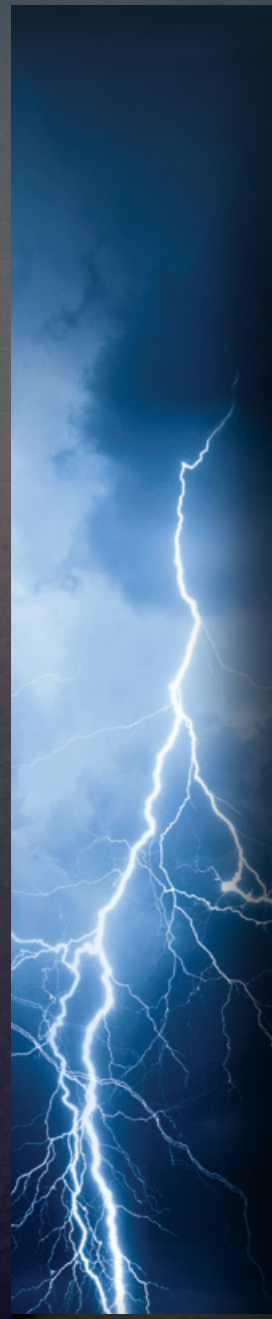


Ace the test

Prepare and
protect against
academia's
power threats



Powering Business Worldwide

Switch  N to Eaton.

Introduction

There is a clear expectation for 100 percent uptime across today's educational landscape.

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With more than 132,000 public and private elementary and secondary schools across the United States, there are nearly 56 million students relying on the availability of IT services within these facilities. Likewise, the estimated 22.4 million higher education students served by 4,500+ colleges and universities throughout the country require always-on technology.

There is a clear expectation for 100 percent uptime across today's educational landscape. With more than 132,000 public and private elementary and secondary schools across the United States, there are nearly 56 million students relying on the availability of IT services within these facilities. Likewise, the estimated 22.4 million higher education students served by 4,500+ colleges and universities throughout the country require always-on technology.

Unfortunately, the sheer magnitude of ever-escalating downtime threats makes executing this requirement a daunting assignment. Over the past decade, Eaton's Blackout Tracker logged more than 32,000 separate power outages, many of which impacted schools and disrupted studies and services. In 2017 alone, Eaton registered 3,526 outages nationwide, affecting 36.7 million people for a collective 197 days!

Unexpected outages can take a dramatic—and often costly—toll on students at every level. Consider the logistics nightmare that ensued after a power line problem in Tyler, Texas, prompted the cancellation of SAT exams. In Michigan, it was SAT's sister test, the ACT exam, that had to be rescheduled when an outage forced Trenton High School juniors to miss the original test.

Imagine the frustration of students who'd spent the entire week cramming for final exams, when another unplanned outage forced the closure of Indio High School in Southern California after leaving 2,400 students in the dark mid-test. On the other hand, pupils at Washington D.C.'s Thomas S. Wootton High School didn't receive a hall pass when a blackout struck their campus on final exam day; although they initially walked into darkened classrooms, they were moved to rooms with windows so they could still take the tests.

Worse still, about 100 students from Michigan's Muskegon Heights High School had to retake state-mandated exams after a power outage left their site in the dark amid the exam.

Assigning blame: what causes power outages

The wrath of Mother Nature is among the biggest culprits behind power outages, lashing out in the form of hurricanes, thunderstorms, monsoons and heat waves, along with other wild weather events.



Even more alarming, in many cases, the scale of these perils continues to intensify. In fact, the 2017 hurricane season produced off-the-chart damages, which experts largely attributed to climate change-induced warmer water in the Atlantic. Meteorologists predict that climate change will not only fuel more powerful storms in the future, but also produce another phenomenon: “global weirding.” The term refers to a rise in average global temperature sparking a range of occurrences, including hotter heat spells, colder cold spells, increased droughts and more intense flooding.

But we can't blame all our power quality woes on Mother Nature. Aging infrastructure on an increasingly overtaxed power grid creates further havoc with the power supply, which was underscored by a Jan. 22, 2018 outage at California State University Sacramento. The unexpected campus-wide blackout—which shut down buildings and forced classes to be canceled—was attributed to old switchgear failing. One Kinesiology major said that when electricity was cut, students had to use cell phones to write notes and light up the board for the teacher. While power to most buildings was returned in about 15 minutes, some remained without power for the rest of the day and full power wasn't restored to the campus until Jan. 27.

