WHITE PAPER

Automating Network Provisioning for Private Cloud
Executive Summary

Roughly 80 percent of all enterprise IT today is virtualized. Virtualization is a key enabler in deploying private clouds that deliver fully automated, closely measured, and agile self-service IT to business users.

The potential benefits are tremendous. Well-planned and well-executed private clouds can:

- Reduce expenditures by minimizing IT involvement in routine provisioning tasks
- Give IT and business leaders accurate measurements of the services and resources consumed by each line of business and department
- Create a highly dynamic and elastic environment for DevOps, enabling businesses to get new products and services to market more rapidly

Enterprise IT cares about quickly enabling services that are always on, available anywhere, and cost effective. Therefore IT architectures consider attributes such as business continuity, reducing time-to-service for new workloads, increased workload mobility within and across sites, and multi-site and multi-tenant architectures to optimize resource utilization. Private clouds are rapidly gaining traction because they can deliver IT services with these attributes at reduced costs.

But to fully realize the benefits of private cloud, full datacenter automation is key. Most of the provisioning of compute and storage is automated through cloud orchestration. Unfortunately, network provisioning—such as DNS and management of IP addresses for virtual machines (VMs)—is still mostly done manually, and administrators are forced to perform routine tasks instead of focusing on valuable business initiatives. Hindered by processes that are error prone, labor intensive, and not scalable, businesses aren’t getting the full return on their investments in virtualization and private clouds.

In this whitepaper we’ll explore some of these problems inherent in virtualized datacenters and cloud environments, specifically enterprise private clouds, and we’ll discuss solutions that can take you down the last mile of the automation journey so that your business can fully achieve agility and extract maximum value from its private-cloud investments.

Private Cloud and the Modern Datacenter

Datacenters are evolving rapidly and have come a long way from the physical datacenters of the past. Most enterprises have virtualized datacenters running VMware, Microsoft, or XenServer platforms. Many of them are using multiple hypervisors, and more than 79 percent will have more than 3 hypervisors by 20161.

Moreover, enterprises are testing cloud-based architectures and software-defined networks and deploying variations ranging from self-service private clouds to application-oriented clouds. They are engaging in datacenter consolidation, automation, and orchestration. IT teams in particular are applying cloud and virtualization for rapid provisioning and multi-tenant hosting.

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1 IDC’s Server Virtualization Tracker, 2012
Businesses are weighing the relative advantages of public and private cloud architectures, and according to Gartner, 44 percent of enterprises are adopting private clouds. More and more organizations want to provide IT as a service with service-level guarantees. In this context, two inflection points are pushing cloud adoption.

**Large Static Workloads**

Enterprises are running static workloads on their virtual infrastructures—workloads like customer relationship management (CRM), human resources (HR), and enterprise resource planning (ERP) applications, as well as Microsoft applications such as Outlook and SharePoint. These environments are usually more stable but need more visibility. They need the flexibility to change, even though changes may be infrequent.

**Highly Dynamic Workloads**

Enterprise IT wants to respond more quickly to requests from employees. As an example, IT has to respond quickly to Dev/QA requests for more compute, which means more virtual VMs. IT needs to support agile product development processes to speed up development and deployment lifecycles. And Dev/QA workloads are dynamic by nature, sometimes needing thousands of VMs spun up and spun down per week to support short projects.

**Challenges in the Modern Datacenter**

As these complex technologies become defining characteristics of the modern datacenter, IT will have a new responsibility: helping to make sure that the migration from physical to virtual to cloud won't be so costly and time-consuming that businesses won't get the return on investment they expect. Several challenges will directly affect IT operations.

**Complexity**

Networking in cloud environments results in complex DNS, DHCP, and IP address management (DDI) requirements such as overlapping IP addresses, multi-tenancy, and hybrid infrastructures that combine public and private cloud. Fundamental network services must allow workloads to be placed at any site in the private cloud without location dependence. They must be resilient to failures. As clouds expand with the increasing needs of the enterprise, these core services must be able to scale as well. These services must give system administrators clear visibility into IP addresses and DNS records for each workload.

**Higher Operating Costs**

The migration from physical to virtual to cloud can be costly and time-consuming. Troubleshooting can become more difficult, and administrator productivity can drop as the deployment of VMs becomes more complicated. Server administrators will have to manage significantly more VMs—sometimes hundreds at a time—and the dynamic nature of these VMs, which are created, provisioned, and then destroyed several times a day, requires the network infrastructure to be agile.

Manual network provisioning for VMs is error prone, and can lead to service disruptions, increased costs, and reduced efficiency in the datacenter. It can take administrators hours or sometimes days to provision IP addresses for VMs manually, making it difficult to provide cloud services at the pace business users have come to demand. Manual cleanup is also cumbersome and error prone, and can result in a sprawl of unused IP addresses and DNS records.
More and more organizations are thinking about providing IT as a service with SLAs—which they can’t afford not to meet.

**Increased Requirements for Scalability and Reliability**

Business-critical datacenters require automation of network provisioning for VMs, scalability, high availability (HA) and consolidation. Without these, datacenter survivability, business continuity, growth, and the future of the business are at risk.

**Greater Need for Centralized Management**

The kind of complexity that modern datacenters have can’t be efficiently managed using point solutions deployed in silos. DDI services across multiple geographically dispersed datacenters should be managed centrally and consistently.

A recent survey conducted by Infoblox revealed that more than 60 percent of server administrators need a fully automated DDI solution for their virtual and cloud environments.

