IDC TECHNOLOGY SPOTLIGHT

Simplifying Private Cloud Operations

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Adapted from *U.S. 2011 Private Cloud Management Survey: The Journey Continues* by Mary Johnston Turner, IDC #230188

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Cloud computing reduces IT operational costs and improves business performance by enabling end-user self-service resource provisioning, as well as dynamic scaling and sharing of IT resources across multiple workloads and user groups, in response to ever-changing business requirements. Many IT organizations expect cloud strategies will be fundamental to their IT architectures over time and are already investing in pilot projects and first-generation production private clouds. These organizations quickly discover that their existing provisioning, compliance, and governance workflows and management tools, which were designed for physical and virtual resource operations, are not always up to the task of handling the real-time, flexible demands of cloud environments. This paper examines the role that self-service provisioning, automation, and workload mobility management software plays in enabling IT organizations to efficiently manage private and hybrid cloud environments. It also looks at the solutions Dell is offering to its customers in this area.

Introduction: Private Cloud Benefits and Opportunities

Cloud computing represents a new approach to IT operations and provisioning that is more flexible, dynamic, and service centric than previous enterprise-scale architectures. While historically, applications, middleware, and infrastructure were deployed as tightly coupled stacks, cloud computing allows for workload and application mobility across a wide variety of multivendor platforms and infrastructure — supplied by both public cloud service providers and the internal datacenter.

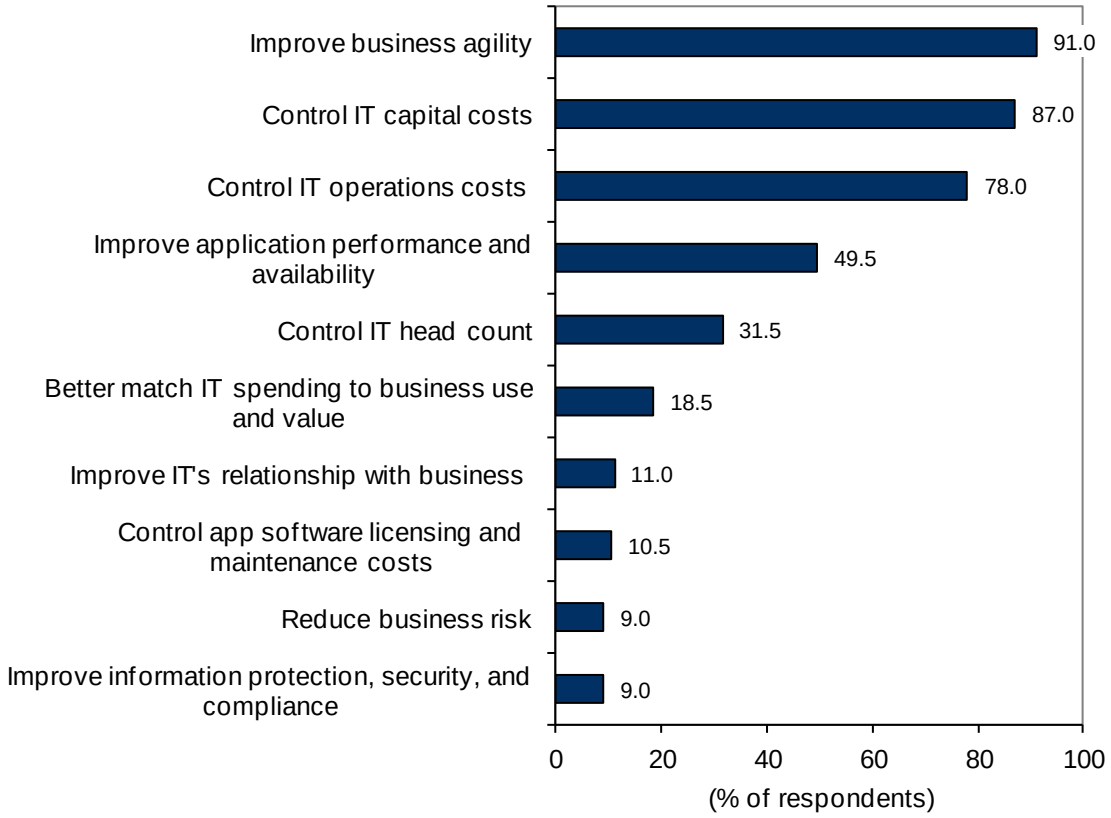
Public cloud service providers have demonstrated that it is possible to use state-of-the-art virtualization, automation, and self-service provisioning software to empower IT users while simultaneously driving down the costs to provision and manage the IT infrastructure. For many enterprises, however, concerns and mandates about information confidentiality, compliance, and business risk preclude use of public cloud services. Furthermore, for highly static workloads, public cloud services are not always the most cost-effective way to provision and maintain IT infrastructure.

