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COVER INTERVIEW

Nokia's Vishal Singh explains how CSPs will Sense, Think, Act as autonomous networks become reality

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CSPs learn to Sense, Think, Act as autonomous networks become reality

As communications service providers (CSPs) continue the push towards autonomous networks, Vishal Singh, the senior vice president of Global Business for Cloud and Network Services at Nokia, tells VanillaPlus how CSPs are moving quickly to meet the rapidly changing needs of consumers and enterprises

Consumer and enterprise needs are rapidly changing, with expectations for faster, more seamless services

VanillaPlus: What does the term 'autonomous networks' mean to Nokia?

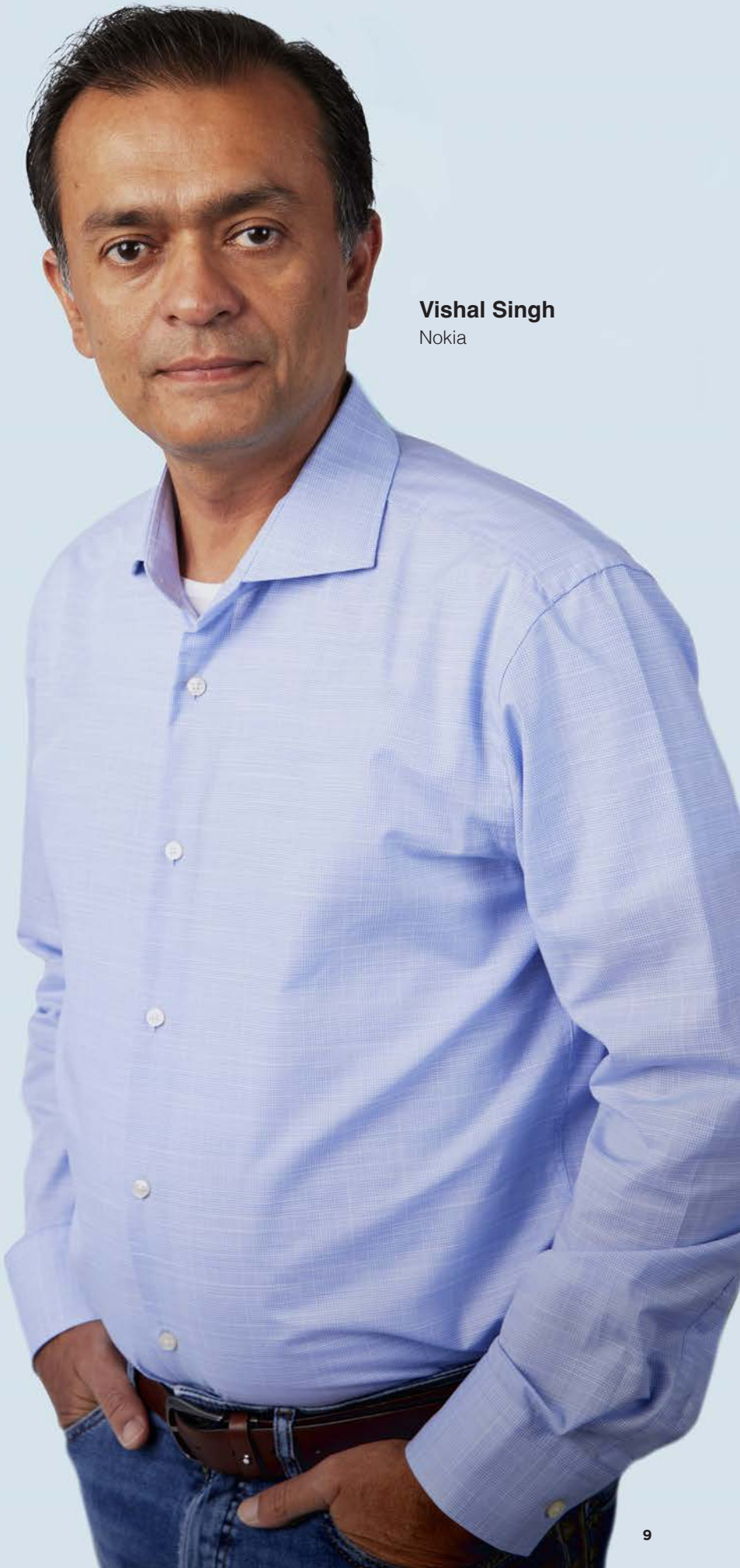
Vishal Singh: Consumer and enterprise needs are rapidly changing, with expectations for faster, more seamless services. To meet their dynamic requirements, CSPs must deliver what we call a 'Zero X' experience: zero-wait, meaning instant order fulfilment; zero-touch, referring to automated delivery; zero-trouble, ensuring flawless service; and zero-trust, built on strong foundational security. That's where autonomous networks come in.

