Case study

Vodafone Germany aims to boost network quality with intelligent alarm correlation

NOKIA INTELLIGENT ALARM CORRELATION

NOKIA

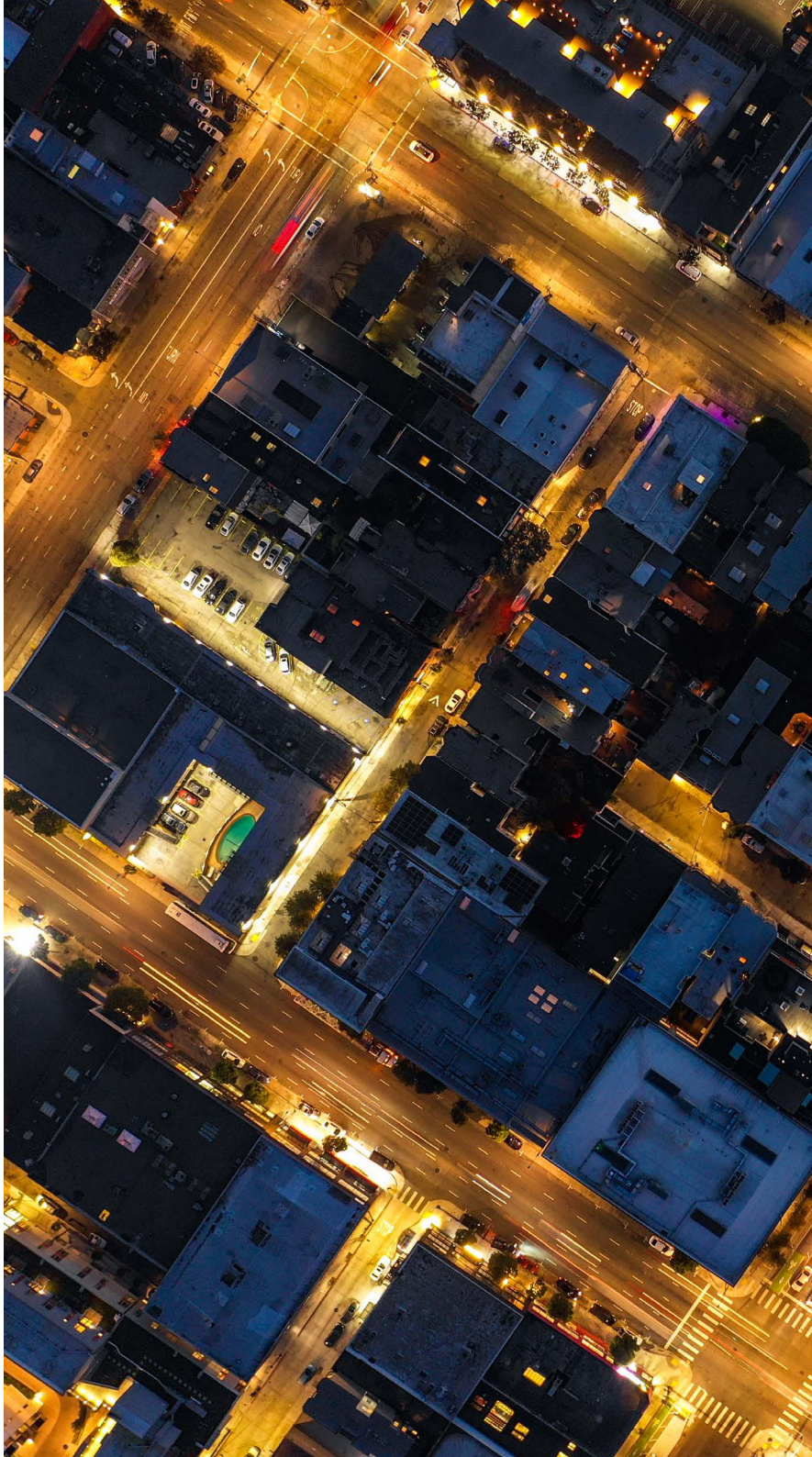
With thousands of network alarms every day and no easy way to identify root causes or determine which need immediate attention and which can be ignored, Vodafone Germany needs some kind of automated support for its engineers. Nokia worked with them to create an intelligent alarm correlation system that identifies patterns and proposes appropriate actions as it leads to the root causes, reducing team workloads and helping ensure consistent network quality.

