



Virtualization and Cloud Management

Providing unified management from a single control point

Published August 2013 © Ovum

EXECUTIVE SUMMARY

CATALYST

Virtualization has expanded well beyond its original value proposition of simply increasing the level of server utilization by enabling data centers to perform server consolidation projects quickly and easily. The virtualization market now provides solutions for desktops, applications, servers, storage, and networks, and most of these solutions are based in the data center. One of the biggest challenges is the management of a combined heterogeneous physical and virtual data center that serves a distributed user base. Cloud computing has further complicated this scenario by adding another dimension, namely the provision of services by multiple third-party suppliers that must be coordinated and integrated into an apparently seamless service delivery to the end customer.

SUMMARY

The current state of the virtualization market is characterized by many proprietary technology stacks. This is partially due to a lack of open standards, and the cloud computing market is similarly fragmented, with many different standards, platforms, and services. The management layer is now assuming the responsibility for providing interoperability between technology solutions, while at the same time applying a business perspective. We believe that as virtualization and cloud computing expands its footprint it will increasingly become vulnerable to fragmentation within the enterprise, unless all the elements can be unified and managed from a single control point. Virtualization has far-reaching implications for all aspects of infrastructure management, even without taking into account the extensions of the technology beyond simple server-consolidation most organizations use to justify their move in to virtual environments.

When the cloud computing revolution is added to this already complex environment, it can quickly be seen that orchestration becomes the new fulcrum for management and control. This fulcrum is now at the center of a federated and fragmented IT supply chain, where applications, services, and infrastructure are separated by location and ownership. While the nirvana of the cloud world is for any workload to execute in any location on any platform, the reality is that the different standards make this something that is currently only possible between technologies that have established working relationships.

One of the principal roles of virtualization and cloud management is to mitigate the risks involved with deploying these new approaches, and this responsibility now extends beyond the confines of the data center. While management alone cannot solve the problem that new technologies introduce, we believe that by addressing the concerns of the entire IT infrastructure, and treating it as a single entity, organizations can reduce the incompatibility issues to which new technologies are susceptible. Infrastructure management must cover all aspects and must be able to link activities and events so that IT managers and business managers can see at a glance the operational performance, cost, and service levels that the IT infrastructure is delivering.

The move to the cloud for many organizations is a journey that involves managing a heterogeneous environment in a state of flux. The typical approach to adopting cloud will be to use public cloud services for clearly defined workloads, while the internal IT infrastructure is transformed so that services can be provided quickly to match business demand. HP has recognized this scenario and developed CloudSystem, which enables organizations to manage and build a mixture of both physical and virtual environments.

KEY MESSAGES

- The management layer is now assuming the responsibility for providing interoperability between technologies.
- HP understands the business perspective of cloud and virtualization management.
- HP CloudSystem provides an open and heterogeneous cloud management solution.

THE MANAGEMENT LAYER IS NOW ASSUMING THE RESPONSIBILITY FOR PROVIDING INTEROPERABILITY BETWEEN TECHNOLOGIES

SERVER PERFORMANCE AND AVAILABILITY

Hypervisor technologies

One of the major benefits associated with virtualization is its ability to accommodate a flexible approach to workload management and service availability. However, this flexibility comes at a price because it adds a layer of indirection that increases the complexity of managing the delivery of services dynamically. The market is still evolving, and as such is characterized by proprietary technologies that have only a rudimentary ability to support cross-platform interoperability. An often-overlooked aspect of managing virtual environments is the need for any management tool to operate at a more granular level than its physical environment counterpart. This approach is further complicated by the need to holistically manage the server, network, client, user, and storage elements.

Currently the vendor lock-in point for server virtualization technologies is at the hypervisor level, and the advanced capabilities provided by the different vendors only operate (in most cases) on top of the vendor's proprietary hypervisor-based technology. These aspects represent the known state of vendor lock-in, but a more insidious lock-in is the tools needed to manage the virtual machines (VMs) that are also linked to the hypervisor technologies. One of the significant aspects of this is that only the hypervisor vendor's accredited partners are able to integrate with that vendor's management console.

