Delivering Optimized Mission-Critical Workloads in Enterprise Datacenters Through Innovative Systems and Services

Sponsored by: Dell
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IDC OPINION

As enterprise business managers continue to rely on IT for advanced technologies to provide competitive strategic advantage, IT environments are growing in size, scale, and complexity. CIOs and IT managers are supporting mission-critical business processes with demanding service-level agreements (SLAs) for internal and external customers. In addition, they must maintain extensive legacy systems for core business processes while expanding investment in innovative projects that can directly affect the bottom line. To help meet these demands, many IT organizations are looking to hardware and software vendors for new solutions and services to improve and optimize ongoing IT operations. IDC research regarding IT operations and support has shown the following:

- The top concerns for IT organizations include a shift from supporting technology to supporting business processes, faster access to mission-critical workloads, efficient IT service delivery modification, and managing hybrid IT environments. CIOs and IT managers are considering new technology solutions to help address these issues, especially as the industry shifts to deploying on the 3rd Platform. Enterprises will need additional capabilities that feature improved IT management capabilities, automated and preventive support solutions, and integrated tools across heterogeneous IT environments.

- IDC recommends that enterprises consider hardware and software solutions and services from vendors with a demonstrated history of considering operations and support as part of the product development process. Integrating IT operations tools and support functionality into product design can provide significant benefits — including accelerating implementation, adoption, and utilization for busy IT organizations. CIOs and IT managers should look for extensive automated and proactive functionality for IT operations and support, especially across hybrid IT environments. IDC also recommends considering providers that offer not only broad geographic coverage to enable integrated global support delivery but also a well-established support partner network to help with support delivery.

- Dell offers a comprehensive suite of technology solutions and associated services specifically designed for improving IT operations and supportability across the IT environment. Used together, these features can help IT organizations looking for automated tools and utilities streamline IT operations and improve IT service delivery. These advanced capabilities for Dell systems and support are available only to Dell support customers and customers of Dell-authorized support partners.
IN THIS WHITE PAPER

This IDC white paper examines the primary benefits of working with vendors investing in solutions that can process, support, and manage mission-critical workloads for cloud solutions, mobility capabilities, and data analytics initiatives in today's datacenters. It highlights the important role of integrated design for enterprise products and services and the potential benefits of new server technologies and support, deployment, and management services. This white paper also outlines new systems and service offerings from Dell and details the potential benefits of selecting a vendor or authorized partner to both design the solution and deliver the expertise for supporting and managing that infrastructure.

SITUATION OVERVIEW

In today's competitive global markets, enterprises are adopting new technology solutions to achieve strategic business advantages. For CIOs and IT managers, deploying and managing these new solutions can pose significant challenges – even in the most sophisticated datacenters. With business managers demanding cloud technologies, mobility capabilities, and analytics solutions, maintaining a high level of service delivery with fewer IT resources can be an overwhelming proposition. As a result, many IT organizations are turning to support providers for help in improving ongoing operations and optimizing IT service delivery.

The Rise of the 3rd Platform and the New Datacenter

As enterprises adopt new technologies to solve complex business problems, value and service delivery models across the IT landscape are changing significantly. Recent IDC research is largely focused on the emergence of the 3rd Platform – a completely new value delivery platform, with a dramatically new scale and new economics based on the disruptive technologies of cloud, mobile, social, and big data and analytics. IDC believes the integration of these four technologies into the 3rd Platform is changing user expectations for enterprise IT considerably and will require a new level of service delivery across the enterprise.

As business managers increasingly embrace the technologies of the 3rd Platform, they are ratcheting up IT service delivery expectations. IT organizations are facing a number of new initiatives to enable new business processes and innovative mission-critical applications. In recent discussions with CIOs and IT managers, IDC identified several key areas of investment and innovation that are changing operational requirements in the IT environment. The most critical areas include the following:

- **Supporting business processes, not just technology.** For many IT organizations, supporting specific technologies in the IT environment is no longer a primary concern. Enterprises rely on IT for high-quality service delivery to speed product development, accelerate time to market, and maximize revenue opportunities. As a result, CIOs and IT managers are focused on supporting business processes with strict SLAs for internal and external customers. This shift will require new technology delivery systems, especially in ongoing operations and support.