Projected business benefits

70% fewer
alarms to resolve

Greater ability to solve problems
right where they start

Faster troubleshooting for higher
quality network performance



Challenge

Vodafone Germany is its country's largest mobile services provider, with 50 million mobile subscribers. It also delivers Internet, TV and landline services, and provides services to majority of the companies listed on Germany's stock exchange. As its network grew more complex, the service provider found fault monitoring and management were becoming more challenging — overwhelming engineers with an average of 10,000 network alarms each day and bursts of up to 300,000.

The high volume of alerts made it hard to quickly distinguish between major alarms that required immediate attention and short-lived alarms that would resolve themselves within minutes and could safely be ignored. Handling each alarm manually also masked correlations between multiple alarms stemming from a single root incident.

Those challenges increase Vodafone Germany's overall time to fault resolution and introduce the potential for human error, making it difficult to guarantee the quality of the network. The company needs a dynamic, artificial intelligence-based system that could monitor and triage alarms accurately, identify common root causes of multiple alarms, and quickly do minor fixes to maintain network quality.

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Solution

Nokia has developed a pattern assistance dashboard that performs sophisticated analytics on incoming alarms and supports rule creation for alarm processing. The solution can incorporate both historical and real-time data, identifying patterns within weeks and becoming more accurate as it processes more alarms.

The dashboard translates identified patterns into recommended response actions that engineers can accept or modify and eventually allow the system to fully automate. With short-lived alarms automatically dismissed, and correlated or repetitive alarms consolidated into single incidents, engineers can focus on resolving only the ones that truly matter.

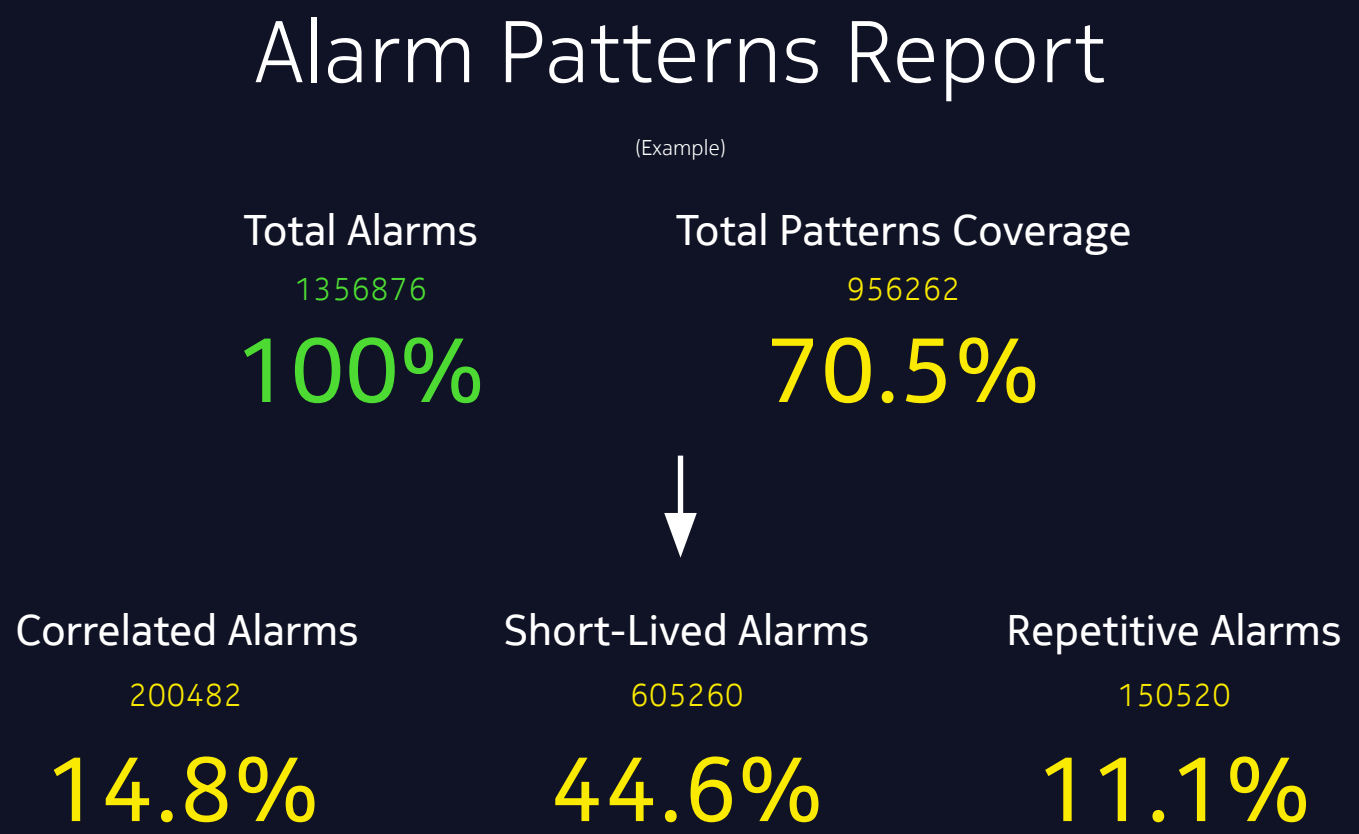
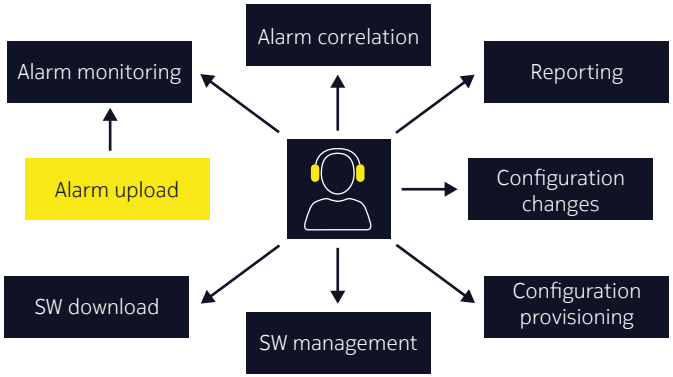


