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Telecom Inventory Management and Network Planning Transformation: Leveraging Digital Resource Automation

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Introduction: Why Inventory Management Transformation?

Digital transformation (DX) in the telecom industry has been underway for several years. While DX was initiated in response to network technologies and industry disruption from new competitors, it's now an ongoing journey that has become a pervasive practice. A key element of telecom DX is digital resource automation, a great leap forward that facilitates enhanced asset management, resource allocation, and faster service delivery as well as assurance capabilities.

Digital resource automation helps manage the digital disruption that has become prevalent in the telecom market, affecting nearly all facets of organizational conduct. The act of implementing digital platforms and processes is complex and requires serious consideration of both technology and organizational structure issues. Digital transformation impacts the entire internal and external supply chain. It influences the type of employees required, employee education and training, interaction with partners and suppliers, and customer engagement.

The DX process is challenging but ultimately rewarding in that it strips away inefficiencies and replaces them with efficient workflows that facilitate agility, increase productivity, and ultimately improve customer relationships.

AT A GLANCE

WHAT'S IMPORTANT

Digital transformation is the way forward for communications service providers, with multiple drivers including 5G, SDN/NFV, and evolving end-customer requirements for agile service calls. In the evolution of inventory management and network planning, key transformation areas of focus are:

- » IT simplification
- » Dynamic service introduction
- » E2E inventory data model
- » Network planning automation
- » Agile service provisioning

KEY TAKEAWAY

Agility and automation in network planning are the key goals to ensure the future OSS application support required for a network growth profile that enables opex savings with a fast time to market in a complex hybrid network (including PNFs and VNFs).

The goals and benefits of communications service provider (SP) digital transformation include the following:

- » Drive operational efficiencies and productivity gains by streamlining business processes.
- » Create and deliver new business models with the agile delivery of products and services, potentially giving the organization the ability to disrupt competitors.
- » Reach new customer segments and enter new markets.
- » Prevent disruption by equipping the organization to act with speed and agility ahead of, or in response to, competitive threats.
- » Transform the customer experience with new digital competencies and technologies.

Key Trends Driving Telco Digital Transformation

The following are important technology drivers impacting communications SP transformation:

- » **Network virtualization and implementation of software-defined networking (SDN).** Burdened by the static complexity and expense of managing a multivendor and multitenant, US\$300 billion annual network infrastructure, communications SPs sought to emulate the cloud-based architecture. This facilitated API-driven orchestration techniques to manage workloads on open source hardware. Over the past five years, service providers have embarked on a strategy to implement network function virtualization (NFV), orchestrated by SDN platforms to facilitate a new era of agile service creation and functionality. Key benefits include the ability to implement network services on demand, with additional elasticity that reduces time to market from months to days or, in some cases, even minutes.
- » **Requirement for digital transformation to improve network performance.** Digital transformation can help communications SPs balance the costs of managing the exponential growth of network traffic and the reality of flat or declining revenues. IDC is projecting 9% growth in network traffic and approximately 2% growth in telecom revenues over the next five years. Companies have implemented software-defined and cloud-based solutions to manage costs and improve efficiencies.
- » **Impact of DX on agility and pressure for faster technology deployment and service delivery.** Software-defined infrastructure benefits include the separation of the physical and control plane, which facilitates enhanced and more flexible network management. Open source infrastructure and platforms can be implemented with integrated orchestration. Digital and automated asset management can facilitate reduced network configuration time, and automated workflows allow for faster service delivery and optimized device management. The benefits are reduced network costs, caused by less reliance on proprietary platforms, as well as enhanced efficiency from the reduction of human errors.

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Benefits

The benefits of digital inventory management include the integration of digital capacity management with network design and planning tools to achieve optimal service delivery and service assurance capabilities. Achieving those goals, however, requires migrating from siloed platforms with separate functions to a cloud-based platform that can manage disparate environments that include TDM, IP, and mobile infrastructures.

In addition, a visualization and reporting infrastructure that facilitates rapid queries and predictive management in a map view can enhance and optimize network efficiency, thus allowing for near-real-time assessments, reservation of bandwidth, and reporting of network assets across the entire carrier infrastructure.

Key Trends

The major trends driving communication DX include the requirement to manage capex and opex, bringing them in line with the flat or declining growth of revenues. Many tier 1 operators have completed the first task of implementing software-defined platforms as well as NFV. Subsequent transformation efforts will include the implementation of automation and orchestration to enhance agility and the time to market of new services. Another key driver is to improve efficiencies in capex spending, leveraging white-box open source platforms. Automation will also drive savings through the reduction of personnel and the improvement of efficiencies.

Artificial intelligence and machine learning (AI/ML) have been adopted by service providers to enhance network operations by leveraging network traffic and end-user data to refine the efficiency of network operations. On the customer-facing side, AI/ML has been used to augment customer experience (CX) as well as provide tools for process automation and sales process automation to recommend services to end users.

Further, smart networking/intent-based networking includes design and implementation of rules and parameters governing the optimal routing of network traffic. This also includes the use of real-time analytics to optimize traffic flows based on traffic patterns and least-cost routing. Additionally, smart networking includes network automation, the process of automating the configuration, management, testing, deployment, and operations of physical and virtual devices within a network. Everyday network tasks and functions are performed automatically.