The other aspect is that much of this integration is provided via the API approach that requires systems management vendors to develop or modify their solutions. Ovum considers this to represent a significant potential problem area for organizations. If an organization uses multiple different hypervisors, these must all be managed from their respective management consoles. The larger systems management vendors usually have partnerships with more than one hypervisor vendor, which allows them to offer a single console access to manage both the physical and virtual environments. However, it is worth noting that currently the proprietary management console from the hypervisor vendor must in most cases still be implemented for this interoperability to work, and only the most popular hypervisors such as VMware and Microsoft tend to be offered by the systems management vendors.

Virtual machine sprawl

VMs provide the organization with a flexible and easy to deploy approach to application delivery. However, this benefit also has a significant drawback that must be recognized and mitigated. By the very nature of its ease and speed of deployment, a VM can very quickly multiply into hundreds of VMs. Therein lies the problem, VM sprawl, a self-generated condition not unlike server sprawl that many organizations suffer from. However, VM sprawl has one distinct difference, you can send a person out to count and record all physical

servers, but the same is not true for VMs. VM deployment needs to be controlled and managed because the ease of deployment can present management challenges.

The problem with VM sprawl is not that it creates a messy situation with respect to managing the applications deployed. Even though the VMs are invisible to most people, the problem is associated with a number of more serious side effects:

1. These VMs consume resources, even when they are unused. This causes a number of issues for the capacity-planning process, the biggest of which is that when projecting the resource usage, most capacity planners take current information and apply a growth figure. Therefore, if 20% of current capacity is consumed by the redundant VMs, the projected growth may require additional resources to be installed, whereas if the redundant VMs were eliminated, current capacity might be sufficient, and would therefore delay any capital spending.
2. The issue of controlling license compliance as organizations struggle to manage the plethora of software licenses, because without a well-defined process, VMs only exacerbate the problem. Not only may organizations be using more licenses than they pay for, but also they could be paying too much for licenses they do not use.
3. A significant issue with VM sprawl is the increased security risk it represents. Because every VM has an application and an operating system associated with it, it could represent a threat or vulnerability that could be exploited if the operating system is not patched.

APPLICATION VIRTUALIZATION

Different approaches

The virtualization of the application stack is characterized by a fragmented, rapidly evolving market. The proprietary nature of client and server-side technologies is amplified in the application stack. This fragmentation in application maturity is demonstrated by the growth of virtual appliances (VAs) – VAs are a pre-built and optimized complete application stack on top of an operating system packaged inside a virtual machine that can be deployed rapidly, these are a software alternative to the hardware appliance. VAs have been produced by some leading ISVs, while others only provide support for their products in a virtual environment. The result is that the IT department's ability to maintain control of software deployment and management is increasingly being challenged. This challenge also extends to the change process used within IT, and provides clear evidence of the need for IT departments to adopt IT service management (ITSM) principles. The application virtualization market has evolved based largely on the approaches taken by the many different vendors in the space. Ovum has categorized these approaches as application containers, desktop and application streaming technologies, centrally hosted applications, and terminal services.

Virtual appliances

The growth of VAs has revolutionized the approach to application delivery and how end users consume IT services. VAs are a hybrid solution where an application is installed on top of the independent software vendor's preferred operating system. The complexity arises because the operating system is typically a cut-down version, with the bare minimum required to execute the application, and the application is performance-tuned for this scenario. This combined application and operating system is then contained in a single wrapper, and the end user only needs a virtual player to execute the application. However, in some VAs, an embedded hypervisor is also provided, which negates the need for a virtual player. Currently only one hypervisor can be installed per physical server, which means that executing hypervisor-embedded VAs requires a deeper knowledge of the infrastructure because only one VA can execute per server.

VAs do have a number of issues that must be taken into account before organizations make the decision to deploy them widely. The first issue to consider is that of managing the whole user-distribution question of who is entitled to what applications. This is more of an internal issue, because ensuring that good processes exist to make it easy for those who need an application to get it, while not being so open that anybody can install any application, will help IT maintain control over the cost of using applications.

In addition, as users are given greater freedom and responsibilities for selecting and implementing the tools they need to perform their job, so the associated responsibilities of recovery must be addressed. Consider the situation where user self-service is employed and an end user's hard drive needs to be replaced: who is responsible for restoring all the end user's applications: IT or the end user? The answer is that it depends on the process agreed between IT and the business users.

