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As analytics becomes core to decision-making, companies are pushing the boundaries of their IT systems to take advantage of data-driven technologies.

Supercharging with converged infrastructure

Faced with the need to boost data-center flexibility, control costs, improve performance, and keep pace with growing data-processing requirements, Mark Reboli wanted to find an innovative technology that would enable him to get off the treadmill of adding one-off physical servers and storage systems.

Reboli, the network, telecom, and IT security manager at Misericordia University, a liberal arts college in Dallas, Pennsylvania, adopted a converged infrastructure and hasn't looked back.

"At a university, systems are critical. We always have students accessing classes, along with faculty and staff, so we need to be at 99.999% uptime." Reboli says that with a converged infrastructure, he can keep systems running if a hard drive or processor fails. If he needs more resources, such as memory, disk, or processor, he can just add it to the virtual server. If a system is no longer needed, it can be easily decommissioned and the resources can be repurposed elsewhere. If someone needs quick access to new resources, he just fires up a new instance.

Reboli is one of a growing number of enterprise IT executives switching to converged infrastructure, which combines storage, compute, networking, and virtualization technologies in a preconfigured, tested, and validated system that promises ease of deployment and management. The latest numbers from an IDC revenue report put the worldwide converged-systems market revenue at $3.9 billion for the second quarter of 2019, an increase of nearly 11% year over year.

John Burke, research analyst at Nemertes Research, points out that converged-infrastructure technology has been around for at least a decade and is "still going strong." In its first iteration, the technology consolidated infrastructure-database workloads from vendors such as Oracle, SAP, and Microsoft and addressed the shortcomings of siloed data centers in efficiency, performance, complexity, risk, and cost.

Today, in a landscape reshaped by vast amounts of structured and unstructured data – and the pressing

Key takeaways

1. Converged infrastructure emerged a decade ago, providing an infrastructure platform to consolidate structured data and workloads. But the systems have not kept pace with today's influx of unstructured data.

2. Businesses' pressing need to capture insight from that data via advanced technologies such as analytics and artificial intelligence has driven innovation in the converged-infrastructure market.

3. Data-center modernization through the latest iteration of converged infrastructure has broad applications across a variety of vertical industries, including manufacturing, health care, financial services, and retail.

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business requirement that companies capture valuable insight from that data – the current generation of converged-infrastructure offerings are enriched with analytics, artificial intelligence, high data availability, and robust cybersecurity.

Companies embracing digital transformation are deploying internet-of-things (IoT) devices and building data lakes to extract business intelligence from historical and real-time data. They are moving to agile software-development models, automating manual processes, deploying robotic process automation, and rolling out intelligent software agents, all of which put enormous stress on today's data centers and converged-infrastructure systems.

Just as you wouldn't renovate a house on a crumbling foundation, companies are realizing they must modernize their core data centers to have the capacity, efficiency, agility, speed, and resilience needed to take advantage of these new technologies. As their next refresh cycle approaches, smart companies will be reimagining their data centers with an eye toward creating a flexible hybrid IT infrastructure – an optimized private cloud that integrates with multiple public cloud services, as well as edge data centers designed to process real-time information closer to the source.

In this data-driven, multi-cloud environment, it's no surprise the converged-infrastructure approach to data-center modernization is rapidly gaining traction.

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Structured vs. unstructured data

The explosion in unstructured data comes with a host of new challenges, putting pressure on existing IT infrastructure.

Source: Igneous' 2018 State of Unstructured Data Management Report

Challenges with structured data:

Insight
Security
Governance
Mobility
Protection

Challenges with unstructured data:

Automating data workflows through APIs
Governance
Insight
Evaluating new technologies
Accessibility

Leading vendors are partnering up to provide reference architectures and preconfigured systems that enable companies to handle increased data-processing needs.

Enterprise Strategy Group research indicates that nearly one-third of organizations have deployed a converged infrastructure with another 56% stating that they have plans to do so.

"Modern converged solutions are driving growth because they allow organizations to leverage standardized, software-defined, and highly automated data-center infrastructure that is increasingly the on-premises backbone of a seamless multi-cloud world," says IDC analyst Eric Sheppard in the revenue report.

Today's IT infrastructure challenge

A single autonomous car will generate 4 terabytes of data a day based on an average of 90 minutes of driving time. That's just one car. Imagine the volume of data that will be created by convoys of long-haul trucks or fleets of city buses.

While self-driving cars may seem a bit futuristic, the data deluge from IoT sensors is already upon us. Cisco estimated that by the end of 2019, IoT devices would have generated more than 5 zettabytes of data – that's 5 trillion gigabytes – and that amount is expected to grow exponentially. Gartner forecasts that IoT market will grow to encompass 5.8 billion devices in 2020, a 21% increase from 2019. By the end of 2019, 4.8 billion devices were expected to be in use, up 21.5% from 2018.

