WHITE PAPER

Why CSPs Must Make the Smart OSS Call

Abstract

As businesses increasingly adapt to a predominantly online model in line with the new reality, the need for high bandwidth and reliable network services is soaring. Consequently, communications service providers (CSPs) are experiencing exponential demand for services and are dependent on progress in virtualization technologies to continue scaling at current rates. Traditional operations support systems (OSS) fall short of addressing the speed and scale requirements of modern networks. CSPs need a modern, agile, modular, and scalable approach to network management.

This paper discusses next-generation OSS platforms and how they can address current issues in bandwidth usage, while fulfilling business requirements at scale. We also share our perspective on the use of standard service models, enabling accurate real-time configuration of underlying resources and achieving a high-speed path to complete closed-loop capabilities.

Rethinking the OSS Function

The necessity of ubiquitous network services with high reliability, throughput, and speed has come into critical focus during the current worldwide COVID-19 pandemic. This has forced organizations to shift most of their business activities online. The first quarter of 2020 reveals an increase of 47% in average broadband consumption to 402.5GB, from 273.5GB during the same time last year[1]. However, traditional networks are not designed for on-demand agility and scalability.

TM Forum[2] research identifies the top two barriers to OSS evolution as:

- Poor end-to-end visibility into network and service performance
- Inaccurate and limited real-time information on network resources

As part of their network transformation, CSPs need a digital OSS platform because virtualized dynamic architectures do not behave like traditional networks.

The five most important attributes of a future OSS platform must include:

- Orchestrated closed-loop service fulfilment and assurance
- Automated closed-loop network optimization
- Scalability
- Open ecosystem-driven
- Container and microservices-based

Besides providing traditional management of fault, configuration, accounting, performance, and security (FCAPS), a futuristic OSS must automate functions that were handled manually in the past to support scale and expansion of high-velocity services.

Driving Well-orchestrated OSS Functions

The next-gen OSS platform must be backed by a data and event-driven architecture. Instead of managing islands of technology, future OSS functions must be created and offered as services composed of microservices to support automated end-to-end orchestration of hybrid (physical, logical, and virtual)

[1] http://openvault.com/complimentary-report-Q120/

[2] TM Forum, Future OSS: Towards an Open Digital Architecture, November 2019, https://inform.tmforum.org/

network resources. Key requirements for transformation towards the digital OSS vision are:

- Resource independent service models with OSS maintaining accurate service inventory and hybrid resource inventory.
- Highly computerized networks delivered by virtual functions or 5G network slices, requiring dynamic service topologies in the OSS.
- Ingestion of streams of network data with ever increasing volume, velocity, and variety.
- Automated policy management realized by business or operational rules, advanced analytics, and emerging artificial intelligence algorithms controlling overall orchestration.
- Human intervention as a last resort for not-yet-learned events.
- Open and secure APIs for use by internal and external stakeholders of the OSS platform delivering its functions as a service.

These requirements present a formidable challenge for CSPs. They require technical OSS re-architecture towards microservice orientation and cloud deployment, in addition to a concurrent agile organizational transformation and cultural shift towards automation. Fortunately, industry standards, open source architectures and software can be leveraged to mitigate the development risks and bootstrap the future digital OSS.

Role of Industry Standards

The Metro Ethernet Forum – lifecycle service orchestration (MEF LSO)[3] and TM-Forum open digital architecture (ODA)[4], provide excellent models for re-architecting OSS to manage service entities and handle underlying resource entities. These frameworks enable a top-down approach where architects design the capabilities of OSS, based on the services that need to be supported. This is independent of the underlying network resources implementing those services. Instead of focusing on the traditional bottom-up methodology prevalent in legacy OSS designs (Figure 1), the LSO and ODA-inspired orchestrators'

[3] Metro Ethernet Forum, Service Operations Specification MEF 55, Lifecycle Service Orchestration (LSO): Reference Architecture and Framework, March 2016, http://www.mef.net/lso/lifecycle-service-orchestration

[4] TM Forum, Open Digital Architecture (ODA) Concepts & Principles, GB998, Release 19.0.1, October 2019, https://www.tmforum.org/oda/

layering allows many-to-many relationships for OSS functions to drive maximum business agility.