Yet another culprit resides within your own facilities; it is estimated that up to 80 percent of power surges occur on the customer side of the electric meter. When high-powered electrical devices such as elevators, air conditioners, refrigerators, pumps, compressors and motors are switched on and off, or operate in cycles, they can generate internal surges that degrade electrical equipment, often resulting in premature failure that can cause downtime. Other times, those very power-hungry devices are rendered useless because of an outage. Such was the case at Ray High School in Corpus Christi, Texas, where a janitor was treated for heat exhaustion because of an outage that trapped several people in the school's elevator.

Regardless of the instigator that triggers a power outage, the effects of downtime can be devastating. Not only are the monetary costs astronomical—for instance, a staggering \$100,000 per hour is now the figure associated with just 60 minutes of downtime, according to a recent ITIC study—but for schools, the consequences range from sacrificing priceless learning opportunities to physical safety implications.

This report is designed to arm you with the knowledge needed to help your school or district better plan for the future. Incorporating valuable facts, considerations and recommendations that IT pros can share with management, committees and other decision-makers, the report will cover:

- Why continuous uptime is absolutely essential in the education environment
- Power protection requirements across K-12 and higher education campuses
- The biggest challenges that affect IT professionals in schools
- How deploying a combined UPS and power management software solution can effectively solve many of education's uptime problems



The need for continuous uptime in education

Across today's technology-driven educational landscape, downtime isn't an option. IT networks have become the backbone of modern learning environments, and when power is interrupted, nobody earns a passing grade.



Not even the nation's most prestigious Ivy League campuses are immune from unexpected power cuts. For instance, an underground cable malfunction was blamed for an 80-minute outage that struck Yale's campus in 2013, leaving thousands of students without lights, electricity and Internet service. The outage also caused a failure in the university's ITS servers, including the email portal, which took several hours to recover.

It isn't only students who require always-on network access. A 2013 Pew Research survey of 2,462 middle and high school teachers found that digital technologies play a key role in their instruction. For instance, 92 percent of teachers said the Internet has a major impact on their ability to access content, resources and materials for teaching. More than two-thirds (69 percent) reported that the Internet was key to their ability to share ideas with other teachers, while 67 percent acknowledged its importance in interacting with parents. Similarly, 57 percent of teachers credited the Internet for its role in improving their ability to interact with students.

Furthermore, in many communities, schools provide students with their only access to digital technology. The lack of access to high-speed Internet and its impact on learning is well-documented and impacts students from mid- to low-income families nationwide.

Coined "the digital divide," research reveals that 33 percent of low- and moderate-income families—and 50 percent of families below the poverty line—do not have Internet service at home.

As digital learning solutions have become an integral part of students' lives, IT pros have been under intense pressure to find new ways to support them. On any given day, students and teachers may be utilizing technologies such as virtual/augmented reality, digital whiteboards, distance learning, personalized learning and artificial intelligence. As a result, greater demands have been placed on IT capabilities and infrastructure, both in the K-12 sector and in higher education. With these exciting new technologies, school districts, colleges and universities are being forced to upgrade infrastructure to an always-on, flexible, and cost-efficient model designed to support 21st century learning.

Beyond the books: blackouts disrupt other activities too

Pomp and (unforeseen) circumstance

Sometimes even straight A's won't guarantee that a student will receive a diploma. Power outages, not lack of preparation, have led to numerous graduation gaffes throughout the years.

The 2015 valedictorian at Strawberry Crest High School in Dover, Fla., for instance, was just beginning his commencement speech when most of the lights went out at the Florida State Fairgrounds auditorium. Although the blackout was brief, it was enough of an interruption that video footage of the speeches by valedictorians and salutatorians was permanently lost.