HYBRID CLOUDS

Service delivery cost and value

Cloud has become segmented and this has not been reflected in organizations' architecture because all too often cloud was seen as an alternative new approach that would sweep away existing infrastructure and practices. In reality, the cloud will be another source of IT supply. Many are finding that segmenting it is the best way of representing how these services fit into the existing IT architecture. The organizational focus will increasingly be on workload management, driven by value and correct sizing of service delivery, and many CIOs are aware that with the use of cloud services it becomes critical to understand the cost and value equation.

To help CIOs with understanding this cost and value, most vendors' have introduced the concept of charging, or chargeback, is a set of processes and techniques that allow an IT function to bill internal customers for the IT services they consume. To fully exploit these techniques, the IT departments need to have successfully implemented, and consistently utilize, IT accounting processes. An effective chargeback model for IT can provide both increased accountability and transparency. The introduction of charging enables internal customers to fully appreciate their usage and the associated costs of IT. This allows IT demand to be managed more effectively, including encouraging internal customers to use high demand IT services at non-peak times. The other major benefit is helping to identify business-driven opportunities to either kill or cut back on existing IT services.

Charging must always add value to the business and be structured in business terms, with a level of simplicity appropriate to the corporate culture. One of the most difficult, and critical, requirements of a chargeback model lies in its perceived fairness, the relative success of agreeing services and service values, with the business.

Business-as-a-service

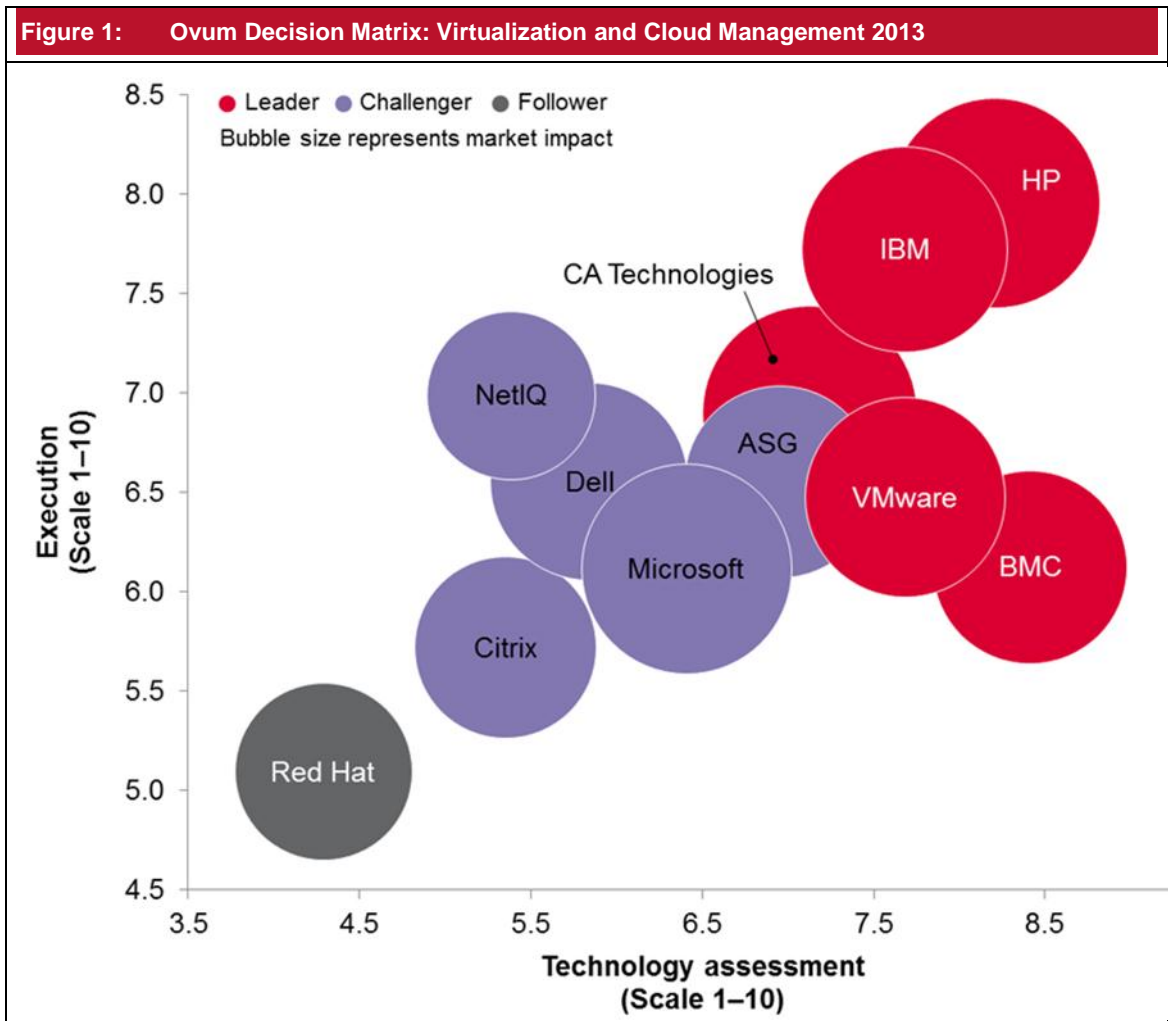
As PaaS and SaaS become more vertically aligned in how they are delivered as services, their use will see a shift away from discrete application services to business services. However, this shift will require any architecture to adapt, because currently business services are not a composite constructed from other elements. If business-as-a-service (BaaS) becomes adopted, any architecture model will need to recognize that business services can be broken down into its individual IT components, but may also be provided as a "black box" service that the architecture model treats as a single business service. The construction of ecosystems based on standards will help drive wider growth in as-a-service, and Ovum believes that it is within the hybrid cloud environment that business services will evolve.

