

Case study

Canada's 5G future

How Rogers deployed Canada's
first 5G standalone network



ERICSSON

In collaboration
with

 **ROGERS**

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Executive summary

In January 2021, Rogers Communications became the first operator to roll-out a national 5G standalone (SA) network in Canada. The implementation of Ericsson's cloud-native dual-mode 5G Core has enabled Rogers to continue its commitment to investing in technologies and infrastructure that serve their business customers, large and small.

The roll-out process presented many challenges but with collaborative learning, development and implementation with Ericsson, the result is a highly capable and reliable, fully cloud-native SA 5G Core network that is ready to be used by Rogers and its customers to harness the full potential of 5G and transform industries and organizations.



As Canada's first and largest 5G national network, and the country's largest wireless carrier, Rogers is considered a key contributor to the development of Canada's digital infrastructure, delivering world-class communication services to both its consumer customers and forward-thinking enterprises. As well as mobile communications, Rogers also offers cable television and internet services.

In January 2021, Rogers – in partnership with Ericsson – began rolling out Canada's first 5G SA network in Vancouver, Toronto, Ottawa and Montreal. By March 2022, Rogers had expanded its 5G network to more than 800 communities,

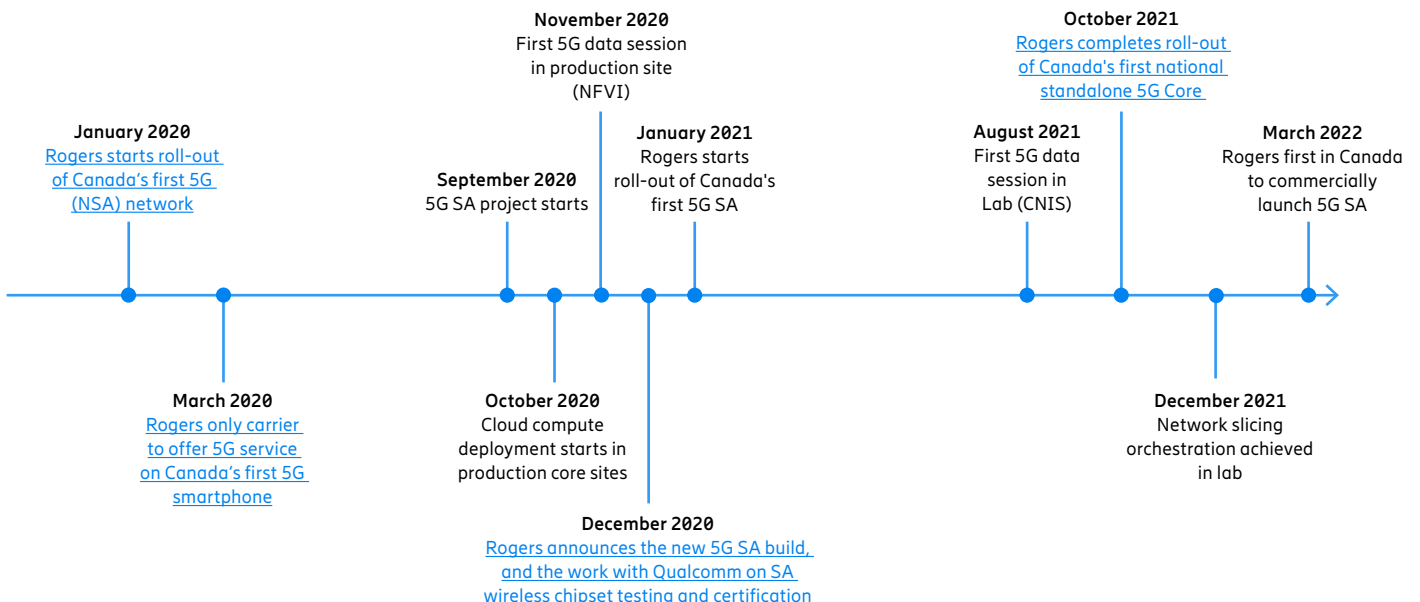
reaching over 19 million Canadians – making the Rogers 5G network the largest in Canada.

Senior Vice President of Network Development, Planning & Engineering Luciano Ramos explains: "For our enterprise customers, it's very important for them to have a fast and reliable network that helps them remain innovative and agile in their respective competitive markets. Being the first to deliver 5G Core and all the capabilities of 5G to the Canadian market, such as network slicing and lower latency, means our customers can develop new use cases that bring their production efficiency to a whole new level."

