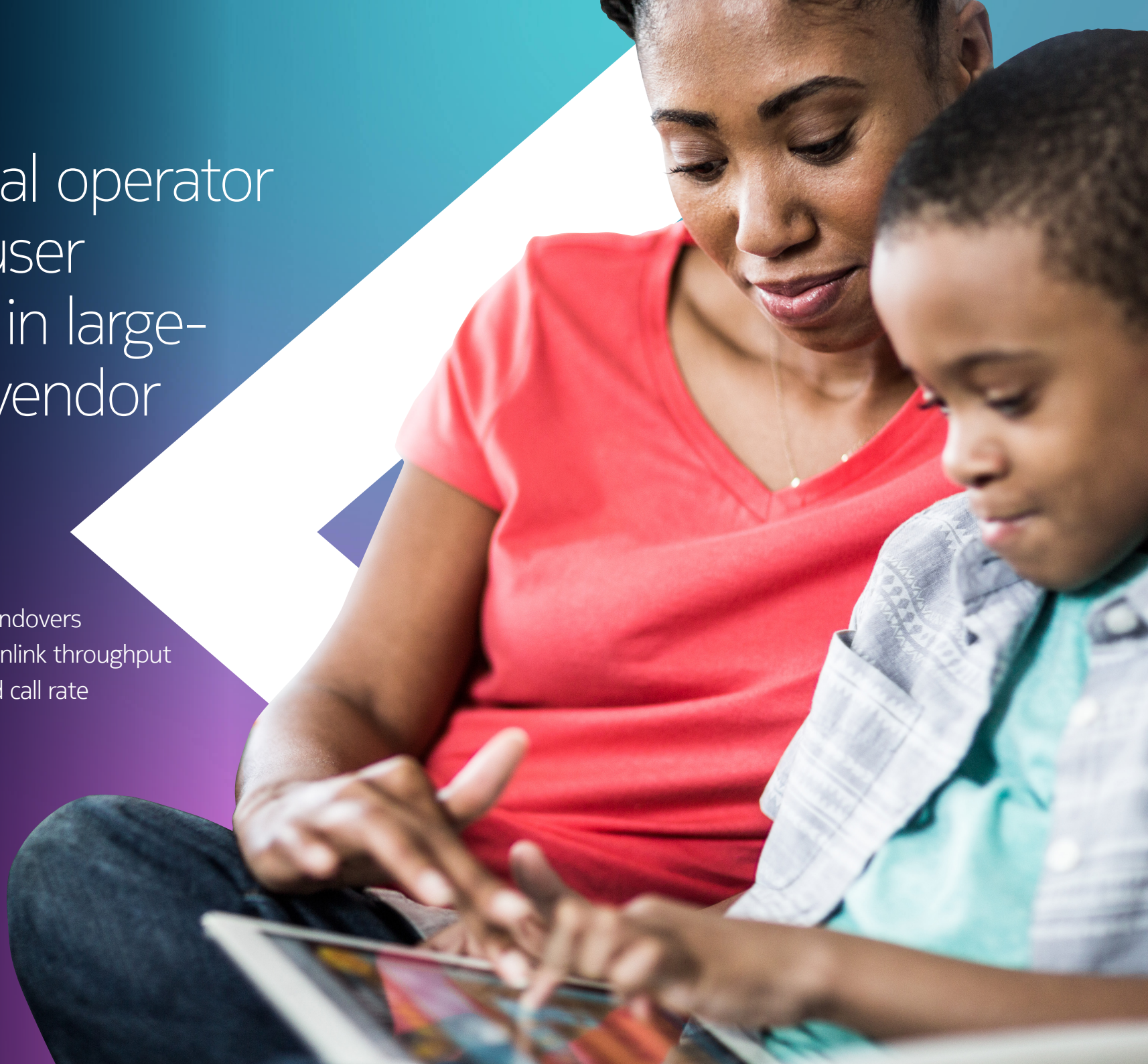
Multinational operator enhances user experience in large-scale multivendor network

- 32% reduction in early handovers
- 17% improvement in downlink throughput
- 13% reduction in dropped call rate



NOKIA

A large multinational operator set out to improve customer experience in its mobile networks.

