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Cloud communication and collaboration with Rapport on CloudBand

Telco Cloud

Application Note

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Executive summary

Service providers around the globe are introducing cloud-based communication and collaboration solutions based on Nokia Telco cloud technology. The introduction of VoLTE and VoWi-Fi, PSTN replacement and advanced communication services for enterprises are compelling events for adopting the new virtualized Rapport™ software on CloudBand™. In a multi-year effort, Nokia has developed a pre-integrated solution with automated deployment, scaling and tools for seamless service assurance. Particular care has been taken to provide the high availability and operational readiness needed for production deployments.

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Why a virtualized communication and collaboration solution?

With network functions virtualization (NFV), service providers and telecom equipment vendors are targeting a new level of service agility, simplified operations and reduced CAPEX. Many service providers are starting their journey to NFV with new services such as Voice over LTE (VoLTE) and Voice over Wi-Fi (VoWi-Fi), taking advantage of the newest available technology base right from the start.

IP Multimedia Subsystem (IMS), the foundation for VoLTE networks, is a mature technology but has been complex and costly to handle when used in its traditional form. A traditional IMS network is deployed on a set of dedicated servers, which sometimes have different underlying platforms. Deploying such complex configurations, and then introducing and testing new features or extending capacity, takes many months as specific hardware needs to be procured and deployed well in advance. Software upgrades with essential new features can take 6 months to validate and deploy. It is also difficult to start small as the minimum configuration cannot be consolidated into an optimal size. Capacity needs to be deployed a year in advance to meet the scaling needs of new services, making the network inflexible for those new services and any form of innovation.

To answer these challenges, Nokia has significantly cut the cost and complexity of delivering communication services by fully re-architecting its widely deployed IMS into a software-based cloud platform called Rapport. While providing feature parity and the same committed service level agreements as physical deployments, Nokia Rapport moves IMS fully into NFV. This includes both control and media elements, such as a telephony application server and Session Border Controller (SBC). By re-architecting and implementing IMS as virtualized network functions (VNFs), Rapport simplifies deployment, enables cost efficiency for small and large networks and improves life-cycle management (for example, fewer maintenance windows for software upgrades).

Rapport allows service providers to shift their focus to growth and innovation by embedding voice, video and social messaging into any application to enrich existing services or create new ones. With Rapport, service providers can drive new revenue with new services and new markets enabled by APIs, WebRTC, and mobile integration into business communications. Communication becomes an asset that can be built into any service or application.

Service providers are moving the NFV solution into production networks delivering service from a few thousand users to tens of millions. This means that the solution needs to be as highly available and manageable as classical network solutions.

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Features and benefits of Rapport on CloudBand

The most critical part of getting NFV right relates to how VNFs, like Rapport, are managed and orchestrated in a cloud environment. CloudBand is Nokia's industry-leading production NFV platform deployed with numerous service providers around the globe.

Based on that experience, recently launched CloudBand 3.0 has been specifically designed to simplify and de-risk the move from proof-of-concept to production. CloudBand 3.0 has been developed and successfully tested as an open, multivendor platform in conjunction with Nokia and third-party VNFs.

To speed up the delivery of cloud-based VoLTE and VoWi-Fi services, Nokia has pre-integrated Rapport with CloudBand to offer a complete NFV solution. While Rapport and CloudBand are both independent, open systems, Nokia makes sure that customers can leverage the full benefits of a combined solution.

