Use Case Brief

BUILDING A PRIVATE CLOUD

PROVIDING PUBLIC CLOUD FUNCTIONALITY WITHIN THE SAFETY OF YOUR ORGANIZATION

At many enterprises today, end users are demanding a powerful yet easy-to-use Private Cloud. This brief describes how a Private Cloud built with Nuage Networks can offer the best of both worlds — great end user experience and enterprise controls.
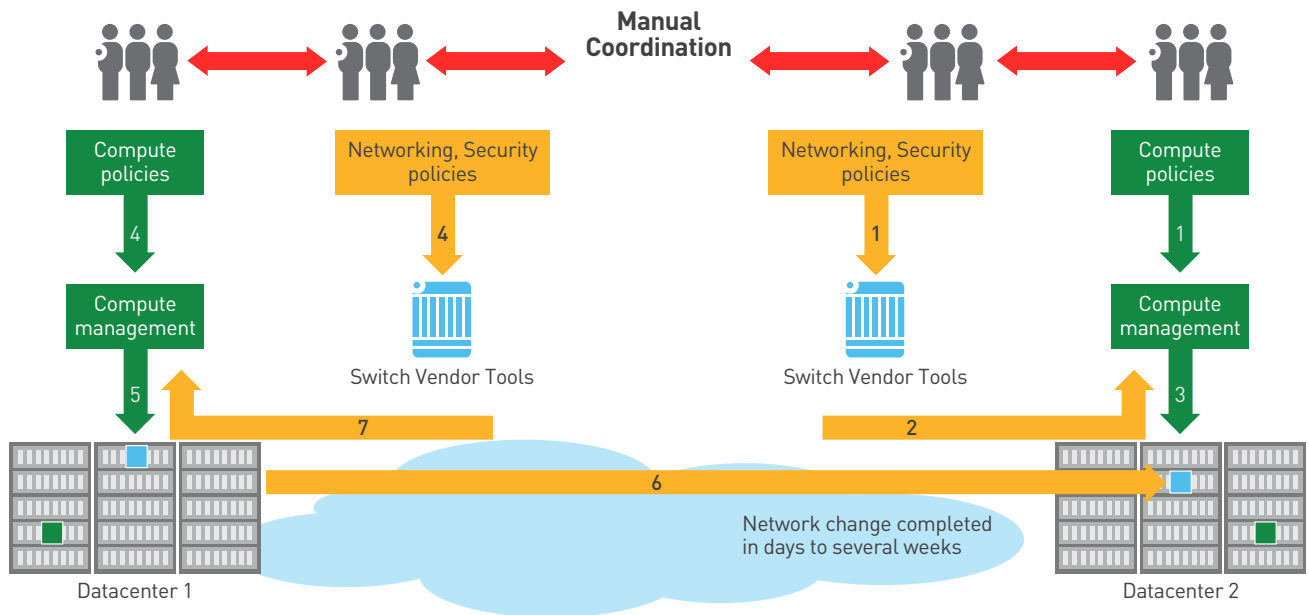
nuagenetworks

From Nokia

Challenges

In many ways, public cloud providers are setting the bar for IT within the enterprise. Many enterprise users prefer the usability, elasticity and cost-per-usage model of public clouds. Yet, for security, compliance and cost control, IT teams cannot fully adopt public cloud approaches. As a result, many IT teams are trying to overcome the following challenges:

- **Self-service controls:** End users prefer self-service controls similar to those of public clouds.

- **Automation:** Legacy manual coordination across servers, networks, and other teams is slow and error-prone.

- **Security:** Existing security vulnerabilities within the datacenter are highlighted in cloud environments.

- **Integration and support :** Cloud approaches typically need to support multiple Cloud Management Software (CMS) systems, hypervisors and bare metal (non-virtualized) resources.

- **Enterprise-grade:** Many of the options available are not enterprise-grade in terms of hardening, security and scalability.

These challenges are summarized in Figure 1.

