White Paper

Dell EMC: Digital Business Success through IT Transformation

A Detailed Analysis of the Dell EMC IT Transformation

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February 2018

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Executive Summary: A More Agile and Efficient Dell EMC Via IT Transformation

We live in an era defined by both digital opportunity and digital risk. For every emerging digital success story, such as Uber or Airbnb, there is an industry stalwart under dire pressure to evolve. For every digital innovator leading a TED Talk, there is a board of directors evaluating whether their CEO can transition the business to compete digitally. And with each innovation, market expectations shift further away from traditional offerings to digital ones. Demands for change emerge on multiple fronts, including:

- Competitive pressures from the emergence of new digital businesses, products, and services.
- Consumer pressure driven by increased expectations from digital products and digital engagement models.
- Pressure from executives, investors, and Wall Street stressing the need for transformations that reduce risk and protect against disruption.

These pressures can force a change even before an impact to the bottom line is felt. Merely the threat of digital disruption can cause leadership transition, reduced favor with Wall Street, or a shift in customer perception. Additionally, the opportunity and risk of digital transformation extend beyond the for-profit business sectors. Government organizations and nonprofits are evolving to stay relevant and meet changing consumer expectations as well. At its core, digitally transforming your business enables the company to better capture new opportunities, such as:

- The creation and delivery of new digital products and access to new markets.
- Speeding the delivery of new offerings to achieve a pace that competes with or exceeds the digital marketplace.
- Better meeting the expectations of modern digital consumers.
- The delivery of digital tools and processes that create a more efficient workforce.

With Digital Transformation, IT Becomes the Business

Undertaking a digital transformation as a business, a nonprofit, or a governmental organization is not a one-time event. It is a multistep process, and transforming the IT organization and the infrastructure is a fundamental step in that process. Completing an IT Transformation shifts IT's role from an expense line to a primary revenue enabler for the newly formed digital business. With digital transformation, IT becomes the business; therefore, the more complete the IT transformation, the more capable the digital business becomes.

Even IT innovators, such as Dell EMC, are not immune to the "evolve or be disrupted" mandate that transcends industries. As part of its recent merger, Dell EMC completed a major integration effort that combined two leaders in information technology (IT) into the world's largest privately controlled technology company, with about $62 billion in revenue and 145,000 employees serving 180 countries at the time of the merger.[1]

As part of its digital and IT Transformation efforts, Dell EMC faced a common challenge of balancing multiple priorities. As part of the integration, the newly formed IT leader had to transform the business digitally while achieving its goals of constantly improving an already successful customer and partner experience. In addition, Dell EMC has a commitment to research and development. As an IT innovator, any interruptions to research and development would impact product

[1] http://investors.delltechnologies.com/news-releases/news-release-details/dell-technologies-reports-fiscal-year-2017-fourth-quarter-and

roadmaps and ultimately impact the business in a highly competitive industry. This paper will provide insight into Dell EMC's IT Transformation to offer a framework to help your organization begin its IT Transformation.

The State of IT Transformation

Any transformation project is a journey and not a destination. In order to measure where organizations are on that journey, Dell EMC recently commissioned ESG to create a research-based, data-driven maturity model in order to identify the stages of IT Transformation progress and then determine the degree to which global organizations have reached those stages. In addition, the research was designed to understand the benefits that result from increasing degrees of IT Transformation. In other words, we sought to understand if having a more transformed IT organization improves the business outcomes.

ESG's maturity model is based on a global survey covering 4,000 respondents from large midmarket and enterprise organizations focusing on the current state of IT and the outcomes that IT offers the business. The study leveraged that information to rank each organization and assign it an IT Transformation Maturity score. The score is based on three measures: how well a firm is leveraging modern data center technology, how automated the IT processes are, and how integrated the business and the IT relationship is.

The study found that IT organizations further along in their IT transformation tended to achieve higher levels of performance in the areas of agile infrastructure provisioning, on-time and on-budget project delivery, faster time to market, and enhanced IT spending efficiency.[2] One thing the vast majority (82%) of IT decision makers agree on is this: "If we don't embrace IT transformation, we will not be a competitive provider of IT services to the business." As a result, this desire for IT transformation has begun to dominate the list of IT spending priorities.

