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# AUTOMATED SWIM (SINGLE WINDOW INFRASTRUCTURE MANAGEMENT) FOR CLOUD

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**Abstract** - Data centers manage complex server environments, including physical and virtual machines, across a wide variety of platforms, and often in geographically dispersed locations. Information Technology managers are responsible for ensuring that servers in these increasingly complex environments are properly configured and monitored throughout the IT life cycle. They also face challenges managing the physical and virtual environments and the fact that we must centralize, optimize and maintain both. If the variation and complexity can be taken out of a process to make it more consistent, it can be automated. Through the use of virtual provisioning software, provisioning and re-purposing of infrastructure will become increasingly automatic. Staff will physically rack once, cable once, and thereafter (remotely) reconfigure repeatedly, effortlessly, as needed. An automatic infrastructure will rapidly change which servers are running what software and how those servers are connected to network and storage. It will re-purpose machines according to the real-time demands of the business. It will enable capacity to be "dialed up" or "dialed down". And it will bring up a failed server on new hardware, with the same network and storage access and addressing, within minutes. All without needing to make physical machine, cable, LAN connection or SAN access changes.

**Keywords** - Automation, cloud computing, virtualization.

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## I. INTRODUCTION

IT is currently under a mandate to use resources more efficiently. In the past, IT organizations typically built an infrastructure that tightly coupled application workloads with physical assets, forcing IT administrators to continually perform repetitive manual tasks just to keep the operating environment up and running. In an effort to maintain some control, software is layered alongside the multiple instances of operating systems to enforce security, manage availability, and ensure performance. Then, to further compound the complexity, some applications require unique hardware, software, and skill sets to support specific business requirements. This entire approach is often referred to as IT being built in silos or IT operating on individual islands at best, but it is inefficient.

In these scenarios, penetrating the walls between the various application workloads to help drive consolidation efforts can be a difficult task in terms of both management and security. Business owners have actually tolerated this approach for some time now, but as applications scale to new compliance and security mandates have been put in place and, in a less than perfect economy, companies are finding themselves tied at the ankles by an inefficient IT environment that is extremely costly to support and maintain. In many cases, it is prohibiting overall business growth and stability. So automation obviously becomes the critical components of the new model.

Automation means that many critical server and system resources can manage themselves, flawlessly

completing tasks that once required a human catalyst. Virtualization gives the power to proactively deploy servers, easily adjusting and allocating resources when and where they are needed. Information Technology managers seek solutions to help them automate the consolidation of servers through virtualization, the provisioning of new servers, and processes to keep systems current with the latest software and security updates. At the same time they need to work diligently on monitoring the health of their infrastructure, industry compliance regulations, and reducing the total cost of managing that data center.

To create a cloud service, self-service and metering (feedback about the cost of the resources allocated) are offered in addition to automation. With self-service and metering, the computing model resembles a utility. The private cloud then is a technical strategy to turn computing power into utility computing, with the data and costs controlled and managed by the enterprise. Self service and metering are breakthrough capabilities for end users and business units, facilitating management and extension of the user experience. Now there is no intermediary between the consumer of a resource and the processes for the acquisition and allocation of resources for core businesses requirements and initiatives.

Since the consumer initiates the service requests, now IT is an on-demand service rather than a gatekeeper. With the transition to an on-demand service, the cost structure is dramatically reduced, since the user uses and pays for only what is needed at a specific moment.

The business benefit of this change in cost structure is significant. While self-service and metering are breakthroughs private cloud capabilities for end users and business units, maintaining service delivery in a fully virtualized multi-tenancy environment and providing security, especially for information and services leaving the data center environment, are essential enterprise requirements for IT administrators.

With a private cloud utility model enabling these needs and requirements, enterprises can scale and expand by pooling IT resources in a single cloud operating system or management platform. They then can support anywhere from tens to thousands of applications and services and enable new architectures targeting very large-scale computing activities.

## II. RULES-BASED AUTOMATION

Automation is the next step in the evolutionary chain, making technology do the business's bidding and driving growth, innovation and profitability. This will drive incredible cultural change within organizations as constraints are removed and management can drive innovation and growth knowing that IT can respond to the ever-changing priorities of the business.

