# Cut Costs and Increase Profits without Cutting Corners

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## Overview

Data centers are capital-intensive businesses that rely heavily on real estate. It's crucial to reduce expenses and increase profits in ways that don't negatively impact performance.

We've gathered some suggestions that will help offer valuable services to your customers – without building out more space, adding another building to your portfolio or expanding a location.

## If You Don't Measure, You Can't Improve

**The Impact of Power in the Data Center**
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. Ongoing 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% of a data center's total energy consumption.

Power Usage Effectiveness (PUE) ratios are 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 costs is understanding how power is allocated. Monitoring of the power draw at the cabinet level using power distribution units (PDUs) with a monitoring feature allows real-time assessment and the opportunity to quickly correct undesirable environmental changes.

**Monitor & Manage**

Gartner estimates that data center infrastructure management (DCIM) tools can reduce data center operating expenses by up to 20%, and extend lifecycle by up to five years. These management systems give Multi-Tenant Data Center (MTDC) and IT managers the ability to monitor and report usage, but they offer much more.

DCIM solutions save money by constantly monitoring and managing data centers 24/7. You'll know right away when temperatures are too warm, humidity levels are too high or someone without permission accesses the space. When potential problems like these are identified early, downtime (and lost revenue as a result of unhappy customers) can be avoided.

Manual monitoring and tracking present an opportunity for mistakes. Will temperature be an issue if you add another server to a rack? Is a rack close to its power limit? Instead of walking the space to gather answers, remotely and automatically track floor and cabinet availability to eliminate time-consuming manual tasks. DCIM solutions can also:

- Establish controls and provide documentation for Sarbanes-Oxley, HIPAA and PCI requirements.
- Shows historical data to help develop trends.
- Provide power usage data for devices and racks so you know where energy is being consumed.
- Identify hotspots or other temperature issues that can lead to downtime.
- Maintain accurate inventory of data center assets.

## Reduce Energy Consumption

The deployment of high-density IT equipment is pushing the average enclosure heat load into the 10-15Kw range, forcing a rethink 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.

**Thermal Management**

Heat created by the IT load should be rejected by moving equipment exhaust air outside the space. By reducing the amount of hot air, not as much cool air is needed from the computer room air-conditioning (CRAC) unit – which saves money. You're cooling a smaller volume of air.

A CRAC unit's set point is based on supplying enough cold air to offset the recirculating hot air. Lots of mixing requires the CRAC unit to be set at a lower temperature to reach an appropriate inlet temperature. When hot exhaust air is eliminated, the CRAC unit can be set to a higher temperature. For every 1 degree Fahrenheit increase in CRAC unit temperature, ENERGY STAR says you can save between 4% and 5% in energy costs.

Using physical barriers along with hot aisle/cold aisle arrangements can also help eliminate mixing of cold and hot air. ENERGY STAR reports that data center containment systems decrease overall energy costs by 5% to 10%. Cold aisle containment allows supply air to pool inside the aisle to ensure a uniform air temperature at the IT intake. Hot aisle containment moves exhaust air back to the AC return.

Check to make sure your temperature and humidity levels meet (not exceed) ASHRAE guidelines. If your data center temperature is much lower, you're spending money unnecessarily to keep the space cooler than it needs to be. To reduce operating costs, adjust temperature and humidity set points according to guidelines instead of over-cooling or being overly dry.

BICSI says that energy accounts for 25% of a data center's operating expenses. When energy usage is cut, you don't spend as much money. Operating costs are naturally reduced for every kilowatt-hour of energy saved.

## Get Tenant Buy-In for Multi-Tenant Data Centers

MTDC lag far behind in efficiency, says the Natural Resources Defense Council. That's often because of the disconnect between tenants and data center owners.

MTDC owners are often paying the electricity bill; tenants pay for blocks of power (or energy costs are built into the calculation for per-square-foot leasing). The tenant's IT staff (who probably aren't paying the tenant's energy bills) is responsible for specifying the servers and other equipment brought in to the space. They may be unaware (or not concerned about) how much energy the recommended equipment uses.

If tenants don't pay data center utility bills (or don't understand the energy costs associated with their equipment), they're probably not concerned about energy-efficient servers and equipment. So how can you encourage tenants who aren't paying utility bills to reduce energy usage?

Implementing incentives is one option. Consider offering financial rewards for achieving energy-efficiency targets or being the "most energy-efficient tenant" in the MTDC. To maximize space and power capacity, consolidation must often occur. In these cases, not only do you reduce energy costs, but this may also allow space for new customers.

As contracts come up for renewal, take advantage of the opportunity to make adjustments that reflect energy costs. Creating leases that shift from a "per-square-foot" approach to a "utility brokerage" approach (cost per kilowatt-hour) can bring tenant energy costs to the forefront.

