Lab Validation Report

VMware Cloud Management Solutions

Simplifying and Automating Cloud Management

By Mike Leone, ESG Lab Analyst

July 2013
Contents

Introduction ........................................................................................................................................... 3
Background ........................................................................................................................................... 3
VMware Cloud Management .................................................................................................................. 4

ESG Lab Validation ................................................................................................................................. 5
vCloud Automation Center .................................................................................................................... 5
vFabric Application Director ................................................................................................................. 8
vCenter Operations Management Suite ............................................................................................... 10
IT Business Management Suite ........................................................................................................... 15

ESG Lab Validation Highlights ............................................................................................................. 18
Issues to Consider .................................................................................................................................. 18
The Bigger Truth .................................................................................................................................... 19

ESG Lab Reports
The goal of ESG Lab reports is to educate IT professionals about data center technology products for companies of all types and sizes. ESG Lab reports are not meant to replace the evaluation process that should be conducted before making purchasing decisions, but rather to provide insight into these emerging technologies. Our objective is to go over some of the more valuable feature/functions of products, show how they can be used to solve real customer problems and identify any areas needing improvement. ESG Lab’s expert third-party perspective is based on our own hands-on testing as well as on interviews with customers who use these products in production environments. This ESG Lab report was sponsored by VMware.

All trademark names are property of their respective companies. Information contained in this publication has been obtained by sources The Enterprise Strategy Group (ESG) considers to be reliable but is not warranted by ESG. This publication may contain opinions of ESG, which are subject to change from time to time. This publication is copyrighted by The Enterprise Strategy Group, Inc. Any reproduction or redistribution of this publication, in whole or in part, whether in hard-copy format, electronically, or otherwise to persons not authorized to receive it, without the express consent of The Enterprise Strategy Group, Inc., is in violation of U.S. copyright law and will be subject to an action for civil damages and, if applicable, criminal prosecution. Should you have any questions, please contact ESG Client Relations at 508.482.0188.
Introduction

This ESG Lab Validation documents the results of hands-on testing of VMware’s Cloud Management solutions. The report focuses on key software components that simplify management and maximize operational efficiency by providing IT agility and business transparency.

Background

The acceleration of cloud computing initiatives, combined with the potential change in IT infrastructure consumption, is rapidly transitioning the IT conversation away from a technology focus to more of a business-oriented approach. Today, the discussion is more about operational efficiency and economics. While the initial success of server virtualization was tied to the reduction of capital expenditures and containment of IT resources, the next phase is poised to focus more on its operational benefits and less on the technical nuances of one solution over the other. Cloud computing is acting as the ideal catalyst to introducing this strategy to mainstream IT and changing the way businesses consume IT infrastructure.

Building a cloud infrastructure is not a simple task, whether that infrastructure will be a corporate private cloud or a hosted cloud service. Bringing compute, network, and storage components together can be as daunting as a do-it-yourself project, even with guidelines; engaging professional services to do the job is an option, but may be extremely expensive and time consuming, and may not deliver exactly what you want.

An integrated computing platform may be a good solution for building a cloud. Integrated platforms are created when multiple infrastructure components work together to provide greater value for the end-user. ESG research respondents indicated that they believe that simplified management, reduced time to deployment, and achievement of a better economic model through lower TCO were all benefits of integrated computing platforms, with those three benefits being the most popular answers provided (see Figure 1). ESG research further indicates that organizations that have already deployed integrated solutions are more likely to report benefits across the board than potential adopters are, further validating the value of integrated platforms.¹

Figure 1. Benefits of Integrated Computing Platforms

What benefits do you believe an integrated computing platform offers your organization? (Percent of respondents, N=471, multiple responses accepted)

- Ease of management: 44%
- Faster deployment time: 37%
- Improved total cost of ownership (TCO): 35%
- Less time and resources required for hardware and/or software integration: 33%
- Reduction in interoperability issues: 28%
- Improved application performance: 28%
- Improved service and support: 28%
- It is more straightforward to purchase from one vendor as opposed to several: 19%
- Less training required: 17%


VMware Cloud Management

Organizations require flexibility and choice in selecting a cloud management platform to manage public, private, and hybrid cloud environments. By leveraging the existing management capabilities of vSphere, such as built-in intelligence for high availability, fault tolerance, dynamic resource scheduling, and disaster recovery capabilities, VMware introduced its cloud management solutions, improving business continuity, availability, and overall manageability of diverse cloud infrastructures. These complementary solutions extend the benefits of virtualization with vSphere throughout the entire data center, from compute, storage, and networking, to the associated availability and security services. This is done by pooling the aggregate capacity of all the abstracted hardware resources and efficiently automating the distribution of these resources based on application requirements.

