White Paper

# Six Best Practices to Transform Your IT Organization and Maximize the Value of Converged and Hyperconverged Infrastructure

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Cushing Anderson Eric Sheppard

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## EXECUTIVE SUMMARY

Driven by the need to simplify IT environments, customers continue to expand their adoption and deployments of converged infrastructure. Indeed, CIOs and IT executives are increasingly identifying converged infrastructure as an effective solution that can modernize and simplify their infrastructure and improve datacenter efficiencies and business agility. Converged infrastructure can do this, in part, by providing a tight integration between core datacenter infrastructure components (storage, compute, and networking) while offering centralized management and increased levels of automation. Those organizations that have deployed converged infrastructure in production environments have experienced new levels of efficiency, agility, and resiliency for a wide range of workloads. The drivers of converged system deployments include:

- **Time to service/time to market and reduced downtime.** With speed comes the ability to add services. According to the ICT service operations manager of a major airport in the Asia/Pacific region, "Our business requirements include the ability to scale up/scale down to new requirements quickly. We can't afford outages."
- **Reduced costs.** Wake Forest Baptist Medical Center required to improve infrastructure management and reduce costs, not simply replace server for server. According to Wake Forest Baptist Medical Center's AVP of Infrastructure Eric Sato, "It was a perfect storm: Our servers, storage, and networks were all end of life. We had lots of different server types … How can we remediate risk, get to a standard platform, reduce server types, deploy faster, and get silos (network, servers, storage) to collaborate?"
- **Efficient infrastructure management.** ProMedica, a nonprofit healthcare system in northwest Ohio and southeast Michigan, had tried to modernize system management before. "In 2012, we upgraded our infrastructure but did not change the way we managed it. We found that model didn't work. We found we were optimizing pieces, not the whole," said David Brackett, chief technology officer at ProMedica.

To reliably get these benefits, successful organizations have realized they must do more than simply improve technology. It is critical to focus on improving the process and organizational support that make the technology work for business. It is also critical to think of improvement efforts as a continuous process rather than a set of one-off events or changes. To do this, successful organizations have:

- **Focused on aligning converged infrastructure (CI) with strategic business imperatives by:**
  - Defining standard tiers of services
  - Establishing a consistent chargeback system for provided services at each tier and reporting the alignment and consumption of IT services with the business
- **Realigned IT responsibilities to create dedicated teams for implanting and administering converged infrastructure by:**
  - Getting organizational commitment to a converged infrastructure culture
  - Reorganizing teams to focus on overarching activities
  - Training to maximize capability and performance
- **Leveraged consultants to effectively implement and manage converged infrastructure by:**
  - Ensuring consultants have a holistic view of the enterprise's business objectives and the specific requirements of the many stakeholders impacted by the converged infrastructure

## SITUATION OVERVIEW

Global spending on converged systems (also referred to throughout the paper as converged infrastructure) surpassed $12.5 billion during 2016. Hyperconverged systems, the fastest-growing segment of the converged systems market, surpassed $2.3 billion in 2016, up 109% over the previous year. The greatest benefits of converged infrastructure come when technology transformation is coupled with organizational transformation. IT organizations must rethink long-standing team structures and processes to maximize the impact of their investments.

IT departments must increasingly operate in an environment that is focused on service delivery and predictable expenditures. According to IDC's *CloudView Survey,* within three years, enterprises will access 78% of IT resources through some form of cloud — public, private, or hybrid. Converged infrastructure supports greater agility at a reduced cost with a more efficient management process, but only if the IT function adopts a converged culture that is organized and transformed to achieve those advantages.

IDC believes organizations early in their converged infrastructure journey can learn from IT groups that have transformed their IT organizations and develop highly responsive capabilities for their enterprise.

## MAXIMIZE VALUE OF CONVERGED INFRASTRUCTURE

Creating the new operating model to support the converged culture will require defining and communicating the vision, goals, and objectives relevant to the organization and organizing work and responsibilities for administering the converged infrastructure to best meet corporate objectives. While it requires effort, the realignment toward a converged culture maximizes the value of converged infrastructure. Discussions with successful firms have uncovered three areas of critical importance to creating a converged culture:

- Align IT transformation with strategic business imperatives.
- Realign IT responsibilities to create dedicated teams for implanting and administering converged infrastructure.
- Leverage consultants to effectively implement and manage converged infrastructure.