- **Faster access to mission-critical workloads.** Through innovative storage and server designs enterprises can run applications, which can include high-impact workloads like analytics and modeling, in real time without performance penalties or impact on users running other applications.
Enabling fast and efficient IT service delivery modification. Business managers need improved flexibility and agility in technology supporting mission-critical business processes to meet rapidly changing market and customer needs. Accordingly, IT organizations are seeking technology solutions and services that can scale up and down quickly to accommodate changing market conditions and new market requirements.

Managing hybrid IT environments. Most IT organizations are juggling a hybrid approach to IT procurement, with a mix of on-premises and cloud solutions. However, for most enterprises, these solutions must integrate seamlessly to support business processes across the enterprise – a challenge for IT management and support delivery.

While these initiatives can present significant benefits to the enterprise, they are also drastically changing the face of IT infrastructure. These changing requirements and the associated new technology adoption are adding considerable complexity to ongoing IT operations, especially for resource-strapped IT organizations.

Operational Challenges in the New Datacenter

With the new requirements mentioned previously, CIOs and IT managers are facing a number of new challenges. As datacenters evolve specifically to enable business managers and increasingly include software-defined "everything," IT organizations are struggling to efficiently manage and optimize IT operations. Key operational challenges include the following:

Maximizing system performance and availability. As IT landscapes grow in scale and complexity, IT organizations must improve infrastructure management to ensure peak system performance. This includes managing multiple support providers across the technology stack to solve complex problems in highly integrated IT environments.

Increasing efficiencies in the datacenter. CIOs and IT managers must take full advantage of their technology deployments to support new initiatives. Optimizing server platforms and workloads to accelerate performance and time to market to match the growing needs of the business is a daunting task in today's complex IT environments.

Provisioning IT capacity on demand. With rapidly changing business requirements, IT organizations need to add, modify, and eliminate IT capacity on demand across complex and interconnected technologies – including virtualized environment and cloud solutions.

Supporting mission-critical business processes. In the face of global competition in dynamic markets, CIOs and IT managers must support mission-critical business processes at a very high level. System downtime and severe performance degradations can lead to significant lost revenue and profits, and those issues are not acceptable for any organization.

Utilizing IT resource more efficiently. As IT organizations increasingly focus on supporting the needs of the business, IT resource utilization can pose significant challenges. CIOs and IT managers need to maintain and support legacy systems while shifting resources toward strategic, innovative projects that directly affect the bottom line.

Adopting preventive and predictive support tools. Many hardware and software vendors have introduced advanced capabilities in IT operations and support, including preventive support tools and automated functionality to manage ongoing operations. However, many of these tools and utilities include advanced software implementation and configuration – making implementation and training a significant hurdle for busy IT organizations.
Given these challenges, CIOs and IT managers are looking for new technology solutions and advanced services that can help manage the transition to the 3rd Platform – especially to improve ongoing IT operations and accelerated technology adoption across the enterprise.

The Benefits of Systems That Deliver Support, Management, and Deployment Automation

To help address the challenges mentioned previously, hardware and software providers are including supportability, manageability, and rapid deployment capabilities as a critical element of product design. Product development teams are designing systems specifically around IT service delivery, with the targeted goals of fast and efficient access to mission-critical applications.

In fact, IDC research has demonstrated that integrating support and management tools, utilities, and even processes into the product design process can produce significant benefits in technology adoption and service delivery. Key benefits include the following:

- Designing key features and functionality to incorporate proactive and preventive support tools and processes as part of everyday use, including automating key repetitive, mundane operational and support tasks as a fundamental aspect of product design
- Increasing application and workload performance through new systems designs, which allow for more efficient delivery and overall cost savings in the datacenter
- Creating efficient and fast deployment capabilities for technologies across the datacenter, primarily through automation and tools built into product functionality that can be managed anytime from anywhere
- Incorporating operational and support tools as essential product components, including easy-to-use management tools featuring a single-pane-of-glass experience and behind-the-scene support tools that can access system information to accelerate diagnosis and resolution
- Understanding and utilizing customer use cases as part of product design and including usability requirements to speed adoption and functionality that can be easily modified to accommodate changing support needs

In discussions with CIOs and IT managers, IDC found that enterprises can experience a higher level of customer satisfaction with hardware and software solutions specifically designed with operations and support in mind. Implementing the tools and automation as designed and utilizing higher-end services to help optimize ongoing operations can help busy IT organizations take full advantage of new technology deployments and advanced capabilities.

