MEETING DEMANDS FOR A MODERNIZED IT INFRASTRUCTURE

By updating their IT environments now, enterprises can enable powerful new capabilities and avoid the problems that often accompany legacy infrastructure.

EXECUTIVE SUMMARY

Outdated infrastructure doesn't just cause headaches for IT teams. A failure to update servers, storage and networks can lead to a surprisingly diverse array of issues that reach throughout an enterprise. Development schedules are delayed, product launches are pushed back, customers become frustrated and employees may even leave a company at least in part because of subpar experiences with technology.

Through modernized solutions such as hyperconverged infrastructure, all-flash storage arrays, and private and public cloud resources, organizations can achieve a number of benefits. A modernized IT environment can improve cybersecurity, dramatically reduce maintenance costs and increase revenue, among other positive business outcomes. It can also allow an organization to make better use of IT staff members, moving these professionals from support roles to more strategic projects.

However, IT modernization must be driven by an organization's specific business goals and should include efforts to standardize, simplify and automate environments. By taking a strategic approach to IT modernization, businesses can maximize the return on their investments and set themselves up for success.

The Benefits of IT Modernization

True story: Executives at one organization were desperate to improve the performance of some of the company's proprietary applications. They were so focused on this effort that they devoted an entire development team to the project for six months, asking them to work on rewriting the code in a way that would dramatically alter how the applications ran. Although the development team worked diligently, they made only incremental gains over half a year — at a great labor cost to the organization.

Then, the data center team upgraded the organization's legacy storage infrastructure, replacing existing hardware with an all-flash array. Application performance improved overnight, meeting the organization's initial goals and dwarfing all of the development team's hard work. The improvement was so remarkable that it set off a tempest within the organization, with developers understandably upset that they'd spent so much time and effort chasing an outcome that could be achieved simply by swapping out older storage hardware for new.

This situation illustrates how detrimental it can be to business outcomes when organizations hold on to their legacy IT infrastructure for too long. It also demonstrates how important it is for developers and IT operations departments to communicate closely with one another about business goals, and how IT modernization efforts might help to achieve them.

It is understandable why many organizations try to wring every last useful day out of their data center solutions. If the hardware is still working, after all, each day that servers and storage appliances are left in place represents money saved, which the organization can invest back into the business — rather than spending that money to replace IT infrastructure that still seems to be doing the job. However, it is easy to take this approach too far, with three-year refresh cycles stretching to five years (and then to six or seven). With these delays come considerable risks, including heightened cybersecurity vulnerabilities, hits to business continuity and increased maintenance costs.

The need to update aging IT infrastructure is widespread, affecting organizations of all sizes and across industries. In fact, according to Spiceworks, two-thirds of North American businesses that plan to increase their IT spending cite the need to upgrade outdated infrastructure as a top factor in this decision.

The Risks of Delays

All components of IT infrastructure can face serious issues as they age. Sometimes, these problems are obvious even to end users, such as when office employees struggle with unresponsive keyboards and endlessly spinning pinwheels on laptops that should have been refreshed years ago. Other times, issues are more insidious, such as when routers or servers age out of support and lack updated software patches, creating security vulnerabilities that may go undetected until after an organization has had a significant data breach.

Supporting older servers and other data center infrastructure can create a drain on IT staff and other resources. When IT shops spend the bulk of their time simply "putting out fires," "keeping the lights on" or any other number of clichés that are synonymous with maintaining legacy hardware, they have far less time available for critical and strategic projects that create value for the business. Putting off modernization efforts not only drives up maintenance costs and bogs

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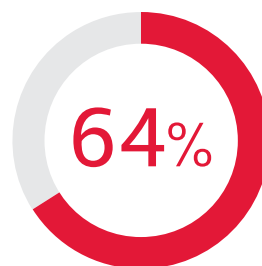
The percentage of organizations that cited the need to upgrade outdated infrastructure among their top reasons for IT budget increases[1]

down IT shops, but it can also cause organizations to miss out on opportunities to improve products, open up new revenue streams and enhance the experience of both customers and employees. This is because older solutions may not support growing bandwidth demands or mobile networking, and retaining outdated legacy servers may make it difficult for companies to deploy new applications.

Taken alone, any one of these problems is probably solvable with some work-arounds. But considered together, the easiest solution is often simply to modernize IT infrastructure.

The Rewards of Updates

Conversely, updated IT infrastructure can provide numerous benefits. For instance, modern servers with outstanding specifications can support advanced capabilities such as artificial intelligence and machine learning. This will become increasingly important as these emerging technologies rapidly become the norm. According to a 2019 study, the machine learning market will grow 44 percent per year in the coming years, expanding from just $1.6 billion in 2017 to nearly $21 billion in 2024.