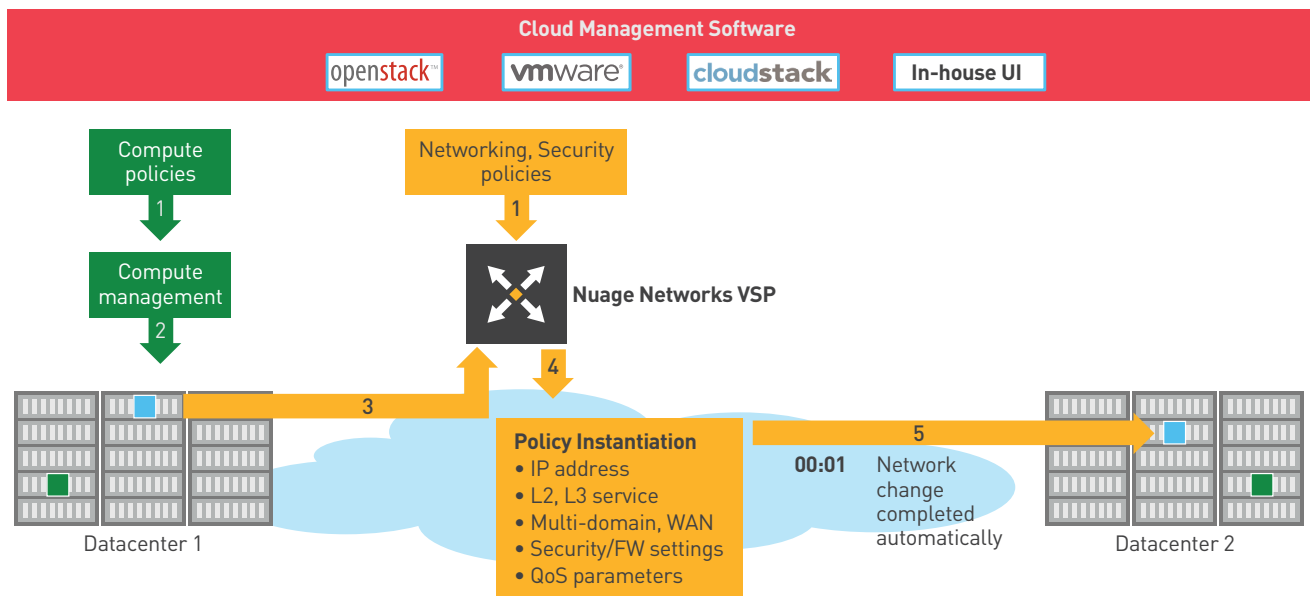**FIGURE 1. Manual server and network provisioning**

How We Help You

Nuage Networks Virtualized Services Platform (VSP) has been architected to be a non-disruptive overlay for all existing virtualized and non-virtualized network resources. No purpose-built networking hardware is required since all components are virtualized. Nuage Networks preserves the network attributes (required network settings including security) no matter where the workload is placed — in a way that is similar to how cell phones preserve their attributes while in roam mode. By replacing the tie to the physical network element with a set of required network attributes, Nuage Networks provides full network roaming capabilities for your workloads.

As shown in Figure 2, Cloud Management Software (such as OpenStack®, CloudStack® and VMware) orchestrates between server and network layers. Nuage Networks unifies all datacenters, network segments and both virtualized and non-virtualized resources into a cohesive, manageable private cloud. Using plug-ins built to individual CMS standards, Nuage Networks VSP accepts instructions from, and relays information back to, the CMS.

With Nuage Networks VSP, the network flexes in real time to provision workloads — typically virtual machines (VMs) — that are being instantiated or moved. For the example below, in step 1 the CMS system initiates a move request for a VM to both the server virtualization control plane (such as VMware® vCenter™) and to Nuage Networks VSP. In step 2, the server virtualization control plane initiates the move based on its policies. Nuage Networks VSP detects that the move is being initiated in step 3. In step 4, Nuage Networks VSP translates the Nuage Networks policy into required network and security attributes at Datacenter 2. In step 5, the VM is automatically moved and instantiated in real time with the appropriate networking profile and consistent metadata (such as networking counters and security definitions).

FIGURE 2. A private cloud with full automation across CMS systems and locations

How this Approach Changes the Game

This innovative approach provides game-changing functionality for private clouds. These capabilities often exceed those of public cloud leaders. A few capabilities are highlighted below.