Using **TM Forum**'s Autonomous Network Maturity Model as a foundation, Nokia offers our customers a multidomain strategy that integrates a powerful combination of security, orchestration, assurance, analytics and AI to simplify complex network operations and deliver the fully autonomous Zero X experience. Our goal goes beyond automating simple tasks. We're working towards building networks that can self-manage, optimise and repair themselves across all domains - radio, transport, core and on any cloud, all while focusing on security and automation from the physical infrastructure to cloud-based applications.

In short, it's about creating seamless, efficient networks that can also open new revenue opportunities for CSPs. Achieving true network autonomy means simplifying the complexity CSPs face, improving network efficiency and resiliency, and unlocking new revenue streams. We strive to help our customers achieve these goals with our 'Sense, Think, Act' framework.

VanillaPlus: How can the integration challenges across networks be addressed?

VS: The key is to make sure different networking domains - radio, transport, core and cloud - work together seamlessly. We're able to do this through AI-powered observability, which gives deep visibility into network performance, and closed-loop automation that automatically adjusts configurations. These technologies ensure that the inevitable seams between systems are invisible, allowing for smooth and efficient operations without constant ▶



Vishal Singh
Nokia

human intervention. Fundamental to this is security embedded into all network layers. The networks that Nokia builds are secure by design, integrating orchestration, assurance, analytics and security to deliver AI-powered autonomous networks.

We understand the network and software – and we have the right people with the right skill sets to help our customers, making us a trusted partner in navigating the complexities of software integration. We've built proven use cases to help CSPs worldwide address the challenges and complexity of multi-domain, multi-vendor networks.

VanillaPlus: How does Nokia approach security in autonomous networks?

VS: Security is non-negotiable in our autonomous networks strategy. Instead of being an afterthought, we build it into every layer of the network. This includes advanced threat detection, real-time monitoring, and predictive security measures embedded within the network's foundation. By ensuring security is 'baked in' from the start, Nokia aims for a network that can self-monitor, detect vulnerabilities early, and self-heal without human intervention, keeping operations secure – a critical requirement as our industry evolves.

Amid the rising sophistication and frequency of targeted cyberattacks, the extended detection response (XDR) security market is projected to grow by nearly 150%, from US$965 million in 2022 to around US$2.4 billion by 2027, according to industry estimates. Our NetGuard Cybersecurity Dome is an award-winning security software suite with pre-built 5G use cases for CSPs and critical infrastructure enterprises. It offers real-time visibility across networks, cloud infrastructure and endpoints. It unifies ▶

security control points, offers security telemetry and provides analytics and operations in a single view – all to drive the resiliency of the network.

VanillaPlus: What is Nokia's 'Sense, Think, Act' approach?

VS: The 'Sense, Think, Act' approach is key to achieving fully autonomous networks. 'Sense' involves gathering and normalising data across the network using observability techniques. 'Think' uses AI and machine learning to analyse this data, creating actionable insights. 'Act' involves using closed-loop automation to implement these insights, optimise network performance and resolve issues autonomously. This vision is the foundation of Nokia's autonomous networks strategy.

By adopting a data mesh architecture, CSPs can enhance data governance, which leads to more accurate AI-driven insights and faster issue prevention

In the 'Sense' phase, we help manage cloud and network complexity brought on by cloud-native architectures and the disaggregation of networks into microservices. CSPs need new ways to 'sense' or understand the dynamic nature of cloud infrastructure in real-time. Embedding observability into service assurance systems is a good starting point to deliver contextual understanding and ensure that the OSS view of the world matches reality. Unified inventory systems are another key building block, providing a real-time view of all network resources, topologies and services.