"AI is increasingly becoming a significant driver of memory and storage needs," adds Roger Spitz, a longtime technology services executive and currently an independent strategic advisor to financial services companies. He points out that the use of AI-powered bots and intelligent agents designed to handle traditional call center and customer service functions is rapidly expanding. And virtually every e-commerce site has some level of answer bot that pops up and asks whether it can assist the customer.

Over time, as the technology behind natural language processing and cognitive computing improves, these software-based agents will be able to autonomously handle higher-level tasks, which will require companies to up their data-analytics game even more.

10.9%

Year-over-year growth rate for the worldwide converged-systems market

Source: IDC's Worldwide Quarterly Converged Systems Tracker, September 2019

60% to 73%

Amount of business data that goes unused for analytics

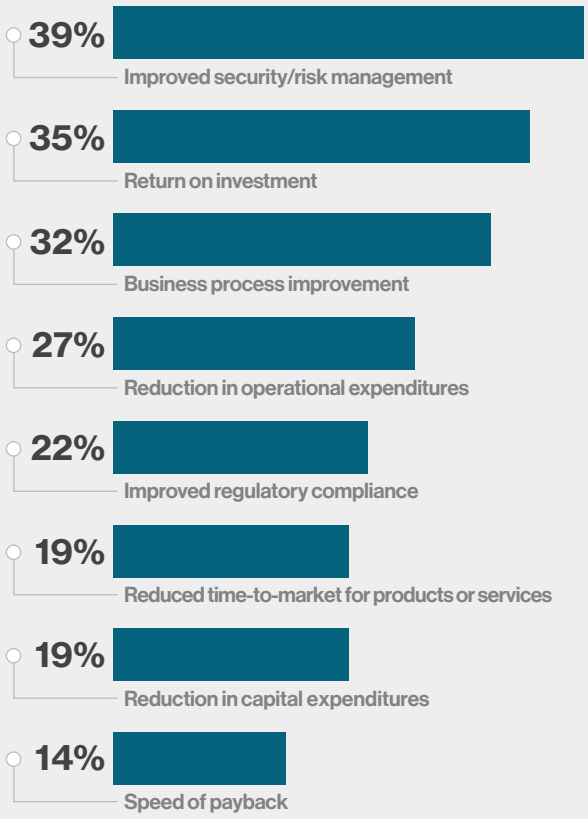
Source: Forrester Wave: Big Data Hadoop Distributions, Q1 2016

And all of this new data will sit on top of the traditional business-process data companies are already generating but not taking advantage of. In fact, Forrester reports that between 60% and 73% of all company data currently goes unused for analytics.

Organizations face a variety of additional challenges associated with their data centers. Demands are increasing, but budgets are not keeping pace. And data centers over time tend to become more complex and difficult to operate efficiently, with too much heterogeneity in their application portfolios and physical infrastructures.

IT investment justification: What matters most?

As organizations look to upgrade data-center infrastructure, these considerations will be top-of-mind.



Source: Enterprise Strategy Group, 2017

Companies are also facing hard deadlines by which they need to accomplish time-consuming and difficult upgrades to many of their core enterprise resource planning and customer relationship management platforms. At the same time, many IT administrators have simply lost track of the number of software licenses and instances they are paying for and don't have the tools to determine where wasteful overprovisioning is occurring or where performance-killing bottlenecks exist, says Kaustubh Das, vice president of product management at Cisco.

According to industry analyst Judith Hurwitz, president and CEO of Hurwitz & Associates, the old-school enterprise data center was good at handling specific workloads in a rigid, static environment. But the modern data center requires the flexibility to handle the increased influx of data, rapidly changing business processes, workloads that might need to burst to the cloud, and other scenarios in which parts of applications might be running in the public cloud and other parts in a private cloud. It's the need for "a fluid, dynamic infrastructure" that's driving interest in converged infrastructure, says Hurwitz.

Converged systems take a leap forward

With so much innovation and change occurring at all levels of the data-center infrastructure, including storage virtualization and software-defined networking, it has become increasingly difficult for data-center operators to piece together an integrated stack from individual products.

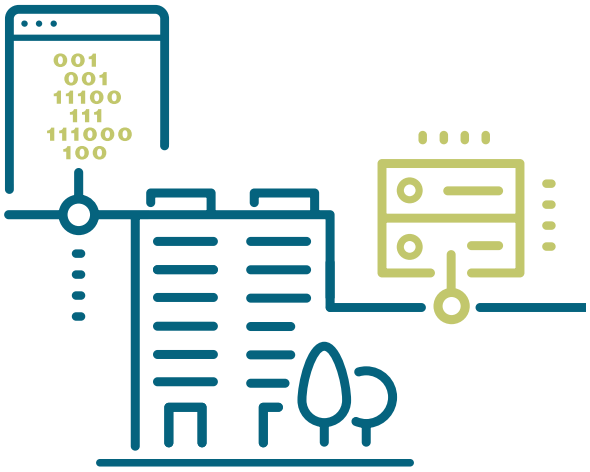
The leading vendors are addressing this challenge by partnering up to provide reference architectures and preconfigured systems that enable companies to handle increased data-processing needs and improve time-to-market for new business offerings.

