

THE MODERN DATA CENTER FOR A DIGITAL WORLD

By eliminating siloed management and using resources more effectively, enterprises can maintain business agility and competitive strength.

EXECUTIVE SUMMARY

A software-defined data center (SDDC), in which infrastructure is virtualized and delivered as a service, can provide numerous benefits. The availability of pooled server, storage and network hardware, for instance, reduces the need for specialized components and servers in favor of affordable, off-the-shelf hardware that is easier to maintain.

Once IT professionals stop focusing on wiring things together and begin using software to manage operations, they can enjoy the benefits of greater efficiency, enhanced reliability and lower costs. In addition to the virtualization of infrastructure such as servers, storage and networking, data centers can implement orchestration and automation solutions to automate routine tasks and reduce the burden on IT staff.

Data center infrastructure management (DCIM) tools can give an organization a comprehensive view of key elements such as power, cooling and computing burden, helping to identify inefficiencies and spot potential problems. Together, these tools can help shift data center optimization into high gear.

A Practical Approach to Data Center Optimization

There is a right way and a wrong way to begin the journey toward data center optimization via virtualization. The wrong way is to sit back and let events — such as system overloads, equipment failures and vendor updates — dictate decisions. The right way to move forward is with proactive planning.

A growing number of organizations are recognizing the importance of virtualization. A [survey conducted by the consulting firm Protiviti](#) recently found virtualization to be a top priority for IT decision-makers. More than half of the respondents said they are currently undergoing a major IT transformation that will last a year or more. About 64 percent said their IT transformation projects are aimed at simplifying existing systems and reducing costs, while 55 percent noted enabling new functionality as a driving force.

The first step toward data center optimization is to create a strategy that combines best practices, addresses current requirements and anticipates future needs and technology advancements.

A good next step for any data center optimization project is to assess the current state of efficiency. Metrics created with the help of key performance indicators (KPIs) in areas such as equipment mean time between failure, average data center rack utilization and data center floor usage will provide valuable benchmarks for estimating future efficiency gains.

Data center agility is achieved by recognizing, understanding and deploying effective new technologies, such as server and network virtualization as well as cloud and hyperscale



WELCOME TO THE HYPERSCALE DATA CENTER

As organizations strive for maximum IT optimization, the hyperscale data center concept is gaining traction.

Hyperscale data centers have architectures that are designed to create a single, massively scalable infrastructure. A hyperscale data center accommodates a large number of small, individual servers to provide computing capabilities and can be customized to meet specific data center needs. The servers — called nodes — are clustered together and managed as if they were a single entity.

With the potential to operate millions of virtual servers, a hyperscale data center can meet an organization's increasing IT demands without requiring additional physical space or resources for cooling or power.

Most organizations that build hyperscale architectures start small to keep upfront costs as low as possible. As demand grows, the infrastructure can be easily expanded by adding more nodes to the cluster. Hyperscale infrastructure allows data center costs and lifecycle management to painlessly transition from unit-based servers to individual components.

78%

The percentage of enterprise workloads that will be processed by cloud data centers by 2018¹



computing. KPIs and other metrics designed to reveal the benefits and costs of such technologies should be calculated early in the planning process.

Understanding Risk

Next, any promising data center optimization technology, process or approach must be evaluated not only for its potential benefit to the organization, but also for the level of risk it presents. Before any optimization initiative begins, a risk assessment should be conducted to detect any lurking vulnerabilities or threats that could potentially harm the organization or its IT systems. There are four aspects to risk assessment:

Vulnerability: an error or a weakness in the design, implementation or operation of a system

Threat: a technical, natural or human adversary that is motivated to exploit a system vulnerability

Impact: the consequences that could result if a vulnerability is exploited

Probability: the chances of a risk becoming reality

As the number of organizations embracing virtualization grows, so do the number of virtualization options. Comparing and evaluating various hardware and software platforms to ensure a perfect fit and optimal performance requires time and research. KPIs alone won't cut it. An experienced partner can leverage its real-world experiences and staff expertise to ensure that all virtualization components meet or exceed their benchmarks and work together seamlessly.

