

Architecture and Principles for the Customer Self-Service Management in Telecommunication

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Abstract - Most Service Providers in the telecommunications market are facing the major Business Transformation challenges, such as:

- offering a more flexible service choice to the Service Customer,
- providing a more Customer involved role in the service,
- increasing the quality of communication between the Customer and Service Provider,
- increasing service availability and providing Customer self-help in telecommunication and
- reducing the service operation cost.

Customer Self-Service is a way to provide all these benefits for the Customer and to help Service Provider reduce his operation costs. Service Provider's objective will be to reduce service operation costs, but the quality of service has to be enhanced in all aspects.

This document provides an overview of Architecture and Principles for the Customer Self-Service Management (SSM) in Telecommunications.

1. Introduction

Customer Self-Service in telecommunications is generally a new kind of service from the Customer perspective. This service should provide to the Customer new capabilities, features and benefits in service. At the same time, the Service Provider (SP) will also have benefits, their final target being to reduce operational costs and increase the quality of service.

Self-Service Management (SSM) provides management functions for telecommunication network

and services at Customer requests, and also a more efficient communication between the Customer and Service Provider. Communication means that the Customer initiates ordering, service inquiry, billing inquiry, trouble administration, maintenance, performance reports and network management. The goal of Customer SSM is to enable zero-touch where appropriate and to facilitate multi-touch when needed. To give an idea, here are some examples of services that may be managed by SSM, at Customer/User requests:

- NGN,
- Fix & Mobile Phone service,
- IPTV, etc.

2. Self-Service Management architecture

The general configuration of Self-Service Management (SSM) is shown bellow. .

Figure 1. shows general communication between all relevant actors (Customer/User, Service Provider and physical interfaces) involved in Customer Self-Service.

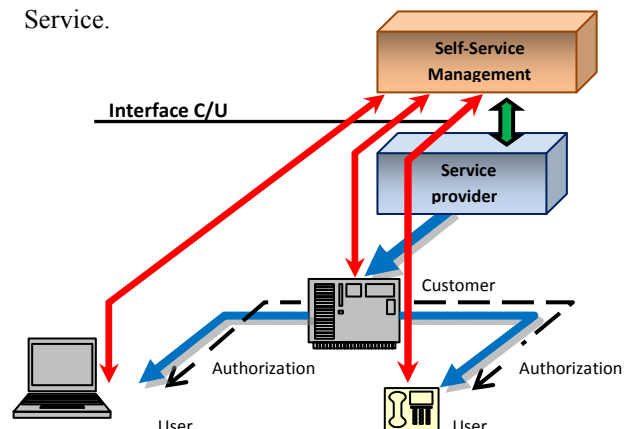


Figure 1. General configuration of SSM

The end user of the Customer Self-Service can be the Customer, or a User with valid authorization obtained from the Customer. Also, by means of authorization, the Customer will determine the way and conditions concerning the usage of Customer Self-Service by the User.

The Self-Service Management architecture is divided into four different architecture views [3] as shown in Figure 2:

- Business Process View;
- Management Functional View;
- Management Information View, and
- Management Physical View.

These four architecture views also take security into consideration.

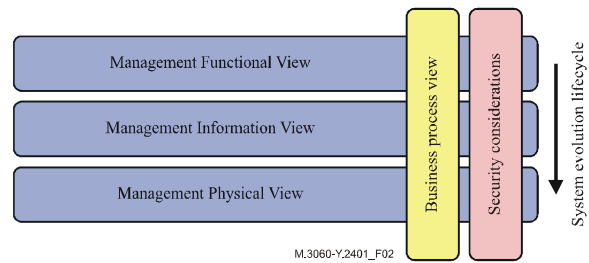


Figure 2. SSM architecture

4. Management functional view

The functional view permits the specification of the functions that need to be achieved in the Self-Service Management implementation.

