THE MODERN CIO:
Digitally Delivering Business Transformation

Executive Summary

A new industrial revolution is barreling ahead, fueled by the Internet of Everything, social media, and cloud computing - bringing about fundamental changes in the way that we live and act. CIOs today are in a unique position to utilize technology to create business value and opportunity. This requires a careful balance of the traditional skills of the CIO, managing the data center infrastructure while driving business strategy and impacting the customer experience.

> The 'Creative CIO' will not only be a technology strategist but also a business strategist and innovator."
>
> Harvey Nash/KPMG
> CIO Survey, 2016

The Dell EMC PowerEdge server systems are the CIO's key tools in this transformation. They are the bedrock of the modern data center – providing scalable system architectures that ensures control of the IT lifecycle while delivering a cyber-resilient environment. Modern CIOs are leveraging the PowerEdge server systems to bring about competitive advantage and drive business transformation.

The Traditional CIO

Today many organizations are looking to "digital transfor-mation" in order to build opportunities for business growth. Digitalization in business though is not a new concept. The introduction of digitalization started decades ago when com-panies began to incorporate computing into business opera-tions. The IT manager at that time was chiefly a technologist with the dual responsibilities of delivering new IT systems on budget and keeping current systems running at a high level of reliability. As projects grew in scope to apply technology to larger-scale business processes such as finance and ERP, it was clear there was a need for a person to manage IT who was not solely a technologist but who also had strong business acumen and an ability to effectively communicate across the organization. Out of this, the "CIO" was born.

Challenges to the traditional CIO

In recent years, an entirely new wave of digital disruption has emerged. This new digital disruption is having a profound impact on the role of the modern CIO. Several key challeng-es the modern CIO faces in this new era involve data, cloud, security, and skills management.

Data proliferation

Dual trends have emerged that are driving an explosion of immense amounts of data. First, with the rapid growth in mobility, it's expected that there will be 7.3 billion personal devices by 2020. In conjunction with the growth of the Inter-net of Things (IoT), there are projected to be 30 billion IoT end points by 2020.[1] With the rapid growth in data generat-ing endpoints, it is predicted that there will be 163ZB of data created by the year 2025.[2] To gain some perspective on the magnitude of such large data, all words ever spoken on earth can be stored in 5 "exabytes" (exabyte equals 10 to the 18th power).[3] One zettabyte equals 10 to the 21st power (or 1000 exabytes).

This explosion of data with the rise of mobility and IoT are contributing to what is being called the 4th industrial revolution. This 4th industrial revolution is "characterized by a fusion of technologies that is blurring the lines between the physical, digital, and biological spheres".[4] It's bringing about the possibilities of billions of people connected by mobile devices or IoT endpoints, blurring the lines between the physical and virtual, and the digital and the non-digital worlds. In addition, social media has evolved to enable a much more intimate involvement with customers, providing vast amounts of data in the form of real-time customer insights. How to manage this data to get the maximum amount of benefit and value is a unique challenge for the modern CIO.

Cloud adoption

Organizations today are faced with a range of private and public cloud options and are finding that with the adoption of hybrid cloud (management of both public and private clouds), they have been able to lower overall operational costs for IT by as much as 24% and are 3 times more likely to achieve digital business goals.[5] Several outstanding examples of cloud-enabled businesses, Salesforce.com, Uber, and AirBnB have brought sweeping business disruptions in their respective industries. Cloud computing can offer opportunities for cost savings as well as disruptive business growth (see Figure 1).

CIOs are seeing

23%
of digital disruption due to new forms of customer engagement

63%
of their role focused on driving revenue

65%
of CIOs report a skills shortage

67%
expect their strategic influence in the organization to grow

Dell EMC PowerEdge Servers enable

99%
increased speed in data driven business decision making

85%
automation of application deployment through "digital labor"

