



NetApp®



Technical Case Study

# Symantec Granite Labs: IT as a Catalyst for Change

How Symantec Built One of the World's Largest Virtual  
Private Clouds to Improve Business Agility

By Jason Puig, Senior Manager, GSL Cloud  
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As the global leader in information protection, Symantec protects more data than any other company on the planet and maintains the largest civilian security threat analysis database in the world. Customers deploy Symantec™ solutions as the bedrock of their organizations, and they expect Symantec to support and enhance the world's leading technology implementations. To meet these expectations, Symantec has traditionally maintained hundreds of lab environments dedicated to customer support, product development, and education services, hosted at 25 locations around the world.

In the past, these labs existed in silos that were built and maintained by separate product groups. As Symantec grew, this approach was no longer effective or efficient. Traditional methods to duplicate customer environments for technical support, troubleshooting, or education were difficult and time-consuming, which hindered our ability to deliver the service levels and response times that our business requires. At the same time, we received a directive from our CEO to reduce our global data center footprint. However, we had to accomplish this while streamlining product support and undertaking R&D capacity improvement initiatives.

Our Alliance Partner



## **Business Benefits of Symantec Granite Labs**

By deploying a highly scalable and virtual private cloud on the FlexPod® platform as the basis of its Granite Labs initiative, Symantec significantly reduced time to market on product development and was able to:

- Save tens of millions of dollars over three years through more efficient use of resources for lab environments
- Reduce the time required to deploy test lab environments from 2 weeks to 15 minutes
- Enable better collaboration among engineering and QA teams, making them more effective
- Improve customer satisfaction and speed time to resolution
- Consolidate 14 lab hosting facilities in the United States down to 2
- Eliminate more than 37,000 weeks of effort that previously would have been spent on manually provisioning lab environments
- Reclaim 70% of engineering time to invest in customer satisfaction activities rather than infrastructure support
- Expand private clouds into new geographies by using dense, scalable building blocks

As we considered our options, we recognized that the scale, speed, and challenges that we had to meet also applied to many of our global enterprise customers. We saw an opportunity to build a best-practice virtual private cloud on a converged infrastructure that would prove the validity of our “Agile Data Center” customer initiative—combining elastic infrastructures, trusted clouds, and IT intelligence to deliver the right resources in the right way to the right users—through our own internal IT practice.

The result is Symantec Granite Labs, an internal “lighthouse project” that has saved Symantec tens of millions of dollars and has grown to become one of the world’s largest private clouds. At Symantec, we use the term “lighthouse” to describe projects that we build for customers that illuminate best practices for emerging technologies. Granite Labs has become an internal lighthouse for large-scale private cloud deployments.

This paper explains how we used our own technology along with solutions from NetApp, Cisco, and VMware to build a foundation for private and hybrid cloud services that has forever changed how we deploy infrastructure—and the impressive results that we have achieved thus far represent only the beginning.

### **Improving Business Agility with Cloud-Based Labs**

For some time, internal customers of Global Symantec Labs (GSL) had been asking for greater agility in deploying lab environments. Each new lab took approximately two weeks to create, and an overwhelming majority of GSL staff time was spent deploying and supporting lab infrastructure, rather than on customer service and support tasks. Many similar or even identical lab environments were created to support multiple teams and technical support engineers working on different projects for the same Symantec products. Because labs could not be efficiently reused, they often had to be redeployed all over again on different hardware when new projects or support issues arose, resulting in time delays and redundant work.

To address our challenges around lab deployment and reuse, accelerating testing cycles, and speeding time to resolution to improve customer satisfaction, we built the Granite Labs private cloud. We based the solution on a model that embraces next-generation data center software and architecture, which combines elastic infrastructure with the adoption of an as-a-service model to improve operational and IT resource efficiency. By allowing end users to deploy virtual labs quickly with a few clicks and contribute lab templates for others to reuse, we saw the potential to dramatically improve business agility.

It’s important to note that in the beginning, our efforts at GSL could have been viewed as “shadow IT,” but executive management trusted our ability to innovate. With Granite Labs, we proved that we could use new solutions to solve old problems and improve workflow for thousands of Symantec employees. In the end, our efforts sparked a company-wide IT transformation, allowing Symantec to run any of its x86-based products in a private cloud environment. This enables better support for Symantec products such as Storage Foundation High Availability for Linux® and Microsoft® Windows®, NetBackup™, Backup Exec™ software, Enterprise Vault™, and security products such as Data Loss Prevention and Data Center Security.

