

WHITE PAPER

Dell Virtual Integrated System (VIS) Management Extensions Improve Datacenter Operational Productivity

Sponsored by: Dell

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IDC OPINION

Over three-quarters (76.1%) of IT decision makers who have implemented virtual server technologies report that reducing complexity is their number one management priority for the next two years. Organizations with plans for cloud computing face similar challenges. Together, virtualization and cloud are forcing IT operations teams to abandon traditional fragmented, manual management strategies in favor of more automated, standardized approaches to provisioning, change control, root cause analysis, and virtual machine (VM) sprawl management.

IDC's research indicates that effective private cloud management will involve several important capabilities, including:

- Automated and integrated virtualization management
- Integrated physical and virtual infrastructure management automation and orchestration
- Self-service provisioning
- End-to-end performance and end-user experience visibility
- Service management and service catalogs tied to automated systems and workflows
- Consumption-based monitoring and analysis to support sophisticated capacity planning, financial management, and chargeback

IT organizations that are serious about running large-scale production virtualized datacenters and cloud solutions need to explore options and develop implementation road maps to address each of these functional requirements over the next few years.

IN THIS WHITE PAPER

This white paper describes how increased use of virtualization and plans for cloud computing require corporate IT organizations to increase use of automated self-service provisioning and advanced performance monitoring and analysis tools. The paper also describes how recent extensions to Dell's Virtual Integrated System (VIS) management software portfolio are addressing these requirements.

SITUATION OVERVIEW

IT Operations Teams Change Tactics to Cope with Virtualization and Cloud Computing

The continued broad-based adoption of virtualization technology, as well as plans to implement private and public cloud solutions, is forcing datacenter management teams to rethink the way they control, monitor, and optimize corporate computing, storage, and network resources across heterogeneous environments and resource pools that are shared by many different business groups and applications.

The introduction of virtualization and cloud technologies fundamentally challenges many traditional IT operational best practices and policies. While traditional IT environments relied on dedicated stacks of hardware, middleware, databases, and applications to support a specific business application, today's dynamic, shared infrastructure strategies rely on a common pool of virtualized resources to support the needs of multiple business groups and application environments. As a result, all types of operational best practices from problem management to approval, configuration, and provisioning activities need to be approached on a more automated, integrated, and coordinated basis than ever before.

IDC's research indicates that the number and complexity of configuration and resource provisioning changes, updates, and support activities taking place in corporate datacenters will continue to increase at double-digit rates over the next several years. It is unlikely that growth of IT organizations will see anywhere near that rate of increase.

At the same time, business users are asking for more visibility into service levels and costs as they consider whether to opt for public cloud services rather than internally provided IT solutions. Business users are demanding faster access to resources as well.

As a result, it is not surprising that in a recent IDC survey, IT decision makers responsible for managing virtualized environments indicated that some of their most important challenges relate to reducing complexity (76.1%), integrating virtual and physical server management (73.1%), standardizing management processes (71.1%), improving virtual server life-cycle operations (69.7%), and reducing VM sprawl (65.2%) (see Figure 1).

FIGURE 1

Virtual Server Management Capabilities Considered Most Essential over the Next Two Years



n = 201

Source: IDC's *Virtualization Survey*, March 2010

If internal IT organizations are to overcome these challenges and remain trusted IT service providers to their business users, they need to manage business stakeholder expectations, retain control over internal configurations, and ensure that use of capital assets and staff resources is as fully optimized and cost-effective as possible. Doing this in today's virtualized, cloud-based environments requires new approaches to many IT activities, including aggressive use of automation and analytics to ensure optimal allocation and consumption of resources. IDC's research has identified a number of management capabilities that are critical for effective operation of cloud environments, including:

- ☒ Self-service provisioning via an online portal that offers end users the ability to select and request resources and services from a predefined, standard set of options. Delivery of the requested capabilities can be approved and provisioned using automated workflow and provisioning technologies.

