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White Paper

The Business and Economic Advantages of SmartCloud Entry for Power Systems

June 2013



This report was developed by Edison Group, Inc. with IBM assistance and funding. This report may utilize information, including publicly available data, provided by various companies and sources, including IBM. The opinions are those of Edison Group, Inc. and do not necessarily represent IBM's position.

Printed in the United States of America

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First Publication: June 2013

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Executive Summary

Companies worldwide are embracing private clouds, not only because they support new, highly efficient and secure data solutions, but also to drive new competitive organizational strategies. Entry-level cloud solutions, such as IBM SmartCloud Entry, offer key private cloud capabilities such as self-service and rapid deployment of new workloads, enabling the flexibility to foster innovation. Private clouds also allow organizations to make more efficient use of IT resources for existing workloads, and real-time scalability for new or expanding workloads.

Because cloud computing abstracts the underlying infrastructure through virtualization, data and other IT assets are accessed much more reliably. Flexible, easy-to-use cloud management software, coupled with scalable and powerful hardware platforms, can deliver improved reliability, responsiveness, and utilization of resources running an organization's critical workloads.

Benchmark tests and other research show that IBM SmartCloud Entry for Power Systems provides several key advantages over comparable solutions from VMware.¹ The combination of IBM's SmartCloud Entry software and the Power Systems platform delivers price and performance advantages while supporting heterogeneous environments. Organizations can leverage their existing systems, even those comprised of a mixture of hardware and operating systems, as the foundation for their cloud. Organizations utilizing VMware's vCloud Director are required to purchase, license, install and configure additional products—notably metering, billing, self-service, image management, and automated approval processing features, all of which come standard with IBM SmartCloud Entry for Power Systems.

Benchmark results show that IBM SmartCloud Entry for Power Systems can yield up to 40 percent lower overall cost-per-workload over three years, when tested against comparable private cloud solutions from VMware.²

¹ Edison Group has verified IBM's benchmark tests, including their methodology, basis of competitive comparisons, and overall accuracy. Edison Group also independently researched data cited in this paper, including private cloud platform comparisons, standard features, and product pricing.

² Costs include licensing and support costs for three years, based on U.S. suggested lists prices for both VMware and IBM solutions. VMware solution includes costs of vSphere Enterprise Plus 5.0, vCenter 5.0, vCloud Director; 1.5 IBM solution includes costs of PowerVM Enterprise Edition, Systems Director Standard Edition, VMControl Enterprise Edition, Storage Control, and SmartCloud Entry



A case study gave a strong endorsement of this solution, giving a narrative to support the numbers:

“We have greatly reduced the time and effort taken to deploy new workloads. In the past, it took us anywhere from two to four weeks to set up a new production server. Now, thanks to our IBM SmartCloud Entry solution, and IBM PowerVM virtualization technology, we can deploy virtual servers more than 99 percent faster.”

Introduction

This white paper provides an assessment of the business value of implementing IBM SmartCloud Entry for Power Systems versus comparable private cloud solutions from VMware on Intel. It discusses the benefits of private cloud solutions, including reduced labor and hardware/software costs, ease of implementation and adoption, scalability, organizational flexibility, security, improved efficiency, as well as allocation of and access to IT resources.

Benchmark test results prove that IBM SmartCloud Entry and the Power Systems virtualization foundation offer cost-competitive cloud solutions for mid-range and large organizations. Entry-level cloud solutions enable organizations to rethink IT, take a modular approach to cloud computing and deploy IT resources more strategically.

This paper is intended for influencers and decision makers who recommend or make the final decision to adopt new IT solutions and strategies, such as the move to a private cloud. The paper will rely mostly on business terms but will also include objective data such as benchmarks and other contextual information to make clear comparisons. Influencers and decision makers will find this data, particularly benchmarks and key features, useful when evaluating private cloud solutions with their IT advisors.

Choosing the Right Cloud

Key Considerations of Private Cloud Solutions

Among the key considerations for private cloud solutions are:

- **Incremental Adoption**—Adopting a private cloud strategy does not require an all-in, wholesale change in an organization’s IT infrastructure. The transition to a private cloud solution can be gradual and incremental. With IBM SmartCloud Entry for Power Systems, for example, organizations can start small, by launching a single project, or moving a workload or department to a cloud. Such an approach allows organizations to make strategic incremental investments in private cloud adoption.
- **Virtualization and Multi-Platform Cloud Management**—the foundation of the cloud is virtualization. Virtualization allows organizations to better utilize their existing assets. The capabilities of virtualization technology and the potential density of virtual machines (VMs) is an important consideration for overall efficiency and lower cost. Underutilized resources tie up capital that could be used for new projects and initiatives. PowerVM, the virtualization technology for IBM Power Systems, has two-and-a-half times the workload density of VMware on Intel.³ Tools that enable the management of both physical and virtual machines together are also a factor to consider for management efficiency, visibility and control. Most organizations will want to build one cloud that can encompass different platforms, rather than several different clouds that are platform-constrained. IBM SmartCloud Entry supports multiple hypervisors (PowerVM, Hyper-V, VMware ESX, and KVM), which enables cloud management and virtual machine deployment across different platforms.
- **Flexible, Elastic, Dynamic vs. Static Resource Utilization**—Private clouds are very flexible, even “elastic.” Rather than relying on static physical infrastructure, private cloud service delivery allows authorized end-users to request and IT administrators to provision access to the resources when they are needed. This elastic capability allows organizations to use IT resources efficiently and cost effectively while managing unanticipated spikes in service and providing development with resources on demand. For example, a project team may require specific compute and storage capacity over a specific time frame. When the team no longer requires these resources, they return to a shared pool, leaving the resources and capacity available to others within the organization. IBM SmartCloud Entry exploits the platform’s ability to scale seamlessly from 1/20 of a core to 256 cores, using all resources of the

³ Does Your Virtualization Platform Matter?; Solitaire Interglobal Ltd (All rights reserved); April 2012

host server and allowing the organization to take the best advantage of the dynamic and flexible capabilities of a private cloud. With private clouds, unlike traditional data centers, IT administrators can also dynamically track and manage the allocation and use of CPU, memory, storage, and other resources

- **Metering and Billing**—Private cloud solutions, particularly IBM SmartCloud Entry for Power Systems, allow organizations to adopt a reliable and accurate metering, reporting and showback⁴ approach to sharing IT resources in organizations. Not only does this allow IT administrators and executives to make departments, projects and teams accountable for their usage of IT resources, but it also makes it possible to determine whether current capacity and resources are truly meeting the organization’s needs. Metering and reporting capabilities also allow IT administrators to track the success of projects in some detail by tracking usage patterns and volume. This ability also allows IT administrators to flag projects that may need assistance or otherwise need some form of course correction. In short, metering, billing, and tracking functions are not just a simple way to charge for IT utilization. IBM SmartCloud Entry for Power Systems includes a pay-as-you-go model, which makes it possible for IT to bill end users for capacity and other services it makes available. At the same time, by tracking usage, IT can work with management to more strategically plan for new investments.
- **Changing the role of IT**—Because cloud solutions provide faster and easier access to IT resources to speed up development cycles, IT staff can work strategically and more directly with lines of business to understand and respond to their needs and plans. IT staff can transform their roles by proactively advising teams on how to best use critical IT resources, and by serving as a control point for access to both public and private cloud services. With a private cloud services delivery model, IT has the opportunity to shift its role from being a cost center to a key driver of business value and innovation. With private cloud solutions, IT staff can make strategic and vital contributions to the organization on an ongoing basis.

Comparison of Power Systems Cloud and the Competition

A brief look at what is needed to build a private cloud service shows the key distinctions between the acquisition costs for IBM’s and VMware’s solutions. Criteria for choosing a vendor solution for a private cloud include a host platform that can achieve a high workload density, handle large and small workloads, create and manage virtual machines, and deliver the lowest cost per workload. While a number of features and

⁴These are two means of addressing internal IT cost issues. Showback is an accounting tool that debits a departmental budget for the use of IT services, providing analysis of costs without direct budgetary effect, rather than debit a budget. Showback will be used going forward.

capabilities, such as the need for virtualization, are common to all private cloud solutions, not all private clouds are equal. IBM and VMware offer many of the same basic features in their private cloud offerings. IBM SmartCloud Entry for Power Systems not only provides a more cost effective solution, based on workload and server- density benchmarks, but also has the advantage of the features and capabilities that come standard with the Power platform.

Table 1 provides an overview of the requirements and features of IBM SmartCloud Entry and VMware vCloud Director. These comparisons provide context for comparing the hardware and software acquisition needs for each vendor’s private cloud solution. For example, IBM SmartCloud for Power delivers a “single pane of glass” for the cloud stack. VMware vCloud Director requires separate management for hardware.