As a result, private clouds that apply virtualization, automation, and self-service software to a single organization's IT resources are attracting attention, particularly among application developers, IT staff, and sophisticated end users. These are the types of users who often need to request IT resources and are frustrated by delays that frequently occur while they wait for these systems to be provisioned and configured.

As shown in Figure 1, enterprises are pursuing private clouds to improve business agility, control IT capital and operations costs, and improve application performance and availability by implementing solutions that incorporate self-service provisioning coupled with automated infrastructure management software technologies.

Figure 1

Top 5 Goals for Private IT Cloud Operations



n = 200

Note: Multiple responses were allowed.

Source: IDC's *U.S. Private IT Cloud Systems Management Survey*, July 2011

Role of Self-Service and Automation in Effective Private Cloud Operations

Today's highly virtualized, multitier IT environments can be complex to provision and operate. Reliance on traditional linear workflows and governance processes can often mean that users wait weeks or even months from the time they request a specific computing resource and configuration to the time it is made available to them. Beyond simply creating the virtual machine (VM), IT organizations need to complete storage and network integrations; apply software patches and security updates; and ensure that the requested configurations, OS levels, etc., are available and that the user is authorized to use them. They also need to ensure that the virtual machine clusters are evenly balanced and that workloads do not overwhelm physical server resources such as I/O and memory.

Cloud computing can shorten this deployment timeline from days, weeks, or months to just minutes or hours by allowing end users to request resources directly using predefined service catalogs and self-service provisioning tools. Standard service catalog menus provide users with approved options for configurations and inform them of the cost trade-offs involved for various levels of service and

support. Users can specify how long they need the resource and how much they are willing to pay. In some cases, users may even be offered options to deploy workloads onto public cloud resources and internal private cloud platforms using the same portal.

Based on predefined policies and service configuration templates, automated workflows can rapidly request internal approvals and confirm compliance with policies for security, access, and cost. Orchestration engines then quickly provision the requested resources. Based on the user's initial requests, IT can later automatically reclaim the VMs and reassign them to other workloads or decommission them as appropriate. It can also generate detailed reports back to the users and business groups to show the compute resources they used and how much it cost.

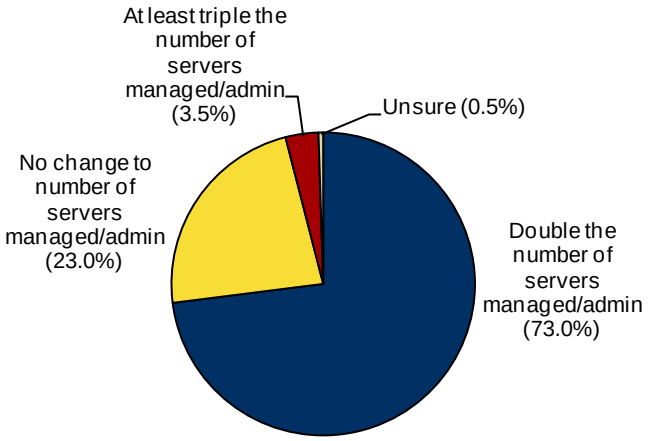
IT organizations and end users benefit in a number of ways from the use of private cloud architectures and management technologies, including the following:

