Top 5 Essentials for a Dynamic Datacenter

SOLUTION NOTE

The Problem: Too Much, Too Fast

While the rapid growth of virtualized infrastructure has brought tremendous benefits to IT, the staff responsible for these dynamic networks are being challenged to do more with less. New techniques in server and desktop virtualization have allowed IT administrators who are responsible for virtual or cloud infrastructure to manage significantly more virtual machines (VMs) than traditional servers, upwards of several hundreds in many cases. The dynamic nature of virtual infrastructures demands that the network infrastructure — provisioning, re-provisioning, de-provisioning, configuration management and monitoring — be dynamic as well. Besides being labor-intensive, error-prone, and non-scalable when tackled manually, this complex orchestration of the infrastructure is compounded by the unprecedented rate of change. Manual techniques used in the past simply cannot keep pace in virtual or cloud environments.

In theory, virtualization at scale allows organizations to realize significant Capex and Opex benefits. But in reality, virtualization is successful only when infrastructure automation is part of the investment. Infrastructure automation eliminates human error, orchestrates change as it happens, ensures constant availability of core network services, and archives all activity — all the while incorporating fail-safe mechanisms such as approvals, compliance assurance and access control.

Of the three types of virtual resources — storage, compute and network — the most critical is network. If the network goes down, the compute and storage silos in a datacenter are inaccessible and, for most purposes, dead. Infoblox has tackled the challenges of automating networks head-on. Our solutions consistently ensure the five essentials for a healthy, always-on, compliant and auditable infrastructure, including:

1. **High-availability of core network services**, including DNS, DHCP, IP address management, TFTP and NTP
2. **Automated orchestration** of the entire network, including all phases of provisioning physical, virtualized, and cloud components, as well as firewalls, VLANs, access policies and configuration
3. **Monitoring and management** through a single pane of glass GUI that allows detailed views of the network end-to-end
4. **Reporting** the complete history of the network, including configuration archives that allow the creation of auditable documentation and facilitate re-configuration and troubleshooting
5. **Compliance** and regulatory consistency, including checking requirements on all components continually and making compliance reports available at any time

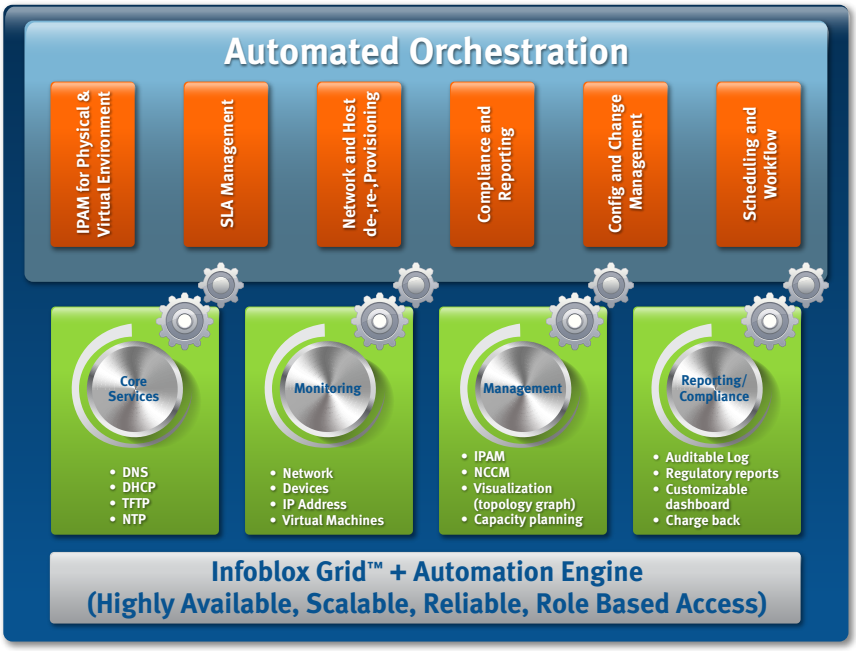
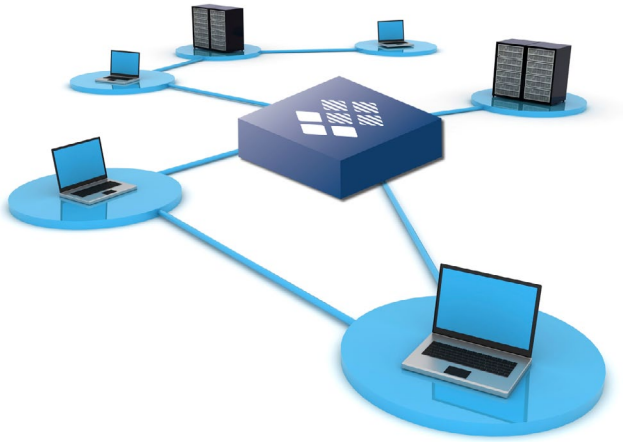