Four Vectors of IT Transformation

In order to better understand the current state of IT spending priorities, ESG conducted an in-depth research study, separate from the maturity model, that covered 651 IT professionals representing midmarket and enterprise-class organizations in both North America and Western Europe. All respondents were personally responsible for or familiar with their organizations' IT spending and 2018 IT budgets. As part of this study, ESG asked IT decision makers to identify the top five initiatives that they believed would drive IT investments over the next 12 months. The results in Figure 1 highlight four main themes, all of which are associated with the core principles of IT transformation:[3]

- Transform the business through data: How efficiently and effectively a firm can leverage value from data drives the success of the business. Nearly one third (30%) of IT decision makers identified improving analytics for real-time business intelligence and customer insight as a business initiative that would drive the most technology spending over the next 12 months. Other identified initiatives that support leveraging the value of data include new product research and development (25%) and developing strategies to interact with customers on mobile devices (22%).

- Transform the workforce with data: Leveraging data to transform customer interactions is just one benefit of an IT transformation; the workforce should become more efficient as well. Multiple initiatives expected to drive technology spending identified in the study align with improving internal efficiency, such as leveraging IT investment for improving internal collaboration capabilities (21%) and providing employees with mobile devices and applications to maximize productivity (22%).

[2] Source: ESG Research Insights Paper, *IT Transformation Research Proves a Persistent Link to Innovation, Agility, and Business Value*, to be published.
[3] Source: ESG Master Survey Results, *2018 IT Spending Intentions Survey*, December 2017.

Figure 1. Top Business Initiatives Driving Technology Spending

Source: Enterprise Strategy Group

- Control costs while meeting increased data demands: The second most commonly identified initiative, cost reduction (33%), reaffirms the ever-present need to support increased IT demands while staying within budget constraints. In addition, transformational initiatives typically require incremental resources. Cost reductions in core operations and infrastructure are critical to free up resources to make Digital Transformation a reality.

- Secure data as demands increase: Central to the idea that data has value, all transformation initiatives must ensure that data is secured and continuously adheres to regulatory compliance. Reaffirming this requirement, IT investment for increasing cybersecurity (44%) was the most commonly identified initiative, and regulatory compliance assurance was selected by over a quarter of participants (29%).

The culmination of these two research activities communicates two important messages: Firms further along the IT transformation journey deliver projects more quickly and efficiently than their legacy counterparts, and the desire to achieve these benefits is driving IT investment. With these general trends in mind, Dell EMC's IT Transformation story provides a prime example of how an IT leader approached the need to transform. The result provides a framework for leveraging modern technologies to dramatically improve IT efficiency, which helps to deliver superior services to employees, partners, and customers. For Dell EMC, all these benefits were achieved while the company was also in the midst of a massive integration/consolidation.

The Forces behind Dell EMC's IT Transformation

Under a traditional model, IT is an expense line item based on last year's run rate and the business often views it as slow and inefficient. This results in business teams turning to "shadow IT" (i.e., leveraging applications or services outside of the

list of approved IT services, such as those from the public cloud), which can offer the desired agility but at the expense of control and security and even cost.

The high-level Dell EMC challenges prior to IT Transformation were:

- IT was often viewed as too slow, too expensive, and too restrictive.
- Frustration with traditional process hurdles frequently drove business units to bypass IT, resulting in IT dollars spent elsewhere and decreased relevance.
- 80% of the IT budget was spent maintaining existing services (keeping the lights on), with only 20% spent on innovation.

Interacting with traditional IT requires the business to choose between agility and security. Neither option alone is enough, and cobbling multiple services together at the line-of-business level generates complexity and cost. Dell EMC identified the need for IT to evolve to become a trusted advisor and a builder and broker of services. The IT organization had to deliver agility, control, and security without limiting the technology options by leveraging on- and off-premises cloud technologies, including the option to integrate multiple public cloud services.

The Dell EMC IT Transformation Approach

IT Transformation is more than just buying the latest technology. When designing its IT Transformation strategy, Dell EMC created a blueprint that consisted of three high-level categories: modernize, automate, and transform.

