WHITE PAPER

Automated Infrastructure Management Powers Future-Ready Enterprise Clouds

Sponsored by: Dell
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IDC OPINION

Future-ready enterprises continually extend IT infrastructure and application development innovation. Modern, digital transformation strategies are helping many organizations enter new markets and engage more directly with customers. Simultaneously, these approaches support faster paths to innovation and improved business agility.

Cloud infrastructure and services are important enablers of "future ready" enterprises. They enable organizations to better match IT resources to business needs through dynamic scaling and assigning infrastructure resources based on business priorities and policies. Automated infrastructure management, including template-driven infrastructure configuration, provisioning, and life-cycle management, is an important enabler of future-ready enterprise clouds. Benefits of using robust automated infrastructure management solutions to optimize enterprise clouds include:

- Faster and more accurate onboarding, configuration, and launch of new mission-critical services
- Increased IT staff productivity and process improvement to boost service quality
- More efficient utilization of resources as a result of automated life-cycle management to assign, migrate, and tear down infrastructure and workload services as needed

IN THIS WHITE PAPER

This white paper explores the role that automated infrastructure management within a hybrid cloud plays in enabling future-ready enterprises to support the expansion and innovation of corporate digital transformation initiatives. Cloud infrastructure in multiple datacenters that are controlled with advanced, automated infrastructure management can accelerate the creation and ensure the long-term sustainability of critical business initiatives. This white paper also discusses how Dell Active System Manager (ASM) provides a template-based approach to automated application and infrastructure management to enable a dynamic, future-ready hybrid cloud architecture.

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SITUATION OVERVIEW

Sustainable Cloud Strategies Enable Future-Ready Businesses

A "future ready" organization leverages and extends the abilities of infrastructure and applications while also pursuing organizational practices that enable it to identify and rapidly respond to changing business requirements. Future-ready organizations not only react quickly to market changes but also are better able to become disruptors themselves.

As future-ready enterprises invest in digital transformation and the expansion of online business, they aim to gain new customers, provide new services, and rapidly extend their reach. To do so, they take advantage of emerging technologies including mobile and social computing, Big Data, and agile DevOps development. All of these technologies drive more frequent changes and updates to applications, which in turn can spawn unexpected demands on the availability and performance of IT infrastructure.

Cloud-enabled IT is key to delivering flexible, on-demand access to resources underpinning new digital business offerings. It allows organizations to scale infrastructure and applications as needed to support changing business priorities while reducing risk and waste that have inhibited investments in innovation in the past. When companies adopt a more mature approach to cloud, leveraging data and applications in their own datacenters while extending their reach through the use of hosted and public cloud services, they can optimize workload performance and resource consumption by providing on-demand access to a diversified set of hybrid cloud services.

Automated infrastructure management is a key capability that future-ready enterprises must invest in to anchor the control and sustainability of their hybrid cloud. To support dynamic application environments and constantly evolving organizational requirements, more enterprises are embracing a comprehensive approach to using template-based automation to manage infrastructure as a functional, aggregate pool of compute, capacity, and network resources designed to support a flexible hybrid cloud strategy.

Sustainable Cloud Benefits for Future-Ready Enterprises

The benefits of a sustainable cloud effort go far beyond simply lowering infrastructure costs. Sustainable clouds provide businesses with greater flexibility, availability, reuse, and control at data and business levels than was possible using more traditional static resources. While 46% of the organizations interviewed for IDC's Future-Readiness Enterprise Study saw cloud benefits in terms of more effective use of their infrastructure, nearly as many (42%) noted better enablement of resource-intensive applications such as Big Data and analytics (BDA). Improved business agility (42%) and greater developer productivity (39%) were also widely noted (see Figure 1).
Sustainable Cloud Deployments Depend on Management and Automation

Compared with traditional static client/server architectures built on dedicated physical or virtual servers, cloud architectures are more flexible and allow for more cost-effective use of IT resources when managed properly. Cloud-based infrastructure provides development teams and business application users with on-demand, pay-as-you-go access to cost-effective computing and data resources.