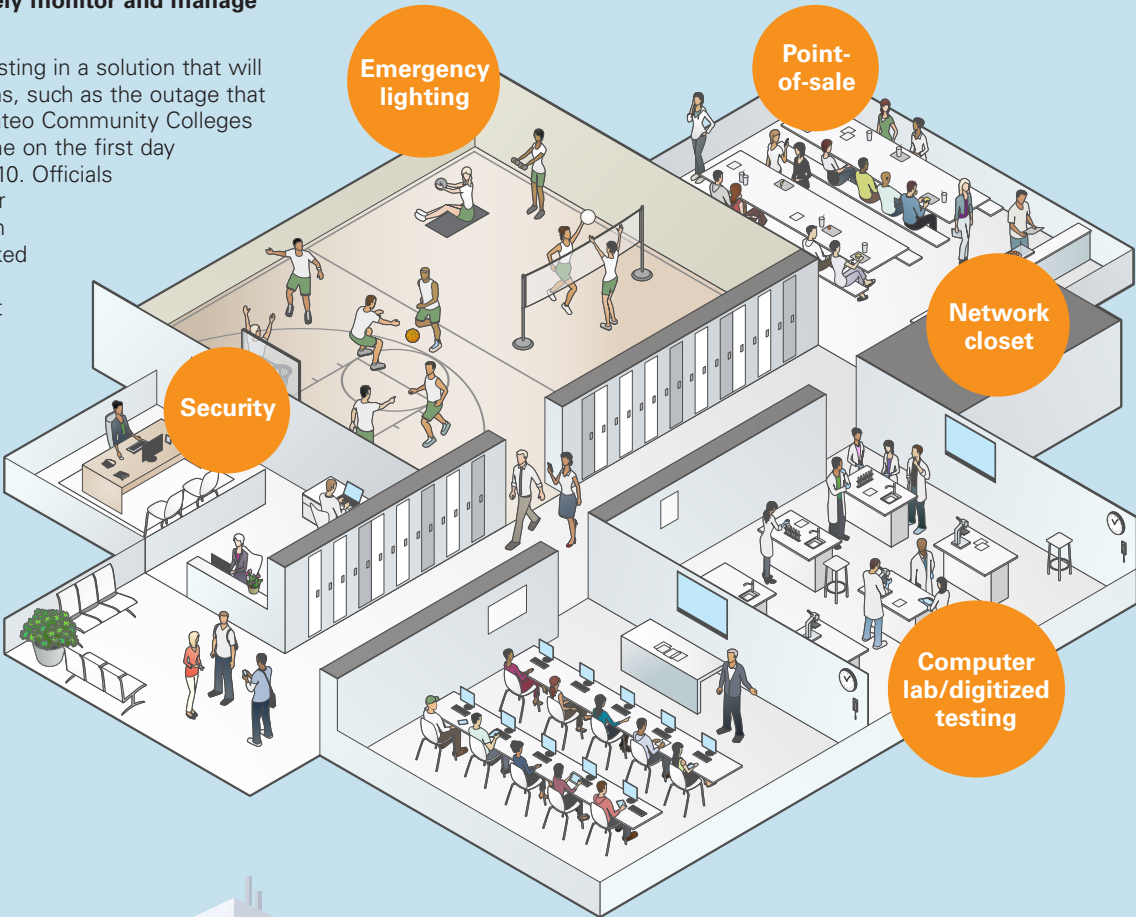
In El Paso, Texas, the Don Haskins Center was supposed to host the 2014 Andress High School graduation. Instead, the power went out and thousands were left to sit and wait for hours in the heat. The district ultimately changed the ceremony, holding it eight hours later at El Paso High School, a decision that students weren't happy about. Meanwhile, in 2015, Ames Middle School canceled its eighth-grade graduation ceremony altogether after a loss of power at the Iowa school.

Powering education environments

Power protection is a prerequisite across both the K-12 and higher education landscapes.

In addition to the obvious job of safeguarding campus data centers and network infrastructure while maintaining digital learning technologies, uninterruptible power systems (UPSs) and accompanying software solutions help administrators remotely monitor and manage their entire networks.

Great care must go into investing in a solution that will prevent unplanned disruptions, such as the outage that forced nearly 20,000 San Mateo Community Colleges District students to stay home on the first day of the spring semester in 2010. Officials had to cancel all classes after wind and rain moved through northern California and knocked out power at the campuses. That same year, a blackout at Snead State Community College in Boaz, Ala., prevented students from completing the registration process.



K-12 power infrastructure



Some outages extend beyond inconvenience and pose an alarming safety risk. Such was the case in October 2018 when a cable failure knocked out power to about 50 buildings on the sprawling Stanford University campus, forcing classes to be canceled. At the time, there were students working in labs with hazardous materials, all of whom were told to immediately stop their experiments and leave the building.

On K-12 campuses, UPSs are relied upon for numerous roles, such as keeping digitized testing available in computer labs, ensuring continuous uptime to bell systems, and providing reliable Internet service in classrooms and common areas. There are numerous points across college and university campuses where power protection is essential, as well, considering that access to both in-class technology and online courses must always be readily available. Additional system that should not be overlooked include:

VoIP

It is important not to ignore power protection on VoIP networks. Essential for maintaining communication—especially with parents during an emergency situation—these phone systems cannot be left vulnerable to the inconsistencies and power blips that affect commercial utility sites on a daily basis. Users have very high uptime expectations for VoIP networks, and UPS systems provide affordable and reliable insurance against the high cost of potentially losing business communications, even briefly. Indeed, during an outage at Solano Community College in Fairfield, Calif., a host of communication difficulties resulted, including being unable to call any offices or visit the college’s website and use online services.

