NaaS Demystified

Unlock the full potential of Network as a Service

blueplanet
a division of ciena

Contents

Introduction

Communications Service Providers (CSPs) typically spend 80 percent of their budgets on integration and routine operations, leaving very little money to invest in innovative new services and technologies. In a platform economy that values innovation above all else, this puts CSPs at a distinct disadvantage.

One reason for this disproportionate spending is that, traditionally, network domains and operational processes are tightly coupled, which requires that all new network elements be integrated with the Business and Operations Support System (B/OSS). Given that most CSPs maintain dozens of such systems, this results in significant cost and complexity.

Another factor is the reliance on manual involvement in routine operational processes. Technicians must access the B/OSS to gather the information they need to design and activate services. This adds cost to service fulfillment and limits scale.

In addition to high OPEX, the impact of this complexity is evident in excruciatingly slow time to market for new services (18 months is the norm) and lengthy service fulfillment processes.

Implementing Network as a Service (NaaS) can help CSPs overcome these challenges and reverse the 80:20 spending ratio. NaaS simplifies operations, streamlines new technology and service adoption, and enables cloud-like network experiences such as on-demand service activation, customer self-service, and subscription-based consumption models. In short, NaaS simplifies network and operations transformation simultaneously.

What is NaaS? | Learn more

Busting the myths

The full scope and potential of NaaS is often overlooked, however. There are four common misconceptions:

1. NaaS is simply a way to deliver virtualized business services.
2. NaaS involves OSS transformation only.
3. NaaS is the same as Software-Defined Networking (SDN).
4. NaaS is a futuristic, pie-in-the-sky vision.

This eBook debunks each of these myths and shows how CSPs, their partners, and customers can benefit today from this open and standards-based technology.

Myth 1: NaaS is simply a way to sell virtualized services to enterprises

Enterprises have embraced cloud-based '-as-a-service' models for many of their storage, compute, and application needs because they can flexibly order, modify, and scale services on demand. Now, they want a similar model for network services.

To meet this demand CSPs are adopting Network Functions Virtualization (NFV), which provides network functionality in software running on commercial, off-the-shelf servers versus proprietary hardware such as appliances and routers. NaaS simplifies the operation of these virtualized resources, letting CSPs offer their customers virtual services that can be flexibly ordered and scaled.

But this is far from the whole story. NaaS offers much more.

NaaS can be applied to all services—wholesale, retail, and enterprise. NaaS can accelerate the introduction of innovative, on-demand digital services by combining any mix of cloud and network services, including those delivered by partners. NaaS does this by providing a complete operational framework that leverages model driven abstraction, standard Application Program Interfaces (APIs), and service lifecycle automation to enable true network and operations transformation.

Keeping it simple

NaaS reduces the complexity associated with legacy CSP operations.