"We were the first to roll-out Canada's first non-standalone (NSA) 5G network in January 2020, and we wanted to be the first to launch 5G SA. In collaboration with Ericsson, we were able to achieve our goal to be the first in the market."

Luciano Ramos,
SVP Network Development,
Planning & Engineering,
Rogers Communications

Figure 1: Rogers and Ericsson 5G SA deployment milestones



A complete 5G solution

Prior to launching 5G SA, Rogers had already rolled out Canada's first NSA 5G network with Ericsson. While this was a large step up from previous network capabilities, customers were not able to take full advantage of 5G capabilities such as ultra-low latency, advanced network slicing and support for a large number of connected devices.

By introducing Ericsson 5G Core to the network, Rogers can offer more advanced wireless capabilities as well as enable developers to build applications that were not possible before, to accelerate technologies that will have a profound impact on the economy and society.



"It is only with the power of 5G technology that the boldest new ideas of today – smart cities, fully automated cars, real-time robotics, truly connected homes and much more – will be fully realized."

Luciano Ramos,
SVP Network Development,
Planning & Engineering,
Rogers Communications

They also wanted to set the base for network slicing deployments able to offer real-time, on-demand highways of 5G for entire industries and organizations.

The key drivers for Rogers to implement an advanced 5G SA network were the ability to offer unprecedented flexibility and speed to meet current customer demand, and to be prepared for the increased stresses advanced wireless services would place on network connectivity of the future.

Current generation widely deployed network functions are based on virtualization technologies. The new SA core platform Rogers uses has been developed from the ground up as cloud container applications or cloud-native network functions (CNFs). A cloud-native environment becomes the ideal foundation that gives the unprecedented flexibility, easy scalability, resiliency and simple in-service upgrades, thanks to the microservice architecture that cloud-native apps are built upon.

Not forgetting the benefits to customers of Rogers, a robust 5G network gives them the opportunity to build new products and deliver cutting-edge solutions much faster than ever before, while expanding coverage and providing unprecedented speeds to customers' devices. "We believe in the power of the network and the benefits it will bring, which is why we invested heavily in rolling out the best 5G network for our customers," says Luciano.