- **Complete UI-driven Self-service**: End users can control every aspect of their virtualized environment with their choice of user interfaces (such as a CMS interface, Nuage Networks VSP, or a user interface developed in-house). This capability both increases customer control and enables private clouds to handle staggering volumes of customers, VMs and requests.

- **Fully Automated Elasticity:** With complete end-to-end automation, VMs can be provisioned within seconds and new hardware can be added to the cloud within minutes.

- **High Security within the Datacenter:** Legacy security approaches focus on external threats rather than threats within the datacenter. The built-in security of Nuage Networks VSP, including a default "Zero Trust" model, operates at the VM and virtual network levels. By protecting the datacenter at the first connection point to the network for VMs and applications, full security and isolation are provided within the hypervisor, rack and datacenter.

- **Virtualization Cost Efficiencies:** A top scalability and efficiency goal — number of VMs supported per server — is typically limited by bottlenecks in hypervisor-based switching and routing. The Nuage Networks Virtual Routing and Switching (VRS) module substantially increases the efficiency of each network port, therefore enabling more VMs to be supported per server.

- **Full Multi-tenant Isolation:** By removing the constraints imposed by legacy and hypervisor-based networking, Nuage Networks VSP enables full network isolation by tenant (customer/customer department). As a result, resource demands made by one end user or department do not impact others.

- **Scale-out Resource Model:** Nuage Networks scales out via federated controllers to present a unified network fabric to any size cloud. A unified fabric enables a number of private clouds' capabilities, including consistent network service independent of underlying hardware, full workload portability among datacenters and full programmability for future services.

- **Predictable Cloud SLAs:** Leveraging the capabilities of Nuage Networks VSP, private clouds are able to provide predictable Service Level Agreements (SLAs). Nuage Networks VSP virtualizes the network to provide consistent, committed performance that is independent of the underlying server and network hardware. Further, SLAs can be defined for different levels of service.

- **Full Support across CMS Systems and Hypervisors at Scale:** Nuage Networks VSP support across CMS stacks and across hypervisors at scale is the foundation for a large-scale private cloud. These capabilities not only reduce infrastructure complexity but also provide the feature set necessary for efficient consolidation across the enterprise.

Benefits

- **Minimum time to cloud:** Nuage Networks VSP is architected as a seamless overlay with canned, plug-in integration into and across CMS systems. Since custom integration efforts are eliminated, an enterprise's time required to build a private cloud is minimized.

- **Maximum flexibility:** Nuage Networks VSP enables our customers to select best-of-breed products, including open source offerings, for load balancers, firewalls, CMS, virtualization, core networking, and more. By providing this flexibility, IT can build a private cloud that is better tailored to the enterprise's needs than any public offering.

- **Maximum asset value:** Since Nuage Networks VSP works with an enterprise's existing network assets, forklift upgrades are not needed. Further, in a way that is similar to server virtualization, when multiple virtual networks share the same network hardware, utilization rises. The net effect is that network assets' useful life and utilization are extended: maximizing asset value.

Why Our Private Cloud Capabilities Are Unmatched

Nuage Networks is the best software defined networking choice for private clouds. Private clouds built with our products include capabilities that cannot be matched by any other vendor.

Only product that enables self-service controls demanded by end users

End users are demanding a customer experience similar to what they enjoy with public clouds. A self-service approach provides that quality of experience along with cost efficiencies: IF the network provides controls. Nuage Networks VSP is the only product that enables full network controllability driven from the CMS, from a custom portal, or from our user interface.

Only product that fully addresses critical security issues within the datacenter

Hackers are exploiting the lack of security in intra-datacenter traffic. By securing virtual machines and bare metal servers at the very first network and virtual network attachment point, Nuage Networks VSP fills these critical security gaps.

Only product that provides full choice, including bare metal

Our network control plane is based on the industry standards that power the Internet today (such as BGP). As a result, Nuage Networks uniquely breaks vendor lock-in by enabling our customers to select best-of-breed products for CMS systems, virtualization, load balancers, firewalls, and other networking gear. Also, no one makes it easier to manage bare metal servers alongside virtualized resources than Nuage Networks.