Dell Innovation in Systems and Services

Trends such as cloud, mobile, social, and big data are causing customer applications to evolve as they must incorporate new streams of data and new user dynamics. This in turn is placing new demands on IT organizations and the server systems in their environment. At the same time, enterprises are expecting IT organizations to deliver more value to the business; IT therefore is seeking systems that deliver greater efficiency and capabilities across a variety of needs.
Dell's new systems are harnessing the latest innovations to optimize application performance and improve ease of use for a range of environments. Dell PowerEdge servers combine new in-server storage designs and innovative management tools for a flexible portfolio offering that can address a broad spectrum of workloads from scale-out infrastructure applications to demanding mission-critical applications. Dell is building a service portfolio that brings more innovation into the datacenter, helping improve application performance and allowing IT to focus on business outcomes.

**Workload Optimized Storage**

The next generation of PowerEdge platforms is designed to handle evolving and complex workloads by innovating on in-server storage (flash) and software-defined storage (SDS). While plenty of focus has historically been on processor and memory, advancements in storage are necessary to optimize for applications, improve utilizing and availability, and reduce time to provision. Dell's newest systems offer a range of configurations, from all-flash configurations to hybrid solid state drive (SSD)/HDD, matching the unique needs of the customer workloads.

- **Solid state drives and flash storage.** Dell PowerEdge servers are designed to drive workload performance by utilizing flash storage within the server. Solid state drives provide faster access to the most frequently sourced data, which can greatly speed application performance. This is especially critical for data-intensive workloads and real-time analytics. Dell's new Fluid Cache for SAN (see Figure 1) boosts performance for latency-sensitive workloads and provides quicker queries results so that customers can make better business decisions with the most up-to-date information.

- **Tiered internal storage.** Dell's internal storage designs enable the optimization of disk utilization for a customer's particular application. The hybrid offering of SSDs and HDDs in the same server brings data tiering capabilities to the server, where customers or applications can allocate the appropriate data to the appropriate storage tier based on access profile or usage patterns. Big data applications and databases require the speed of flash with the high capacity of local HDD storage. As an example, the PowerEdge R730xd has 18 x 1.8in. SSDs and 8 x 3.5in. HDDs and is capable of running a midsize database without external storage, thus reducing the capex associated with an external storage array.

- **Software-defined storage.** Today storage is quickly following the virtualization trend that swept servers a few short years ago. The next generation of PowerEdge servers integrates with software-defined storage solutions such as VMware VSAN and Microsoft Storage Spaces to deliver SDS capability. This innovation creates an in-server virtualized storage pool that provides just-in-time provisioning, improves disk utilization, and enables multitenant support for hybrid storage.
Management Efficiency

Today IT administrators are overwhelmed and have little time for innovation or value-added projects. IDC’s research indicates that 80% of IT staff time is spent on simply maintaining the current IT infrastructure. Dell OpenManage allows IT departments to efficiently manage Dell PowerEdge servers in virtual, physical, local, and remote environments with one single set of tools. In addition, Dell favors an “open” strategy to infrastructure, enabling choice within the customer datacenter. Dell OpenManage integrates into third-party management tools. As customers are already operating a heterogeneous environment with multiple technologies, they can opt for their preferred tool to manage their infrastructure.
A key innovation in Dell's system management is the automation of tasks and simplification of day-to-day operations that deliver greater efficiency to IT operations by reducing manual processes and user errors.

- **Auto-everything:** Dell's latest generation of PowerEdge servers delivers new levels of automation. Embedded in every Dell system, the integrated Dell Remote Access Controller (iDRAC) simplifies and automates systems deployment and firmware updates. iDRAC eliminates manual tasks, which reduces errors and speeds time to production. In addition, the auto-update feature will keep the systems synchronized to the firmware baselines previously defined by the IT administrator.