VMware Cloud Management solutions deliver comprehensive visibility and control through solutions that enable end-users to access quickly and easily provisioned services that have been prepared by IT for any cloud. The management of operations is streamlined and problem identification and remediation is accelerated to meet SLAs faster, reduce costs, and alleviate IT staff from manual, error-prone tasks.

A logical view of the VMware’s key software components appears in Figure 2. The VMware Cloud Management software components are depicted in dark blue. These software components were designed specifically for virtual and cloud environments to help with managing hybrid and heterogeneous clouds through tight integration with one another.

Figure 2. Logical View of VMware Cloud Management Solutions

![Figure 2. Logical View of VMware Cloud Management Solutions](image)

The VMware approach to managing hybrid and heterogeneous clouds can be addressed in three key areas:

- **Cloud service provisioning** (vCloud Automation Center and vFabric Application Director) – Automate the provisioning of infrastructure, applications, and desktops across multiple clouds and platforms.
- **Cloud operations management** (vCenter Operations Management) – Manage the health, risk, efficiency, and compliance of infrastructure and applications.
- **Cloud business management** (IT Business Management and vCenter Log Insight) – Govern and manage cloud services as critical elements of running IT as a business.

VMware Cloud Management solutions combined with VMware’s partner network extend the initial benefits of vSphere by offering a complete portfolio of intelligent and policy-driven IT solutions. By utilizing VMware’s management solutions, IT is now able to operate at the scale of the cloud and start acting as an IT services broker to the business.
ESG Lab Validation

ESG Lab performed hands-on evaluation and testing of VMware’s Cloud Management solutions at various remote VMware facilities. Testing was designed to demonstrate VMware’s new management capabilities and how they simplify and automate the way organizations manage IT. ESG Lab followed a common user process for deploying a cloud infrastructure, from the automated provisioning of hardware and software to the comprehensive management to understanding all the costs associated with everything related to the IT infrastructure.

vCloud Automation Center

vCloud Automation Center helps companies improve service delivery times by automating provisioning and management across multi-vendor deployment technologies, tools, and processes. vCloud Automation Center’s policy-based governance helps insure more efficient resource utilization by eliminating over-provisioning by cleaning up and reusing inactive resources. vCloud Automation Center helps companies accelerate the consumerization of IT by providing users with a self-service portal to request new services, automated delivery to assure access to these resources quickly, and policy-based governance, which is critical to allowing IT to maintain control over the infrastructure, ensuring each business will have timely access to the resources needed.

ESG Lab Testing

ESG Lab started testing by learning how to automate the provisioning and management of applications and services through vCloud Automation Center. ESG Lab followed the same process an organization would follow to build a VMware cloud infrastructure in one to two days with vCloud Automation Center. This process assumes all hardware, including server, storage, and networking resources, has already been deployed and the vCloud Automation Center prerequisite software has already been installed. It is important to note that the installation of the vCloud Automation Center software takes less than 15 minutes after that prerequisite software has already been installed.

After logging in to vCloud Automation Center as the Administrator, ESG Lab first configured the management endpoints. vCloud Automation Center discovered the underlying compute fabric through a device manager. To communicate with the device manager, EGS Lab defined a managed endpoint for each virtual, physical, and public cloud device manager (i.e., vSphere, vCloud, Amazon EC2). Once the endpoint was defined, vCloud Automation Center initiated an ongoing discovery to identify the available resources, existing virtual machines, and their associated policies. Next, ESG Lab created an enterprise group, which grouped the discovered resources with an administrator who could allocate those resources to eventual end-users. Now that the consumable infrastructure was defined, ESG Lab needed to create people that would consume those resources. This was done by creating a provisioning group, shown in Figure 3.