In this multi-technology (2G/3G/4G), multivendor environment spanning across several countries, harmonizing network optimization with a centralized tool was key to achieving the targeted enhancements.

The operator chose Nokia EdenNet Self-Organizing Networks (SON), a market-leading solution with a proven track record of providing seamless automation and optimization in complex, large-scale networks.

The resulting improvements in the quality of service are directly benefiting the operator's subscribers.

This case study explores the operator's targets, the solution, and the key results.

Objective: improving customer experience in a complex environment

The large multinational operator provides telecommunications services in several African countries with over 100 million subscribers in the region.

Today, the operator is running 2G, 3G and 4G networks based on technologies from different vendors, while building a future-proof foundation for 5G deployments.

Enhancing performance for superior customer experience in this complex environment required a specific focus in optimizing and automating network operations. The operator's key criteria for a harmonized SON solution included:

- Centralized tool with drill-down capability to visualize and benchmark network performance across different countries, clusters and cells.
- Tracking changes in the network and the effect of those changes on performance.
- One tool for daily operations, such as detecting and trouble shooting issues across the network.
- Visibility to how automated SON algorithms impact the network and the resulting improvements.

As part of its overall target to optimize network performance throughout the network, the operator aspired to introduce improvements even in the high performing areas.

Solution: one centralized tool for seamless radio network optimization

The multinational operator chose Nokia EdenNet SON, a market-leading solution that delivers seamless automation and optimization across the radio network.

With a proven track record of managing both single vendor and large-scale multivendor networks, it's an ideal tool for the operator's complex environment.

EdenNet SON provides a centralized and highly scalable solution for the operator's 2G, 3G and 4G networks today, managing more than 200,000 cells in its multivendor environment. EdenNet SON helps the operator rethink operations and determine the right actions with the use of abstraction and automation.

Having rich insights on performance enables benchmarking the operator's network performance across countries, clusters and cells.

With a centralized tool, it's easy to implement policies and optimization algorithms throughout the network and see the impact of changes in real-time.

The operator is increasingly automating its network operations, resulting in timely action and resolution of issues, higher performance and cost savings.

Most importantly, the operator is able to improve throughput where needed without compromising availability of service in other parts of the network, as automated optimization takes into account all predicted impacts.

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> EdenNet SON supports 5G multivendor deployments with a software upgrade

Key results: improved data rates and fewer dropped calls

This case study explores three EdenNet SON modules executed both in closed and open loop as well as their impact on the quality of experience for mobile subscribers.

