5G Network Automation

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5G is finally here. Well, almost. After all the hype, operators are slowly but surely deploying the technology. And they are turning to automation to address the demands placed on the network from the explosive growth of data and devices. The ability to scale services quickly and flexibly is the key to success—and network automation provides operators that capability.

That is easier said than done. All too often, operators have 'reactive automation'—a rules-based system that springs into action *after* a failure. In most instances, subscribers can feel an impact on the quality of experience. That is not really fit for purpose in the age of 5G. Instead, it really should be 'proactive automation.' That is when artificial intelligence (AI) and machine learning (ML) algorithms are trained to take corrective action *before* a failure occurs by predicting network behavior. Such automation is designed to negate the possibility of a subscriber experiencing a service shortfall.

Many reasons to pursue automation

A growing number of operators recognize that the network efficiency brought about by automation is integral to their ability to manage the complexity of 5G. This is especially true with heterogeneous equipment meant to deliver end-to-end services. An early example is Vodafone, which increased its network optimization speeds by a staggering 45,000 percent by implementing AI-enabled augmented engineering.

Augmented engineering involves the effective use and analysis of diverse data sets that are usually executed with specific computing software. This can be time-consuming. According to Vodafone, machine learning made the process efficient, so engineers focused their attention on more critical and strategic projects while the automation did the heavy lifting. Research from *MIT Technology Review* shows that operators expect automation will result in operating expense reductions of between 30 and 50 percent.

Futuriom, a technology research company, conducted a survey of over 200 operators that revealed their top three goals for implementing network automation. These goals included:

1. Faster service delivery to increase revenue (79 percent);
2. Boosting network security (75 percent); and
3. Improved ability to support dynamic and on-demand services (70 percent).

Interestingly, respondents considered lowering operating costs (42 percent) and capital spending (38 percent) as secondary goals. Moreover, when asked where they wanted to implement cost savings over the next two years, 63 percent said they want the ability to use intelligence and analytics to automate fault resolution. Fifty-five percent wanted the ability to automate network design, build and deploy operations.

One size does not fit all

Simply put, there is no one-size-fits-all path that leads to network automation. Some operators start by automating in the data center. Others focus on automating

operational support systems (OSS). In most cases, operators generally begin by automating virtualized functions (VFs) before tackling legacy systems. This variety shows that there is no right or wrong way. There are a number of emerging use cases that suggest how network automation could shape the network of the future.

Mirroring the findings of the Futuriom survey, Altran's extensive experience with operators has found that automation is the top choice to prevent faults. Consider these other use cases:

- *Security:* Automating the network operations center can prevent distributed denial-of-service (DDoS) attacks and botnets. This strategy enables root-cause analytics, anomaly detection and guided diagnostics to strengthen security and address vulnerabilities at the onset.

- *Network planning:* In the era of unpredictable traffic patterns, automated intelligent service rollouts can manage the sudden peaks and troughs on radio and fiber optics to deliver consistent quality of experience. 5G infrastructure will be reliant on cloud-native architectures and most of the network function will be "workloads." Automation will need to consider "compute planning" as well as network planning.

- *Network slicing:* Automation has also given way to intent-based dynamic network slicing. Thanks to this capability, operators can secure new enterprise revenue streams by offering bespoke network slices to meet different use cases and business models.

The impact of automation is substantial. Analysis undertaken by researchers at Altran with an operator found that within the core network, automation improved network failure predictions, intelligent network orchestration and traffic congestion control by as much as 40 percent. On the radio network, automation improved network optimization, call drop-rate predictions and network slicing automation by as much as 30 percent. In network and service operations centers, improvements of up to 50 percent were recorded when automation was used for predictive maintenance, autocorrelation and root cause analysis.

The operator also saw improvements in subscriber churn, which was reduced by as much as 50 percent with automation. Likewise, automation can reduce power usage by about 30 percent in data center operations and drives cognitive workload management and capacity planning. It can also cut DDoS attacks by up to 40 percent.

Challenges to automation

While automation might sound like the panacea for network headaches, Futuriom's research surfaced a number of major hurdles that operators can face when trying to automate a network. More than 30 percent of respondents said they lack the budget to invest in either staff or technology to support the migration to automation. Twenty-nine percent were daunted by the scale and implementation of the automation.

Another significant challenge is formulating a digital transformation strategy to guide an operator's automation efforts. More often than not, operators do not have a well-thought-out strategy and try to piecemeal it. Such an approach is inefficient and almost always results in unnecessary costs.

As operators make structural changes to capitalize on automation, they often merge or redistribute responsibilities across network and IT teams. However, retraining existing staff and trying to instill DevOps principles present additional challenges. The truth is that introducing automation into the network requires a different skill set, one that's difficult to find.

Even when highly skilled talent can be found, when it is brought into the company, it sometimes creates resentment, which can further slow the process.

To address these challenges, operators should create a detailed strategy for how network automation will be introduced and used to generate business value and ROI. They should develop a roadmap that identifies when and how organizational changes

will occur and specifies which technologies and partners will be needed to achieve their goals. Security will have to be at the heart of the strategy.

Don't be left behind

A growing number of telecom operators now understand the need to modernize their networks. They have watched from the sidelines as cloud-based service providers like Google and Amazon have revolutionized value-added services—delivered over the operator's networks—at record speeds. Meanwhile, traffic loads from video streaming, gaming and other bandwidth-intensive applications, as well as data traffic from the burgeoning IoT, are growing exponentially. In fact, this growth is so fast that [mobile data volumes are projected to double worldwide](#) from 35 exabytes this year to 73 exabytes by 2022.

Network automation is a mixed blessing for operators. It presents enormous opportunities yet poses some formidable challenges. As the 5G era starts to unfold, automation should be part of a robust digital transformation strategy. Given the role it can play to secure and make a network more efficient, the question is not *if* but *when* will you automate your network. The old adage still rings true: failing to prepare is preparing to fail.