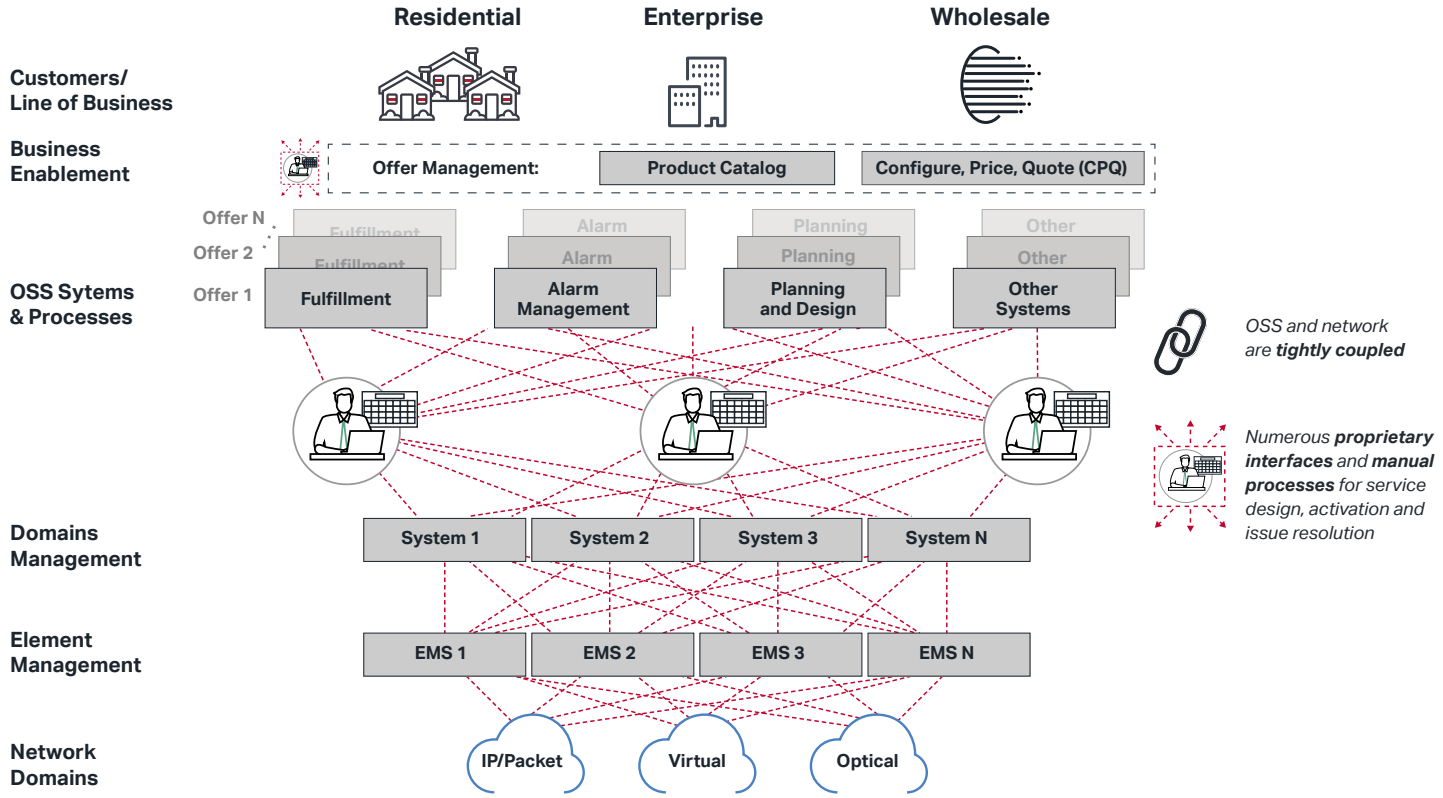


Figure 1. Traditional CSP operational model

Contrast the complexity of Figure 1 with the simplicity of the NaaS operational model depicted in Figure 2. NaaS leverages model-driven abstraction to decouple the network and B/OSS layers, summarizes network capabilities in a service catalog, and uses standard, open APIs to facilitate communications between layers.

Importantly, these catalogs allow service components to be reused to create new products and services quickly and efficiently. NaaS also employs service lifecycle automation in a closed loop to reduce or even eliminate manual involvement in routine processes. This automation ensures rapid service delivery, resource optimization, and the quick remediation of issues when they arise.

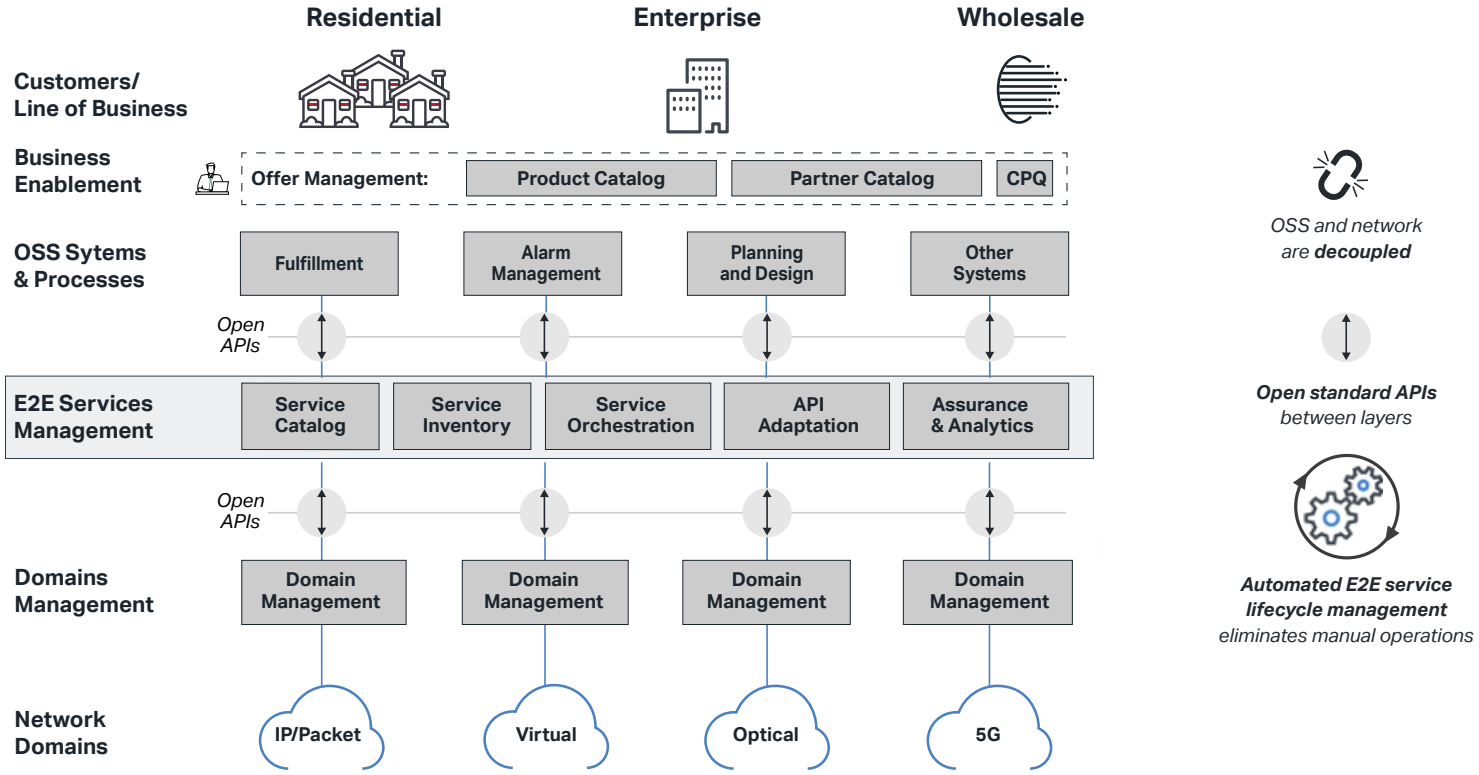


Figure 2. NaaS operational framework

The next section will closely examine the benefits of decoupling the network and operations and take a look at how collaboration among standards bodies and other groups makes NaaS possible.

Myth 2: NaaS is strictly about OSS transformation

Implementing NaaS results in OSS transformation, but it also helps CSPs transform their networks and realize the full promise of increased agility.