POS system

Point-of-sale (POS) protection is necessary to ensure smooth monetary operations at bookstores, cafeterias, sporting arenas and stadiums, and other venues where financial transactions occur.

Security

Another area of critical infrastructure requiring protection is security systems, which often encompass cameras and video surveillance monitors, lighting, badge-entry and electronic locking door systems. IP-based security devices such as network cameras and access control devices are usually powered through PoE over the LAN. Since their function is essential, these devices must continue to operate during a power outage.

A 2014 power outage inadvertently sparked a security fiasco at Mt. Zion High School in Morrow, Ga., leading to the campus being locked down following reports of a gun at the site. The security scare came after students attempted to use a storm-related outage to close the school. Officials said students tried to trick the media into believing school was dismissed, then one student reported seeing someone with a gun, which was a prank. That led to a huge police presence, in the air and on the ground, with parents rushing to the school to pick up their kids. Power was restored fairly quickly, and police subsequently charged one student with disrupting operation at a public school.



Higher education power infrastructure

- 1 Security
- 2 Emergency lighting
- 3 Point-of-sale
- 4 Digital learning technologies
- 5 Network closet
- 6 Data center

Assessing the greatest challenges of IT professionals

Digital technology is driving fundamental changes in the entire educational process, especially as repeated research continues to demonstrate a clear link between technology, achievement and motivation.

Most experts agree that students and teachers tend to be more engaged and interested when technology is an integral part of teaching and learning. As a result, IT pros face tremendous expectations to properly support them.

When Eaton recently surveyed IT professionals in the education industry, the majority expressed an overwhelming need for more time. If putting out fires and troubleshooting problems didn't steal so many hours of their day, IT pros would choose to focus on objectives such as new technology adoption, improving documentation, ensuring a digital learning pathway, creating scalable learner-centric technology architecture, teacher training, automation and bolstering wireless capabilities.

Almost universally, IT professionals report being hindered by:

Downtime and managing expectations: When access to technology grinds to a halt, so does much of the learning process. During a power outage, IT personnel must drop everything and shift their attention to resolving the problem, executing orderly shutdown of equipment and reducing data loss. You can imagine how IT pros had their hands full during a campus-

wide outage at Arizona State University in 2012, which prevented students from being able to log into online systems to access e-mails and class materials, as well as take tests.

Serving multiple end users: It's not easy answering to many bosses, each of whom has a different set of priorities and expectations. Yet that is exactly what most IT professionals are tasked with, as students, faculty and staff, and even parents look to them for support. Yet they are far more than just a help desk.

Juggling multiple responsibilities: Wearing many hats in their roles in education, IT personnel must oversee and prioritize a wide variety of day-to-day responsibilities, including managing hardware, software, security, support and training. In the K-12 sector, they are also routinely pulled in to assist with curriculum planning, standardized testing and other issues—and often must execute this ever-growing list of responsibilities with insufficient staff and support. As one K-12 IT manager summed up: "I am a department of one that serves 420 students, 110 staff and faculty, and about 350 parents who all feel like I'm their first line of support."

Budget constraints: Similar to what is being experienced in many other business sectors, today's education-based IT administrators are being expected to do more with less. Dwindling budgets coupled with growing threats make accomplishing this objective especially tough.

In fact, budget limitations ranked sixth among higher education IT pros' challenges in Educause's list of the [Top 10 IT Issues for 2018](#). Respondents said balancing and rightsizing IT priorities and budgets to support IT-enabled institutional efficiencies and innovations was a major test.

Platform cross-compatibility in mixed-use environment: With students, faculty and professors using so many different devices, IT professionals are continually troubleshooting platform cross-compatibility problems, especially on college campuses.