HP UNDERSTANDS THE BUSINESS PERSPECTIVE OF CLOUD AND VIRTUALIZATION MANAGEMENT

The role and purpose of IT in an organization is undergoing significant change, driven by the need for businesses to become more agile and have greater control over cost levers when using technology. This transformation of IT involves many different aspects, not all of which are technology-related, but the one thing they all share is that IT modernization is about making changes to meet the current and future demands of business. Figure 1, the Ovum Decision Matrix (ODM) provides a side-by-side comparison of leading virtualization and cloud management solutions, looking at IT modernization from a data center infrastructure perspective. It considers the significance of management in the virtualization and cloud environments and how this influences the way in which technology is deployed, used, and controlled.

Key findings from the ODM include:

- Ovum’s technology capability evaluations show that HP is a leader with strong results.
- HP was particularly strong in financial management, but also had leading scores in virtualization management, and reporting and integration.
- Ovum’s execution evaluations showed that HP is classified in the leader category
- HP was the clear leader in execution dimensions: interoperability, innovation, and scalability categories.
- Ovum believes that HP demonstrates a strong bias toward understanding the business perspective of cloud and virtualization management, and using its solution to articulate that value.



To download the Ovum Decision Matrix: Virtualization and Cloud Management 2013, click [here](#) .

HP CLOUDSYSTEM PROVIDES AN OPEN AND HETEROGENEOUS CLOUD MANAGEMENT SOLUTION

WHY CONSIDER HP CLOUDSYSTEM MATRIX?