The automated infrastructure will, of course, need a set of rules, and the provision of its demands from the business will need to be delivered in a structured manner. This rulebook will be the service catalog, essentially a huge database of functions an organization undertakes and the parameters for each – such as a description of the service, timeframes, SLAs, costs and actions required. And a runbook will provide step-by-step procedures for governing workflow. In the automated infrastructure, these powerful workflow automation and management systems, with strict policy control, will:

- allocate resources to the applications and users that need them automatically in real-time
- continually monitor service levels to ensure business performance is on target
- provide a dynamic, on-demand environment, with support for the industry's leading virtualization, provisioning and re-purposing tools
- support major third-party servers, software and devices

## III. CHALLENGE

Labor Intensive, Time Consuming Virtual Machine (VM) Resource Provisioning

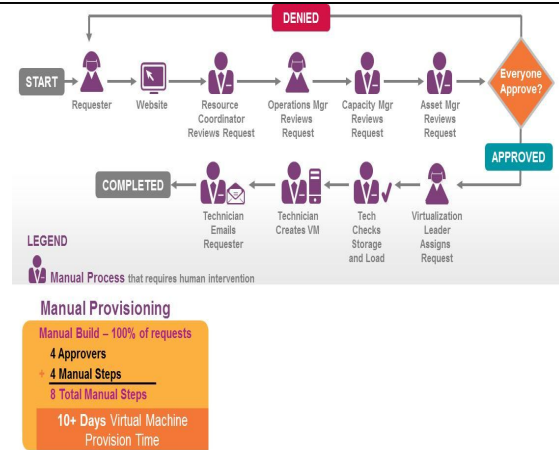


Fig. 1: Manual Provisioning

With the increased amount of requests for VMs, it was taking too long to provision virtual machines, provisioning those VMs was labor and time consuming. In addition, users were not releasing the VMs when they were done with them. They'd simply keep them running and not do anything with them. This caused stranded resources such as processor, memory and disk space that could be used for other VMs. This caused the need for the environment to continually grow to meet new demand for virtual machines. Virtual Machine request process went through as follows, where users would go to a web page, make a request for resources and approval process was reviewed by cloud administrator and the manual steps that were required to create a VM. We determined that 95% of our requests fell into a common configuration and that we could 100% automate provisioning that common configuration. Solution

### A) Automated VM Provisioning- Standard Build

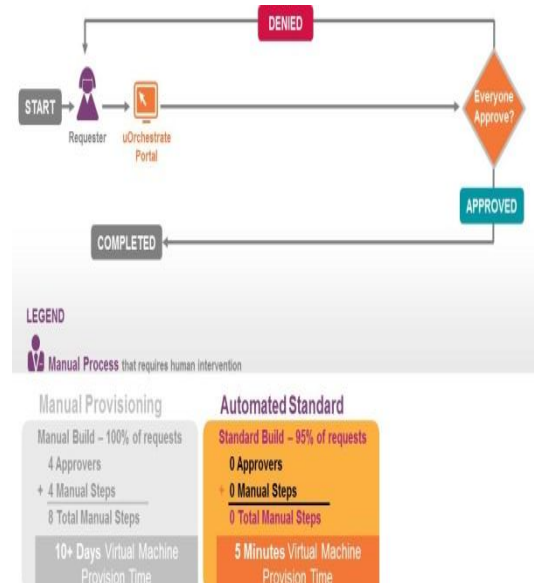


Fig. 2: Automated Standard Provisioning

B) Automated VM Provisioning- Manual Build

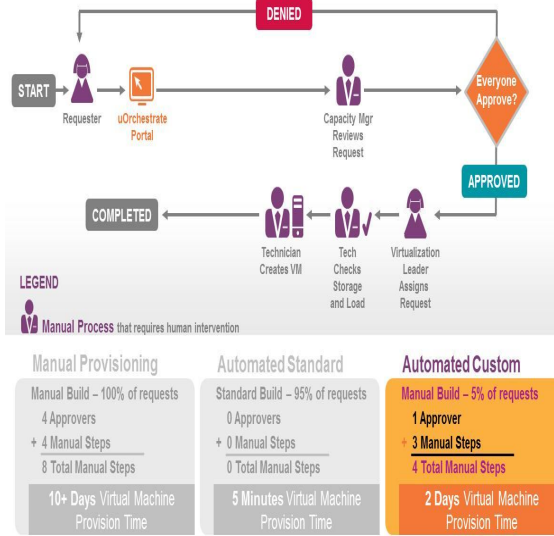


Fig. 3 : Automated Custom Provisioning

It is essential that the entire process be correctly understood before attempting to plan out what will be automated. It makes no sense to automate a bad process. Get all parties involved, to discover any hidden steps or misunderstandings in the flow. Once the process is understood, determine if anything needs to change, or be dropped, in order to streamline the automated process.

