# UNIFY SUBSCRIBER ACCESS MANAGEMENT AND EXPLOIT THE BUSINESS BENEFITS OF NOKIA REGISTERS ON VMWARE vCLOUD NFV

Subscriber data management (SDM) plays a significant role in network evolution as a key entity of the modern CSP network. This is defined by business drivers like 5G, LTE, VoLTE/VoWifi, and hundreds of millions of upcoming internet of things (IoT) subscriptions, generating the need for proper and reliable network authentication and SDM. Further, there is a need to operate these virtual network functions (VNFs) as stateless functions in the telco cloud. These cloud native applications are beginning to be rolled out, as operators accelerate the evolution of their networks toward cloud architectures and 5G.

To turn challenges into opportunities, a unified core network infrastructure is needed, where components supplied by a variety of vendors are brought together following emerging industry standards for easy and cost-efficient interoperation. Operators need to focus on evolving their network infrastructure toward the cloud in order to leverage its scale and agility to ensure faster service introduction and reduced total cost of ownership (TCO).

Telco-grade applications and networks demand stringent performance, interoperability, uptime and support / service level agreement (SLA) requirements. To ensure lasting business benefits, communications service providers (CSPs) are realizing that there are significant advantages to designing subscriber-centric networks and working with carefully chosen vendors like Nokia and VMware, who are partnering to deliver well-integrated solutions that help address and overcome these challenges.
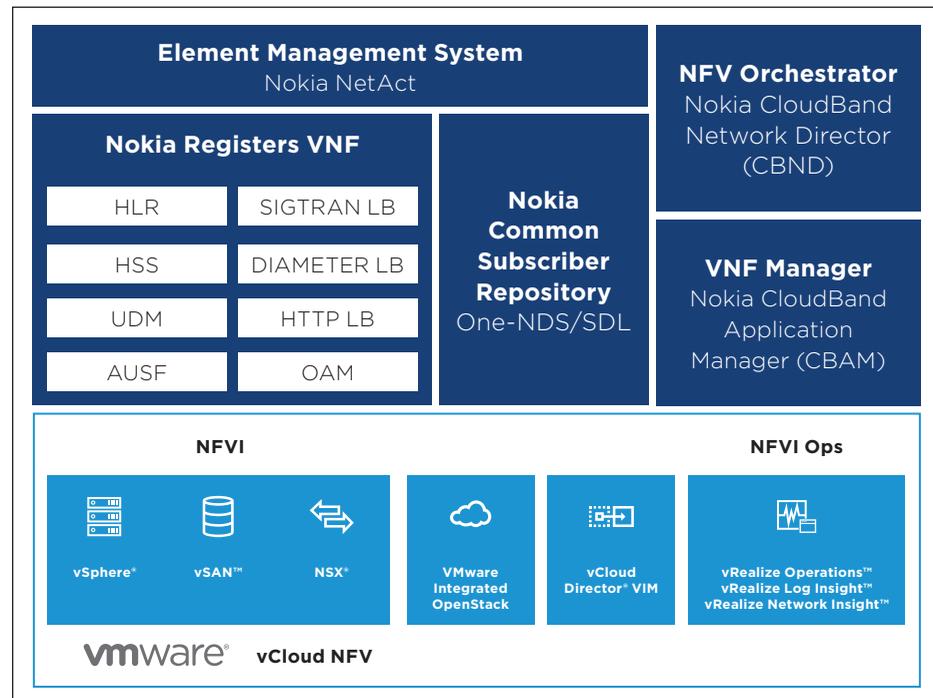
Nokia is the market leader for advanced SDM solutions suitable for mobile operators, fixed, hybrid, mobile virtual network operators in mature and emerging markets. Nokia's SDM enables operators to create innovative and agile services. Nokia's approach to telco cloud infrastructure virtualization is based on openness and a multistack strategy. One main pillar of this strategy is VMware vCloud NFV, an NFV infrastructure platform tailor-made for communication service provider's needs.

## Nokia Registers—Unified Solution for Subscriber Access Management

Nokia Registers is the evolution of the Nokia HSS solution, which includes all functionalities of HLR/HSS/UDM/AUSF. Using the advanced capabilities of Nokia user data repositories (One-NDS/SDL), Nokia Registers enables the consolidation of subscriber data into a common repository using a distributed and flexible architecture.

Most operators today must accommodate different technologies in their networks, including fixed, mobile, and Wi-Fi. They need to manage subscribers' data and authentication in a flexible way across technologies while delivering high-quality service to their subscribers and ensuring quick and seamless introduction of innovative services.

The Nokia Registers solution supports management of 2G, 3G, 4G, 5G, IoT, and fixed networks in a unified and extremely scalable manner that decouples subscriber data administration from HLR/HSS/UDM/AUSF functions. Nokia Registers is a powerful solution for multitechnology network subscriber data and service management. It also lays the groundwork for future evolution to 5G and next-generation networks.

| Element Management System<br>Nokia NetAct | | NFV Orchestrator<br>Nokia CloudBand<br>Network Director<br>(CBND) |
|---|---|---|
| **Nokia Registers VNF** | **Nokia Common Subscriber Repository** One-NDS/SDL | |
| HLR · SIGTRAN LB | | **VNF Manager**<br>Nokia CloudBand<br>Application<br>Manager (CBAM) |
| HSS · DIAMETER LB | | |
| UDM · HTTP LB | | |
| AUSF · OAM | | |

**NFVI**          **NFVI Ops**

vSphere® · vSAN™ · NSX® · VMware Integrated OpenStack · vCloud Director® VIM · vRealize Operations™ vRealize Log Insight™ vRealize Network Insight™

**vm**ware®   **vCloud NFV**

## Proven Scalability in the Telco Cloud

The Nokia Registers solution's evolution is based on cloud-native principles to fully leverage the benefits of the cloud. The field-proven functional code of the bare-metal solution has been re-used and adapted to achieve true cloud native architecture. With its stateless architecture, Nokia Registers is designed to achieve the same massive scale with no performance degradation, which is crucial to supporting hundreds of millions of subscriptions in large-scale IoT deployments.