In traditional networks, when a CSP wants to incorporate new technology or add physical or virtual components, they must be integrated with the B/OSS in a customized manner—a slow, expensive, and risky process that stifles innovation. Network engineers must access the systems manually to gather and correlate information needed to design, provision, and assure services. This results in static services delivered with long contracts.

With NaaS, network capabilities are summarized in a service catalog, exposed through open, standardized APIs, and services can be orchestrated and managed autonomously end to end. Several industry consortia support projects to enable this.

NaaS: Built on Open Standards

Efforts such as MEF's Lifecycle Service Orchestration (LSO) architecture, the Linux Foundation's Open Networking Automation Platform (ONAP), ETSI's Zero-touch Service Management (ZSM) project, and TM Forum's Open Digital Architecture (ODA) provide reference architectures and standard APIs that help overcome the constraints of traditional CSP operations. While each group approaches the problem from a different angle, their architectures and interfaces are fundamentally similar and complementary. For example, the MEF's LSO offers specifications that enable standardized, end-to-end service orchestration across one or more network domains, including partners' domains, while the TM Forum has contributed a suite of more than 50 REST-based Open APIs that enable standards-based communications between the B/OSS and the network.

These efforts enable NaaS operational models by automating service design and activation, and by providing ongoing network and service monitoring, optimization, and assurance in a closed loop. This approach can be applied to any type of network service, and use cases leveraging these efforts have been publicly demonstrated in many NaaS-related proofs of concept. For example, in a recent TM Forum Catalyst project in which Blue Planet® participated, AT&T discovered that it may be possible to cut in half the time it takes to go from concept to cash for optical wavelength services.

Use Case: Using NaaS to improve time to market and customer experience

During the Automating NaaS Lambda (λ) Services Catalyst project, AT&T showed how an enterprise customer could use a self-service portal to order a 100G wavelength service connecting sites in Houston and Atlanta. The team used NaaS to define and expose reusable services by decomposing the wavelength service into Reconfigurable Optical Add/Drop Multiplexer (ROADM) and Open ROADM connections.

In a traditional order capture process, a customer service representative must enter an exhaustive list of service and resource information manually—a tedious and error-prone process. During the demonstration, however, AT&T used NaaS to simplify the ordering process so a customer could configure its own wavelength service.

A service catalog was set up within the end-to-end management domain that defined a composite wavelength service and its related domain services. This service specification consisted of attributes that were exposed to the B/OSS layer, but the list did not include any resource-level information. In fact, the wavelength service was composed of five domain services that were not exposed to the B/OSS layer at all.

