HCLTech | Supercharging Progress™

Realizing the benefits of OSS transformation

Contents

Abbreviations

Abbreviation	Definition
OSS	Operations Support System
BSS	Business Support System
TSP	Telecom Service Provider
API	Application Programming Interface
SLA	Service Level Agreement
OPEX	Operating Expenditure
CAPEX	Capital Expenditure
RAN	Radio Access Network
UPF	User Plane Function
SFP	Small Form-factor Pluggable
SDN	Software Defined Networking
NFV	Network Function Virtualization
NMS	Network Management System
SBI	South Bound Integration
NBI	North Bound Integration
TMF	Tele Management Forum
ODA	Open Digital Architecture
CRM	Customer Relationship Management
CPQ	Configure, Price, Quote

Introduction

Telecom networks are expanding rapidly, integrating heterogeneous elements to serve the needs of the customer. The growing complexity of managing diverse network components is significantly increasing operational costs.

Telecom Service Providers (TSPs) need to deploy different networking technologies to provide a broad spectrum of services. At the same time, TSPs seek to avoid vendor lock-in and technological reliance on proprietary IT systems. Rather, they aim to leverage best-in-breed solutions, approaches and open-source standards to support their evolving requirements.

In addition, new services like 5G demand tailored solutions for bandwidth, service quality, service on demand, latency and throughput requirements. The customer now expects minimal waiting time for service usage, high standards of service quality and high transparency on performance.

This creates strong demands for robust Operations Support Systems (OSS) capable of supporting service provisioning in a multi-vendor, heterogeneous environment. End-to-end service monitoring has become the need of the hour.

In this whitepaper, we examine the challenges and solutions involved in addressing these requirements.

OSS transformation challenges

Siloed systems

Over time, telecom operators have independently developed various systems in silos, resulting in a lack of interoperability. This fragmentation makes it challenging to gain a unified view of the network.

- **Proprietary APIs:** Many systems rely on proprietary APIs, making integration complex. Without support for open APIs, building a unified platform becomes significantly more difficult.
- **Desperate integration points:** TSPs often face issues with standardizing integration points. They seek a platform that can facilitate seamless integration across systems, expose information in a standardized format and support the business processes across multiple domains.
- **Automation challenges:** The lack of integration and standardized APIs hamper automation in critical areas like service and network provisioning and assurance. Effective automation requires a high level of coordination and data sharing, which is difficult to achieve with siloed systems.

Cross-domain visibility

Telecom operators frequently encounter challenges arising from the development of numerous isolated systems over time. These systems lack integration, making it difficult for operators to gain a holistic view of their networks, obstructing the shift from manual to automated operations.

This fragmentation obstructs TSPs from achieving high levels of automation in the areas of:

- Service provisioning
- Network provisioning
- Network and service assurance

Network inventory and data accuracy

Many TSPs face data-related issues with their networking inventory and resources. When network faults occur, operations and field engineering teams often restore the network by configuring resources and data directly within the network, bypassing updates to the inventory systems. These quick fixes result in a data gap between the inventory systems and the real-time network.

Furthermore, obtaining a real-time view of the network is limited due to the lack of an effective network discovery process and tools that can capture the real-time status of the network elements and components.

The lack of data accuracy poses challenges for teams that rely on inventory data, such as:

- Quotation team
- Sales team
- Provisioning and automation teams

Challenges are particularly evident during service availability checks and service qualification.

Ensuring high accuracy of network resources is crucial for:

- Improving order processing efficiency
- Service quality
- Service impact assessment
- Accurate reporting

Customer service quality visibility

TSPs are under significant pressure to enhance service quality visibility and quantify service performance parameters.

Customers have the following expectations:

- Real-time service quality reporting
- Stringent SLA support
- Proactive notifications

These capabilities are essential for demonstrating real-time service quality and availability. However, the legacy OSS implementations often lack:

- Technological support
- Coverage needed for comprehensive monitoring

Additionally, the absence of cross-correlation capabilities across different domains limits a TSP' ability to:

- Provide a comprehensive view of service performance
- Ensure service quality
- Take proactive remediation steps before issues escalate

Tactical decision making

Technology and IT managers frequently operate under strict budgets and timelines when making decisions about technologies and solutions. This can lead to:

- Rework or duplication of efforts to achieve better integration and automation
- Gaps between OSS solutions affecting operations, engineering and customer satisfaction

Frequently, decision-making is tactical and misaligned with the TSP's long-term strategy, such as:

- Minimizing OPEX/CAPEX
- Providing automation
- Improving operational efficiencies

For instance, deploying new provisioning and assurance platforms for each new service to meet short-term market demands can lead to:

- A growing number of OSS and legacy applications with minimal integration and data overlap
- Increased operational expenses

Migration and support for brownfield services

In implementing a greenfield OSS ecosystem, there is an expectation to migrate legacy services, customers and networks into the new stack, along with their associated data. TSPs aim to lower CAPEX and OPEX by phasing out outdated solutions.