### **Requirements for Private Cloud Storage Layer**

Granite Labs is one of the world’s largest software-defined data centers (SDDCs), and software-defined storage is a critical component of the SDDC model. Unlike traditional data center deployments, we need to scale Network File System (NFS) volumes on demand to accommodate any needs that our engineers, developers, and QA teams might have. The use of NFS was a requirement because of the manageability and flexibility benefits that it offers in a VMware® vSphere® environment.



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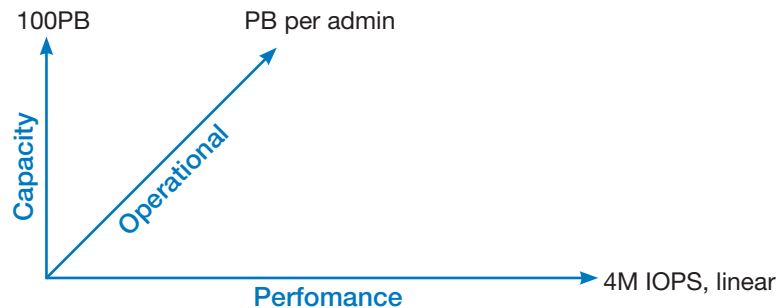
Jason Puig, senior manager of cloud services at Symantec, is responsible for the delivery of one of the world's largest enterprise private clouds and was instrumental in uniting Symantec's global contact centers through the delivery of a unified global interaction management platform.

In his 18 years in enterprise software, Mr. Puig has focused on bringing value to organizations through large scale global systems in a broad range of areas including knowledge management, interaction management, telecommunications, CTI, software distribution, inventory management, virtualization, and cloud infrastructure.

He holds a Bachelor of Science degree in Business Administration from the University of Central Florida.

Standardizing on the right storage platform for Granite Labs was critical to providing a highly available, scalable foundation for cloud services. We also sought a stable and innovative partner that we could turn to for advice as we built out our private cloud. Ultimately, we chose NetApp and Cisco in the form of a FlexPod converged infrastructure platform for technology, guidance, and support to design and develop our Granite Labs storage infrastructure, for the following reasons:

- **Leadership.** We wanted a mature storage solution to support VMware over NFS, and NetApp has a proven track record in software-defined storage for large private cloud deployments.
- **Partner network.** NetApp maintains partnerships with other industry leaders, which helps us achieve better integration and support across our cloud stack. The FlexPod Datacenter platform we're using is validated by NetApp and Cisco and is designed to work seamlessly with VMware products. So, we have a pretested converged computing, networking, and storage solution on which to base our private cloud.
- **Seamless scalability with nondisruptive operations.** Our Granite Labs architecture required the ability to cluster network-attached storage controllers in an NFS environment; FlexPod, built with the NetApp® clustered Data ONTAP® storage operating system, allows us to scale storage for our private cloud for capacity or performance, without interrupting users (see Figure 1). An easily scalable storage solution is critical, because if we hit growth limits or sacrifice availability to scale, users would create their own siloed solutions.
- **Performance.** NetApp provides robust storage I/O performance in a private cloud environment by offering the ability to attach PCIe flash cards to storage controllers, hardware-accelerated cloning of virtual machines (VMs), and superior integration with VMware vSphere.
- **Efficiency.** NetApp NFS volumes are thin-provisioned by default, reducing the initial storage space consumption. Deduplication and thin cloning technologies enable us to cost-effectively deploy storage for many similar lab environments.



**Figure 1) Benefits of seamless scalability.** Symantec Granite Labs can address data growth by scaling in three dimensions.

**Symantec Granite Labs at a Glance**

- **Registered users:** 7,000+
- **Active users:** 3,000+
- **Active labs:** 9,000+
- **Labs deployed to date:** 156,000+
- **Lab templates available:** 1,400+
- **VMs provisioned to date:** 680,000+
- **Current storage capacity:** 9PB

**How We Built an Agile Data Center with NetApp, Cisco, VMware, and Symantec Technologies**

For our Granite Labs project, we decided to build a highly virtualized, scalable private cloud on a FlexPod environment, which includes Cisco® Unified Computing System™ (Cisco UCS®) B200 blade servers, Cisco UCS Manager software, Cisco Nexus® 9000 Series switches, and NetApp FAS6280 and FAS6290 storage systems. Operating in Cisco NX-OS Software mode or in Application Centric Infrastructure (Cisco ACI™) mode, the Nexus 9000 Series switches are ideal for traditional or fully automated data center deployments. VMware vCloud Suite® Advanced provides compute virtualization, management, and automation capabilities. To secure physical and virtual servers, we use Symantec security solutions, and for recoverability, we back up our cloud by using NetBackup.