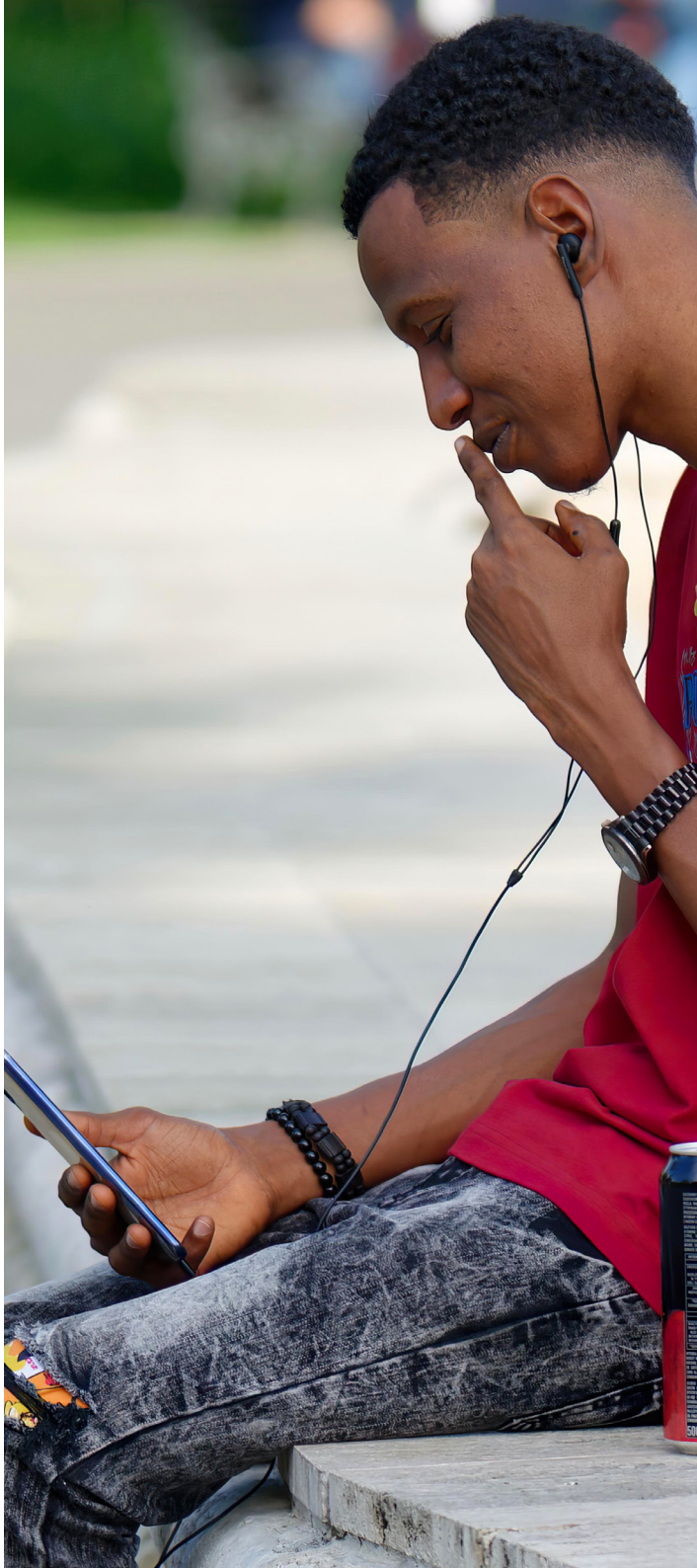
With EdenNet SON, the multi-national operator saw improvements in several key areas that are directly impacting customer experience, such as mobility, load balancing and dropped call rate. Even in the highest performing parts of the network, the operator was able to improve quality of service.

As a result, its subscribers have a constant level of service across the multivendor environment.

Trust in automation

Many operators choose to run SON modules first in open loop with manual approval of recommended actions. Seeing how SON brings concrete quality improvements helps gain trust in automation.

The final step is closed loop execution, which means the automated system operates with no need for human intervention.



Increase in successful handovers with Mobility Robustness Optimization (MRO)

Mobile users expect high network reliability even when they are on the move, for example, to use streaming services or make a call while using public transport.

When a mobile device is moving between the coverage area of adjacent cells, the network performs a handover.

The operator chose the Mobility Robustness Optimization module to optimize handover mechanisms.

Key results included 32% reduction in early handovers in the operator's 4G network.

The MRO algorithm manages mobility parameters to reduce the number of handover-related radio link failures and inefficient use of network resources. It detects and minimizes handovers that occur too late or too early, as well as handovers to a wrong cell. In particular, it helps avoid the so-called ping pong handovers, which means frequent shifting of the connection between adjacent cells before settling on one.

Avoiding the ping pong effect helps maintain high connection quality while decreasing dropped calls and load on the network.

The module supports automated monitoring of network performance and rolls back changes in case it detects performance degradation.

Improved downlink throughput with Mobility Load Balancing (MLB)

Radio network congestion can happen when many people gather in the same area and use mobile services at the same time. Subscribers are expecting stable network performance and high download speeds also in these situations.

The operator implemented the Mobility Load Balancing module to avoid network congestion. A key result was 17% improvement in average downlink throughput per user in its 4G network.

The Mobility Load Balancing module identifies congested cells and optimizes parameters for offloading traffic to the surrounding cells. For identifying overloaded cells, it analyses KPIs such as data access failures, call drop rates and average power levels received by the base station, which is an indicator of uplink interference impacting performance.

The MLB algorithm triggers redistribution of traffic from congested cells to neighboring cells which have a lighter network load, while ensuring that none of the cells become overloaded as a result.