- Faster resource delivery improves user productivity and business agility.
- Better VM sprawl management due to policy-based automation increases server utilization and drives down capital costs.
- Standardized service catalogs and automated template-based provisioning improve workload performance and availability by reducing human error and ensuring that all the appropriate patches and security updates are consistently applied.
- IT staff productivity increases as formerly manual activities are automated.

The ability to do more with less is a familiar theme, as many IT organizations expect cloud to help IT staff become more productive and efficient. IDC's research among current private cloud users indicates that the majority are currently seeing significant improvement, as 73% reported that they expect private clouds will allow the organization to double the number of systems supported by an individual administrator during the next two years (see Figure 2).

Figure 2

Expected Change in Ratio of IT Administrators to Physical and Virtual Servers: Today and 2013



n = 200

Source: IDC's *U.S. Private IT Cloud Systems Management Survey*, July 2011

Private Cloud Management Evaluation Criteria

When evaluating private cloud self-service provisioning and workload automation solutions, IT decision makers should look for solutions that can deliver value rapidly to pilot tests and early-adopter user groups while positioning them to scale up over time as needed. The following capabilities are important to consider:

- Intuitive role-based self-service user interface that can be quickly personalized to the needs of a wide range of end users and is flexible enough to support a broad range of service and application types
- Workflow automation and provisioning orchestration that can scale up as needed across heterogeneous public and private cloud fabrics, as well as virtual and physical resources including servers, storage, and networks
- Service catalogs and templates that can be defined and updated easily and intuitively
- Support for policy-based resource monitoring, control, and reclamation
- Usage and cost monitoring and reporting
- Ability to integrate with existing service management processes and tools
- Ability to securely segregate resources and information associated with one group or business unit from another to ensure information confidentiality and compliance
- Support for workload mobility and capacity optimization across clusters and heterogeneous platforms as needed to adjust to changing business demands and to ensure business continuity
- Support for heterogeneous hardware and software that enables cloud provisioning with existing infrastructure instead of requiring a rip-and-replace approach

Clear business and IT agreement is required before standardization and automated policy-based optimization of workload placements and resource balancing can be widely implemented. A well-understood business and IT governance process to review, update, and extend standards, as well as execute on a chargeback/IT services funding strategy, on an ongoing basis is also needed for successful cloud operations.

Dell VIS Solutions for Private Cloud Management

Developed in part to help customers implement and manage cloud architectures across heterogeneous environments, Dell's Virtual Integrated System (VIS) portfolio offers a modular, software-based approach to creating and managing cloud infrastructure. From a management software perspective, VIS currently includes the following major elements:

- Dell Advanced Infrastructure Manager (AIM) is a software solution that creates a flexible and resilient IT environment by enabling workload mobility and business continuity across diverse virtual and physical server, storage, and network resources.
- Dell VIS Creator is an automated, policy-driven, self-service provisioning portal and automation engine that streamlines ordering, deployment, and management of infrastructure and workloads — virtual, physical, or hybrid cloud — by end users and IT staff.

With Dell AIM, IT organizations can continuously monitor workload and service status and automatically migrate workloads when needed to ensure consistent service levels or for disaster recovery reasons. AIM can quickly migrate workloads across VM clusters and can repurpose OS

instances across multihypervisor environments to create the flexible IT infrastructure needed to support cloud services. AIM can also be used to migrate workloads from legacy platforms to cloud environments and to speed recovery time across dissimilar systems and geographically dispersed datacenters.

VIS Creator provides end users and IT staff with an automated, policy-driven, self-service provisioning portal and service catalog. It allows authorized users to select, deploy, and manage a customized catalog of IT applications and resources (known as service blueprints) while IT maintains governance and control.