However, two primary challenges arise with brownfield solutions:

- Ensuring the reliability and accessibility of data related to service endpoints and customer details
- Preserving the relationship between these two critical data points

This often necessitates the re-provisioning of brownfield services with the new OSS stack. However, this re-provisioning can lead to data synchronization issues within the Business Support System (BSS) and billing platforms.

Dealing with the volume of information

As the requirement to oversee multiple domains, applications, services and networks expands, the complexity of OSS systems increases correspondingly. This growth demands the management of a vast volume of data and information, resulting in the need for enhanced computing and storage infrastructure.

The data may include:

- Services
- Plans
- Service and network modeling and templates
- Service qualification and availability
- Customer services

TSPs must be prepared to manage the current volume of data while cost-efficiently planning for future increases.

Without effective data management approaches, TSPs struggle to:

- Utilize existing data
- Leverage service offerings within their networks
- Deploy the systems and processes to reuse and to monetization the data

Operational efficiency

The presence of disparate systems, data inaccuracies and lack of integration makes achieving operational efficiency challenging at multiple levels. In the provisioning domain, efficiency cannot be attained without:

- Standardizing processes and services
- Ensuring a high degree of integration within the OSS and BSS spaces

High-order fallouts lead to increased OPEX and significant delays that can be attributed to manual interventions.

The existence of different network domains and separate monitoring systems and teams further complicates the efficiency of network and service monitoring. This fragmentation puts additional pressure on both OPEX and CAPEX.

Customer satisfaction

Gaps in the provisioning process, non-standard workflows, long provisioning cycle times and limited visibility into service quality are significant contributors to customer dissatisfaction and churn.

Legacy OSS tools often lack full integration, hindering end-to-end automation of TSP processes. Siloed systems present considerable challenges to integration efforts.

Without adequate visibility and data points regarding issues or alerts, TSPs struggle to ensure high-quality customer service.

Network growth and technological complexities

In addition to modern tools and solutions, telecom operators are integrating new technologies:

- 5G and its associated devices
- Satellites
- Microwaves and radios
- Transport systems

These new systems come with their own support tools that need to be integrated and maintained.

On the deployment front of 5G, TSPs are facing numerous challenges, such as:

- Network CAPEX and OPEX
- Radio frequency licenses and limited range of antennas

- Complex service virtualization for 5G components such as network exposure function, access and management mobility function, session management function, Radio Access Network and it is modeling, user equipment and modeling and User Plane Function
- Huge requirements for transport bandwidth
- On-demand provisioning of service quality and bandwidth
- High level of automation in provisioning and assurance domains
- Highly automated network/resource management
- Open and inter-operable wireless network components

Similarly, satellite and microwave technologies in the transport domain also have challenges, such as:

- Unreliability of the network
- Monitoring and assurance systems and tools
- OPEX investments and longer duration of cost recovery

Network expansion and evolution drive the need for:

- Network modeling
- Network planning
- OSS integrations for provisioning and monitoring

The future OSS and BSS stacks must be network and vendor-agnostic.

IT organizations within TSP ecosystems are under pressure to deploy scalable, flexible, vendor-agnostic OSS tools and incorporate features of SDN and Network Function Virtualization (NFV).

Key components of OSS transformations

The key components of the OSS transformations are as below.

Order orchestration

The order orchestration component involves the service templates and order decomposition object rules.

Service workflows

Service workflow components consist of the step-by-step process that guides orders through the provisioning flow, ensuring that different stages, such as validate, design, allocation, provision and activate, are completed.

These workflows also address various order scenarios, integration points, fallouts, errors and methods to handle the same.

Network adapters

Network adapters are utilized by the OSS solution to connect to the network and perform different activities, like service configuration, inventory discovery and network monitoring for alerts and alarms.

Network inventory

Network inventory is a repository of network resources like nodes, links, cards, ports, SFPs, etc. It also supports network planning, reporting and feasibility check processes by integrating with the orchestration and/or BSS platforms.

Service inventory

Service inventory is a repository of the customer services and the logical objects created during the provisioning workflow.

