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7 Steps to Reduce Data Center Complexity

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Data center complexity is almost inherent with the new technology and applications that have emerged in the past 10 years: IoT and convergence, virtualization, increased security requirements, mobile computing and the cloud, to name just a few. Pressure on data center IT operators continues to increase as the number of business-critical applications grows rapidly, adding more complexity.

Complexity occurs when several different types of product, tools and resources are used to support a network. This mix-and-match can occur for a variety of reasons, but often happens because business demands require data center managers to move quickly – sometimes without time to be practical or think through long-term ramifications. This leads to IT systems that are difficult to design, deploy, maintain and manage, ultimately causing higher capital and operating costs, slower deployment, increased potential for human error and downtime and more challenging scalability.

What Causes Complexity?

Business and technology developments are coming at us with an alarmingly fast pace, putting high demands on data center infrastructure. Today's existing IT systems and components are more quickly outdated as hardware and software continue to demand higher requirements and increased performance. Consider these statistics:

- Business app usage is at an all-time high, according to Gartner
- Mobile devices have never been more prominent in the enterprise
- 82% of enterprises have a hybrid cloud strategy, up from 74% in 2014, according to RightScale
- By 2020, Gartner estimates that at least 20.8 billion IP-enabled devices will be connected to our networks
- Since 2008, there have been more devices connected to the Internet than people, says Cisco
- By 2020, there will be 6.1 billion smartphone users, says TechCrunch

In a recent Symantec "State of the Data Center" survey, IT professionals identified mobile computing, server virtualization and the public cloud as top causes of increased data center complexity. The same survey also found that the typical organization experienced 16 data center outages in a 12-month span, with 11 of the 16 outages caused by system failure resulting from data center complexity.

The more complex a data center is, the more difficult it can be to ensure efficiency – not only of the systems and equipment, but of the IT staff as well. It can be hard to implement new technology and strategic initiatives to move your business and data center forward when you're stuck in reactive mode, dealing with problems that can be traced back to data center complexity.

1. Emphasize Standardization

BSRIA (Building Services Research and Information Association) says that 90% of active equipment in the data center will need to be replaced in five years – product standardization is something to keep in mind as you upgrade and replace this equipment, as well as the infrastructure that supports it.

By utilizing standardized data center hardware, you get to work with common parts, common technology and common upgrade approaches – all of which make maintenance go smoother and faster, saving you time, resources and money.

A standardized operating environment can simplify IT infrastructure, allowing operations to become more efficient at a lower overall cost. Even something as simple as racks and enclosures that assemble using a similar process will save time.

2. Streamline Vendors

If your data center is currently made up of services and solutions from several vendors, you already know how difficult it is to manage patches, upgrades and maintenance.

Even though using several different providers can lead to increased complexity, many data center managers struggle to overcome this problem. A recent IDC survey found that nearly 50% of IT professionals rely on 10 or more software support services; more than one-quarter of the survey respondents had 20 or more vendors delivering hardware and data center support.

Integrating equipment from different vendors is an easy way to introduce unnecessary complexity into your data center. Are the products interoperable? Does combining these two pieces of equipment pose a potential downtime problem? The more types of products that are deployed, the more opportunity for problems. These problems can pull valuable staff resources away from strategic initiatives, instead placing them in fire-fighting mode to focus on product deployment and compatibility.

When you streamline your vendors – selecting partners that span the states, countries and continents where you do business, and partners that offer consistent support across all product lines – you automatically reduce the complexity of your data center. Fewer parties are involved, fewer people need to be called when there's a problem and fewer opportunities exist for product incompatibility. There are also fewer contracts to sign and manage, and fewer warranties to track.

3. Select Products Engineered to Work Together

Investing in products that are engineered to work together goes hand in hand with streamlining data center vendors, which is explained above. You'll experience faster, less complex installation when products are designed and manufactured to fit together and follow consistent installation processes.

You also experience the flexibility of making product switch-outs and changes without compatibility or footprint issues, or large product replacement requirements. This reduces complexity, which also inherently reduces the opportunity for human error or unplanned downtime due to product incompatibility or installing components that end up not working together.

## 4. Easy Installation and Maintenance Requirements

A complex data center environment makes it more difficult to identify the root cause of errors or misconfigurations. And when there's a complex problem, a complex fix is likely the solution.

Selecting products with improved installation and maintenance features mean shorter lead times, less training time for staff and lower maintenance costs – whether you're talking racks and enclosures that come together quickly with adjustable rails and taller heights or pre-terminated solutions that allow for quick installation, easy MACs (moves, adds and changes), and easier migration to new technology.

