

# SigmaUptime

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## Improving IT Agility through Convergence

**Converged infrastructure solutions help speed provisioning and deployment while relieving IT complexity and sprawl.**

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## Sigma Uptime

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## Converged infrastructure solutions help speed provisioning and deployment while relieving IT complexity and sprawl.

**T**he push to transform IT operations began several years ago with a desire to reduce costs, increase operational efficiency and create a more flexible, scalable environment. Today, that movement has been transformed by increasingly dynamic market forces.

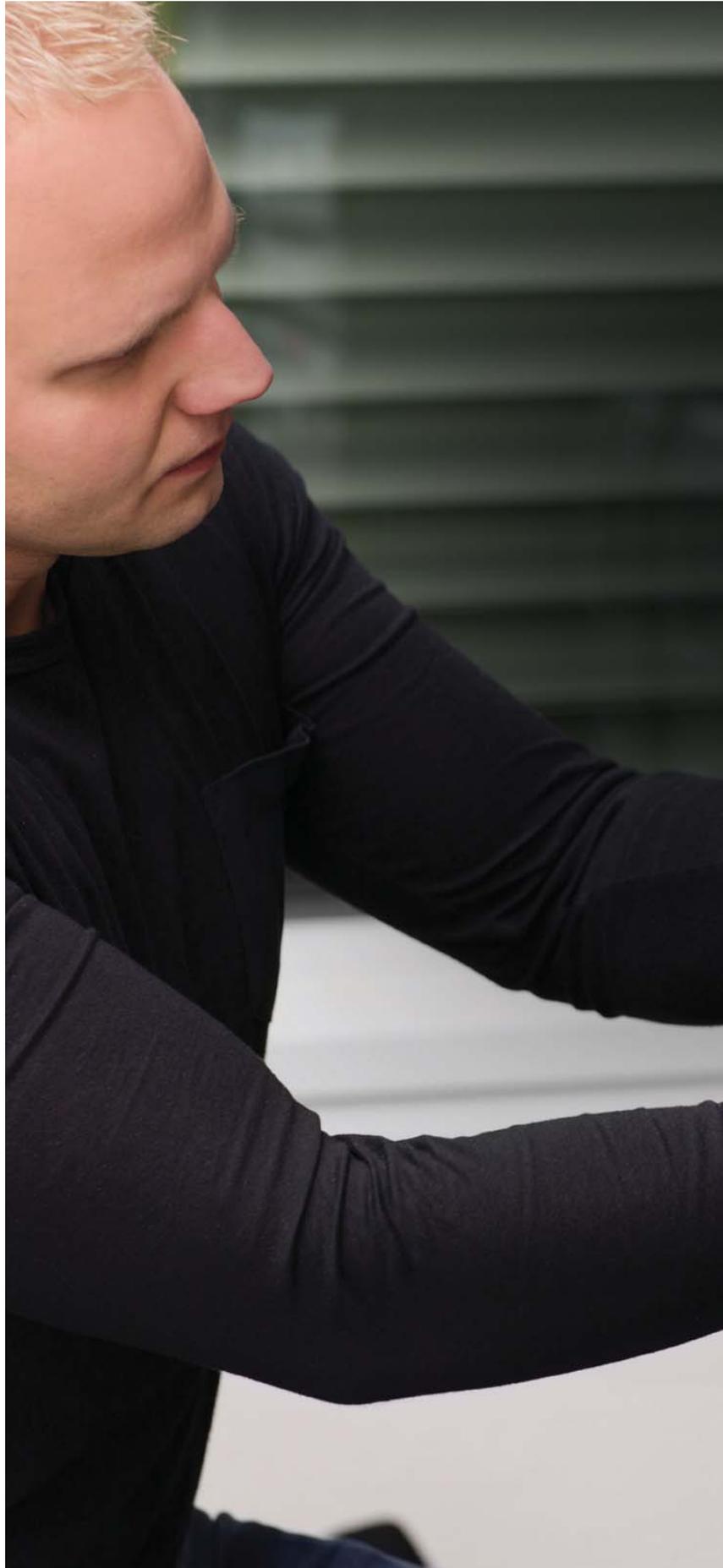
IT organizations are expected to respond instantly to changing business requirements and deliver innovative solutions that drive the business forward.