In other instances, the performance of modern IT infrastructure is so much better than that of legacy systems

Modernizing to Support Younger Workers

As baby boomers retire in larger numbers, businesses are increasingly competing for the most talented millennial and Generation Z workers. Having grown up with technology and mobility, these younger workers typically have high demands for their employers' IT environments. Organizations can attract and support these workers by modernizing infrastructure to enable increased connectivity and collaboration.

Virtual desktop infrastructure: Many organizations turn to modern data center infrastructure such as flash storage and hyperconverged infrastructure to support virtual desktop infrastructure (VDI). Among other benefits, VDI can reduce IT costs, improve data security and allow employees to access their desktops from anywhere.

Mobility and BYOD: Today, virtually every knowledge worker is a mobile worker — including employees who typically come to the office every day. By updating wireless networks, organizations can provide the coverage and performance necessary to support mobile devices and apps.

Collaboration and video: Collaboration suites and videoconferencing tools can help employees in different locations work together in real time, but they require significant network bandwidth. By updating IT infrastructure, organizations can change the way their employees work.

that its slightly higher cost becomes almost negligible. One prime example of this is flash storage, which can sometimes produce a tenfold improvement in application performance for latency-sensitive workloads. Flash solutions can also handle much more data than traditional spinning-disk storage because of compression and data deduplication features, and they can even reduce the number of servers needed to run an application. Such factors can sometimes make the total cost of ownership lower for modern infrastructure than for legacy systems.

By strategically adopting cloud infrastructure — including private, hybrid and multicloud architectures — organizations can improve the flexibility, scalability, manageability and security of their IT resources.

On-premises or in the public cloud, modernized IT infrastructure can help to support new mobile apps and e-commerce solutions and can give businesses greater agility to roll out new systems. The result isn't just an improvement to the IT environment, but also to the ways an organization develops and rolls out new products, serves customers and enables its workforce to be as productive as possible.

Key Elements of a Modernized IT Infrastructure

There's no single roadmap for IT modernization. Every organization's IT environment is unique, and companies should base their investment decisions on their specific business goals rather than trying to chase trends or replicate other companies' successful efforts. That said, there are a number of modern storage, networking, compute and cloud technologies that organizations should at least explore as they set out to modernize their IT infrastructure. These solutions tend to provide heightened performance, greater simplicity or improved ease of management for IT administrators.

Storage

Modernizing on-premises storage solutions can improve application performance and streamline management tasks.

Software-defined storage: The Storage Networking Industry Association describes software-defined storage (SDS) as storage virtualization with a service management interface, including automation, standard interfaces, virtualized data path, scalability and transparency. SDS emphasizes interoperability across hardware and software solutions, giving organizations increased flexibility to consume and explore different physical data storage options and improve their ability to generate business insights.

Hyperconverged infrastructure: While hyperconverged infrastructure (HCI) also incorporates networking and compute, it is the first foray into SDS for many organizations. In addition to the other benefits of SDS, many organizations are attracted to HCI because it is modular and scalable. Many businesses start with just a few nodes in their data centers, then gradually expand their HCI clusters as demands increase.

Flash storage: Data center administrators have long coveted the performance of all-flash arrays. The major difference today

is that these solutions have become considerably less costly in recent years, making them viable even for organizations that exclusively considered spinning–disk storage during their most recent infrastructure refreshes. The emergence of NVMe (Non–Volatile Memory Express) is another important development. This high–performance protocol offers lower latencies (even compared with previous flash solutions) and can enable new applications and capabilities for real–time workload processing, both in the data center and at the network edge. Organizations preparing to update their storage infrastructure should look closely at the total cost of ownership for all options, as flash arrays can sometimes provide improved performance at a lower overall cost than spinning–disk solutions.

Networking

A robust network is essential for supporting bandwidth–intensive use cases and mobile applications.

Software–defined networking: Software–defined networking (SDN) solutions separate a network's data plane from the control plane, making the control plane independent and leading to a more programmable network. Among other benefits, SDN enables organizations to deploy applications and services more quickly by leveraging open APIs.

Wi–Fi 6: The latest generation of wireless connectivity, Wi–Fi 6 (also known as 802.11ax) offers a theoretical maximum speed of 9.6Gbps, a dramatic increase from the 3.5Gbps of the previous Wi–Fi standard. Because this is far more speed than any one user or machine is likely to require, the benefits of upgrading to Wi–Fi 6 come from improving overall wireless network performance.

Considering Containerization

Many organizations are exploring whether to use containers in the data center. This trend has real benefits, but it's not a perfect fit for every environment.

