

Running a high-performance data plane application in a dynamic NFV cloud environment

Alcatel-Lucent and CloudBand™ Ecosystem Program member NFWare showcase virtual carrier-grade network address translation (vCGNAT) – a high throughput network functions virtualization (NFV)-based virtual appliance designed to provide transparent address and protocol translation on a carrier's level. In this use case, Alcatel-Lucent and NFWare, working together, demonstrated to a Tier 1 carrier how to run data plane intensive services such as vCGNAT in cloud, as well as how to orchestrate them in a dynamic demanding environment, leveraging the virtual network functions (VNFs) performance indicators for orchestration decisions.

CloudBand ECOSYSTEM PARTICIPANTS

- Alcatel-Lucent
- NFWare

Challenge

Global IPv6 deployment was slower than originally expected and Tier 1 operators must continue to assign IPv4 addresses to large numbers of new customers even when there are no new IPv4 addresses available. A strategy to cope with IPv4 exhaustion can be to use a CGNAT solution. Data plane services in packet core networks historically have been running on dedicated hardware appliances. However, this approach may not be efficient for a decentralized national network of dozens of sites with bandwidth varying between several gigabits and hundreds of gigabits per second. A joint solution from Alcatel-Lucent and NFWare demonstrates how IPv4 exhaustion challenge can be solved in an efficient way using

the NFV approach with commonly available commercial off-the-shelf (COTS) computing hardware, orchestration system and virtualized data plane service with carrier-grade performance. For carriers this approach enables significant service agility and deployment flexibility that cannot be achieved based on a hardware model.

Solution components

- NFWare contributes the virtual CGNAT solution as a virtual appliance including APIs for the cloud and Alcatel-Lucent provides CloudBand – a carrier-grade NFV platform, which enables the management and delivery of cloud computing services with guaranteed availability and response times.