80%
reduction in IT management time, increasing IT environment security

1   Gartner Keynote: The Infrastructure and Operations Scenario:@ the Core of Change, Gartner, December 2016
2   IDC White Paper, sponsored by Seagate, Data Age 2025, April 2017.
3   Globally Interconnected Object Databases, Julian Bunn, September 1997
4   World Economic Forum, Klaus Schwab, 2016
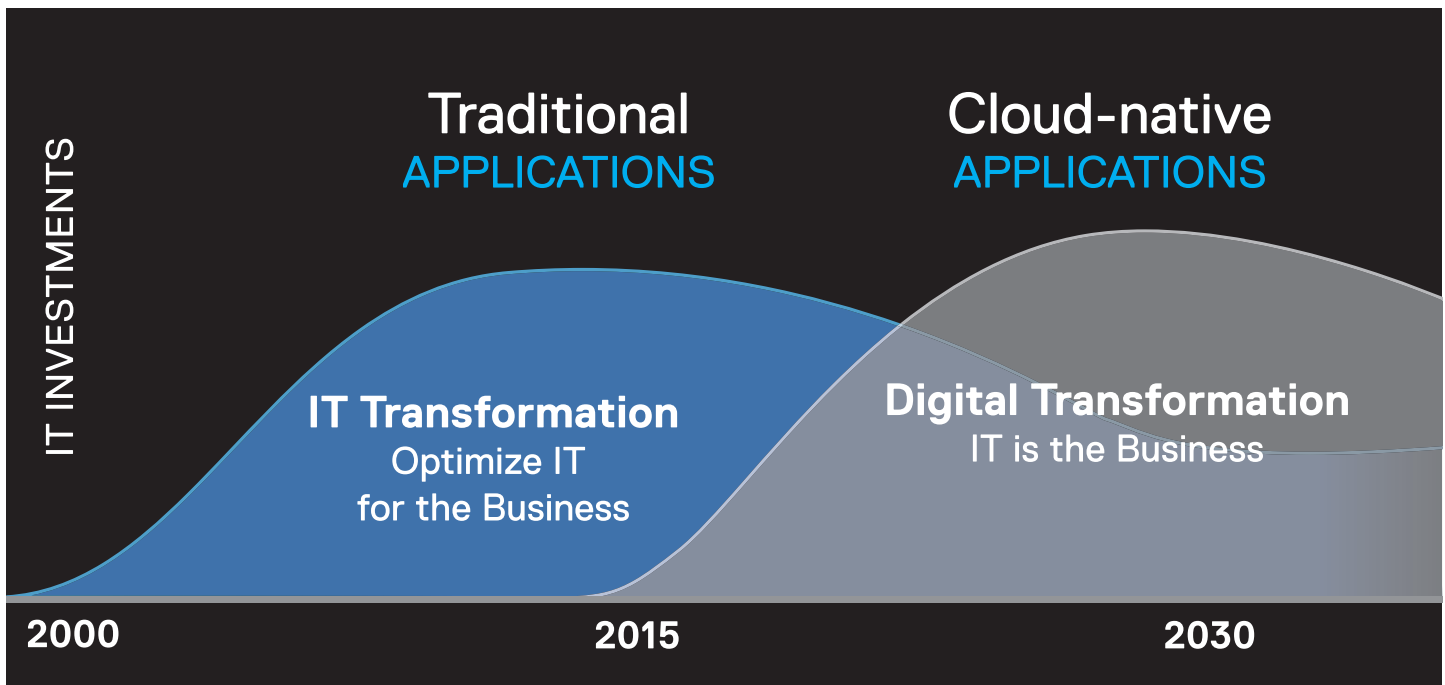5   Harvey Nash/KPMG CIO Survey, 2016

Figure 1. IT becoming the business

Cyber security and privacy concerns

In the 4th industrial revolution, the fusion of technology with the physical has also become a rapidly growing vehicle for malicious gain. There are approximately one million cyber-attacks released every day with 28% of CIOs having had to respond to a major IT security threat or cyber-attack in the past 2 years.[6] Recent years have shown several notorious instances of companies' data being compromised with hackers gaining access to the personal information of up to 145 million individuals.[7] Security attacks in the form of cyber warfare, and government and corporate espionage are also increasingly prevalent. Security management needs to evolve beyond traditional firewalls and anti-virus programs to provide the necessary protection.

Skills shortages

In the midst of all these changes, the ability to find and keep qualified IT staff to tackle these challenges has become a major hurdle for today's CIO to overcome. 65% of CIOs report skills shortages holding them back from executing on current initiatives.[8] In addition to finding the talent with the required new skills to address the modern data center challenges, 89% of CIOs are also concerned about how to retain the IT talent they have on staff today.[9] Companies are needing to invest in training IT professionals but this still falls far short of what is needed to address the growing complexity.