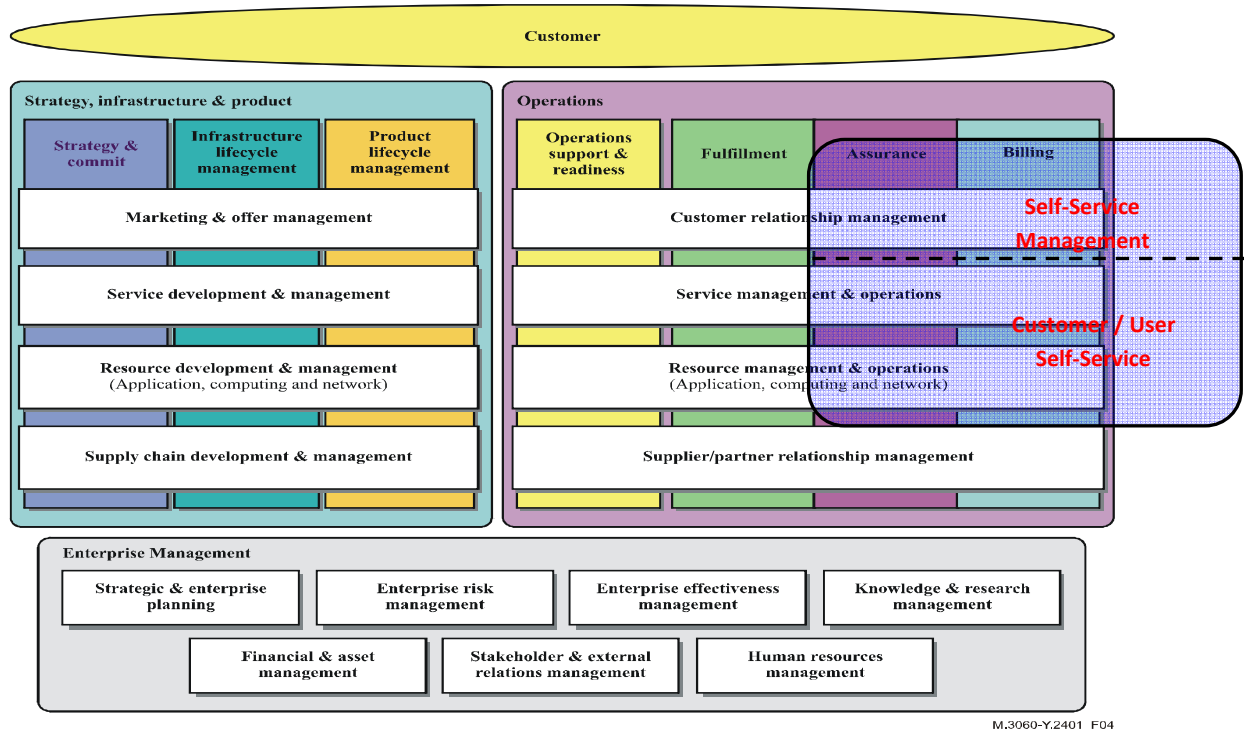


Figure 3. Relationship between eTOM and Self-Service Management

3. Business process view

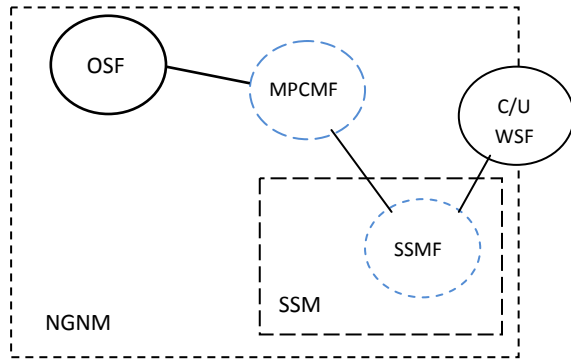
The business process view, based on eTOM model [1], provides a reference framework for categorizing the business activities of a service provider.

The model described by eTOM, as shown in Figure 3, is used to describe the SSM architecture, as a part of an NGNM business process framework.

SSM functional view is a structural and generic framework of the management functionality. The management functional view is composed of fundamental elements, such as: management function blocks, support function blocks, management functionality, provider and consumer reference points and logical management function layers.

