Modeling of Operation Support System (OSS) for Business Management and Automation

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Abstract
Nowadays, due to the increasing competition in the telecommunication market and business automation, operators are confronted with a number of challenges. Sustaining a reliable network is the foundation of the service provisioning. Subscribers expect stable and continuous services. Frequent interruption of their services will result in the decrease of their satisfaction, and the possible loss of end users. Today, operators usually select their network elements from different vendors, which make it difficult to maintain high network availability. How to effectively integrate and manage multivendor network poses another question for the operators. Hence OSS is today's business emerging needs I have discussed with some basic ideas and modeling of it in this piece of research.

Keywords: BIS, DSS, OSS, MIS, PCS, TPS, ECS, ERP, Business Automation, Industrial automation

Introduction
The systems that keep networks running and profitable are in the direct line of fire when it comes to implementing change. So, as the world moves toward global connectivity, as smart phones cause a shift in user behavior, and as subscribers demand more personalized products and even greater control, the functions of OSS/BSS – such as planning, configuration, fulfillment, charging, billing and analytics – need to be integrated. A consolidated architecture is a typical computer-science approach for bringing together the functions of different systems. By adopting such a consolidated architecture for OSS/BSS, operators will be able to maintain control over costs while implementing network changes effectively.

Definition

'The term operation support system (OSS) generally refers to the system that performs management, inventory, engineering, planning and repair function for business automation."

The challenges of evolution
By exposing the functionality and information held in their networks, operators have the opportunity to create innovative and ever more complex value chains that include developers, OTT players and subscribers. In these new value chains, the flow of information and control shifts from unidirectional to multidirectional, and participants can be consumers of services and information as well as being producers of them. New business models for network evolution are

based on providing anything as a service (XaaS) – including IaaS, PaaS, SaaS and NaaS – and when using this model, it is not just value chains that become more complex; the life cycles of products and services also become more diversified. How then, as business models advance, should OSS/BSS requirements evolve to cater for factors such as big data, personalization and virtualization? The simple answer is through configurability. To create a high level of flexibility, the evolution of OSS/BSS needs to be configuration driven, with an architecture based on components.

The impact of big data

Information is a critical resource. Good information is a key asset – one that can be traded, and one that is critical for optimizing operations. As volumes rise, the rate of creation increases, and a wider variety of data that is both structured and unstructured floods into OSS/BSS, access to storage needs to be effortless. In this way, tasks and optimization processes can maximize the use of existing infrastructure and keep data duplication to a minimum. Data management needs to be secure and controllable; ensuring that the systems accessing information do not jeopardize data integrity and subscribers can feel confident that their information is protected.

The impact of subscriber needs

Personalized services and superior user experience are key capabilities for business success and building loyalty. Subscribers want to be in control, and feel that their operator provides them with reasonably priced services that meet their individual needs, over a network that delivers near real-time response times. The ability to create and test services in a flexible way with short time to market will help operators meet changing user demands.

The impact of M2M

As the number of connected devices gets closer to 50 billion, the need for automated and autonomous behavior in processes such as configuration and provisioning is becoming more significant. Being able to remotely configure provision and update millions of devices without impacting the network supports scaling while maintaining control over opex **making good use of technology.** One way to address these challenges is to make good use of advancing technology, particularly when it comes to OSS/BSS implementation architecture. And it's not just about using technology development in a smart way; it's also about understanding the potential of a given technology. So, when a new concept results in a significant breakthrough, the services and products that can be created as a result should be readily definable. Capitalizing on increased flexibility and agility made possible by new technologies (such as virtualization and SDN) needs to be coordinated through a management function, which puts new demands on OSS/BSS architecture.

The evolution of virtualization

The demands created by increasing virtualization of data centers, not just in terms of computational capacity, but also in terms of storage and networking capabilities, are: virtualization of the OSS/BSS, and running these systems in the cloud;

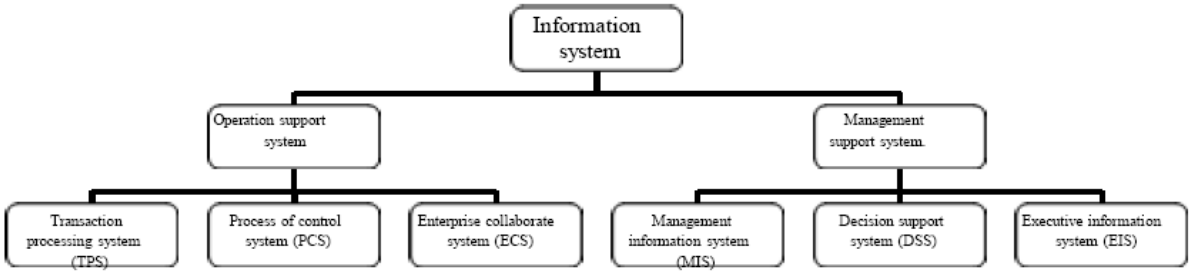
- Management of cloud-based OSS applications such as service assurance; and
- Management of cloud-based BSS applications such as IaaS and PaaS.