Figure 1. Pattern Assistance Dashboard

Nokia understands that Vodafone Germany needs a way to assess correlatable alarms specifically — those with a common root cause — which are usually more challenging and laborious for humans to process than short-lived, on-off alarms.

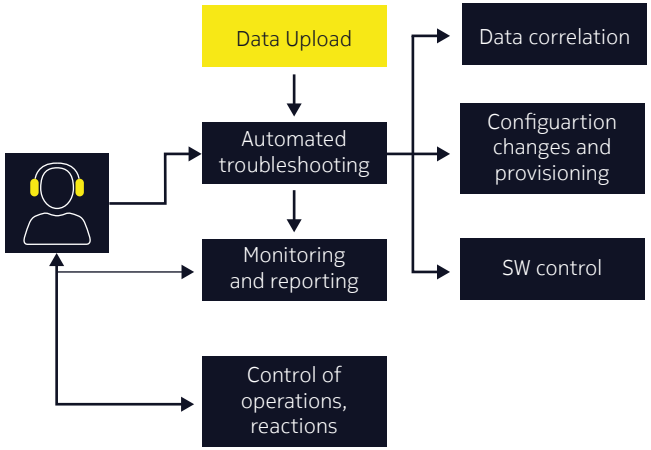
Starting at the end of 2018, Nokia worked with the German CSP on tailoring a solution to its requirements. With machine learning, a full year's worth of Vodafone Germany's historical alarm data was processed, identifying patterns and correlating alarms associated with the same root causes of network incidents. In 2020, that data informed the development of an intelligent alarm correlation system that automatically categorizes and sorts alarms.

The Nokia alarm correlation solution will position Vodafone Germany well for its operational shift to more complex 5G services — which will require today's human-centric, manual workflows to evolve into software-centric workflows to manage services at scale, eliminate human error and bring greater flexibility and reliability to the network.