Trouble tickets (TT)

TT component of the OSS solution integrates with the incident/problem management solution. It includes rules for raising TTs automatically in response to network alarms or alerts and lifecycle management and updates for each ticket.

Workforce management

Workforce management may be a part of the incident/problem management solution or closely integrated. This solution allocates field engineers and operational teams to an incident or ticket.

Network monitoring

Network monitoring is an OSS solution that monitors the connected networks using standard networking protocols, such as SSH, SNMP, etc. It collects and processes all the alerts and alarms from various network elements, including nodes, ports, cards, etc. Different network OEMs provide a standard network monitoring parameter enabled in the network and the same is deployed in the monitoring solution.

Service monitoring

Service monitoring is an OSS solution that oversees active customer services, focusing on service attributes and performance parameters. This is accomplished using standard networking protocols, e.g., SSH, SNMP, etc. As per the service configuration templates, each service type would have its own set of attributes that can be monitored and discovered in the OSS solution. Different network OEMs provide standard service monitoring templates for each service parameter that needs monitoring.

Network Management Systems (NMS)

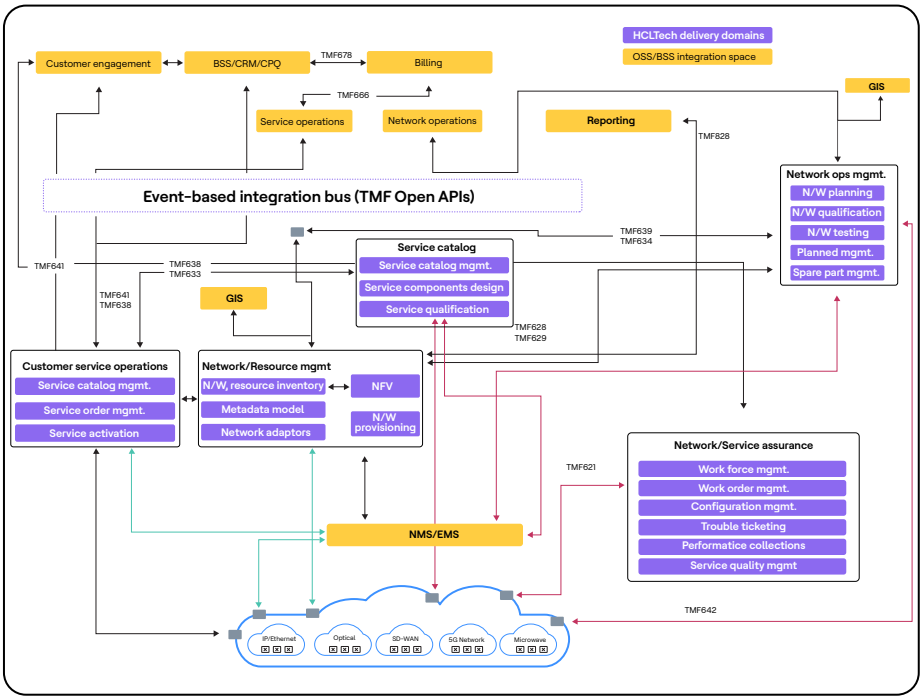
NMS systems are specialized network management systems deployed for network domains, e.g., Cisco nodes have dedicated NMS systems, while Juniper nodes utilize their own.The NMS system plays a vital role in the OSS transformation component by facilitating integration with network nodes to support various processes, including service provisioning, service modifications, resource configurations, monitoring, etc.

APIs for integration

Another important element of the OSS transformation journey is the APIs and the technology and parameters supported in API transactions. During the API deployment process, standardization of the APIs, preferably using Tele Management Forum (TMF) API guidelines, is advisable. This ensures that the APIs can be integrated with any OEM products and efficiently rolled out.

Realizing the benefits of OSS transformations

Emphasizing integration and automation across the OSS and BSS layers can realize the benefits of OSS transformation. It is crucial to prioritize complex processes such as service design, service provisioning and network and service monitoring for integration and automation. Additional advantages can be achieved by automating service quality reporting, problem management, fault prediction and proactive planning, closed-loop automation, network resiliency and auto-healing.



The considerations and outcomes of realizing the benefits of the OSS transformation are as follows:

- Standardization of APIs to South Bound Integration and North Bound Integration (SBI and NBI)
- Standardization of service templates
- Standardization of networks and node types
- Network adapters for network activations/configurations
- Network adapters for network monitoring
- Workflows for service activation, modification and termination
- Workflows for resource management
- Workflows for network activations
- Data reporting, sometimes using a centralized big data solution

HCLTech offering

There are various requirements from the TSPs to adopt off-the-shelf products with necessary customizations provided as professional services, while some customers prefer tailored solutions built specifically for their needs.

