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9 Tips to Improve System Uptime

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Overview

Downtime: One of the worst words a data center manager can hear. Data center failure truly affects every type of organization, from a small business to a large hotel chain. Productivity and profitability obviously suffer, but downtime may also cause regulatory penalties, put people's lives at risk or lead to an investigation that results in job loss.

After analyzing 4,500 data center incidents (including 400 full downtime events), the Uptime Institute's data center end-user network concluded that 73% of downtime is caused by human error. According to Cabling Installation & Maintenance magazine, the average total cost of a human-error outage is $298,099. Human error is reported as an issue every year – and doesn't seem to be improving.

Many aspects of a data center invite the potential for mistakes, whether due to illogical layout, poor (or no) labeling, lack of maintenance or inadequate training. Even the simplest oversight can result in a serious downtime event that may be difficult and costly to recover from. Some of the mistakes that result in data center downtime include:
- Activation of the emergency power-off (EPO) switch
- Adjusting the temperature from Fahrenheit to Celsius
- Pulling power cords out of equipment
- Overloading a circuit

In addition to identifying the mistakes that cause downtime, it's also important to pinpoint what causes those mistakes to occur in the first place. Examples can include:
- Lack of proper documentation
- Lack of motivation
- Lack of staff awareness about procedures
- Improper equipment placement
- Staff fatigue

No data center is completely immune to human error, but training and technology can prevent mistakes. Implement any of these tried-and-true suggestions to improve your data center's uptime by reducing the potential for human error to occur.

TIP 1:

Make Time for Training, Engagement and Documentation

All the training in the world can't overshadow poor working conditions. Start by scheduling work shifts in a way that promotes staff alertness and attentiveness.

It may seem simple, but it bears repeating: Establishing standard operating procedures, teaching those procedures to data center staff and then documenting them is a crucial step in avoiding human error. In many cases, a mistake can be traced back to not following a step-by-step checklist for a particular procedure (or the lack of a checklist altogether).

The procedures should be site-specific, since every data center configuration is unique. They should be accessible electronically and on paper. Once they're created, someone on staff should be assigned the task of revisiting and updating the procedures once a month.

Create documentation for every regular procedure, from positioning rack servers and setting the correct temperature range to bringing new equipment online and relocating old equipment. The procedures should include:

- Step-by-step processes, with written instructions and pictures
- Safety requirements
- Potential risks

Once the documented procedures are in place, it doesn't hurt to offer incentives that will keep staff members engaged and encourage them to follow it. Whether it's a financial reward, an extra day off or public recognition for their accomplishments, incentives can keep people motivated to pay attention and take their time.

It's also a good idea to create a policy outlining the rules of working in the data center. This policy should be read and signed by everyone who enters the space, whether it's a staff member or a third-party contractor. It should detail everything from the obvious "don'ts" (don't bring beverages into the data center) to rules about safety gear and when it should be worn.

TIP 2:

Define Ownership and Tasks

With increasing workloads, IT staff are sometimes trained to be generalists instead of specialists who focus on specific disciplines. To minimize human error, consider developing "specialists" within your team. Although cross-training is a good idea, specialists who learn one or two products/systems inside out, and complete the same processes every day, week, etc., make it less likely that an error will occur. (But this doesn't mean that documentation is no longer necessary. Processes should still be written down and kept up to date in case someone else has to step in.)

Depending on your data center environment, work schedules and staff members, consider rotating each staff member's focus on processes and infrastructure systems every few years to increase knowledge levels and build confidence.

TIP 3:

Practice for Downtime

Simulating data center downtime is similar to conducting weather-related drills. No one wants to experience a downtime event, but it's likely that most data center managers will have to deal with at least one. Knowing this truth, it helps to understand exactly what each team member should do if unplanned downtime occurs. Create a training program that walks data center staff through how they should respond to downtime events.

Consider conducting a downtime simulation event afterhours (or, if it's during the day, warn people before you do it). By taking your network down for a certain amount of time, you can uncover all kinds of issues, such as malfunctioning generators or problems with the existing recovery plan.

TIP 4:

Employ Product Standardization

Simple product designs that incorporate a standard look and feel, and clear color coding, makes installation and maintenance easier, and reduces the likelihood of human error.

Rather than deploying different components from different vendors, it's more efficient to determine standardized building blocks for data center cabinets, connectivity and infrastructure deployment and maintenance.