Specifically, flexible cloud platforms allow enterprises to spin up resources and shift workloads as needed to accommodate business priorities. Organizations achieve greater agility, flexibility, and data control at the application level and the business level than was possible using client/server architectures. They also improve IT operational productivity and user (internal and external) satisfaction.

This improvement happens only if the IT organization can ensure appropriate service-level agreements (SLAs) for applications by scaling compute, network, and storage resources as needed. Only then can enterprises gain competitive advantage over the long term by making sure that their cloud environment is sustainable. A future-ready cloud evolves easily over time as the scale, location, and complexity of applications and business priorities evolve.

Achieving a sustainable hybrid cloud architecture isn't dependent on purchasing a specific product or a public cloud service. Rather, it reflects a thoughtful approach to application design, deployment, and delivery as well as planning for a flexible infrastructure that powers the cloud, supported by automation and management tools that allow organizations to make much more effective use of their IT and data assets.

IDC's research has identified the characteristics of organizations that are most successful and well prepared to take advantage of cloud and emerging information technologies to transform their businesses and create new business opportunities. IDC calls these organizations "Future Creators." Future Creators are more likely to have diversified cloud strategies. Future Creators' IT organizations
do a better job of supporting business needs than the IT organizations of companies with less comprehensive strategies. Specifically, 98% of Future Creators believe they provide high levels of support for business needs compared with only 43% of Current Focused organizations that have less mature strategies.

Successful future-ready enterprises see their internal IT team’s role as that of an internal service provider responsible for optimizing services levels and delivery across hybrid cloud resources. These organizations have a solid understanding of how each business unit and application is using cloud resources. This insight puts them in a position of strength for predicting and provisioning additional compute capacity or coping with unexpected changes in resource demand. These organizations typically invest in automation to help optimize services levels across application life cycles.

By comparison, organizations that struggle to effectively manage their cloud environment often lack the necessary tools to automate, optimize, and standardize operations. This results in misalignment between workloads and resources. These organizations can't scale, repurpose, or update cloud-based services as quickly as needed by business demands, and the competitive position of their organizations can suffer.

FUTURE OUTLOOK

Future-Ready Clouds Require a New Generation of Automated Infrastructure Management Tools and Processes

The most experienced users of future-ready cloud architectures have deployed a new generation of open, extensible automated infrastructure management tools that rely on standardized service configuration templates, streamlined user request processes, collaborative governance models, and business-centric SLAs. These types of automated infrastructure management tools allow organizations to define and provision workloads and services consistently across heterogeneous cloud platforms and support ongoing workload portability and resource scaling as needed to optimize the consumption of infrastructure resources and the performance needs of the applications. These types of automated infrastructure management tools allow IT teams to work much more efficiently and deliver more consistent user experiences across hybrid cloud environments than would be possible using just the platform-specific native configuration and workload migration tools provided by commercial cloud platform vendors, public cloud service providers, and open source projects.

As shown in Figure 2, the majority of experienced cloud users in the United States invest in a range of cloud management and automation tools. Template-based configuration management tools are currently used by 74% of heavy cloud users, but even these organizations recognize that they need to increase the maturity of the processes supporting them. Similarly, 63% of heavy cloud users currently implement automation and orchestration tools, and 55% use self-service provisioning automation and service catalogs.

Use of these automated management solutions will increase significantly in the coming year as more organizations respond to business requirements by investing in next-generation cloud management solutions. These sophisticated enterprise cloud customers recognize the value of even more automation for deploying, maintaining, and optimizing cloud services.
Status of Cloud Management Tools Deployed by Heavy Cloud Users in the United States in 2015

Q. Thinking about your organization's ability to manage its cloud environments efficiently, please indicate whether you currently have implemented the following technologies/tools.

