

WHITE PAPER

Enabling Datacenter Automation with Virtualized Infrastructure

Sponsored by: VMware

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IDC OPINION

Virtualization provides IT organizations with a significant opportunity to improve management and automation across the datacenter. As IT organizations face growing business demands and budget pressures, automating labor-intensive, human tasks offers an ability to "do more with less" and increase the productivity of existing staff. As virtualization adoption increases across IT domains, IT should deploy virtualization with automation as an underlying foundation. Automation offers an accelerated path to delivering process standardization, which empowers IT organizations to work across IT silos and lower costs through workflow automation.

IN THIS WHITE PAPER

This white paper analyzes the impact and opportunities that virtualization offers for human- and technology-based process workflows. As virtualization adoption increases across domains (e.g., server, storage, client, and application), the use of automation offers IT organizations an opportunity to reduce time to market, establish tighter business alignment, and improve IT service availability while lowering operational costs and improving staff utilization.

SITUATION OVERVIEW

During the past several years, the reality of automating a datacenter has increased in importance and executive prioritization. Increasing business expectations and the demand for IT organizations to deliver high-quality services with reduced (or limited) headcount dictate that senior IT leaders improve productivity from existing staff and "do more with less." Business managers now expect IT to meet or exceed their demands quickly in areas such as improving time to market, ensuring compliance, providing disaster recovery, and increasing competitive advantage. Automation empowers this thinking, offering IT an opportunity to increase availability, reduce operations costs, respond to business demands faster, and reduce infrastructure error rates through automated, integrated workflows.

Besides business pressures and cost reduction, IT executives face an ever-changing, increasingly complex IT system and infrastructures that require substantial training, integration, process, and management solution investment. SOA-based application architectures are making it more difficult to manage change and resolve problems as IT specialists struggle to stay ahead of the technology curve. Globalized, highly

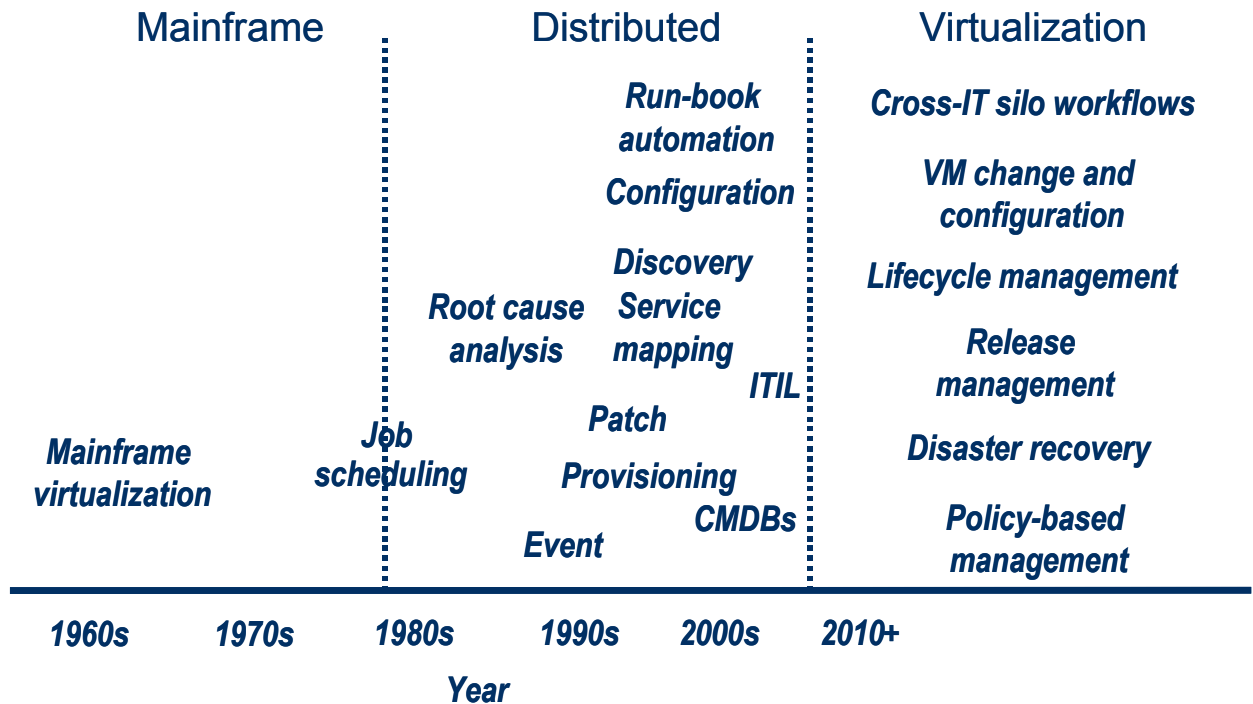
distributed hardware and software systems are making it more difficult for IT organizations to maintain compliance and ensure IT service performance in line with agreed-upon service-level agreements (SLAs). Many IT organizations are moving toward becoming more like service providers, organizing around profit generation based on the successful, cost-effective delivery of IT services while minimizing labor increases.