Containers, often managed via an open–source system such as Kubernetes, are essentially very lightweight virtual machines. They allow data center administrators to deliver code without the extra "overhead" associated with traditional virtual machines, such as guest operating systems. This leads to more efficient use of resources within the data center, requiring fewer racks, less energy, fewer software licenses and less maintenance.

However, containers don't make sense for some organizations. One reason is that the benefits won't be as great for organizations that rely primarily on off–the–shelf software as for those that develop most of their own applications. Also, implementation is typically simpler for organizations with large Linux environments. Often it's best for organizations to start small and take the time to learn exactly how containers will fit with their specific environments to prevent cost overruns and other problems.

Intent–based networking: An intent–based networking solution allows network administrators to define a desired state for the network and then uses automation to implement these desired (or "intended") policies. With this approach, data center administrators can ensure sufficient performance for traffic, simplify management and maintenance, and improve security.

Network management: By adopting network management software, organizations can reduce complexity and improve productivity, resulting in a lighter management burden for IT staffers. This can lead to lower networking costs, more time to market for new services and an enhanced end–user experience.

Compute

Aging compute infrastructure is a major source of inefficiency in enterprise data centers. According to IDC, organizations that replace their servers see a substantial reduction in costs associated with maintenance, power and facilities over a three–year period and significantly reduce their unplanned downtime. (According to some estimates, the cost of data center downtime alone can approach $10,000 per minute.) In organizations that leave aging servers in place, meanwhile, IDC reports that IT staffs spend more than half their time conducting routine maintenance tasks. Server upgrades are also associated with a reduction in total physical infrastructure footprint, an increase in virtual machines per physical server, and faster development and deployment of new applications. Yet many organizations try to squeeze seven years of life out of their compute infrastructures.

IT administrators have a number of options when upgrading their compute environments. Several chip makers have driven innovation as they have advanced processing according to Moore's law. For example, Intel's new memory module, Optane, is based on Data Center Persistent Memory Module and can load frequently used database tables and rows into memory for significant performance enhancements. Similarly, AMD's EPYC chipset enables many more virtual machines than a standard chipset.

Cloud

Many organizations have moved away from the cloud–first mindset that once prevailed, instead evaluating the public cloud on a case–by–case basis. Still, it is important for organizations to do their due diligence by exploring whether portions of their environments could run more efficiently in the public cloud. Not only does public cloud infrastructure support scalability and agility, but public cloud resources also require far less maintenance and support than on–premises resources. Infrastructure in the public cloud is always "modernized." But to get the most out of the public cloud, IT administrators must take care to appropriately design and optimize their environments.

Cloud management platforms are essential for helping IT professionals to gain needed visibility into and control over their public cloud environments. Governance policies, often established by a multidepartment cloud center of excellence, are also important for preventing the sort of sprawl that can quickly lead to cost overruns.

Hybrid clouds that incorporate both private and public resources have become the norm in enterprise data centers, and organizations are increasingly looking to multicloud environments that tie together on-premises resources with more than one public cloud. This approach not only allows organizations to take advantage of different vendors' strengths and unique features, but it may put them in a stronger bargaining position when negotiating new contracts with cloud vendors.

Crafting a Modernization Strategy

To improve IT operations over the long term, organizations must combine modernized infrastructure with a strategy that emphasizes business goals and gives decision-makers the flexibility to respond to changing events. It may seem obvious at first that a deliberate strategy should guide IT modernization, but IT environments typically have many moving parts (all of them on different refresh cycles). Thus it's understandable that many organizations find themselves in a largely reactive posture when updating their infrastructure.

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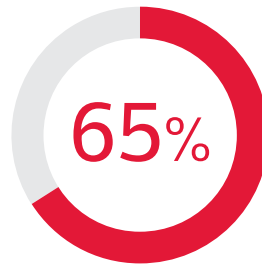
The percentage of enterprises expected to aggressively modernize legacy systems with extensive new technology platform investments through 2023[2]

In fact, organizations face a number of challenges in crafting and implementing an IT modernization strategy. First, executive buy-in can be a sticking point. IT departments generally don't control their own purse strings, and executive leaders will probably need to sign off on any major changes — especially changes to financing models (such as a switch from CAPEX to OPEX budgeting). Too often, a disconnect exists between IT departments and line-of-business stakeholders, and bridging that gap is essential to ensuring that new investments actually help to achieve an organization's business goals.

New infrastructure must also be compatible with existing hardware and software. And finally, many organizations lack the internal IT expertise needed to support some emerging technologies, a concern that often presents itself when organizations move resources to the cloud.

To address these challenges, organizations should aim to craft IT modernization strategies that emphasize standardization, simplification, automation and orchestration. Guided by these core values, businesses can not only improve the performance and efficiency of their environments, but they can also ensure that the introduction of new systems does not inadvertently create new problems.