That's a tall order given the structure of the traditional IT environment. Most data centers were built using best-of-breed components that were carefully integrated and tuned to meet specific requirements. Over time, new technologies were added to help bolster security, streamline management and support growing demands. The result is a highly complex environment that limits IT's ability to react to change and deliver resources and services flexibly and efficiently.

"Some years ago, vendors started offering servers, storage, networking and management as discrete components that IT organizations used to build their data centers from scratch," said Shannon Gillenwater, Product Development Manager, Sigma Solutions. "Now the IT industry is starting to rethink this architectural approach. Converged infrastructure solutions have emerged to help relieve complexity and reduce the time spent provisioning, configuring, deploying and managing the IT infrastructure."

Converged infrastructure solutions tightly integrate compute, storage and network resources under a common management framework. These pools of shared services can be implemented on the fly, increasing flexibility and enabling IT to focus on innovation.

"Converged infrastructure solutions maximize IT efficiency and lower total cost of ownership through a shared-service model," Gillenwater said. "The result is





# Improving IT Agility through Convergence

reduced IT sprawl, simplified provisioning and management, and faster service delivery.”

## Many Benefits

Also known as integrated infrastructures, these pre-built and pre-configured systems can be up and running in hours or days — not weeks or months. Add single-pane-of-glass management that cuts across the technology stack, and organizations quickly gain the ability to create virtual resource pools that make adding services and applications faster and easier than ever before.

“A greater number of IT customers are realizing the value proposition of integrated systems and how they can simplify IT operations,” said Jed Scaramella, IDC’s research director for enterprise servers. “IDC expects integrated systems to be on many customers’ radar during purchasing cycles in 2014.”

In a recent case study, IDC demonstrated that a converged infrastructure not only sped application deployments, but simplified operations, improved business-support agility, saved money and freed staff to focus on delivering new business capabilities. According to the study, the solution reduced data center costs by 50 percent, cut downtime by 96 percent and allowed new services to be deployed five times faster than before.

In its Worldwide Quarterly Integrated Infrastructure and Platforms Tracker, IDC reported an impressive 68.5 percent year-over-year factory value growth in the integrated infrastructure market during the third calendar quarter of 2013, with system sales totaling \$1.4 billion.

“The strong growth in the integrated systems market has become a real bright spot within the IT industry,” said Eric Sheppard, IDC research director for storage. “Server, storage and networking vendors have clearly created a set of offerings that resonate very well with data center operators looking for the next level of infrastructure efficiency for their highly virtualized environments.”

## Pooling Resources

Converged infrastructure solutions help optimize the data center for today’s IT demands. Legacy data center architectures were designed to address predictable workloads, structured data and dedicated access. Today’s requirements are exactly opposite, with unpredictable workloads such as virtualization and big data applications.

The changing relationship between storage, servers, networks and applications requires a new level of integration across the enterprise. A converged architecture simplifies integration and provides centralized management, automation and orchestration tools that further reduce ongoing operational costs.

“Automation and orchestration help deliver on the promise of virtualization and serve as stepping stones to

the cloud,” said Gillenwater. “When all components of the IT infrastructure are tightly integrated and working in concert, policy-based automation and orchestration tools create a highly responsive environment that requires little manual intervention.”

Several characteristics make converged infrastructure solutions a good enabling platform for private and public cloud services. These include the ability to pool IT resources, automate the provisioning of those resources and quickly scale capacity up or down to meet the needs of dynamic computing workloads.

