German Cloud Provider Automates Infrastructure-as-a-Service Using Software-Defined Networking

Summary

Organization:
CloudSeeds

Industry:
Cloud Engineering and Consulting Company

Challenges:
- Build a new network platform
- Create an open architecture
- Establish a fully automated, highly scalable and resilient platform for future growth

Selection Criteria:
CloudSeeds' technical team selected Juniper Networks because the network could be controlled and orchestrated via an open API, enabling full service automation and a software-defined architecture.

Technology Solution:
- Juniper Networks® QFX5100 Ethernet Switches
- Juniper Networks MX80 3D Universal Edge Routers
- Juniper Networks SRX1400 Series Services Gateways
- Juniper Networks Contrail Networking

Business Results:
CloudSeeds now has a network that:
- Delivers its vision of zero-touch provisioning
- Allows services to be provisioned in minutes not weeks
- Is highly robust and resilient
- Is cost efficient to operate
- Is an open platform

CloudSeeds, based in Hamburg, Germany, was founded in 2013 to help establish virtualized infrastructures and IT services to companies that are growing rapidly and need scalability for their business objectives.

Kevin Fibich, founder and managing director at CloudSeeds, had worked in a number of operational IT environments and recognized the need for a new class of software-defined IT services based on a highly scalable, flexible and automated platform. CloudSeeds developed its new approach, known as A.C.R.E. (Advanced Cloud Resource Elements), using standard pre-built cloud components creating a highly dynamic IaaS (Infrastructure-as-a-Service) Layer – combining deep automation and complete virtualization to create turnkey solutions for its customers. The platform delivers new data center and IT infrastructure that can scale as its customers' needs change and grow, without customers having to worry about the day-to-day management of IT hardware. CloudSeeds operates dedicated cloud setups for their customers – managed and operated on its premises - as data security is a key topic in the German commercial enterprise sector with customers pressing for data sovereignty.

Kevin Fibich said, "Our customers can sometimes be overwhelmed by their own rapid success and as a result they need to rapidly deploy new infrastructure. We call this a 'friendly DDoS' (distributed denial of service) attack, as their existing network may be overwhelmed by legitimate customer demand. It is a luxury problem for them to have, and our automated software-defined services help them overcome it."

CloudSeeds is enjoying high growth as it takes on new customers, attracted by the business flexibility and scale it offers, and is currently expanding its team.

Challenges

To realize its vision of a new class of automated services, CloudSeeds needed to create a new network platform, providing seamless, high-performance routing, switching and intense security measures. Most critically, it needed an open architecture that could be controlled and configured by software.

CloudSeeds also needed a network platform that could scale ahead of its requirements, and provide a highly resilient service to enable its customers' businesses to grow.

Selection Criteria

CloudSeeds' technical team had already worked with Juniper Networks technology in the past and felt that by comparison to other vendors it gave them more flexibility and future proofing, the configuration and management features were more advanced, and its open APIs had the best potential for scripting and automating tasks.

Kevin Fibich said, "Our entire architecture is a software-defined structure - and everything we do must work over the network. We knew that Juniper's technical philosophy fitted what we wanted to do, and how we wanted to do it."

In particular, CloudSeeds felt that the ability to control its architecture using OpenStack software, and to put the Puppet software agent directly onto devices running Junos OS, set Juniper apart. Puppet is third-party software from Puppet Labs that is used for configuration management. It provides an efficient and scalable solution for managing the disparate configuration of large numbers of devices.

High-performance networking was also a critical requirement for CloudSeeds, along with granular support for quality of service (QoS) and high availability, including the ability to perform in-service software upgrades to ensure full business continuity for CloudSeeds' customers. CloudSeeds also had a preference to source all of its networking equipment from a single vendor to streamline building, maintenance and support.

Solution

CloudSeeds used various Juniper systems to create its new software defined A.C.R.E. platform. It created the physical infrastructure using Juniper Networks QFX5100 Switches to provide it with a high-performance, high-density platform which can support 1GbE, 10GbE and 40GbE connections. It also used Juniper Networks MX80 3D Universal Edge Routers—flexible, full-featured routers that offer 80Gbps of system throughput—and Juniper Networks SRX1400 Service Gateways for secure customer aggregation. Juniper's vSRX virtual firewall was used to create smaller virtual firewalls for CloudSeeds' customers, enabling CloudSeeds to deploy scalable firewall protection in a highly dynamic environment.

