Service oriented architecture approach with Service management in NGN

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Abstract: Changes created in service base of telecommunication industry is named next networks that also NGN is a part of this someone changes that itself is a package based network. Also management subject of these networks has gained specific importance with the concept of next generation networks. Therefore, in this paper while explaining goals in NGN management, also general structure of management is given. In this network, service operations is independent of technologies related to transmission, that without no string provides and supports access possibility to networks and providers of competitive service and the other service s. Management of resources and service in NGN has investigated and compared. Finally, to aid of service -based architecture has given management structure for NGN and investigated finding obtained from the new model.
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1. Introduction

Concept of next generation telecommunication networks has been made with the purpose of giving new services at any place, any time and via any kinds of access by subs cribber [1]. According to ETSI definition, next generation network NGN is a concept for definition and realizing network that because of decomposition to layers and various levels and using of open interfaces provide appropriate field for developing and administering of the new service in form of step by step for service providers and operators[1]. on the other hand, NGN is a network that because of higher speed support of more service, support capability of various levels of QOS and simplicity and being low cost of exploitation, maintenance and management, acts better than existing networks.

According to ETSI definition, next generation networks (NGN) is a concept for defining and realizing of networks that because of decomposition to layers and various levels and using of open interfaces provide appropriate field for developing and administering of the new services in form of step by step for service providers and operators[12]. On the other hand, NGN is a network that because of higher speed, support of more services, supports capability of various levels of QOS and simplicity and being low cost of exploitation, maintenance and management, acts well than existing networks.

NGN structure has a fundamental difference with traditional network structure and that is how networking interconnection and a related services. In traditional network there is a one vertical relation between various networks and services. In fact, each service completely depends on own support network, and without it isn't accessible. In NGN with combining of various networks and different services, any desired service is accessible by a unit network.

Goal of NGN is preparation of capabilities for constructing and creating, expanding and managing of all kinds of possible services. For achieving this goal, with made of NGN concept, management discussion of these network.

Management of next generation networks

With regard to development of NGN concept and management subject importance of these networks, in this section are described general goals in NGN management and general management structure in NGN.

General purposes in NGN

At NGN management structure should be assigned border between working areas of service provider firms, processes between operators, their equipment providers and reference points of interface between logical functions used for achieving those process and also information models used for support of logical functions.

In this direction, it should be considered made processes at standards M.3050 [3], [4], and FCAPS managerial and function areas at standard M.34000 [5], in needed structures for networks and NGN services.

Management structure in NGN

NGN management structure can be categorized to four sub structure of physical management, information management, management of function and business management.of course, in these structure, also security observations are considered.NGN management is in relation to managing security aspects of NGN.X.805{6} recommendations and Seri of M.3016{7} to {8} should be considered about making secure of managerial substructure of NGN.

Service-oriented architecture

Service-oriented architecture is a new and developing method for making of distributed programs. In a service-oriented architecture, various components of system are indicated via a good definition from interfaces that named services. service-oriented architecture isn't a product but it is a bridge between profession and technology to aid of a set of services depending on technology that having laws, standard and certain planning principals. [9,10,11]

It is a used a service –oriented architecture, software architecture involved in coupled loosely and providers of SOA service, users of SOA service and SOA register service. in service –oriented architecture service interface are independent of their realization.

Main purposes of service-oriented with the other software architecture:

1. Faster conformity of software with needed changes of business.
2. Cost reduction in unity of new services, also in maintaining available services [13,14]

Today, service-oriented is development key and heterogeneous extension of address ability software components of network. Figure 1 shows layered architecture of SOA that also IMB has given it. [15]
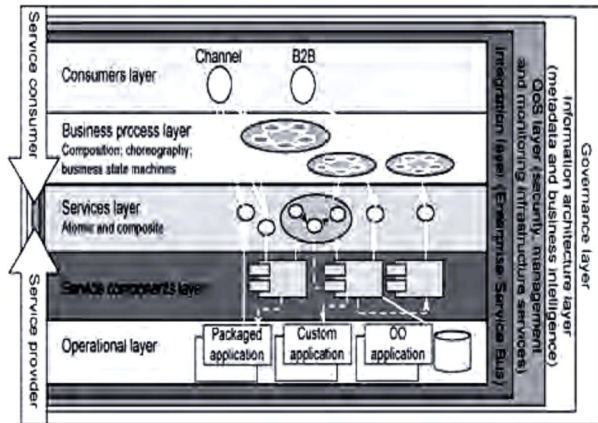

Figure 1: Layer Architecture [15]

This architecture is divided by five functional areas and four separate non-functional areas. Five functional areas consist of:[15]

- Operational layers: This layer includes all habits or applied value packages that is executed in applied portfolio of functional environment of IT and supports business activities. also it can help to releasing budget for new initiatives and developing new critical service of business. SOA realization is performed in this layer.