There are many examples of products that make installation and maintenance simpler for data centers:

Fiber connectors that can be terminated in five seconds or less with no tools required
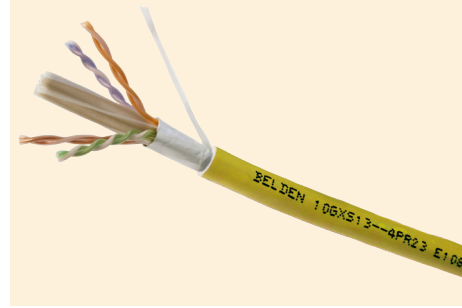
Category 6A cables that require fewer twists and offer fast tape removal and easy-to-separate pairs

Patch cords with built-in LEDs, making it easy to find patch cord connections in dense patching areas

High-density patch cords that are easy to remove through the use of a flexible pull-tab

By reducing complexity when it comes to installation and maintenance, it's possible to save money, time and frustration. Trimming off a few seconds or dollars here and there may not seem like much, but saving just a few minutes (or dollars) a day can add up to hours and days of savings (or thousands of dollars) over time.

5. Safeguard Against Complexity "Seepage"

Just because you've made a concerted effort to remove complexity from your data center doesn't mean it won't come creeping back in. Even if you haven't made great strides in reducing data center complexity yet, you can still implement practices to prevent things from getting worse.

When new products, systems or components are proposed, it's a good idea to identify potential issues and commonalities right away. This may also allow you the opportunity to leverage an existing system or application for multiple uses to avoid investing in something new or unknown.

Following protocol set forth by the Open Compute Project (OCP) is another way that data center managers are now focusing on to eliminate complexity. By supporting open designs for racks, servers, storage boxes and motherboards, traditional data center technologies are being broken down to core components to build simpler, more flexible, scalable and efficient data centers – all with an emphasis on energy-efficiency improvement and operational cost savings.

Open Compute Project logo is trademark of OCP. Visit www.opencompute.org for more information.

6. Find Products that Serve More than One Purpose

Complexity tends to grow over time. Think of it this way: Systems are often built to do one specific task; as needs change, they are modified or converted to do things they were never originally intended to do.

Open bridge racks are a good example: They can offer both an Open Compute solution and a standard solution without having to purchase and store double inventory. They can be used as standard IT enclosures until your data center decides to migrate to Open Compute. When that decision is made, the racks will be ready – you won't need to purchase new ones. They convert quickly (in less than 40 minutes) from TIA/EIA rails to Open Compute rails while in the field.

Mixed-media options make it easier to transition from copper to fiber (or vice versa) without having to make space for additional components. For example, copper frames can easily be swapped out for fiber frames within the same patch panel when they share the same form factor.

7. Aim for Seamless Scaling and Migration

Your data center should be equipped to handle current needs while offering a clear path for future technology requirements. Data center complexity can be reduced when components are used that allow you to grow and migrate to new systems in the future, without compromising performance or reliability.

For example, solutions that offer support for both legacy ST and SC and modern LC and MPO applications support cost-effective, simpler migration to 40G and 100G applications with only a simple cassette or adapter frame change. This reduces the need for lots of redesign and reconfiguration work. It also allows data center staff to upgrade systems faster while avoiding complete teardowns and replacement.
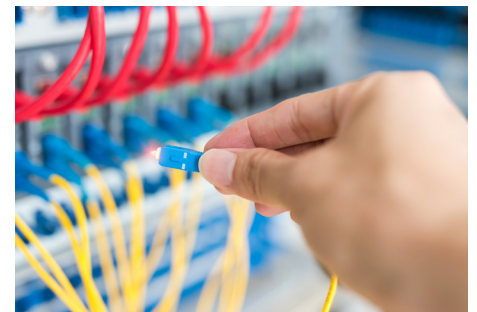
Learn More

When data center processes and components are simplified, installation and maintenance become easier and less costly, staff resources are freed up for more strategic tasks, troubleshooting becomes less cumbersome and migration is more easily achieved. Belden can help you design, upgrade and maintain a data center that decreases complexity by emphasizing simplicity.

Belden's ease-of-use solutions include:

- Data center products that avoid cumbersome installation and scaling challenges

- Products that eliminate compatibility issues and large product replacement requirements

- Solutions designed and engineered to work together for easier, quicker installation and better system performance

- Cable and connectivity solutions that are developed in-house to work together seamlessly

- Scalable components that allow for fast upgrades and backward compatibility without full system teardowns

To learn more about reducing data center complexity, visit info.belden.com/data-center/complexity

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