Configuration Management and Auditing: An Essential Step for Network Automation

Abstract

The telecom industry has witnessed phenomenal growth in the last decade. The rapid proliferation of smartphones, and the adoption of cloud and IoT technologies are triggering an unprecedented demand for communication services across industries. This growing need for connectivity has been keeping telecom service providers extremely busy in developing reliable network capabilities that can match up to the corresponding requirement for high quality services. The importance of network configuration lifecycle management therefore becomes key in measuring and improving the quality of service (QoS) in the telecom industry. This paper explores how telcos can transform their current network configuration methodologies in order to establish a more reliable network, in turn improving customer experience.

Growing Pressure on Telcos

Despite the increase in market size, the average ARPU in the telecom industry has seen a steady decline due to the aggressive competition from OTTs. Forced into a commoditized market where competition is based on price, telecom operators have tried their best to redefine strategies, and continue to optimize operational expenditures in a bid to maintain profitability. Many players have even expanded their service portfolios to capitalize on the digital developments and seek newer avenues of revenue.

The relentless advancement in technology though has not offered any respite from modernization imperatives that continue to mandate capital investments. The evolution of Software-Defined Networking (SDN), Network Function Virtualization (NFV) and other technologies offer significant transformation opportunities though only to those that are ready to invest and explore beyond traditional services. The IT spend forecast for the global telecom sector by Ernst & Young, set to rise and touch $85 billion USD by 2020, is an indicator in this direction.

Network as a Core Differentiator for Quality of Services

While telcos may focus most of their energies in keeping up with these new possibilities, it will be equally critical for them to ensure their core capabilities do not get neglected. With the upcoming developments in 5G and the Internet of Everything expected to generate further demands on the industry, the telecom network will become the bedrock on which competitive success will be built. The network quality and throughput will continue to influence customers' choice of operators. It will also have a significant impact on the QoS rendered and subsequently the customer churn as well.

It is no wonder then that network has emerged as the single most critical priority for investments in the near future. With customer experience (CX) management being the top concern of most telcos, and data continuing to grow exponentially, the network will become the crucial arrow in the telecom's quiver.

Manual Network Configurations: The Invisible Pain Point

The simultaneous growth of subscribers and the changing face of network management in recent years have been nothing short of an imposing challenge. Networks are constantly being configured and updated to provide customized services to users. The use of multiple spectrum bands, and operators' efforts to optimize their networks continuously has been growing steadily. The rate at which such changes are made to the network every day runs in mammoth proportions that place a heavy demand on both time and resources. With today's networks being a mash-up of multiple technologies in a multi-vendor environment, managing the networks has thus become a difficult exercise.

Though the introduction of SDN and NFV offer enormous scope to dynamically modify networks with ease, in reality, they may further add to the complexity. Networks still contain legacy elements that struggle to match new service demands and their maintenance is still largely manual. As a result, even as the changes brought about by these new transformational technologies seem to deliver positive results, not all telecom services can be delivered without the legacy elements.

Upgrading network configurations, in addition to being a time burden on teams, can also result in errors on the networks that may go unnoticed, such as reducing performance or security vulnerability. Holding the power to regulate and govern the quality of the network makes network configurations extremely critical.

As networks get called on to handle progressively higher volumes, telecom operators will need to reconsider the traditional KPIs they have been associating with QoS and include the network as one of the key parameters to drive customer experience. In turn, they will also need to identify a better approach for network configuration lifecycle management including using automation to drive efficiency and reliability.

Traditionally, the network configuration lifecycle has been handled by telcos mostly on a piecemeal basis. However, going forward, this will need a more holistic approach that can

consider the newer complexities. It would also be necessary to acknowledge that wherever network elements are deployed as per a golden or baseline configuration guideline, configuration management would still be needed owing to the inevitable configuration drifts that would have happened.

A New Approach to Network Configuration Management

The shift in the way network configurations are presently being managed will need to follow a systematic step-by-step transformation. These include:

Systematic backup of configuration files

The first step is to put in place an automated backup system. Care must be taken to ensure configuration files are regularly backed up for all the critical elements in the network. More importantly, this should be automated with a provision to maintain version control, and raise alerts in the case of failed backups. Any tool that can be used to check the differences in multiple versions of the configuration file will be an added advantage.

Identification of network parameters

Once the automation of configuration backups is accomplished, the next step would be to study the various element configurations in the network to identify how they affect the security, performance, availability, and other network service factors. Their corresponding parameters and values are documented post an exhaustive interaction with all network managers and teams.

Automated network auditing

The most essential step in upgrading the network configuration lifecycle management is the implementation of an automated network auditing. Whether developed internally or implemented through a third-party tool, such an audit tool will be irreplaceable.

The audit system must be capable of monitoring the network elements at a regular frequency, either at a pre-defined interval or on a trigger immediately after a configuration change. It must be able to estimate the impact any configuration changes will have on the identified service parameters and raise alerts for those that do not comply with

the fixed set of audit rules that are established. It would be desirable to have the ability to build more audit rules with an option to group rules under categories and sub-categories to accommodate the growing volumes over time. The system should also be able to validate these rules against the configuration files.

In the event of a breach, the system should either alert the concerned authorities or be able to take action by rolling back automatically. Detailed reports on breached configuration changes should be available for analysis to avoid similar incidents in the future.

Automatic generation of configuration files

The automation of network configuration management may also be taken to the next level through the automation of configuration file generation for different devices or elements in the network. This will be especially useful where a large number of devices are deployed on the network everyday as in the case of enterprise services. By automating the definition of configuration schema for all device models and generating configurations by taking boundary conditions and attributing values, significant savings in time and cost of deployment can be achieved.

Conclusion

The automation of network configuration is an essential step in the evolution of the telcos to prepare themselves for the transformation of networks. Despite many telcos still evaluating it as an optional step, few have already been able to realize its benefits including an improvement in QoS. For instance, a leading operator in the United States recently implemented an automated network configuration management and auditing platform making its voice network 100% compliant in a short period of time. As a result, the telco was able to reduce the network issues by 40% leading to improved customer experience and satisfaction.

The telcos of the future will be those that have built a strong, lean, and automated network today. By managing network configurations effectively, telcos can not only optimize their capital and operational expenditures on the network but also become more agile and efficient.

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