During the 'Think' phase, we focus on improving data quality for smarter decisions. AI and machine learning is used to make intelligent, data-driven decisions. But without a continual stream of high-quality data to fuel them, even the most sophisticated AI algorithms are useless. The extreme diversity of telecoms data compounds the challenge, leaving CSPs to struggle with an unprecedented variety of data sources and vendor-proprietary formats that make effective governance a nightmare. An **Analysys Mason** survey showed that 56% of CSPs view data quality as a significant challenge.

By adopting a data mesh architecture, CSPs can enhance data governance, which leads to more accurate AI-driven insights and faster issue prevention. Better quality data would also increase the accuracy of both traditional machine learning and GenAI, specifically large language models. With this intelligence, CSPs will quickly identify anomalies, analyse network issues and prevent future service degradation.

In the 'Act' phase, we help our customers close the loop and automate processes at scale. CSPs must act efficiently on the insights AI provides to deliver zero wait, zero touch, zero-trust and zero trouble services. Closed-loop automation is necessary to achieve this at scale. It speeds up responses to customer orders, removes friction and ensures flawless quality in service delivery.

Network slicing is a good example of the value of closed-loop automation. Think of an airport that needs a dedicated network slice for baggage handling and staff communications. Demand on that slice will vary greatly depending on flight and passenger traffic, and closed-loop automation ensures the slice adapts in real-time to meet those needs.

VanillaPlus: Are zero-touch operations really the desired outcome for operators?

VS: Zero-touch operations might sound ideal, but we think the real goal is finding a balance between full autonomy and human oversight. Autonomous networks can handle most of the day-to-day tasks and fix common issues, but when it comes to strategic business decisions or critical interventions, human input is still necessary.

Right now, the industry is sitting at Level 1.5 to 2 when it comes to autonomous network maturity. When we talk to CSPs, one of the things we focus on is helping them benchmark their networks' automation and AI maturity levels. We do that using a framework that lines up with the TM Forum's Autonomous Network Maturity Model. From there, we work on building a roadmap for autonomy, starting from the ground up. The level of autonomy each customer aims for is going to vary based on ▶

The ecosystem around autonomous networks is becoming more collaborative than ever. At Nokia, we're leading the way by building multi-domain, multi-vendor solutions that combine AI, automation and security with our deep understanding of the network

their specific needs, and our goal at Nokia is to keep things flexible while making sure automation brings the resilience, efficiency and reliability they need.

VanillaPlus: What technologies are needed for greater autonomy?

VS: To increase autonomy in their networks, CSPs need a mix of AI-driven automation, observability and orchestration tools. One key technology is digital twins, which allow CSPs to model real-world scenarios and predict outcomes before they happen. When you pair AI and machine learning with a strong observability framework, the network can start to sense and think on its own, reducing the need for manual intervention.

VanillaPlus: How do you see the ecosystem developing, and Nokia's role in it?

VS: The ecosystem around autonomous networks is becoming more collaborative than ever. At Nokia, we're leading the way by building multi-domain, multi-vendor solutions that combine AI, automation and security with our deep understanding of the network. This way, our integrated approach works seamlessly across different network environments, helping CSPs push innovation further and work more closely with external partners. Ultimately, it's about driving the evolution of autonomous networks on a global scale.

VanillaPlus: Will we ever see fully autonomous networks?

VS: Autonomous networks are the long-term vision, but it's a journey to get there. We're talking about a future where networks run themselves - handling complex tasks like optimisation, fixing issues and rolling out services, all with little human involvement. While we're not there yet, we're making significant progress with AI, machine learning and automation, and we're committed to helping CSPs along their journey. Our seamless, integrated approach automates everything across radio to transport, core and cloud networks.

Security is a top priority, and we're working on over 500 telco security projects globally using AI-driven security operations. When it comes to AI and MLOps, we're teaming up with a major CSP in Europe to train models that improve network efficiency and support sustainable operations. And in North America, we're collaborating with a large CSP on automated slice operations for complex networks by combining our orchestration and assurance tools to make it run seamlessly.

When it comes to automating networks, every CSP has different needs based on how far along they are with cloud adoption. With our deep expertise in both software and networks, we can meet our customers exactly where they are, helping them move toward fully autonomous networks.

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