Management function blocks

The management function block is the smallest deployable unit of the management functionality. Figure 4. illustrates the management function blocks which are directly involved in Self-Service Management.



C/U WSF	Customer/User Workstation function,
MPCMF	Market, Product&Customer Management Function,
NGNM	Next Generation Network Management,
OSF	Operations System Function,
SSM	Self-Service Management,
SSMF	Self-Service Management Function.

Figure 4. Management function blocks

Self-service Management Function block (SSMF)

The SSMM is an OSF which processes information related to the Customer Self-Service and SSM. Its functionality comprises, but is not limited to, the following management tasks:

- management of Customer/User profile (build, update and modify profile data);
- management of Customer/User experience;
- management of Customer/User self-service check and self-help trouble shooting;
- management of Customer/User self-service configuration;
- management of Customer/User self-service ordering and activation;
- management of Customer/User self billing;
- management of Common functionalities, such as:
 - Account management,
 - Self manage customer profile,
 - Credit management;
- management of Service self-assurance;
- management of other features, such as:

- Online exchange,
- Online feedback,
- Customization management, Etc.

Customer/User Workstation Function block (C/U WSF)

The C/U WSF provides the means to interpret the SSM information for the Customer/User, and vice versa.

The Support function blocks, Management functionality and reference point q, b2b/c2b and hmi are defined in the ITU-T recommendation [2], [3].

c/u reference point

This reference point is located between the SSMF and C/U WSF [2]. The reference point provided/consumed from an SSMF consumed/provided by Customer/User via C/U WSF. The c/u reference point represents the functional interactions and information exchange between Customer/User (over C/U WSF) and SSMF.

Figure 5. illustrates the reference point between the function blocks.

Management Layers within the management functional view

SSM is defined as a part of the Market, Product and Customer Management layer.

The Market, Product and Customer Management Layer consists of Market Product and Customer Management Functions. Customer Management Function has to contain Self-Service Management Function.

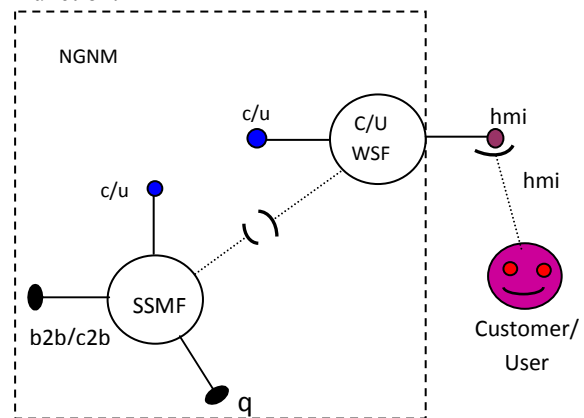


Figure 5. Illustration of reference point between function blocks

5. Management information view

Management of Service, *at Customer/User demands* is an information processing application. To effectively manage Service (manage complex network and support network operator/service provider business processes) *at Customer/User demands*, it is necessary to exchange management information between Customer/User, SSM applications and managed systems (Service).

As management information and actions play crucial roles for administrations, security techniques have to be applied in the SSM environment in order to assure the safety of the information exchanged over the interfaces and residing in the management application. Security principles and mechanisms are also related to the control of access rights of the SSM users to information associated with SSM applications.

The management information view is structured from the following fundamental elements: interaction models, information models, information elements, information model of a reference point (information-specified reference point).

6. Management physical view

The SSM physical architecture is structured from the following fundamental elements: physical blocks and physical interfaces.

Figure 6. shows an example of a simplified physical view for SSM implementation. This example is provided in order to facilitate the understanding of the SSM physical blocks described below and physical relationship between the telecommunication management and SSM.

Self-Service Management physical blocks

SSM Operation System (SSM OS)

The SSM OS is the system which performed SSMF.

Customer/User Workstation (C/U WS)

The C/U WS is the system which performs C/U WSFs. The C/U workstation functions translate the information at the c/u reference point to a displayable format at the hmi reference point, and vice versa. This functional block interprets SSM information for

the Customer/User, and vice versa. In this situation hmi reference point presents a point for the Customer/User access to the SSM over the C/U WS.