Converged infrastructure enables organizations to deploy tightly coupled, "gold-standard" technologies that enable the business outcomes customers are looking for, says Todd Palmer, senior vice president for strategic partners and alliances at Hitachi Vantara.

For example, storage stalwart Hitachi and data-center heavyweight Cisco have teamed up to offer a converged system that delivers computing, storage, networking, virtualization, and other features.

The Hitachi Vantara-Cisco converged infrastructure is designed to help companies get more value out of their data. It provides a foundation for analytics and data-driven automation applications and gives users access to data across global businesses and cloud systems.

According to an IDC report by Sheppard and fellow analyst Chris Kanthan, converged-infrastructure vendors are continuing to improve and upgrade their data-center offerings to reflect the growing requirement to handle structured and unstructured data. "Innovations within the converged systems market are successfully addressing the needs of next-generation workloads (AI, machine learning, and Kubernetes) as well as consistent and unified hybrid cloud," the authors write.



Wide-ranging use cases

Data-center modernization through converged infrastructure has broad applications across a variety of vertical industries in which data analytics has become critical to business operations.

In manufacturing, companies are deploying data-intensive, digital-twin simluations; embedding IoT devices in motors, pumps, and other physical assets to do preventive maintenance; and creating product lifecycle systems that link customer and supplier feedback with product development and production.

Health-care facilities are using AI to analyze vast troves of historical patient data to spot trends and improve outcomes. Insurance companies are automating processes, digitizing forms, improving customer self-service, and calibrating rates based on sophisticated data analysis. Banks are deploying AI to spot fraudulent transactions in real time, and investment companies are using data analytics to better understand their customers' needs and create innovative services and offerings. And retailers are using machine learning and AI-based initiatives to provide personalized customer service and optimize their supply chains.

All of these applications call for sophisticated data-analytics capabilities, which companies are achieving through a hybrid approach to data-center modernization that can include workloads running on public or private cloud. And those workloads can be hosted on a converged-infrastructure platform or a hyperconverged platform, depending on the use case. (While converged infrastructure provides a platform for running essential business applications, hyperconverged infrastructure is often deployed for virtual servers and virtual desktop infrastructure applications.)

Data-rich applications are improving processes and driving business in multiple industries. And those applications can be hosted on converged systems.

Kaufmann adds that very few of the organizations that have deployed converged infrastructure have pushed the systems to their full capabilities, which means the performance gains and scalability provided by converged infrastructure are delivering the headroom needed "to handle existing performance requirements and additional application deployments in the future."

At Misericordia University, Reboli confirms that converged infrastructure meets his current needs and has him well-prepared for future growth. He says, "We needed the ability to replicate our data to and from our disaster-recovery center with ease. We needed features to allow us to address the cybersecurity frameworks we utilize. And we wanted it in a nice, integrated package." ■

Benefits of converged infrastructure

Converged systems deliver a number of potential IT and business gains, which fall into four main categories:

BUSINESS PRODUCTIVITY. Converged-infrastructure systems deliver improved application and system performance, agility, and reliability, enabling organizations to better seize business opportunities. According to Enterprise Strategy Group, companies deploying converged infrastructure reported less time dealing with performance issues and latency spikes, less time balancing workloads and migrating data between storage arrays, simplified management through application integration, increased business agility, and quicker deployment of applications. The latest generation of converged-infrastructure platforms are built to facilitate data-driven applications such as analytics, to drive better customer insights.

IT STAFF PRODUCTIVITY. The promised ease of management and deployment of converged infrastructure enables staffers to spend less time on repetitive tasks and more time on higher-level, strategic activities. They also enable companies to rely on infrastructure systems with partners that have years of converged-infrastructure experience, allowing the staff to innovate for the business and not the infrastructure.

RISK MITIGATION. The resilience provided by converged infrastructure reduces the frequency and duration of application and system outages, which translates into higher worker productivity while minimizing data loss and associated reputational damage. Enhanced cybersecurity controls is a feature of newer converged-infrastructure systems.

COST REDUCTION. By consolidating data-center resources, companies can cut spending on power, facilities, and licensing. On the storage side of the equation, a converged infrastructure helps companies reduce costs and avoid having to buy new storage hardware. By using an all-flash array, companies can consolidate multiple workloads on a single storage system with predictable low latency. This enables companies to effectively run inline deduplication and compression, run file and block storage with the same controllers, and in general meet performance requirements with fewer drives. This means less hardware to deploy, manage, maintain, and support, not to mention reduced power, cooling, and floor-space costs.

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