Converged infrastructure solutions offer other benefits as well. Generally, these solutions are architected to support virtualization and consolidated to eliminate redundant components and minimize cabling. As a result, they help reduce the data center footprint and improve energy efficiency.

## How to Choose

Because converged infrastructure solutions bring together server, storage and networking components along with systems management, it’s important to choose a manufacturer with best-in-class products across the technology stack. It’s also important to ensure that the converged infrastructure has been architected using industry-standard components and interfaces, and that the solution has been thoroughly tested with specific applications. Finally, organizations considering a converged infrastructure solution should ensure that it will work with the provisioning and automation tools already in place within the data center.

It might seem like an insurmountable challenge to move from a traditional data center assembled from “best-of-breed” components to one built on converged infrastructure solutions. The good news is that there is no need to change the entire IT environment all at once. Converged infrastructure solutions can be deployed incrementally to support individual applications and new initiatives.

“Converged infrastructure solutions can go a long way toward increasing flexibility and better aligning IT with business goals,” Gillenwater said. “By providing pre-configured and integrated components that are virtualization-ready with management built in, converged infrastructure solutions enable rapid deployment of new applications and services. These standardized IT building blocks can be added incrementally yet create a cohesive data center that is inherently flexible.”

Certain applications and services are always going to stay on-premises, so IT needs to begin evolving the data center infrastructure to reduce sprawl and complexity. With the demonstrated ability to turn technology assets into interoperable, shared pools of resources with a common management platform, converged infrastructure solutions can give IT the agility that today’s business requirements demand.



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# Transforming IT Processes



Data center automation and orchestration tools enable organizations to create a more agile IT environment while reducing costs and risks.

One hundred years ago, Henry Ford revolutionized manufacturing with the introduction of the moving assembly line. It began with workers arranging tools and parts in a row and dragging each auto down the line on skids. Ford then implemented a rope-and-pulley system and then, in February 1914, a mechanized conveyor belt. His innovation cut the time to build a car by nearly 80 percent.

Ford had worked to improve productivity for years, breaking the automobile assembly process into steps, training workers to perform one task and engaging a motion expert to make those jobs more efficient. But it took automation to truly transform the manufacturing process.

Data center managers are at a similar crossroads. A growing array of tools promise to streamline IT management and administration processes, yet operational costs are stubbornly stuck at almost 80 percent of IT budgets. IT teams face a constant challenge to keep up with growing demands for compute resources, storage capacity, network bandwidth and other services.

Virtualization has been embraced as way to reduce capital and operational expenses by enabling organizations to maximize the value of their data center resources. At the same time, virtualization creates a more agile IT environment in which the deployment of applications is accelerated. While this allows organizations to bring products and services to market faster and quickly take advantage of new business opportunities, it requires that IT departments work faster and faster to satisfy ever-increasing demand and deliver revenue-producing value.

IT departments are finding it difficult to keep up using traditional tools and methodologies. There is a rapidly growing need for automation and orchestration technologies that add a layer of intelligence throughout the technology stack.

## The Layered Approach

Even the best IT team on the planet cannot effectively support strategic initiatives when they're constantly tied up with day-to-day tasks such as provisioning, configuration, monitoring and administration. By automating many of these tasks, organizations can speed the deployment of new services and maintain optimal network performance and availability for today's mission-critical applications.

Server-level automation solutions are mature and robust, virtually eliminating manual configuration processes. Templated tools enable administrators to set up one server profile that can be propagated across new deployments. This enables the kind of rapid provisioning that reduces the risk of human error, increases IT agility and moves closer to an on-demand environment.

Similar tools are available to automate workload provisioning at the virtualization layer. Administrators can create virtualized environments in which each workload is monitored, managed and controlled by software, with processes that provision new virtual machines as needed to meet changing demands.

At the software layer, administrators can set load-balancing thresholds for key applications, and automate the provisioning of resources based upon utilization. If application performance is impacted by peak demand, automated processes can spin up a new instance of the app or move it to a different server.