| Features | IBM SmartCloud Entry | VMware vCloud Director |
|--|--|--|
| Installation effort | Streamlined installation set up time in hours. | Requires multiple steps and can take up to a few days. |
| Hardware requirements | Minimal requirements for running the software. | vSphere management cluster with ESXi hosts recommended per VMware’s best practices. |
| Resource integration | Simple automatic discovery of existing virtual machines and templates. | Manual process to add virtual appliances through copy, import, or creation. |
| Billing, audit, metering and approvals | Built-in features to create accounts, allocate funds, report showbacks, meter resources and accounts, and manage delinquent accounts through established policies. | Requires purchase of additional products with separate interface. |
| Physical infrastructure management | Built on IBM Systems Director with hardware, storage and networking management. | Does not provide physical hardware management. |
| Private cloud platform | Automated approval, metering and billing, “single pane of glass” cloud management | Requires purchase of additional products. |
| Virtualization Platform | Systems Director/VMControl and Storage Control built in PowerVM—high consolidation ratios. | vCenter requires additional products for hardware management vSphere — modest consolidation ratio. |

Table 1: Functional Comparisons: IBM SmartCloud Entry and VMware vCloud Director

Numbers Behind the Cloud

Workloads and Hardware Required to Manage Workloads

IBM SmartCloud Entry for Power Systems and VMware vCloud Director for Intel are designed with distinctly different platform strategies. While IBM's solution is built around high performance, scalable IBM Power Systems hardware, VMware relies on commodity x86 processors. With the VMware approach, many more x86 boxes are required to manage the same workloads as Power Systems hardware. Managing a growing cluster of x86 servers to meet increasing workload requirements can prove to be inefficient and unreliable. As documented in benchmark tests with VMware vCloud Director on Intel and IBM Smart Cloud Entry for Power Systems, three-year total costs per workload for IBM's private cloud solution were 33-40 percent lower than comparable VMware solutions.⁵

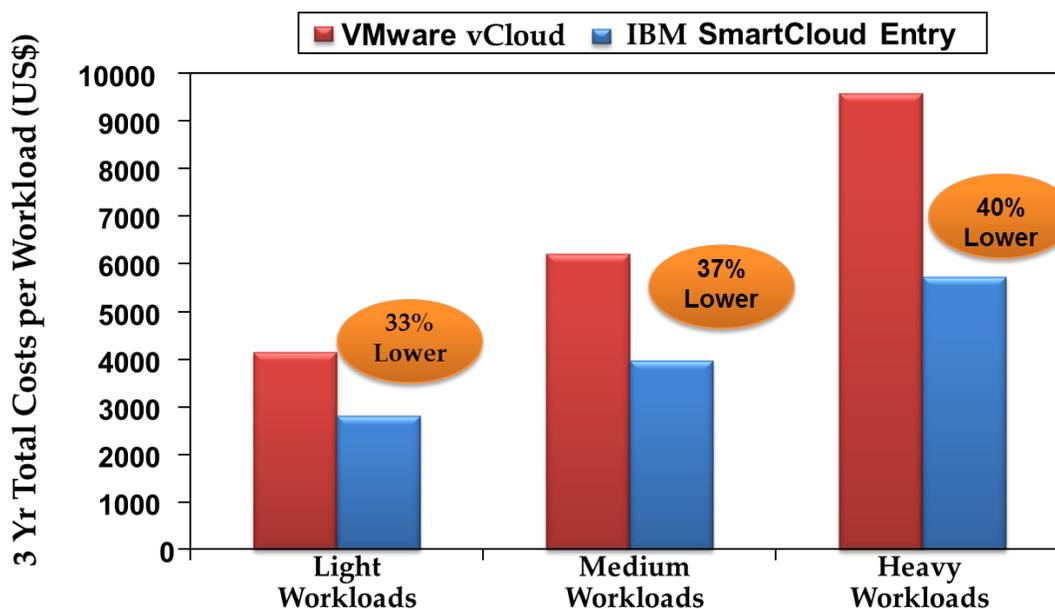


Figure 1: Three-Year Total Cost per Workload VMware vCloud on x86 vs. IBM SmartCloud

⁵ Costs include licensing and support for three years, based on U.S. suggested lists prices for both VMware and IBM solutions. VMware's solution includes vSphere Enterprise Plus 5.0, vCenter 5.0, vCloud Director 1.5 IBM's solution includes costs of PowerVM Enterprise Edition, Systems Director Standard Edition, VMControl Enterprise Edition, Storage Control, SmartCloud Entry

Based on the same series of benchmark testing, IBM Smart Cloud Entry software license costs per core were 27 percent less than for a comparable VMware private cloud configuration. At 1700 transactions per second, the total three-year private cloud software stack costs on IBM SmartCloud Entry vs. VMware vCloud Director on Intel were \$565,968 and \$771,207, respectively.

In the context of these benchmark tests, heavy, medium and light workloads are defined in relation to each other. In the testing reviewed here, per VM, the heavy workloads are driving about 1700 transactions per second, the medium workloads are driving about 1100 transactions per second and the light workloads are driving about 540 transactions per second.