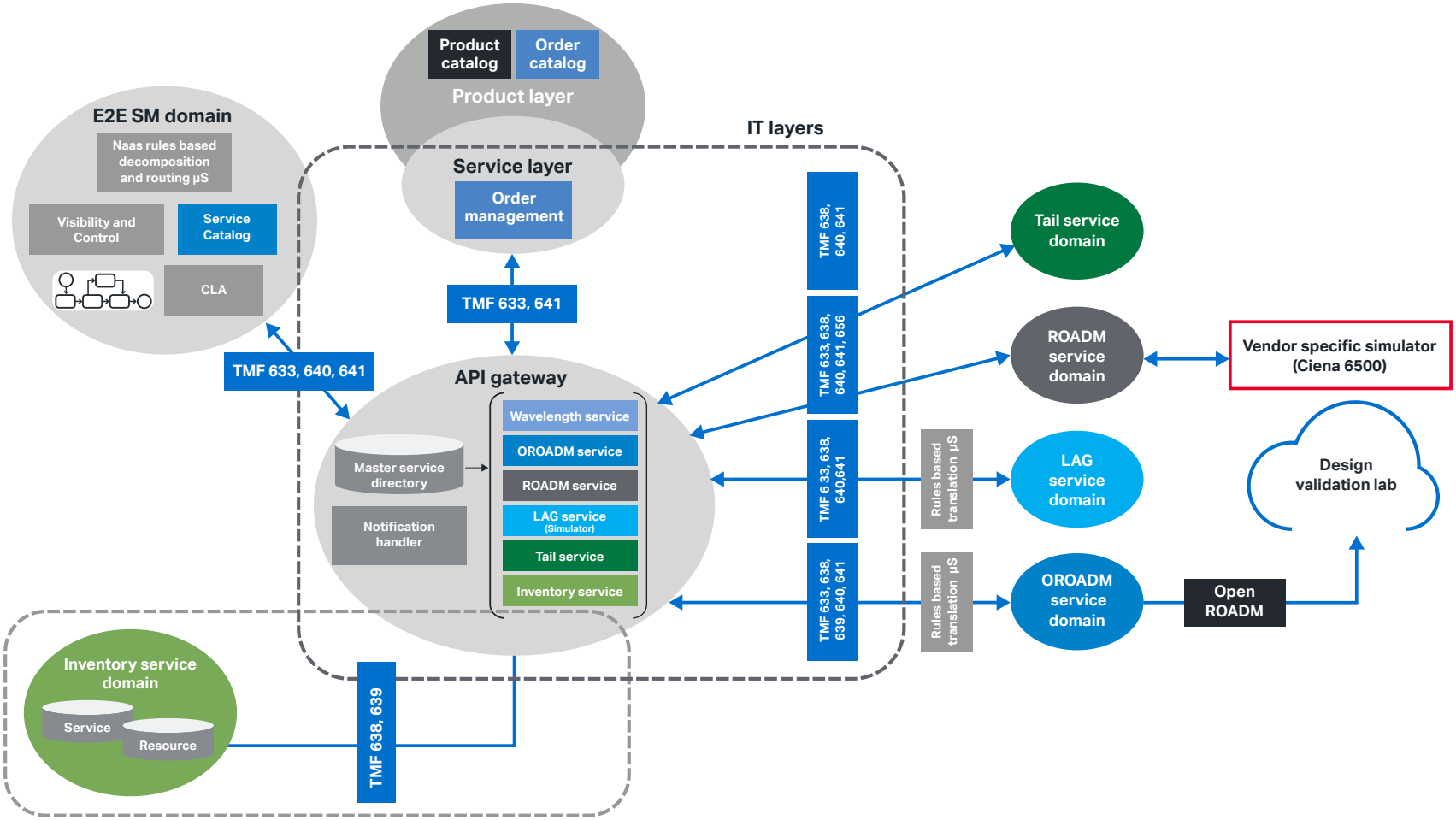


Figure 3. Logical topology, Automating NaaS Lambda (λ) Services Catalyst (source: AT&T/TM Forum)

Dramatic savings are possible

An important takeaway from the Catalyst project is that, while ordering systems and other B/OSS need to know ***what*** to deliver based on the customer's intent, they do not need to know ***how*** the services are implemented in the network. By decoupling the B/OSS from the network, abstracting network capabilities, and using industry-agreed APIs to expose the high-level network capabilities offered by each domain, AT&T estimates significant benefits in operational efficiency, DevOps enablement, and the time it takes to go from concept to cash, shown in Figure 4.

Figure 4. Projected benefits from implementing NaaS for wavelength services, based on Automating NaaS Lambda (λ) Services Catalyst (source: AT&T/TM Forum)

Myth 3: NaaS is the same as SDN

SDN is an approach to network architecture that enables the network to be intelligently and centrally controlled, or 'programmed,' using software applications. This helps CSPs manage network domains consistently and holistically, regardless of the underlying network technology. Sometimes people equate NaaS with SDN, believing they are one and the same.

NaaS is not the same as SDN, but it does build on SDN's open and programmable nature to help CSPs modernize and automate operational processes, from design through ordering, provisioning, and optimization, and ongoing management.

Traditional CSP operations cannot efficiently or effectively support cloud-based business models, on-demand services, or even new technologies like 5G. To achieve this, automation—more specifically, closed-loop automation—is becoming mandatory. Beyond the previously stated issues with traditional service activation, manual processes cannot handle all the changes that need to happen—at the speed they need to happen—to meet today's business requirements for latency, throughput, reliability, and availability.

Closing the loop

Closed-loop automation continuously assesses real-time network conditions, traffic demands, and resource availability to determine the best path for traffic to take through the network. It is achieved with a continuous and repeating cycle of communications between network components and IT applications, using:

- **Analytics** from network-generated telemetry to assess network state and traffic demands
- **Policy** to determine ideal network configurations
- **Orchestration** to optimize and automate end-to-end configuration and provisioning instructions to the network
- **Network infrastructure** that is dynamically controlled and streams telemetry for continuous analysis

Use Case: NaaS at the edge

CSPs can also combine NaaS, SDN, and Multi-access Edge Computing (MEC) with closed-loop automation to optimize content and application delivery. This will allow them to support a wide range of 5G use cases such as industrial IoT, gaming, remote healthcare, autonomous vehicles, emergency services, and more. For some of these use-cases, operators will co-create services with partners.

Many CSPs intend to control edge capabilities even if the infrastructure is provided by cloud partners, managing it in the same way they manage other network domains. Another recent TM Forum Catalyst proof of concept in which Blue Planet participated demonstrated this concept, showing how a CSP can use closed-loop automation to deliver zero-touch Edge Compute as a Service (ECaaS). The project—supported by seven CSPs, including BT, Orange, TIM, Telus, Verizon, Videotron, and Vodafone—again showed how standard reference architectures and APIs make it possible for CSPs to implement NaaS and realize a 50 percent reduction in time to market.

NaaS at the Edge Use Case

Automated, zero-touch edge computing in action

During the Catalyst demonstration, the team showed how the organizer of a live gaming event could select a 'gold' connectivity package that includes surveillance and emergency service. During the event, a crisis was simulated to require automated and rapid reconfiguration of edge computing capabilities to deliver public safety emergency service.

The team identified three challenges CSPs face in combining NaaS, SDN, and MEC:

- A diverse group of players, including telcos, cloud providers, and application developers, must work together to deploy and manage solutions at the edge.
- MEC is new for CSPs, which means many technology deployment decisions have not been made yet.
- It is challenging to meet customers' requirements when multiple partners are involved; for example, to guarantee latency and performance along with security and privacy.

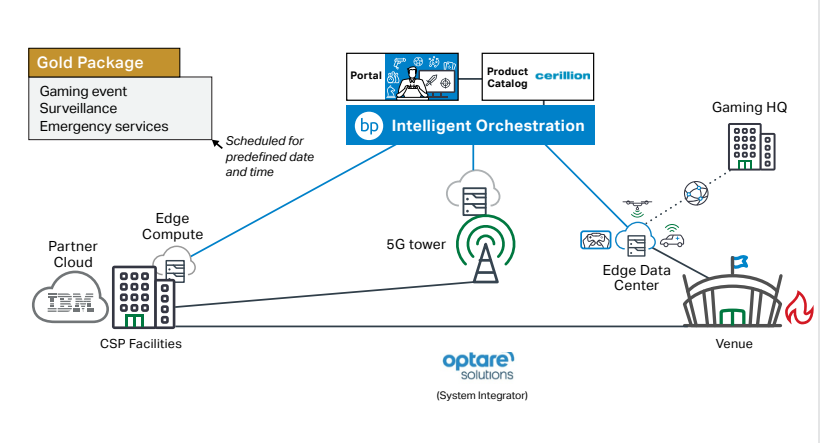


Figure 5. Logical view, Edge Compute as a Service (ECaaS) Catalyst

A primary goal of the Catalyst project was to build a definition of a standard payload for edge services that can fit into a CSP's NaaS product catalog. This required using TM Forum's ODA and NaaS Open API Component Suite, ETSI's ZSM and MEC APIs, the GSMA Operator Platform, and MEF's LSO architecture. The project represents an important step forward for closed-loop automation, showing how industry groups can work together to enable it.