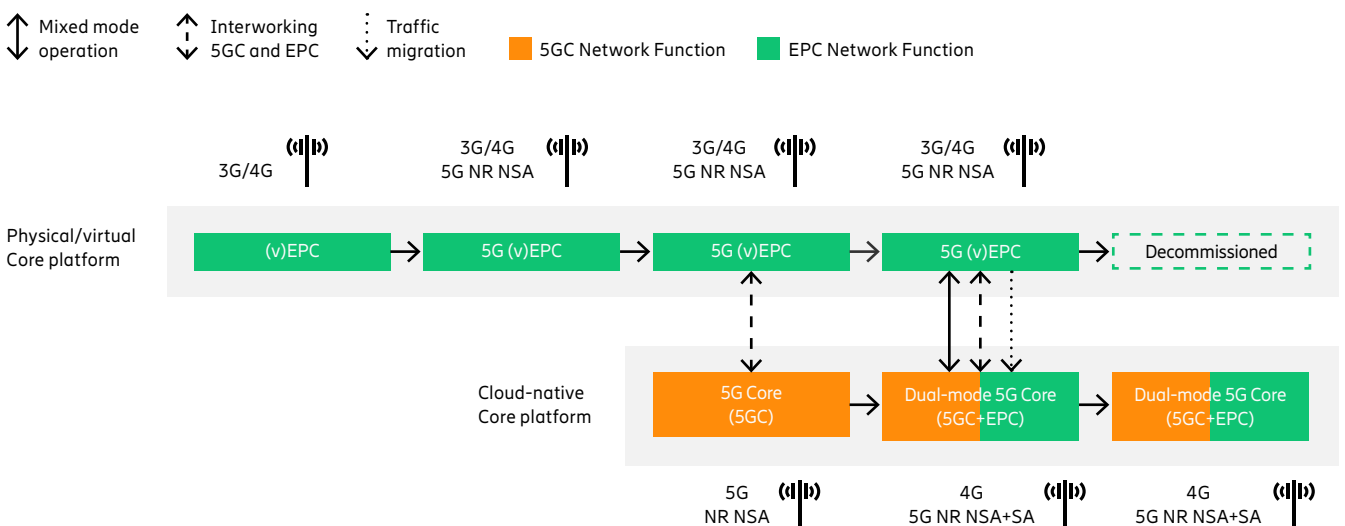
Unprecedented flexibility and speed

Rogers challenged themselves to become the first to launch 5G SA in Canada. By deploying 5G SA services and a cloud-native 5G Core, they wanted to build a cloud-native foundation for all of the company's next-generation core network functions, unleashing the power of the microservices architecture design paradigm in order to deliver seamless scalability, resiliency and simple in-service upgrades.

"To reach our business targets, 5G SA was the logical next step in our journey – an evolution in wireless technology that will revolutionize and transform the way we live, work and experience the world around us."

Jorge Fernandes,
Chief Technology Officer
Rogers Communications

Figure 2: The Rogers path to cloud-native dual-mode 5G Core



The Rogers journey to 5G SA

From a core network deployment perspective, the Rogers journey into 5G started back in January 2020 with the roll-out of Canada's first 5G NSA network. This was achieved with a software upgrade to its existing 4G Evolved Packet Core (EPC) solution from Ericsson. Leveraging the existing 4G Core allowed a quick time-to-market of 5G services, placing Rogers as the first in Canada and among the world to offer commercial 5G services.

In September of the same year, Rogers launched the second, and more ambitious phase of its strategy to release the full capacity of 5G by deploying 5G New Radio (NR) SA. Its focus was to be first to market with 5G SA services in Canada, and at the end of the same year was already performing its first 5G SA data call in a production site and starting the massive deployment of 5G SA services country-wide.

The 5G SA services require a completely new core network architecture known as

5G Core, which is based on cloud-native and microservices technology, to be deployed. Rogers opted to do so as an overlay to its existing 4G core network. This allowed higher deployment flexibility and minimized the risk of impacting existing services (see Figure 2).

The third (and ongoing) phase of this journey is to build a one-core network to manage both 5G and 4G, providing highly efficient total cost of ownership. Thanks to the deployment flexibility of Ericsson's dual-mode 5G Core solution, the EPC network functions can be implemented in the same 5G Core, enabling all packet core, unified and data management, policy, signaling controller and exposure network functions from both the EPC and 5G Core architectures to run in the same container-based cloud-native software platform (see Figure 3). This will provide Rogers with high levels of network programmability, operational efficiency and resource optimization, among other benefits.

From a cloud infrastructure perspective, Rogers has also split its journey into steps:

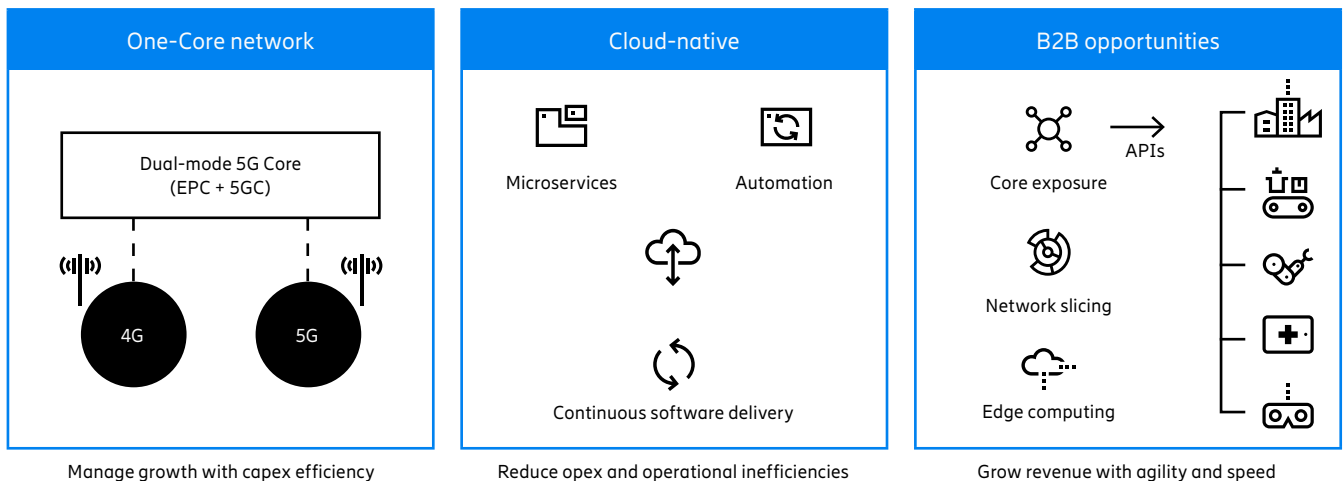
Step 1 – Utilizing the Ericsson Network Function Virtualization Infrastructure (NFVI) for the services launch including the Ericsson Cloud Container Distribution (CCD) to support Kubernetes.