Considering Tech Mahindra and BT

Tech Mahindra

Tech Mahindra, a US\$5.2 billion company with 125,200-plus professionals across 90 countries, is actively engaged with 973 global clients and is part of the Mahindra Group, a US\$21 billion global enterprise. The Mahindra Group, which was the highest-ranked non-U.S. company in the *Forbes Global Digital 100* list in 2018 and was featured in the *Forbes Fab 50* companies in Asia in 2018, employs more than 200,000 people in over 100 countries. The Mahindra Group operates in key industries that drive economic growth, serving diverse markets such as tractor and utility vehicles, information technology, and vacation ownership.

Tech Mahindra specializes in offering convergent, digital design experiences built on innovation platforms enabling reusable assets that connect across many technologies to deliver tangible business value and experiences for its clients. Tech Mahindra's DigitALL philosophy focuses on transforming clients' businesses across products and services, business models, and reimaged

business processes, leading to new revenue opportunities, enhanced customer experience, operational efficiency, reduced risk and, ultimately, a better society.

Tech Mahindra has been a key partner for IT services for communications SPs worldwide. With deep capabilities across verticals, Tech Mahindra's services include Infrastructure and Cloud Services, Data Analytics, Consulting Services, Cyber Security, Business Process Services, Digital Supply Chain, Telecom Product Engineering, Enterprise of Future, and Network Services.

BT

BT's purpose is to use the power of communications to make a better world. BT is one of the world's leading providers of communications services and solutions, serving customers in 180 countries. Its principal activities include the provision of networked IT services globally; local, national, and international telecommunications services to its customers for use at home, at work, and on the move; broadband, TV, and internet products and services; and converged fixed-mobile products and services. BT consists of four customer-facing units: Consumer, Enterprise, Global, and Openreach.

Use Case

As part of BT's transformation toward a truly digital operation support system (OSS), BT Technology along with other systems integrators including Tech Mahindra engaged to consolidate network inventory systems and digitize business processes in order to introduce automation and improve customer experience. The transformation aimed to create a model-driven system that allows dynamic end-to-end service design, activation, and management for legacy and future networks and services. The goal was not only to automate network planning but also to simplify, optimize, and orchestrate fulfillment through the next-generation digital OSS stack.

"With exponential increase in network demand, putting more people on to plan and build our network is simply not sustainable. Also, infrastructure is increasingly software driven. This presents a unique opportunity to reengineer our existing processes and automate network planning," notes Ravi Ramachandran, Platform Director, Fulfillment Tools for BT OSS.

A key objective of the project has been to consolidate the different types of network inventory — physical, logical, and virtual — into a single system to ensure data integrity. The information framework (also known as SID) has been leveraged to build a scalable, multimodel graph database for a service resource inventory management system (SRIMS) as opposed to the traditional relational database model. Graph databases are useful for modeling complex, unstructured environments such as a network where many dynamic relationships exist between data. Key benefits from the new inventory model include real-time and consolidated data, no data redundancy, fast data retrieval, and alignment with industry standards.

In addition to the information framework, which has been instrumental for data modeling, TM Forum Open APIs have been used to integrate network resources and services with consumer applications. This has enabled a standardized exposure of network planning capabilities. YANG and TOSCA have further enabled defining the network kit and service definitions and have been used to map the service provisioning journey to the information framework, which was necessary to achieve NetOps and one-touch provisioning.

"The data model caters to access, metro, and core domains and fully supports optical, Ethernet, IP, and mobile networks, covering both physical and virtual network functions," notes Sreenath Gopalakrishna, Head of Software Engineering, OSS Transformation, BT OSS. "Also, SRIMS is an intent-based, catalog-driven solution that enables BT to flexibly provide and ensure services over its hybrid converged network infrastructure."

The final piece of the puzzle was optimization and automation of the network planning processes with specifically built universal workflow management tools integrated with the SRIMS module. The tool makes use of the TM Forum's Business Process Framework model, providing a foundation for the fulfillment processes for the orchestration workflows required to automate the network planning journeys. The Agile OSS automation solution has enabled a significant reduction in planning tasks timelines over a simplified OSS stack with reduced handoffs.

"Automation is a buzzword used across various industries to seek significant improvement in cost reduction, efficiency, productivity, accuracy, and performance," says Hari Nagarajan, Senior Engineering Manager, Automation and Plan & Build, BT OSS. "BT's Agile OSS Automation solution has significantly reduced opex costs by automating 70% of manual tasks and quicker time to market."

Challenges

A vital step in digital OSS transformation is adoption of the of Agile DevOps culture. Culture change is a huge challenge, especially with a large telco such as BT, which has complex planning processes encompassing multiple planning and engineering teams to handle its huge diverse network. To overcome this challenge, the transformation team adopted key principles of Human Centered Design (HCD) and Design Thinking, ensuring the involvement of end stakeholders at each stage (brainstorming, conceptualizing, developing, and implementing) of the solution design process.

Conclusion

Digital transformation continues to reshape the communications service provider business and no more so than with the use of digital resource automation, a set of essential technologies that facilitate enhanced asset management, resource allocation, and faster, assured service delivery. In short, digital resource automation upgrades network operations by leveraging network planning automation and enabling agile service provisioning, which ultimately lowers opex costs for carriers and improves customer experience.

About the Analyst



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Courtney Munroe is responsible for supporting IDC's continuous research on global telecommunications trends. The core research includes the evolution of WAN networking to software-defined hybrid wide area networking and the impact of digital transformation on WAN architecture. Courtney's research focus also includes consumer and enterprise networking requirements and analysis of the strategies of communications service providers as they transform to implement new business models.

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