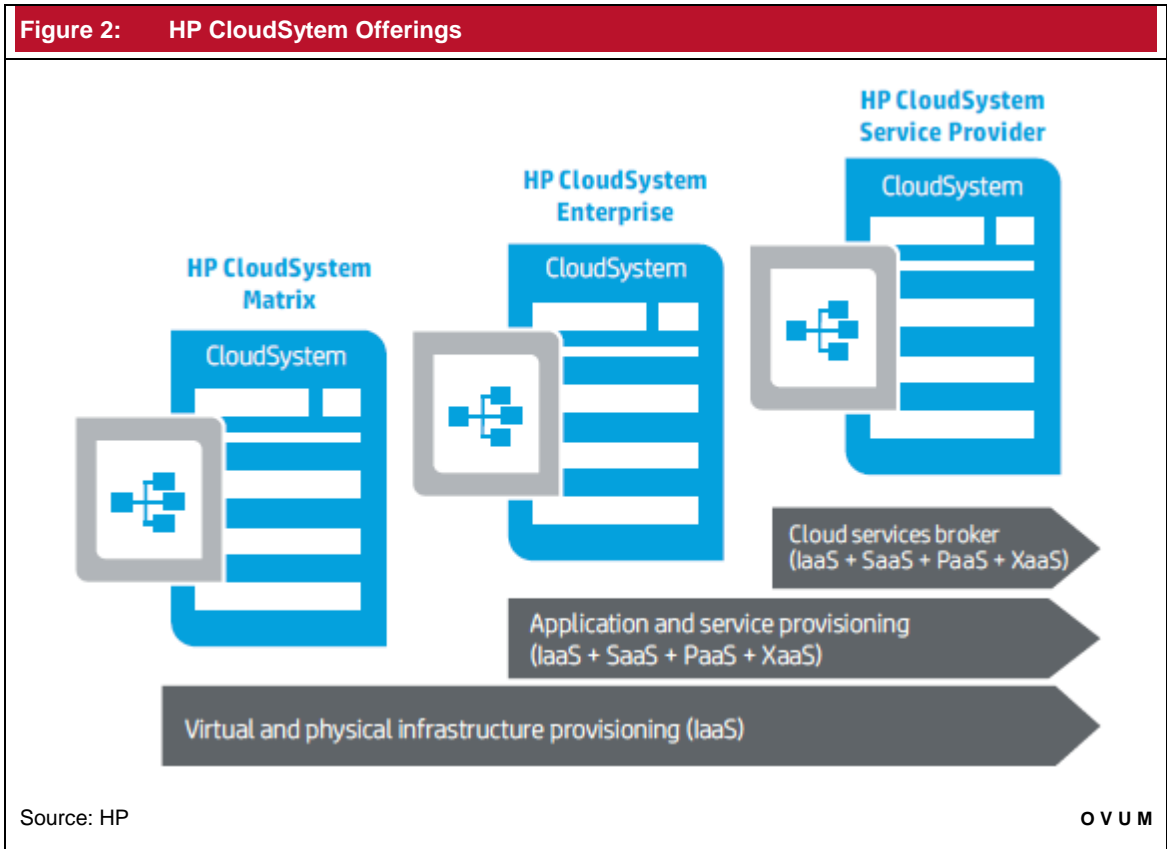
The problem with many cloud management solutions is that they take a narrow perspective on what is needed to manage and build a cloud. The focus is too much on X86 virtual environments. While managing the VMs is an important aspect this narrow focus ignores the bigger picture of cloud computing with organizations moving to a service-centric model for IT delivery and management. In a service-centric model for IT delivery and management the focus is on how the resources (compute, storage, and networking) are combined to form the service. Many solutions are limited in terms of how they consider this, some only from a provisioning perspective, while others only consider the complete service and not the constituent components. Ovum believes that taking a holistic service lifecycle approach is less common among vendors, mainly due to the fact that to perform this capability successfully requires the solution to be designed for this lifecycle approach. HP CloudSystem addresses all of these challenges which is demonstrated by HP's leadership position in the Ovum Decision Matrix (ODM) for virtualization and cloud management 2013 -14.

The market for cloud management solutions is crowded, and buyers need to carefully match requirements with vendor offerings to ensure that the solution delivers real value for their particular environment. HP CloudSystem offers one of the most open and heterogeneous cloud management solutions available today. CloudSystem supports a multi-hypervisor approach to X86 virtualization, including VMware ESXi, Microsoft Hyper-V, and KVM. Although this is the most dominant approach, it is not the only one and neglects UNIX and physical environments. HP has taken a bigger picture view and, while still limited in some respects (it supports only HP-UX as a UNIX platform), it does at least recognize that UNIX, physical, and multi-hypervisor support are needed.. CloudSystem uses OpenStack as its core strategic cloud management approach, which is a sensible move as OpenStack is gaining traction with vendors and end-user organizations.