Also, make sure that the client requirements are clear. Have a comprehensive test and evaluation plan for the automation process.

IV IMPLEMENTATION

- A) Automation ↑ 100% => Availability ↑ 100%
- Automate Application Management – When VMs are created, agents are automatically embedded for backup , performance and capacity management
- Automated Asset Tracking – When VMs are created, the Configuration Item is automatically updated in the CMDB
- Automate incident management – incidents are automatically sent during the provisioning process
- Automate performance and capacity management – insert agents and automate updates for the collection process
- Automate VM provisioning tasks – Standardize the VM templates and automatically allocate them based on pre-determined approval schemes
- Automate Security – Establish tiers and tenants so that they can be automatically isolated using vLAN technology or more sophisticated encryption technology
- Automate Identity and Access Management federation – Single sign-on and seamless

management from datacenter management to cloud management

B) “Near Zero Touch” delivered through extreme automation

Secure Private Cloud includes a complete suite of tools to provision, operated, integrate and meter the use of cloud-based IT infrastructure. These tools allow automating and scaling to hundreds or even thousands of servers with little or no incremental administration and management cost.

Component	Value Delivered
uOrchestrate	The Virtual Orchestrator component (which includes LifeRay portal) is the basis of the PSO UI PSO UI is the interface by which the user and administrator interact with Secure Private Cloud “Run-book” automation – software that programmatically sequences a number of formerly manual steps into an automated sequence
uAdapt	Automatically provisions / de-provisions HW/SW platform from a pool of waiting servers Provisions physical servers Creates a “persona” which defines an instance of the HW attributes and SW components that are to be provisioned
VMware vCenter	Does most of the heavy lifting for provisioning of virtual servers Manages “templates” – defined set of SW that a VM will contain

Table 1: Components used for automation

V RESULTS

Cost and Value Analysis

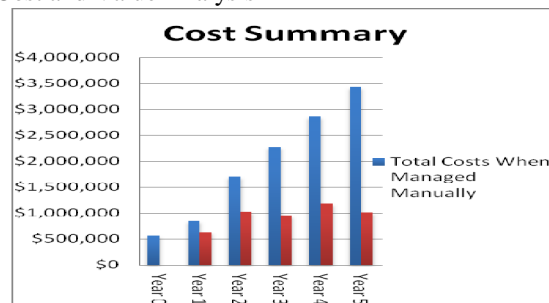


Fig. 5 Manual Provisioning cost versus Automated Provisioning cost

The economic conditions around the world have forced companies to be more cost conscious. With costs continuing to escalate, data centers are coming under unprecedented operational scrutiny. The Information Technology (IT) managers, faced with the challenge of squeezing more performance out of existing data center budgets, need to limit the capital and operational expense on additional equipment, simplify network operations, and ensure maximum efficiencies

Sophisticated automation can help to reduce operating expenses through:

- On-demand reallocation of computing resources
- Run-time response to capacity demands
- Trouble-ticket response automation (or elimination of trouble tickets for most automated response scenarios)
- Integrated system management and measurement

## VI CONCLUSION

Enterprises need to move from managing underlying infrastructure to managing service levels based on what makes sense for the user of applications. For example, the customer may want to manage factors such as the minimum tolerable application latency or the availability level of an application. Enterprises also must implement automation for central IT and self-service for end users, thus extricating IT from the business of repetitive management procedures and enabling end users to get what they need quickly.

In this stage, virtualization optimizes IT resources and increases IT agility, thus speeding time-to-market for services. The IT infrastructure undergoes a transformation in which it becomes automated and critical IT processes are dynamic and controlled by trusted policies. Through automation, data centers systematically remove manual labor requirements for the run-time operation of the data center.

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