Modernize IT Applications and Infrastructure

IT and storage technology innovations have delivered dramatic improvements addressing the cost and complexity of IT infrastructure. For example, according to ESG research:

- 33% of solid-state storage users identified benefits to improved resource utilization, and 27% identified an improvement to TCO.[4]
- 34% of software-defined storage users identified a reduction in operational expenses, and 34% identified simplified/expedited storage deployment.[5]
- 27% of converged infrastructure users identified simplified management as a realized benefit of the technology, and 25% identified an improvement in TCO.[6]

On-premises innovation is only one piece of IT modernization. Dell EMC also identified the need for a unified multi-cloud approach, leveraging both on- and off-premises to provide best of breed infrastructure options to the business. When selecting infrastructure options, Dell EMC endeavored to standardize as much as possible to help create predictable building blocks of infrastructure that could make the cost of infrastructure more transparent and predictable. At the most basic level, technology modernization helps to dramatically reduce the cost and complexity of deploying and managing IT infrastructure. These modern technologies can also deliver critical capabilities, such as larger capacity and performance

[4] Source: ESG Brief, *Flash Storage: Growth, Acceptance, and the Rise of NVMe*, September 2017.
[5] Source: ESG Research Report, *Software-defined Storage (SDS) Market Trends*, February 2017.
[6] Source: ESG Master Survey Results, *Converged and Hyperconverged Infrastructure Trends*, October 2017.

scale, software-based deployment, and API-based management, which support a necessary foundation for the automate and transform phases.

Automate the Delivery of IT Services

When IT becomes a critical enabler for revenue opportunities, any delays hurt profits. IT services must scale automatically and on demand, without delays caused by internal bureaucracy or holdups in infrastructure procurement and deployment. This requires two core IT capabilities:

1. The most automatic and seamless deployment and management of applications.
2. The most predictable and transparent cost of the delivered service.

A critical tool in automation is virtualization technology. A goal that Dell EMC set for its IT Transformation initiative was to become a 100% virtualized IT environment (Dell EMC currently stand at 80% virtualized) to better automate the deployment and management of IT services. In order to automate the consumption of those IT services, the Dell EMC team delivered a user portal that offers access to a service catalog of IT offerings. Delivering this necessary metered service demands an infrastructure that can scale in both performance and capacity while being predictable from a TCO perspective. Additionally, IT automation is designed to extend to both "day one" and "day two" activities. In other words, Dell EMC IT automates not only the initial deployment of workloads, but also the ability to scale the infrastructure to support those workloads as needs change.

Ultimately, any required manual IT task is the enemy of an efficient digital enterprise, so deploying the necessary automation and orchestration is the key to fully realizing the benefits of the modern IT infrastructure. Infrastructure provisioning time came down from 90 days to less than 1 day, over a 98% reduction in the time required.

Transform IT Processes and the Organization

Modernization and automation, however, are not enough to deliver timely IT services. The organizational structure of the IT personnel, their responsibilities, and their skills must transform as well. As a result, Dell EMC shifted IT personnel to work directly with key line of business leaders to understand their demands better and ultimately deliver the necessary IT capabilities faster. This meant IT became dedicated to understanding the needs of its customer, the business, instead of focusing on technical areas.

Without the elements of modernized infrastructure and automated services, however, the added headcount required to support the necessary level of IT organizational transformation would likely be not sustainable. The scale of IT infrastructure can balloon as a company transforms digitally. Modernizing and automating the infrastructure fundamentally reduces the cost curve. As a result, existing IT resources are freed to take on these new responsibilities without driving up budget demands.

Blueprint for an IT Transformation

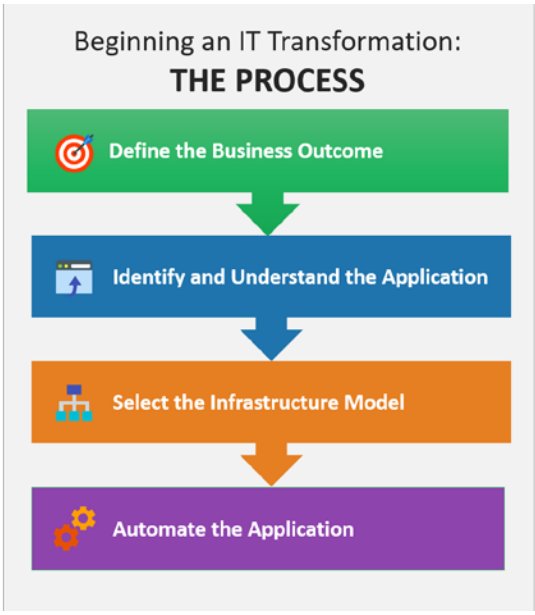
IT Transformation starts with accepting the overarching "modernize, automate, and transform" blueprint; one that can deliver common automation tools, a common portal, and common infrastructure building blocks. The next step is to select a specific workload-based initiative as the place to start. For Dell EMC, each IT Transformation initiative followed a multistep process that included:

1. **Define the desired business outcome:** Examples of defined overarching goals include growing revenue with a new product or service, or reducing costs and improving efficiency by leveraging analytics. The goal should focus on measurable, business-related results that center on a single workload or a contained set of workloads.