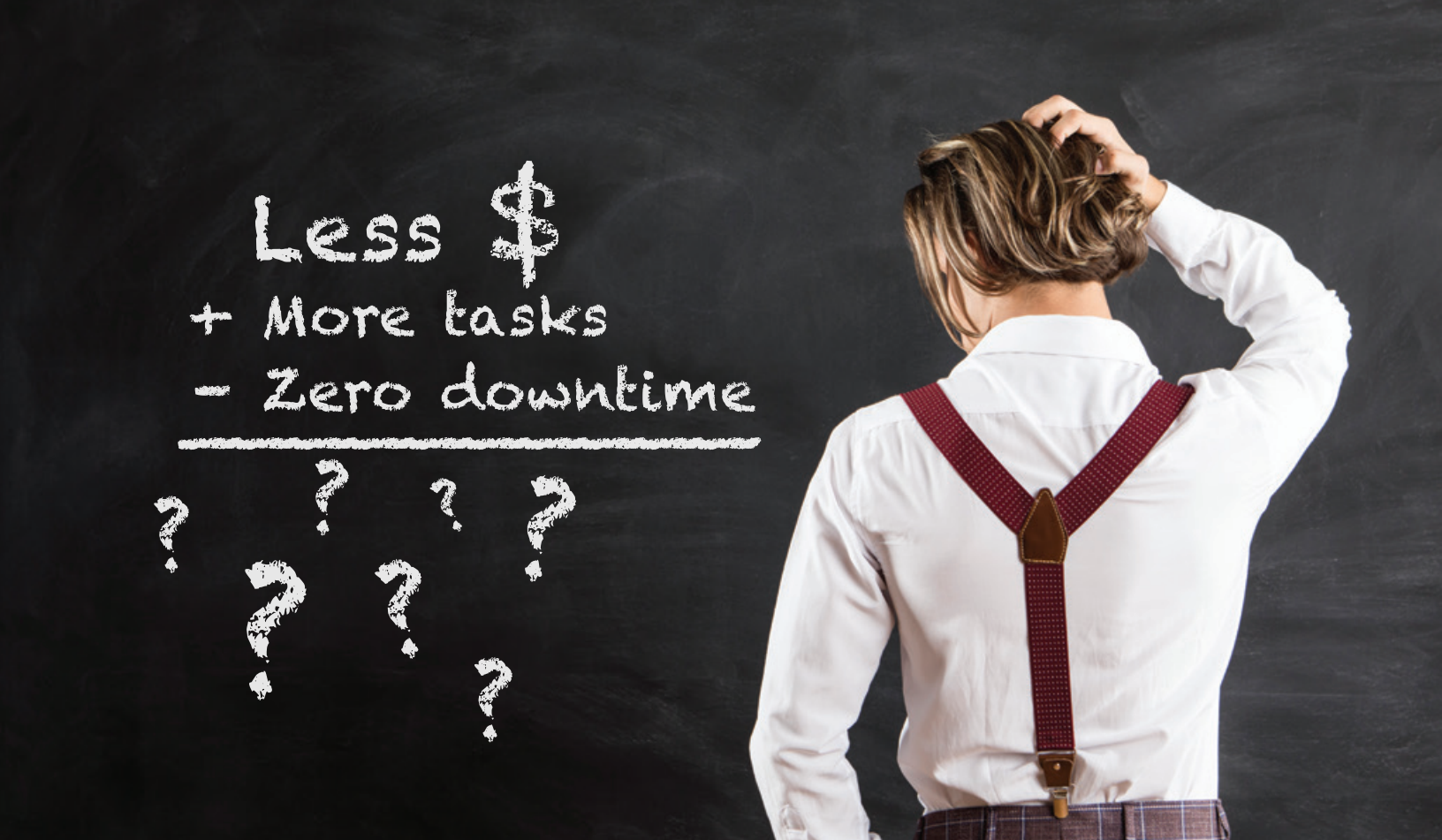
Slow adoption by faculty: Helping institutional constituents, including IT staff, adapt to constantly changing technology was another challenge identified in the [Educause list](#). The pace of technology adoption tends to move slowly at every level of education which can gridlock IT personnel.

Universal ticket

IT pros in schools don't have time to worry about power quality — a reality that was highlighted by a recent Spiceworks query. When the professional networking group asked IT pros to share the topics of their most frequent tickets, almost universally they reported students or teachers unable to reset their passwords and requests to remedy projectors not working properly.

ONE COMMUNITY MEMBER SUMMED UP THE MOST COMMON COLLECTIVE TICKET:

"My (computer/projector/printer/IWB/speakers/TV/radio/anything else with a plug) hasn't been working for (approximately half the time since the start of term) and I need to use it (next period/this afternoon)."



Less \$
+ More tasks
- Zero downtime

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The true test: unifying technology needs and budgets

When deteriorating budgets meet increased expectations for IT personnel, ensuring continuous uptime can feel like a math problem with no solution.