CloudSeeds used Juniper Networks Contrail Networking together with OpenStack to orchestrate the software-defined overlay networks, creating virtual networks, service chains, and using the powerful Contrail network analytics engine and API. CloudSeeds highly values the development of Contrail Networking in the OpenContrail open source project and the open community around it. Contrail Networking is decoupled from the physical network underlay but made to interoperate and have visibility into any IP underlay network. The automation available in the Contrail Networking solution and Juniper data center underlay fabric solutions pairs perfectly to streamline the entire data center network at the speed of cloud. Furthermore, Contrail

Networking's open approach to federation with routers was employed to peer with the MX routers to extend and connect virtual networks between data centers, truly realizing the Juniper Networks' data center vision..

Kevin Fibich said, "SDN is well used for cloud infrastructure. Using Contrail has allowed us to create a software-defined network that seamlessly integrates disparate locations into a single unified cloud."

Results

The new network has delivered CloudSeeds' vision of zero-touch provisioning. In turn, this allows the rapid uptake of IaaS services by CloudSeeds' customers, making their businesses far more agile and responsive.

Kevin Fibich said, "Our customers need less staff to operate and run their infrastructure and provision new instances or infrastructure. In addition, the high amount of automation reduces the potential for human errors. They simply pick or receive a new device and cable it up, or we'll do it for them. It's up to the customer whether to operate the new device using their own IT crew, or to leave the management and operation of the device to CloudSeeds. Once the equipment is physically in place and the software overlay is ready-to-go, it only takes minutes to bring up new servers or we can even deploy a whole new data center for customers in a few hours."

CloudSeeds has also used SDN to create a highly robust and resilient infrastructure. CloudSeeds' approach has completely eliminated traditional Layer-2 issues, such as broadcast storms or switching loops, enabling it to use all of its available capacity to maximize operational efficiency and customer satisfaction.

CloudSeeds also has a very high degree of control over its cloud network. Kevin Fibich said, "I need real-time visibility into any performance issues. Using Juniper technology helps me identify any problems or symptoms in the virtual space and isolate any errors in the underlying physical network. This is only possible because of Juniper's open API, as it enables us to put our own software onto the devices. We see a lot of industry discussions around whether or not networking devices should become a simple commodity. We believe that it is far better to have a richly featured system that is supported by the vendor while still open for easy integration, as it gives us the best of both worlds - open and supported with new features."

CloudSeeds also valued Juniper's ability to perform in-service software upgrades, which has allowed CloudSeeds to automate the rollout of new software images without network disruption and removed the need to have technicians on site. Kevin Fibich said, "Instead of rebooting the switch, we simply boot up a second Junos OS virtual machine, then this new machine takes over from the first one without any impact on packet forwarding, so our customers do not even notice software upgrades at all. Downtime is no longer accepted nor necessary."

The network also helps CloudSeeds reduce costs. Kevin Fibich said, "Using Juniper equipment in conjunction with our automation approach means we have less operational expense. It also means we don't need that many specialized IT employees – in fact they are hard to find. This approach frees up our specialists to put their valuable skills to more creative, productive use elsewhere, for example, with customers."

Next Steps and Lessons Learned

CloudSeeds now plans to add even greater scale into its infrastructure with Juniper's QFX10000 line of Ethernet switches, which offer platform support from 3 to 96 Tbps of throughput, all of which deliver the industry's highest 100GbE port density and support up to 480 ports in a single chassis. This will enable CloudSeeds to continue building on its vision of a highly scalable and reliable physical network. CloudSeeds is also exploring the creation of an open marketplace for third-party software developers to build on Network Functions Virtualization (NFV) solutions orchestrated with Contrail Networking layer.

Kevin Fibich concluded, "The Juniper Networks architecture is unique in the way it has helped us create a software-defined network, and in turn an entire software-defined cloud. It has opened up a new world of possibilities for us and our customers."

About Juniper Networks

Juniper Networks is in the business of network innovation. From devices to data centers, from consumers to cloud providers, Juniper Networks delivers the software, silicon and systems that transform the experience and economics of networking. The company serves customers and partners worldwide. Additional information can be found at www.juniper.net.

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