We spoke with several firms that highlighted the importance of these areas to the success of their converged infrastructure.

### Align Converged infrastructure with Business Needs

One of the most important factors in maximizing the value of converged infrastructure is effectively aligning IT services offered to the business priorities they enable. For many organizations, this requires establishing a closer link between business objectives and IT priorities. For converged infrastructure, it is especially important because the line of business may infer that the "agility," "flexibility," and "scalability" of converged infrastructure come with little cost. One of the most effective ways to do so is to use a chargeback system to report where IT services are being consumed. David Brackett, chief technology officer at ProMedica, agrees: "It is important for business units to recognize that virtual machines aren't free." And while there is an initial up-front cost for modernizing infrastructure with converged infrastructure, the flexibility results in maximum business benefits when there is a consistent approach to implementation and administration. Brackett at ProMedica continued saying that it's important that leadership "understands the bigger up-front cost is worth the investment over time."

With converged infrastructure in place, services can be provisioned more quickly and administered more efficiently. To maximize business value, organizations must establish a governance process that is equally responsive and agile.

#### *Best Practices to Align Converged infrastructure with Business Needs*

##### Best Practice 1: Define Standard Tiers of Services

Well-defined standard tiers of service are the foundation to create and provide infrastructure services that meet the agility, availability, performance, and support requirements of different levels of business needs.

For example, ProMedica used a three-tier model to define performance characteristics, support, and availability. The company describes these services levels as follows:

- Critical applications
- Systems supporting critical applications
- Noncritical systems

Because every new service is administered according to the agreed characteristics of one of the three classes of service, lines of business and IT can quickly agree on performance requirements for new solutions. For converged infrastructure, with highly flexible performance characteristics (core processors, storage, etc.), describing standard classes of service helps line-of-business leaders think more about the business need, related business value and, ultimately, cost of the new service than about negotiating with the IT organization over the specific technical specifications of the solution. It also helps the IT organization better investigate minimum and optimum infrastructure requirements based on tiers of service expectations. Both these benefits help the business maximize the value of the new service and help the converged infrastructure deliver value more quickly.

According to Brackett, "Standard tier expectations make for faster decisions for new applications using converged infrastructure. Approval, sign-off, and building often take less than a week [unless new equipment is required]."

### Best Practice 2: Establish a Consistent Chargeback System for Provided Services at Each Tier

By assigning costs for IT services and charging the related costs of the converged infrastructure back to the stakeholder business unit or line of business, both the IT organization and the line of business are motivated to remain focused on using the converged infrastructure to address the business issues that have the greatest value.

Combined with standard tiers of services, a consistent chargeback process enables lines of business to predict what costs to expect for new services so they can build the business case to support a request for resources. This drives more efficient and aligned infrastructure provisioning and consumption. For example, ProMedica's three tiers of service each has a standard price for the allocated IT infrastructure. The chargeback system helps ensure that the addition of new converged infrastructure is justified by the business case, and costs will be consistent compared with services with similar business impact.

In addition to aligning expectations between the IT organization and the business unit, the chargeback process gives program managers and the DevOps team incentive to standardize system requirements, increasing standardization and reducing administration. According to Brackett of ProMedica, "This helps rationalize and standardize architecture requirements such as number of server cores and storage requirements and reduces internal costs."

Establishing consistent service levels and standard cost models helps both line of business and IT establish priorities to guide the planning and implementation process. According to Brackett at ProMedica, those lines of business may be making requests as diverse as mobile payments system for the café or standing up a new a digital imaging capability across the network of facilities.

## Realign IT Responsibilities

In traditional IT environments, storage, compute, and network services each has an independent team. The IT organization may even have technology strategy, design, and integration teams that exist separately from the other groups. For enterprises to derive the most value from the converged architecture, these silos should merge, delivering an infrastructure service where compute, storage, software, and network capabilities are bundled.

Wake Forest Baptist Medical Center's Sato described the common organizational challenge: "We had silos of network engineers, server administrators, and storage engineers with roles in both engineering

project teams and operate/run (break/fix) teams. This wasted cycles in every activity." IDC found that organizations that failed to realign responsibilities around their converged infrastructure spent 40% more time administering their infrastructure.