Human-centric

Current management tools require manual workflows. Workflows are defined by network operators. When network complexity is increasing, costs are increasing.



Software-centric

New management solution supports flexible and customizable automation. Operators can define digitalized and automated network processes.

Figure 2. Moving from human-centric to software-centric network management

Results of ongoing project

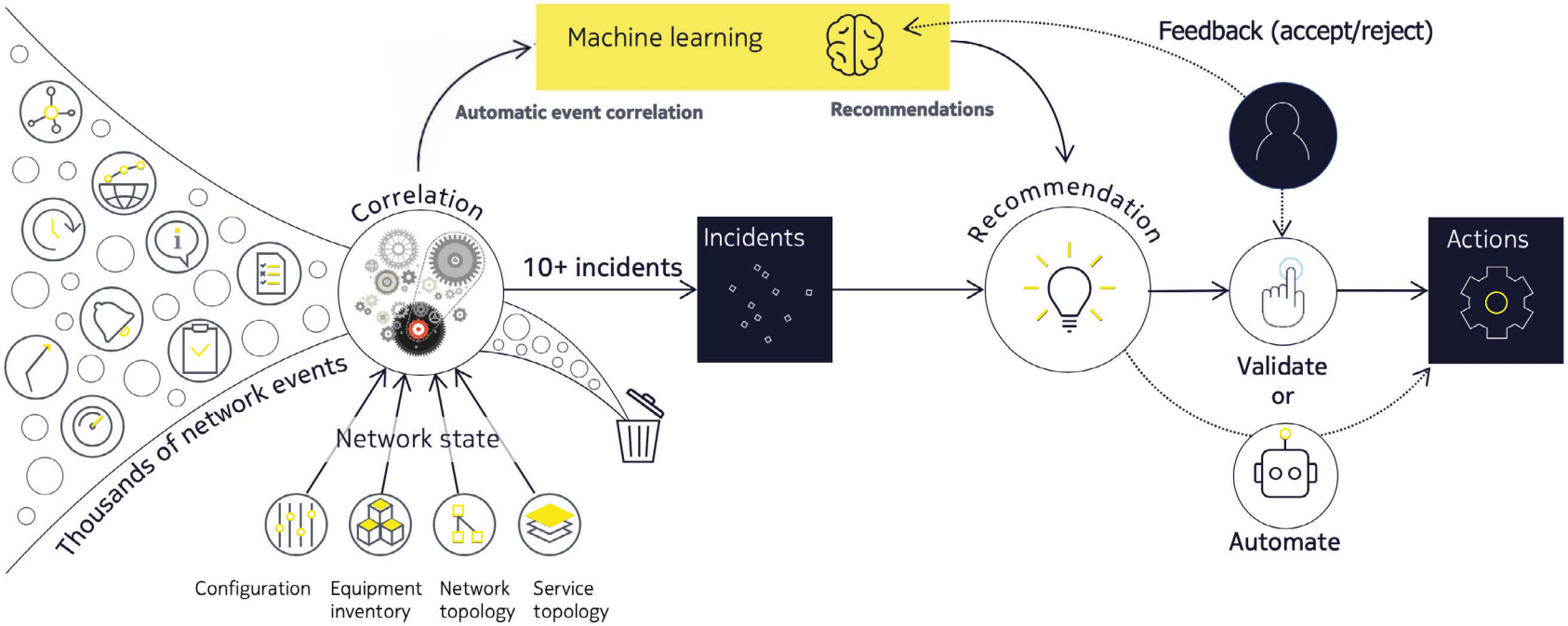
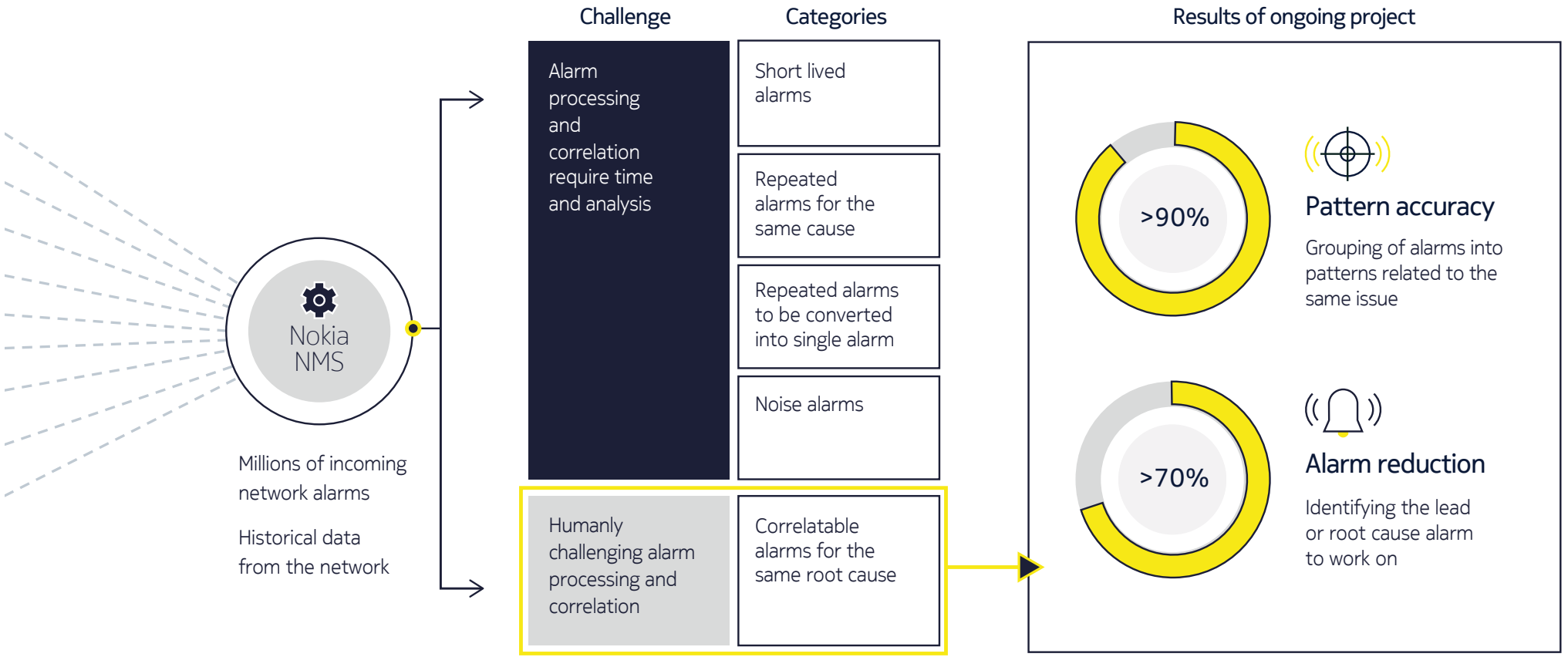