Figure 3. vCloud Automation Center – Creating an Provisioning Group
Three different roles were defined when creating the provisioning group: group manager, support, and user. The group manager role allows the designated group manager to create blueprints for their group. Blueprints define the policies that will control the provisioning and ongoing management of a vCloud Automation Center compute service from the initial request, provisioning, ongoing management, and decommissioning. The support role helps to ramp-up an organization through the initial adoption period by making requests on behalf of other users in the group, as well as control basic operations like powering systems on or off. Finally, the user role is the end-user who will be consuming the resources that have been allocated to her group.

The last step for ESG Lab was to tie together the consumable resources and the people who would be consuming those resources. This was done by creating a reservation policy, which mapped the resources to a group of users. The reservation policy defines what parameters will be allocated to the group, including CPU, memory, storage, and networks from a specific vendor. Once the resources were grouped together through the reservation policy, ESG Lab defined a way to deploy those resources through a global blueprint offered by VMware, out of the box.

Now that the resources were consumable and available to the end-users, ESG Lab transitioned into the IT end-user experience of vCloud Automation Center, which offered a separate web interface than that of the administrator or group manager. The dashboard is shown in Figure 4. The two areas ESG Lab focused on were My Machines and Blueprints.

*Figure 4. vCloud Automation Center – End-user Dashboard*

The My Machines section gave ESG Lab a list of all the machines currently owned. The list ranged from physical servers running various operating systems, to multi-virtual machine deployments running services. The underlying idea was that the location of the resources was irrelevant to ESG Lab as long as the resources were meeting the requirements to deliver the service and meet the SLA of the desired deployment. Through the My Machines interface, ESG Lab could manage multiple aspects of the system or service having been given the proper control by the group manager including: adjusting the configuration by editing, adding, or removing specific components; various power options; changing the lease time of the resources; and destroying the configuration to free up the resources for other deployment options.

The Blueprint section gave ESG Lab a list of all the deployment options made available by the group manager, similar to a personalized service catalog. The list of options provided a description of each deployment, the group the blueprint was available to, and the daily cost estimate of deploying that particular system or service. ESG Lab selected a blueprint and was presented with a popup that guided the deployment by asking basic configuration questions (number of virtual machines, CPU, memory, etc.), storage options, and a final cost summary.
Why This Matters

While server virtualization has reduced application deployment times, tools that automate the end-to-end, policy-driven provisioning of new applications and services are needed to respond even faster to the needs of a business. As organizations transition to a public, private, or hybrid cloud model, management complexity quickly rises as a growing number of organizations deploy applications and services within a multi-vendor infrastructure.

ESG Lab validated that vCloud Automation Center automated the provisioning of virtual, physical, and cloud deployments while comprehensively managing machine lifecycles from user request and administrative approval through decommissioning and resource reclamation. Through built-in customization and extensibility features, ESG Lab saw a highly flexible means for customizing machine configurations as needed and integrating machine provisioning and lifecycle management with other enterprise-critical systems. ESG Lab saw how the business-aware governance and control within vCloud Automation Center provided an ultimate gateway to the public, private, or hybrid cloud. Business units could apply their own ideas and ways of doing business without changing their major organizational policies or processes. This provided the flexibility for each and every business unit to utilize their own SLAs, policies, and automation processes based on their needs, making both IT and consumers happy.
vFabric Application Director

vFabric Application Director accelerates and automates the configuration and deployment of multi-tier applications by enabling application provisioning and management across cloud services. While vCloud Automation Center implements awareness from an application standpoint to the infrastructure, vFabric Application Director manages the applications themselves, from installation to updating irrespective of hardware environment. vFabric Application Director leverages vCloud Automation Center as a cloud abstraction layer and ties the system and application components together.

ESG Lab Testing

ESG Lab learned the process for building a cloud infrastructure from a hardware and resources standpoint through vCloud Automation Center. Next, ESG Lab used vFabric Application Director to understand the application side of automating the provisioning and deployment of desired services. ESG Lab logged into vFabric Application Director as the administrator and was immediately presented with a view showing a list of applications from the application catalog ranging from trading applications to shopping cart applications. ESG Lab looked at other views as well, including actively deployed applications and cloud providers available to deploy applications. The application catalog view is shown in Figure 5.