Step 2 – Gradually move into Ericsson Cloud Native Infrastructure (CNIS), a bare metal-based cloud infrastructure solution that will provide higher resource utilization and simplified operations.

The scope of the project also included:

- Leveraging the existing Ericsson IP Multimedia Subsystem (IMS) to support, initially based on EPS Fallback and later to be evolved into voice over NR.
- Lifecycle management of network services with Ericsson Dynamic Orchestration.
- 5G Radio Access Network (RAN) from Ericsson including Ericsson Spectrum Sharing and Ericsson Carrier Aggregation.

Figure 3: Ericsson's dual-mode 5G Core



The Rogers journey to 5G SA includes:

- **Ericsson EPC:** existing physical/virtual network upgraded to support 5G NSA and 4G services.
- **Ericsson Service-Aware Policy Controller (SAPC):** existing policy controller solution upgraded to cope with the first stage of the 5G network (to be later replaced by the new 5G core policy controller node).
- **Ericsson's cloud-native dual-mode 5G Core:** container-based cloud-native platform including packet core, unified and data management, policy, signaling controller and exposure network functions.

- **Ericsson Cloud Infrastructure** deployed in two steps:
 - Step 1 – Ericsson NFVI for the services launch: cloud infrastructure including Ericsson CCD to support Kubernetes
 - Step 2 – Ericsson CNIS as the definitive cloud infrastructure solution based on bare metal higher resource utilization and simplified operations
- **Ericsson Cloud IP Multimedia Subsystem (IMS):** supporting voice services, initially with EPS fallback and later voice over NR.
- **Ericsson Orchestrator:** to manage the complete lifecycle of network services, including design, instantiation, configuration, and upgrades.

- **CNEX service assurance:** provide service topology, inventory, fault, and performance from disparate systems, correlated into a single view enabling closed-loop automation.
- **Ericsson 5G RAN:** antennas, radios, baseband (RAN Compute), and RAN software to enable incredible speeds and mobility.
- **Ericsson Spectrum Sharing:** software solution for quick introduction of 5G over a wide area, leveraging 4G spectrum and existing Ericsson Radio System Infrastructure.
- **Ericsson Carrier Aggregation:** to extend the coverage of mid-band and high-band 5G while enabling faster data speeds and enhanced performance.



“We embarked on a program to transform our core platforms and move directly from legacy physical platforms or PNFs to next-generation cloud-native Dual Mode Core, leapfrogging the immediate step of virtualization. We did this to access the full suite of benefits the cloud provides from day one.”

Jorge Fernandes,
Chief Technology Officer,
Rogers Communications

Network slicing session

Network slicing is another area being explored by Rogers to expand its 5G service offerings to new segments. As Luciano says: “Network slicing will offer real-time, on-demand highways of 5G for entire industries and organizations, like a network slice for first responders that supports prioritized, ultra-reliable, low-latency data connectivity. This capability will give us the ability to build a national end-to-end quality wireless service and allow us to expand our services”.

Rogers started this journey with a proof-of-concept, utilizing Ericsson Orchestrator solution to design, orchestrate and lifecycle manage both RAN and Core elements on top of a cloud-native infrastructure. CENX service assurance was also used to implement closed-loop assurance of end-to-end slices.

Upon successful completion of the PoC and validation of Ericsson

solutions, Rogers started to deploy network slices in its production network. One of the network slicing-based services to be offered is the Rogers First Priority Service – a secure and dedicated data channel that seamlessly connects users to the vital

information they need via their devices and emergency vehicles. “Making a prioritized and guaranteed network available to all customers would bring endless opportunities for Canadian innovations and solutions,” says Luciano.