The Modern CIO – traditional and transformative

While maintaining the traditional roles within IT of managing costs and supporting the business, the modern CIO is also tasked with creating value for the business and driving new revenue. 67% of CIOs are expecting their strategic influence to continue to grow with 34% of them reporting directly to the CEO and 57% now sitting on an executive board.[10] The CIO is expected to both manage and optimize the traditional applications and infrastructures while also functioning as a business strategist - driving innovation and creating value (see Figure 2). IT building blocks utilizing the Dell EMC PowerEdge are important leverage points for traditional and transformative components of the modern CIO's success.

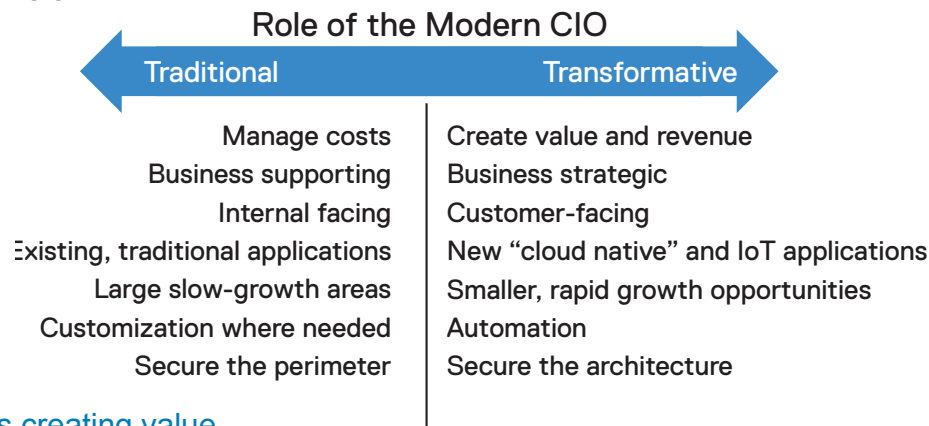6   Harvey Nash/KPMG CIO Survey, 2016
7   Here's Who's Been Hacked in the Past Two Years, Fortune, 2015
8   Harvey Nash/KPMG CIO Survey, 2016
9   Harvey Nash/KPMG CIO Survey, 2016
10   Harvey Nash/KPMG CIO Survey, 2016

Figure 2. Role of the Modern CIO

Role of the Modern CIO

Traditional	Transformative
Manage costs	Create value and revenue
Business supporting	Business strategic
Internal facing	Customer-facing
Existing, traditional applications	New "cloud native" and IoT applications
Large slow-growth areas	Smaller, rapid growth opportunities
Customization where needed	Automation
Secure the perimeter	Secure the architecture

Managing cost versus creating value

IT traditionally has reported into the CFO/Finance department – in part because the very early IT applications were financial applications. With IT's focus on plans, projects, and expenditures – there needed to be a regular cost justification and control for these activities with clear ROI measurements. The traditional CIO has had a strong focus on managing costs with TCO being a key metric for IT management effectiveness.

In recent years, "IT spend" has been increasingly moving outside of the formal IT organization. Gartner has recognized that at least 29% of IT spend is is outside the IT organization (see Figure 3).[11] Technology to support business drivers versus technology to support the business is splitting the IT budget, with the new IT focused on creating value and revenue.

With the new wave of digital transformation, the IT organization has squarely moved from its foundations within a cost center into a profit generating business strategy center. Today 37% of CIOs still see their key focus on saving money but 63% have seen their key focus change to making money.[12] For the modern CIO, IT will continue to manage large capital purchases and cost management will remain an important function. CIOs though are expected to utilize technology to drive business outcomes that create value and new revenue.
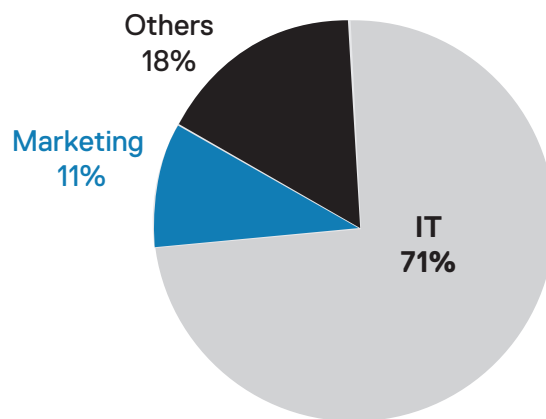