Figure 5. vFabric Application Director – Application Catalog

Next, ESG Lab created an application blueprint from an out-of-the-box template for a banking application. Using drag-and-drop functionality, ESG Lab selected logical templates to represent components needed to deploy the desired application. The deployment consisted of a load-balancing server, an application server, and a database server. The application server was made into a cluster by adding 2 additional servers for future scalability and high availability. Then ESG Lab added services to each of the servers. An Apache web server was added to the load balancer; a JBoss for linux was added to the application server; and a MySQL database was added to the database server. Now that the basic services had been set up, ESG Lab added the final components that the application required. A JAR file was added to the application server and a SQL script was added to the database server. Then linkages were made throughout the application. The load balancer was linked to the web application, and the web application was linked to the database. The finalized blueprint is shown in Figure 6.

Figure 6. vFabric Application Director – Creating a Blueprint
Next, ESG Lab created a deployment profile for the application blueprint. The process to create a deployment profile goes through four steps. First, ESG Lab configured everything related to the deployment environment, specifying the type of VM templates and network. Second, ESG Lab configured the application properties for all the resources in the application blueprint, ranging from number of vCPUs and memory to application administrator usernames and passwords. The third step focused on the execution plan. Based on the previously defined dependencies, the execution plan lays out the order with which the applications get kicked off. Once the VMs power on, get configured, and get network access, the system will begin the installation. The last step summarized everything and then ESG Lab deployed the application. Once deployed, ESG Lab followed the execution plan in real-time and watched as the application was configured and eventually fully deployed. The execution plan is shown in Figure 7.

![Figure 7. vFabric Application Director – Execution Plan](image)

**Why This Matters**

Many organizations find it difficult to adjust to changing business conditions, and a long application provisioning process is often a key inhibitor. Organizations want to launch a new application to gain a competitive edge, but when weeks go by waiting for the application to be deployed, the competitive advantage may dissipate. ESG research has found that among organizations that support or plan to support private cloud environments, faster provisioning and increased simplicity of implementation and management is consistently among the top prerequisites for doing so.

ESG Lab confirmed that vFabric Application Director made application provisioning fast and easy. Through an intuitive interface, ESG Lab was able to act as an administrator and create a blueprint from scratch. Then with total control over all installation dependencies, configuration details, and editable scripts, ESG Lab completed a full deployment while following the application’s execution plan flow chart in real-time. Overall, vFabric Application Director tied the development and operation together in one seamless step.
vCenter Operations Management Suite

At its core, vCenter Operations Management Suite allows IT administrators to get the most out of the resources that make up their infrastructure by bringing together industry-standard hardware and running everything as software-defined services through software-defined datacenters. Whether physical or virtual, regardless of hypervisor type, VMware’s fully-integrated management components help organizations with any type of deployment, including public, private, hybrid, heterogeneous, and multi-cloud infrastructures. Organizations create pools of servers, storage, and networking with ever-changing configurable security, availability, and management services to meet the needs of any and all applications.

vCenter Operations Manager serves as the foundation within the software suite by providing IT personnel with a single operations dashboard for monitoring an entire virtual infrastructure, performance analytics, and capacity optimization. These capabilities allow IT administrators to gain comprehensive visibility into each virtual object residing in the virtual infrastructure, proactively ensuring service levels, and managing capacity in dynamic virtual and cloud environments. Other key concepts include:

- **Operational intelligence** – Spot potential performance bottlenecks proactively and remediate before end-users notice. Automatically correlate and analyze monitoring data across infrastructure and application silos to gain a holistic view of root cause and effect.
- **Policy-based automation** – Leverage an integrated approach to operations management by maximizing agility, resource utilization, and efficiency through the automation of previously manual processes.
- **Unified Management** – Gain comprehensive visibility into the health, risk, and efficiency of a virtual IT infrastructure and applications. Manage thousands of virtual machines, physical servers, and applications across multiple data centers from a single console.