The following use cases were explored by Rogers:

Use case 1: Automated orchestration of network slices

Instantiation of a slice including RAN and 5G Core Control and User Plane Network Functions ensuring no service degradation for users even in network congestion scenarios.

Use case 2: Closed-loop assurance of the slices

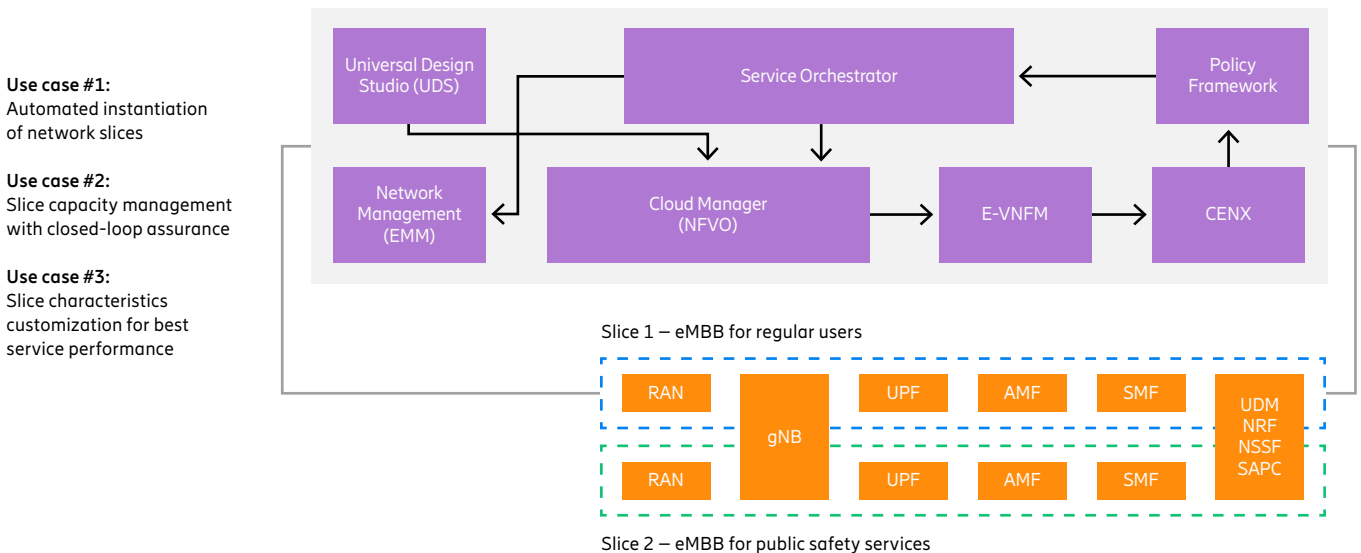
Ericsson Orchestrator’s policy function automatically increases slice capacity

according to configurable performance threshold. The CENX service assurance solution monitors the slice and triggers the increased capacity process once the pre-defined threshold is reached.

Use case 3: Customization of network slice characteristics

Ericsson Orchestrator was used to efficiently modify the slice configuration parameters and evaluate how the changes affect the slice’s service performance.

Figure 4: Network slicing use cases explored by Rogers



A collaborative partnership

The collaborative partnership between Rogers and Ericsson proved crucial to the delivery of the first complete 5G SA solution to the Canadian market, providing high levels of capability and reliability. As well as adding to its extensive portfolio of services, the development has helped Rogers reinforce its position as a driving force in Canada's digitalization.

Sharing of key insights and resources during the research and development phase – including direct access to Ericsson's Canadian research and development centers and top talent – has helped Rogers to develop the underlying

