Nokia Cloud: a complete compilation of cloud capabilities

Executive Summary
Digitization is going global, spanning the private and public sectors, changing all industries. The driving force of this digital evolution is the need for organizations to innovate more rapidly, operate more efficiently, make better use of available resources, become more flexible and improve profitability. With digitization comes new data insights that will enable organizations to give their users and customers pioneering services that are available at any time and on any device.

Cloud technology is making this digital transformation possible. The cloud provides continuous access to the key pillars of digitization – flexible, automated, scalable computing and data resources available everywhere.

‘Available everywhere’ puts communications service providers (CSPs) at the heart of delivering cloud capabilities to users, creating new business opportunities for themselves along the way.

**Everything cloud from Nokia**

Those CSPs that invest today in end-to-end cloud-based systems to support the new opportunities will be well placed to take full advantage of the fast-developing digitization trend. Integrating the cloud across their entire business and operations is critical for CSPs. Simply bolting on selected cloud components will not deliver the high flexibility and low costs needed to meet the key business needs of the growing fixed and mobile broadband market, as well as the evolving Internet of Things (IoT) market, and to implement 5G and other next generation networks.

The demands on CSPs are well known – build more capacity to carry tens of thousands of times more traffic, create massive connectivity to support billions more devices, boost network performance for millisecond latency to enable high-value services, expand coverage to ensure gigabit services are delivered anywhere they are needed. Cloud addresses these business challenges.

Nokia brings together every aspect of the cloud in an end-to-end portfolio matched to the needs of CSPs. From the Nokia AirFrame data center solution to SDN networking, including programmable IP and optical transport solutions, from a comprehensive portfolio of application software to lean operations and management through our OSS and CloudBand MANO portfolio, and all backed by a wide-range of expert cloud services and full data security.

**Open is the new cloud model**

The Nokia cloud portfolio takes account of the way that cloud technology is evolving. The new era of the cloud is built on openness in which we work with third parties, yet take full responsibility for the end-to-end solutions we deliver. Collaboration is the most effective way to accelerate innovation.

Open ecosystems and open source are the enablers of innovation and co-creation. Nokia contributes to open source communities, but also uses the innovation coming out of those communities by integrating it into its products and customizing them for CSPs. The advantages are clearly seen in our support of the open compute project (OCP), which enables us to use open hardware specifications to implement new levels of efficiency, operability and scalability in CSP
data centers. Similarly, we have worked to implement carrier-grade reliability and performance into OpenStack, a popular cloud stack for telco and IT.

Nokia supports open ecosystems and open source as the enablers of future cloud-based networks

Single source for all CSP cloud needs

The Nokia end-to-end cloud portfolio brings together all the capabilities needed to implement, operate and orchestrate cloud-based networks that minimize business risk for CSPs, while supporting their digitization goals.

Virtualized network functions and shared data layer: CSPs can take advantage of a full range of VNFs, including Nokia AirScale Cloud RAN, Nokia telecom application server (TAS), IP multimedia subsystem (IMS), Cloud SBC, virtualized service router (VSR), and the cloud packet core (CPC). Shorter innovation cycles and DevOps are enabled by moving to a cloud-native design that includes open APIs provided by Nokia VNFs and APIs provided by the Nokia Shared Data Layer, a common data repository for storing all data required by the network functions.

Software defined network (SDN): Nokia SDN solutions include the network services platform that provides a unified approach to carrier SDN for IP and optical networks; the Nuage Networks virtualized services platform, which enables cloud data center automation; and SD-WAN for dynamic enterprise services. In addition to SDN solutions, Nokia offers a complete suite of programmable IP routing and optical networking products.

Data center solutions: The Nokia AirFrame data center solution supports both telco and IT workloads. Available in a conventional rackmount format and on the highly efficient and scalable OCP-based form factor, AirFrame delivers high performance in centralized and distributed deployments. The Nokia cloud design center can also integrate third party components from selected partners or according to customer demand to ensure the required cloud performance.
**Management and orchestration (MANO):** Nokia CloudBand simplifies the hosting, orchestration, automation and management of VNFs and services. The scalable and flexible CloudBand portfolio helps to reduce the time to revenue for new services, while automation and optimization simplify network operations. With CloudBand, operators benefit from rapid open-source innovation and can rely on a ready-to-deploy carrier-grade product. Nokia also provides security products and services covering all areas, which can use network analytics from Deepfield, a recent Nokia acquisition.

**Cloud wise services:** To help CSPs implement cloud capabilities throughout their organization, Nokia experts deliver a broad range of services from consulting, to design and build, to operations and maintenance.

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**The Nokia cloud portfolio is an end-to-end solution based on open collaboration**

**Business benefits drive developments**

Nokia focuses on helping to transform CSP networks, operations and commercial capabilities to take advantage of real business opportunities.

Let’s take one example, implementing an enterprise virtual private network (VPN). An enterprise wanting to connect a new remote office involves the CSP in a lengthy and complex process to implement and provision a traditional customer premises equipment (CPE) router-based wide area network (WAN) to the new office. It can take weeks, if not months, and can be costly.
A much more effective, cloud-based approach is to use software-defined WAN (SD-WAN). The SD-WAN substantially simplifies VPN provisioning through policy-based automation along with the ability to choose broadband Internet and/or MPLS WAN links. In effect, the VPN becomes self-provisioning and can be set up in minutes. This not only benefits the CSP’s enterprise customers, but also creates new opportunities for the CSP to offer flexible, cost effective and customized solutions to smaller organizations.

Network slicing is another capability with huge potential benefits by enabling a CSP to quickly and easily support different mobile virtual network operators (MVNOs) or verticals by creating multiple instances of their core network.

**Creating cloud futures, today**

The end-to-end Nokia portfolio of cloud products and services is already helping CSPs globally to offer digital transformation to their customers. To find out more about the possibilities, please contact your local Nokia representative or see our [cloud portfolio website](http://www.nokia.com).

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