In regulated industries, many organizations are turning to automation to reduce compliance costs and risks. Compliance automation tools help ensure that automated provisioning, patching and management meet industry standards and regulatory requirements, and provide automated remediation of detected violations.

These tools not only relieve IT bottlenecks but improve productivity, customer service and responsiveness throughout the

business. Those benefits, coupled with reduced operational costs and improved utilization, help to accelerate the ROI from IT investments.

## The Next Step: Orchestration

Here's the catch. If the discrete systems within the data center environment — compute, networking, storage and virtualization — are functioning independently of one another, management is much more complex and automation becomes a nightmare.

The next step toward taking full advantage of virtualization and the cloud is orchestration. Orchestration brings all the pieces together so that they can be managed as an integrated whole using workflows based upon best practices.

With orchestration, all components are viewed holistically as part of one ecosystem that is aligned with business objectives and managed through a single interface. The infrastructure can be scaled up or down on demand through automated provisioning and change management that adheres to defined policies and service levels.

This approach eliminates silos and improves collaboration, making it possible to develop best practices for the entire environment in order to speed the delivery of services and quickly adapt to changing market conditions and business needs. Orchestration also enables organizations to make better use of their IT resources and reduce costs by eliminating the need for manual management of services.

A century ago, Henry Ford figured out that human-centric processes can go only so fast. In order to realize his vision of a "motor car for the great multitude," he had to automate the assembly line and build machines that could stamp out parts more efficiently than any human could.

The modern data center is no different. Organizations can achieve significant cost savings and agility through virtualization, but manual IT processes place very real limits on the ability of IT to keep up with growing data center demands. Automation and orchestration tools can help organizations optimize IT operations, accelerate service delivery and realize the full business benefits of today's data center technologies.

**Even the best IT team on the planet cannot effectively support strategic initiatives when they're constantly tied up with day-to-day tasks such as provisioning, configuration, monitoring and administration.**

# Network Rejuvenation



*The time is right for upgrading the network backbone to 10 Gigabit Ethernet.*

“Our network is incredibly fast and we have way more bandwidth than we can ever use,” said no one ever.

The truth is that when it comes to network capacity, there is no such thing as “enough.” CIOs and IT managers perpetually face demands for more speed, more capacity and more services. It’s a tough job in today’s data center where bandwidth-heavy technologies and applications place a heavy burden on aging network infrastructure.

On average, bandwidth consumption and data volumes in the data center double every 18 months, and the number of devices accessing the network doubles every 30 months. Few organizations have a network infrastructure built to support such explosive growth.

In one recent survey of more than 1,500 IT leaders in North America and Europe, 81 percent said that growing demand for network bandwidth is one of the most critical

issues facing data centers, and 70 percent said that improving I/O performance in the data center was a “high” or “very high” priority.

## **Time is Right for 10GbE**

This is why organizations are increasingly migrating to 10 Gigabit Ethernet (10GbE) data center infrastructures. More than 5 million 10GbE ports shipped in the fourth quarter of 2013, a 35.5 percent growth year over year. With a 10-fold improvement over the conventional 1GbE network backbone, 10GbE delivers the performance boost organizations need to accommodate current growth and prepare for anticipated demand.

The technology behind 10GbE isn’t new. The standard was ratified by the Institute of Electrical and Electronics Engineers (IEEE) in 2002, but for years it was used almost

exclusively to interconnect switches and routers. Server connections in data centers generally remained 1GbE for cost-performance reasons — it was more cost-effective to have multiple 1GbE connections than a single 10GbE port.

The cost-performance advantage is quickly disappearing. With demand driving volume, 10GbE has experienced significant price drops over the past two years. The cost per gigabit of bandwidth and the price per port have dropped enough to make the 10GbE upgrade a value proposition.