Running Nokia Registers on VMware® vCloud® NFV™ further optimizes the solution, beginning with fast and simple onboarding. Operators will gain balanced performance with scaling and dynamic resource scheduling. They'll see faster response times with the flexibility and agility needed to support today's VNF needs and future technology evolutions. They can count on the carrier-grade performance and availability expected of this industry. And finally, they'll experience added confidence in partnering with two industry powerhouses. The Nokia unified subscriber solution has many commercial deployments around the world, and vCloud NFV is deployed in Tier 1 networks across the globe, servicing over 300 million active mobile subscribers.

**vm**ware® | **NOKIA**

- VMware vSphere

- VMware vSphere with
Operations Management™

- VMware vRealize®
Operations Insight™

- VMware vSAN

- VMWare vCloud Director for
Service Providers

- VMware Integrated OpenStack

- VMware NSX

- VMware Site Recovery Manager™

- Policy-based provisioning,
simplifying the resource
allocation for VNFs

## VMware vCloud NFV Platform

VMware vCloud NFV is a modular, horizontal, common NFV infrastructure (NFVI) platform built on proven virtualization technologies for compute, storage, and networking, along with integrated dual multi-tenant VIMs. This solution enables cloud-centralized operations and management across the deployed topologies, and delivers an integrated set of NFV service delivery, operations, and management capabilities. VMware vCloud NFV augments Nokia Registers through:

- **Services management automation**—vCloud NFV provides flexible, automated VNF onboarding and full-service lifecycle management through multi-VIM capabilities, greatly accelerating new service onboarding and expanding customers with faster time to market. With VMware vCloud Director (VCD) or VMware Integrated OpenStack (VIO)—a full OpenStack implementation—organizations can automate the process of deploying VNFs and NFVI resources, including the configuration and provisioning of compute, storage, and networking resources. With policy-based provisioning, vCloud NFV simplifies the resource allocation for VNFs, giving organizations a multitenant, robust VIM that automates and accelerates service deployment.

- **Carrier-grade performance and availability**—vCloud NFV provides proven carrier-class performance, extending control, and data plane–separated cluster design. Workloads can take advantage of the high-performance fabric with built-in dynamic high availability and scalability to meet application demands. Service-level agreement (SLA) guarantees are met through resource isolation, reservations, and dynamic workload placements with DRS and VMware vSphere vMotion® technologies. The platform can be scaled from a branch office virtual PoP to a large centralized data center to achieve micro-data center and multi-tenant network sliced designs.

- **Integrated operations management**—vCloud NFV is a fully integrated, single-pane-of-glass cloud solution that ensures and restores service levels using near-real-time operation monitoring, analytics, automation, and remediation. The solution provides an overall integrated and correlated view across service, access, network, and virtual and physical tiers, with issue isolation and recommendations for RightScale Cloud Appliance (RCA). Northbound triggering closes the loop with service and resource orchestration remediation and network management systems / operations support systems (NMS/OSS) notifications. The solution can be extended with custom data feeds and third-party domain and technology expert analytics systems.

## Key Features and Benefits of Running Nokia Registers on vCloud NFV

The flexibility, automation and hardware abstraction enabled by VMware vCloud NFV comes together with Nokia Registers to deliver faster, easier, and more effective unified subscriber access management in the telco cloud. This joint solution:

- Combines UDM and AUSF functions for 5G, HSS function for LTE, and IMS and the HLR/AuC function for 2G/3G into one unified solution
- Allows easy introduction of machine type communications (MTC) and IoT services
- Delivers seamless roaming, handover, and load balancing between technologies
- Reduces operating expenses with common applications, a single point of provisioning, and simplified network architecture
- Enables geo-redundancy and multiple-applications hosting—including third-party applications
- Provides simplified installation and deployment, and a fast path to a fully operational environment
- Offers seamless and hitless upgrades using vCloud Director or VMware Integrated OpenStack VIM
- Delivers 360-degree visibility, proactive and predictive analytics, issue isolation, root cause analysis, and fast remediation capabilities from a single pane of glass
- Helps deliver on infrastructure-related SLAs and improved capacity planning while securing tenants within the network with resource-level tenant isolation and guaranteed resource availability for each tenant
- Increases responsiveness to real-time network traffic conditions with an elastic service construct that can seamlessly scale up based on usage patterns
- Utilizes cloud resources more efficiently with live resizing of running VMs, allowing CPU and memory capacity to be dynamically added based on real-time network conditions

## Nokia Registers and VMware vCloud NFV—
## A Winning Combination

Nokia and VMware are helping address the demands placed on operators today by offering a smooth and effective pathway to the cloud that is ultimately more sustainable moving forward. Nokia Registers offers a stateless application architecture that builds on the success—namely the impressive scalability— of its bare-metal solution. VMware, likewise, is working closely with the telecommunications industry, delivering NFV-based service platforms that transform operator businesses through significant reductions in cost and increases in service agility.

The maturity of our integrated virtualization platform enables organizations to rapidly adopt and deploy an effective SDM solution. Nokia Registers has achieved VMware Ready™ for NFV certification. This joint, certified solution combines a field-tested and proven application from Nokia, a company with over 100 years' experience in the telecommunications industry, with VMware's market-leading, enterprise-class virtualization technology. Through this joint effort, we're helping organizations manage today's rapid technology shifts and embrace a new era of telecommunications where you are ultimately empowered to succeed.