- Layer of service components: this layer includes software components that whichever is provided for a realized service operation. Service components definition of a service may be completed with architecture of service components and features of object –oriented data service.

- Service layers: This layer consists of all service that is defined in SOA. For this reference model purposes, one service includes abstraction features from a (or more) set of IT functions of intelligent business, some of services in service layer may be a version of the other services.

- Layer of business process: combinations and arrangements of considered services in layer 3 are defined in this that may be a combination of these services. Layer of business process covers presentation process, methods of combining and structuring blocks for agreement of loosely coupled service like process arrangement according to business purposes.

- Consumer layer: provides necessary capabilities for delivering IT functions and data to final users, for achieving to specific priorities.

Four non-functional [15]

- Unity layer: this layer creates capability for interfacing, routing and transition of requested services from service applicant to correct service provider.

- Service quality layer: in SOA characters are inherent that in computer systems that existing QOS is important, is accelerated layer of SOA with required capability is generated for achievement of non-functional equipments.
- Layer of intelligent business and information architecture: this layer involves key observations depending on data architecture and information architecture that can be used like leg for creating intelligent business via data marts and data warehouses.
- Supervision layer: this layer is all appearances of operational business management lifecycle in service- oriented architecture. This layer creates guidance and policies for decision making about SOA and management of all its appearances, including capacity, function, security and supervision. This layer can be used for all layers in this architecture. Each of layers show a various view from business values. The layers have separated relation from each other. [15]

Study of various models at network management:

Network management in today business for assuring from high accessibility of network is very important. Security of communications, being easy the use of network and related technologies, effective management of network devices and support of users settle among network management, there are many number of network management architecture and suggested modals by various standard organizations some of these are realized widely in the real world while some of the may consider only concepts. The most important models that are reference model is public management model of FCAPS that has been standardized by ISO. This model has been expressed on the basis of OSI model of network and includes failure management, configuration management, financial management, efficiency management, and security management. [16]. [17] 3GPP is a specific authority model which has been expressed for architecture of open systems. These model layers consist of organization systems, network manager, element manager and network element. [18, 19]

TOM is used to unifying business support processes which these processes are an interface between customer and operational support that the processes are with a substructure related with specific services. TOM has expanded in E tom for covering all generically required processes by service producer. This management model has been given by telemanagement forum among the most prominent elements of this model are operational processes, strategy, substructure and organization management and product. Management covers both fixed networks and mobile ones and applies a set of new aspects

related to NGN, like network capabilities and all multimedia IP services. [13] SNMP

It allows hardware and software components to provide information for network. SNMP architecture consists of four layers of network manager, managing director, sub, and management components.

Management architecture of NGN:

NGN is no longer a subject related to future, but is a reality that we should accept it.next step after applying services is to find a method for management and control of these services, until quality of provided services is according to contract management environment will require to extraordinary unity, comprehensiveness and flexibility like an approach which has been considered in development of an architecture for NGN management by ETSI. Business requirements have been expressed in NGNOSS requirement for management of next generation networks.

Features of NGNOSS architecture should cover developed management of network and its service and defined according to concept of service-oriented architecture planning. Main purpose of this model is passed on help to business and development of projects for clarifying superiority between various management areas because of applying effective management environment of cost. [13]

NGNOSS architecture consists of interface groups of market management service, service management and management of resources.

- Resource management: this management function provides direct management of NGN resources. These resources may be a part of transmission substructure or a part of service environment, when service management layer is able to mapping oriented-service information used by service management layer in information dependent on resource/technology.

According to comparison with ETOM from work, service management layer can be written development service and management and functional management service of a set of ETOM processes.

Resource management layer has been combined two sub layers:
Management of service resources.
Management of transmission resources.

Basic from work of this section services is related to a method that items settle in various function. These services allow to service-oriented architecture until they would place at interaction.

- Marked management: customer and product: this management function support directly factoring of external customer management (for example

managing relation with customer or CRM) [23] processing set will be mapping according to comparison with customer.