Figure 3. At least 29% of IT spend is outside the IT organization

Leap from business process management to business decision driver

The explosion of data has become a bonanza for businesses who are able to make use of this data to drive rapid business decisions. The key isn't just enabling a big data management system but more than ever in being aware of the key business issues and matching it with rapid decision making based on hard data. This was described by Bill Gates in his book *Business @ the Speed of Thought* where he spoke of the intertwining of technology and business forming a "digital nervous system." Organizations then would "make better decisions – to think, act, react, and adapt."[13] Today with high-performance
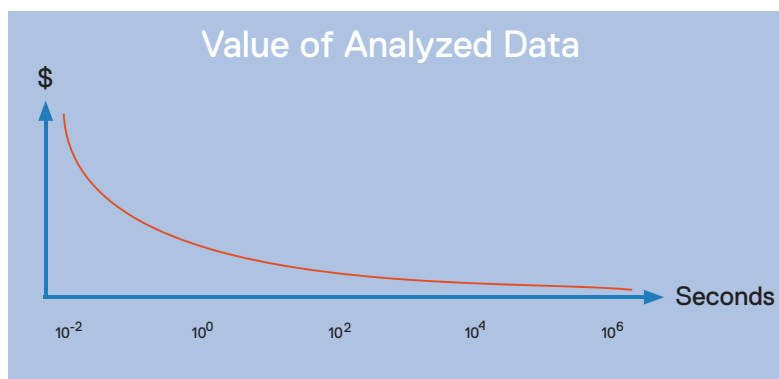
- Businesses demanding real-time insight
- Increasing amounts of data to be analyzed

Figure 4. Driving timely business decisions and outcomes

Dell EMC PowerEdge servers with optimized in-line memory capability, large quantities of data can be quickly analyzed and decisions automated to occur real time. The CIO is responsible for utilizing the data to drive timely business decisions and outcomes (see Figure 4). This can show itself in a researcher utilizing big data for weather pattern modeling to an online retailer utilizing a specific customer's data to serve up the correct product offer or experience while the customer is "in the shop."

Just as timely information can be critical for business decisions, in the fourth wave, data has time-based value and its value can rapidly decline. Taking too long to piece together data on a customer in an online transaction can result in a lost sale. The modern CIO must manage large amounts of unstructured data while

11 Top 10 Technology Trends and Their Impact on Infrastructure and Operations, Gartner Presentation, David Cappuccio, December 2016
12 Harvey Nash/KPMG CIO Survey, 2016
13 Business @ the Speed of Thought, Bill Gates, 2009

maintaining deep insights into that data. **Utilizing the Dell EMC PowerEdge server solutions for big data management, Sensus, an energy and utilities business, deployed a big data solution based on the Dell EMC PowerEdge R730 and R730xd servers** in order to manage enormous data sets from manufacturing and real-time customer information to gain actionable, timely business insights. Sensus with Dell EMC created a "data lake" and used the Dell EMC solution to enable faster decisions on whether a particular device in the field should be changed or redesigned based on how it is being used at any specific moment in time. They gained the business outcome of being able to "shape the next set of requirements for products that we want to develop for our customers" based on hard facts. They've also noticed that "having this data at our fingertips makes us a lot quicker on response time and allows us to provide faster and more accurate results… to the business so that we make really good decisions with real data." As a result, Sensus is able to take over 200 terabytes of real-time data and process it in less than a minute. This represents up to a 99% reduction in time, enabling critical business decision making while data is at its most valuable.

Customer *and* technology focused

In order to deliver business value through digital transformation, CIO's today recognize that regular direct customer engagement is essential. 23% of digital disruption that is being applied for successful business transformation is due to some new form of customer engagement.[14] CIOs recognize better engagement with customers as a key priority with 40% of CIOs spending at least one day out of their week outside of IT.[15] Getting closer to the customer and being able to apply technology in the business offering is delivering real competitive value. Moving customer engagements to the cloud, utilizing in-memory data analytics to optimize customer service, leveraging social media for targeted marketing – all these require the modern CIO to have regular, ongoing customer face time to better understand how to effectively apply new technologies for a competitive benefit.

In order to give Anana a competitive edge in the contact-center industry, they **migrated to a Dell EMC FX architecture to develop a contact platform to enhance the end-user customer experience.** Utilizing Dell EMC server technology they deployed a cloud solution with a strong social media platform utilized by approximately 2,000 contact center operators. This accelerated their move to social media, web chat, and mobile apps versus traditional telephony as a way of servicing their customers. The new Dell EMC FX architecture for the cloud gave Anana greater speed and agility in order to improve customer experience. The Dell EMC solution is also 30% more cost effective than their previous solution.