<table>
<thead>
<tr>
<th>Feature</th>
<th>Currently implemented with mature process</th>
<th>Currently implemented, in early stages</th>
<th>Plan to implement within 12 months</th>
</tr>
</thead>
<tbody>
<tr>
<td>Consistent service-level monitoring and reporting across private, hybrid, and public cloud applications and services</td>
<td>[Bar Chart]</td>
<td></td>
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<tr>
<td>Standardized ROI and business case tools to evaluate the costs and benefits of cloud resources</td>
<td>[Bar Chart]</td>
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<tr>
<td>Standard configuration and provisioning templates for cloud workloads and infrastructure</td>
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<tr>
<td>Ability to perform granular metering and chargeback to business units/teams consuming the IT services</td>
<td>[Bar Chart]</td>
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<tr>
<td>Effective use of automation and orchestration tools</td>
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<td>Unified service catalog and automated self-service provisioning</td>
<td>[Bar Chart]</td>
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<tr>
<td>Ability to monitor, forecast, and optimize server, storage, and network resources and capacity dynamically</td>
<td>[Bar Chart]</td>
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</tbody>
</table>

n = 701

Note: "Heavy" U.S. cloud users are defined as using cloud to support multiple production workloads.

Source IDC's CloudView Survey, January 2016
Five Factors to Consider When Evaluating Automation for Future-Ready Enterprise Clouds

Automated infrastructure management solutions for future-ready enterprise clouds need to be scalable, open, and flexible to support an increasingly diverse portfolio of infrastructure, cloud systems, services, and applications. IT organizations that are considering investing in modern automated infrastructure management solutions for hybrid cloud should focus on the following five factors to ensure that their cloud management strategy is future ready:

- **Hybrid cloud support to ensure workload portability:** IDC expects that by the end of 2017, over 80% of enterprise IT organizations will commit to hybrid cloud architectures encompassing multiple public cloud services as well as private clouds, community clouds, hosted clouds, and/or non-cloud infrastructure resources. Automated infrastructure management tools will be needed to accommodate a range of infrastructure technologies, cloud platforms, and standards in order to enable seamless workload portability and automated migration on demand. Enterprises will demand tools that can optimize and orchestrate application deployments across multiple clouds to ensure SLAs, regardless of whether the workload runs in-house, on dedicated hosted assets, or in a public cloud.

- **Open, extensible architecture:** Open standards provide investment protection and allow organizations to more easily migrate workloads across multiple cloud platforms and optimize hybrid cloud cost and performance. Extensible architectures simplify the process of adding visibility to new types of hardware platforms and systems. Together, open standards and extensible architectures ensure that automated infrastructure management solutions will be able to scale and adapt as the needs across hybrid cloud applications evolve.

- **API-based integrations across diverse infrastructure platforms and management tools:** Cloud administrators need to be able to consistently manage the configuration, provisioning, and optimization of traditional IT, private cloud (on-premises physical and virtual) infrastructure, and public cloud resources in order to maintain end-to-end SLAs. API-based integrations with third-party tools such as Puppet as well as widely used infrastructure management platforms allow administrators to maintain broad visibility while providing management information and control via a consistent set of intuitive interfaces and workflows.

- **Robust IT asset management and template design libraries:** The move to automated cloud configuration and provisioning means administrators must have accurate, up-to-date information about available resources and standardized configuration templates. The ability to create, manage, and update templates efficiently in a unified manner is critical to improving the productivity of cloud administrators and ensuring consistent end-user service levels.

- **Unified control across network, storage, and compute resources:** The majority of hybrid clouds will be built based on a mix of equipment and services from a variety of solution providers, including server, network, and storage equipment, as well as integration of one or more public cloud services. Effective cloud automation and provisioning needs to support the full range of assets and services used by the organization and be able to expand as new technologies and vendor solutions emerge.
CONSIDERING DELL ASM FOR AUTOMATED INFRASTRUCTURE MANAGEMENT OF FUTURE-READY ENTERPRISE CLOUDS

Dell Active System Manager offers cloud management teams an open, intuitive, and automated infrastructure management platform that is designed to support the complex operational needs of agile future-ready enterprises using hybrid clouds.

ASM uses robust template-based provisioning and automated management to enable and speed the delivery of complex infrastructure and application services. The ASM template management system allows administrators to quickly define and use server, storage, and network templates for physical infrastructure configurations, bare metal operating system (OS) deployments, hybrid virtual and physical applications, and application ecosystem provisioning including underlying hardware.