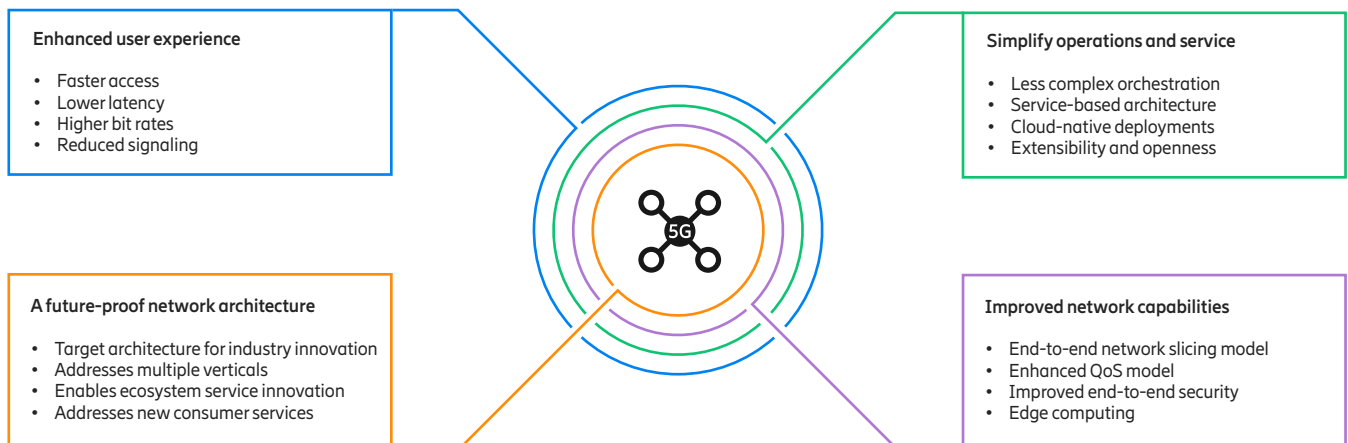
technologies and processes that will enable it to prepare for the next stages of 5G and beyond wireless connectivity.

"A solid true cloud-native foundation is the first key step in a successful 5G journey. Ensuring we deploy and leverage automation tools to handle day zero and day one, infrastructure setups and configurations is also paramount. We're thinking bigger than 5G and we play a crucial role in building out a network that operates as a foundational layer for the next big innovation. Working with Ericsson, we have many strategic programs that will build on the new 5G foundations that we're laying today," says Luciano.

"The future is exciting. 5G unlocks a world of possibilities and the business opportunities that 5G will present for us are unparalleled to prior technology cycles."

Luciano Ramos,
SVP Network Development,
Planning & Engineering,
Rogers Communications

Figure 5: Benefits of cloud-native 5GC and NR SA



Key learnings and insights

Key learnings from Rogers adapting a 5G and cloud-native technology in the core network can be grouped into three main areas:

The ability to ramp-up resources and competence is of high importance

The cloud-native transformation process requires both staff and organization to be prepared for this new technology. From technology knowledge, to how to deploy and manage the cloud-native applications, cloud-native network functions are new, maturing and are becoming fully-featured over time. This is an ongoing process, and network roadmaps, service roadmaps, monetization plans and vendor product roadmaps need careful alignment.

Rogers recognizes that it is important that competence gaps are filled as early as possible to ensure agility. Working with an experienced vendor such as Ericsson was also key to enabling Rogers to achieve its business targets in time.

Adaptability and flexibility with speed was key to ensure being first to market

Rogers wanted to be first to the market with 5G SA, so they had just three-and-a-half months to build the required sites for the initial offering of these services.

Along with competence gaps, the cloud-native transformation also demanded changes to the ways of working, and a more agile approach

between the Rogers and Ericsson working partnership was crucial to achieve service readiness in time.

Device testing is a separate challenge

On the journey to a complete 5G SA solution, many network challenges were identified during the testing and validating of devices – most of them encountered on the fly – stressing the need to team-up with 5G device vendors early on in the process.

Rogers recommends that a specific workstream with a clear scope and defined criteria, and enough allocated time, be added to the overall deployment project.

About Rogers

Rogers is a proud Canadian company dedicated to making more possible for Canadians every day. It has grown to become a leading technology and media company focused on building and expanding world-class networks to deliver the next generation of connectivity to consumers and businesses and to support Canada's future. The founder, Ted Rogers, purchased his first radio station, CHFI, in 1960. Today, Rogers provides the very best in wireless, residential, sports and media to Canadians and Canadian businesses.

About Ericsson

Ericsson enables communications service providers to capture the full value of connectivity. The company's portfolio spans Networks, Digital Services, Managed Services, and Emerging Business and is designed to help our customers go digital, increase efficiency and find new revenue streams. Ericsson's investments in innovation have delivered the benefits of telephony and mobile broadband to billions of people around the world. The Ericsson stock is listed on Nasdaq Stockholm and on Nasdaq New York.

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