

# A new framework for service support in Network Management

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## **Abstract:**

**This paper discusses about the Operational Support Systems (OSS) and the service management component in it .OSS and its functionalities are viewed with the insight on services. Services are changes in the network elements' state in order to support efficient and reliable flow of data. As the technologies in networking is increasing and improving day by day, service management gains interest. This calls for service management to exist as an independent entity. The pillars behind any service management are elaborated here. Need, importance and integration among services is depicted by providing a comprehensive and complete service support framework as a solution.**

**Keywords: Operational Support Systems, Service provisioning , Service assurance , Network Management**

## **1. Introduction**

Operational support systems (OSS) refer to a comprehensive solution for Telecom providers which involve inventory management, service provisioning, billing and repair functions. It can be termed as a software which performs network management and service support. "Services" can be termed as an action which causes creation, deletion or modification of the configuration in the network elements in order to enable the flow of data to the specified network in the specified manner. Considering those network management systems which need only partial OSS operations have no choice apart from using OSS completely. Service Management is one such area. Even though there are many applications which provide service support, they are essentially a part of OSS. Also, there is still high complexity in ensuring that the services can be scalable to meet the technological demands and yet be cost-efficient[1]. Further, only service support can be provided by existing management systems as an add-on tool .Complete solution for services is discussed below.

In the 1960s the majority of the administration processes were manual. After the computer revolution, the concept of automation and managing all information within an enterprise started growing. It took many years for telecommunications companies to create a variety of applications which automated operations to a large extent. These applications merged into larger systems which were then designated as OSS systems.

OSS is a system which supports processes such as network inventory maintenance, services management, configuring network components, and deals with faults. OSS architecture forms the main core of the forth layer (Service Management Layer) of the TMN( Telecommunication Network Model).OSS is the architecture which helps the service provider monitor , control and operate a network. The main functionalities of OSS can be grouped as [2]

### **1.1 Network Planning and Engineering:**

This deals with forecasting the need and dimensioning the network based on the forecasts. It takes into consideration various access technologies and chooses the best which takes into consideration all economic and geographic factors.

### **1.2 Billing Systems**

This deals with providing a flexible billing system so that the customer can choose his plan. It also pays attention in pricing and giving post-paid and pre-paid billing services to its customers. Depending on the motive and profit goal, infrastructure providers, network managers and service provisioning entities can structure their prices.

### **1.3 Automation Assistance**

Larger telecom networks are being automated and this is essentially possible through OSS. As the technology is growing, the customer requirements push the service providers to put in more value and diversity in their services [3] . Automation would aid in making the product time-efficient and cost-efficient. Thus human intervention is necessary only in case of exceptional scenarios.

### **1.4 Services**

Connecting customers from one end to another by the flow of data traffic across the network is a service. OSS extends the Network management system features by the configuration, provisioning, activating and deployment of service to the respective managed networks.

## **2. Research Gap**

Many network management systems are leading due to their high performance. In such era, for a product to be competitive -performance, efficiency, scalability and diversity are needed. But integrating all features and components of OSS may be unnecessary when the service provider is looking at the partial integration with OSS. Business investment is also a consideration[4].

Existing scenario	Gap	Proposed scenario
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Operations of OSS are all implemented as a part of OSS architecture.	No partial implementation of OSS process or operation	Service support and management as a complete solution for Telecom service providers.
No service support which does not have dependency on OSS	Service support solutions which can be used by existing and upcoming products without being a part of OSS	An intermediary and independent service support solution between network management systems and OSS.
Service management as a part of OSS	Service support as an individual component	Service Integration Framework(SIF)

**Table 1: Need for independent and complete service support**

### 3. Service Support

Service Management deals with end to end connectivity of customers by the flow of data through various networks. Identifying the heterogeneous networks, configuring network elements, invoking the operations are all part of service management. Service management also deals with the ability of the product for being scalable, interoperable and reliable.

#### 3.1 Service Provisioning

This is intermediary between service and configuration management .Provisioning a service deals with sending requests or commands to the network to deploy the required functionality. This is performed by the process of activation. Activation targets the network elements involved in the request to provide a service it is basically is responsible for order processing and activation or de-activation of customer services.

Service Provisioning involves input from these sources – documents, repositories and the customers. Service Provisioning and activation becomes very important as this module also provides automated support [5] for reporting of all service transactions.

This area is responsible for vendor specific and multi-vendor support. It enables the service providers to customize their product to the new technologies. Service provisioning hence provides a platform to add new customers, automation of specified tasks, enhances the network management functionality. It establishes a foundation to integrate the business decisions and service support.

Today, supporting new services while preserving its integrity is of at most priority. Thus, in completing the service management, service provisioning plays a very crucial role.

### **3.2 Service Assurance**

It is the application of procedures and software to ensure the services are of pre-defined quality. The quality of service mentioned in SLA should be met [6]. The two major key components addressed here are performance and quality.