- ☒ Advanced performance and usage monitoring and analytic technologies that can monitor and analyze the health of transactions and end-user application experiences and provide in-depth real-time diagnostics regarding root cause of problems, capacity and configuration optimization, and consumption and cost of resources being used. These types of tools can increase resource use and improve service levels by identifying situations where resources need to be added or removed or workloads need to be migrated to overcome performance bottlenecks or hardware/software failures.

Along with automation and orchestration and intensive efforts to standardize configurations, service-level agreements (SLAs), and operational workflows, these technologies can enable corporate datacenters to operate more efficiently and effectively, even as complexity increases.

Self-Service Provisioning Automates Governance and Security

Self-service portals allow IT users to select and request IT resources using a menu or catalog-based interfaces similar to those that are used by online service providers when customers sign up to use subscription or on-demand compute services. Typically, self-service portals offer end users a well-defined, standardized set of options using drop-down menus and check boxes. Behind the scenes, an end user's request may kick off the appropriate approval and IT request workflows and may trigger automated VM and/or physical server, storage, and network provisioning activity.

Predefined security, access control, data retention, and VM sprawl management policies can be implemented as part of automated deployment sequences. This allows IT to track, monitor, and reclaim unused resources as needed. This capability also significantly reduces business risk by creating a change control and compliance record and automated enforcement of important information management and data protection policies.

The benefits of implementing self-service portals include:

- ☒ Significant increases in IT administrative staff efficiency as time-consuming, routine tasks are automated and the amount of customization is reduced
- ☒ Improved service levels as standard implementations can be more consistently patched and tested, reducing downtime due to configuration, patch, or security changes
- ☒ Higher user satisfaction rates and increased IT credibility with business stakeholders as resources are provided more quickly and service levels are more consistent with expectations
- ☒ Improved hardware and VM utilization as policy-based VM sprawl management reclaims unused resources and returns them to the resource pool for reassignment
- ☒ Improved capacity planning and reduced service-level violations due to resource contention on a single physical server
- ☒ More consistent configuration, change control, information management, and security compliance due to consistent, automated implementation of policies and standard environments

IDC's research indicates that many corporate IT organizations expect to reduce costs and increase internal IT flexibility using private cloud computing management strategies enabled by self-service provisioning solutions in 2011 and 2012. Many will start with application development/QA/test teams or develop pilots with internal IT groups or specialized business analysts or researchers. Over time, they hope to significantly expand self-service menus and continue to drive down costs while speeding up delivery of resources to business users. They also aim to improve service levels via more and more extensive use of shared infrastructure and automated management technologies.

Advanced Analytics Needed to Enhance Operational Efficiency and Resource Utilization

Along with automation and self-service, effective management of today's complex datacenters requires real-time visibility into system and application performance and availability, including understanding of the end user's actual experience. Today's multitier architectures and composite application environments are highly distributed. Often, the actual business service delivered to an end user is based on multiple applications and workloads hosted internally and externally. Each component may function perfectly well on its own, but the end user's experience may still be unacceptable.

Advanced performance and consumption monitoring and analysis tools are needed to provide IT operators with a deep understanding of dependencies, root cause of problems, and areas where applications and workloads contending for resources are creating bottlenecks and slowdowns. Alerts and alarms can be set based on predefined performance and utilization thresholds.

In response, IT organizations can automate processes to test, reboot, and migrate existing resources or to spin up additional capacity as needed to maintain the required SLAs. The data collected by these tools can also be used to support detailed capacity analysis and optimization activities, utilization trends analysis, and usage-based cost analysis.

Dynamic virtualized datacenter and cloud environments maintain service levels and maximize resource utilization by constantly monitoring resource use, infrastructure performance and availability, and end-user experiences in order to fine-tune the environment as needed while improving their ability to plan ahead with regard to capital and staffing requirements. Sophisticated tools can compare historical, current, and anticipated performance and consumption data and create "what-if" scenario models and trend analysis to inform planning programs.