It may, however, not always be beneficial to run certain network elements on generic IaaS resources. For example, information stored in a database may be better provided in the form of a service to subscribers in an IaaS environment, rather than as virtually deployed tenants. The

general rule is that anything provided as a service, which is implemented by a piece of software running in a generic IaaS environment, has a reduced level of control and efficiency. Due to the extra layers created by running software in a generic environment, the drawbacks of this approach must be weighed carefully against the benefits of increased flexibility and better (shared) use of physical resources. For next generation OSS/BSS, the focus should be placed on implementing flexibility in an efficient way together with automation and orchestration of resource allocation. The hypervisor approach to virtualization, where virtual machines (VMs) share the resources of a single hardware host, is evolving so network infrastructure is becoming more efficient. For example, the failover capabilities of the hypervisor can place agents on the host in a similar way to traditional failover clusters, and can monitor not only VM health, but application and OS health as well. Such features are prerequisites of an efficient virtual environment. However, application architecture may have to take these features into account, as in some cases they cause the responsibility to perform certain tasks (such as data recovery) to shift between the application and the infrastructure.

The business logic

When OSS/BSS are deployed, they bring business and technical stakeholders together and allow them to focus on the design and implementation of their unique business. The functionality provided by OSS/BSS must support the necessary user-friendly tools to implement and develop business logic. The deeper and more flexible this support is, the more business opportunities can be explored, and the more profitable and enterprise can be.



Information System is divided into two types:
1. Operation Support System.
2. Management Support System.
1. Operational Support System:

The role of operational support system is to efficiently process business transaction, control industrial process support enterprise communication and update corporate database. The Information system generally deals with the support of business operations known as operation support system produces a variety of information product for external and internal use, however such products produced by OSS needs further processing for efficient use by manager. The various Operation Support System are:

i) Transaction Processing System (TPS)
ii) Process Control System (PCS)
iii) Enterprise Collaboration System (ECS)

i) Transaction Processing System (TPS):
It is a category of OSS that generally record and process data resulting from business transaction. It is generally process sales, purchase, inventory and other organizational database. These databases then provide the data resources that can be processed and used by DSS and EIS.
TPS processed transaction into two ways:

1. Batch Processing:
Data is accumulated over a period time and processed periodically.

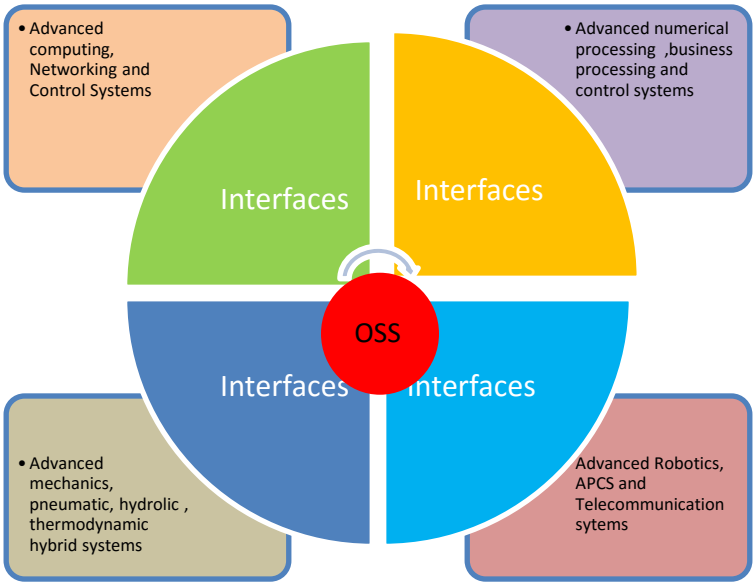
2. Real Time Processing:
Data is immediately processed after a transaction occurs. Ex: Sales and Inventory Processing

ii) Process Control System (PCS):
It is a category of OSS in which decision about a physical production process are automatically made by computer through routine decisions that control operational process. Ex: A petroleum refining center uses electronic sensors which are linked to the computers to continuously monitor chemical processes and make instant adjustments that control the refined process.

iii) Enterprise Collaboration System (ECS):
It is the information system that uses a variety of information technology to help the people to work together. ECS helps to collaborate and communicate ideas, share resources and co-ordinate work effort of an organization. The aim of an ECS is to use the information technology to enhance productivity and creativity of organization and work group in an organization. Ex: E-mail, chat, video conferencing etc.