On the other hand, organizations that are able to effectively redeploy and reallocate resources to support their converged infrastructure can expect operations related to deployment, management, and support to require 66% less staff time (see *The Business Value of Modernizing Mission-Critical Applications with Dell EMC VxBlock Systems*, IDC white paper #US43087517, October 2017).

Sato concluded, "In the old way, projects were slow. And it took longer to get to business value. We had to pad the schedule to make sure we could deliver 'on time' in case we had to pull people in an emergency."

## *Best Practices to Realign IT Responsibilities for Converged Infrastructure*

Realigning IT roles and responsibilities isn't as easy as redrawing an organization chart.

### Best Practice 3: Get Organizational Commitment to a Converged infrastructure Culture

The change in operating model, the shift in individual and team responsibilities, and a more aligned relationship between IT and the business each reflects a change in the way individual IT professionals, supervisors, and IT and business leaders must work and behave. To maximize the benefit of converged infrastructure, organizations will need to adjust from component (storage, network, compute)-focused organizational silos to a structure that encourages holistic management of the system. Sato of Wake Forest Baptist Medical Center advises, "Make sure the team has bought into CI. Make sure stakeholders buy in – both the boss and the team."

To take advantage of converged infrastructure, the organization must change in many ways. Classic change management activities will be essential to establish a converged infrastructure culture and include:

- **Establish a common sense of urgency.** All the impacted stakeholders must understand what is at stake and what is the overarching issue that must be resolved. Urgency establishes the need for change.
- **Form a powerful coalition of supporters.** This often involves identifying and securing commitment from the most ardent supporters of the change to a converged infrastructure and line-of-business leaders who would most likely benefit from the change. The IT leaders might include the infrastructure and architecture teams that span the CI/hyperconverged infrastructure (HCI) technologies. The business leaders would include those responsible for the mission-critical or core business processes that might be targets for early pilots. The coalition of early leaders will likely identify the first opportunities that will lead to early success. To ensure project momentum and maximize effectiveness, assign a single person responsible for driving the program results by facilitating collaboration across IT and with the impacted business areas and reporting results.
- **Create and communicate a vision for change.** A clear vision of the intention and benefits can help IT and the lines of business understand why establishing a converged infrastructure is the right approach to address the urgent need. When staff and leaders see what converged infrastructure can achieve, they are more able to cooperate and even take productive, independent steps to realize the vision.

- **Remove obstacles.** IT leaders must examine their organizational structure, job descriptions, and performance and compensation systems to ensure they're in line with the converged infrastructure vision. It also helps to:
  - Recognize and reward people for successfully leveraging the converged infrastructure process — rapid deployment, complex upgrades happening without service interruption, effective partnership between IT and the lines of business, automating an important administrative process, and so forth
  - Identify people inside or outside IT who are resisting the changes to responsibilities or processes, and work to understand and resolve the barriers they feel or experience
  - Fuel the transformation engine; set a process with accountability to implement, monitor, and report on the change and progress.
- **Create short-term wins.** Nearly all successful implementations of converged infrastructure deliver benefits to some stakeholder very quickly. Identify projects that can be implemented without help from strong critics. Publicize those early successes, and use them as examples when advocating for expanding workloads on the converged infrastructure. (And don't forget to recognize and reward the people who help you achieve early successes.)

## Best Practice 4: Reorganize Teams to Focus on Overarching Activities

Because the component parts of a converged system already work, the IT organization doesn't need specialists in storage, servers, or networking to fit pieces together. Because the components of a converged system work together, the core activities shift to three overarching requirements:

- Designing and implementing new capabilities
- Administering the existing converged infrastructure
- Administering other parts of the network

For example, ProMedica split the responsibility for converged system administration and basic networking into separate teams. Describing ProMedica's approach, Brackett said, "We created [administration] teams for managing the converged infrastructure as a defined utility. They work to ensure the system meets guaranteed availability and capacity levels. The server team then became responsible for managing the virtual machine or guest level."

Each team has all the functional and technical skills it needs — storage, compute, network, and so forth. But each team can focus on its own responsibilities. Team members aren't pulled from an implementation activity to support or recover a critical active service. And implementation or administrative teams can work holistically between storage and compute, for instance, because team members are dedicated to implementation or administration.

For Wake Forest Baptist Medical Center, this has also meant a change in the IT professionals' career paths: "We set up two career paths — for technology managers and technologists. The simplified organization structure broke down silos and allowed the teams to work collaboratively," said Sato. Sato explained that technology managers were responsible for team direction and management and act as workload, implementation, or special project managers and are supported by teams of technologists. Technologists are technical specialists certified in one or several technical areas (storage, compute, networking, or security) and work on design/implementation or the system administration teams.

