings
- Reducing material use and waste
- Providing longer lifecycle solutions

Through innovation and groundbreaking technologies, Belden has a tremendous history of delivering signal transmission solutions that provide the advanced performance and reliability business operating systems rely on. Belden's data center solutions seamlessly integrate the data center's functional areas and work together to maintain performance and uptime, while cost-effectively addressing the latest trends and challenges.

Belden has leveraged its industry expertise to provide products and systems that offer optimal and environmentally-sound solutions for today's data center — signal transmission solutions that are sure to meet or exceed all system requirements.

Belden's Total Enterprise Networks (TENs) solutions exceed some of the key challenges of data center environments, offering improved energy efficiency, optimized space savings, reduced material use or waste and longer product lifecycles.

The Belden TENs solutions portfolio is also vast, encompassing all potential data center applications. These products and systems include:

- Complete end-to-end high-performance copper and optical fiber cable and connectivity solutions
- Wireless solutions
- Enclosures, racks and cable management solutions
- Thermal and power management solutions
- Specialty systems including audio, video, security, life-safety and building automation and management

All Belden solutions are also backed by a solid reputation of reliability and an effective business model that eliminates risk and uncertainty in an ever-changing world. Through our decades of experience and superior technical support, we provide the expert service and advice customers rely on to deploy the right design and solution for their unique needs.

To meet global initiatives and reduce our impact on the environment, Belden eliminates, or appropriately reduces, the use of hazardous materials and implements efficient, environmentally-sound manufacturing processes and practices in all our facilities. At the same time, Belden designs and develops technologies, products and systems that enhance energy efficiency, support sustainability and minimize waste.

BELDEN

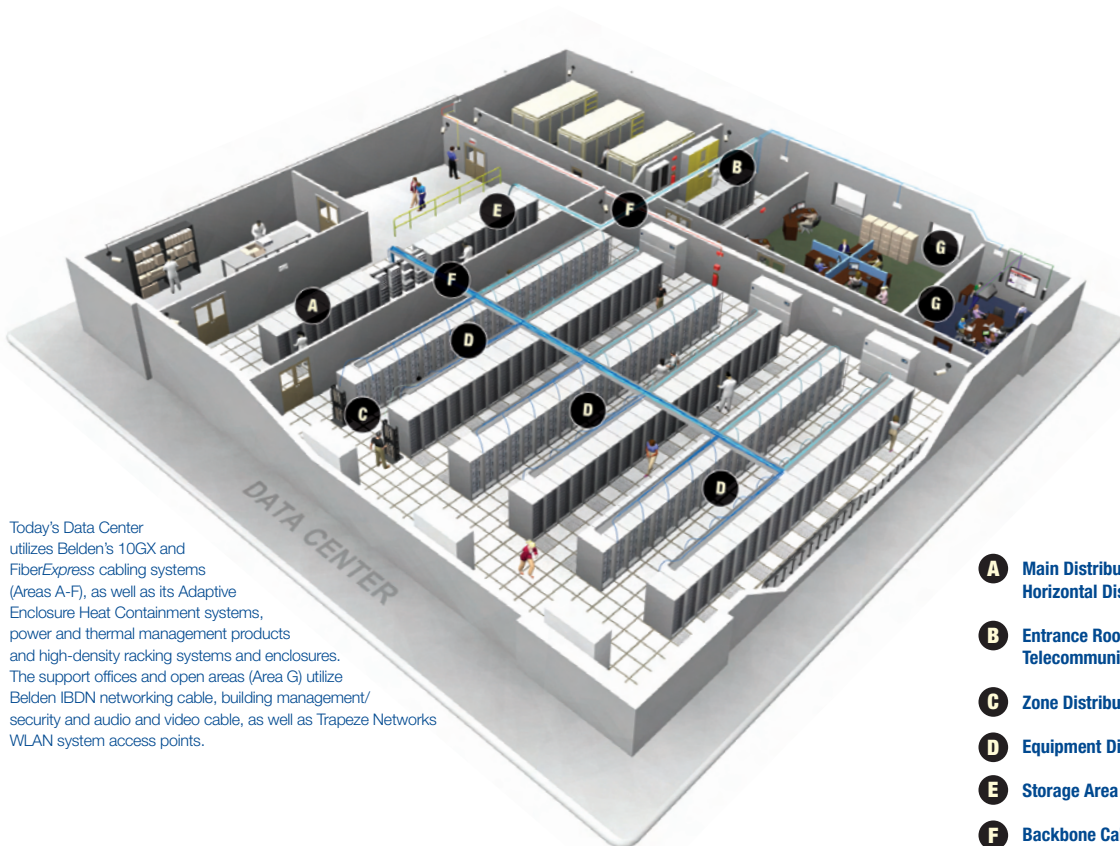## Belden Understands the Issues Confronting the Data Center

Belden has leveraged its expertise to provide products and systems that offer optimal and environmentally-sound solutions for today's data center.

As an industry leader, Belden understands the fundamental importance of the data center — its mission-critical applications, equipment and systems that support all business operations. We also understand that today's data centers are faced with a new challenge — reducing power consumption. Electricity needed to run and cool the increasing amount of more powerful data center equipment is at an all time high, causing high costs and a significant impact on the environment. Consequently, data center managers are finding themselves restricted by power, cooling and space limitations yet still needing to support increasing applications, transmission speeds, storage, uptime and scalability.