Figure 1. Joint solution architecture

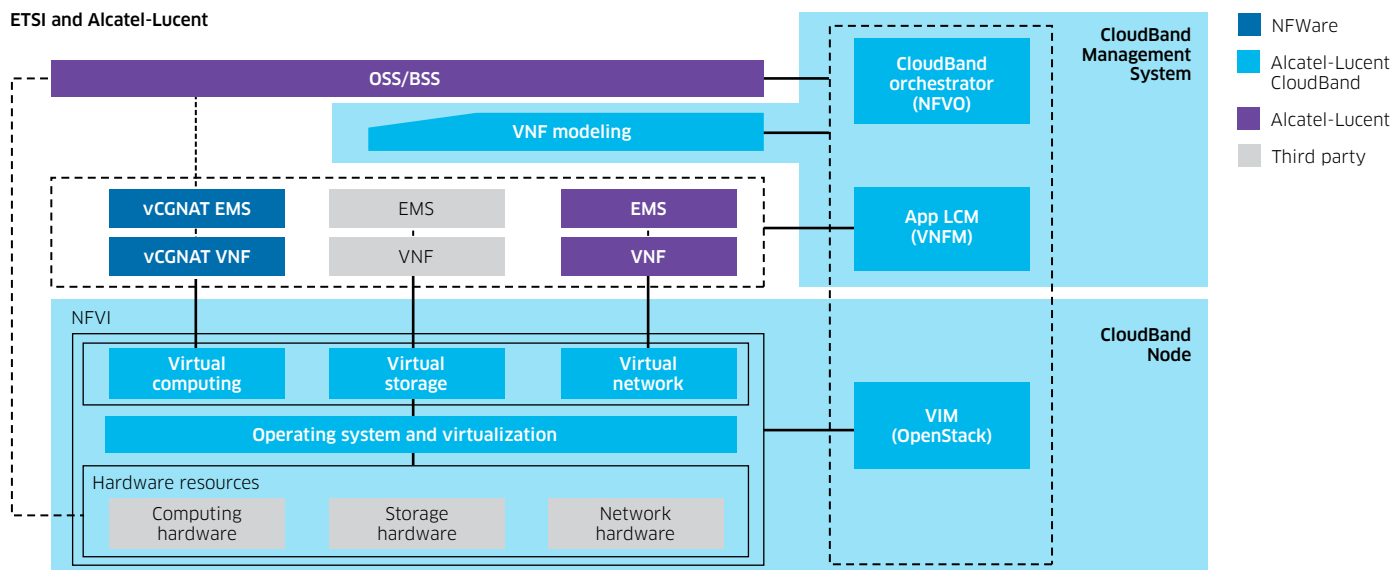


Figure 2. CGNAT deployment

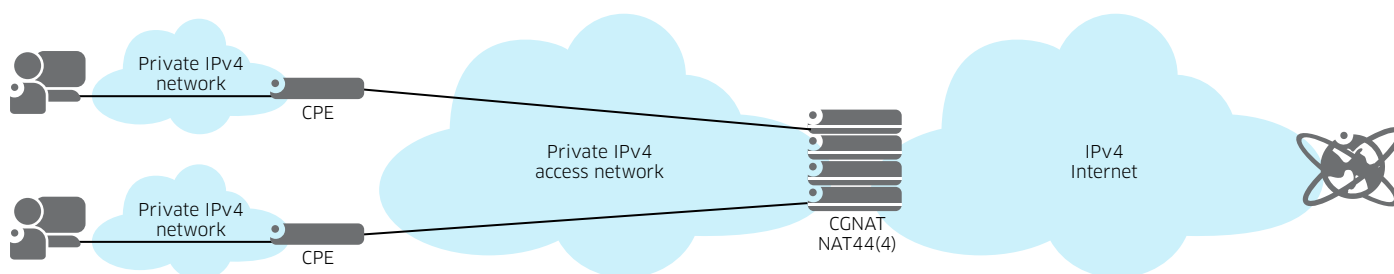
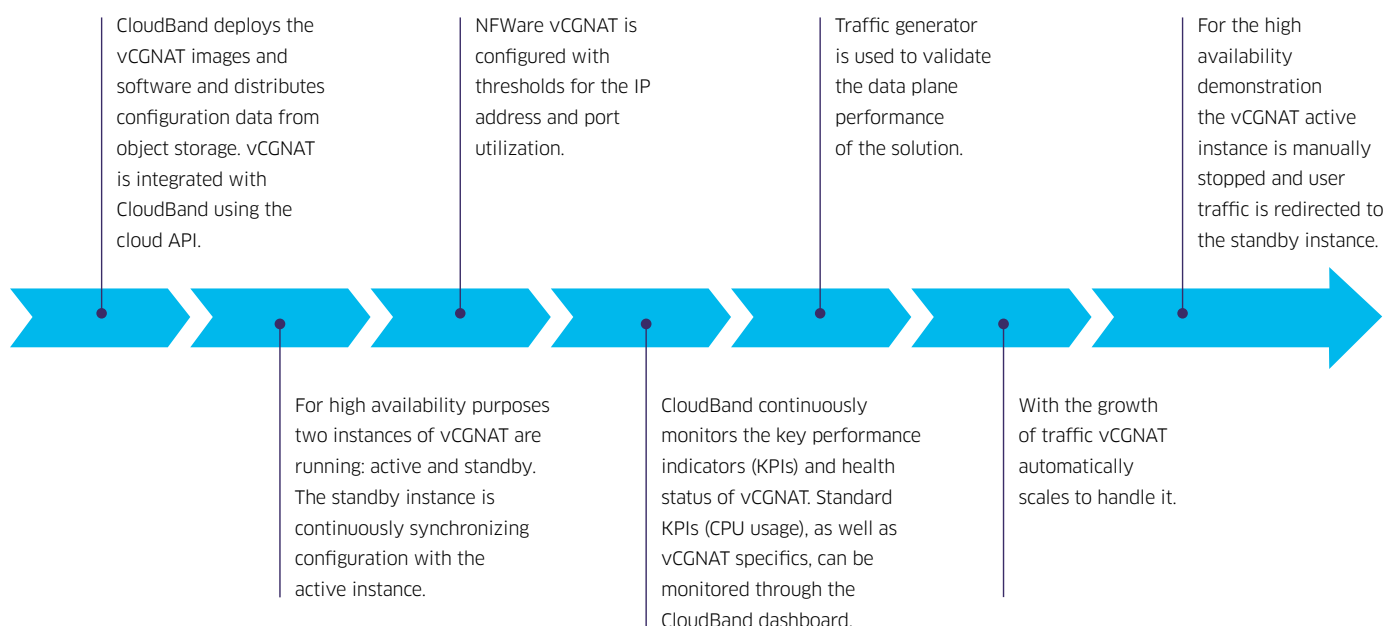


Figure 3. Use case flow



VNF and platform vendor solution components

NFWare

NFWare vCGNAT is a centralized NAT placed in the service provider's network that extends the life of an IPv4 network infrastructure and mitigates IPv4 address exhaustion by using address and port translation on a large scale. With the deployment of CGNAT many customers can share a single public IPv4 address as CGNAT multiplexes the addresses of many inside devices to a single outside address by mapping application flows. NFWare vCGNAT supports all types of NAT mappings and filterings, a rich set of L7 protocol application layer gateways (ALGs) and high-performance logging for lawful interception. It can be deployed on bare metal and in a virtualized environment, delivering as much as 120 Gb/s per host.

CloudBand

The Alcatel-Lucent CloudBand Management System considers factors, such as server load, network congestion and latency, to ensure service-level agreements are met. Another element is the CloudBand Node – a set of computing, storage, virtualization and cloud management components for each cloud facility on the network. With these CloudBand components, Tier 1 operators can establish nodes near the edges of their networks. This gives customers quicker access to cloud resources, thus minimizing network load by shortening the distance to the subscriber and by offloading traffic as early as possible.

Table 1. Key benefits of each solution

CloudBand ECOSYSTEM PARTNER SOLUTIONS	KEY BENEFITS
Alcatel-Lucent CloudBand and CloudBand nodes	<ul style="list-style-type: none"> • Enhances automation • Improves operations • Scales on demand for simplicity and speed • Hosts and orchestrates multiple VNFs contiguously • Enables automatic or manual scripting of business logic • Provides resiliency • Delivers scale-out and scale-in logic • Self-heals in case of failure • Manages distributed resources
NFWare	<ul style="list-style-type: none"> • Elastic, programmable and flexible: virtual CGNAT purposely built for x86 architecture and designed for virtualized and cloud environments • Carrier-grade reliable solution with highest industry performance in Gb/s and Mb/s due to innovative multicore packet processing algorithms • Unique capabilities for scaling with dynamic vertical scale-up – efficient power and license consumption depending on traffic volume • On-demand, pay-as-you-grow licensing

Summary

Virtualized data plane services, such as vCGNAT running in CloudBand, provide operators with a network solution which combines reliability, high throughput, and at the same time, deployment flexibility and operational agility. This use case demonstrates that in packet core networks the NFV approach can be successfully applied, but in many cases it also enables a significant increase in efficiency for operators due to elasticity and accelerated time to market. With this approach, operators can effectively manage data plane functions in a geo-distributed environment with tens of locations.

To learn more about the CloudBand Ecosystem Program or to become a member, visit:
<http://ecosystem.cloud-band.com>.

For more information about the participant in this use case, visit <http://www.nfware.com>.