ALCATEL-LUCENT CLOUDBAND
THE PLATFORM FOR NFV
RELEASE 2.0

- **Accelerate and de-risk the move to network functions virtualization (NFV)**
- **Reduce CAPEX and OPEX with new optimized operational models**
- **Support the performance, availability and security demands of virtual carrier applications**
- **Increase business agility by deploying and upgrading applications and services rapidly**
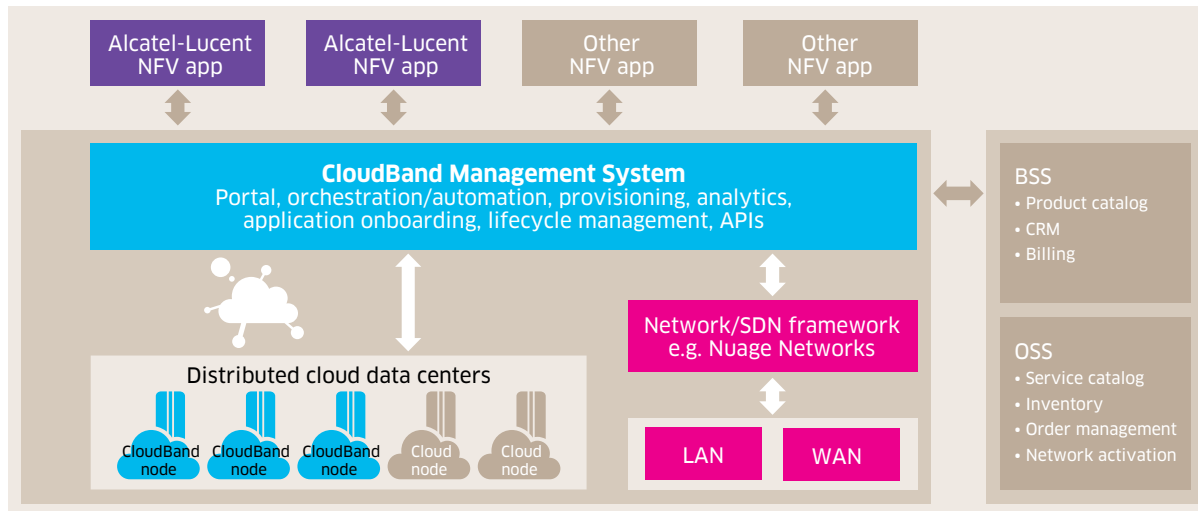
With NFV, service providers bring proven cloud computing and IT technologies into the networking domain. These technologies help reduce equipment and operational costs, power consumption, and time-to-market for new services and functionality. But IT technologies alone are not enough. Service provider applications are more demanding than most IT applications. With the award-winning Alcatel-Lucent CloudBand™ NFV platform, service providers can meet these more rigorous requirements and implement new NFV network architectures. CloudBand supports distributed clouds and dynamic network control to meet application demands. It also optimizes network operations by automating cloud node management, application lifecycle management, smart placement, and network configuration.

SOLUTION OVERVIEW

The Alcatel-Lucent CloudBand platform enables service providers to accelerate adoption of NFV. It provides a fully integrated solution that orchestrates infrastructure, applications and the network in a single virtualized platform. This solution lets service providers migrate to a more efficient and cost-effective operational model, based on automation of infrastructure and application provisioning, self healing and scaling of cloud resources. CloudBand also provides robust metrics for actionable capacity planning analytics.

With an NFV approach, providers can run network functions on a homogeneous, distributed cloud infrastructure. They can port their network functions – such as communications and messaging applications, as well as fixed and mobile network functions – from proprietary hardware to virtual machines (VMs). Once freed from physical boxes, service providers can use this single, virtualized infrastructure as the basis for their own service platforms and operations. With the CloudBand NFV platform they gain the agility to quickly deploy and upgrade services in a dynamic cloud environment, and to grow and shrink service resources on demand. The platform eliminates the need to buy more custom hardware or support the large operations teams that are currently needed to install and manage sites.

Alcatel·Lucent

Figure 1. CloudBand architecture

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SOLUTION COMPONENTS

The Alcatel-Lucent CloudBand solution has been purpose-built to serve as an NFV platform. CloudBand was built with the service provider in mind from its inception. The CloudBand solution comprises a software and hardware stack with two elements: the CloudBand Management System and the CloudBand Node.

The CloudBand Management System

The CloudBand Management System orchestrates, automates, and optimizes virtual network func-tions across the service provider's distributed network and data centers. The management system aggregates distributed cloud resources – cloud nodes – providing a coherent view of the entire NFV infrastructure as a single carrier-grade pool.