These public demonstrations show what is possible with NaaS—today. The next section more closely examines how an Australian CSP is embracing Blue Planet's standards-based NaaS solution in a production environment for network and operations transformation.

Myth 4: NaaS is a vision for the future

The final myth to bust is that NaaS is a futuristic vision or an unrealistic ideal. Not only is it ready for prime time, but CSPs are implementing it today, using industry-agreed reference architectures and standard APIs.

Fiber network provider Vocus is implementing a NaaS architecture and is well on the way to activating services within seconds and achieving combined OPEX and CAPEX savings of AU$60 million (about USD$40 million). The subject of a recent TM Forum case study, Vocus has been pursuing an aggressive growth strategy for the past three years. It has acquired 15 companies with fiber and submarine assets, and as a result must manage six networks and eight B/OSS stacks. This made operational efficiency and scale next to impossible.

The company is adopting NFV, SDN, and NaaS as part of its 'Future State' strategy, which aims to consolidate all networks into one, and introduces automation so customers can control bandwidth dynamically, in real time. To accomplish this, Vocus partnered with Blue Planet, which provides the Blue Planet Intelligent Automation Portfolio software that leverages TM Forum Open APIs along with other standards and open-source solutions.

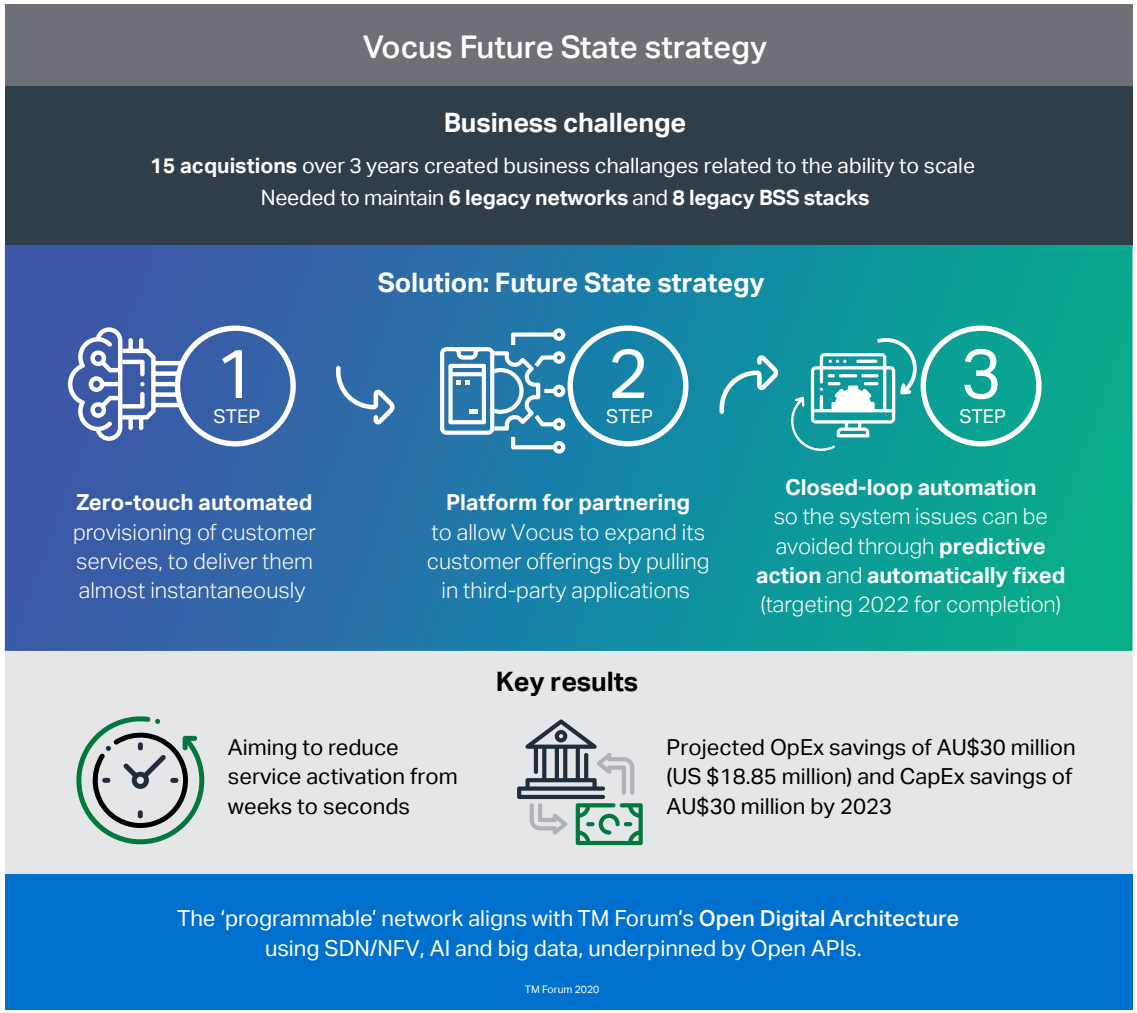


Figure 6. Vocus' three-phased strategy to automate service activation and assurance significantly reduces time and cost (source: TM Forum)

A phased transformation

Vocus is embracing a three-phased approach to network and operations transformation, shown in Figure 6. While it will take the company several years to complete the work, the foundational platform is now in place, with dozens of sites already utilizing Blue Planet Intelligent Automation.