The Evolution of Datacenter Automation

Datacenter automation has continued to develop over the years; recent IT automation deployments involve provisioning management, run-book automation, change and configuration management, and patch management with technologies that layer on top of existing solutions (see Figure 1).

FIGURE 1

History of Datacenter Automation



Source: IDC, 2008

IT organizations are automating manual tasks based on agreed-upon processes, which also enables lower costs and can dynamically trigger actions to reduce service downtime.

While ticket and project management systems are a good start in the right direction, automation at the infrastructure level is subject to limitations arising from constraints and configuration dependencies inherent in the deployed physical infrastructure. Virtualization offers IT organizations a new architecture for management and automation, inherently embedding intelligence into the virtual machine (VM) and making automation a focal value proposition for enhancing cost savings opportunities and improving staff efficiencies. *In virtualized architectures, automation is simply embedded in product workflows; in physical environments, automation is layered on top.*

It provides IT with a shared utility infrastructure, one that dynamically enables automated workflows and management across IT teams, reducing the costs of dynamic infrastructure. In fact, most IT specialists on different teams can experience the value of automation throughout the VM lifecycle. It is important to note, however, that not all virtualization platforms enable or even use automation. For example, only VMware Infrastructure provides resource pooling and live migration, two key building blocks for automating workflows and dynamically allocating resources across the datacenter. IT teams must be cognizant of the prerequisites for automating a virtual environment and understand the true capabilities of each vendor platform.

Opportunities with Virtualization

It is important that IT organizations consider how virtualization empowers the use of automation in ways that were not possible before. A few examples are as follows:

- ☒ For IT operations staff, datacenter managers, change advisory boards (CABs), IT administrators, system administrators, and infrastructure managers, virtualization provides automation that transcends "IT silos" to drive automated resource allocation on demand.
 - ☐ **Policy-based, consistent, and automated provisioning and tracking process.** Request, approve, deploy, update, and retire VMs to drive down the cost of compliance assurance, reduce VM sprawl, and decommission underutilized or unused VMs.
- ☒ For application development and deployment teams, automating virtualization provides a new way of reducing errors and speeding time to production during the application lifecycle.
 - ☐ **Reduction in application development and testing resources.** Lab automation simplifies software testing and development by creating a comprehensive configuration library of build, test, and production environments for fast reuse and improved application deployments.
 - ☐ **Accelerated change and release processes.** Running applications as VM configurations in the preproduction process can speed time to market and help application managers quickly identify configuration drift during the release cycle. By using virtualization to support the change and release management process, companies can more effectively manage and automate the change, configuration, and release processes for production-bound software systems; visualize, organize, and streamline resources

needed for preproduction and service transition activities; reduce server sprawl and increase the resource utilization efficiency of IT services; and ensure that all environments used for preproduction integration and testing are exact copies of current production systems.

- ☒ For storage and system managers and architects, automating disaster recovery plans and procedures enables faster and more efficient recovery times from a central point of control.
- ☐ **Meet recovery time objectives (RTOs).** Automating the recovery process eliminates error-prone manual steps in the recovery process and ensures that recovery procedures will be consistently executed as intended. It also simplifies and centralizes the process of creating, updating, and managing recovery plans, eliminates common causes of failure during recovery, and makes it possible to test recovery plans.

The aforementioned automation examples show the advantages that the virtualization architecture provides; integrated, cross-silo workflows that utilize a common automation architecture empower IT to work together to deliver high-quality, highly available services at the lowest possible cost. VMs become files that can be dictated by embedded policies based on application-specific resource requirements and SLAs, thus increasing the ROI from the virtualization investment. Time to market, IT agility, business alignment, cost savings, and business impact begin to work in concert when automation is applied across IT silos utilizing virtualization as the underlying architecture. Many of these capabilities are difficult, if not impossible, to deploy in the physical world due to fragmented processes, poor organizational structures, and lack of integrated management solutions.

Automation Implications

There are many implications to the IT organization as automation is deployed onto virtualization. They include:

- ☒ An increased importance of using defined management processes and business-driven policies to control the environment
- ☒ Changes to existing management and organizational paradigms as IT might have to manage things in a different way and create new organizational structures
- ☒ Elevated need to utilize multiple standardized processes (e.g., ITIL, CoBIT)
- ☒ The ability to patch offline VMs, dynamically control and apportion resources, and manage moves, adds, and changes (MACs) to VMs dynamically
- ☒ The ability to manage VM inventory and monitor performance throughout a VM's lifecycle

Automation can be inserted into dynamic, rather than static, management workflows and processes with virtualization. Infrastructure management, provisioning, configuration and change management, application management, lab automation, release management, business continuity/disaster recovery, and related management

requirements become inherent, automated processes integrated into the VM lifecycle. Automation empowers a more dynamic infrastructure with built-in integrations and reduced manual tasks delivering automated, cross-silo actions in the most efficient manner possible.

