Realizing the True Potential of Cloud Through **Network Automation**

As the growth of cloud computing continues unabated, IT executives are coming to grips with the fact that certain perceptions about cloud are at odds with realities around how quickly they can roll out new cloud-based resources.

The perception, widely promoted by cloud and virtual server technology providers, is that it takes just seconds or minutes to roll out new virtual machines. While that may technically be true, the reality is it can take days or weeks to get those VMs attached to a network and into service. That's because while the virtualization platforms have a great deal of automation built in, the process of provisioning network resources — an IP address and Domain Name Services (DNS) — is still largely a manual one.

If they are to reclaim the promised benefits of cloud, organizations need to automate the network provisioning process just as they have server provisioning. For without network automation, even the most robust cloud platform will be unable to deliver the kind of agility customers expect.

The growth of cloud

More than two-thirds of companies (69 percent) responding to the 2014 IDG Enterprise Cloud Computing study have at least one application or portion of their infrastructure in a cloud environment, up from 57 percent two years ago. Another 18 percent plan to use cloud applications or infrastructure within the next 12 months and 13 percent plan to do so within one to three years. That adds up to a full 100 percent — rather convincing evidence that interest in cloud is pervasive, even ubiquitous.

The workloads are split among private, public and hybrid clouds, the survey shows, with 19 percent in a private cloud, 15 percent in public and 5 percent in a hybrid cloud environment. Many companies use all three types at once, as the survey says 57 percent employ some form of private cloud, 60 percent public and 19 percent hybrid.

These are not just token implementations, either, as respondents report they'll spend 24 percent of their total IT budget on cloud computing within the next year, on average (see Figure 1).

Another IDG survey, the *CIO* magazine Tech Poll, found similar interest in cloud. More than half of all respondents (55 percent) say they plan to increase investments in Software-as-a-Service (SaaS) and cloud applications in the coming year; the category is second only to business intelligence and analytics (56 percent).

It makes sense because the benefits of cloud are well documented, including IT and business agility, cost savings and increased line of business productivity. When respondents to the IDG Enterprise Cloud Computing study were asked for their top business goals or objectives with respect to cloud, two answers tied at the top: speed of deployment and lower total cost of ownership.

Threats to the cloud promise

But network provisioning issues threaten both of those benefits. The problem is, even in a relatively small environment, an awful lot of network provisioning work has to take place to get all the new virtual machines onto the network.

"While it's not a particularly difficult task, it's a monotonous task," says Kevin Tolly, founder of The Tolly Group, an independent testing organization for the IT industry. "If you take monotony and multiply it many times over, you're likely to get fairly high error rates."

The typical process of getting a new virtual machine onto the network goes something like this:
- A user submits a request to the network team for DNS records and an IP address.
- The request likely requires 3 touches: a server administrator, a network admin responsible for IP address management (IPAM) and a network admin responsible for DNS.
- Depending on how many groups are involved and the volume of requests, each may take hours or days to complete.

As Tolly suggests, the process is error prone because it requires manual updates and data entry.

What's more, problems can crop up when an administrator tries to provision a VM in a subnet that has exhausted its allotment of IP addresses. "Most subnets only have 254 IP addresses available. It doesn't take long before one pool is exhausted, and you need to go to another pool," Tolly says. "If you do that manually you've got to juggle lists of IP addresses." Should an administrator mistakenly assign an IP address that's already in use to a new VM, the device that originally had the address will no longer have network access.

All in all, the network provisioning process results in a number of pain points:
- Added time for turning up new VM instances, from hours to days

FIGURE 1: **Total IT Budget Allocated to Cloud**
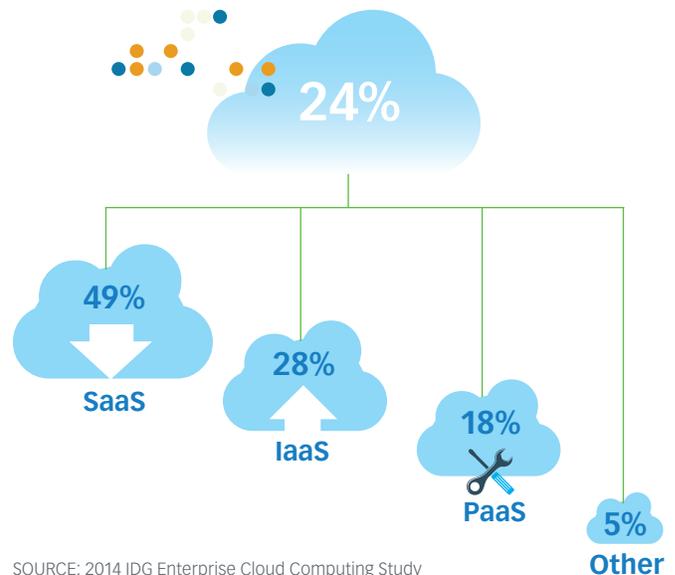
SOURCE: 2014 IDG Enterprise Cloud Computing Study

- Lack of visibility to IP addresses, resulting in conflicts, with the same IP address being assigned to more than one machine
- Rapid, unwieldy growth in DNS records, making them more difficult to manage
- Too much administrator overhead
- Lack of reliable DNS, DHCP and IP address management (DDI) for private cloud environments
- No correlated view of DNS and IP addresses across the organization, to identify available addresses.