2. **Identify and understand the application(s) that will play the critical role in delivering the desired business outcome:** Is the application a more traditional workload with a client/server usage model, such as Oracle or SAP? These applications demand secure, highly available, and reliable infrastructure. Or will the applications be more cloud-based? These cloud-native applications tend to be web-based, leverage micro-services, and require a more agile and scale-out infrastructure, high availability, and security. This determination will impact the infrastructure and the automation choices available.

3. **Select the infrastructure model:** Part of modernizing the infrastructure is leveraging emergent technologies, such as flash, software-defined, converged, and hybrid cloud services, which can deliver transformational value. Another consideration is deploying these technologies in a predictable building-block fashion to simplify future automation. This new way of infrastructure deployment will deliver a predictable level of performance and capacity, which can better fit into policy-based automation.

   Additionally, the type of infrastructure can depend on the workload involved. For example, Dell EMC's more traditional scale-up applications leverage a VMware-based infrastructure-as-a-service (IaaS) architecture often deployed on converged infrastructure in a hybrid cloud model. For cloud-native workloads that leverage a scale-out model (where the necessary resiliency is often handled at the application layer), these may be better suited on a platform-as-a-service (PaaS) architecture based on Pivotal Cloud Foundry deployed on hyperconverged infrastructure.

   When architecting any IT infrastructure modernization initiative, the impact on network resources also must not be overlooked. In the data center, as micro-service-based distributed applications experience increased adoption and the already widespread usage of virtualization continues to scale, new traffic patterns emerge and bandwidth needs skyrocket, requiring new network architectures and processes. With emerging "Mobile first" network architectures further challenging the status quo of endpoint connectivity, data networks can become a significant burden to IT budgets and resources. To address these challenges, Dell EMC adopted an Open Networking vision designed to deliver up to 40-50% cost savings and 50-60% operational savings with faster design, provisioning, and management capabilities. Dell EMC Open Networking plays a chief role in enabling its cloud-based IT service delivery and simultaneously freeing up valuable human capital for higher-value tasks.

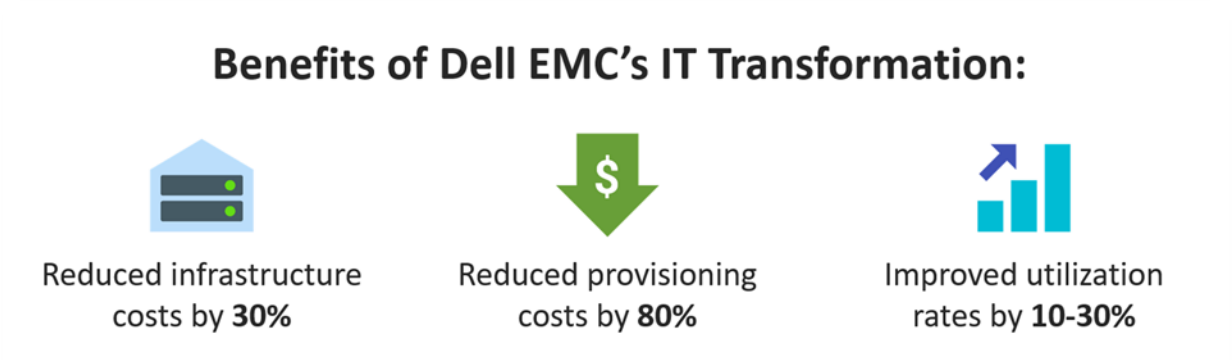
4. **Automate the application:** Manual processes are the enemy of the digital enterprise. They are expensive, slow, and not easily scalable. The design and configuration of the necessary orchestration and policy engines serve as a background to deploying a service catalog of IT services. Ideally, this service catalog will be presented via an end-user portal, further removing manual IT intervention. Leveraging the right modern infrastructure technology and the development of proper metering helps ensure that the right infrastructure costs are transparent, tracked, and allocated to the business unit requesting the service.