Instead of a collection of “pods” that are loosely patched together, our FlexPod environment acts as one seamless system on a single VMware vCloud instance and uses the NFS protocol, giving us the flexibility to meet changing requirements. FlexPod allows us to scale our private cloud as needed by using dense, easily deployed building blocks.

NetApp and Cisco have demonstrated a shared commitment to the FlexPod platform, and their common vision of a unified data center is aligned with Symantec’s goal of maximizing business agility with Agile Data Centers. One example of this commitment is FlexPod integration with Cisco ACI, an innovative technology that simplifies, optimizes, and accelerates the application deployment lifecycle in next-generation data centers and clouds.

Cisco and NetApp are currently integrating Cisco ACI and Application Policy Infrastructure Controller (APIC) for Granite Labs’ FlexPod deployment to provide network programmability and application infrastructure automation. When coupled with Cisco ACI network policies, NetApp clustered Data ONTAP provides rapid application provisioning, reducing the time required to deploy applications while meeting application-specific service levels. This integration will make our business and IT groups even more agile and will further reduce operational costs and complexity.

Our entire Granite Labs environment is protected with Symantec NetBackup appliances, which combine a backup media server with deduplication to increase data protection efficiency. The latest-generation appliance, the NetBackup 5330, runs NetBackup 7.6 and uses rebranded NetApp E-Series storage arrays.

Since we launched Granite Labs on FlexPod in early 2012, the private cloud has dramatically accelerated Symantec’s ability to provide faster, better, and more flexible service to our internal and external customers. It has also become a convenient and cost-effective test bed for developing improved capabilities in our product offerings. Users quickly recognized the benefits and embraced Granite Labs, with the number of active users growing to nearly 3,000 by mid-2014 (see Figure 2).



**Figure 2) Growth in usage of Symantec Granite Labs.** Demand for cloud-based virtual lab environments has doubled year over year.

### Storage Efficiencies Behind Symantec Granite Labs

NetApp technologies play a major role in the performance, efficiency, and reliability of Symantec Granite Labs, helping us achieve the promise of an Agile Data Center. Beyond the technology, NetApp has taken an active role in partnering with Symantec to help us be successful and drive IT transformation.

### Maintaining 24/7/365 Cloud Availability

Our NetApp storage systems run the clustered Data ONTAP storage operating system, which is an enabling technology for cloud service providers. With clustered Data ONTAP, we can provide continuous data access during maintenance and perform dynamic load balancing without requiring disruptive data migrations.

To support our zero-downtime objective for Granite Labs storage, we deployed a 12-node NetApp storage cluster and a separate 4-node NetApp cluster with Cisco ACI, which we plan to scale out as demand for services increases. A Cisco APIC cluster provides a single point of control, a centralized API framework, and a central application policy repository for Cisco ACI and the whole data center.

We can scale up either NetApp storage cluster to 69PB of capacity and scale out to 24 controller nodes without taking storage offline, allowing us to accommodate unforeseen growth while providing 24/7/365 availability for cloud services. Thus, we are enabling our users to collaborate and benefit from each other's work without any concern that we will run out of capacity in our private cloud.

When deploying new controller nodes into our storage clusters, our NetApp resident engineers use NetApp OnCommand® Workflow Automation software to automate setup and enforce consistency. All configurations and performance enhancements from previous controller deployments are seamlessly incorporated into the workflow, saving time and reducing risk.

As we expand our private cloud, clustered Data ONTAP will allow us to be more flexible in how we perform maintenance and plan our future strategies for storage. To put this in perspective, we have a 7,000-user environment with 18,000 VMs running at any given time, and we have already made significant changes to our core switching and storage infrastructure with zero downtime—none of our end users were affected.