At the major Asia/Pacific airport, the converged infrastructure team has been able to further improve its management efficacy. "CI makes it easier to add capacity — server, memory, storage. We have the same staff size, but with more expertise, the mundane tasks have been automated," said the airport's ICT service operations manager. IDC has found that effectively implemented and administered converged infrastructure can result in a 70% reduction in time to manage the systems compared with a traditional infrastructure.

The airport has been modernizing and expanding since it was taken private. It has widened and lengthened its runways, increased baggage handling capacity, and added a multistory parking facility. Many of these modernization projects involved increasing the technology infrastructure — from automated bag routing to credit card payment processing for the car park. And, like other airports, system failures result in unacceptable inconvenience for travelers and significant public pressure on airport administrators. The migration to a converged system standardized the deployment process for systems as diverse as video monitoring, baggage scanning, payment systems, and facilities management systems. "There is no difference to stakeholders, except [provisioning is] faster. We have reduced the time to deliver a new something. It's a faster way to 'yes,' and we can test before we go live," the ICT service operations manager said.

### Best Practice 5: Train to Maximize Capability and Performance

Training IT professionals for their new roles, and continuing to train on new technical areas and approaches, helps both the enterprise and the employee in several dimensions. Regular, relevant training for the IT organization improves the organization's performance by ensuring staff members are aware of the features of the IT products that make up the converged system, as well as tools to use to administer the CI. Well-trained IT organizations spend up to 20% less time "fixing" their IT environment and apply that time to "evolving" or "improving" the functionality of the IT environment. Regular training also gives the enterprises the necessary capabilities to take advantage of new technologies and techniques and provides a foundation on which to further modernize their infrastructure.

Regular training further helps employees envision their role as the organization evolves, making employees more relevant to the strategic shift toward converged infrastructure and empowering them to help improve the infrastructure to best meet the needs of the business. "The people part is hard. With cloud and CI come new roles. Dell EMC is providing technology to transform how we work," agrees the Asia/Pacific region airport's ICT service operations manager.

Organizations that maximize the value they receive from converged infrastructure more consistently include training as part of their strategic planning and key initiatives. In fact, 98% of the most successful IT organizations incorporate IT employee training into IT's overall strategic planning and all key initiatives compared with only 38% of less successful IT organizations. But as Sato said, "It was always hard to get training credits built into a project budget. Moving forward without training is setting [us] up to fail. The system would underperform immediately."

Sato at Wake Forest Baptist Medical Center said his organization overcame budget pressures and "cross-trained technologists on VMware and Cisco" to be sure the teams had the breadth of skills they needed. The ICT service operations manager at the major Asia/Pacific airport pointed out that the benefits went beyond having a well-trained team: "We don't need network specialists [or] storage specialists anymore. And we don't have configuration drift." The ICT service operations manager is able to source his converged system team members from other parts of IT. Because of its commitment to training, the airport has a ready supply of skilled IT professionals.

## Leverage Consultants to Effectively Implement and Manage Converged Infrastructure

Not all IT organizations have the staff, skill, or experience to manage the initial deployment and administration of converged infrastructure or administer a converged infrastructure. Consultants, from both converged infrastructure vendors or third-party consultancies, can offer a range of services that can either augment or replace internal IT for any part of the converged infrastructure life cycle. The organizations we spoke with each leveraged consultants differently to support their converged infrastructure.

The Asia/Pacific region airport, with a lean IT staff, leverages its consultant and converged system vendor to configure and run the technology stack. The converged system vendor provides fully configured, ready-to-run systems, and the consultant monitors profiles to be sure that installed systems are updating properly. The ICT service operations manager's team has responsibility for managing the business-specific applications the airport relies on: "Our consultant runs the infrastructure stack – we run the apps."

A contrasting approach is offered by Sato of Wake Forest Baptist Medical Center. During the deployment of converged infrastructure at the medical center, it leveraged consultants as the project management team because of the consultants' familiarity with similar projects at other medical centers. The consultant team was responsible for coordinating the technology and other subcontractors and was augmented by an internal project manager to help coordinate internal resources and internal communications. "We hold our vendor accountable for the runbook," said Sato.