It is the quality of service which generates revenue to the product and any disruption in the communication service may impact the entire company. It is intended to make certain that a service under development meets specified requirements at all stages in the process.

Performances deals with optimizing the process of providing service and also extract details about the end user experiences. This attribute maps the performance data with business decisions. This module deals with detection, isolation and correction of any faults or errors encountered during service provisioning.

The service assurance software is thus expected to be in place before any new service is introduced to the customer. Also, this software should work perfectly before the fault hits the customer domain. Assurances can also be given by a third party system [7].

The increasing demands of customers are creating a heavy push on the service providers to provide service solutions which are scalable, reliable and efficient. Thus, assuring that the service is guaranteed and ensuring its reliability and standards meet the prescribed set of demands makes it a vital component in service management.

### **4. Service fulfillment**

This deals with delivering the service to the end customer. It consists of chain of activities which are involved in delivering the service at the user end and customer satisfaction. The key components involved are multi-enterprise support, service design and automation, end to end support.

The pressures upon the service providers to generate new revenues and increase profits rapidly while keeping the overall cost low are increasing. A commercial platform that can be easily customized provides the best possible alternative. Such a platform that automates the service delivery process should be built on a multi-tier, component and web-based architecture that supports n- deployment scenarios. Service fulfillment

software mainly concentrates on reducing the delivery time and increasing the profit margin for upcoming services with minimal hardware [8].

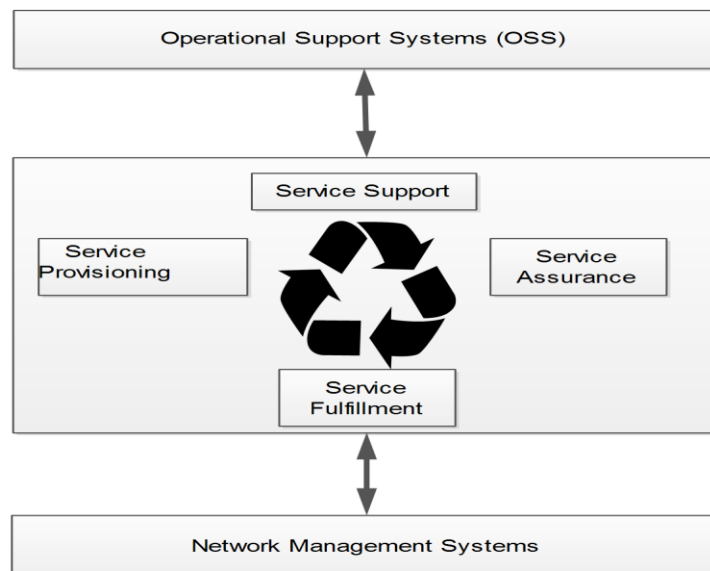
This software platform must also support a complete catalog of communications products and services, to assist service providers to immediately create and provision new services and unique offerings to the customers.

Service fulfillment thus changes the focus from network operations to customer experience and feedback.

## 5. Service Integration Framework (SIF)

Providing services for widely distributed networks is complex and requires different service providers to interact with each other. The process of providing interoperability among different providers is necessary and combining the three pillars of service support is called integration. In order to support end to end service management, the three pillars - service provisioning, service assurance and service fulfillment must be satisfied. Also it should provide interface to connect to the OSS and other NMS.

SIF provides an independent platform which can be used by those service providers who want to support only service management. It also targets those service providers who as external vendors provide complete service solutions to the network management vendors. The three pillars coexist and the provider implements the main features in all the three modules in parallel thus assisting in efficient, reliable and timely delivery of service to the customers.



**Figure 1: Conceptual view of Service Integration Framework (SIF) for comprehensive service support.**

#### **4.1 Overview of steps for implementing SIF**

- Step 1: The service provider would make SLA with the customer.
- Step 2 : The provider identifies the technologies, networks and services needed.
- Step 3 : The provider enables the configuration, activation and provisioning of services.
- Step 4 : Quality of service and fault management and repair handling modules are developed.
- Step 5: Delivery of end-to-end service and customer satisfaction is kept in mind and feedback modules are developed.

#### **4.2 Advantages of SIF**

- ⤴ Any product can enhance its efficiency and visibility by using the service support solution.
- ⤴ SIF is feasible as it can be integrated into existing product as an add on tool or merged into an upcoming product.
- ⤴ This SIF provides the interfaces to interact with BSS (Business Support Systems). Thus it associates a management system with service solution and also gives a revenue domain extension.

#### **5. Conclusion**

The OSS and service support component of it is considered here and the three pillars for service support have been mentioned. Integrating these pillars formulate a complete comprehensive service solution for any management product.

This is specifically important when only service management functionalities of the OSS have to be extracted and introduced to another product. Also considering the cost efficiency, unnecessary implementation of entire OSS would turn heavy on service support. Customized, feedback oriented, scalable service support can be provided using an integrated service support solution. This framework thus associates the revenue and technology support.

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