These high-level steps deliver a framework for conducting an IT Transformation initiative; however, they are not the entire story. An effective IT Transformation requires strong executive support as well as a cultural shift, which can take time to achieve, but must not be ignored.

Quantifying the Impact of Dell EMC's IT Transformation

To provide an idea of the scale of Dell EMC's IT Transformation, the resulting IT operations of the combined Dell EMC organizations is comprised of over 50,000 virtual machines, over 14,900 servers, and over 140 petabytes (PB) of storage across 19 data centers. As mentioned in the process section, the current phase of Dell EMC's IT Transformation was not a single initiative, but the culmination of multiple initiatives that all followed the same blueprint. The end results have been impressive but the journey continues.

Leveraging Dell EMC's IT Transformation approach, and adopting a modern data center approach, the organization was able to reduce infrastructure costs by 30% and provisioning costs by 80%, while improving utilization rates by 10-30%. These benefits improved the speed at which new services could be delivered while leveraging a more efficient IT infrastructure and organization.



To better understand the specifics behind these impressive benefits of Dell EMC's IT Transformation, ESG was able to gain some insight into one of Dell EMC's larger IT Transformation initiatives, centered on application modernization.

Dell EMC's Application Modernization Initiative

As part of its Digital Transformation, Dell EMC saw a need for the innovators in the company to think and act more like a software company. Simply put, Dell EMC wanted to achieve a greater focus on development both culturally and operationally, while simultaneously improving the quality and speed of its development efforts. The role of IT was to modernize application services and deliver a modern application development platform to enable, even accelerate, the business's efforts to optimize innovation efforts. Tactically, Dell EMC identified three goals:

- Develop, deploy, and operationalize software more quickly and at a reduced cost.
- Drive and enable internal adoption of the agile software development model, featuring rapid and iterative development practices based on the Pivotal Labs methodology.
- Serve all developers companywide: Line of business and product development teams house over ten times the number of developers as those in IT.

As an industry leader with a massive IT footprint and multiple development teams worldwide, Dell EMC's IT responsibilities cover a wide breadth of applications, ranging from the more traditional systems of record, such as Oracle and SAP, to modern cloud native systems of customer engagement and insight built on Pivotal Cloud Foundry (PCF).

Pivotal Cloud Foundry

With the goal being to accelerate innovation, enabling cloud-native applications was a central focus, helping to shape architecture decisions such as leveraging Pivotal Cloud Foundry. Unlike more traditional infrastructure models, Pivotal's

PaaS architecture doesn't permanently allocate storage infrastructure to a specific application. Cloud-native applications are self-contained and can scale horizontally as demands increase. High availability, fault tolerance, and resiliency are delivered at the platform level, ideal for cloud-native applications and micro-services-based development. As a result, cloud-native applications automate infrastructure provisioning. Infrastructure resources are allocated dynamically at deployment, and can then evolve as needs evolve.

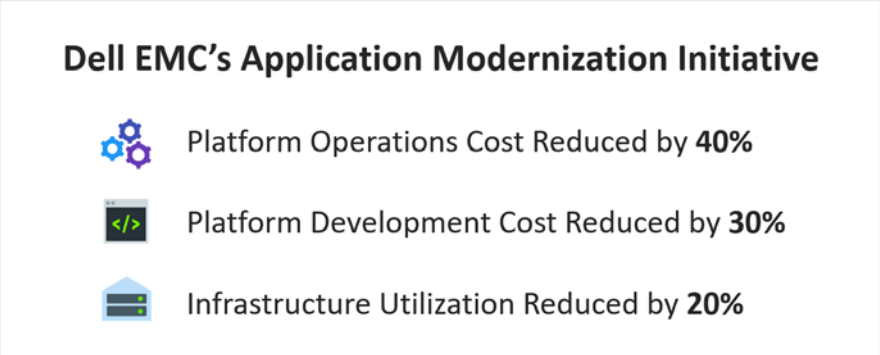
Successfully enabling cloud-native development, however, is not an overnight process. It is being achieved with a series of smaller steps over a multi-year timeframe. The step-by-step process ensured development teams were brought along in the journey, and not left behind, reducing the risk to the overall program. As a result, Dell EMC IT currently offers its developers automatic access to multiple cloud-native development platforms via its self-service portal. A high-level overview of the process steps includes:

1. Training for IT, line of business, and product development teams on how to design and build cloud-native applications using Pivotal Labs framework.
2. New infrastructure deployment with Pivotal Cloud Foundry offering capacity designed to serve a variety of application demands.
3. IT offering a cloud-native infrastructure "sandbox" for developers to evaluate and provide feedback via IT's self-service portal. This offering was followed by multiple iterations of training, feedback, and knowledge transfer.
4. Multiple Pivotal Cloud Foundry services available in Dell EMC's IT self-service portal, with consumption at scale leveraging both on- and off-premises infrastructure.

