BT reduces network planning time by 70% using TM Forum Open Digital Framework

Who?

Developed next-generation workflow management tool to simplify and optimize network planning

What?

Developed next-generation workflow management tool to automate planning through standardization of processes and data models

How?

Used the TM Forum Open Digital Framework to automate planning through standardization of processes and data models

Results

- 70% reduction in time to complete prechecks and preplanning
- Significant operational savings and redeploying staff to handle other critical tasks
- Successful transition to DevOps culture

While 5G is an exciting opportunity for communications service providers (CSPs) like BT Group, it also represents a huge challenge when it comes to network and capacity planning. Simply put, the manual processes and legacy systems used in planning today will not be able to keep up with projected demand for 5G connectivity and other services.

“As BT prepares for its digital transformation journey and for the onset of 5G, one of the major challenges is coping with the ever-growing demand for core network capacity and overcoming its slow growth profile for core network,” explains Hari Nagarajan, Senior Engineering Manager, OSS (Operational Support System) Tools Planning & Automation, BT OSS. “There is very high demand for capacity, so we need to transform our legacy OSS to become data-driven Agile OSS.”

BT is undertaking a multi-pronged digital transformation program to reimagine OSS, which includes four main projects:

- Development of a next-generation workflow management tool (NGWFMT) for automated planning, which is highlighted in this case study
- Deployment of a new, combined inventory system called SRIMS (Service and Resource Inventory Management System) that represents a ‘single truth’ database for inventory management (see this case study for more about SRIMS)
- Implementation of a single catalog for service and resource management enabling a dynamic and data-driven OSS by providing a catalog of service and resource specifications (the catalog is based on the Internet Engineering Task Force’s (IETF’s) YANG data model, which describes configuration information for network devices and services, and TOSCA, an open source orchestration data modelling language developed by OASIS)
- Development of a next-generation service activation engine (NGAE), a cross-domain, model-driven and network-aware activation tool enabling provisioning of complex services over hybrid networks
Implementing cultural change to improve agility has been a key part of overhauling workflow management. BT and Tech Mahindra developed the NGWFMT solution using key principles of human-centered design and design thinking, which aim to make systems more useful and usable by focusing on users’ needs and requirements. The idea is to improve efficiency, human wellbeing, users’ satisfaction, accessibility and sustainability.

“In the past, we have followed a release-based waterfall model,” Nagarajan explains. “Now we have moved to Agile way of working enabling faster time to market.”

Agile DevOps software development focuses on flexible planning, evolution, early delivery, and continuous development, testing and improvement. It encourages teams to try out changes and then incorporate them if successful or move on quickly if they fail.

BT is using this approach to automate capacity planning, which until now has been a manual and cumbersome process involving many steps and many human decision-points. Lack of automation means the planning process can take months, and it’s difficult for engineers to make decisions about where and when to increase network capacity by adding physical network elements such as switches and routers in data centers.

The team identified that planning processes can be standardized and planning rules can be “template-ized”. This enables end-to-end automation of network planning journeys, resulting in much quicker planning with less demand on staff. A key example is the base build configuration journey for physical network functions (PNFs), which was a cumbersome, manual planning journey that takes up to 20 hours using legacy processes. With automation, single-touch planning can be

Mandar Udawant, OSS Solutions Designer, Tech Mahindra, adds: “In the new Agile approach, the end stakeholders are involved at every stage of the process. This includes brainstorming, conceptualization, development and implementation.”
## Putting the Open Digital Framework to use

To develop NGWFMT, BT and Tech Mahindra used the TM Forum Open Digital Framework, specifically the Business Process Framework (eTOM), the Information Framework (SID) and Open APIs. The goal was not only to automate network planning, but also to simplify, optimize and orchestrate fulfillment through the new SRIMS inventory management solution.

“The legacy OSS inventory model was complex and spread across multiple systems, each using its own terminology,” Udawant explains. “We created a one truth, consolidated inventory data model covering all the layers – physical, logical and service – and implemented it in a graph database. This improves performance and reduces complexity.”

The Business Process Framework helped the team standardize all the processes involved in the journey, while the Information Framework provides a standard data model. Then, Open APIs are used to expose network resources and services to internal systems. For example, the Resource Inventory Management API lists the network resources that are available, and when a resource has been ordered, resource inventory is updated through this interface. The Service Management API is similar in that it lists the network services (chains of resources) that are available.

## Promising results

Automating BT’s network planning and fulfillment processes has already resulted in a 70% reduction in the time it takes perform planning tasks. While it used to take five days to do network prechecks and preplanning, now it only takes an hour, and as noted, the time it takes to perform configuration changes is down to just four hours.

As a practical example, BT’s network team was able to achieve a target of building 3,000 headends for its Ultrafast Fibre project by automating planning and workflow. This has resulted in connecting enough ports in the broadband core network to the Openreach access network to be able to reach 90% of the addressable Openreach market. Eventually, NGWFMT will also be used to automate planning and fulfillment of virtual infrastructure as well as physical.

Implementing NGWFMT also has delivered significant operational savings. While some of the savings comes from reducing demand for staff resources, this is not necessarily a negative outcome. Much of BT’s senior engineering staff is aging, and as they retire their knowledge is lost. NGWFMT incorporates their expertise into the automated processes and systems. And as noted, automation frees staff from mundane planning tasks and lets them focus on more important aspects of network management like optimization.
The adoption of Agile DevOps culture that has resulted from the NGWFMT project and BT’s OSS transformation overall is also an important outcome, but it hasn’t been easy to achieve.

“Culture change is challenging,” Nagarajan says. “BT is the largest telco in the UK and it has a big, complex network which requires complex planning. In most processes, information is scattered and not well documented, and planners work in the way that works for them to complete the planning process. So, our first challenge was to ensure we were bringing people together to understand the processes.”

The transformation team held hackathons that brought together key planners and helped them set goals. By doing this, everyone involved could understand what kind of input is required during network planning and fulfillment processes and the resulting output.

“You need to know the processes and understand them in order to automate them,” Nagarajan says. Another major challenge was the fact that data was scattered across so many systems and not well documented. Developing the “single truth” graph database used by BT’s next-gen OSS solves that problem.

“That was our biggest problem, because you can’t automate processes when data is scattered across applications,” Udawant says. “That’s something we’ve overcome with our End-to-end Service Data Model Solution.”