**ESG Lab Testing**

After creating the consumable infrastructure and deploying an application from a configured blueprint, ESG Lab turned to the comprehensive management side of VMware’s Cloud Management Solutions. ESG Lab tested vCenter Operations Manager functionality by highlighting daily operation, avoidance of future issues, and key areas for optimization. The management of a cloud infrastructure that has access to the vCenter system can be represented through three high-level badges: Health, Risk, and Efficiency. The number displayed in each badge represented a calculated average from various other statistics from sub-badges. The badges are shown in Figure 8.

**Figure 8. vCenter Operations Manager – Infrastructure Badges**

The Health badge displayed the areas of the infrastructure that needed immediate attention and is comprised of three sub-badges: workload performance, anomalies, and faults. The minor workload badge is comprised of CPU, Memory, Disk I/O, and Network I/O. The minor anomaly badge is comprised of detecting abnormalities from typical normal operations.
The Risk badge allowed users to view system-wide trends in order to surface any changes to the environment from past to present. If all risks were mitigated, IT administrators could avoid future health issues in their virtual infrastructure. The Risk sub-badges include: time remaining or the number of days before resources are consumed; capacity remaining or the remaining VMs as a percentage of the total VM capacity; and stress, which shows a historic representation of workloads.

The Efficiency badge is made up of two sub-badges: reclaimable waste and density. Reclaimable waste is the percentage of total capacity that can be reclaimed while the density compares the ideal consolidation ratio to the actual consolidation ratio or the Host-to-VM ratio. If all efficiencies are improved upon, this can allow users to reduce infrastructure costs through greater resource efficiency.

After noticing an anomaly with the allocated memory of a virtual machine within one of the cloud deployments, ESG Lab dug deeper into the Health sub-badge. As shown in Figure 9, ESG Lab navigated to the memory metric chart of the troubled virtual machine.

![Figure 9. vCenter Operations Manager – Memory Anomaly Diagnosis](image)

The memory metric chart displayed the historical memory utilization of the selected host. The blue line represented the measured value of memory at a given point in time and the gray area represented the dynamic threshold based on historical memory measurements. ESG Lab quickly noticed a yellow highlighted area above the dynamic threshold, which identified the anomaly.

Next, ESG Lab wanted to understand how vCenter Operations Management Suite addressed the complexities of managing a hybrid cloud. This required a separate user interface due to the fact that IT administrators do not always have access to vCenter systems in public cloud environments like AWS or BLUELOCK. Though vCenter systems are unavailable to IT administrators, much of the same private cloud management functionality can be extended to the management of hybrid clouds. ESG Lab was presented with a different dashboard through a separate user interface that displayed important information about the managed resources (physical or virtual) within the hybrid cloud infrastructure. The dashboard is shown in Figure 10. Through the Overview tab, ESG Lab was able to view the overall health of the cloud, which contained multiple smaller cloud deployments, as well as the health of the deployed applications within each of the clouds.
The vCenter Operations Management Suite included many more components that ESG Lab took the time to learn about including:

- **Application Discovery** – Automated the discovery, cataloging, and visualization of application dependencies while monitoring performance. ESG Lab easily saw what applications, databases, and web servers ran on the physical and virtual infrastructure to help provide disaster recovery protection, backup, security, and compliance for all infrastructure components.

- **Infrastructure Change Management** – Enabled a faster rate of virtual infrastructure change to help respond faster to the business needs. This can be managed carefully through vCenter Operations to gain insight and visibility into the configuration changes. By looking at application dependencies ESG Lab could assess the impact of potential and proposed changes before committing to them.

- **Operational Compliance** – Enabled the proactive enforcement of configuration standards, early detection of configuration drift, and automatic remediation against IT policy violations all while hardening infrastructure security and regulatory compliance. With the automated reporting, critical infrastructure areas were pinpointed with tight integration into the operations dashboard.

Next, ESG Lab looked at the new VMware vCenter Log Insight, which provides automated log management using log aggregation, analytics, and search to provide operational intelligence and enterprise-wide visibility to help organizations increase efficiency, security, and compliance in dynamic, hybrid cloud environments. VMware vCenter Log Insight integrates with VMware vCenter Operations Management Suite to bring unstructured and structured data together for an efficient end-to-end management solution. When used together, Log files and measured metrics can help organizations ensure SLAs as well as optimize efficiency and cost of IT operations, while fulfilling policy, security, and regulatory requirements.