NaaS-related use cases

NaaS is a standards-based framework, and while it's not a specific product or solution, several real-world use cases are closely aligned with the NaaS concept. The primary use cases related to NaaS include Bandwidth on Demand (BoD), SD-WAN Automation, 5G Slice Lifecycle Automation, and Inventory and Network Synchronization (INS).

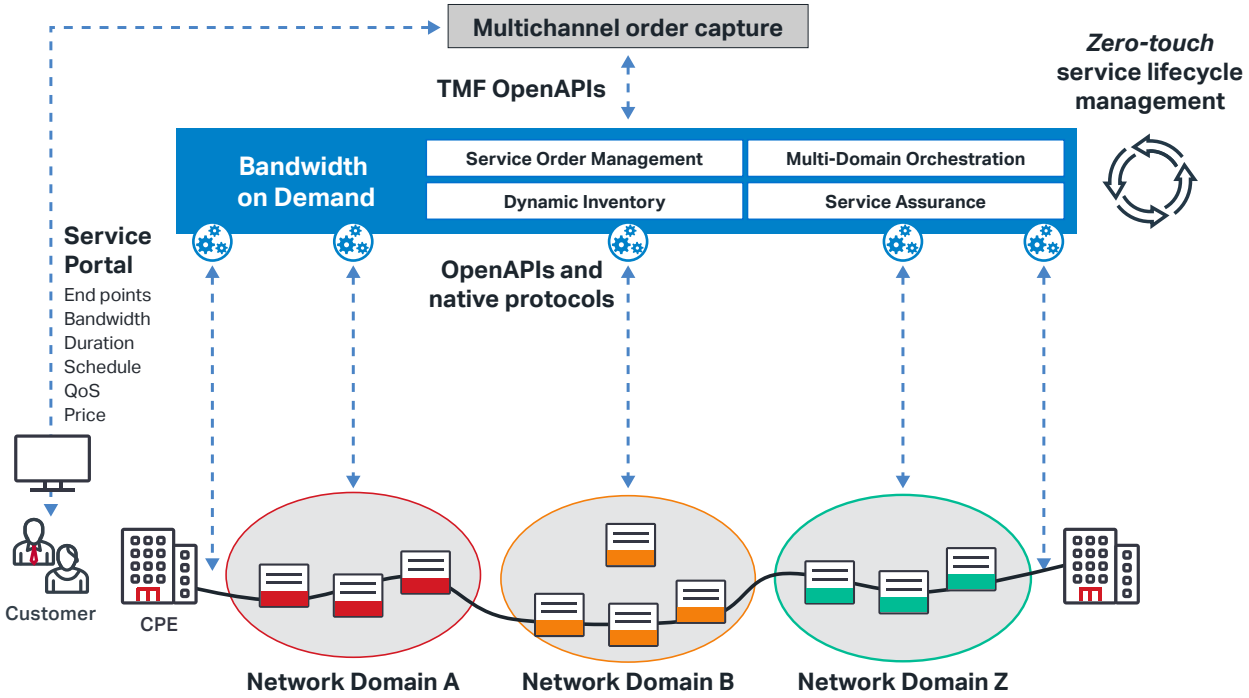
- **» Bandwith on Demand**
- **» SD-WAN Automation**
- **» 5G Slice Lifecycle Automation**
- **» Inventory and Network Synchronization**

Bandwidth on Demand

Enterprise and wholesale customers want flexible WAN connectivity that can be activated and modified with the same speed and ease as cloud services. Unfortunately, network operators' traditional services can't address this need because they require an expensive, multi-week order-to-service process.

Bandwidth on Demand (BoD) addresses this market opportunity by providing customer-controlled service activation for Ethernet and OTN connectivity in realtime, or on a prescheduled basis. The two key components of the BoD use case include:

1. An intent-based orchestration engine that supports bandwidth calendaring with time-aware path computation and automated end-to-end service provisioning across a multi-layer and multi-vendor network
2. A self-service portal that enables customers to select service end points, bandwidth, protection type, Quality of Service (QoS) parameters, and scheduling options.