Secure perimeter to secure architecture

With the blurring of the physical and virtual infrastructures in the business, the real battle against cyber-attacks has moved beyond focusing on the perimeter (firewall) of the IT infrastructure to creating a trusted environment for internal traffic. With the widespread deployment of virtualization and hybrid cloud, traffic needs to be proved wherever the user or application exists. Modern security needs to move beyond reactive response to proactive secure environments. Security must be built into the DNA of a modern IT architecture. Dell EMC server technology can provide the secure DNA for a worry-free foundation for enterprise security. Embedding the Dell EMC integrated Dell Remote Access Controller (iDRAC) into each PowerEdge server provides secure and remote server access. It ensures secure management throughout the lifecycle of the server – from deployment, repurposing, monitoring, upgrading, and decommissioning. Dell EMC minimizes security vulnerabilities in the data center by providing embedded protection at all points of the server hardware's lifecycle. Through automating the security function, Dell EMC's Zero-Touch automated configuration feature securely reduces configuration time by 99%.

Dell EMC has also developed the Dell Security Development Lifecycle (SDL) means to secure data from within the infrastructure wherever the data resides. With SDL, Dell EMC proactively surveys the security landscape, anticipating evolving threats and exploit vectors and providing frequent secure updates to software and firmware to keep the IT environment safe. Dell EMC uses the SDL during the development of server firmware to thwart the injection of malicious code during the product development lifecycle (see Figure 5).

14   Harvey Nash/KPMG CIO Survey, 2016
15   Harvey Nash/KPMG CIO Survey, 2016

Intelligent Automation Opportunities

In the fourth industrial revolution, intelligent automation is a promising area for alleviating the skills shortage through "digital labor," leveraging digital technologies to augment or automate tasks.[16] Through automation, it's expected that 24.7 million jobs will be replaced by 2027,[17] potentially making up for a significant portion of skills shortages.

Utilizing the Dell EMC FX2 using the FC630 server module, Liaocheng University has been able to manage skills shortages by automating application deployment by 85%. The Institute was able to complete a virtual desktop infrastructure (VDI) deployment in a single day instead of the initial estimate of seven days utilizing the automation capabilities with the FX2. They've also been able to gain efficiencies in overall mathematical modeling, decreasing model design by 66 percent. Through deploying digital labor they've moved personnel to more strategic, higher value activity. Yu Bo, Information Center Director for China Smart City Research Institute stated that "we believe that IT can inspire personnel to be more creative and the end-to-end Dell EMC VDI solution is doing just that."

Figure 5. The Dell EMC Security Development Lifecycle

Automation also greatly increases the security of an IT infrastructure by taking out the human error in repetitive processes. Manual security-related misconfigurations have also been noted to result in 48% of organizations experiencing an application outage and 42% a network outage.[18] The average cost of a data center outage due to misconfiguration is $740,357 and on average taking 1-3 hours to resolve, with 19% taking a full working day to fix.[19]

Shelby American looked for a reliable, secure and affordable way to connect on-premises networks. By updating their data center environment they were looking to build an infrastructure that could reduce administration time as a way to reduce vulnerabilities. **They deployed Dell EMC OpenManage Essentials on their Dell PowerEdge server environment and were able to reduce their IT management time by 80%.** Richard Sparkman, IT Director for Shelby American commented: "it helps me spend less time actively managing all my servers and more time on strategic tasks that may not relate directly to IT."

16   Harvey Nash/KPMG CIO Survey, 2016
17   The Future of Jobs, 2027: Working Side-By-Side with Robots, Forrester, April 2017
18   The State of Automation in Security, Algosec, Spring 2016
19   Cost of Data Center Outages Report, Ponemon Institute, 2016

Conclusion: CIO strategy built on PowerEdge technology

The modern CIO is facing unique opportunities in the midst of the fourth industrial revolution to bring about significant transformation to organizations and industries, delivering exceptional business outcomes. Dell EMC PowerEdge Server technology is the proven platform for the modern CIO to build those solutions that will enable the next business transformation. With Dell EMC PowerEdge technology, CIOs can deploy a consistent, scalable design for any workload. The PowerEdge server is a bedrock foundation for hybrid cloud and converged architectures. In addition, Dell EMC PowerEdge technology can enable the modern CIO to address skills shortages with automation and intelligent management while providing a worry free, secure infrastructure built into the architecture.

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