The CloudBand Management System has a pluggable architecture, which allows it to evolve quickly and to incorporate new technologies from the dynamic fields of cloud and NFV.

CloudBand provides industry-standard open APIs based on OpenStack™, Apache CloudStack™, and others. NFV applications and other management systems can use the northbound API to manage their cloud resources and the application lifecycle. Southbound APIs allow CloudBand to integrate with different cloud nodes as well as Software-Defined Networks (SDN) and other network frameworks.

CloudBand supports multiple tenants – for exam-ple different service provider departments and divisions – each with their own set of resources and their own accounting. CloudBand supports the changing user roles and responsibilities for cloud administrators and within operations departments as service providers transition toward NFV.

Users can select and instantiate individual VMs and storage volumes as well as complex carrier applications. Using Bell Labs algorithms, CloudBand finds an optimal location for these virtual elements based on resource availability, latency and high availability requirements, compliance, regulatory requirements and other business policies. These optimizations can be tailored around resource cost, cost-to-operate, customer requirements, compliance, and regulatory concerns.

With the CloudBand carrier Platform-as-a-Service (cPaaS) function, service providers can automate the complete application lifecycle from deployment, monitoring, scaling, healing, and upgrading/patching, all the way to phase out.

The CloudBand Management System provides the kind of LAN and WAN networking abstractions needed for NFV applications. Quality of service is assured using bandwidth capping, traffic monitoring, and auditing. To simplify network configuration, CloudBand offers routing domains, a logical concept for Layer 3 connectivity between

Figure 2. CloudBand Management System – user portal

subnets and across multiple cloud nodes and data centers. With routing domains users do not need to specify the details of network connectivity. Routing domains provide access to classical and SDN network frameworks. CloudBand provides built-in load balancing as a service, firewalling, and network address translation.
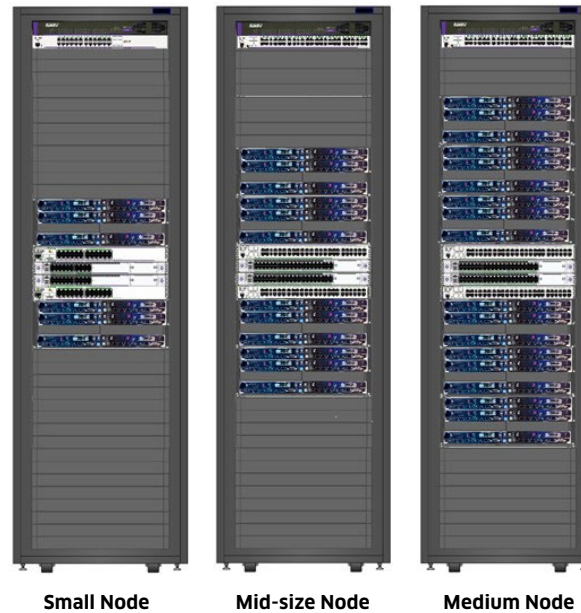
The HTML5-based user interface has been designed to streamline operational processes. User actions, system events, and alerts are first class objects allowing users to track system activity and analyze event flows for problem analysis. As HTML5 tools and technologies are becoming increasingly mainstream, the user interface can be easily adapted to meet customer needs.

The CloudBand Node

The CloudBand Node is a unique, turnkey, all-in-one compute, storage and network node system ("cloud in a box"). It includes hardware and software that has been designed for efficient remote operation of distributed clouds. Legacy data center processes are characterized by manual mounting, cabling, installation, and repair procedures. The CloudBand Node adopts efficient operational models pioneered by web-scale companies to achieve fast deployments and a low total cost of ownership.

CloudBand Nodes are delivered as fully config-ured rack systems that can be automatically commissioned in a central office or data center, within hours. The Node is available in three form factors (small, mid-size, and medium) and can provision more than a thousand VMs per rack. The Node provides a high-speed distributed storage system with solid state and hard disk

Figure 3. CloudBand Node in three form factors

| Small Node | Mid-size Node | Medium Node |

drives. CloudBand Nodes are currently delivered with off-the-shelf HP™ server hardware. Due to its multi-vendor architecture, the Node can be integrated with server hardware from the customer's preferred vendors.

Much of the value of the Node is contained in its software, a high-availability software stack that includes a module for automated installation and configuration, modules for system, network and server monitoring, the Ceph distributed storage system, and OpenStack or CloudStack™ as the infrastructure manager. Nodes can be partitioned into security zones to isolate and protect NFV applications with different security requirements.

