Vodafone is partnering with Nokia to build an anomaly detection application on GCP

Anil Rao and Francesco Paolo Bellomo
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**Vodafone’s analytics vision and strategy overview**

### State of the Business
- **Use cloud economics**
- **Capex to opex model**
- **Increase focus on apps**

**Business Drivers**
- Vodafone wanted to pivot from being capex-heavy to being opex-friendly.
- It wanted to use Google Cloud Platform (GCP) as the primary data platform and embrace a standard way for collecting data.
- Vodafone plans to increase its focus on delivering business outcomes by developing AI/ML-based intelligent applications with a ‘develop once, deploy many times’ model.

**Strategy**
- Transform network management using data insights to automate as much as possible.
- Deliver cost and network efficiencies through smarter network capacity optimisation, discovery and troubleshooting.
- Find partners for application development to deliver business value across domains such as the RAN, IT, core network and the Enterprise business.

### Focus of this Effort
- **Transform the way of working**
- **Automate and drive efficiencies**
- **Partner strategies**

**Project Approach**
- **Anomaly detection**
- **Nokia**
- **Vodafone Italy**

- Prioritised use case
- Solutions partner
- First OpCo to deploy the use case

### Analysis
- Vodafone prioritised anomaly detection due to its potential to provide the biggest benefits in terms of network automation.
- It chose Nokia as the solutions partner due to its flexibility and openness for ongoing collaboration and its willingness to jointly innovate and provide the source code.
- It implemented the solution in Italy and is due to roll out in Portugal and elsewhere.

### Benefits
- Easier to deploy and scale new applications across operating companies
- Access to global best practices and a joint innovation partner
- Anomaly detection delivers efficient network planning, optimisation and operations

Source: Analysys Mason
Business challenges and key drivers of the project

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**Vodafone’s move from its on-premises Big Data Platform (BDP) to Google Cloud Platform (GCP) provided a new opportunity to rethink data management and increase the focus on use cases and application development.**

Vodafone’s BDP consisted of many different clusters across operating countries, which in turn created multiple ‘data lakes’ and made data analytics inefficient. The disparity in data across the data lakes and lack of robust algorithms led to undetected network issues and service degradations. Vodafone decided to move to GCP in order to solve these data-related problems by creating a single cloud-based ‘data ocean’.

Vodafone also wanted to use GCP to transform its network management and drive cost efficiencies across the business by increasing its levels of automation. To achieve this, Vodafone increased its focus on developing use cases and applications that would be hosted on GCP because GCP allows for easy scaling across OpCos and supports region-specific customisations.

Vodafone needed a partner with strong network and cloud expertise to accelerate the network optimisation on GCP. It also needed the partner to collaborate and co-innovate on the development of use cases and applications. Vodafone chose to partner with Nokia to take advantage of the company’s strong history of innovation (through Bell Labs), its deep expertise in RAN and cloud and its partnership with GCP.

**Figure 1: Business factors that are driving the transformation project**

- **EFFICIENCY**
  - Increase cost efficiency and simplify data architecture across markets
  - Increase focus on algorithmic innovation
  - Drive automation in planning, optimisation and operations

- **AGILITY**
  - Implement a ‘develop once, deploy many times’ model
  - Develop applications collaboratively
  - Automate root-cause analysis and use faster/iterative closed loops

- **NEW POSSIBILITIES**
  - Identify ‘unknown unknowns’ via correlation of disparate data
  - Empower staff with automated tools for network optimisation and service innovation
  - Provide a superior customer experience and decrease time to market

Source: Analysys Mason
Vodafone partnered with Nokia to develop an anomaly detection application

Anomaly detection is expected to provide Vodafone with significant benefits in the radio domain and forms part of Vodafone’s broader goal of delivering network and cost efficiencies across its OpCos.

Vodafone is using the anomaly detection use case to support network planning and optimisation with a plan to expand to network operations. It is the first step towards achieving full automation of network lifecycle management. The Neuron platform runs within GCP to render and store the RAN data and the Nucleus algorithms are used for ML-based pattern recognition, clustering and classification (Figure 2).

Nokia developed the anomaly detection application to be consumed as-a-service. It shared its vision with Vodafone and exhibited flexibility and an openness for ongoing collaboration (some of Vodafone’s key requirements). Nokia worked on an equal partnership basis and provided the algorithm source code, which increased the level of trust within the partnership.

Vodafone provided the network data, and Nokia and Vodafone together agreed on the ‘productised algorithm’ creation and delivery plans. Nokia provided the applications and the models, which were validated by Vodafone before deployment.

The application has already been deployed in Italy and Vodafone has noted good initial results. It will deploy in Portugal and nine other countries next.
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Key benefits

1. Easier to deploy and scale new applications across operating companies

GCP enables Vodafone to focus on use cases and business outcomes. It has allowed Vodafone to adopt a ‘develop once, deploy many times’ model, which has resulted in a 60–70% reduction in effort, thereby allowing Vodafone to rapidly deploy apps in different markets. Moving to GCP has also lowered the overall cost of maintaining a platform, because Vodafone only pays for what it uses.

2. Access to global best practices and a joint innovation partner

Nokia and Vodafone will continue to jointly plan product roadmaps with ongoing collaboration on application development. The equal partnership with Nokia alongside a shared vision and partnership with GCP also provides a strong foundation for future collaboration. There is a clear separation of responsibilities between Vodafone and Nokia: Vodafone provides the network data and Nokia builds the models and applications.

3. Anomaly detection delivers efficient network planning, optimisation and operations

Anomaly detection delivers the greatest benefits in terms of automating root-cause analysis (25–30% operational efficiency improvement). It uses machine learning to automatically identify issues such as call set-up failures. Vodafone has already deployed the anomaly detection app in Italy, thereby providing a template and best practice for future app development. It plans to extend its roll-out at other OpCos.
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About the authors

Anil Rao (Research Director) is the lead analyst on network and service automation research that includes the Network Automation and Orchestration, Automated Assurance and Service Design and Orchestration research programmes, covering a broad range of topics on the existing and new-age operational systems that will power operators’ digital transformations. His main areas of focus include service creation, provisioning and service operations in NFV/SDN-based networks, 5G, IoT and edge clouds; the use of analytics, ML and AI to increase operations efficiency and agility; and the broader imperatives around operations automation and zero touch networks. Anil is also a frequent speaker and chair at industry events, and holds a BEng in Computer Science from the University of Mysore and an MBA from Lancaster University Management School, UK.

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