One major source of data center complexity is a piecemeal approach to IT infrastructure. When a new need pops up, an organization will often seek a solution to meet that need without giving much thought to the rest of the IT environment. This sort of approach is often penny-wise in the short term but can frequently be pound-foolish in the long run, leading to inefficiencies as data center administrators scramble to manage and support an ever-growing menagerie of disparate systems.

By opting for the most cost-effective solution for each problem, organizations end up introducing more and more variables into their environments. IT staff members then need to be trained on multiple operating and management systems, and the organization needs to juggle maintenance contracts with multiple vendors. This is not to say that a single vendor will be able to support an organization's entire IT environment. But when upfront costs are in the same ballpark, standardization can be a tiebreaker that saves money in the long run. By embedding simplification into their IT modernization strategies, organizations can address many problems related to data center complexity before they even start.

For similar reasons, organizations should look for every possible opportunity to embrace automation and orchestration in the data center. Any time data center administrators can identify repeatable processes and automate those workflows, that's an enormous win for staff productivity and efficiency.

$ CAPEX vs. OPEX

When weighing new investments, organizations must consider whether they want to finance their IT infrastructure via a capital expense (CAPEX) or an operating expense (OPEX) model. Each approach has benefits and drawbacks.

CAPEX: This is the traditional financing model for IT refreshes, with organizations planning out large capital outlays far in advance. A company, for instance, might replace one-third of its employee laptops every year (or all employee laptops every three years) and then plan its capital budget accordingly. The danger of this approach comes when organizations are tempted to stretch out refresh cycles, which can lead to outdated hardware, increased maintenance costs and security vulnerabilities.

OPEX: Through a consumption- or subscription-based OPEX model, organizations can procure IT resources for a recurring monthly charge or usage-based fees. Most commonly associated with the public cloud, the OPEX approach has also been adopted by organizations that engage in a Device as a Service model to deploy end-user computers. In addition to predictable monthly costs, this approach can simplify or even automate patching and other maintenance tasks. Organizations must be mindful, though, that they have governance policies in place to prevent cloud environments (and costs) from sprawling excessively.

According to BMC, automation of IT infrastructure results in a 90 percent improvement in service deployment speed, a 95 percent improvement in regulatory compliance, a 60 percent decrease in downtime and more than an 80 percent reduction in labor costs. Data center automation may require its own strategy, as many processes span different tools and departments, which can create failure points associated with manual tasks and bottlenecks in the gaps between steps.

Any IT modernization strategy (or any IT strategy at all, really) should place a heavy emphasis on governance. When IT environments are sprawling, inefficient and outdated, the blame usually falls at least in part on a failure to implement proactive policies and processes designed to ensure that any new solutions will be a good fit for the organization.

However, it is important for IT departments to be seen as enabling business initiatives rather than delaying or stopping them. When business units are constantly hearing "no" from governance boards or being told that their projects will be possible only after a wait of several months, they are liable to turn to a shadow IT option — only exacerbating complexity. When lines of business see the IT department as an ally instead of an obstacle, the IT team can help the organization to achieve its business goals while also ensuring a streamlined, modernized environment.

CDW: We Get IT Modernization

With decades of experience helping organizations to optimize their IT environments, CDW's solution architects are uniquely qualified to offer advice that can help companies modernize infrastructure and future proof their environments.

Among the services CDW offers:

IT consulting: CDW's Professional Services team can help companies to build and orchestrate a strategy that supports current needs and future growth. Areas of consulting can include IT direction, process improvement, governance and technology for cloud, IT operations, business continuity, and mergers and acquisitions.

Managed services: Through managed services engagements, organizations rely on CDW's experts for ongoing support managing their most complex infrastructure and applications. These engagements can be tailored to an organization's goals, giving internal IT staffers time to pursue business–critical initiatives that give their companies a competitive edge.

Workshops and assessments: Engagements such as our Cloud Readiness Assessments, Network Assessments, or Automation and Orchestration Workshops can help to focus on specific challenges.

CDW Can Design, Orchestrate and Manage a Comprehensive Infrastructure Strategy

CDW's simple, smart, scalable and flexible services portfolio provides a fully automated and managed infrastructure across your entire network, whether on–premises, hybrid or in the cloud.

DESIGN for the Future
Consult with our team of technology experts to plan a solution that fits your unique needs and optimizes business impact.

ORCHESTRATE Progress
CDW Amplified™ Infrastructure services help you build and deploy your custom infrastructure utilizing best practices.

MANAGE Operations
Our world–class, certified staff monitors and manages your infrastructure 24/7/365 to ensure operational efficiency and security.

Sponsors

Read how CDW can help your organization with infrastructure modernization.