ALCATEL-LUCENT CLOUDBAND

RELEASE 1.0

CloudBand brings the power of the network to the cloud

- **Optimize business, infrastructure and operations**
- **Set the stage for new business models, revenue and profits**

The Alcatel-Lucent CloudBand solution provides the foundation for a new class of carrier cloud. It enables communications service providers to bring the benefits of the cloud to their own network and business operations. It also allows them to offer a new range of high-performance cloud services to their enterprise and consumer customers.

SOLUTION OVERVIEW

The Alcatel-Lucent CloudBand solution provides a carrier-grade framework to build and manage a carrier cloud service delivery environment. CloudBand is comprised of two distinct elements:

- CloudBand Management System, which orchestrates, automates and optimizes services between the communications network and the cloud.
- CloudBand Node, which provides the compute, storage and networking hardware to host a wide range of cloud services.

CloudBand capabilities can be expanded beyond the service provider's network to help manage access to a wide array of public and private clouds. In addition, CloudBand features advanced algorithms developed by Alcatel-Lucent Bell Labs. These algorithms give service providers the flexibility to deliver services in the most efficient way based on business logic such as location, cloud node availability, system response time, network usage and service level agreements.

The CloudBand Management System is deployed on one or more cloud nodes. It manages multiple cloud nodes as well as federated resources from

other clouds. The cloud nodes, or data centers, can be CloudBand Nodes or any other node supported by the CloudBand Management System. Figure 1 illustrates the relationship between the CloudBand Management System, which is deployed on one or more cloud nodes, and the network and cloud nodes.

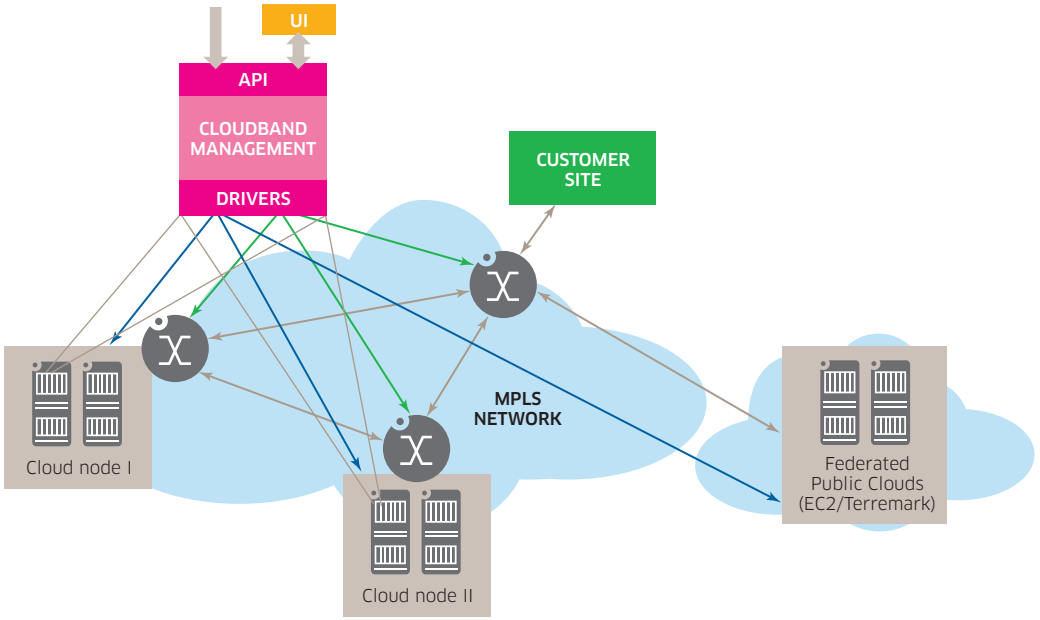
THE CLOUDBAND MANAGEMENT SYSTEM

The CloudBand Management System brings together the wide area network and the data center resource pools to provide a global view of, and control over, the service delivery environment. This allows service providers to look at all resources as a single carrier-grade pool. The goal of the management system is to leverage cloud and network resources to deliver the best service for the customer at the lowest cost. For example, it delivers the intelligence to optimally place services for the best customer result. These optimizations can be tailored based on cost to operate, customer requirements and other factors.

THE CLOUDBAND NODE

The CloudBand Node is a pre-configured, all-in-one system that allows service providers to immediately implement CloudBand and begin offering cloud-based network, compute and storage services. It includes hardware and software with a built-in management layer and automated commissioning capabilities and is delivered in a fully configured rack system that can be deployed in a central office or a data center. The CloudBand Node is designed to greatly streamline the processes required for a service provider to begin offering services. For example, it includes an online portal so services can be rapidly configured and launched.

Figure 1. The CloudBand Management System manages cloud nodes and federated resources from other clouds



The CloudBand Node:

- Includes integrated cloud hardware and software designed for service providers' distributed clouds
- Uses a northbound API to communicate with the CloudBand Management System
- Is delivered in predefined form factors (small, medium, large)
- Is pre-integrated, mounted and tested before delivery
- Uses third-party cloud stacks

CLOUDBAND BENEFITS

Save capital and operating expenses

An Alcatel-Lucent Bell Labs business model demonstrates the capital expenditure (CAPEX) and operational expenditure (OPEX) benefits of moving a service provider's service delivery environment to the cloud.