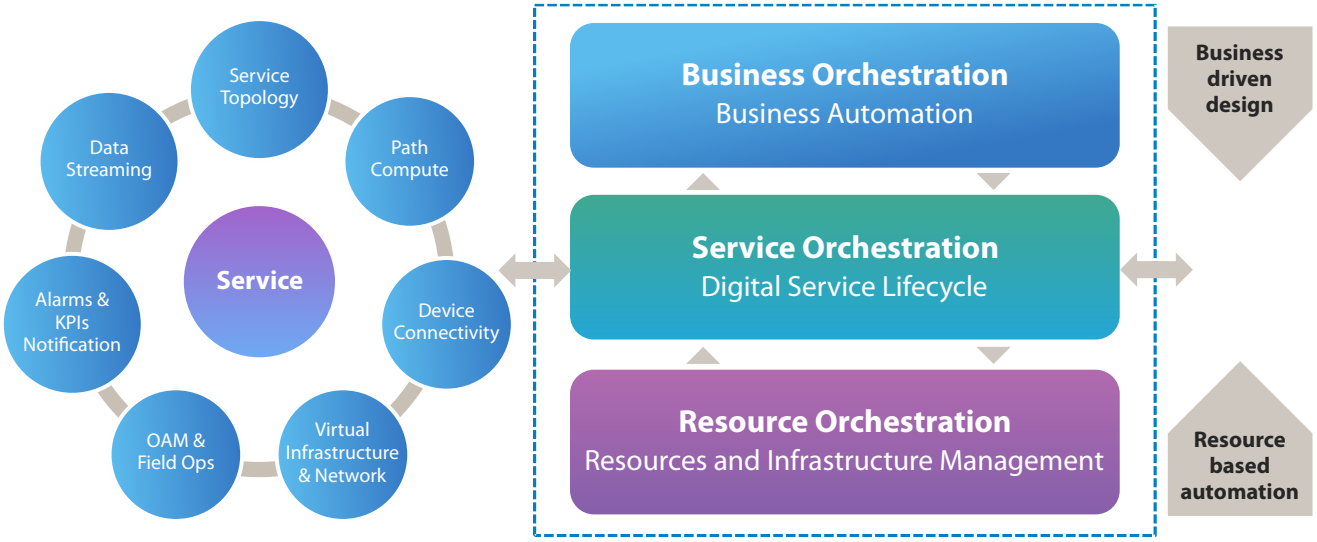

Figure 1: Top-down Approach to OSS Re-architecture

Next-gen OSS – Lead to the future

The main objective of next-generation OSS is to abstract the services implemented by underlying hybrid network resources and deliver automated zero-touch closed loop orchestration. Service model creation is crucial to architecting the future OSS and should be the starting point. The use of standard service models[5] is recommended to accelerate development of resource-independent models. This is a prerequisite for designing effective service inventory management and provisioning capabilities of future OSS.

The provisioning function should be securely integrated with dynamic configuration management to maintain accurate real-time configuration of underlying resources and to modify the network as required by business, engineering or operations teams. This provides the feed-forward path for service configuration updates into the hybrid network. It also helps maintain accurate views of dynamic resource inventory to support advanced capabilities such as real-time service topology and on-demand graph for path compute.

Future OSS must also implement a secure high-speed path from resources to close the service loop. Data ingestion for this feedback loop will support data streaming and higher throughputs than that for legacy networks where polling at prescribed intervals

[5] Metro Ethernet Forum, MEF Technical Specification MEF 7.3, Carrier Ethernet Service Information Model, February 2017, http://www.mef.net/resources/technical-specifications

is customary for retrieving resource data. The case for supporting high speed data ingestion is mandated by virtual network functions, deployed at the speed and scale of software. For instance, counts of devices, network slices, service chains, virtual functions, and edge compute capacity are increasing exponentially in support of 5G and industrial IOT devices.

This data provides the foundation for OSS service assurance and service quality management to monitor the health and performance of dynamic hybrid resources, while providing automated root cause and service impact analysis as events unfold in the network. This function may initiate auto-reconfiguration of resources or rerouting of connectivity as mandated by business or operations policies to resolve network faults and service degradations due to failures, high utilization, or intermittent software and hardware problems.

Policy management is critical for enabling orchestration and dynamic administration of services and resources required for quality or healing actions. It is also necessary for on-demand scaling and implementing security controls. It can complement robotic process automation and smart workflow business process integrations and orchestration. In some scenarios, notifications from the network may trigger policy actions while in other long-running trends, actions may be instigated by key performance indicators/ key quality indicators (KPI/KQI) analytics and insights from temporal events. This may result in changes to resource configurations or security profiles. Providers gain valuable intelligence about business performance by implementing governance policies to transmit network consumption and performance data to financial systems.

Policy actions can also be enabled through a catalog of services exposed by OSS in support of end-to-end service fulfilment and assurance functions. This allows for agile tailoring of business and technical capabilities within and outside the enterprise. The use of open APIs permits external and internal interactions with stakeholders, customers, suppliers, and partners, enabling automated zero-touch service realization.

Lastly, next-generation OSS should maximize utilization of cloud native tools, cloud lift and shift, containerization, continuous integration/continuous delivery (CI/CD) and scale agile framework devops. This is necessary to rapidly scale, pivot and respond to changing user requirements, cater to evolving customer needs, and keep pace with higher business velocity experienced in digital ecosystems.

Today when organizations are striving to become more adaptable, relevant, and purpose-centric, digital OSS transformation initiatives fit perfectly. In our experience accumulated through multiple client engagements, those methods have been proven to bring down the total cost of operations for OSS by 25%, while increasing efficiency tenfold or more and mitigating risks.

Stay Ahead with a Futuristic OSS

Next-generation OSS serves as the foundation for establishing sophisticated revenue models. It enhances collaboration and governance within the CSP organization as well as with partners, suppliers, and customers. This drives successful monetization of ongoing investments in 5G, IOT and advanced virtualized network technologies.

As companies plan their strategies for a new beginning a holistic focus on digital transformation, and location independent at scale agile, supported by intelligent automation and cloud deployment, enables the realization of a digital OSS architecture. It mitigates risks, reduces total cost of ownership, and accelerates the delivery of the next-generation OSS platform, featuring automated closed-loop, zero-touch, lifecycle service and resource orchestration.

About The Author

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