ESG Lab used vCenter Log Insight and walked through a customer use case where storage performance deteriorated and I/O latency significantly increased. After opening vCenter Log Insight, ESG Lab navigated to the Interactive Analytics interface, as shown in Figure 11. This screen displayed a visual representation of the log messages, as well as the log messages themselves. To best understand the customer’s situation, ESG Lab adjusted the time range to the latest seven days of data, as well as customized a search query to return only log messages that were associated with SCSI performance deterioration. By highlighting sections of a log message, ESG Lab could
further narrow down where the problems were occurring by extracting different fields from the logs, including specific terms like “latency increased” or specific names of objects within the infrastructure, like a server name.

**Figure 11. vCenter Log Insight – Interactive Analytics**

As filters were used to present the most relevant information, ESG Lab added and saved different collections of events and search queries to a dashboard. The dashboard was used to continuously monitor saved search queries. By default, VMware provides a vSphere content pack for vCenter Log Insight that includes a collection of common search queries.

After specifying an object to focus on and creating an alert through vCenter Log Insight, ESG Lab transitioned back to vCenter Operations Manager to better understand how the two tools integrate with each other. ESG Lab navigated to the server object and was given the new ability to show notification events based on the alert created in vCenter Log Insight. These events are shown in Figure 12. vCenter Log Insight was able to push all the necessary information to vCenter Operations Manager where the alerts were continuously monitored going forward. This feature is important because now administrators don’t need to leave the vCenter Operations Manager interface to determine the cause of various issues.

**Figure 12. vCenter Log Insight Integration with vCenter Operations Manager**
Why This Matters

A growing number of organizations are moving towards an internal private cloud service where virtualization is the core component. In fact, recent ESG Research shows that 76% of respondents without an existing private cloud solution plan to deploy or are interested in deploying a private cloud infrastructure. It’s no surprise that this will lead to a complex environment from an administration and operations standpoint.

ESG Lab validated that vCenter Operations Manager was designed to simplify monitoring, improve efficiency, optimize performance, and maintain overall infrastructure health in highly dynamic virtualization & cloud infrastructure. Through the intuitive interface, ESG Lab easily monitored all of the objects within an IT infrastructure and quickly detected and fixed a performance anomaly. With vCenter Log Insight’s tight integration into vCenter Operations Management Suite, VMware’s industry leading tools synchronously worked together to deliver an efficient and effective way to simply manage a hybrid cloud deployment. Also, by using vCenter Log Insight, ESG Lab was easily able to search through log files to detect a storage performance issue using common search query terms. Setting up alerts to continue to monitor future performance deterioration was also quite simple. ESG Lab was most impressed with the potential reduction of OPEX and CAPEX costs while ensuring SLAs are met through the highly automated management modules.

---

2 Source: ESG Research Brief, Private Cloud Usage Trends, August 2012.
IT Business Management Suite

IT Business Management Suite manages the cost, budget, charges, service levels, and vendors within an IT infrastructure to give organizations the visibility and control needed to run IT as a business. This is all done by providing the fundamental understanding of the actual numbers that drive the business to the people that matter. Different graphical views show historic, planned, and predicted costs with key observations about optimizing existing IT deployments or choosing different technology options such as cloud computing. Organizations can optimize IT delivery, as well as predict and influence IT cost through business visibility of individual bills of IT. Figure 13 shows a dashboard view of the IT Business Management Suite 7.5.

Figure 13. IT Business Management 7.5 Suite Dashboard

ESG Lab Testing

After learning the process of building out and managing cloud deployments, ESG Lab turned to the business side of IT. This last phase of testing focused on the cost transparency offered by IT Business Management Suite and how the tool can help organizations justify the addition of new IT services. ESG Lab tested IT Business Management Suite 7.5 with a goal of understanding all of the services the software products offered to help organizations establish business needs and requirements while helping to evaluate service costs and risks. The first module, “Costing,” focused on cost transparency through cost business models to show organizations their IT expenses. This allows organizations to use prebuilt or customized cost models designed for how they want to allocate all of their IT costs. ESG Lab used a prebuilt, out-of-the-box cost model provided by VMware to understand the breadth and depth offered by the software. A view of the cost model is shown in Figure 14.