- Rapport is included in the CloudBand application catalog and the VNF descriptors for automated deployment have been created and tested. Rapport can benefit from CloudBand's policy-based placement algorithm to make sure that VNF components are placed where the required platform resources are available and that (anti-)affinity policies are implemented. With CloudBand, service providers can easily onboard and deploy additional value-added service Function from the ecosystem or other third parties.
- As a well-designed, integrated solution, Rapport on CloudBand takes less work to deploy and is available sooner for commercial service. It provides more efficient networking and storage, including no single point of failure of the NFV infrastructure (NFVI). And IP address management of large distributed systems is simplified via CloudBand's integration of software-defined networking with Nuage Networks™ Virtualized Services Platform.
- Service assurance: Rapport and CloudBand have been integrated to simplify and automate handling of failures. CloudBand notifies Rapport of potential service-affecting alarms and events related to the NFVI (Deduced Alerts). Rapport uses that notification to quickly restore redundancy or migrate virtual machines off of servers that are at risk. CloudBand root cause analysis helps to reduce the number of alarms and identify their true origin. CloudBand itself has been made resilient to failures, ensuring that deployed VNFs are not orphaned and the NFV platform always has a correct view of the infrastructure resources. CloudBand and Rapport can be upgraded without service interruption (in-service software upgrade).
- Networking: The solution provides dual stack IPv4/IPv6 networking across multiple data centers as well as data plane acceleration with Single-Root Input/Output Virtualization in bonded mode for high availability or other technologies. Rapport's media-intensive VNFs, such as the SBC and Media Resource Function (MRF), are commercially deployed for cloud.
- Security: CloudBand security design has been hardened with numerous measures. For example, external as well as internal API usage is authenticated and encrypted. CloudBand security has been audited by external parties. CloudBand provides role-based access control in a multi-tenant environment allowing different teams to securely share the NFV platform.

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Customer cases

Service providers are now deploying Rapport on CloudBand. Here are some examples discussing their motivation:

- China Mobile Communications Corporation (CMCC) trial, APAC – The service provider expects from an NFV solution a significant cost reduction with the ability to reduce service prices as well as a better competitive position against over-the-top communication providers. The large-scale introduction of COTS servers will give CMCC a significantly better bargaining position for hardware purchases, while the ability to roll out and scale up services and features more quickly will reduce OPEX and improve their position against web-scale competitors. The service provider is now moving from lab trials to field trials to prepare for commercial deployment in the coming years.
- Tier 2 service provider deployment, Europe – The service provider pursues a pragmatic NFV strategy with initial focus on virtualized IMS for VoLTE and virtualized evolved packet core. The service provider expects to cut down service installation and expansion times, compared with those of a classical IMS solution, and expects to gain more freedom of choice for hardware purchases and better service agility. The service provider is starting with a non-NFV solution and will then expand with NFV as soon as it is fully tested.
- Tier 3 service provider deployment, North America – The service provider does not originally have a strong preference for NFV. The proposal to deploy an NFV-based solution came from the perspective of a more efficient VoLTE deployment. The main advantages are a faster time-to-deploy, a more compact small-scale solution due to the ability to package multiple VNFs on a small number of servers, a better performance due to newer hardware and better hardware utilization. In addition, the solution allows rapid addition of value-added services based on ecosystem members and Rapport APIs for service innovation.