At the business level, the Dell EMC application modernization initiative has delivered significant and tangible results to date. In some areas the cost of platform operations was reduced by 40%, the cost of platform development reduced by 30%, and infrastructure utilization improved by 20%. These benefits highlight the cost and infrastructure optimization achieved by the initiative, but the most valuable benefit was likely Dell EMC's ability to deliver greater customer value through its cloud-native software development projects. To better understand this value, ESG was able to gain some detailed insight into one such cloud native-application project, MyService360.

Application Modernization Example: MyService360

The Overview



For Dell EMC customers, MyService360 delivers a cloud-based dashboard for a personalized and consolidated customer service experience. Dell EMC customers receive actionable insights across their entire global install base of Dell EMC products, offering capabilities such as incident management, code level analysis, install base overview, connectivity status, and onsite service tracking. Dell EMC customers can see the health status of everything they have bought from Dell EMC as well as associated alerts and resulting actions. The Dell EMC IT transformation team viewed MyService360 as an area for potential improvement. The specific desired business outcome was to deliver an improvement upon the already well-received customer experience that MyService360 provides while leveraging a more efficient infrastructure.

The Approach

Given that MyService360 is developed as a cloud-native application, Dell EMC transitioned to a more flexible and agile infrastructure support model leveraging a data lake. The services tier leverages Pivotal Cloud Foundry, enabling software updates to be deployed more easily and rapidly, which speeds up release cycles and the delivery of new features. Additionally, Pivotal Cloud Foundry allows for the consolidation of multiple infrastructure options including Isilon, ScaleIO, and XtremIO as the data storage foundation for its data lake. Another benefit of the Pivotal Cloud Foundry approach is its ability to automate horizontal scaling by sensing spikes in demand for MyService360 and automatically allocating resources to ensure the right customer experience while optimizing infrastructure.

The Outcome

Due to the efficiencies delivered through the combination of Pivotal Cloud Foundry and the Pivotal data lake architecture, Dell EMC reduced the software release cycle time for MyService360 from four months to two weeks. As a result, new functionality is delivered to the customer faster. The previously required 24-hour downtime is eliminated; new MyService360 updates and functionality are deployed instantaneously and non-disruptively, further improving the customer experience. From the infrastructure perspective, resource scaling was changed from a manual on-premises deployment model to an on-demand resources expansion model by leveraging Pivotal Cloud Foundry. Previously, to support increased customer demand for MyService360, new hardware resources required four weeks before they could be deployed. After the transformation, resources can be added on demand. The net result not only sped up the ability to scale MyService360, but also dramatically reduced the operational cost associated with resources scaling.

The Bigger Truth

Digital transformation is not limited to the hot flashy startups, nor is it limited to massive corporate behemoths. The ideals of the digital economy are quickly permeating every industry and will impact essentially every business and organization. As the number of digital products and services increases, consumers will adjust their expectations accordingly. As more businesses leverage analytics to garner more valuable insights, more traditional companies will be at disadvantage. Even if your industry has not felt the effects, history has shown that even business leaders of successful companies are not immune to being ousted by the threat of future digital competition. Ultimately, digital transformation is inevitable, and IT transformation serves as the logical first step in getting ahead of this trend.

Dell EMC has provided a powerful blueprint for IT Transformation with its three-prong strategy: modernize infrastructure, automate IT services, and transform processes. In the end, the IT organization has to understand its new role of being the central business enabler. IT is part of the critical chain for enabling the digital enterprise. The more agile and flexible the IT capabilities, the more rapidly a digital business can grow and adjust to market demands. Infrastructure silos, manual and time-consuming processes, and inaccessible IT leaders are costly for traditional organizations, but are the death of a digital business. With its expertise from its own internal IT Transformation along with its expansive set of infrastructure and software technologies, Dell EMC has become a powerful ally to help any business in its IT Transformation journey to fuel digital innovation.

Enterprise Strategy Group is an IT analyst, research, validation, and strategy firm that provides actionable insight and intelligence to the global IT community.

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