In practice, these issues mean it will take longer than expected to roll out new virtual machines and retire old ones. That, in turn, makes it more difficult to realize the promise of cloud in terms of increased agility. Errors in the network provisioning process also put companies at risk of falling out of compliance with internal company policies and perhaps external regulations.

SOLUTION: **Automated IPAM and DNS management**

For GlaxoSmithKline (GSK) the solution was a system that automates IPAM and DNS management.

The system includes a centralized database of available IP addresses and DNS entries and can automate their distribution as new VMs come online. The automated solution also reclaims IP addresses and DNS entries from retired VMs and puts them back in the available pool.

The solution automatically adds metadata to the various IP addresses, networks, and DNS zones, to reduce provisioning errors and simplify troubleshooting. It gives GSK a single point of IPAM and DNS management for its entire global network, providing tracking, auditing, and DNS data management.

Automated tools may also come with built-in workflows that eliminate manual steps and take advantage of economies of scale for bulk VM deployments. Another important feature is automated DHCP lease assignment with fixed address support, which is especially important in OpenStack environments.

"Automated IP address and DNS tools enable the integration of the network group with the server team, and provides for server provisioning that really does live up to the cloud promise — in private, public and hybrid cloud environments," says Matt Gowarty, Sr. Product Marketing Manager, Network Automation, for Infoblox.

Delivering results

The Infoblox DDI solution is what GSK now uses to for automated IP address and DNS management, and the results have been impressive.

"The Infoblox solution saves a lot of time and effort," Dugan says. "It eliminates errors. In the old system, a typo could result in duplicate folders, but now Infoblox automation prevents that. Management is simpler, and I can offload tasks to other organizations because it's easy to give specific access to other groups."

The system has freed the network engineers from making all those manual changes, producing big savings for a company that builds about 1,600 VMs per year and decommissions another 500 to 600. In just two weeks after the Infoblox system was in full production, all manual activities associated with server rollouts had ceased.

After one year of use, GSK estimates the time savings from automating IP address assignment and DNS name registrations for building 1,500 servers is 1,893 process days. That translates to a cost savings of $519,792, which does not factor in gains from increased business agility, a factor that GSK puts in the millions in terms of increased revenue.

The Tolly Group found similar gains in its tests of the Infoblox Cloud Network Automation solution vs. handling IP address and DNS tasks manually. It found total cost of ownership savings ranging from $71,497 for a company that's making changes to 500 VMs per week to $714,996 for companies dealing with 5,000 VMs per week.

Tolly's tests assumed a "best case" scenario, where all required VM and DNS tasks could be performed by the same individual. In reality, he says it's likely that different groups will each handle IP address management and DNS name registries, meaning the manual process would involve interacting with multiple groups.

CASE STUDY: **GlaxoSmithKline**

GlaxoSmithKline (GSK), the global pharmaceutical firm, experienced many of these issues first-hand.

"We didn't have an accurate list of our 70 to 80 DNS servers," says Chuck Dugan, GSK's DDI lead. "We were having service outages because the lists we did have weren't keeping up with the changes."

The company's IPAM system was disconnected from its DNS, so changes made in one system where not reflected in the other. All DNS and IPAM data had to be entered manually, resulting in data inaccuracies and inconsistencies.

"It was inefficient and costly," Dugan says. "We had no centralized management, and I had to go through other organizations to get permissions. On top of that, we had multiple domains, and had to spend time documenting configurations in other regions."

The end result was it took too long to get new servers on the network, about one and a half working days spent dealing with IP address and DNS issues.

"So you might be able to spin up compute resources in a matter of seconds, but have to wait hours or a day to have the network resources delivered — DNS and IP addresses — before you can figuratively press the button," Tolly says.

Get the most of out cloud: automate

It doesn't have to be that way. No longer do companies have to deal with manual processes around IP address and DNS name server entries for the cloud environments, whether private or hybrid.

Infoblox Cloud Network Automation can help them realize the full benefits cloud promises in terms of increased agility and cost savings. The solution reduces rollout or decommissioning time for VMs to minutes or hours rather than days, freeing up network engineers to work on more strategic projects.

Learn how to bring centralized management and sound processes to your cloud rollouts. To learn more, visit **www.infoblox.com/cloud**.