The service blueprints are the library of approved, preconfigured service profiles and workflows that drive the automation used to quickly deliver on end-user requests. Using the VIS Creator portal, users are allowed to provision resources, manage access control and alternative delegation, and review cost profiles and application software licensing requirements. The Creator Workflow Designer, which is a new feature, is a collection of tools, utilities, and documentation that allow developers and administrators to rapidly create cloud services.

Once an end user makes a request, VIS Creator launches and tracks automated approval workflows and then orchestrates the configuration and activation of resources based on predefined configurations and policies. VIS Creator is designed to support a broad range of applications and middleware as well as multivendor physical and virtual server platforms. It can also be used to provision and manage VMs and workloads onto public clouds with the same governance it provides with private clouds.

Overall, the Dell VIS portfolio enables customers to simplify, standardize, and automate many aspects of cloud provisioning and ongoing management. Its strengths include the following:

- Creation of a resilient and elastic infrastructure that can scale services up and down on demand while maintaining service-level agreements
- Role-based personalization of service blueprint profiles — which can include authorization workflows — that can be defined by individual, group, or service tier profiles (This capability means that a specific user's self-service portal view will show only the service catalog options that the user has been authorized to access, and approval and governance policies and workflows that are specific to that end user will be automatically activated.)
- Automated provisioning orchestration and workload mobility management across a heterogeneous mix of hypervisors, physical servers, and management software from a wide range of in-house platforms and an increasing range of public cloud service providers
- Secure multitenancy capabilities that allow IT to dedicate resources to a specific group, even in a shared infrastructure environment (This level of control is important in gaining business buy-in for shared services environments and is also important to ensure that each group gets the service levels it expects.)
- Detailed usage monitoring and reporting capabilities to allow for multilevel usage and cost chargeback and review
- Ability to extend integration to existing service desks, trouble ticket systems, and CMDB environments
- Ability to extend user provisioning options beyond server OS and VM configurations to include the automated orchestration of application and middleware package deployments as well as virtual desktop implementations

The Dell VIS portfolio is designed for scalable growth, with elasticity that allows customers to start with a limited set of self-service users and service blueprints and scale up the use of the portal and associated automation as needed over time.

Challenges

Private and hybrid cloud strategies represent a major change to the way IT is purchased, managed, and governed. They require IT and business stakeholders to collaborate closely to define services and operational policies. IT teams need to become more comfortable with user-driven provisioning and automation and usage-based chargeback strategies.

IDC's research indicates that most IT decision makers are looking to vendors and peers to learn about best practices, create new approaches to governance, and develop business case models. Most are growing their private and hybrid cloud environments modularly. In many organizations, application development and test organizations and IT system administrators have been some of the first users of these technologies. Field sales staff responsible for conducting certain types of live demos and business analysts who rely on applications with intensive compute requirements, such as business analytics or modeling, have also been testing private cloud self-service solutions. Building on these initial use cases, most organizations expect to scale up use of cloud management technologies over time to the extent their business users and applications can benefit from this type of dynamic environment.

For Dell, as with other vendors in this market, success depends on being able to establish relationships with customers early in their cloud life cycle, with the goal of becoming a strategic cloud enabler for the long run. To help customers move quickly from proofs of concept to operational cloud environments, solution vendors need to provide customers with a range of use cases and payback models that go beyond the automation of VM provisioning. For Dell, the value of VIS will be seen most strongly in complex environments that need automated provisioning and control across a wide variety of platforms and management tools.

Conclusion

IDC believes that self-service provisioning, automation, and workload mobility management are fundamental elements of effective private and hybrid cloud environments and that the demand for these technologies will increase as enterprise customers ramp up the number of users and services supported by cloud infrastructure and services. To the extent that Dell is able to successfully engage with customers early in their cloud life cycle, the VIS portfolio will be positioned to become a critical element of those environments over the long run.