Figure 1 The building blocks for a dynamic datacenter

1 - High Availability of Core Network Services



Network connectivity is essential for deploying, configuring and making virtual machines available dynamically. Network connectivity or availability includes the allocation of IP addresses, host names and subsequent registration for routing and locating provided by DNS and DHCP systems. Time synchronization is also a key requirement; hence, the need for NTP services. Today's most popular hypervisors are available as "stateless," meaning they are installed on machines with lots of RAM and large CPUs and no hard disk. All the software (hypervisor, virtual machines, virtual switches, virtual routers, etc) is installed on-demand on boot via TFTP-like services. Network availability also involves less obvious, implicit requirements such as the need for IPv4 and IPv6 addressing, the ability to track assets based on IP and MAC address information, and auditable logs on the life cycles of individual virtual machines and their access.

Collectively, these services form the basis of a dynamic datacenter and are the sine qua non of network availability. The totality of these services must be highly available and designed with redundancy to prevent any interruption. Clearly, only a superhuman cloud administrator could manage a few hundred virtual machines and oversee the execution of these services manually. Automating the orchestration of any sizable setup, incorporating virtual machines, is the only viable way to ensure high availability of core network services. And at the same time automation serves as a prime means of reducing capital and operational expenses.

Infoblox ensures high availability of network connectivity through our Trinzic family of physical or virtual products that automate core network services. The Infoblox Grid™ architecture enables an "always-on" network and provides resilient network services with high availability, failover, disaster recovery and seamless maintenance. The Infoblox Grid deployment spans from a single building though a networked campus, all the way to remote locations. Support for both IPv4 and IPv6, DNS Security, single pane management with delegated administration are built-in on all products. The Trinzic family of products in conjunction with the Grid architecture provides all the essential core network services building blocks for successful virtualization and cloud deployments in any datacenter, no matter the location.

2 - Automated Orchestration

Cloud administrators are continuously asked to provision and/or modify virtual machines and their associated services. These are no small tasks. Accommodating a specific new SLA (Service Level Agreement) could mean modifying service to upwards of hundreds of VMs, and that freshly updated service may be in use for only a few hours before further changes propagate. Customers normally request specific response times for their services. When loads increase, additional VMs may need to be provisioned with appropriate bandwidth requirements - this is another aspect of SLA management. Additionally, network devices need to be maintained with frequent patch and configuration updates that are specific to brand and model numbers, necessitating a large database of patches and configurations which, due to regulatory compliance requirements, must be version controlled and tracked. Maintaining and provisioning all phases of physical, virtual, and cloud VMs, from provisioning to re-provisioning to de-provisioning — not to mention the firewalls, VLANs, the access policies, and all aspects of configuration — is impossible to execute flawlessly in an expedient amount of time through manual techniques.

Automating the orchestration of these processes is the only way to deal effectively with the instantaneous changes occasioned by today's virtual and cloud environments. The dynamic nature of services requires that resource pools (storage, compute and network) be constantly updated, based on use. To allow the kinds of infrastructure flexibility needed to accommodate VMs and to facilitate their dynamism, automation enables specific "knobs" to address specific use cases. To maintain workflow and to aid in regulatory compliance, the automation of infrastructure operation and control incorporates a system of checks and balances.

Built for dynamic environments and for scale, the Infoblox Trinzic family of products automates all these functions, including provisioning, re-provisioning, de-provisioning, change management, scheduling and discovery. The Trinzic family of products offers vendor-agnostic network automation solutions that automatically collect and present real-time network information for use in asset management, reconciliation, troubleshooting and maintenance, empowering the IT staff to take preventive action proactively well before your end user experiences poor performance or application degradation. The Trinzic family of products from Infoblox dynamically and reliably keeps your datacenter up and running regardless of how many virtual machines come to play — or how often or how fast.