### *Best Practice to Leverage Consultants*

While there are many practices and approaches to manage consultants effectively, companies will find the greatest value from their consultants when the consultant and the IT organization have a shared understanding of the purpose and objectives of the converged infrastructure. By leveraging consultants, the IT organization can generate early momentum by identifying and implementing a quick win. Over time, specialist consultants may be able to more efficiently manage the infrastructure – either onsite or remotely – freeing IT staff time to address higher-value issues for the business.

#### Best Practice 6: Ensure Consultants Understand the Specific Business Objectives of the Converged Infrastructure Project

At Wake Forest Baptist Medical Center and the Asia/Pacific region airport, the project leaders agreed. "When working with consultants, the consultant needs to understand your needs – in our case, high availability and failover," said the airport's ICT service operations manager.

Whether the consultant is implementing the system, adding a workload, or administering patches, it is essential that the consultant has a thorough understanding of the organizational objectives for using a converged system and the unique parameters or constraints on each related system.

## DELL EMC'S CONVERGED INFRASTRUCTURE AND SERVICES PORTFOLIO

Dell EMC was the largest converged technology supplier during the first half of 2017, with more than 30% share of global converged infrastructure sales (nearly double the share of its nearest competitor). Dell EMC's current portfolio offers a broad set of solutions that support a diverse set of datacenter environments. An overview of Dell EMC's converged infrastructure portfolio is discussed in detail.

Dell EMC's converged infrastructure solution is the VxBlock System. Each VxBlock System is a complete datacenter system that enables companies to procure, deploy, manage, scale, and refresh core datacenter infrastructure (storage, networking, servers, and infrastructure software) as a single system. Dell EMC designs, tests, and fully integrates each VxBlock System. VxBlock Systems greatly reduce the time IT staff spend on low-value, high-risk infrastructure management tasks such as system maintenance, configuration management, change management, provisioning, and patching. It should be noted that customer quotes used within this paper may refer to Vblocks rather than VxBlocks. This is a reference to systems deployed prior to Dell EMC's decision to focus on standardizing on VxBlock Systems (exclusively) as they can be configured the same as a Vblock System and add additional levels of flexibility with VMware NSX support.

Dell EMC's hyperconverged solutions include appliances and rack-scale offerings. VxRail and XC Series appliances include software-defined compute and storage, with VxRail including the VMware vSphere hypervisor and XC Series providing multihypervisor options. VxRack System FLEX and VxRack System SDDC rack-scale solutions add fully integrated software-defined networking, and both support vSphere, with VxRack System FLEX also providing bare metal or multiple hypervisor options.

Dell EMC offers a robust set of services that can be leveraged by organizations deploying any of the company's converged offerings:

- Operating Model Services can help customers organize and structure their IT roles and processes before they receive their converged system. This service can create a service catalog, automate IaaS services, and implement an initial set of IT processes and roles to manage service delivery.
- Onboarding Services offer another way to streamline operations by leveraging onsite consultants to help the IT team quickly become production ready after deployment of the converged system.
- Residency Services provide converged infrastructure administrators onsite for as long as the customer requires. Residents help IT teams bridge the knowledge gap during integration and ongoing operations.
- Managed Services (via Virtustream) can provide remote 24 x 7 monitoring, management, provisioning, and optimization of converged infrastructure and related workloads — including onboarding and technical-readiness services. Managed services options can include support for virtual machine (VM) deployment and virtual operating systems and applications.
- Training and Education Services can help round out an IT team's skill and maximize the business value of the converged infrastructure.

## CHALLENGES/OPPORTUNITIES

When considering the impact converged infrastructure can have on the business, IT organizations tend to want to completely transform the IT infrastructure as soon as possible. But the goal should be to "future proof" the IT organization. The enterprise doesn't need to be "all in" on day one. By building a strong foundation, the IT organization can expand the use of virtualization over time. Some projects might be fast, and some might take more time. A thoughtful prioritization will help create a manageable rollout and allow stakeholders to continuously adjust as new lessons are learned along the way.

The Asia/Pacific region airport had "one lead engineer, hired in June, migration complete by November — with more reliance and more security," confirmed the airport's ICT service operations manager. But

standardizing is the key: "Now, the standard platform adds speed. All the components talk with each other. We have moved from 23% virtual to 90% virtual," said Sato of Wake Forest Baptist Medical Center.