![Figure 1: Demand for automated DDI among server administrators](source: Recent Infoblox survey)

**The Solution: Automated Network Provisioning for Private Cloud from Infoblox**

What is needed is a DDI architecture that can scale seamlessly, in sync with the elasticity of cloud environments, as the need for IT resources expands and contracts. An enterprise-grade DDI solution for private cloud should provide the following:

- Full network automation to help IT teams with change in dynamic cloud environments
- Centralized management, visibility, and control to give server administrators a single pane of glass for viewing resources across multiple datacenters and for using metadata to organize and correlate IP addresses, networks, DNS objects and VMs
• High availability to ensure datacenter survivability
• Support for multiple cloud platforms to allow for heterogeneous datacenter environments

Infoblox DDI offers a range of features directly addressing the challenges that private cloud infrastructure poses for server and network administrators.

**Integration with Industry-leading Cloud Platforms**

Infoblox works seamlessly with a broad set of cloud platforms to make sure that IT teams can get the full benefit from DDI automation no matter which private cloud platform they choose. Figure 2 shows the cloud orchestration platforms supported by Infoblox.

<table>
<thead>
<tr>
<th>Orchestrator</th>
<th>Products</th>
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<tbody>
<tr>
<td><strong>vmware</strong></td>
<td>vCloud Director (vCD) vCloud Automation Center (vCAC)</td>
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<tr>
<td><strong>Microsoft</strong></td>
<td>Virtual Machine Manager (VMM)</td>
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<tr>
<td><strong>bmcsoftware</strong></td>
<td>Cloud Lifecycle Manager</td>
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<td><strong>CA Technologies</strong></td>
<td>Auto Suite for Cloud (ASC)</td>
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<tr>
<td><strong>Cisco</strong></td>
<td>Cisco Intelligent Automation for Cloud (CIAC)</td>
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<td><strong>HP</strong></td>
<td>Cloud Service Automation (CSA)</td>
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<td><strong>Elasticbox</strong></td>
<td>Elasticbox Enterprise Cloud Service offering</td>
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*Figure 2: Infoblox support for major cloud orchestration vendors*

**Faster Time to Deployment**

By integrating Infoblox DDI with these platforms, services can be deployed faster to meet business demands. Server administrators are empowered with automatic network provisioning for VMs as they are created, moved, and destroyed. This simplifies and streamlines allocating of IP addresses to newly created VMs through automatic updating of DNS records and release of IP addresses when VMs are taken down—all in a matter of seconds instead of hours or days. By fully automating the workflow, Infoblox DDI reduces time-consuming and error-prone manual process, brings agility and elasticity to dynamic virtual environments, and accelerates time to service.
Ease of Use
Ease of use is another significant benefit. Infoblox DDI gives cloud and server administrators a simple drag-and-drop interface for deploying pre-designed workflows that have been extensively tested for IT teams who want an out-of-the-box solution. And the same interface enables organizations with unique requirements to quickly create highly customized workflows. IT no longer needs to write and test scripts, thereby increasing efficiency, cutting costs, and reducing time to deployment.

Scalability, Reliability, Manageability, and Visibility
As virtualization and cloud delivery continue to shift the way datacenters are designed, engineered, and deployed and alter the way resources are provisioned, some things don’t change. Traditional concerns such as scalability, reliability, manageability, and visibility remain as important as ever. All of these capabilities are built into the Infoblox DDI architecture.

- **Scalability.** Infoblox APIs can scale from supporting small-scale test cloud deployments to large production cloud deployments. Because Infoblox DDI appliances can be added to the network and automatically provisioned from a central database with the click of a mouse, the network grows without consuming staff resources or disrupting business operations. Thus the DDI service can scale with the cloud and add more capacity as needed.

- **Reliability.** The Infoblox Grid™ architecture uses high-availability pairs, constant back-and-forth health checking, and automatic failover to ensure network reliability and 24x7 operations. The central appliance, called the Grid Master, can be coupled with a mirrored backup appliance that takes over instantly in the event of a failure. There are no single points of failure, and if a link fails temporarily, communications go into a queue that is maintained until the link is restored.

- **Visibility.** Infoblox provides single-pane-of-glass visibility across multiple datacenters, so network administrators can keep track of VMs in each datacenter, identify problems easily, and reduce time to repair. By classifying VMs using metadata, Infoblox solutions for cloud enable better tracking of resources and improve overall datacenter efficiency.

- **Manageability.** Infoblox delivers centralized and unified IPAM management of physical, virtual, and cloud environments. And Infoblox Multi-Grid Management technology enables centralized management of multiple Grids, scalable to thousands of hosts, and includes visual representation of both IPv4 and IPv6 networks.

- **Flexibility.** Workloads can be deployed across multiple sites in a private cloud and can also move between these sites. The Infoblox DDI service can be distributed across multiple sites to enable workloads to be placed anywhere. With automated management of IP address and DNS records, virtual machines can be placed anywhere at anytime.
The Last Mile to the Cloud

In many ways, extending enterprise-grade DDI into the datacenter is the last mile in the journey to fully automate cloud deployments. With today’s rapid transition from physical to virtual to cloud environments, Infoblox DDI leads the way by providing extensive support for virtualization and automating network provisioning in cloud deployments.

If you think that private cloud will play a big role in your datacenter strategy and your business, contact us today and let us tell you more about how Infoblox DDI can help automate critical aspects of network provisioning and eliminate manual processes that could rob your business of the agility it seeks to gain.

![Diagram showing network control functions](image)

Figure 3: Extend enterprise-grade DDI into the datacenter.

About Infoblox

Infoblox (NYSE:BLOX) helps customers control their networks. Infoblox solutions help businesses automate complex network control functions to reduce costs and increase security and uptime. Our technology enables automatic discovery, real-time configuration and change management and compliance for network infrastructure, as well as critical network control functions such as DNS, DHCP, and IP address management (IPAM) for applications and endpoint devices. Infoblox solutions help over 7,100 enterprises and service providers in 25 countries control their networks.