For explanation, C/U WS can be for example: mobile phone, computer (on the Net)

C/U WS is independent from the service. For example, if the service is mobile networking, the Customer/User has to use a device in order to communicate with the SSM (C/U WS). That device can be a computer (on the Net), PSTN or mobile phone.

For some services, Customer/User will have more device as C/U WS, for communication with SSM.

C/U Interface

The C/U interface is applied at c/u reference point. The C/U interface connects C/U workstation to the SSM OS.

C/U Interface has some characteristics of the Q interface and some characteristics of B2B/C2B interface.

As explained, C/U WS (Customer/User) and SSM OS can be in the same administrative domain, but they can also be at two different administrative domains.

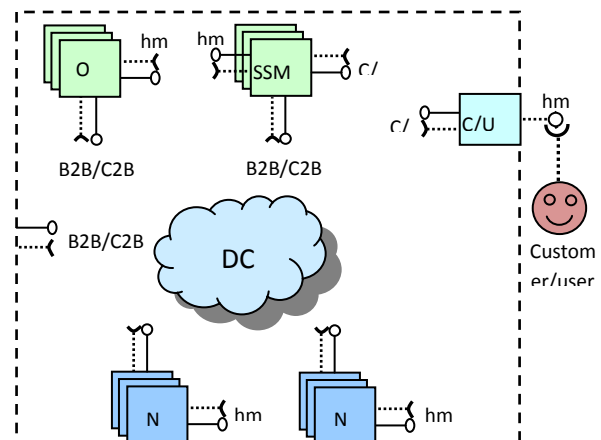


Figure 6. An example of a simplified physical view

7. Relationships between management views

Figure 7. shows the relationship between the Self-Service Management views and their components.

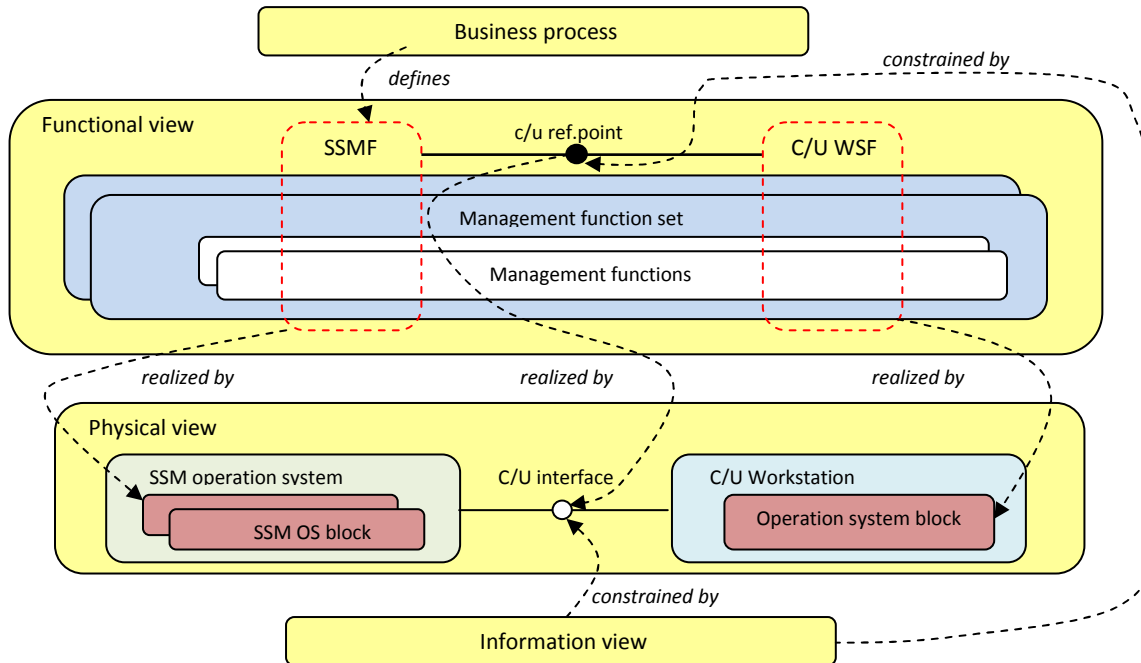


Figure 7. Relationship between Self-service Management view and their components

8. Basic function and benefits of Self-service Management

Self-Service Management needs to:

- manage Customer requests (for fulfillment, assurance, billing, etc.)
- enable a user friendly way for the Customer to use the Customer Self-service.
- enable a user friendly communication mechanism between the Customer and Service Provider.

The SSM implementation will bring benefits for both the Service Provider and the Customer, with a general idea to provide better service with more appropriate price for the Customer, and enable the Service Provider to deliver service more efficiently and, finally, to increase the profit.

Some of the Customer benefits are specified below:

- a more involved Customer/User role in managing own service (managed capability).
- easier access to the Service Provider.

- a more efficient communication between the Customer and SP.
- self service configuration, such as:
 - Service check and selection,
 - Resource and service availability check,
 - Service change (Service Parameter self-configuration):
 - Service interruption (initiated by Customer),
 - Service restriction.
- Service termination.
- Service notification, alarm, payment setting.
- self-help trouble shooting.
- self-service ordering and activation online.
- self-knowledge [4].
- self-optimization [4].
- self-healing [4].
- self-protection [4].
- report Customer experience to the SP.
- remain the Customer loyalty.
- Shorten the time to get telecom service including the ordering, activating service.
- Better marketing promotion information and new service information, Etc.

Some of SP benefits and possibilities are specified below:

- enhanced capability to track Customer experience.
- ability to create Customer profile, based on the Customer actions.
- reduced maintenance costs.
- reduced operation costs.
- reduced marketing costs.
- increased quality of service.
- easier provision of new services.
- simplified business process.
- avoid service lost through enhancing the customer experience and telecom business efficiency.
- shorter time needed for provision of a telecom service including ordering and activating the service.
- shorter time required to resolve customer service or network problems .
- a closer relationship with Customer.
- increase in profit.

9. Conclusion

Self-Service Management provides technologies for efficient exploitation of telecommunication services and network. The administration and management of telecommunication network, complex information and communication system comprises a significant part of the overall operational expenditure that raised the need for SSM [4]. In this context, this document has presented a Self-Service Management architecture.

Also, Adaptive networks are envisaged to play a significant part in the future, where the time and space variation in the traffic pattern will necessitate the ability to continuously amend the RATs' operating parameters. Reconfiguration of communications systems is a facilitator towards this convergence and enables the dynamic adaption and optimization of the access characteristics [6].

Reconfigurable equipments are an important step in this direction. In order to enable seamless experience through such reconfigurable equipment, enhancement of the corresponding management and control mechanism is required [5].

The presented Self-Service Management model does not consist in upgrading the existing models, which are not numerous and have not been standardized, but, in the author's view, contains certain originality, characterized by the introduction of:

- Self Service management,

- Self-Service Management Function,
- c/u reference point,
- Customer/User Workstation Function,
- Customer/User Workstation.

Future work will be targeted to produce basic ITU-T recommendation for SSM, and provide guidelines to the Service Provider concerning the SSM implementation in real network and service. In order to implement SSM, it will be necessary to develop a complex software for communication between the Customer, Service Provider and network equipment. SSM usage will determine new demands for reconfigurable equipment, which will have to change parameters "in real time" at Customer demand. Reconfigurability provides tools that enable equipment (terminals and network elements) to dynamically select what equipment with "real time" configure parameters will be included in the service delivering process, at Customer/User demand.

General conclusion is that SSM can bring a lot of benefits to the telecommunications market, but many complex problems, such as: communication between all relevant parts, network and equipment reconfigurability, security consideration, data protection, etc, would need to be solved first. They can only be solved in close collaboration between the service provider, equipment producer, standardization organization and regulatory administration.

References

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