FUTURE OUTLOOK

IDC advises IT organizations to heed the following recommendations to get started with automating the datacenter with virtualization:

- ☒ **Take an incremental approach.** IT staff should consider existing manual tasks that can be automated and apply a virtualization mentality to those processes as workloads migrate to VM architecture.
- ☒ **Consider automation value across IT silos.** For most IT organizations, virtualization is being rolled out across server, storage, desktop, and application teams in various stages. Automation offers each team various points of value, and collaboration and team communications can drive greater cost savings and more efficient operations.
- ☒ **Plan and budget.** IT should plan for the use of automation from the onset of any virtualization project, as well as budget for solution and training purchases that deliver automation and improve its effectiveness throughout the VM lifecycle.
- ☒ **Measure and monitor automation success.** IT should look at tactical outcomes and measure its cost savings and ROI as well as create a longer-term strategy that brings together teams and stakeholders that utilize automation in a broader perspective.

Pitfalls to Avoid

IT organizations should avoid the following pitfalls when automating their virtualized infrastructure:

- ☒ **Solution selection.** Automation is a long-term trend. IT should isolate the key vendor and product features that it needs today and identify those that should be on the vendor road map.
- ☒ **Process standardization.** If IT has not adopted a process standard, it should start by looking at ITIL and adopt it in the IT operations team. Other maturity models include CMM and CoBIT, which should also be considered by the respective IT group.
- ☒ **Cross-silo features.** Automation impacts different buying centers and requires flexibility in what can be automated and the integration points among the workflows and products. Buyers must consider the interface, functionality, and short- and long-term automation strategies within their IT silo and across teams.

- ☒ **Integration with existing management solutions.** Automation solutions should integrate with existing management solutions that manage the physical environment to provide a service management perspective.
- ☒ **Underlying virtualization architecture.** Automation at the hypervisor layer must gather data (and sometimes act on this data) at very granular levels. Not all automation solutions are equal, and integration across broad virtualization architectures is required to drive workflows and trigger dynamic actions.

VMWARE'S APPROACH

VMware has developed a shared utility infrastructure that offers automation solutions that enable IT to achieve business objectives. By embedding automation throughout the VM lifecycle, VMware enables IT to deliver consistent cost savings and automated workflows that reduce total cost of ownership and improve customer satisfaction. Customers should consider the following VMware automation portfolio when deploying virtualization:

- ☒ **VMware VirtualCenter** provides centralized management of VMware Infrastructure and the core functionality for enabling automation of critical IT processes. It also serves as an integration point for solutions from systems management vendors and other third-party products.
- ☒ **VMware Site Recovery Manager** leverages VMware Infrastructure to provide disaster recovery capabilities.
- ☒ **VMware Lab Manager** provides self-service provisioning of multi-VM environments for use in application development and test labs.
- ☒ **VMware Lifecycle Manager** automates the management of the VM lifecycle, from request to approval to decommissioning.
- ☒ **VMware Stage Manager** leverages VMware Infrastructure for automating release management infrastructure and operations.

Automation capabilities will only increase as virtualization continues to develop and mature. VMware has shown a high level of execution in developing high-value automation solutions through innovative product development and surgical acquisitions such as B-hive (for application performance monitoring) and Dunes (for virtual machine orchestration). Future innovations include automation scenarios that likely will assist IT organizations with integrations that cross IT silos and automatically drive application-aware problem, incident, and change management workflows based on event-driven policies.

CHALLENGES AND OPPORTUNITIES

Virtualization provides a strong architectural foundation for implementing datacenter automation, with the ability to decouple operating systems and applications from physical infrastructure, thereby enabling resource pooling and flexible assignment of

workloads to logical devices. VMware has made a strong play in virtualization, not only by enabling virtualization through software hypervisors but also by providing software tools for management and automation of virtualized facilities.

VMware will be challenged to deliver increasing degrees of management and automation software. Management and automation will need to expand beyond current capabilities to include wider ranges of resource management. Integration of management and automation for infrastructure, operating systems, and applications — both physical and virtual — will pose ongoing challenges.

In addition, as datacenters adopt more heterogeneous virtualization solutions, VMware must be prepared to extend its management and automation capabilities to encompass other platforms to provide a comprehensive solution. The ability to easily connect to major management frameworks and third-party datacenter automation solutions will provide broader market opportunities.

CONCLUSION

Virtualization enables a more agile infrastructure by decoupling the application stack from the underlying hardware and operating system. This much-adopted architecture enables IT leaders to drive efficient task automation within and across "IT silos" and drive tighter process standardization across teams. Virtualization provides encapsulated automation opportunities that IT must take advantage of to drive higher ROI and more effective and efficient delivery of IT services. Increasingly, IT organizations that virtualize a higher percentage of their application workloads must utilize automation capabilities as the demand for higher-quality services outpaces hiring practices. To accelerate automation's impact on increasing staff utilization, IT should adopt process standardization. By using automation along with virtualization, IT has an incredible opportunity to provide highly cost-effective service delivery while gaining flexibility in the ability to meet ongoing business needs.

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