Another factor spurring the upswing is increasing support for 10GbE on motherboards from nearly every major server vendor. This means organizations no longer have to use pricey and power-hungry adapters to connect servers to the faster network backbone. Motherboards with onboard 10GbE controllers generate less heat with a better cost-performance ratio and a smaller footprint than those requiring a PCI-Express expansion card.

## **Enabling Virtualization, Consolidation**

Analysts agree that the rapid growth of server virtualization is probably the single biggest factor behind the increased demand for 10GbE. While 1GbE is sufficient to support basic file serving, email and databases, it can't meet the demands of the virtualized environment. Physical servers that previously hosted only one application are now running virtual operating systems and hosting multiple apps, fueling the need for increased I/O capacity at every server.

Storage network changes also make 10GbE more compelling. Storage is increasingly dependent on heavy algorithms for compression, de-duplication, thin provisioning and more. Additionally, the increasing use of flash-based solid-state drives is delivering massive performance improvements over rotating media. These changes all increase the need for a high-performance network infrastructure.

Additionally, 10GbE supports network convergence. Data centers typically use Fibre Channel for storage networks and Ethernet for IP networks. However, 10GbE can accommodate Fibre Channel over Ethernet (FCoE), a technology that encapsulates Fibre Channel frames over Ethernet networks. This allows organizations to consolidate the LAN

and the storage network to conserve costs and resources. FCoE is not supported on 1GbE networks.

## **Supporting Wi-Fi**

Organizations seeking to eliminate bandwidth bottlenecks within their Wi-Fi networks are also upgrading their networks with 10GbE. No longer viewed as a matter of convenience or a way to cut costs, reliable Wi-Fi is a strategic business necessity capable of creating competitive advantages and revenue streams. Wi-Fi supported by 10GbE helps organizations maintain the highest levels of productivity and customer service, support and quickly deploy new and innovative services, and maintain a more cost-efficient IT environment.

Organizations considering the new 802.11ac Wi-Fi standard should be particularly interested in 10GbE. With 802.11ac, 10GbE uplinks are needed to consistently deliver higher data transfer speeds and better data rates in high-density environments. A single 802.11ac access point will be capable of supporting much higher traffic volume and faster wireless connections, but only if 10GbE is in place to provide a faster connection between the access point and the network core.

It is safe to assume that demand for more network capacity, speed and services will only continue to grow. Upgrading to a 10GbE network backbone makes a lot of sense. It not only delivers key improvements in bandwidth, scalability, reliability and performance, but lays the groundwork for the next logical step in the evolution of the data center — the 40GbE network. The

40GbE standard was ratified four years ago and a number of routers, switches and network cards operate at this speed. Many enterprise organizations are already using 40GbE to aggregate 10GbE servers for high-performance computing, cloud and big-data applications.

“10 Gigabit Ethernet is finally on the verge of becoming the most popular data center switch port connection, after a long and sometimes rocky adoption curve,” said Seamus Crehan, president of Crehan Research, which specializes in analysis of the data center switch, server and storage networking markets. “And as 40GbE starts to ramp, we are still forecasting its adoption curve to look much better than that of 10GbE. This is already evidenced by the fact that recent data center switch introductions are really pushing the envelope on 40GbE port densities and economics.”

A 10GbE network backbone not only delivers key improvements in bandwidth, scalability, reliability and performance, but lays the groundwork for the next logical step in the evolution of the data center — the 40GbE network.

# Your solution to the cloud puzzle



## CloudSource from Sigma Solutions



The benefits of cloud computing have been well established, but implementation challenges continue to perplex many organizations. Sigma Solutions' new CloudSource offering is designed to put all the pieces in place for a robust cloud solution. Leveraging partnerships with key cloud vendors, Sigma Solutions provides access to best-of-breed

cloud services and architectures, which are combined with our own professional services in a comprehensive cloud delivery package. We'll help you determine the proper cloud strategy, migrate to the most appropriate environment and manage the infrastructure on an ongoing basis. Contact us today to learn more!