"Where to begin?" That's the first question many IT leaders ask themselves as they contemplate a data center optimization initiative. Because a massive, sweeping data center overhaul may not be possible due to cost and other limitations, the logical approach is to target areas that promise the most significant impact in terms of enhanced performance, efficiency improvements and cost savings. KPIs can be used to pinpoint the servers, storage devices, networking equipment and other resources that are prime candidates for virtualization.

On-Premises or in the Cloud?

A [2014 study by research firm Saugatuck Technology](#) predicts that by 2018 more than 60 percent of organizations will have at least half of their IT infrastructures on cloud-based platforms.

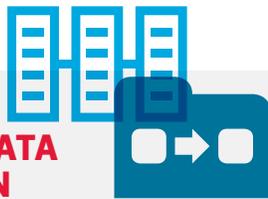
When it comes to having an on-premises data center versus migrating workloads to the cloud, the financial argument typically boils down to accounting for IT as an operating expense (OPEX, the cloud's financial model) or as a capital expense (CAPEX, which is how on-premises data centers are paid for).

¹SOURCE: Cisco Systems, "Cisco Global Cloud Index: Forecast and Methodology 2013–2018 White Paper," November 2014

Choosing the cloud and its OPEX payment model yields some significant benefits. For example, OPEX costs can be planned for in advance, giving IT decision-makers an accurate idea of their future budgetary needs, while capital expenses require major outlays that can be difficult to estimate and that depreciate over time. A cloud deployment also allows an enterprise to pay only for the services it needs, providing the ability to scale up or down as needs change.

However, data center optimization doesn't have to present a distinct choice between on-premises or cloud solutions. It is possible to straddle both worlds and use whichever technology makes the most sense for a specific system or task.

One [major software industry executive predicts](#) a "decade of coexistence," during which the three models of cloud service — Software, Platform and Infrastructure as a Service — continue to work alongside conventional on-premises systems. In this model, known as a hybrid deployment, an organization can maintain an in-house data center for workloads that make sense to run on-premises, such as those that contain sensitive personal information. Workloads that make more sense in the cloud can be migrated to a service provider.



FIVE KEY BENEFITS OF DATA CENTER VIRTUALIZATION

By utilizing virtualization, a software-defined data center (SDDC) offers benefits that traditional data centers simply can't match.

- 1 LOWER COST:** High equipment cost has long frustrated IT managers. By minimizing the amount of hardware in use by virtualizing servers, storage and networking resources, equipment expenditures automatically drop. Virtualization also saves money by improving uptime, reducing the use of power and streamlining maintenance.
- 2 SPEEDIER REDEPLOYMENT:** When a physical server suddenly dies, redeployment time hinges on several factors, including having an available backup server ready to go and ensuring that the data on the backup server is up to date. In a virtualized environment, a redeployment can be completed within minutes. With the help of a virtual backup tool, end users may never even know there was a problem.
- 3 EASIER CLOUD MIGRATION:** Transitioning to virtual machines brings a data center a step closer to becoming a full-fledged cloud environment.
- 4 RISK-FREE TESTING:** A virtual environment is ideal for running tests. Isolated from end users, tests can be conducted while maintaining regular services. In the event of an error, IT administrators can simply revert to a previous snapshot and try again.
- 5 IMPROVED DISASTER RECOVERY:** Disaster recovery can be handled more quickly and easily in a virtualized environment. Using up-to-date snapshots of virtual machines, it's possible to get systems back up and running without missing a beat. Even if the data center itself is destroyed, virtual machines can be replicated at another location.

➔ **For more information on how CDW can help your organization optimize its data center operations, call 800.800.4239 or visit CDW.com/datacenter.**

The Tools at Your Disposal

Organizations that transition to an optimized, virtualized data center gain a wide range of new tools and capabilities that not only contribute to increased IT productivity and efficiency, but also boost innovation and help IT focus on an organization's mission.

