

Improving the user experience for data centers and networking applications

How to increase operational efficiency and reduce maintenance costs

Data centers and hyperscale networking facilities come in all shapes and sizes, but the largest can occupy hundreds of thousands, if not millions, of square feet of space. Inside, neatly organized rows of servers and other equipment provide a sense of structure and organization. But upon closer inspection, the vast network of cords, cables, ports and other inputs and outputs becomes extremely complex. Data centers may house servers and chassis from multiple manufacturers, and larger facilities may have hundreds of employees — from network specialists to maintenance crews and custodial personnel — coming through on a daily basis.

With so much activity and so many individual pieces of equipment on-site, it's important for equipment

manufacturers and data center operators to provide a visual and tactile user experience that differentiates hyperscale equipment. Easy-to-understand instruction labels, clear safety information, equipment branding and other interface solutions create a better user experience for data center personnel. This can lead to greater maintenance and production efficiency while reducing user errors, ultimately saving organizations time and money.

Boyd has helped many enterprise organizations develop custom solutions for [data centers](#) and [hyperscale networking facilities](#). To help manufacturers and operators control costs and increase operational efficiency, here are some key considerations to improve the user experience for enterprise networking applications.

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Labels

Labels are among the simplest and most cost-effective ways to improve the user experience for technicians and others operating in data center environments. Safety labels, input/output port labels, system information labels and [other types of labels](#) all convey important information at the location where it is needed most. In data center operations, this can help speed maintenance activities and reduce errant warranty claims while allowing personnel to be more efficient. Some types of labels to consider optimizing for networking facilities include:

System information labels – These labels instruct and inform users of critical safety and maintenance information and are often produced as large printed adhesive graphics.

Serialized and barcoded labels — QR codes, serialized labels, and 2D and standard barcodes are common features on many pieces of data center equipment. These types of labels help personnel quickly access critical information that can't fit on a standard label to increase operational efficiency.

Cable wrap labels — Wrap labels not only identify cables, cords and other wiring, but they also keep them more organized for easier maintenance and upkeep of complex systems.

Part markings and labels — These solutions identify products and convey important information such as brand name, part number and lot number. This can make re-ordering parts easier, as well as aid maintenance personnel in finding the right solution to a given challenge. Durable labels can be converted to fit in tight spots on servers or other equipment without being damaged by the heat emitted by those machines. Manufacturers and operators can also utilize ink or laser marking solutions for more permanent identification of parts.

Warranty management labels — Manufacturers of hyperscale equipment warrant devices with specific functionality and environmental conditions in mind.



However, system users often push the boundaries of how they use and expect products to perform. This isn't always in line with offered warranty programs. Boyd offers tamper evident labels and moisture indicators to help manage and defend warranty claim compliance, ultimately reducing allowable warranty claims and charges.

Regardless of the type of label required, advanced converting capabilities are needed to ensure customized label solutions are compatible with preexisting devices and equipment. Boyd can convert nearly any decorative or informational label into a multifunctional solution by printing onto one of many 3M materials with special properties such as [EMI shielding](#), [electrical insulation](#) and [thermal management](#). Labels can be delivered in roll or sheet format to improve manufacturing and application efficiency. We offer an extensive array of printing and finishing capabilities, including custom inks and specialized textures, to create a cohesive user experience across the entire enterprise.

Backlit switches and overlays

Backlit switches, overlays and other types of display solutions are a cost-effective way to enhance usability, decrease user error and improve aesthetics. [Backlit switches and overlays quickly guide](#)

technicians and users to correct device operation, especially in dimly lit or dark environments. Contrary to how they're often portrayed in movies and TV shows, most server rooms are well-lit with fluorescent lighting. But backlit displays can still be particularly useful in tight spots where it would otherwise be difficult to accurately make out specific information.