Attributes of Effective Solutions

In evaluating automation, self-service, and advanced performance and consumption monitoring/analysis options, organizations need to select solutions that can address immediate needs while having the ability to scale over time as more of the datacenter is virtualized and cloud strategies are introduced. IDC's research indicates that many organizations are implementing virtualization and cloud solutions on a workload-specific or an application-specific basis and then extending the use of these approaches over time as the benefits are proven.

In evaluating management software tools, IT decision makers should consider the following:

- ☒ Current and expected diversity of corporate server, storage, network, and application environments and the ability of the tool to provide visibility and integrate automated workflows and provisioning processed across complex, heterogeneous environments in order to maximize IT staff productivity and reduce the level of complexity that needs to be exposed to business users.
- ☒ If organizations anticipate making use of public cloud infrastructure-as-a-service (IaaS), platform-as-a-service (PaaS), or software-as-a-service (SaaS) solutions, they should consider how well the tools will help provide an end-to-end view of resources, utilization, and performance and how well they will help to automate provisioning and migration across public and private resources.
- ☒ The level of insight provided into end-user experiences and business impacts. In virtualized and cloud environments, resources are broadly shared across many groups and users, but it is critical for IT to be aware of the business impact of any SLA violations and to prioritize activity based on the potential business impact.
- ☒ Role-based, intuitive views and interfaces that allow physical and virtual server, storage, and network administrators, as well as application owners and business stakeholders, to monitor status and performance in the context of their day-to-day roles, responsibilities, and priorities. It is important that all views, regardless of the role, tie back to a shared common set of data and analytics so that all stakeholders are on the same page.
- ☒ Easy-to-design and easy-to-maintain out-of-the-box templates, configuration management models, and automated workflows. Although there will generally be a need for some level of customization, organizations that start with reference architectures, standard images, and best practice workflows frequently realize value more quickly. Of course, every organization will need to build and maintain templates for internally defined configurations and reports, so tools that make it easy to define and manage gold images, standard workflows, and VM sprawl management policies will result in more productive staff and higher service levels.

By investing in scalable tools that can address the needs of complex, heterogeneous environments and diverse user groups, IT organizations will be positioned to ramp up advanced management capabilities as customers, applications, and infrastructure are ready for them.

Dell Virtual Integrated System

Dell's Virtual Integrated System (VIS) offers customers a modular, software-based approach to creating and managing cloud infrastructure. From a management software perspective, VIS includes three major elements:

- ☒ **Dell Advanced Infrastructure Manager (AIM)** enables administrators to use a single interface to automate provisioning and management of virtual and physical server, storage, and network resources as needed against application workload requirements.