## Accelerate Deployment Times

You want your data center up and running on Day One, so deployment time is everything. For MTDCs, how long it takes to get customers up and running may be what separates you from a competitor. When you can turn on a customer faster, you increase tenant satisfaction and retention. For enterprise data center managers, internal customers can begin work faster if deployment is completed quickly.

Put together pre-determined packages with one vendor (including cabinets, pre-terminated cabling and everything else required to set up a new tenant) so all infrastructure comes from one place, saves shipping time, streamlines ordering and provides a single of contact. With a pre-assigned bill of materials established for rows of 10 or 20 cabinets, for example, you'll get the equipment you need faster so you're up and running sooner.

If you spend valuable time reconfiguring cabinets or other equipment once it arrives, find a vendor that will customize products to specifications before shipping. When the units arrive, they're configured and ready to deploy immediately to save even more time.

## Make the Most of Vertical Space

No matter what type of data center you manage, floor space is extremely valuable. For MTDCs, having floor space available - and maximizing the space already being used - brings in more customers and more revenue.

Even though you aren't selling floor space to customers in enterprise data centers, it's just as valuable to protect. The benefits of using data center floor space in the most efficient way possible are numerous:

- Ensure room for future growth
- Reduce the risk of running out of space
- Lowers operating costs associated with cooling and humidity control
- Reduce energy and water usage, leading to smaller utility bills each month
- Prevent the move into a larger space, which could increase costs

MTDC managers can get creative by offering customers value-added services that are favorable for both parties. For example, if you charge customers per square foot (how much floor space the cabinets take up), consider recommending that your clients grow "vertically" instead. This can solve problems for tenants who need more space now, or anticipate needing it in the future and think it won't be available. By growing vertically, they can increase capacity without increasing monthly leasing costs while you save valuable floor space to offer to new tenants.

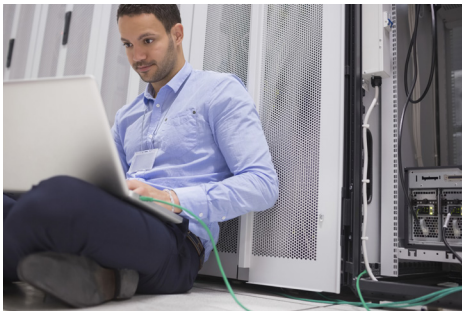
Enterprise data center managers can employ the same idea of vertical vs. horizontal growth to preserve as much open floor space as possible.

Typical rackmount solutions provide 45U of rack space; however, 48U, 50U and 52U of rack space are also possible, which can add up to 14 more inches for vertical growth. This provides flexibility without having to find more floor space when it's already at a premium.

## Employ a Virtual Inventory

Managing and storing inventory in-house takes up valuable floor space that MTDCs could lease to tenants, or that enterprise data centers could use for future expansion and growth. But having products on hand is important to keep deployment time down, make fast replacements when necessary and ensure that repairs are completed quickly.

Consider partnering with a vendor that can manage your inventory off site but still get the products to you quickly when needed. You identify what the vendor keeps in stock, and the products ship when you place an order. By using a virtual inventory system, you save space by not storing extra products on site.



## Simplify Repair and Maintenance

When equipment needs to be maintained or repaired, it is cost-effective to complete it as quickly as possible: less labor time required, less downtime for tenants and more time for your staff to complete other important initiatives.

Streamline equipment repair with data center infrastructure products that feature a simple design with a standard look and feel, and straightforward color coding. When all products function the same way, it is easier to document repair and maintenance procedures, and train staff on proper repair methods. This reduces human error, ensuring that products can be fixed by following routine procedures.

## Have a Migration Path Plan

The migration of Ethernet links from 40 Gb/s to 100 Gb/s is rapidly accelerating due to continuously increasing requirements. It's no longer a question of if, but rather when, data centers will migrate to 40/100G Ethernet to support rising data rate applications.

If you're not prepared for this migration, you could, waste valuable time and spend more money than anticipated when things don't go smoothly.

Educate yourself now about 40/100G Ethernet, and evaluate your current cabling infrastructure. When setting up your data center for a 40G infrastructure, make sure it will convert to 100G without big upfront costs or major time investments. Depending on the 40G infrastructure in place, converting to 100G can be accomplished by simply changing out the assemblies.

## Reduce Costs by Partnering with Belden

Belden can help you maximize cooling, power and density opportunities, as well as conserve floor space, by delivering solutions for building a highly efficient, optimally performing data center.

Belden solutions include:

- Airflow, power distribution and power and climate monitoring devices for high-density computing environments.
- High-density racks, enclosures, cabling system components and cable management solutions that enable maximum bandwidth and availability in an efficient footprint for better airflow and optimal use of real estate.

To learn more about the cost-saving solutions offered by Belden, read the accompanying white paper:
"How Belden Reduces Data Center Costs"

To learn more call **1.800.BELDEN.1**
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