Backlighting can be achieved in a variety of ways, including:

▶ **Discrete LEDs**

▶ **Light guide films**

▶ **Fiber optic weave**

▶ **Electroluminescence Lamps (EL)**

Each of the above backlighting options come with distinct advantages and disadvantages, based on the specific application. Boyd has decades of experience creating custom backlighting solutions for a range of industries, including hyperscale networking, and can provide manufacturers with design insights and considerations to help integrate the optimal backlighting solution for a given product. In addition, all of Boyd's backlighting assemblies meet ISO 2001 quality standards to ensure lasting durability and performance.

Nameplates

Nameplates are an effective way to instantly convey branding information to identify equipment while also helping develop meaningful brand connections with frontline workers. This can help speed maintenance time while also hopefully creating brand evangelists who may be consulted for their input during equipment purchasing or replacement.

[Nameplates](#) can be incorporated into user-interfaces, enclosures and more to deliver the brand experience where it will have the most impact. In many

industries, nameplate materials — such as aluminum, stainless steel, acrylic, polyester and polycarbonate — are often selected based on their durability as they need to be able to withstand harsh environmental conditions. But in the temperature-controlled environments of data centers, manufacturers mainly need to ensure the material can withstand any thermal output from the equipment itself. Therefore, primary design considerations mostly have to do with creating a tailored look and feel that matches an established brand identity. Boyd offers a variety of different finishes, textures and printing methods to create custom nameplates that meet nearly any visual requirement.

Bezel branding

Server bezels are simply the outward-facing covers or faceplates located on the front of a server, making them one of the most visible pieces of data center equipment. This is an [important branding opportunity](#) for manufacturers who want their products to stand out in large data centers that may house hundreds of servers from a variety of manufacturers. Similar to nameplates, server bezel branding promotes the manufacturer's brand with frontline workers, while clear branding can also reduce errant warranty claims from facility managers.

Boyd has a suite of converting capabilities to create custom bezels that match a manufacturer's established branding elements. We can deliver multiple textures, finishes, colors and more to help equipment manufacturers create a unique brand experience that provides benefits for both their organization and frontline users.

Optimized front and back panel graphic overlays

Graphic overlays are an important human-machine interface (HMI) layer component used in a variety of networking equipment applications. These solutions involve graphic printing on durable materials to create a functional, user-friendly interface that will last

through consistent usage. Better user interfaces save time by clearly identifying unique maintenance steps and custom requirements for data center equipment.

Within the enterprise networking market, graphic overlays often take on one of three forms:

- ▶ **LED deadfront overlays** — Deadfront overlay product labels are graphic overlays that do not show symbols or graphics unless they are lit. By controlling when and what graphics are illuminated, products can communicate critical information to users. These deadfronts can also use diffusing films to more uniformly spread backlighting.
- ▶ **Display overlays** — These solutions feature a transparent window within an overlay around an LED or LCD screen, providing both environmental protection and additional information and branding to products.
- ▶ **Keypad and button overlays** — These solutions provide long-lasting identification of [elastomeric buttons or keypads](#). By labeling the surface around elastomeric buttons, printed information will not see the same wear and tear as the buttons themselves, extending the longevity of the product and usefulness for frontline technicians.

Boyd has in-house capabilities to produce complex graphic overlays with tight tolerance and registration controls. Using high-quality 3M materials, graphic overlays can feature FR V-0 rated substrates, full-coverage, selective or island placement adhesives and highly complex die cut geometries. Graphic overlays can also provide EMI shielding and insulation, and Boyd's converting capabilities allow for custom color matching, dual surface printing, and custom finishes and textures to provide a unique user experience that aligns with manufacturers' branding.

Small changes, big impact

Improving the user experience in data centers is about more than just making life easier for technicians and maintenance personnel. It can have a significant impact on facility operations and ultimately help limit costs and equipment downtime. Thankfully, labels, nameplates, overlays and other branding elements offer relatively simple, straightforward solutions to common challenges. By re-evaluating the ways in which critical information is conveyed to frontline workers, manufacturers and operators of networking equipment can improve the user experience and reap benefits for the entire organization.

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your next project?**

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About Boyd

With over 90 years of customer-focused performance, Boyd's innovative, sustainable engineered material and thermal solutions make our customers' products better, safer, faster and more reliable.