Further, Table 2 highlights the efficiency of IBM Power Systems, compared to the x86 hardware platforms. The virtual machine and server density comparisons again underscore the cost effectiveness and performance of IBM SmartCloud Entry for Power Systems. For 60 heavy workloads, VMware vCloud Director requires 60 Intel 16-core servers compared to 12 IBM POWER7 32-core servers running IBM SmartCloud Entry.

| Workloads | Number of Servers | Hardware Platform | Private Cloud |
|---------------------|-------------------|--------------------|------------------------|
| 60 Heavy Workloads | 60 | Intel 16-Core | VMware vCloud Director |
| 60 Heavy Workloads | 12 | IBM POWER7 32-Core | IBM SmartCloud Entry |
| 60 Medium Workloads | 30 | Intel 16-Core | VMware vCloud Director |
| 60 Medium Workloads | 6 | IBM POWER7 32 Core | IBM SmartCloud Entry |
| 60 Light Workloads | 10 | Intel 16-Core | VMware vCloud Director |
| 60 Light Workloads | 2 | IBM POWER7 32-Core | IBM SmartCloud Entry |

Table 2: IBM and VMware Private Cloud Solutions Compared: VM and Server Density

Labor and deployment costs can be reduced when using IBM SmartCloud Entry for Power Systems vs. VMware vCloud Director. Deploying new servers, the management software and workloads typically requires complex time-consuming configuration and

installation processes.⁶ With IBM’s PowerVM, the total cost of labor, in hours, associated with server deployment can be reduced significantly by consolidating workloads on fewer larger servers. The ratio of servers required for comparable workloads for VMware makes it clear that the VM density available with PowerVM results in much greater efficiencies and software license savings. Benchmark tests show that labor costs with IBM SmartCloud Entry for Power Systems are considerably lower than VMware vCloud Director, by as much as 53 percent.⁷

This table shows a time comparison for deployment based on tests validated by Edison.

| Customer Labor Tasks | Labor Time | |
|---|---------------------------------|--|
| | VMware vCloud Director on Intel | IBM SmartCloud Entry for Power Systems |
| Create standard VM for workload and make available as template. | 00:10:36 | 00:10:36 |
| Submit request to deploy standardized workload. | 00:01:00 | 00:01:00 |
| Approval processing of request. | 00:05:00 | 00:00:00 |
| Total time | 00:16:36 | 00:11:36 |
| IBM reduces labor time by 30% | | |

Table 3: Software Deployment Comparison: IBM vs. VMware

Additional Cost Considerations

Benchmark tests of hardware and software demonstrate that investments in VMware vCloud Director are not as cost effective as generally believed. The VMware solution depends on using commodity x86 processors and continually adding these servers as workloads increase. Managing such large and ever growing clusters of x86 servers consumes IT administrators’ time and budget. With configuration of more than 60 x86 servers, IT departments face higher electrical power, heating, and cooling requirements, and organizations are more vulnerable to service interruptions, viruses and hacking.

⁶ Labor and deployment cost research and data produced by Alinean, Inc., a privately held independent firm that developed ValueIT, a set of IT budgeting tools for CIO.

⁷ Slide 18, Why IBM SmartCloud Entry on Power Is Better Than VMware vCloud Director IBM Competitive Project Office

Unlike IBM SmartCloud Entry, VMware vCloud Director does not provide a centralized console from which these server clusters can be managed and workload usage can be tracked. Organizations using the VMware private cloud solution must purchase additional software to effectively manage and track workloads and the status of their large server clusters. IBM offers a streamlined, scalable solution with SmartCloud Entry for Power Systems without requiring additional investments in other products. In short, IBM SmartCloud Entry for Power Systems offers a more cost effective, feature-rich private cloud solution.

IBM SmartCloud Entry for Power Systems Meets IT Needs

Today, IT is in a unique position to reinvent itself. In many organizations, IT is still viewed as a remote and often under-appreciated, underutilized cost center. Private cloud solutions and IBM SmartCloud Entry for Power Systems in particular, addresses these and many other longstanding pain points of IT administrators (see Table 4).