Figure 3. Machine learning-based intelligent alarm correlation

The ongoing project between Vodafone Germany and Nokia has so far reached the following milestone: validation of patterns mined from historical data, and validation of incidents and identification of root causes based on live alarm. This is an important step towards verifying the accuracy of the machine learning algorithm.

In this phase, with Nokia's intelligent alarm correlation, Vodafone Germany could achieve 90% pattern recognition accuracy in analyzing alarms and reduce the proportion of alarms that need action by 70%. The solution will allow Vodafone's engineers to work more efficiently by simplifying troubleshooting and enabling resolution of entire incidents at the source instead of addressing multiple alarms individually. Far fewer alarms will then be escalated from the domain layer to end-to-end service operations where trouble tickets are generated.

Since its development, the intelligent alarm correlation capability Nokia created for Vodafone Germany is undergoing the productization process and will be available to other communications service providers as part of **Nokia NetAct** and as a microservice within the cloud-native **Network Operations Master** solution.



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"Our management has issued the target *'No one will be looking for alarms anymore.'* What we've seen so far from our collaboration with Nokia is impressive and promising. We strongly believe this is where the future lies, and this methodology will revolutionize fault management."

Jörg Volkmer, OSS Project Manager
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Document code: CID207881, RAMP SR2009046971EN

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