THE CLOUDBAND ADVANTAGE

Alcatel-Lucent CloudBand was purpose-built as an NFV platform to satisfy the needs of demanding NFV applications. CloudBand is the only solution that integrates the five main differentiators for a successful NFV implementation; these differentia-tors can be used as a benchmark for any NFV cloud platform.

ORCHESTRATING DISTRIBUTED DATA CENTERS — TREATS DATA CENTERS AND NETWORK AS A SINGLE CLOUD

Many NFV applications need to respond in real time with low latency. NFV applications also need to be highly available and capable of surviving disasters. For these reasons, NFV infrastructures need to be distributed across a geographic coverage area or even multiple countries in the case of multi-national service providers. CloudBand enables service providers to manage and orchestrate distributed data centers and networks as one virtual entity, displaying status and resource availability across the entire infra-structure. CloudBand places NFV workloads based on resource availability and business policies.

LEVERAGING THE NETWORK — MEETS PROVIDERS' NETWORKING DEMANDS

A service provider's most valuable resource is its network, known for its high reliability, availability and performance. But providers need to find a way to leverage this asset, embedding network functions into the network, and relying on network connectivity. With its network driver, CloudBand abstracts and automates network provisioning and monitoring while being agnostic to any third-party network equipment and/or SDN implementation.

The Nuage Networks Virtualized Services Platform is fully integrated into CloudBand's SDN solution, enabling a fully programmable data center network. Because the Nuage Networks solution is policy driven, CloudBand users can create networking policies in the same way they create policies for compute and storage.

AUTOMATING THE CLOUD NODE – LESS THAN FOUR HOURS FROM BARE METAL TO FULL FUNCTIONALITY

Current node installation and operation increases complexity and CAPEX, requiring professional teams to set up and maintain this equipment. In contrast, the CloudBand Node bootstraps itself within less than four hours. The CloudBand Node monitors itself and autonomously reacts to failed components (self-healing).

MANAGING APPLICATION LIFECYCLES – cPAAS AUTOMATES AND OPTIMIZES APPLICATION SERVICES

CloudBand's cPaaS application lifecycle management platform removes the complexity in onboarding and handling complex carrier applications. Any onboarded application can be deployed at the push of a button using the CloudBand placement algorithms. Based on "recipes", cPaaS also automates the monitoring, scaling and healing of applications.

OPEN AND MULTI-VENDOR – NO VENDOR LOCK-IN FOR A BEST-OF-BREED SOLUTION

Any platform for NFV must be able to leverage best-of-breed solutions from different vendors, avoiding vendor lock-in and reusing existing service provider infrastructure where appropriate. CloudBand does not lock service providers into

a particular choice of compute and storage hardware. CloudBand has demonstrated its ability to onboard NFV applications from small and large vendors. CloudBand provides northbound and southbound industry-standard APIs for use by applications and OSS/BSS.

THE CLOUDBAND ECOSYSTEM

Network functions virtualization can succeed only if all industry players work together. Alcatel-Lucent launched the CloudBand Ecosystem Program as a hub for idea exchange, exploration and collaboration between service providers, NFV solution partners and NFV application vendors. We are inviting the industry to use our CloudBand NFV platform to onboard applications and access free tools, resources, and use cases that will help accelerate change and create new business opportunities.

SOLUTION FEATURES

FEATURE	BENEFIT
Efficient management of a distributed cloud	• Supports carrier SLAs with low latency, jitter and scalability, and high availability. • Provides a coherent view of a distributed NFV infrastructure • Provides automatic quasi-optimal placement of cloud resources
Operational optimization/DevOps	• Enables service providers to evolve toward agile service development and operation (DevOps) with application lifecycle management, node automation, and HTML5 user interface
NFV network control	• Supports the demanding networking requirements of NFV applications including rapid changes with routing domains, network templates and SDN framework integration
Carrier grade, integration and hardening	• Delivers high availability, coherent error messages, upgradability, and stability thanks to an extensive effort to integrate technologies • Uses state-of-the-art open source and proprietary technologies such as OpenStack, CloudStack, Ceph, Nuage Networks, and more
Open and multi-vendor architecture	• Supports industry-standard multi-vendor IT hardware and software at the level of compute, storage, and networking hardware • Supports NFV applications from different vendors including Alcatel-Lucent competitors • Relies on industry-standard open APIs and frameworks, such as ETSI NFV and OpenStack

For more information on the Alcatel-Lucent CloudBand solution contact your local representative or visit:

Cloud opportunities
http://www.alcatel-lucent.com/solutions/cloud

CloudBand solution
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CloudBand Ecosystem Program
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