Dell's ASM solution addresses the evaluation factors cited previously, including requirements for unified hybrid cloud support; open, extensible architectures; and integrations across diverse systems and platforms. Customers can:

- Streamline discovery and inventory management of hardware resources
- Automate onboarding and initial configuration of server and network I/O resources and physical resource pools
- Configure bare metal servers for deployment as physical or virtual servers
- Install operating systems and hypervisors
- Configure virtual machine (VM) clusters
- Implement template-based server provisioning, including on-demand and schedule-based provisioning of physical and virtual infrastructure resources
- Automate firmware management and compliance monitoring
- Scale up and scale down of services by adding or removing physical resources
- Decommission and activate resource reclamation services that automate and speed the release of resources to support new business initiatives

Dell's goal is to enable a significant reduction in the time required for many routine activities when compared with traditional manual processes. Specific examples include:

- Onboarding, updating, and configuring new blade infrastructure in under three minutes
- A greater than 90% reduction in the time required to provision hardware and ESX clusters
- A greater than 80% reduction in the time needed to provision a VMware vSphere High Availability and Distributed Resource Scheduler (HA/DRS) cluster

ASM features deep integrations and reference architectures to support third-party virtualization platforms such as VMware vSphere and Microsoft Hyper-V. ASM also supports a range of non-Dell infrastructure hardware including Brocade, Cisco, EMC, and NetApp. API integrations are available for major enterprise-scale service catalogs and self-service hybrid cloud management platforms.
As shown in Figure 3, ASM features an intuitive, unified graphical interface that allows IT administrators to quickly discover available resources, define service and infrastructure templates, deploy and optimize applications and resources, and maintain physical and virtual configurations including firmware and security.

**FIGURE 3**

**Active System Manager Dashboard (with Inset of Template Builder Interface)**

ASM's flexibility, extensibility, and ability to integrate with a wide range of server, storage, and network systems as well as cloud management platforms position ASM to support enterprise future-ready infrastructure by reducing operational complexity and guesswork in performance tuning, thereby maximizing the efficiency and accuracy of resource utilization.

**CHALLENGES/OPPORTUNITIES**

Enterprise IT organizations have a myriad of options for tools and services when it comes to supporting on-premises, private cloud infrastructure configuration, provisioning, and life-cycle management. Some alternatives are very specific to a single technology silo (e.g., physical or virtual servers or storage). These types of tools typically help automate selected administrative tasks but do not help reduce the time and complexity related to the management of complex services supported by highly integrated and dynamic cloud infrastructures.
Dell offers customers a unified platform and interface to optimize the management of a diverse range of private or hybrid cloud infrastructure and services. To gain the greatest benefit from this type of solution, IT teams need to review and update many operational processes in order to take advantage of standardization and template-based automation. In this type of unified environment, decision makers representing different infrastructure and application silos agree on standard configurations and life-cycle management policies, which can then be enforced with automation. Dell must ensure that its customers have access to the most unified platform and interface to optimize management of a diverse range of cloud infrastructure and services across its hybrid cloud portfolio.

For many organizations, this type of organizational and process change can come slowly. To accelerate customer adoption of this type of integrated solution, Dell needs to help educate customers about the value of template-based life-cycle management and automation and support internal customer teams as they work to define services, SLAs, and standardized configurations.

**CONCLUSION**

Future-ready enterprises, especially those that aspire to be Future Creators, will rely on hybrid clouds. Enabling sustainable on-premises cloud infrastructure to power agile business innovation and respond to new business opportunities on demand is critical. Use of agile and sustainable automated infrastructure management to ensure consistent allocation of resources for applications is critical for any IT organization that wants to maintain service levels and optimize costs.

The template-based automation, provisioning, and life-cycle management capabilities provided by Dell ASM offer customers an important option for streamlining cloud operations in a hybrid cloud, scaling resources on demand, and maintaining strong integrations with open third-party cloud management platforms and services.
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