- **At the box:** Dell has enhanced local management of the server system for faster deployment and convenient onsite troubleshooting. iDRAC Direct expedites local deployment via XML profile upload from a simple USB thumb drive. The server information can instantly be accessed with a laptop connected via iDRAC management console. Troubleshooting and problem resolution can now be sped up, which will minimize system and application downtime.

- **Manage from anywhere, anytime:** Dell's new systems are designed to enable server administrators to be more efficient without the need to be onsite all the time. With OpenManage Mobile, system administrators can access their systems via a smart device to get comprehensive status and error logs. IT can configure system and networking configurations and troubleshoot errors at its fingertips, giving the IT administrator time and flexibility in the maintenance of the IT environment.

**Versatile Platforms**

IDC finds that enterprises operate heterogeneous environments with a wide variety of workloads; no one server form factor or configuration can adequately handle all environments or applications. Dell is offering a versatile portfolio of systems that can match the unique needs of the customer's application, from large-scale Web deployment to mission-critical enterprise applications to remote brand deployments. Dell's PowerEdge lineup includes a full complement of rack servers, tower servers, and shared infrastructure (M-Series blades and PowerEdge VRTX).

- **Modularity:** Dell's modular systems design delivers the optimal resource for the current workload demand, without costly overprovisioning. As business demands grow, IT is able to incrementally deploy systems to ensure peak performance and optimization. The PowerEdge shared infrastructure servers, the M-Series blades, and PowerEdge VRTX enable the IT customer to easily scale and allow multiple generations of technologies in the same density, power, and cooling envelopes.

- **Tailored:** With Dell's systems, customers have options to tailor the server to their unique needs. Customers can opt for compute- and memory-centric designs for virtualization and cloud environments. Ultra-dense local SSD storage options are suitable for data analytic applications, and a hybrid SSD/HDD provides local data tiering that combines performance and capacity.

- **Manageable:** The notion of IT management complexity has already been mentioned; what customers do not require is yet another management tool. Dell's approach is to reduce complexity and allow the system administrator to simplify system management. Customers can choose to integrate Dell's management console into third parties or choose Dell as their primary single pane of glass.
• **Agent free.** Dell PowerEdge servers do not require additional software or agents to monitor the system. iDRAC8 provides real-time analytics for optimal CPU performance, memory bandwidth, and I/O utilization. The storage is now also agent free, as iDRAC provides full management for RAID and non-RAID devices.

• **Integrated.** To provide seamless management, Dell OpenManage integrates into hypervisor management platforms, including VMware and Hyper-V. Dell's open philosophy design allows customers to opt for their choice of management platforms but still have discrete hardware management within a virtual machine manager. In addition, OpenManage is integrated into Oracle Enterprise Manager, offering a complete management experience for Oracle on an x86 platform.

**Engineered Systems**

More and more customers are opting for integrated systems that converge compute, storage, and networking resources into a modular IT block. IDC forecast indicates that the integrated systems market will increase at a CAGR of 32.8% over the next five years. Dell currently offers three platforms that combine expertise from Dell and partners to deliver new, innovative solutions to solve today's complex challenges:

• **Dell-engineered solutions for Cloudera:** These solutions deliver real-time analytics platforms to enable faster time to insights for faster time to value. The solutions bundle Cloudera Enterprise into an appliance delivered with Apache Spark. Centralized data management is incorporated using Cloudera Enterprise Data Hub, with built-in enterprise-level security. The systems are built on ScaleMP's Versatile SMP architecture, aggregating multiple x86 servers into a single virtual machine (VM) to create a large virtual memory system.