When the congestion is over, the algorithm reverts the network back to its original settings.

4G **17%** Improved downlink throughput

Mobility Load Balancing (MLB)

Reduction in dropped call rate with Automatic Neighbor Relations (ANR) Optimization

Many mobile users use voice calls for their day-to-day communication needs, and expect reliable service without disruptions.

The operator deployed the Automatic Neighbor Relations Optimization module to introduce improvements that help maintain the stability of established calls.

In its 3G network, the operator saw 13% reduction in circuit-switched dropped call rate.

The ANR module implements one of the key features of automated self-organizing networks. Provisioning and managing neighboring cells manually is too time-consuming and difficult as the complexity of the network increases.

ANR automatically establishes relations between radio network entities to enable mobility and load balancing. This module optimizes intra-frequency, inter-frequency and inter-RAT neighbor lists, which are used for handovers, and automatically initializes neighbor lists for newly provisioned cells. It detects and ranks the cells, adds the missing neighbors and can remove poorly performing neighbors.

ANR optimization helps increase the number of successful handovers and leads to less dropped connections related to missing or incorrect neighbor relations.

Nokia EdenNet SON ensures first-rate customer experience in multivendor radio networks

Global developments such as increasing consumption of digital entertainment and services as well as the digitalization of industries underline the systemic importance of reliable network infrastructure to meet the requirements of existing and new customers.

Many operators have chosen a multivendor approach and are running multiple generations of telecommunications technology from 2G, 3G, and 4G to 5G. This accentuates the need for a centralized solution for optimizing and automating the multi-layered network with visibility to impact on performance across the sites.

The SON modules described in this case study are part of the comprehensive Nokia EdenNet SON solution with the industry's widest range of SON modules for self-configuration, self-healing and self-optimization. With EdenNet SON, performance improvements and boosting quality is possible in all types of radio networks.

Moving from manual optimization to closed-loop automation with EdenNet helps achieve significant improvements in network performance. The end result is superior customer experience with constant level of service across the network.

Visit EdenNet SON webpage to learn more.

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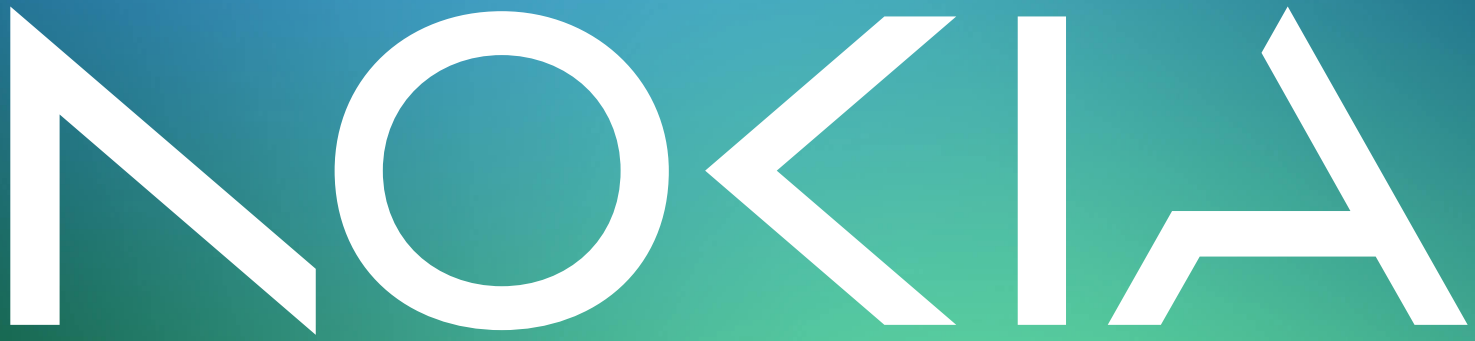

At Nokia, we create technology that helps the world act together.

As a B2B technology innovation leader, we are pioneering the future where networks meet cloud to realize the full potential of digital in every industry.

Through networks that sense, think and act, we work with our customers and partners to create the digital services and applications of the future.