Telecom Operations
Extreme Automation and
What Next?

White Paper
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Introduction

As of today, the network operations still have a lot of space for improvement and automation. With extreme automation it is expected that operators can benefit on overall productivity and efficiency increase.

The challenge

As the industry moves into the digital future, everyone’s expectations are changing. The customer expects quality beyond zero defects, reliability and rapid response. They expect an outstanding experience across all touching points from time-to-market and simplicity of use, to flawless deployment, self-installation and self-operations. This dictates a clear need for automation to expand virally and efficiently in all possible use cases.

The solution

Operation Evolution: Automation

Nokia’s automated operations solution delivers all functionality of the existing CEM and Performance Management tool, and uses the same inputs. The landscape to ensure the full automation of E2E Design Authority activities is captured in the figure below. It consists of Radio and Transport Access network planning, configuration and performance management, as well as troubleshooting tools.
All these tools are upgradable to new technologies and solutions; Nokia’s future proof tools and platforms are ready to deliver automation as a practice in the current network transformation, and is expected to be software upgradable to provide operations for the future 5G networks.

Extreme automation helps to achieve one of Nokia’s prime goals, “The renewal of network management to ensure that 5G networks fully support new personal, business and public opportunities”.

In general, Nokia believes in enabling automation at different layers of the network and OSS environment to avoid a single point of failure. This way, Nokia distributes automation orchestration and execution logic over different technology layers, while keeping the overall control over automation actions executed in the network. Consolidating data from multiple sources and different technologies into a single view is the next step in building a more focused view of the E2E services, ensuring faster reaction towards customer centric operations.

Process automation is enabled by technology, manipulating the existing application software to automate synchronization of data between several systems. Machine executed processes relieve humans from these tasks, and implement workflow automation at different technology layers. In addition, Nokia moves the focus towards the Autonomic Solutions - systems that gain knowledge from data as “experience”, and apply it in the upcoming situations. For example, self-learning digital Assistant advising field technicians on issues and resolutions, and analytics advise on organization, prioritization, staff dimensioning and improve operations performance. Nokia is also investing into automation where machine-to-machine automation is not feasible nor possible; The Robotics framework is an extension of Nokia’s wide automation initiative.
Nokia’s Managed Services delivery model provides customers with a comprehensive and robust approach to preparing, launching and managing network operations for RAN and Cloud RAN elements, and is based on the following enablers and transformation levers which will deliver high network availability and performance together with a strong user experience for end customers:

- A mixture of local and remote delivery models which leverages on strong local knowledge of operator and subscriber expectations underpinned by proven, industrialized operations processes;
- Continued process rationalization and standardization across the mobile network making use of Nokia’s VOPs service developments for cloud environments;
- Efficiency improvements and automation via Nokia’s continual service improvement process which includes the use of robotics to automate the execution workflow.

### Global Service Delivery

**Expertise**
Certified people, multi-vendor capabilities, virtualized resource mgmt, center of excellence

**Automation & robotics**
Artificial intelligence, zero-touch, analytics, predictive services, cognitive platforms

**Standardisation**
Process standardization, global best practises sharing, knowledge management

**Quality culture**
“virtual-zero” faults, quality practises, quality certifications, continuous improvement

Figure 1.

Nokia’s Automation solution is based on establishing more consistent links to Service Assurance. Nokia’s automation solution is vendor agnostic and covers all technologies including Radio, C-RAN and Transport. Nokia’s automation solution reduces the amount of management and governance required with Service Assurance. Nokia’s Service Assurance solution with automation support assists in forming a combined continuous improvement team focused on end customer experience and reduced TCO through use of tool sets, automation and policy management.

**Transformation from traditional reactive to proactive support services**

With the adoption of new technologies comes new challenges as operations and processes become more complex, requiring new skills to run multi-vendor, multi-technology solutions.

Nokia is responding by going digital - expanding our capabilities by introducing technologies such as artificial intelligence, sensors, augmented reality and virtual reality. We are already using such technologies in our pioneering Predictive Care, powered by the Nokia AVA cognitive platform, to detect and resolve potential network and service issues before they degrade the customer experience.

Predictive Care services use deep element level visibility for faster issues detection and resolution. Combining it with the experience of Nokia care experts it speeds up identification of the new key operational alerts before they have a negative impact on subscribers.

