



Telecom Review recently met with Nokia to talk about application reliability challenges being faced by web-scale content providers and the ISPs that connect them to end users. A new solution was discussed to resolve network congestion and latency issues that impact the end-user experience for these applications.

Users expect their Over-the-Top (OTT) cloud applications and Internet of Things (IoT) devices to be continually responsive and steady whether in the office, at home or on the go. However, user experience will degrade whenever there is network congestion and latency. This is a difficult issue to solve because, from the data center to the end user, the application traffic path may cross several networks operated by different Internet service providers (ISPs), content delivery networks (CDNs), exchanges and transit providers. When these applications transit through the Internet backbone or between these multiple service provider networks, issues related to speed and responsiveness can arise. To gain more control over the end-user experience, innovative web content providers and communications service providers (CSPs) are investing in network solutions to maximize application reliability.

Nokia has recently introduced dynamic assurance, analytics and network automation capabilities to solve this critical issue. It is part of what Nokia calls “insight-driven automated networking”, an approach announced with its FP4 silicon (reported on by *Telecom Review* in our July-August edition). We interviewed Sasa Nijemcevic, VP & GM of the Network and Service Management business unit at Nokia to get his perspective on this important topic and how Nokia is working with its customers to address it.

Telecom Review North America: What sparked Nokia's recent investments in this area?

“Nokia has been working to integrate network automation with dynamic assurance and multi-layer, multi-domain carrier SDN for the last few years. We have been extremely invested and committed to tackling it for both web-scale content providers and carriers. Our recent acquisition of Deepfield now gives us the analytics to better guide our network automation and control capabilities. By integrating Nokia Deepfield analytics into our network automation solution, we now offer a truly unique solution in the industry that also has a very low barrier for investment relative to existing solutions. It will not only appeal to our carrier networking customers, but also to web-scale content providers and providers of services that connect IoT devices to servers in data centers. We've adopted a new approach that results in a better end-user experience for a broad range of cloud applications used by consumers and businesses.”

Telecom Review North America: Which specific types of applications and content does Nokia see as the key benefactors of this solution?

“We are talking about providing visibility of all cloud applications and IoT devices operating over the Internet. Essentially all content and IT service providers are going to benefit. And so will the CSPs that carry this content to end users over residential, enterprise or mobile services networks. Each of the companies providing the network connectivity path of the application – including ISPs, CDNs and transit providers - will be able to independently use our solution for maximizing the reliability of cloud applications and content.”

“To put this into context, let me point to some key use cases. For instance, how might we enhance the performance of streaming video applications such as Netflix, HBO Go, YouTube and Facebook? These are top targets because they comprise 60 percent of internet traffic today. Equally important, how do we improve business cloud services and applications frequently used in enterprises that run over the Internet or virtual private networks (VPNs)?”

“Enterprise use cases include those for cloud applications that have become critical for business-operations as well as for enhancing productivity such as CRM applications from, for instance Salesforce.com, office and collaboration tools from Microsoft and Google, as well as the many enterprise applications hosted with Amazon Web Services (AWS) and other web-scale data center providers. Some of these applications are also now delivered through secure, hybrid VPN and SD-WAN network connectivity and partially run over the Internet

instead of only transiting carrier networks, which used to be the case. Our solution improves reliability and performance for all these use cases.”

“We are also targeting numerous other latency-sensitive applications: everything from multiplayer online games, such as League of Legends and World of Warcraft, to financial transaction applications. On the IoT device side, we are looking beyond today’s consumer home automation devices. Future versions of these devices will incorporate streaming of latency-sensitive video chat and will also access other video content through the Internet.”

“Other latency-sensitive IoT use cases include industrial automation applications, for example, in the natural resources and manufacturing sectors. Looking into the future, it will also improve reliability and performance in shipping and transportation automation, such as the automated vehicles and drones that may one day deliver us or our purchases right to our doorsteps.”

“Because of the wide volume of applications that will benefit, we believe our Nokia insight-driven automated networking solution is going to be a game-changer in the industry.”

Telecom Review North America: How are you tackling the dynamic assurance, analytics and network automation part of Nokia’s approach to “insight-driven, automated networking”?

“Our insight-driven, automated networking approach was introduced in June of this year with our announcement of our FP4 silicon and next-generation IP routing portfolio — now the world’s most powerful routing platform. It brings a massively scalable and smart network fabric that, in terms of my group’s mandate, enables more sophisticated dynamic assurance, analytics and network automation. Integrating our Deepfield analytics insights into our Network Services Platform gives our customers the visibility and control required to maximize their network resources for cloud application reliability.”

“So how do we achieve this new approach for visibility and control? Our Deepfield technology harnesses a massive amount of streaming telemetry from network devices and servers. It combines this with customer provided data, application context, and an understanding of the cross-domain and cross-provider paths that applications take through the Internet. It then correlates this data every few minutes to keep it fresh and relevant. We call this

'multi-dimensional analytics', the key ingredient for driving software-defined automation in network optimization and application flow control."

"The global scale of the Internet and today's interconnect network domains means rapid fluctuations and unpredictability in usage patterns and traffic types. Carriers are finding that this level of unpredictability cannot be met economically by over-provisioning their networks. The gap between peak and mean traffic levels is rising too quickly as network consumption becomes increasingly dynamic. The answer to managing this unpredictability economically is by gaining insight into network traffic and understanding the bandwidth and performance needs of applications being delivered so that automated actions can be taken at a per-application level."

Telecom Review North America: Since past solutions have tried to address similar problems without broad success, how will the Nokia solution be different, and how will it solve the problem in a way that may not have been possible or practical before?

"One key element of this is certainly that our solution is able to provide multi-dimensional analytics and application-level visibility without the need for expensive probes, taps and monitors in the network. Because this has previously been uneconomical, networks today are widely lacking the insight needed for understanding what network traffic is associated with specific applications. This solution affordably provides visibility into the network paths taken by applications as well as the egress peering routes taken as traffic leaves the network to various partnering carrier and interconnection networks. This enables network automation with near real-time control."

"In addition, without real-time service intelligence and insight on application traffic, today's network optimization tools lack the key information needed to automate their actions. Operators are faced with a tough choice: either act quickly with virtually no data to guide them or resort to manual processes that take hours or days to complete, rendering the data stale and irrelevant. Our solution prevents them from having to make a compromise."

"Our Nokia solution can also provide policy-based control for optimization of application traffic flows. It covers inbound traffic through a network domain as well as peering options for this same traffic as it egresses to partnering carrier domains, interconnection networks or CDNs. This is called egress peer engineering (EPE)."

“Our EPE achieves far better results than other solutions in the industry today. Firstly, this traffic flow steering approach is proving to be a preferred starting point for implementing better network control and optimization by carriers. This is because it has less impact on the overall network compared to dynamic network re-engineering. Secondly, in all cases the flow control will also be much easier to implement when based on multi-dimensional analytics because of the added application-level visibility.”

“Our solution enables both web-scale providers and carriers to have the visibility and control required to dynamically assure applications during periods of peak network demand, as well as for unpredictable traffic spikes. The multi-dimensional, analytics-driven, flow control works cross-domain and cross-provider to avoid congested network resources. It directs traffic onto network paths that will meet the needs of the cloud application all the way from the data center to the end user. In this way, it assures a satisfactory level of user experience for cloud applications with higher bandwidth needs or latency sensitivity.”

“This type of approach is now more relevant in the industry because of the increasing complexity of dynamic network behavior and requirements. We believe Nokia’s insight-driven automated networking will be needed more than ever as both web-scale content providers and carriers strive to keep pace with demand and still maintain profitability.”