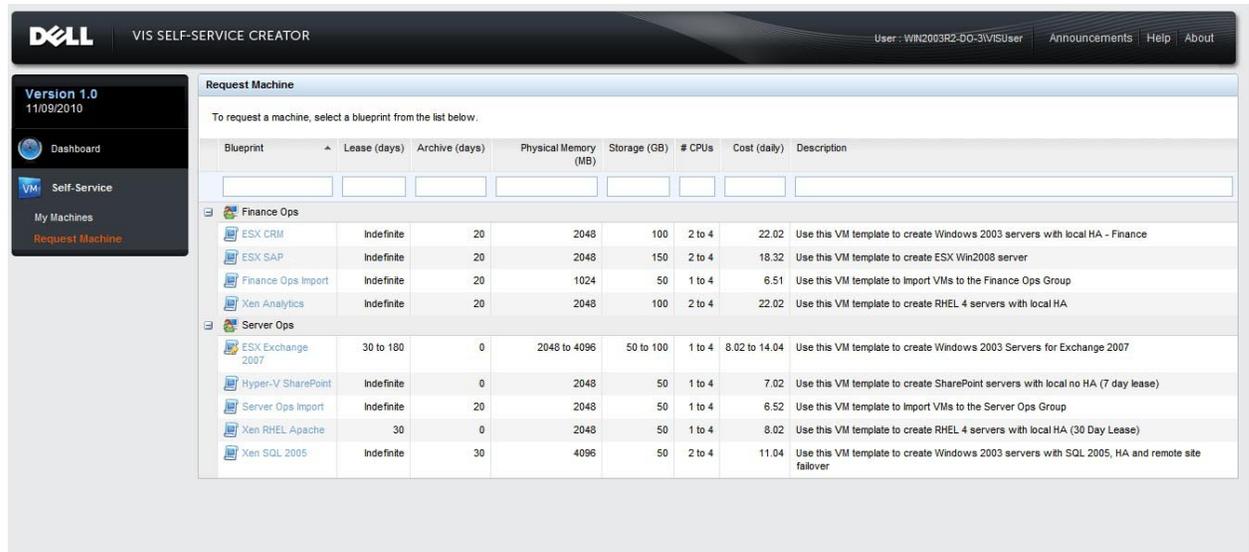
- ☒ **Dell VIS Self-Service Creator** is a self-service portal that provides simplified ordering, deployment, and management of business services and workloads by end users as well as IT staff.
- ☒ **Dell VIS Director** provides an end-to-end view of infrastructure dependencies, end-user experience, and application performance including trend analysis, predictive reporting, and cost analytics.

AIM and VIS Self-Service Creator are available now, while VIS Director is scheduled for release in the coming months.

The VIS Self-Service Creator portal enables authorized business users or IT administrators to select, deploy, and manage a customized catalog of IT applications and resources by orchestrating and automating configuration, workload migration, and change management activities across multivendor hardware and hypervisor environments (see Figure 2). In its initial release, the VIS Self-Service Creator targets operations inside an enterprise's private datacenter cloud. However, over time, the tool's ability to abstract and model application services and to migrate workloads across heterogeneous platforms should allow Dell to extend self-service provisioning options to include public cloud resources as well.

FIGURE 2

Dell VIS Self-Service Creator



Source: Dell, 2010

Dell VIS is designed as an open architecture solution with a focus on multivendor interoperability and the ability to deploy into a customer's current environment, including legacy infrastructure. IDC expects Dell will continue to ramp up its management software assets rapidly over the next one to three years as advanced virtualization and cloud infrastructure management capabilities will increasingly provide critical differentiation across enterprise- and midmarket-class hardware solutions.

FUTURE OUTLOOK

Datacenters Rapidly Evolve to Be More Automated and Efficient

Lessons from Public Cloud Service Providers

Public cloud services that provide on-demand access to computing resources or business applications are capturing the attention of business stakeholders with the promise of speeding access to business-critical computing, storage, and network resources while reducing costs and improving service levels. Public IaaS providers deliver compute-on-demand and storage-on-demand services cost-effectively because they tightly constrain the menu of choices and configurations made available for a given price and SLA. Extensive and consistent standardization allows service providers to build detailed provisioning and orchestration templates and to tightly define service delivery policies with regard to performance, security, duration of service availability, and pricing.

This in turn enables extensive use of automation and orchestration technologies to provision resources, to reclaim resources when they are no longer needed for a specific use, and to streamline approval and validation processes and certifications at every step. By using policy-based automation to reclaim unused resources, service providers can increase resource utilization and hold down capital costs.

Businesses that opt to subscribe to these services, in essence, are trading choice and flexibility for cost and speed. The service catalogs, provisioning tools, user portals, and workflow orchestration technologies needed to power these types of IaaS services are widely available. Rather than technology, governance and the ability to tightly define and enforce menus, standard builds, and predefined SLAs are the real reasons that cloud service providers are able to offer rock-bottom prices and explain why they can achieve very high levels of IT staff productivity.