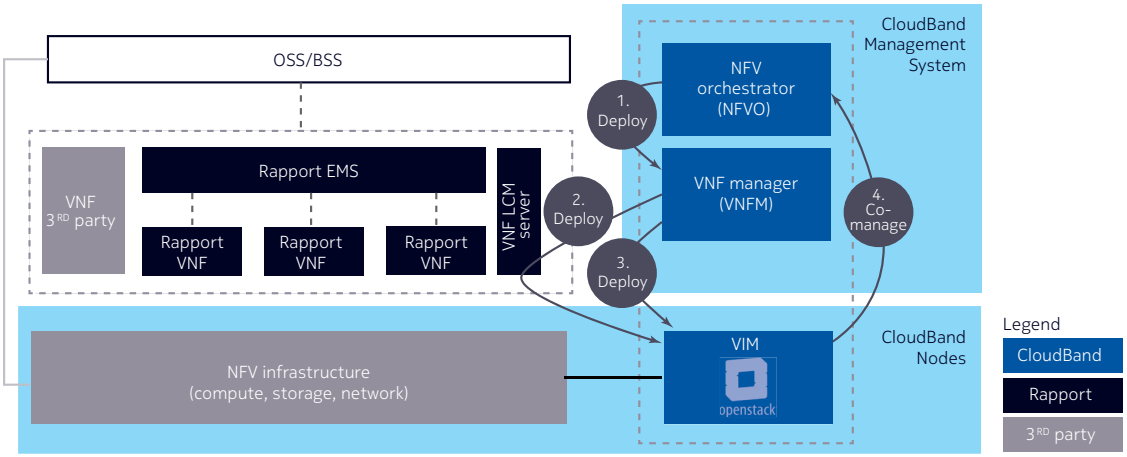
Business case

With Rapport on CloudBand, service providers can reduce CAPEX and OPEX and increase service agility, benefits frequently attributed to NFV. Rapport simplifies network operations; new instances can be rapidly deployed in new markets and for new enterprise customers. Rapport can be scaled up quickly to match growing service demand. Rapport can be packaged to run in smaller configurations by deploying multiple component Function as virtual machines on few servers. For example, as assessed by a North American region service provider, the virtualized version of an offline charging network function provides an 80 percent better utilization of the hardware resources, because a better balance is achieved between input/output and processing VMs compared with dedicated blades in a physical deployment. NFV enables better performance due to rapid availability of the latest powerful server technology. The CloudBand Node Suite is a cost-effective commercial package specifically designed for service providers to get started with NFV and be able to add more applications incrementally. Nokia is ready to develop business cases tailored to specific customer projects.

Application architecture

Rapport is deployed on CloudBand as a set of VNFs (Figure 1). One or more CloudBand Nodes provide the NFV infrastructure with compute servers, storage and networking as well as the virtual infrastructure manager (VIM) with built-in monitoring capability. The CloudBand ManagementSystem provides the NFV orchestrator function including the distributed resource management and service assurance.

Figure 1. Information flows and architecture of Rapport on CloudBand



Rapport uses a VNF life-cycle management (LCM) server that is designed to co-reside with its element management system (EMS) or to be a stand-alone micro-service. The Rapport VNF LCM server provides basic actions such as deploy, scale, heal or upgrade, which are initiated through RESTful APIs or command line instructions. Combined with CloudBand's VNF manager (VNFM), the VNF LCM server provides advanced automation of operations such as self-healing and auto-scaling.

CloudBand supports such external VNF LCM servers with its Co-Manage function. While Rapport interacts directly with the OpenStack-based VIM to allocate or delete virtual resources, the CloudBand management system is synchronized with the VIMs in the CloudBand Nodes so as to maintain an up-to-date view of all resources. CloudBand also provides root cause analysis and delivers relevant infrastructure-related alarms and events to Rapport.

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Simplify the delivery of advanced communication and collaboration services with Rapport and CloudBand

Pragmatic service providers are looking for opportunities to differentiate with advanced services in an increasingly competitive market. The introduction of VoLTE and VoWi-Fi, APIs, WebRTC, PSTN replacement, or open communications solutions for large enterprises are compelling events to get started with a new technology — NFV — instead of aging conventional solutions. Rapport on CloudBand is the result of a multi-year development and validation process. The pre-integrated solution lowers the risk, yet is fully open to evolution with additional third-party communication applications or any other NFV applications, such as those available from the Nokia ecosystem. The NFV approach enables a dynamic response to customer uptake both by swiftly adding capacity as needed and by innovating with new features such as application-embedded communication, WebRTC and self-service portals. Virtualized solutions can be packaged more flexibly for very small to very large configurations and enable a better utilization of hardware resources. For this NFV approach, Rapport and CloudBand work together to make service delivery a seamless experience, even when there are failures either at the NFV platform level or at the Rapport application level. In addition to automated failover, the solution provides the tools for quickly pinpointing and remedying problems.

Tier 1 through Tier 3 service providers have validated the business case and are now deploying Rapport on CloudBand for commercial service.

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Acronyms

BSS	business support system
CAPEX	capital expenditures
CMCC	China Mobile Communications Corporation
EMS	element management system
IMS	IP Multimedia Subsystem
LCM	life-cycle manager
MRF	media resource function
NFV	network Function virtualization
NFVI	network Function virtualization infrastructure
NFVO	NFV Orchestrator
OPEX	operating expenditures
OSS	operations support system
PSTN	public switched telephone network
SBC	session border controller
VIM	virtual infrastructure manager
VNF	virtual network function
VNFM	VNF manager
VoLTE	Voice over LTE
VoWi-Fi	Voice over Wi-Fi

Further reading

- Web page: CloudBand – The platform for NFV
- CloudBand Solution Sheet
- Video: Ron Haberman: Bringing NFV to production with CloudBand 3.0
- Web page: Rapport – the next wave of communications
- Video: Rapport – the next wave of communications

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