- The results show that up to 80 percent of a service provider's service delivery infrastructure can be positively impacted, reducing capital and operating expenses as well as total cost of operation and ownership.

Increase revenue by reducing time-to-market

CloudBand reduces time-to-market, opening the

door to incremental revenue opportunities for service providers.

- Reducing time-to-market can increase market share.
- Offering try-before-you-buy functionality can accelerate and increase market penetration.

Enhance quality of experience

The CloudBand Management System manages all aspects of distribution, placing virtual machines, applications and content in the optimal location based on business logic. It takes advantage of the service provider's geographically distributed data centers to lower latency, especially for applications such as virtual desktops, online gaming, video conferencing or those that use Asynchronous JavaScript and XML. These applications are all affected by latency and typically consume more network bandwidth as the number of users increases. CloudBand optimizes the entire infrastructure, using the network to improve performance and reduce costs.

- Service providers can offer end-to-end cloud services because they operate both the cloud and network infrastructures. Service providers can configure these two layers to optimize customer experience, for example, by provisioning paths with the bandwidth or delay required by a service.
- Service providers can guarantee quality of service because they can reserve resources in the network and cloud infrastructures.
- Services can be executed very close to customers with minimum delay and maximum bandwidth.
- Traffic can be managed by placing services in regions of the network that have the capacity. Avoiding highly loaded network regions leads to a better experience for all customers.
- Service providers can innovate quicker and rapidly deploy new services on their cloud-based infrastructure. Customers benefit from a large set of innovative services that scale as demand increases.

THE CLOUDBAND ARCHITECTURE

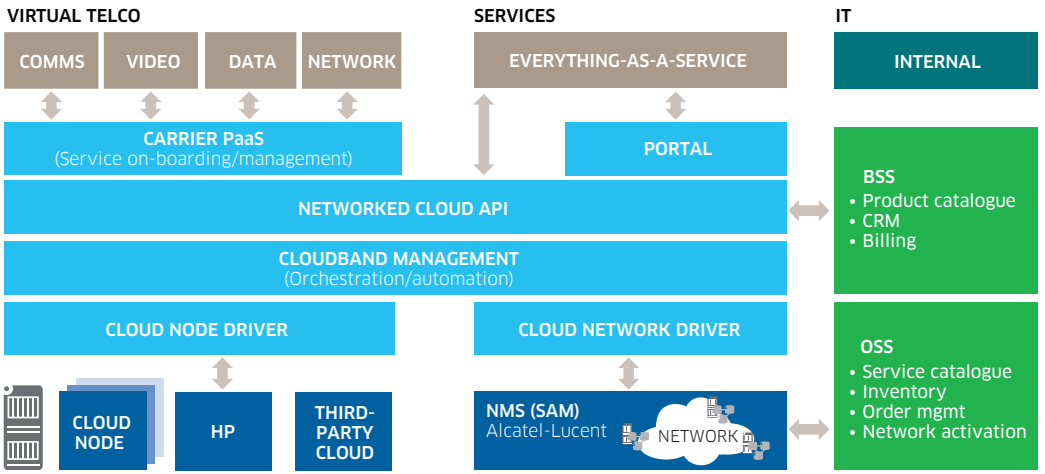
The CloudBand architecture provides a unified platform and management layer for the following applications:

- **Carrier cloud services:** A new class of cloud services for enterprise, government and consumer customers.
- **Carrier cloud operation:** Cloud-based service delivery and operations infrastructure for network, compute and data storage.
- **Carrier IT:** Cloud-based IT infrastructure for the service provider's internal operations.

In the Alcatel-Lucent CloudBand architecture shown in Figure 2, the CloudBand Management System is presented as a management layer positioned over existing compute and storage hardware and network resources. Underneath, the cloud node driver and the cloud network driver work together to pool the network, compute and storage resources and capabilities.

The CloudBand management layer provides a consolidated virtualization layer that orchestrates resource allocation. It provides automation capabilities that ensure resource requests are handled in the most efficient manner. This orchestration

Figure 2. Alcatel-Lucent CloudBand Architecture



removes the complexity of managing multiple systems. The management layer ensures that the entire network appears as one resource to the service provider and that the allocation of compute, storage and network resources is transparent to administrators and users.

As a carrier-grade solution, CloudBand provides a variety of northbound interfaces. The API supports customized interfaces for integration with the service provider's existing IT and operations systems, or for use by the internal teams that allocate services to customers. CloudBand provides a built-in portal for the service provider's use, as well as a ready-to-use interface for customers to purchase virtual machines, virtual private network (VPN) and network services. This simplified system architecture allows internal services to be used across the cloud network, dramatically reducing the complexity of managing IT and operations within the service provider's organization.

CloudBand can also be integrated with major service provider systems, including operations and business support systems (OSSs and BSSs) and customer relationship management (CRM) systems.

To support service providers as they transition to the cloud, Alcatel-Lucent offers a range of carrier cloud professional services, including:

- Consultation
- Planning and design
- Implementation

LEARN MORE

For more information about the Alcatel-Lucent CloudBand solution, please visit **http://alcatel-lucent.com/cloud**

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