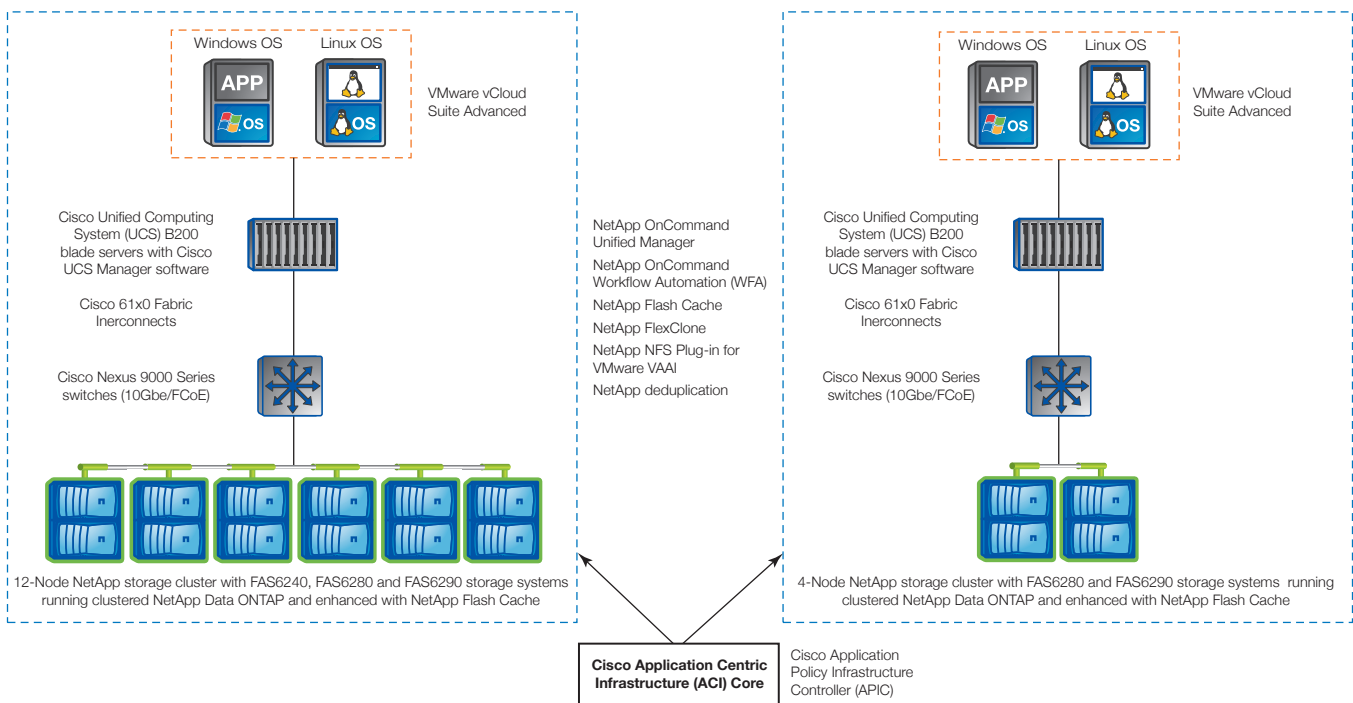


Figure 3) Symantec Granite Labs Private Cloud FlexPod Infrastructure.

### **Maximizing Performance with Intelligent Tools**

The technology and guidance that NetApp provided were invaluable in helping us analyze our workflows and deploy the right solutions to enhance performance and achieve the best possible working environment for our end users. For example, Granite Labs users deploy lab environments from VM templates of Windows or Linux machines, which is a read-heavy storage operation. To accelerate storage I/O performance without adding more spindles, we use flash storage on controller-attached PCIe cards. This helps us minimize our storage footprint and keep our costs down.

To further improve performance, NetApp recommended hardware-accelerated cloning of VMs through integration of NetApp FlexClone® software with VMware, using the NetApp NFS Plug-in for VMware vSphere Storage APIs – Array Integration (VAAI). By off-loading the VM cloning process to the NetApp storage controllers, we can rapidly produce clones and use those clones in production over a long period of time without any performance degradation (unlike traditional linked clones).

### **Peace of Mind with NetApp Resident Engineers**

From the very beginning of Granite Labs, Symantec decided to partner with NetApp for storage deployment and management. We want to concentrate on being a service provider and on delivering value to our users, so we let the NetApp engineers handle the details for us. It's wonderful—we don't worry about the storage, and support issues and escalations are handled smoothly. NetApp has become a trusted partner, and we respect the NetApp team and their advice.

To identify storage infrastructure issues quickly, our resident engineers rely on the NetApp AutoSupport™ diagnostic tool, which sends alerts about disk failures or other potential problems, enabling fast resolution.

### **Improving Operational and Management Efficiency**

Another essential technology behind Granite Labs is deduplication, which we use to eliminate redundant data on our primary storage and backup media. Deduplication has reduced our storage capacity requirements by 70%. NetApp FlexClone is deduplication-aware, giving us maximum efficiency on the storage controllers.

To view performance metrics and utilization statistics at a glance, we use NetApp OnCommand Unified Manager management software. We are currently implementing NetApp OnCommand Insight to gain more visibility into data capacity management, as well as cost reporting for showback and chargeback.