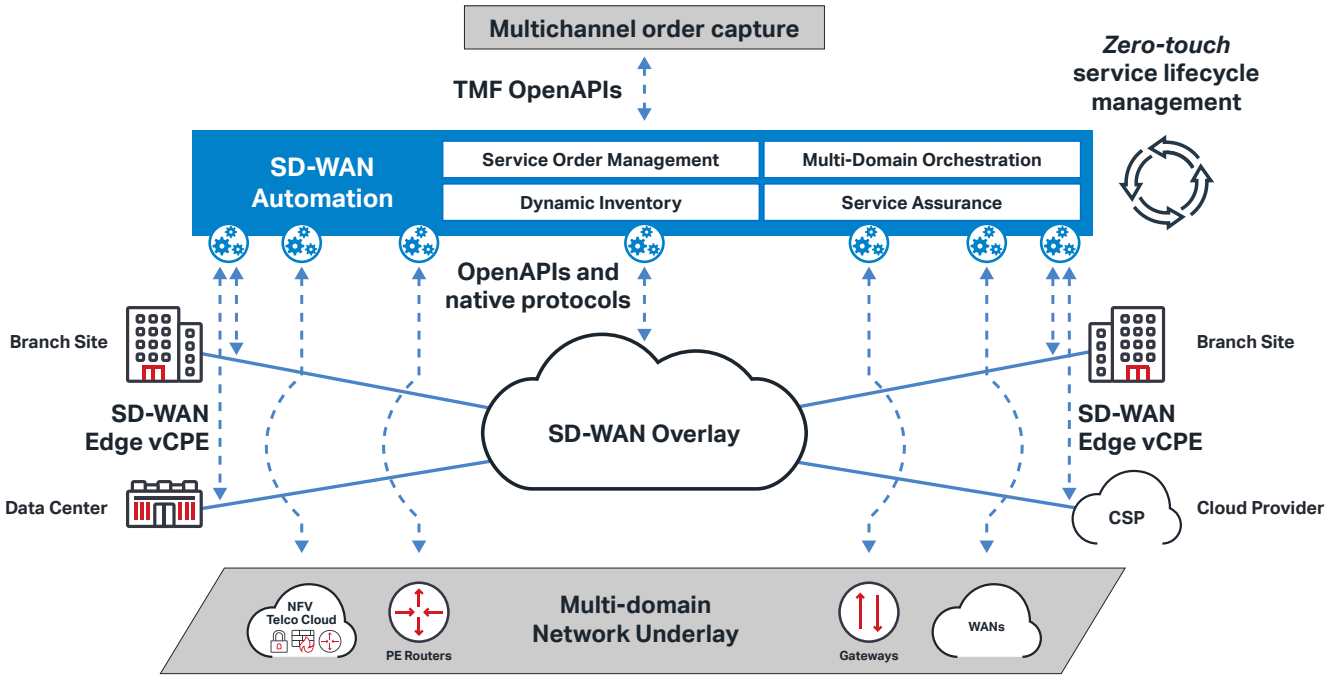
The BoD use case helps network operators increase their connectivity service margins by up to 60 percent and decrease their service fulfillment costs by up to 90 percent - while improving their market appeal with on-demand OTN and Ethernet services that meet enterprise and wholesale customers' desire for a cloud-like service experience.

SD-WAN automation

SD-WAN services have rapidly gained popularity with enterprises seeking reliable, high-performance branch office connectivity—at a lower cost and with greater flexibility than MPLS-based services. Now, as the SD-WAN market matures, network operators need to evolve and differentiate their services by integrating new vendors and virtual network functions, accelerating service fulfillment, and improving service reliability—all without increasing operational complexity and costs.

True SD-WAN automation allows network operators to automate the full SD-WAN service lifecycle —from service order management, to activation, to assurance—end-to-end across network layers and domains. Three key components of the SD-WAN automation use case are:

1. Service order management, which uses standard TMF OpenAPIs to communicate with order capture systems and provides service order enrichment, visibility, and control throughout the service fulfillment process
2. Multi-domain service orchestration for automating the discovery, provisioning, and activation of underlay networks, inter-carrier access connections, SD-WAN service endpoints, controllers, and routing gateways
3. Integrated multi-domain service assurance for rapid fault isolation and remediation, with unified, real-time network and service visualization



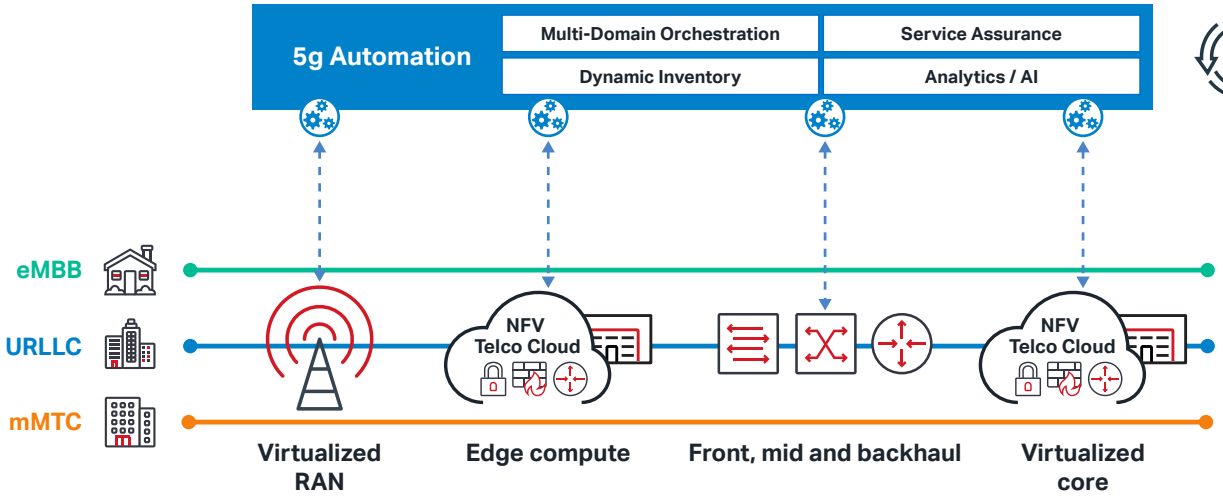
With SD-WAN automation, network operators can reduce the costs and complexity of SD-WAN services, even as they broaden their service portfolio to profitably meet growing demands.