IBM SmartCloud Entry gives organizations a simple, scalable way of adopting private cloud without requiring a large upfront investment, helping eliminate many of the obstacles that have limited IT efficiency and organizations’ opportunities to use IT as a strategic and competitive resource. Key capabilities include a single pane of glass to manage and deploy workflows in real time, standard image libraries, self-service interface and metering, billing, and tracking.

| IT Pain Points | IBM SmartCloud Entry |
|--|---|
| Timely response to users requests for resources and services. | Simple and intuitive self-service interface. |
| Labor-intensive resource management and oversight. | Automated service request and approval workflows. |
| Limited workload density restricts system utilization. | Higher workload density increases utilization. |
| Virtual machine version control and sprawl. | Virtual image management, standardization and oversight. |
| Managing across organizational boundaries to deliver services. | Centralized administration for pools of systems storage and network across platforms. |

| IT Pain Points | IBM SmartCloud Entry |
|---|---|
| Redirecting cost of services provided back to the business. | Ability to closely track resource utilization with metering, billing, reporting features. |

Table 4: IBM SmartCloud Entry for Power Systems Eliminates IT Pain Points

A case study tells the same story as both the cited research supporting SmartCloud Entry for Power Systems, and the IT pain points in Table 4.

As a leader in the fiercely competitive financial services industry, a commercial bank based in China is perpetually looking for ways to differentiate itself from its rivals with a sharp focus on customer service. One of the bank’s main objectives is to introduce new products and services that quickly meet the ever-changing requirements of its customers. Prior to finding success with its current cloud-based solution, the bank invested countless weeks in developing new systems and processes to get such new products and services up and running. The bottleneck was its inflexible IT systems. To speed up development time and launch new products and services more quickly, the bank sought a computing environment that was flexible and simplified workload deployment without risking performance, efficiency, scalability or reliability.

The bank chose to build a highly virtualized environment on IBM POWER7 servers with PowerVM. IT administrators use IBM Systems Director Enterprise Edition to unify management of both physical and virtual infrastructures. To this strong virtual foundation, the bank added IBM SmartCloud Entry to accelerate service deployment. SmartCloud Entry on POWER7 with PowerVM has enabled the bank to meet its goal of responding quickly to the dynamic financial service requirements of its customers.

The bank is now able to build rapid prototypes to streamline deployment, allowing the organization to quickly develop and trial new products and services that both respond to and anticipate customer needs. At the same time, the bank has lowered operational costs, reduced hardware footprint and energy consumption, as well as costs for IT.

According to the bank’s spokesperson:

“We have greatly reduced the time and effort taken to deploy new workloads. In the past, it took us anywhere from two to four weeks to set up a new production server. Now, thanks to our IBM SmartCloud Entry solution, and IBM PowerVM virtualization technology, we can deploy virtual servers more than 99 percent faster.”

Conclusion

Private cloud solutions ensure that organizations can respond quickly to the increasing demands of the competitive global marketplace. With private cloud solutions, IT resources are freed up to proactively focus on innovative and strategic projects to better serve the needs of the company. Adoption of private cloud by midrange and large organizations is not a question of if, but when.

While private clouds offer core features and benefits, individual vendor solutions vary dramatically. Benchmark tests and feature comparisons discussed in this paper demonstrate key differences between entry-level private cloud solutions offered by IBM and VMware.

By many measures, IBM SmartCloud Entry for Power Systems best addresses the numerous ongoing needs and requirements of midrange and large organizations. Here are some of the key benefits and features:

- ROI Benchmarks, verified by Edison Group, demonstrate that labor costs with IBM SmartCloud Entry for Power Systems are as much as 58 percent lower than VMware vCloud Director.
- IBM SmartCloud Entry for Power Systems allows IT administrators to manage heterogeneous servers in multiple physical locations from a single console, or “pane of glass.”
- VMware’s vCloud Director customers must purchase, license, install and configure additional products—notably metering, billing, self-service, image management, and automated approval processing features, all of which come standard with IBM SmartCloud Entry for Power Systems.
- A case study on a Chinese bank backs up this paper’s cited research and analytics, bringing to life quantifiable advantages of SmartCloud Entry for Power Systems.

Resources

- IBM SmartCloud Entry for Power Systems site:
<http://www-03.ibm.com/systems/power/solutions/cloud/smartcloudentry/>
- Short video **showing** how it only takes 4 clicks to deploy a VM with SmartCloud entry:
<http://www.youtube.com/watch?v=B7uk2QA2-wE>
- Short video showing how IBM SmartCloud Entry for Power Systems works:
<http://www.youtube.com/watch?v=MNvfwlV9J3Q>
- Redbook Solution guide: Transform Your Virtualized Platform to the Cloud: A SmartCloud Entry Use Case Scenario:
<http://www.redbooks.ibm.com/abstracts/tips0955.html>
- InformationWeek Webcast Sponsored by IBM: Cloud Perception vs. Reality:
<https://www.techwebonlineevents.com/ars/eventregistration.do?mode=eventreg&F=1005538&K=6IK>