But as the IT organization gets more experience, there are external risks, too. With high demand for converged infrastructure skills in the marketplace, organizational success creates external pressures on the IT staff. At ProMedica, the nonprofit healthcare network, the standard salary structure in the IT organization was typically under "market rate" for the region. As the converged team began to gain experience with the newest technology, the converged infrastructure team began to be targets of external recruiters, and several employees became flight risks. However, by making a strong case to keep the skills the company had developed, ProMedica began to address the pay differential and reduced attrition.

With a converged or hyperconverged infrastructure in place, services can be provisioned quickly, but to maintain and maximize the benefit to the enterprise, there is more to be done: Enterprises must change the provisioning process, so strict governance doesn't become a roadblock. Chargebacks will help maintain IT and business focus on the most valuable uses for the new infrastructure. Establishing service-level agreements will help maintain a consistent, homogeneous infrastructure. And improved automation of administrative tasks will increase the predictability and reliability of the infrastructure. So, while the technology is important, and factors outside the technology contribute to success, challenges will still need to be addressed in converged infrastructure migration.

## CONCLUSION

The benefits of combining converged infrastructure technology with process and organizational support cannot be overstated:

- **Converged infrastructure is easier to administer.** According to the ICT service operations manager of the major Asia/Pacific airport, "The new environment is complex, but it's simplified … it is a lot easier to drive."
- **Converged infrastructure helps align business need with value.** According to Sato of Wake Forest Baptist Medical Center, "Having a standard infrastructure makes allocation and efficiency easier."
- **Converged infrastructure can make a difference quickly.** Sato explained, "We purchased Vblock at the end of December, delivered in 45 days, tested in March, online with new hardware in March/April."

To reliably achieve these benefits, organizations must do more than install excellent technology. Organizations must also focus on improving the process and organizational support that make the technology work for business. Some best practices will flow in a natural progression during the implementation process (see Table 1). Successful organizations have:

- Aligned IT transformation with strategic business imperatives
- Created dedicated teams for implementing and administering converged infrastructure
- Leveraged consultants to help align to priorities and projects

These practices must be implemented at the right time in the project life cycle. The firms we spoke with believe the technology is valuable, but to make it work requires transforming beyond the infrastructure: "Get the right people, build it right, and invest early. The value comes over time," recommended the Asia/Pacific airport's ICT service operations manager. We agree.

## TABLE 1

### Timing of Some Best Practice Activities

| Phase | Best Practice Activity |
|---|---|
| **Planning** | |
| T-180 | Build organizational commitment to converged infrastructure (continuous). |
| **Execute purchase order (T=0)** | |
| T+5 | Design a converged or hybrid IT organization. |
| T+10 | Consider skill enhancement requirements. |
| T+15 | Schedule predelivery training from Dell EMC. |
| T+*x* | Create an "onboard" consultant team for project objectives, business objectives, and operating expectations. |
| Live-90 | Develop a "tiers of service" model. |
| Live-45 | Review and revise an IT governance process/establish a chargeback system. |
| **System live (live=0) (deployment and implementation complete)** | |
| Live+0 | Consider ongoing training requirements. |
| Live+0 | Establish "new hire" training requirements for additional or replacement staff. |
| Live+30 | Review team skill and capability (Is additional training required?). |
| Live+180 | Review team skill and capability (Is additional training required?). |
| Live+180 | Review the ongoing effectiveness of tiers of service and the governance process. |
| Live+360 | Review team skill and capability; ensure all new staff have been sufficiently trained to baseline expectations. |
| Live+360 | Ensure all staff have ongoing training plans that align with the expansion of CI. |

Source: IDC, 2017

## About IDC

International Data Corporation (IDC) is the premier global provider of market intelligence, advisory services, and events for the information technology, telecommunications and consumer technology markets. IDC helps IT professionals, business executives, and the investment community make fact-based decisions on technology purchases and business strategy. More than 1,100 IDC analysts provide global, regional, and local expertise on technology and industry opportunities and trends in over 110 countries worldwide. For 50 years, IDC has provided strategic insights to help our clients achieve their key business objectives. IDC is a subsidiary of IDG, the world's leading technology media, research, and events company.

## Global Headquarters

5 Speen Street
Framingham, MA 01701
USA
508.872.8200
Twitter: @IDC
idc-community.com
www.idc.com

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