• **Dell-engineered solutions for databases:** Easy to procure and deploy, these pre-integrated solutions enable midmarket and enterprise customers to quickly and cost effectively boost database performance. Database- and operating system-independent block storage provides acceleration for any database infrastructure (Oracle, MS SQL, SAP ASE, SAP HANA, MySQL, etc.). The systems leverage innovative technology solutions and designs:
  - Dell PowerEdge servers
  - Fusion-io 3.2TB SSDs
  - Fusion-io ION Acceleration
  - Pre-integrated flash storage provides up to 12.8TB of flash storage for up to nine database servers on the network (with optional high availability, mirrored, configuration)

• **Dell-engineered solutions for Oracle 12c Database:** These solutions are pre-integrated, engineered platforms for fast and easy deployment of database infrastructure designed to deliver extreme performance for midmarket customers.
  - Designed for high availability, the solutions deliver the performance and scalability of Oracle 12c Real Application Clusters (RAC) database software on Dell PowerEdge servers for maximum uptime and reliability.
  - Systems management is simplified with the Dell OpenManage Plug-In for Oracle Enterprise Manager 12c, providing a single tool to manage the entire hardware and software infrastructure.
  - Ultra-high-performance flash technology from Fusion-io provides 19.2TB of mirrored flash storage to ensure a highly responsive system.
FUTURE OUTLOOK

As enterprises continue to embrace the disruptive technologies of the 3rd Platform, day-to-day IT operations will become more complex and integrated for most IT organizations. CIOs and IT managers struggling to meet performance and availability SLAs will look for support providers that can directly help manage IT operations in complex IT landscapes.

IDC believes that enterprises will select technologies and support providers that can automate mundane and repetitive operational tasks and key support processes to help minimize downtime and improve staff productivity. In addition, IT organizations will value tools and applications that can integrate across the IT environment with multiple hardware and software solutions and packages.

CHALLENGES/OPPORTUNITIES

IDC believes that as IT organizations increasingly look to support providers for help in optimizing IT operations, Dell will have the opportunity for clear differentiation from unauthorized third-party support providers in the market. The new advanced systems and the associated services can provide distinct benefits for many enterprises, adding key datacenter efficiencies and helping resource-strapped IT organizations optimize workloads across multiple technology deployments. To accelerate the adoption and utilization of these new capabilities, enterprises should put processes in place during sales and implementation to introduce these tools and utilities and help with setup and configuration.

In addition, IDC believes that Dell has the opportunity to continue expanding its ecosystem of operations and support functionality to include non-Dell software and hardware as part of integrated solutions. The majority of IT environments include components from a number of vendors and suppliers, and directing operations and support across that complexity can be an IT management nightmare. Helping IT organizations manage operations and support across multiple providers can provide significant benefits, including a holistic view of the datacenter, improved efficiencies across heterogeneous IT solutions, and decreased time to resolution when problems occur. IDC recommends that Dell continue to expand multivendor support capabilities in its management and support tools – the more platform agnostic, the better.

However, IDC also anticipates that Dell will face some challenges as it expands solutions and services focused on operational and support capabilities. Reducing the presence of white-label and lower-end servers in the enterprise IT environment will be a key strategy as Dell expands these systems and services. Some customers may believe that non-OEM systems will perform perfectly well in supporting mission-critical business processes in their IT environments. CIOs and IT managers will need demonstrated proof of the value associated with a robust system that can deploy and integrate quickly and efficiently. Dell also will need to demonstrate its advanced capabilities to help simplify managing and supporting technologies across the IT landscape to the enterprise customer.

In addition, Dell must continue to maintain and improve the high level of support it currently delivers when customers contact Dell directly for support. As the number of customer interactions with support staff decreases, the importance of each interaction increases substantially. All support interactions must be high-quality, high-value engagements to maintain high customer satisfaction and improve customer loyalty.
CONCLUSION

For most enterprises, the adoption of the 3rd Platform will continue to increase the size and complexity of the IT ecosystem. Optimizing IT operations in these complicated IT environments will remain challenging for CIOs and IT managers attempting to balance innovation and growth with streamlining IT service delivery and reducing the overall cost of IT. As a result, most IT organizations will look to external support providers for help in improving and optimizing IT service delivery. To meet the growing need for advanced capabilities in IT management and support deliverables, Dell offers a comprehensive suite of management and support technologies built into Dell server hardware and software – for both Dell support customers and customers of Dell-authorized support partners. IT organizations can access the full set of these advanced technologies and take advantage of robust IT management and support technologies to help improve ongoing IT operations.
About IDC

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