Figure 14. IT Business Management Suite – Cost Model
By following the cost model from left to right, ESG Lab saw how costs were allocated from a general ledger and accounting system level all the way to individual business units consuming specific resources within a larger organization. Costs were first separated into different cost elements, including hardware, labor, software, telecom, facilities, and other components. Then those elements were grouped into logical services hosted in various data centers and ultimately presented as a business service. This showed ESG Lab which business unit was consuming what portion of allocated services and the direct cost associated with that consumption.

IT Business Management Suite also highlighted areas for cost optimization by providing detailed analysis that correlated different types of resources (i.e. storage), cost profiles, and utilization ratios. This went as far as suggesting savings that could be made by moving to different technologies to help reconcile actual costs.

Next, ESG Lab moved to the CIO dashboard through the “Cost Analysis” module to get a clearer picture of everything in the cost model through easy-to-follow charts and graphs. The CIO dashboard showed how all of the costs were allocated, how they compared to the budgets, and how they broke down by service and by business unit. All of this information was displayed through various customizable widgets, some of which are shown in Figure 15.

The “Observations” widget was particularly interesting to ESG Lab. This widget can be used to identify anomalies in an existing financial management model. ESG Lab used a default rule for virtual servers that would send an alert when the actual cost of virtual servers exceeded the yearly budget cost (shown in the upper right of Figure 13).

ESG Lab continued through the rest of the IT Business Management Suite modules including:

- **Showback** – Provided a report that showed the line of business, the department, and cost of IT services. In other words, this module showed a bill of IT for each department and what they’re consuming in terms of IT resources. This is commonly used to help identify business units that are over consuming allocated resources.
- **Benchmarking** – Gave the IT consumer or provider an understanding for how they compare to the rest of the world. This module helped identify where an organization’s IT services costs were compared to industry peers and provided insight into what providers were doing better or worse.
- Planning – Flipped the cost model and worked backwards from the business unit to the general ledger. This module took a business unit’s demand for various IT services based on things like downsizing or increased employee count and modeled the cost for how this business unit would need to be funded for the upcoming year.
- Service Level Management (SLM) – Used to set up and manage service level agreements (SLAs) and service level objectives (SLOs). This module extracted data from services like help desk or ticketing systems and paired them to their SLOs. Generated reports showed whether those services were in or out of compliance. This module was also used for vendor governance to set up SLAs and SLOs with external vendors to help measure effectiveness and responsiveness. Generated reports showed whether a vendor is overpriced or not responding in a timely fashion.

**Why This Matters**

Demonstrating the value of IT is a key part of running IT as a business. Financial transparency efforts are necessary to offer a clear picture of true IT costs and the corresponding business-unit IT spending based on actual consumption. This information can make both the business unit and IT more prudent and less likely to over allocate resources, and will more closely align technology consumption with demand as a result.

What parts of IT should move to the cloud? What parts should be moved back? What costs are associated with the move? How much money is being wasted because of forgotten resources being utilized in the cloud? IT Business Management Suite answers all of these questions and more. ESG Lab validated that VMware’s IT Business Management Suite provided the cost visibility, cost transparency, cost analysis, cost optimization, and showback needed to understand an organization’s bill of IT. IT Business Management Suite clearly showed what services were deployed, which business units were consuming which portion of those services, and how to allocate the costs associated with that consumption. ESG Lab saw how IT Business Management Suite also provided visibility to the resources that fall outside of the internal IT infrastructure. By seeing the costs associated with resources and services in the cloud, informed decisions can be made to optimize those costs by identifying areas that should be moved to and from the cloud.
**ESG Lab Validation Highlights**

- With vCloud Automation Center, ESG Lab easily deployed and provisioned cloud services across a vendor-agnostic cloud. Hardware resources and configurations were automatically detected, grouped together, and made consumable to IT end-users. The IT end-users had a separate, easy-to-follow interface to manage their currently deployed services, as well as to deploy new services through blueprints or decommission existing services through user requests.