Using the same cabinet brand and model, cabling media, PDUs, patch panels and cable management not only reduces costs and speeds up deployment, but can also reduce the potential for human error. The higher the number of different products and systems that are in use, the higher the potential for a mistake – it can be hard to remember how each solution functions when they're all different. If products operate on a common methodology and footprint, they're easier to learn and work with.

TIP 5:

Clean Up

If staff members are in a hurry, corners may be cut due to fear of missing a deadline during data center equipment rollout. While cutting corners may not seem like a big deal at the time – like keeping the data center neat and organized – it can make troubleshooting and cable tracing more difficult later.

Unorganized, loose cables are a recipe for disaster. They can obstruct cooling vents, leading to high data center temperatures – which can result in unplanned downtime due to equipment malfunction. Untidy cables can present trip hazards, which are dangerous for staff members and data center equipment. If someone accidentally gets caught up in a cable dragging on the floor, not only does he or she run the risk of injury, but a disconnection may also occur. Messy cabling makes it difficult to determine which cables connect to what; it's very easy to disconnect the wrong ones. It also provides a place for unwanted pests to hide.

TIP 6:

Use Visual Identification to Your Advantage

If certain aspects of your data center layout or design make it too easy for mistakes to occur (such as poor location of the EPO switch), use labels or covers – or add nearby signage that makes staff members aware of what the button really does.

From cabling to switching devices, labeling every data port and component ensures the correct sequence of operations. It also helps verify that you're working with the right component when performing maintenance tasks and troubleshooting.

Color coding can also be used to visually recognize feeds or network segments, or even fiber types. When color is used to differentiate components, it makes moves, adds and changes (MACs) simpler and less prone to mistakes. It also makes carrying out repairs faster when you can easily trace and troubleshoot issues.

TIP 7:

Take Security Seriously

Incorporating physical security into the data center can do more than keep intruders away from sensitive information and equipment. With smart cabinet-level security, zones can be established that grant user access only to certain cabinets. This technology makes sure that network technicians have access only to the systems they're responsible for. Users can be set up with parameters that define whether they have full administrative access, zone access or access to specific cabinets only.

This can help minimize human error by preventing accidental access to the wrong cabinet or piece of equipment when it's time to make a change. When biometrics are incorporated, automated audit trails display who accessed each cabinet and when.
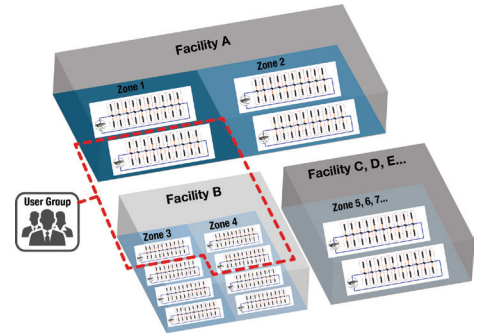
TIP 8:

Apply Automation and Technology

When possible, invest in products and solutions that help you avoid human error in the first place by employing automation or advanced technology.

For example, patch cords with built-in LEDs and tracing wires make it possible to visibly trace patch cords. You can quickly and clearly identify connections, and see exactly where the cord is connected.
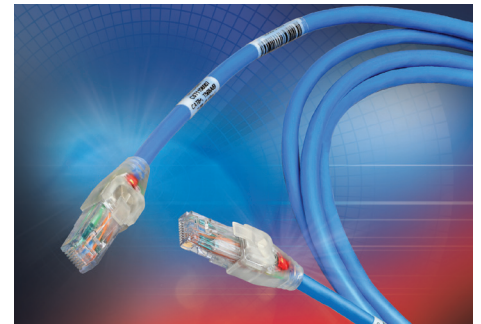
TIP 9:

Implement Physical Segregation

With physical segregation between active equipment and passive structured cabling, and the use of sub-systems and interconnects, the risk of downtime caused by human error is greatly reduced. By simply restricting access to active components (switches and servers), MACs can be performed in cross-connects, acting as service areas.

Learn More

Belden can help you design a data center that minimizes the potential for human error to maximize data center availability.

Belden solutions are designed to eliminate human error by:
- Standard product look and feel, with clear color coding
- Simple product design that facilitates easy installation and maintenance
- Controlled access at all levels with smart access security systems
- Certified and trained partners who verify system performance to eliminate equipment failure potential

To learn more about solutions offered by Belden, visit
info.belden.com/data-center/system-downtime

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