Modeling and Discussion:

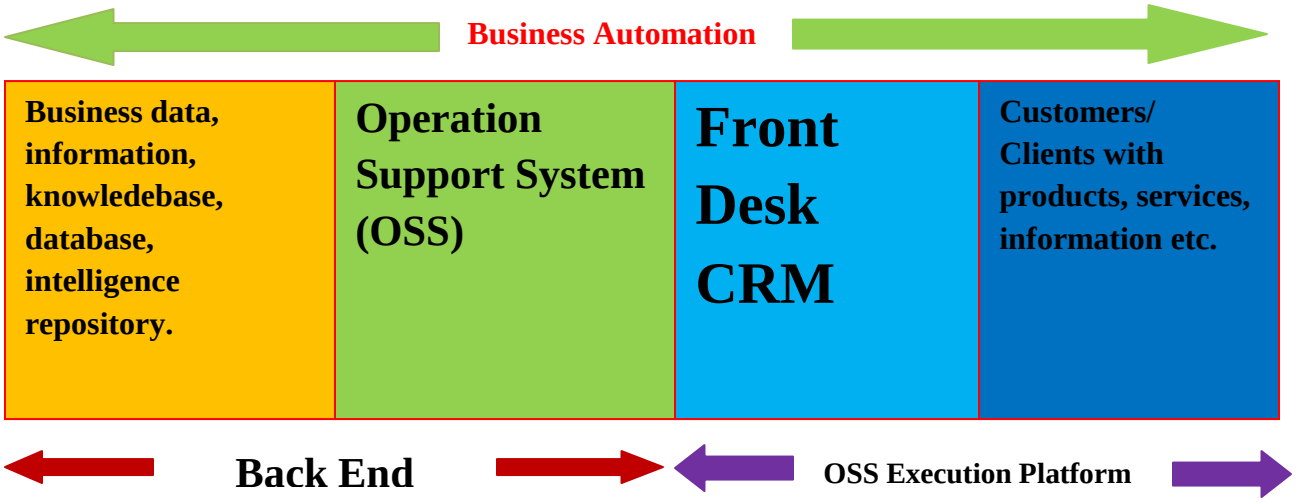
OSS Component Model



Source: Prof. Md. Sadique Shaikh

This is first proposed model I have developed with considering four major components where each needs its own separate interface which is integrated further for coupling and cohesion. The first important component for OSS development advanced computing, computer networking and control system can be treat as backbone of OSS implementation along with second important module Advanced numerical processing ,business processing and control systems to run in OSS environment for business automation. The third major component is Advanced Robotics, APCS and Telecommunication systems which gives strong support to OSS processes designing and controlling while execution. The forth important criteria is Advanced mechanics, pneumatic, hydraulic, thermodynamic hybrid systems need for physical business automation assisted by virtual business automation. All these modules work in coordination.

OSS-Business Model:



Source: Prof. Md. Sadique Shaikh & Pavitra Patil

This is second important model which providing idea about how OSS works for business automation. This is the simple illustration of OSS execution never been exhibited like this by anyone previously. This model has four important segments as customers/clients with products, services, business information request is first segment followed by second block front desk OSS-CRM for business data submission to OSS and after processing grant and available business information/intelligence. These two stages often called "OSS execution platform". Next important segment is OSS itself for data, orders, request, queries handling processing and business information generation and available to clients and customers. Last but most important part of this model is Business data, information, knowledgebase, database, intelligence repository which available all necessary inputs to OSS to process and generate business operation supports to customers as well update their data, queries, information in it. Hence last two stages can be said "Back End "of OSS.