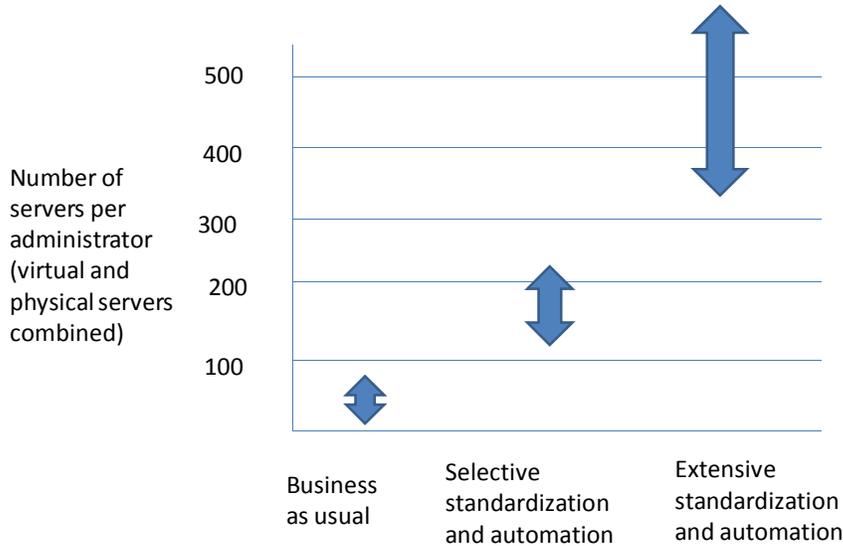
Corporate Datacenters Will Seek Cloud-Scale Economics and Operational Efficiencies

IDC expects that over the next several years, many corporate datacenter managers will strive to attain the same type of scale economics and staff productivity benchmarks being demonstrated by large, hyperscale cloud service providers such as Facebook or Google. While the complexity, security, corporate governance, and unique requirements of legacy applications may not allow all organizations to achieve this level of performance in the near term, IDC's research indicates that a solid commitment to

automation, standardization, self-service technologies, and advanced analytics has the promise of increasing IT staff productivity by 3x, 5x, and even 10x depending on the organization's starting point and business requirements (see Figure 3).

FIGURE 3

Automation Critical to Achieving Cloud-Scale Operational Efficiency



Source: IDC, 2010

Looking to the future, IDC expects many IT organizations will successfully harness automation, self-service, and advanced consumption and performance monitoring and analytics to dramatically increase the efficiency of internal operations while taking advantage of public cloud resources where it makes sense for the needs of the business.

CHALLENGES/OPPORTUNITIES

Dell's commitment to an open, software-enabled approach to converged infrastructure operations continues to differentiate the VIS program from the more hardware-centric solutions being offered by the competition, but it requires that Dell provide customers with management solutions that are able to mask the underlying operational complexity that often results from supporting heterogeneous infrastructure environments. By adding a self-service portal and more sophisticated analytics to the existing AIM automation capabilities, Dell will be able to address a broader set of customers that want integrated, cloud-ready solutions.

The company will need to quickly provide potential customers with proofs of concept that deliver rapid payback. Dell will also need to provide services and support to help customers craft cloud operations and evolutionary strategies appropriate for their business over time. As a relatively new provider of sophisticated management software solutions, Dell will need to consistently and comprehensively educate both customers and suppliers about the increasing breadth and depth of its capabilities and its commitment to supporting enterprise-class customers.

ESSENTIAL GUIDANCE

Investments in automation, self-service, and end-to-end monitoring and analytics are needed to help virtualized datacenters and cloud environments maintain service levels, improve operational economics, speed availability of resources to business users, and optimize use of infrastructure resources. Achieving these types of operational efficiencies will require strong leadership and joint business and IT commitments to standardization of infrastructure configurations, application deployments, VM sprawl management policies, and SLAs.

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