Strategic Service Inventory Management

Abstract

In its Magic Quadrant for Operations Support Systems 2019, Gartner[1] indicates that inventory management earns the lowest satisfaction rating amongst all Communication Service Providers (CSPs). The report also elaborates significant obstacles that continue to plague CSPs trying to transform this critical domain of Operational Support System (OSS).

Today it is imperative for CSPs to deploy a Strategic Service Inventory Platform (SSIP) to support their customers, and thereby address the challenges they face. The proposed platform implements flexible service models and hierarchies that are independent of the underlying resources providing these services. In addition, the proposed solution federates across several resource inventories and incorporates necessary elements of asset management and Configuration Management Database (CMDB). The service inventory contains representations of physical, logical, virtual, and commercial components that go into the composition of next-gen services.

Implementing the proposed solution will help companies to establish a single source of truth for customer services, thereby improving overall customer satisfaction. It also enables live updates for customer services, eliminating the dependency on spreadsheets.

Challenges such as mismanaged resource inventory data, unavailability of accurate end-to-end network federation, irregularities in service topology visibility, inadequate network data models and rudimentary service models remain major impediments to OSS transformation.

[1] Gartner, Magic Quadrant for Operations Support Systems, January 2019

Business drivers to rethink service inventory

Over the years, most CSPs have developed several inventory systems due to technology evolution, mergers and acquisitions, and operational needs. This approach led to the existence of disparate applications, proliferated information across multiple systems and files, with no single view of the network and service topology.

Complexity is further compounded for global B2B CSPs where local networks are managed by local operating companies using their inventories and processes, global connectivity and service resources such as CPE and licenses are managed by global enterprises using another set of systems. This split ownership creates limitations.

Furthermore, operator faces challenge of capital leakage due to inactive and unused off-net access network services and resources. They require information on the availability of service resources, to cater to the real-time needs of businesses and customers and maximize efficiency of operations.

Reimagining inventory management

CSPs need a dynamic, real-time view of network infrastructure, services and topology, including customers, networks and complex virtual network functions (VNFs) riding on the telco infrastructure, to manage the hybrid network of today.

However, implementing a well-functioning resource and service inventory management system is increasingly difficult with the emergence of 5G, SDN/NFV and IOT. The sheer volume of devices to be added with adoption of 5G services and IOT applications will need an inventory management system that favors automation.

In order to ready OSSs to address business and operational challenges, CSPs can take one of the three alternate approaches.

The first option involves consolidating all existing inventories into a single unified inventory, which serves as a single source of truth for all CSP business functions. The second, build E2E network and service topology into an overlay solution. This will support integration between the newly introduced service topology capabilities in the incumbent inventory system with CSP's existing service management modules and applications. The third approach builds the service topology as an overlay on the CMDB of a separate service management solution. This allows reusing the native integration between the service management solution and corresponding CMDB functions in

addition to offering the newly introduced service topology capabilities through APIs to the existing OSS ecosystem. Both second and third options require defining robust service models, as well as interfacing with the other inventory systems, fetching the data from those respective systems and mapping the resources to the respective components in the service model.

While the first option is suitable for CSPs with basic and siloed inventory systems, CSPs with mature inventories and advanced automation need to choose between the second and third option. With next-gen transformations, CSP networks become dynamic and autonomous. In fact, the industry requires active closed-loop service orchestrators with E2E visibility and segregated control over the next-gen network. Therefore, the third option, with focus on service management becomes a better option for CSPs.

Introducing the Strategic Service Inventory Platform

The Strategic Service Inventory Platform (SSIP) solution federates across multiple resource inventories in order to provide a holistic topological view of customer service inventories.

A schematic representation of the SSIP is depicted below in Figure 1:

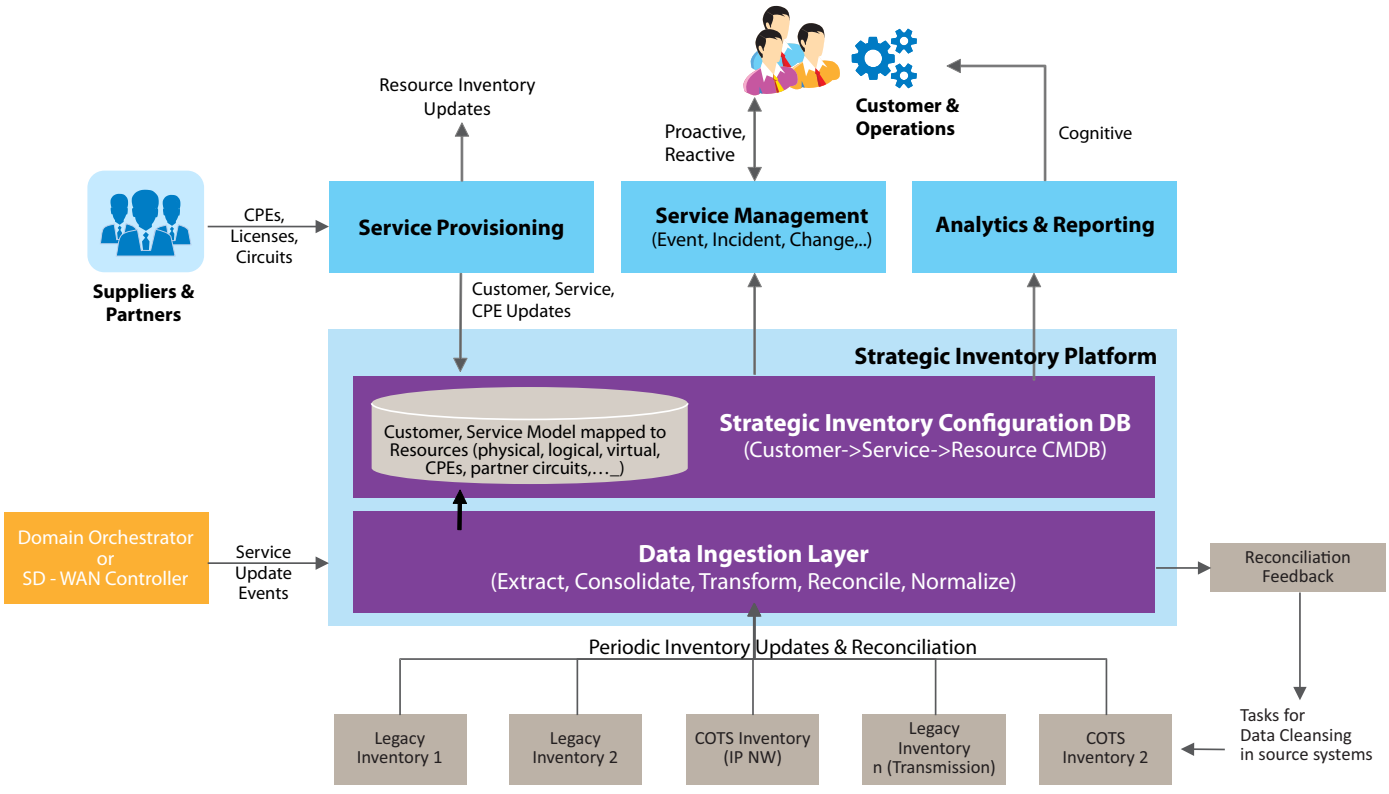


Fig 1: Strategic Service Inventory Platform – high level architecture

The SSIP platform consists of two key components:

Strategic Service Inventory Platform (SSIP) and Configuration Management Database (CMDB): The platform supports the core capability of correlation; it maps services with CMDB resources. The CMDB contains information on customers, services, resource layer entities and their hierarchical relationships. The mapping helps SSIP to support physical, logical, virtual, and commercial components that next-gen services are comprised of, such as access circuits, CPEs, contracts and software licenses. It supports the end-to-end service model, stitching together all resources needed to deliver a seamless customer experience. The SSIP service model has a federated read-only access to the resource information. Any service information in the source inventories, however, is migrated to the SSIP CMDB.

Data Ingestion/ Integration Layer: This component fetches inventory data from various data sources, transforms it into a common data model, and ensures its availability for the SSIP CMDB layer. This layer leverages capabilities of different source systems and uses various integration mechanisms to connect to different data sources. Besides polling data, the platform streams event driven data on the feed in order to accommodate dynamic network functions such as those afforded by 5G or SDN/NFV networks. Leveraging open source technologies to realize the data ingestion functions, such as apache NiFi for collection, Kafka for distribution, Hortonworks Data Platform for data lake, offers a definitive cost advantage.

SSIP solution integrates with the domain orchestrator or SD-WAN controller, picks up underlying service modification events and makes them available in real-time for the service management process.[2]

Figure 2 explains how SSIP manages service model hierarchies in the system for VPN service:

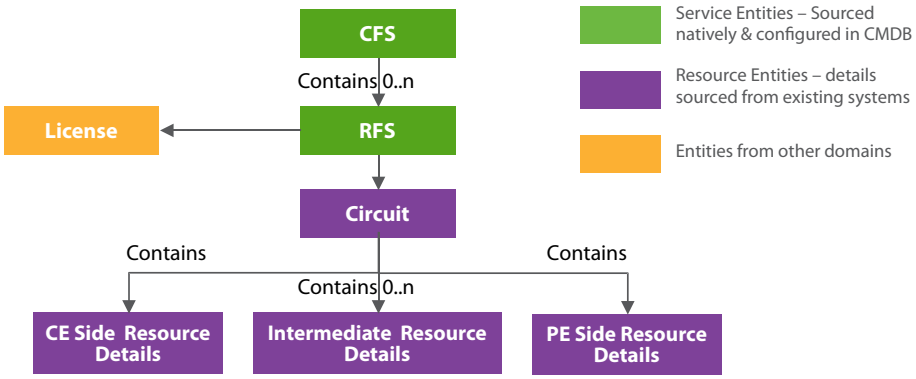
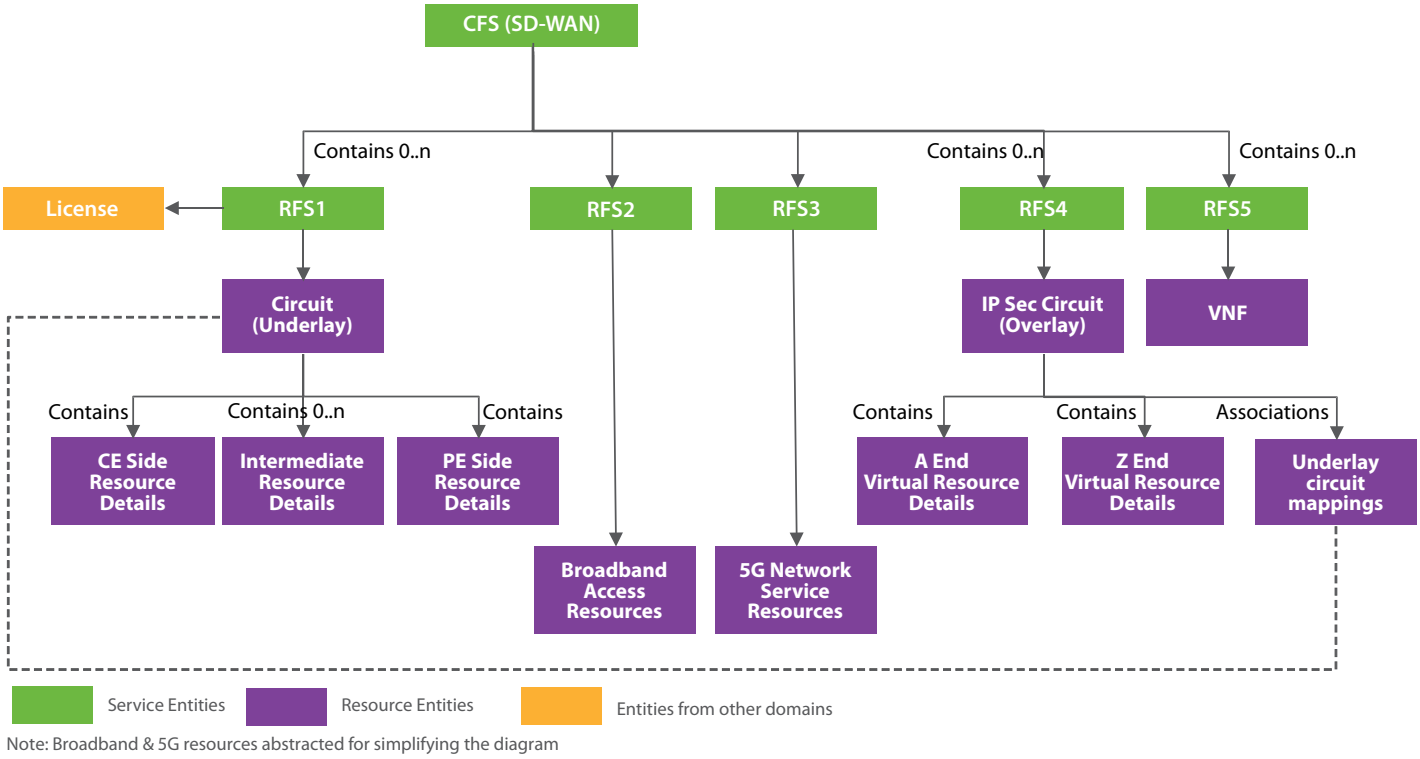


Fig 2: Representative Data Model 1: VPN Service

[2] MEF , MEF 70 "SD-WAN Service Attributes and Services" (2019), accessed July 2019, https://www.mef.net/resources/technical-specifications/download?id=122&fileid=file1

Representative Data Model 2: SD-WAN Service

The overlay contains IP Sec tunnels created between virtual CPEs using the underlay IP connectivity. The SD-WAN controller allows configuration of routing policies on the vCPEs to route the traffic from IP Sec tunnels based on QoS requirements for the traffic. Figure 3 explains how SSIP manages service model hierarchies in the system for SD-WAN service:



Note: Broadband & 5G resources abstracted for simplifying the diagram

Fig 3: Representative Data Model 2: SD-WAN Service

Advantages of Strategic Service Inventory Platform

Leveraging the SSIP solution, operators can unlock numerous possibilities for driving greater value creation. Some of the benefits include:

- End-to-end view of the service allows operators to drill down from services offered to network resources to network infrastructure.
- The single source of truth for service resources reduces the service qualification process from days to minutes.
- Operators save significant amount of time spent on inventory-related activities by eliminating the need to maintain spreadsheets for service inventory.

- Next-gen service management improves customer experience with better service quality.
- Reliable links between customer service and supplier service aids in timely renewal and cancellation of contracts with suppliers.

Conclusion

A Strategic Service Inventory Platform enables CSPs to overcome shortcomings of existing service management solutions. In addition, this new approach fulfills the expectation of operators to leverage existing investments instead of rebuilding OSS stacks from scratch. At the same time, as CSPs embrace virtualization to deliver next-gen and dynamic services, it becomes easy for them to fulfill customer expectations with the implementation of SSIP. With a reliable SSIP solution, operators can successfully deliver dynamic, real-time view of hybrid networks, infrastructures and service topologies.

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