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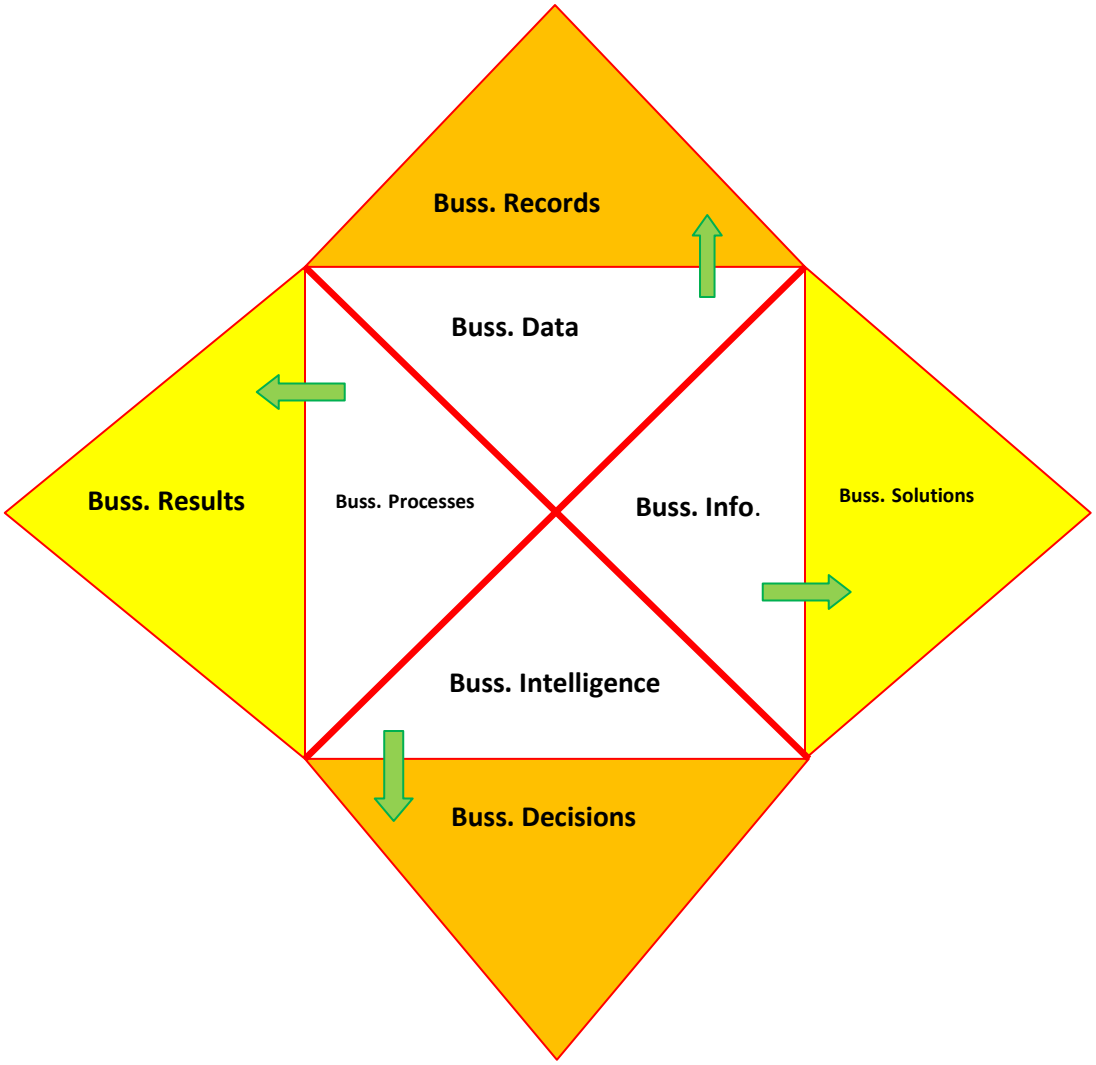
OSSM-Implementation Model:



Source: Prof. Md. Sadique Shaikh & Niraj Chaudhari

This is the model developed with the intention to create domains of OSS in business automation. These are namely business data, business processes, business intelligence and business information, where each is different from other. This can further expressed as business data tends to business records, business processes tends to business results, business intelligence leads to business decision whereas business information assist to business solutions offered by OSS in business automation.

Conclusion

Operations support systems (OSS), or operational support systems in British usage, are computer systems used by telecommunications service providers to manage their networks (e.g., telephone networks) but today also very useful business automation. They support management functions

such as network inventory, service provisioning, network configuration and fault management. Together with business support systems (BSS), they are used to support various end-to-end telecommunication services. BSS and OSS have their own data and service responsibilities. The two systems together are often abbreviated OSS/BSS, BSS/OSS or simply B/OSS. We have discussed several facts about OSS in this piece of research using three different model help to enhance knowledge for OSS engineering and implementation.

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