Greater Agility

Tech market research firm [Gartner defines agility](#) as "the speed at which an IT organization responds to business needs." By deploying a virtualized data center with a software-defined architecture, IT departments can move management, provisioning and other attributes into the software layer to deliver improved agility and greater cost savings.

Orchestration and automation solutions further enhance agility by automating routine IT tasks, managing compliance and orchestrating process management. For example, Cisco Systems' Intelligent Automation for the Cloud solution can provide a self-service portal that allows users to request new services such as servers, as well as to decommission services.

Bimodal IT is a data center trend that allows enterprises to maintain consistent operation of traditional IT infrastructures while taking advantage of advanced technologies for greater speed and agility. Under this model, data center managers establish one mode for a traditional IT infrastructure approach, emphasizing scalability, efficiency, safety and accuracy. The enterprise also employs a second mode that focuses on innovations such as hyperconverged infrastructures, web-scale IT, cloud computing and flash storage. By combining these modes, IT organizations can improve their speed, agility and flexibility, while also maintaining efficient traditional data center operations.

Highly Efficient Servers and Infrastructure

Server consolidation and virtualization allow organizations to minimize the burdens of the traditional technology refresh cycle. Enterprises still must replace obsolete hardware and software with new technologies, but if the data center has switched from physical servers to virtual machines, this practice does not have to be performed as frequently or as extensively as in the past. A data center that uses fewer physical machines can significantly extend the traditional three- to five-year server refresh time frame.

SDDCs also enjoy lower power and cooling costs. Resource capacity, for instance, can be precisely provisioned based on an individual application's needs. SDDCs also make it easier to move workloads to other data centers where energy costs may be lower. Additionally, a new generation of management tools, designed to offer comprehensive visibility into the entire data

center footprint, can help IT managers make informed power and cooling efficiency decisions that can be carried out automatically.

Data centers also can improve their efficiency by implementing storage techniques such as data deduplication. Traditional data centers often store multiple copies of the same data in various storage and backup systems. Data deduplication software, by comparing files or blocks within files across a data set, automatically detects wasteful redundancies. Whenever the software spots a duplicate block, it inserts a pointer to the original block into the dataset's metadata (the information that describes the data set), rather than storing the block again. If the same block appears more than once, multiple pointers to it are created. Because pointers are smaller than blocks, storage space is automatically saved.

More Efficient Management

DCIM gives an organization continuous, detailed insight into key operational and support aspects to improve planning, increase agility and reduce costs.

Data center management can be augmented with single-pane-of-glass visibility, which captures key metrics from an array of sources to provide a rapid, comprehensive view of IT performance indicators and metrics. Single-pane-of-glass visibility helps IT managers align business goals by linking operational metrics with organizational priorities.

Another management tool, automatic application delivery, helps make data centers more efficient by removing slow, complicated manual processes that hinder the speed of

application deployments. This technology also improves the reliability of business systems, as well as new apps and services, by eliminating avoidable human errors from release processes.

Software-defined network technology is also revolutionizing data center management, providing benefits such as faster and more agile service provisioning, dynamic responses to ever-changing traffic loads, holistic management with increased visibility across the network and enhanced security.

A [2015 survey conducted by market research firm IHS](#) found that 45 percent of North American businesses intend to increase spending on software-defined wide area networking over the next two years.

CDW: A Data Center Partner That Gets IT

From start to finish, CDW helps organizations of all types and sizes meet their data center needs and make a seamless, painless transition to a software-defined data center. A dedicated account team provides solutions and services ranging from IT components (such as servers, storage and networking equipment) to the underlying infrastructure for power and thermal management.

Partnerships with leading industry vendors give CDW the insight and experience necessary to evaluate and address an organization's unique needs. With an account manager to help guide planning and implementation, CDW's experienced, industry-certified solution architects can recommend a customized path for any organization to follow.

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