SOLUTION ANALYSIS

Overview

The HP CloudSystem family provides infrastructure, software and services as a wrapper to the entire process of designing, building, deploying, operating, and retiring cloud environments and services. HP offers three different software solutions under its CloudSystem brand: CloudSystem Matrix for basic IaaS, CloudSystem Enterprise for advanced application management and unification of cloud management, and CloudSystem Service Provider for multi-tenancy environments. Customers can move from IaaS to broader cloud services by adding CloudSystem Enterprise Starter Suite to a CloudSystem Matrix environment.



HP CloudSystem Matrix

The core capability of CloudSystem Matrix is to provision and re-provision shared pools of resources, which consist of compute, storage, memory, and network. The concept of Cloud Maps is used to template these resources based on the specific use case. For example, Microsoft Exchange could be a template with exactly the resources needed to execute and operate Exchange in the organization. These templates are built according to a collaborative approach in which IT architects and domain experts use the inbuilt graphical tool. The IT architect will design the service request in terms of servers, storage, and network requirements. Then, by using the same tool the different domain experts create and build a service catalog of available assets. The architect can then combine these to construct a service template, or cloud map, and publish it in a service catalog as an available service for users.

It is at the level of domain experts where these cloud maps can be most versatile; for example, a storage administrator can create storage assets that have been pre-provisioned, as well as specifications for on-demand storage assets. These asset templates can include policies determining such things as RAID level, quotas, and whether thin provisioning is used or not.

One of the key strengths of operating in a cloud environment is the ability to share resources in a multi-tenant way. HP CloudSystem Matrix supports this by using the concept of a service provider administrator who can support multiple clients by creating a virtualized instance for each client group. These groups can then be allocated specific access to service templates based on the group's particular business needs.

HP CloudSystem Enterprise Starter Suite

This optional module allows organizations to automatically provision and manage applications and platform services. Designed for rapid implementation, it includes HP Cloud Service Automation (CSA) and other

software for building more advanced cloud services. By using CSA, the IT architect can create a template that consists of the infrastructure, operating system, and application stack and can ensure all of these are optimized to work together.

Summary

While virtualization and cloud management leaves enterprises vulnerable to vendor lock-in or fragmentation, there are solutions that successfully bridge multiple virtualization environments.

HP CloudSystem manages a broad spectrum of virtual and physical environments. It also provides both basic cloud capabilities like infrastructure provisioning, as well as more advanced application provisioning and management. HP CloudSystem offers one of the most open and heterogeneous cloud management solutions available today.

COMPANY PROFILE

Table 1: Contact Details	
<p>Hewlett-Packard Co 3000 Hanover Street Palo Alto CA 94304-1185 USA</p> <p>Tel: +1 (650) 857-1501 Fax: +1 (650) 857-5518</p> <p>www.hp.com</p>	<p>Source: HP</p> <p>OVUM</p>

Ovum's Knowledge Centers are new premium services offering the entire suite of Ovum information in fully interactive formats. To find out more about Knowledge Centers and our research, contact us:

Ovum Europe
 Mortimer House
 37-41 Mortimer Street
 London W1T 3JH, UK
 +44 20 7551 9000
 crmgroup@ovum.com

Ovum Australia
 Level 5, 459 Little Collins Street
 Melbourne, VIC 3000
 Australia
 +61 3 9601 6700

Ovum New York
 100 Wall Street, 9th Floor
 New York
 NY 10005, USA
 +1 212 686 7400

All Rights Reserved

No part of this publication may be reproduced, stored in a retrieval system or transmitted in any form by any means, electronic, mechanical, photocopying, recording or otherwise, without the prior permission of the publisher, Ovum Europe Limited. Whilst every care is taken to ensure the accuracy of the information contained in this material, the facts, estimates and opinions stated are based on information and sources which, while we believe them to be reliable, are not guaranteed. In particular, it should not be relied upon as the sole source of reference in relation to the subject matter. No liability can be accepted by Ovum Europe Limited, its directors or employees for any loss occasioned to any person or entity acting or failing to act as a result of anything contained in or omitted from the content of this material, or our conclusions as stated. The findings are Ovum's current opinions; they are subject to change without notice. Ovum has no obligation to update or amend the research or to let anyone know if our opinions change materially.

© Ovum. Unauthorised reproduction prohibited

This report is a licensed product and is not to be reproduced without prior permission.