3 - Monitoring and Management

Virtual machines are often viewed as inexpensive, mostly because no Capex cost is directly associated with them and because they are much faster to deploy. For example, provisioning a physical server can take a few days, while a new virtual machine takes a few minutes to an hour. The perceived low cost of VMs can easily lead to unchecked proliferation. But these "inexpensive" VMs have to be managed and monitored relative to resource, QoS, licensing, usage, availability and updates, and these additive tasks can overnight put an enormous load on IT infrastructure. While departments are quick to request new VMs, they are normally slow to request — and sometimes simply ignore — de-provisioning of services and replaced virtual machines, and that can rapidly lead to VM sprawl. VM Sprawl induces resource (storage, network, compute) hogging, which often results in degraded performance. Poor practice in saving virtual machine instances also compounds network complexity and increases unproductive storage requirements.

With IT departments organized around servers, networks, applications and virtual infrastructures, obtaining a single pane management window is more and more a rarity these days. With the advent of virtualization, increasing numbers of different people virtualize and manage servers, networks and applications, creating enormous accountability and visibility issues. The end result is that it is becoming ever more difficult to monitor and manage today's complex networks, especially with so many virtual and cloud components.

Effective monitoring requires clear and comprehensive views of both physical and virtual servers and devices, as well as the ability to visualize network topology maps. Effective management involves control over both physical and virtual switches, firewalls, load balancers, and other network devices, the ability to configure, patch and manage device firmware, and the delegation of administration.

Infoblox can help you achieve effective monitoring of today's hybrid networks by keeping tabs on both your physical and virtual devices for you. Our Trinzic range of products offers you network topology mapping and automates the process of discovering virtual machines dynamically for the purposes of asset management, monitoring and tracking used IP addresses. Our discovery engine automatically tracks and correlates relationships between virtual machines and network infrastructure, displaying its findings in a single graphical view.

Infoblox can assist you in managing your network effectively through our innovative built-in visual interfaces, which also allow you to manage using standard management consoles from VMware and Microsoft. Our multi-vendor network solutions for configuration, optimization and compliance enforcement — with hundreds of built-in rules and industry best practices — automate network change, intelligently manage device configurations and reduce the risk of human error. We detect and track all network changes for you — including who changed what, where and when, and the impact of changes — and we save every historical device configuration to allow you to view easy side-by-side comparisons.

Our Trinzic family of products offers complete network discovery and dynamic inventory for multi-vendor, Layer 2 and Layer 3 networks elements. User-friendly analysis and graphical views provide rich information on network elements, including devices, VLANs, routes, routing tables, HSRP (Hot Standby Router Protocol) peers, subnets, OS and models. Our automated solutions identify and expose lurking and intermittent problems often caused by poor configurations, which are typically very difficult and sometimes impossible to troubleshoot. Using built-in expertise and analytic techniques to identify network issues and poor configurations, our products detect symptoms for you before they evolve into faults.

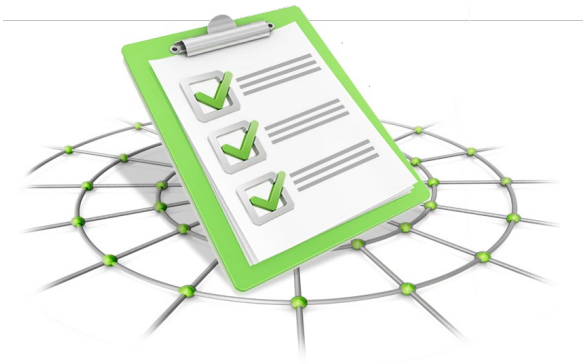
4 - Reporting

Whether for external or internal audits, or for aid in troubleshooting or inventory, or even for making a business case for future planning, comprehensive reports on the state of your network at any given time are essential components in any datacenter administrator's toolbox, especially those of cloud administrators. Can you easily tell how many VMs are running on your network at any given moment? Can you say with certainty which ports are being used by what VMs? Do you know whether the existing network topology will handle future VM growth? Office space costs are charged to each and every department depending on their usage. Similarly, network, physical, software and virtual (VM) assets also need to be charged back to corresponding departments based on usage. At which point will the current network topology become a bottleneck for additional VM deployments? How many free switch ports are available for use right now?

Without the ability to formulate clear answers to these kinds of questions, a cloud administrator would have a difficult time making informed decisions on how best to manage and grow the virtual environment or to manage the network overall. As the popular phrase goes, "If you can't measure it, you can't manage it." One of the key attributes of an effective management system is its ability to measure and report various forms of data in a consumable way. The ability to generate reports easily and readily is an essential requirement when selecting a management product, including auditable logs and historical archives.