With a keen eye on today's data center challenges and the movement to build sustainable LEED-certified facilities, Belden has leveraged their expertise to design data center solutions that are unique in their ability to provide optimal performance, density and manageability while simultaneously enhancing energy-efficiency, reducing environmental impact, and minimizing total cost of ownership. Belden's beyond-standards performance and longer lifecycle solutions enable adding capacity, consolidation and convergence without sacrificing reliability or having to replace components. Belden high-density solutions cost effectively yield more space for reduced waste, as well as more efficient cooling and scalability. Belden's exclusive and innovative cabling management solutions improve airflow, power distribution and climate control, greatly improving energy efficiency.

Belden's commitment to "green" is evidenced by this sampling of optimal performance, high-density and highly sustainable products that serve to reduce the environmental impact.

Today's Data Center
utilizes Belden's 10GX and
FiberExpress cabling systems
(Areas A-F), as well as its Adaptive
Enclosure Heat Containment systems,
power and thermal management products
and high-density racking systems and enclosures.
The support offices and open areas (Area G) utilize
Belden IBDN networking cable, building management/
security and audio and video cable, as well as Trapeze Networks
WLAN system access points.

A   **Main Distribution Area (MDA) &
Horizontal Distribution Area (HDA)**

B   **Entrance Room/
Telecommunications Room (TR)**

C   **Zone Distribution Area (ZDA)**

D   **Equipment Distribution Area (EDA)**

E   **Storage Area Network (SAN)**

F   **Backbone Cabling &
Horizontal Cabling**

G   **Support Offices and Open Areas**

A sampling of Belden green products
and systems follows:

- **Adaptive Enclosure Heat Containment (AEHC) System** provides up to 30% energy savings and enables 100% utilization of existing cooling infrastructure by efficiently managing airflow and providing hot aisle/cold aisle containment.

- **High-density Racking System** provides 60% reduction in floor space requirements while enabling scalability and easy reconfigurations.

- **Power and Thermal Management products** save space, monitor and control temperature, and deliver efficient three-phase power distribution to the cabinet for better load balancing, increased airflow and reduced material usage.

- **IBDN® System 10GX®** performance and longer lifecycle reduces product obsolescence while its smaller cable diameter enables higher densities, or space savings, and improved airflow for energy efficiency.

- **IBDN 10GX and FiberExpress® Pre-Terminated Cabling Systems** significantly reduce installation labor and waste, provide up to 90% reduction in deployment time, offer higher density for space savings and ensure longer lifecycle due to performance and reusability.

- **IBDN AngleFlex™ Patch Panel** provides 27% space savings per rack while facilitating intuitive cable management and improved airflow.

- **IBDN 10GX IDC System** reduces required floor space, improves material usage due to cross-connect cable vs. patch cords.

- **FiberExpress Ultra Patch Panel System** maximizes space and scalability by supporting up to 96 fibers in a 1U space, the highest density available.

- **FiberExpress Brilliance Field-installable Connector** significantly reduces installation labor and waste.

In addition, the high performance and reliability attributes inherent in Belden products reduce early product obsolescence across all signal transmission systems and support, multiple systems converging onto a single IP-based system for better control, operating efficiency and reduced waste.

Belden's approach to product modularity from the patch panel to the workstation outlet also enables easy reconfigurations and upgrades while reducing waste, inventory and material usage.

Use of Belden's
Adaptive Enclosure Heat
Containment System
results in a 30-50%
reduction in cooling costs
by eliminating hot spots
within the enclosures
and the need to
oversupply cool air.

A Total Systems Approach

Belden's portfolio of data center solutions encompasses best-in-class products and systems, all perfectly "tuned" to operate together as a complete, end-to-end solution.

Following the principles of Belden's Total Enterprise Networks (TENs) solutions, all components, including the copper and optical fiber cabling systems, cable management, and power and thermal management solutions, work together across all functional areas to provide optimal performance, density and manageability. The result is increased reliability and peace of mind for data center owners and operators.

Taking Belden's total systems approach to greening the data center not only helps to ensure that environmental and energy-saving goals will be met, but also provides greater scalability and lower Total Cost of Ownership (TCO) over years of service.

Here are some key data center areas in which Belden products/systems can be deployed:

In the entrance room, Belden GigaBIX IDC System and wall-mount Fiber*Express* patch panels save floor space at demarcation points, and in zone distribution areas, 10GX and CAT6+ ultra high-density patch panels and distribution frames manage high-density connections in less space.

In the equipment distribution area, Belden high-density solutions save space while enclosure systems and power and thermal management work together to efficiently keep equipment cool and reduce power consumption. In the storage area network, Belden Fiber*Express* pre-terminated assemblies and management deliver high-speed transmission, capacity and density.

In cabling pathways, Belden 10GX smaller-diameter cables save space and improve airflow while high-performance copper and fiber data transmission reduces early product obsolescence and supports IP convergence and consolidation for improved efficiency and reduced waste.

- According to the EPA's Report to Congress on Server and Data Center Energy Efficiency, the energy use of data centers more than doubled between 2000 and 2006, and if current trends continue, the demand for power by data centers would require an additional 10 power plants on the North American power grid by 2011. With power and cooling infrastructure accounting for 50 percent of the total consumption, any improvement in airflow and cooling efficiencies will have a significant benefit.

- A recent study by Upside Technologies and the Uptime Institute concluded that in conventional legacy data centers, only 40% of the air delivered from precision air conditioning units makes its way to cool the existing IT equipment. This amounts to a tremendous waste in energy and excessive and unnecessary operational expense.

- According to Gartner Group, the main reason for waste in a conventional data center is caused by mixing of cold supply air with hot exhaust air, which increases the load on the cooling system and energy used to provide that cooling. Gartner says that implementing cold or hot aisle containment in the data center dramatically improves separation of cold supply air and hot exhaust air and will be, for most users, the single largest payback of any data center best practice.

For all of these reasons, Belden leads the way in the greening of the data center.