

Network Abstraction: The Key to Agility

By Carl Moberg

Delivering new services is critical to CSPs staying competitive and profitable. Today, the systems and processes used to deploy services and configure the underlying network equipment have become bottlenecks that cause delays in both introducing new services and activating existing services. Service providers are undergoing a sea change in the way they manage their networks; moving from network engineers configuring individual devices to software developers programming the entire network. A critical component to delivering true network automation is the adoption of a resilient network abstraction layer. A network abstraction layer is needed to enable services to be programmed and automatically translated into configuration changes on network devices in a way that supports the rapidly emerging software-centric network management practices.

No Longer Set and Forget

The requirements for service fulfillment have changed dramatically in the last few years, owing to applications driving the need for more flexible network architectures and dynamically changing overlay networks. Network devices are no longer configured for static applications, and only occasionally upgraded. New architectures require management systems that support high frequency; fine-grained configuration changes in real-time and in a fail-safe manner.



Modern communication applications and services require frequent configuration changes. In some CSP environments, there are thousands of configuration changes made to the network per hour. At the same time, configuration changes are often fine-grained and made to multiple networking devices, like when CSPs temporarily change the bandwidth profile configuration on all devices that carry a specific virtual connection.

Fail-Safe Changes Needed

Services are technically abstractions built on top of applications and devices distributed across a network. A change request to a service instance results in a distributed state transformation in the network. Unless these changes are made in a fail-safe manner, the network can easily end up in an inconsistent state. Configuration errors are a major source of network outages and are difficult to recover from, often extending the period of disruption. Configuration changes to modern networks require

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**Tail-f's NCS software automates
the configuration of large
service provider networks.**

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transaction and rollback management to ensure that multiple changes can be made in their entirety or not at all.

Real-time Changes

Whether customers are ordering increased bandwidth or new services, they typically expect services to be turned-up quickly if not in real-time. Change requests increasingly originate from customer self-service portals further propagating the expectation for more or less instant fulfillment of requests. While speedy turn-up of services leads to increased customer satisfaction and loyalty, it virtually removes the possibility of human involvement in the process of changing device configurations.

Tail-f Systems' Network Configuration Server

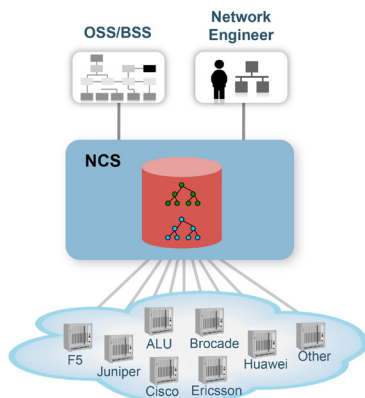
Tail-f's Network Configuration Server (NCS) is a software solution for provisioning multi-vendor services and configuring network devices and fully meets the requirements for a network abstraction layer.

With NCS, users and developers can use network-wide APIs and user interfaces to configure devices and provision services with a minimum of effort. The network API provides transaction-safe configuration changes to the network and the transactions include the actual devices in the network. This takes away tedious low-level work with various protocols or different CLIs. For example, the unified NCS CLI lets administrators easily configure and inspect configuration changes over many devices from different vendors.

NCS provides a unique way to map service configurations to corresponding device changes. This is normally a development project which itself blocks the introduction of new service types. With the NCS FastMap technology, the mapping is condensed to one simple page of definitions. Not only does this

speed up the introduction of new services, it also guarantees the accuracy of the service configuration and corresponding device configuration.

A blocking factor for deploying network automation is



The key to solving this problem is to provide a network abstraction layer between the OSS/BSS environment and the network.

the cost and time to integrate the device interfaces. NCS provides a powerful interface technology that makes it possible to integrate new CLI-based device types in days and NETCONF-based devices like Juniper instantly. Traditional adapters block network upgrades since the adapters need to be upgraded first. The NCS model-driven device integration effectively removes this roadblock.

When new devices support new features there is a need for a new or refined service definition that usually requires time-consuming software programming. NCS is model-driven and automatically renders user interfaces so devices can be upgraded and new services can be defined without disruptive delays. In addition to smoothly accommodating changes in services and device portfolios, NCS scales from small networks to extremely large networks without any administrative tasks.

Summary

New services are complex to provision and require frequent and granular configuration changes to network equipment. Existing approaches to service provisioning and device configuration are dependent on manual processes and ad hoc scripting tools. These approaches are error-prone and hamper services agility. Adding a network abstraction layer to existing OSS systems enables CSPs to program their underlying network to quickly support new services and change existing ones. Configuration changes are made automatically with built-in transaction management to prevent errors. This approach reduces time-to-market, speeds service activation, and allows networks to scale cost effectively.

About Tail-f Systems

Tail-f Systems is the leading provider of configuration management and network automation software. Service Providers use Tail-f's technology to quickly integrate powerful network abstraction layers to their OSS systems and benefit by bringing network services to market faster and more reliably. Seven of the ten largest global networking equipment providers are Tail-f Systems' customers. Network Equipment Providers use Tail-f's software to build on-device management systems and EMS/NMS platforms in less time and with differentiated capabilities. Tail-f Systems is one of Stratecast's 2012 **Global OSS/BSS 10 to Watch** Companies and a Red Herring Top 100 company. See www.tail-f.com.