HCLTech supports TSPs in understanding the current service landscape, infrastructure requirements, processes and tools. We offer consulting on OSS transformations based on the TMF recommendations of 'Running on Open Digital Architecture (ODA)' and 'Ready to run on ODA.'

As a preferred partner for many OSS providers, HCLTech addresses the diverse needs of clients by delivering professional services on top of Commercial-Off-The-Shelf or COTS products. Our services include building service templates and workflows, building, testing and certifying TMF APIs, consolidating the inventory management as a single source of truth, providing a holistic view of the networks and creating the resource adaptors for provisioning, discovery, fault management and performance management.

Additionally, we offer managed services for OSS applications, including solution support and application modernization from legacy stacks like mainframes to microservice-based architecture.

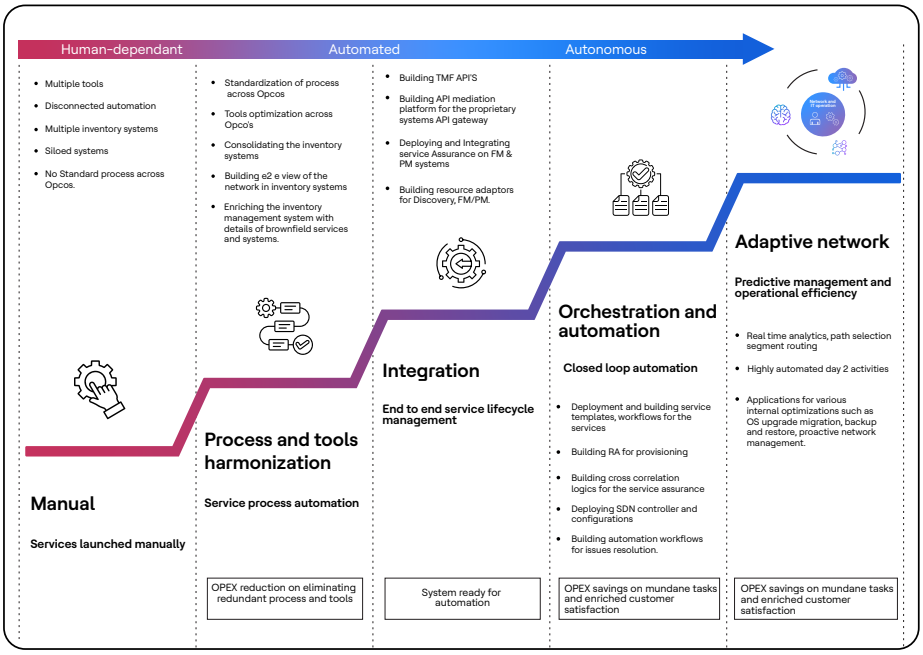
With a robust set of accelerators for professional services, HCLTech supports OSS transformations while significantly reducing turnaround times.

HCLTech approach

HCLTech performs due diligence in understanding the client's current OSS landscape and mapping it against the current level of maturity, as per the transformation model below.

There are building blocks to attaining the final level of maturity of adaptive networks. At HCLTech, we can leverage our own accelerators to enable the organization to move toward the highest level of maturity.

OSS transformation model



Conclusion

HCLTech is well-positioned to assist TSPs in conducting a basic assessment of their OSS process, tools, current level of automation, products, platforms and application landscape, mapping them against HCLTech's defined OSS maturity model.

Increasing demand for new services brings ongoing pressure to reduce OPEX. At HCLTech, we consult with and empower TSPs to identify their pain points. We work together to create an OSS stack transformation blueprint. Leveraging our extensive experience, accelerators and partner ecosystem, we are committed to helping TSPs realize their OSS visions.

Please contact us to work together on your OSS transformation.

Author information

Saumya

Saumya has been in the Telecom industry for the past 21 years, delivering solutions for TSPs in Architecture and design of OSS/SDN, Integration automation & Network Transformation. He has rich experience in building solutions across various domains, such as Network validations, OSS solutions, Service provisioning and assurance areas.

Sathiyanarayanan Moorthy

Sathiyanarayanan has been in the Telecom industry for the past 25 years, driving solutions across TSPs and OEMs. He has rich experience building solutions across domains such as Network testing, OSS, Lab services, Private 5G and GenAI. He has a strong understanding of the needs of Telcos and integrates the solution tenants to meet customers' expectations.