Infoblox provides solutions to the reporting needs through our Trinzic reporting product lines. Trinzic reporting capabilities provide flexible documentation for trending, planning, and security, focusing on the collection, tabulation and presentation of detailed DNS, DHCP and IPAM information for long-term analysis, trending and diagnostics. You can examine the trends in network growth, gain insight into network usage, create baselines and detect performance deviations. In addition, our Trinzic reporting capabilities allow you to identify security threats. Trinzic reporting capabilities are integrated with our Infoblox Grid™ technology, and you can use a common GUI to view both real- time and historical reports.

5 - Compliance



How can you tell if the network devices in your datacenter, that are the lifeblood of your virtual environment, are compliant with your corporate policy such as HIPAA (Health Insurance Portability and Accountability Act), PCI (Payment Card Industry), etc? How can you determine if your existing network infrastructure is capable of handling future workloads? You need clear answers to these compliance questions to protect your organization, your network and your end users. Having non-compliant network devices threatens your corporate policy, and leaving them unaddressed could lead to legal complications that could cost your corporation significant amounts of time and money.

Regulatory compliance is a corporate mandate that cloud administrators must incorporate into their monitoring and management processes. Besides complying, you need to prove that all sectors of your network and all devices on it — physical or virtual, on the premises or in the cloud — are meeting all the compliance requirements. You need clear, easy to understand, historical, auditable compliance reports to make your case and make it convincingly. Failure to prove compliance may lead to penalties, law suites and PR nightmares, which can adversely affect businesses.

The Trinzic family of products from Infoblox places the highest premium on both compliance enforcement and compliance reporting. Our Trinzic products proactively and automatically enforce configuration compliance and detect standardization issues so you can audit, analyze and standardize your network faster and more efficiently — all while supporting your key IT initiatives that require a more dynamic network infrastructure than ever before. With our compliance capabilities, a cloud administrator can automatically track connected end devices and monitor what was connected, by whom, when and where.

We make certain that your network is compliant at all times by automating the process of maintaining network standardization, meeting security requirements and proving success for external mandates or internal best practices. The automation maintains consistent network compliance for you 24x7x365, and also provides change detection and security requirements tracking, and delivers single click compliance reports. The Trinzic family of products enable cloud administrators to be proactive instead of reactive, and lets them detect potential network and virtualization problems early on, saving them and their organization time and money.

Solution Requirements Summary	
Category	**Requirements**
Core Services	• Scalable, Reliable and Available DNS, DHCP, IP Address Management, TFTP and NTP services
Automated Orchestration	• A dynamically adaptive and scalable solution • Ability to customize, automate and schedule IT tasks • Integrated automation solution for both physical and virtual environment • (Automation includes on-demand provisioning, de-provisioning of networks, virtual machines, IP life-cycle and address management, configuration management, triggered events, etc)
Monitoring & Management	• Discover, Monitor & Manage both physical and virtual networks and devices • Visualize with network topology maps • Delegated Administration • Ability to control and manage virtual or physical network devices such as firewalls, load balancers, switches, etc. • Configuration management of network devices
Reporting	• Capacity planning and reporting
Compliance	• Regulatory compliance report • Auditable logs

Summary

Datacenters rely on networks that are a mix of physical and virtual devices, and these networks, unlike those of the past, are dynamic and in constant flux. Cloud administrators are charged with doing more with less, even as their responsibilities and the number of network devices are on a constant increase. As Capex and Opex are reduced, scalability is increased, and cloud administrators are left to deal with problems of network availability, reliability, management and compliance. Simply put, their tasks today exceed human ability.

Network automation is the only way that today's dynamic hybrid networks, where VMs proliferate like viruses, can be controlled. Automation of provisioning and orchestration of core network services to yield high availability, coupled with automated monitoring and managing, and automated reporting and compliance are the way cloud administrators and others overseeing today's dynamic datacenters can keep pace with virtualization and cloud computing. The Trinzic family of automation products from Infoblox is leading the way in taming the new world of virtual and cloud components on today's complex networks.

Infoblox Product Warranty and Services

The standard hardware warranty is for a period of one year. The system software has a 90-day warranty that will meet published specifications. Optional service products are also available that extend the hardware and software warranty. These products are recommended to ensure the appliance is kept updated with the latest software enhancements and to ensure the security and availability of the system. Professional services and training courses are also available from Infoblox. Information in this document is subject to change without notice. Infoblox Inc. assumes no responsibility for errors that appear in this document.

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