- vFabric Application Director streamlined and improved application provisioning, optimization, and monitoring. ESG Lab created an application blueprint through a drag-and-drop interface that included logical templates, services, and application components. Then using guided instructions, ESG Lab deployed the application and followed an execution plan flow chart as the application was started, installed, configured, and eventually prepared for use.

- ESG Lab used vCenter Operations Management Suite to automate the management of a hybrid cloud infrastructure and deliver quality of service, operational efficiency, and continuous compliance for the deployed business-critical applications and services.

- vCenter Log Insight enhanced the management experience of a hybrid cloud deployment by integrating with vCenter Operations Management Suite and provided varying levels of insight through an intuitive interface. ESG Lab easily searched through millions of log files to pinpoint a storage performance issue that caused increased I/O latency.

- IT Business Management Suite provided the transparency and control over the costs, services, and quality needed for an organization to run IT like a business. ESG Lab saw all the costs associated with every deployed service within an organization, the business units that were consuming those services, and how the services should be allocated to meet the consumption needs of the business units.

**Issues to Consider**

- ESG Lab evaluated four critical components of the VMware Cloud Management Solutions stack. An area that was not evaluated was VMware Professional Services. This component includes VMware Accelerate Advisory Services, Cloud Operations Services, Technology Consulting Services, Technical Account Manager Services, and Education Services and Certification Programs, all of which help VMware to collaborate with teams to address the technical, people, process, and financial considerations for IT acceleration within any organization.

- Though vCloud Automation Center, vFabric Application Director, vCenter Operations Management Suite, and IT Business Management Suite are integrated together, they are still four separate pieces of software with four different install bases. In the future, ESG Lab expects these software components to merge into fewer software components, making installation and management significantly easier for IT administrators deploying the complete VMware Cloud Management Solution.
The Bigger Truth

As organizations continue to consolidate data centers, drive increased use of virtualization and cloud technologies, and deal with overwhelming amounts of data, it will be critical to have solutions in place to effectively manage these environments. This will be especially true for those environments that leverage a combination of private and public cloud infrastructures.

Cloud computing is clearly on the rise. In recent ESG research, 60% of respondents indicated that they planned to increase spending on cloud computing this year. However, while the benefits of agility, better resource utilization, and cost savings are significant, deploying a cloud remains a daunting task. Many customers have suffered through large consulting projects trying to deploy their clouds; these are complex, time consuming, expensive, and may not deliver what you want in the end. In addition, the lines between infrastructure domains (and accompanying IT activities) are blurring as virtualization and cloud computing expand; separate silos of servers, storage, and networking won’t effectively support these technologies and service delivery models for long.

VMware Cloud Management Solutions simplify management, maximize operational efficiency, and increase the business agility of IT infrastructures by helping organizations understand the benefits of the cloud. By delivering comprehensive visibility and control, organizations can now access and provision services in a public, private, or hybrid cloud by taking their existing resources and easily turning them into cloud infrastructure, while merging and automating component administrative and management tasks.

ESG Lab validated that VMware Cloud Management Solutions made it simple to create and deploy a cloud infrastructure in just a couple of days. Using vCloud Automation Center, ESG Lab leveraged existing resources and automated the governance, sourcing, and provisioning of the infrastructure. By leveraging vCloud Automation Center as a cloud abstraction layer, vFabric Application Director helped to automate the provisioning and management of various applications across the cloud, while tying together the automated resource provisioning from vCloud Automation Center. Next, vCenter Operations Management Suite offered the operational intelligence, policy-based automation, and unified management necessary to overcome common complexities that normally follow along with cloud deployments. With the addition of the tightly integrated vCenter Log Insight, ESG Lab was able to increase the time-to-value through an easy-to-use interface that helped lower OPEX costs, while increasing operational efficiency. Finally, ESG Lab used IT Business Management Suite and its cost transparency, cost visibility, and cost analysis capabilities to help justify new hardware and service deployments for particular business units. If your organization is looking to leverage the benefits of a complete cloud platform with integrated software solutions that deliver policy-driven, automated provisioning, and management of service offerings, ESG Lab recommends that you start with Cloud Management Solutions from VMware.

---