However, educating decision-makers about ever-growing blackout threats—and their potentially devastating consequences—can go a long way toward securing necessary funding for technology.

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IT pros should consider demonstrating to district and campus leaders how deploying a solid power protection solution will pay dividends in return on investment (ROI). By reducing downtime, both money and time are saved and can be allocated to other vulnerabilities (this also tends to bolster job security for IT pros!). Furthermore, utilizing power management software can help you extend your reach, with the ability to resolve many issues without even leaving your desk.

The good news for the near term is that IT budgets are expected to grow or remain steady in 2019, according to Spiceworks' [The State of IT Report 2019](#). The firm revealed that 58 percent of organizations anticipate revenues will increase in 2019, with an even greater percentage of larger companies reporting plans for more profits. Thankfully for IT pros, some of this new revenue will very likely trickle into the IT department. In fact, 89 percent of companies said they expect IT budgets to either grow or stay the same over the next 12 months, with an average increase ringing in at 20 percent.

Organize, protect, manage: it's as easy as A-B-C

Achieving a sufficient power management strategy in today's education environment requires more than simply deploying a UPS.

IT managers are seeking solutions that will not only help them avoid downtime but also achieve additional benefits, such as improving remote monitoring and reducing clutter.

The following cheat sheet summarizes what is included in a high-achievement approach to power quality.



A broad selection of racks, enclosures and PDUs are available to keep servers, switches and storage devices safe and organized.



Backup infrastructure that is clean, reliable and redundant is provided through UPSs, extended battery modules, maintenance bypass modules and service plans. UPSs that are designed for emergency lighting applications (i.e. UL 924 tested and certified) are also available to enhance student safety.



Comprehensive software—with complementary products such as intelligent rack PDUs and environmental monitoring probes—that enables monitoring, control and automation of an entire power infrastructure, allowing personnel to identify potential issues and resolve them before they escalate.

Work smarter with power management software

Eaton is ahead of the curve when it comes to power management software.

Our three platforms include:

- [Intelligent Power Manager \(IPM\)](#)
- [Visual Power Manager \(VPM\)](#)
- [Visual Capacity Optimization Manager \(VCOM\)](#)

Eaton power management software creates a robust solution that helps IT managers save time and money while reducing threats. The ability to monitor and automate risk mitigation actions keeps a district or institution operating at optimal capacity.



Intelligent Power Manager

IPM is an on-site, policy-based automation software platform that is easy to use across multiple campuses or facilities.

Helping to maintain business continuity, IPM triggers advanced remediation actions during a power outage to ensure critical equipment remains up and running as long as possible. By allowing remote monitoring, management and control of UPSs and other devices on the network — both physical and virtual—IPM increases uptime, while saving time and money by enabling power issues to be resolved remotely.



Visual Power Manager

Ideal for school districts, VPM is an excellent tool to remotely monitor large and distributed deployments.

VPM helps you monitor power equipment, supply predefined and custom reports, initiate mass firmware and configuration commands and deliver a visual layout of your data center, making it simple to stay in-tune with trends and identify and resolve any issues. The comprehensive reporting software saves you time, allowing you to stay on top of power management while focusing on the bigger picture.



Visual Capacity Optimization Manager

VCOM is Eaton's data center system optimization (DCSO) platform.

VCOM is an intuitive remote monitoring and management software that provides a greater level of business intelligence by monitoring both IT and facilities power infrastructure, making it a perfect choice for large or multi-campus management. The platform features capabilities designed to reduce operational expenses, improve system and application reliability and mitigate risk through data analysis. You gain the unique ability to not only easily track usage, utilization, capacity limits and more, but also the advantage of reacting quicker to address any related concerns.

The adage, “knowledge is power,” is especially appropriate in the education sector, where the reverse is equally relevant: power is knowledge.



Continuous access to clean, reliable power has become the cornerstone of facilitating modern-day digital learning.

Now more than ever, IT professionals need quality power protection solutions that do more than simply safeguard equipment.

While IT personnel may not be able to be in more than one place at a time, they can deploy solutions that consolidate management duties, freeing up time to focus on more important matters, such as teacher training and tools to further enhance the learning process. They can choose solutions that enable them to save money incurred from outages and new equipment deployments, and reallocate those funds to other IT vulnerabilities that need attention. Ultimately, with the optimal solution in place, IT managers can create robust disaster avoidance plans that will help to ensure business continuity and uptime for their campuses, students and faculty.

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Eaton
1000 Eaton Boulevard
Cleveland, OH 44122
United States
Eaton.com

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