5G slice lifecycle automation

5G is driving a massive mobile network transformation that promises consumers a new connected experience, while offering network operators unprecedented potential for business and revenue growth. The new services made possible by 5G build on the concept of network slicing, which enables the creation of on-demand, end-to-end virtual networks that can be optimized to meet the needs of specific end users. Existing OSS aren't well-equipped to support on-demand services like network slicing, which mandate real-time service management.

The 5G slice lifecycle automation use case enables network operators to automate the creation, modification, and deletion of network slices—in moments, as desired by end customers. 5G slice lifecycle automation combines several software elements, including:

1. 3GPP-compliant, multi-domain service orchestration for on-demand activation of end-to-end slices that span the Radio Access Network (RAN), edge cloud, transport, core and, in some deployments, public cloud
2. Integrated service inventory capabilities for visualizing physical and virtual resources
3. Unified service analytics and assurance to enable network slice monitoring and modification in real-time.



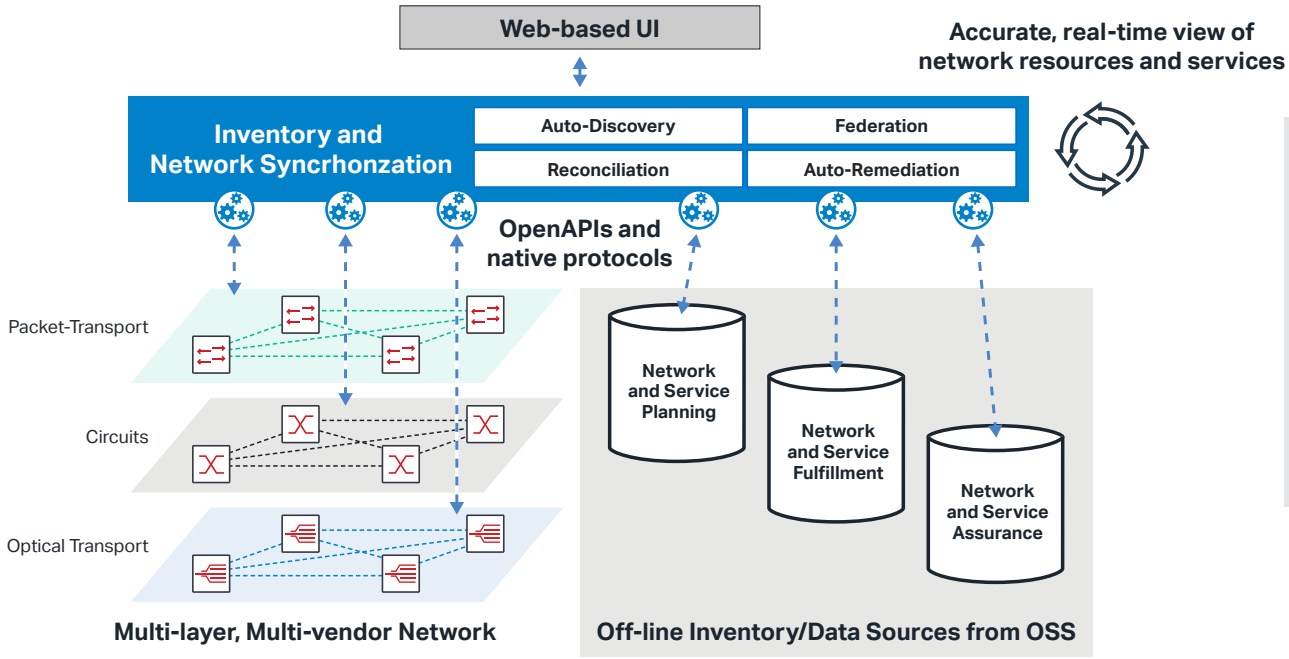
With 5G slice lifecycle automation, network operators can offer highly customized, SLA-based network slicing services to increase revenue and differentiation while simplifying operations and reducing costs.

Inventory and Network Synchronization (INS)

Inventory systems are a critical component of a network provider's operations environment. But, more often than not, the information they contain is static and out of date, created when the network device was first commissioned into the network, and not updated since. Even worse, there are many systems that contain inventory data, each containing only a narrow view that is specific to a vendor or technology layer. This fragmented and stale data leads to inefficient network planning, high order fallout rates, time-consuming troubleshooting, and many other operational inefficiencies.

The INS use case provides a single source of truth for physical network and logical service inventory to improve network providers' operational efficiency. INS combines multiple capabilities to build the single source of truth including:

1. Auto-discovery of network resources and services across Layer 0-Layer 3 to gain real-time, accurate end-to-end visibility
2. Federation of auto-discovered network data with existing B/OSS inventory to create a unified inventory model, including stitching between physical devices and logical circuits
3. Auto-reconciliation of data discrepancies between the B/OSS inventory and the network, based on business policies



The clear and complete visualization of all physical network and logical service inventory provided by INS allows network operators to respond to customer requests more quickly and accelerate their automation strategy.

Get started on the NaaS journey

We hope this eBook demystifies NaaS and shows why adopting an evolutionary NaaS strategy today can increase agility and innovation, reduce costs, and lower the risks associated with adopting new technology.

Blue Planet can help you on this journey. We understand how networks are built, scaled, and maintained, and we draw on this experience to deliver a state-of-the-art, holistic NaaS framework.

Blue Planet is a member of ONAP, TM Forum, and MEF, and we have incorporated standardized interfaces and architectural principles into our vendor- and technology-agnostic Blue Planet Intelligent Automation Portfolio. With our deep OSS and network expertise and support for true closed-loop automation, Blue Planet powers OSS and network transformation and provides a business-driven evolution to NaaS.

Learn more about Blue Planet NaaS