Nokia deploys automated, machine-learning technology to capture and correlate previously hidden behavioural inconsistencies that can lead to more serious performance problems. Identifying these issues early helps to improve the quality, availability and connectivity.
Nokia reporting & pro-active optimization

To ensure the best possible performance and continuous network and E2E user experience KPIs improvement, Nokia performs pro-active optimization focusing on SON optimization modules and developing Preventive complaint analysis models.

More specifically, Nokia identifies network performance trends and patterns, reviews benchmark network performance with subscriber experience data and implements Open-loop optimization SON modules.

Automation mechanism

With widespread Internet of Things (IoT) and 5G fast approaching, networks are on the verge of an explosion in complexity. Against this backdrop, operators will need to deliver high speed, low latency services quickly and flawlessly for widely diverse applications, all while remaining profitable.

So how can operators move from beyond having enough capacity for data hungry users, to offering flawless performance to realize the connected world?

Nokia’s AVA (Automation, Virtualization, Analytics) integrates these capabilities to deploy advanced services to operators and enterprises by offering connected solutions through the automated delivery of services which are powered by:

• Intelligent analytics to collect and process vast amounts of data. Machine learning is used to recognize growing network anomalies at an early stage and take rapid corrective action before they balloon into faults that affect the customer experience.

• Virtualized delivery for flexible and fast commission of services. Nokia AVA is cloud-based to gain the flexibility needed to enable new use cases to be deployed in days or even hours, instead of the weeks conventionally needed.

• Advanced automation including robotics to quickly and accurately implement and configure networks to deliver smoothly running services at all times. The AVA platform changes forever the way that operators receive expert support services to help them deliver the flawless network performance essential for connected health, autonomous cars and other growing markets.

The platform for agile, cloud-based delivery, Nokia AVA brings new agility to the way operators are supported by expert services. Simplifying the delivery of multiple Nokia services, this cloud-based platform can be deployed and managed in a variety of ways from Nokia’s own cloud or an operator cloud, either centrally or locally. This deployment flexibility enables Nokia to provide the most effective and secure service delivery in any situation. The operator retains full control over how its network is accessed, while ensuring compliance with local data privacy laws.
The Nokia AVA Platform consists of:

1. Integrated Desktop
   a. Consolidating data from multiple sources into a single view to complete a process

2. Process Automation
   a. Applying technology to manipulate existing application software to complete a process

3. Digital/Virtual Assistance
   a. Computer-generated character simulating a conversation to answer queries and provide guidance

4. Cognitive Computing/Autonomic Solutions
   a. Systems that gain knowledge from data as “experience” and apply what is learned in upcoming situations

Figure 2. Nokia AVA
Figure 3. Nokia AVA can be deployed on a variety of cloud arrangements according to the needs of each operator

**Business benefits**

1. Reducing headcount and consequently increasing profitability
2. Improving network quality by less faults and consistently reduced execution time
3. Reduces human mistakes, through automation of tasks – leading to repeatable results
4. Automated continuous service improvement based on cognitive machine learning

**Conclusion**

Extreme automation stands as the future of network operations. The “Traditional” approach will no longer be applicable in tomorrow’s virtualized networks where self-organizing networks, dynamically managed topologies, orchestrated capacity management and data managed meta operations, become common place. Network Management will require extreme levels of agility and instantaneous reaction times to maintain the customer experience on acceptable levels, this can only be achieved through extreme automation.
## Acronyms

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<tr>
<th>Acronym</th>
<th>Definition</th>
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<tbody>
<tr>
<td>API</td>
<td>application programming interface</td>
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<td>BSS</td>
<td>business support system</td>
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<td>DBaaS</td>
<td>Database as a Service</td>
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<td>EPC</td>
<td>Evolved Packet Core</td>
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<td>ETSI</td>
<td>European Telecommunications Standards Institute</td>
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<td>FWaaS</td>
<td>Firewall as a Service</td>
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<td>QoS</td>
<td>Quality of Service</td>
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<tr>
<td>TCO</td>
<td>total cost of ownership</td>
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<tr>
<td>VIM</td>
<td>virtual infrastructure manager</td>
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<td>VNF</td>
<td>virtual network function</td>
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<td>VNFM</td>
<td>VNF manager</td>
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<td>VNFO</td>
<td>VNF orchestrator</td>
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<tr>
<td>XaaS</td>
<td>anything as a service</td>
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