### **Business Impact: Faster Time to Market, Better Support**

For Symantec, the impact of Granite Labs was immediate and profound. Granite Labs has helped us consolidate our U.S.-based lab hosting facilities from 14 down to 2, reducing the number of data centers that host our global enterprise support services from 25 to 13.

Users can provision lab environments in minutes, selecting from a library of virtual machine templates. This capability has freed up 70% of GSL staff time for customer service instead of infrastructure support, improving customer satisfaction and time to resolution. By keeping our engineers and QA teams focused on Symantec products instead of building test environments, we're accelerating time to market and improving quality assurance and support for our diverse product portfolio.

To date, Granite Labs has saved Symantec tens of millions of dollars in resources and has eliminated more than 37,000 weeks of effort—more than 700 years of valuable engineering time—and that is only the beginning. The Granite Labs private cloud architecture is now being replicated throughout the company, allowing Symantec to deploy hardened production environments in weeks instead of months.

This transformation in IT is enabling the business to take advantage of new growth opportunities at an accelerated pace. Granite Labs has truly been a catalyst for change at Symantec, helping us derive maximum business benefit from cloud infrastructures. Our customers have noticed, too, and are looking to Symantec as a model for how to design and build the next generations of their private clouds. It's very gratifying when a large enterprise customer flies hundreds of its IT employees to our facility to learn best practices from our 29-person GSL team.

We recognize that IT needs to be an innovative adopter of new technologies, such as FlexPod, that accelerate time to market and drive greater market demand for Symantec products. Therefore, many of our team members have been promoted into new roles, embedding the Granite Labs "DNA" deep within Symantec IT.



## What's Next

We are excited that Cisco and NetApp plan to incorporate the Cisco Intercloud Fabric into the FlexPod roadmap. By delivering uniform control across workload locations, FlexPod will enable us to use the power of public cloud computing in our private or hybrid cloud deployments. We are building a new data center with the ultradense FlexPod architecture and are condensing 80% to 90% of the workloads that used to require 40,000 square feet of space into just six rows. When we presented the impact of this data center transformation to executive management, we received a one-word response: "Seriously?"

In the coming years, we plan to deploy additional FlexPod units and expand the Granite Labs private cloud into new geographies for additional redundancy and disaster recovery benefits. We're looking forward to the enhanced integration with NetApp Snapshot® copies in NetBackup Replication Director, which we will use to efficiently replicate our Granite Labs environment to additional DR locations around the world.

Granite Labs is now recognized across the company as a proven model for reducing data center footprint and management requirements while improving business agility. In the future, Symantec can easily evolve to a hybrid cloud environment and leverage public cloud services where appropriate, while retaining proven storage efficiency, availability, and scalability.

## About NetApp

Leading organizations worldwide count on NetApp for software, systems and services to manage and store their data. Customers value our teamwork, expertise and passion for helping them succeed now and into the future.

## About Symantec

Symantec Corporation (NASDAQ: SYMC) protects the world's information, wherever it is stored or accessed and operates the largest civilian cyberintelligence threat network in the world. The company's more than 20,000 employees reside in more than 50 countries and are pioneering new solutions in growing markets. 99% of Fortune 500® companies are Symantec customers. [www.symantec.com](http://www.symantec.com).

## About Cisco

Cisco (NASDAQ: CSCO) is the worldwide leader in IT that helps companies seize the opportunities of tomorrow by proving that amazing things can happen when you connect the previously unconnected. For ongoing news, please go to <http://thenetwork.cisco.com>.

### FlexPod Components

- NetApp FAS6290 and FAS6280 storage systems
- NetApp clustered Data ONTAP 8.2
- NetApp OnCommand Unified Manager
- NetApp OnCommand Workflow Automation
- NetApp Flash Cache™ caching
- NetApp FlexClone
- NetApp deduplication
- NetApp NFS Plug-in for VMware VAAI
- NetApp AutoSupport
- FlexPod Cooperative Support
- Cisco UCS integrated infrastructure
  - Cisco Unified Computing System (Cisco UCS) B200 blade servers
  - Cisco UCS Manager

- Cisco Nexus 9000 Series switches
- Cisco Application Policy Infrastructure Controller (APIC)
- Cisco Application Centric Infrastructure (ACI)

### Other Products

- Linux
- VMware vCloud Suite Advanced
- Symantec NetBackup
- Symantec Protection Suite Enterprise Edition
- Microsoft Windows Server®



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