• Service management: this management function provides support from various forms of service management (like, quality control of service). Service management includes management function of interaction with development service, managements and agents. all management function is SM are independent of technology /resources and no knowledge from resource layer will not involve in preparation of service to customers.[23]

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Service-oriented in management NGN:

Basically, in service-oriented architecture service are designed for reuse, whether this reusing be performed at present time at future.this is achieved by using standards independent of technology and separation and realizing service from interface.there for, service layer itself is separated to the other components for example processing service layer, business service layer and functional service layer, as showed in figure 2.[24]
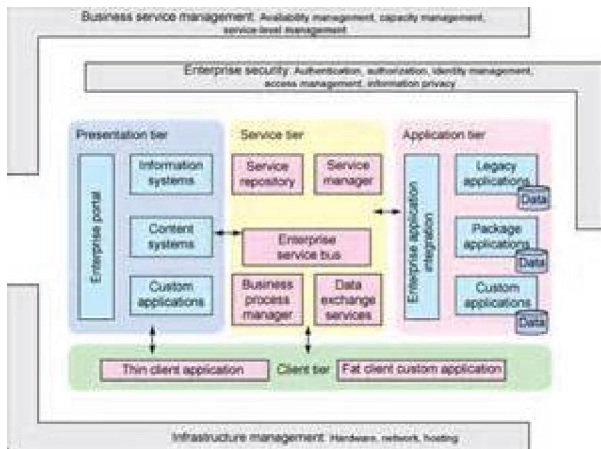
Figure 2: Service layer components in service-oriented architecture

Architecture S3 supposes that service function requirement have two views.first,provider view is business and technical capability that one service should deliver for customer satisfaction, while customer view is business and technical capability that service for delivery in a field that the customer has expected. and this allows to organization to select customer and providers in unity. way of service customer relationship with service provider has been showed in figure 3.

Figure 3: Trend of the correlation workflow application service provider service

In this approach applicant sends your request through profession application and channel for business process layer, also business process layer sends request to service layer or directly is send of it by channel. The service layer interacts with operational and service component layers performs applicant request. This process for service applicant has high to down approach and for service provider has down to high approach. All steps of doing process will support by non-functional layers.

Of course, with regard to layer independent, these layers are non-functional that supervise and manage on functional layers so that service applicant is in touch with service provider by unity layer and information related to these تراکنش is stored in architecture layer databases. Therefore we can map in NGN management architecture, market, product and market management layer with a scheme from service applicant and service management layer with a scheme from service provider in logical architecture of SOA, as it has been showed in figure 4.
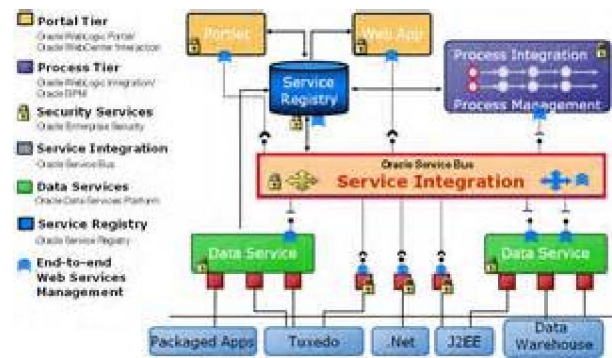
Figure 4: NGN management architecture using SOA architecture mapping

With help to applying SOA architecture in NGN management architecture model, all purposes considers to realizing next generation network easily are achieved. Among we can refer to separation service layer and transmission easily from each other and giving new services without no dependent to service substructure and increasing flexibility in service management with regard to connection looseness at service-oriented architecture, reuse capability from services and self-government combinativeness and service irregularity. And all these are benefits caused by SOA realization in bed of NGN. Figure 5 shows NGN management in terms of service-oriented architecture. thus marker management layer, business process layer and service layer including processing service and service management layer consists of service layer including business service and functional service and service component layer and operation layer Because of SOA realization in this model is prevented the necessity 0f vertical layer presence of ETSI model, since applied interfaces are run by service oriented architecture plat form and instead of that replaced SOA non-functional layer. Resource management layer, if we consider resources in form of service, it has capability of realizing service – oriented architecture which is out of our discussion scope.

Also with realizing SOA in NGN management will create the following benefits:

- Support of management and network agents and simultaneously support of decision marker business investment by correspondence with SOA principals (for example combinativeness and reusability).
- Creation of OSS service (monitoring and measuring service) for increase in satisfaction of customer service.
- Defining business homogenization and harmonization and its processes.
- Defining a unity platform for BSS for access and reusing services created by OSS for service management and profession to profession applications.
- Defining anthology specific to OSS, semantic presentation and measurement recovery and information supervision.
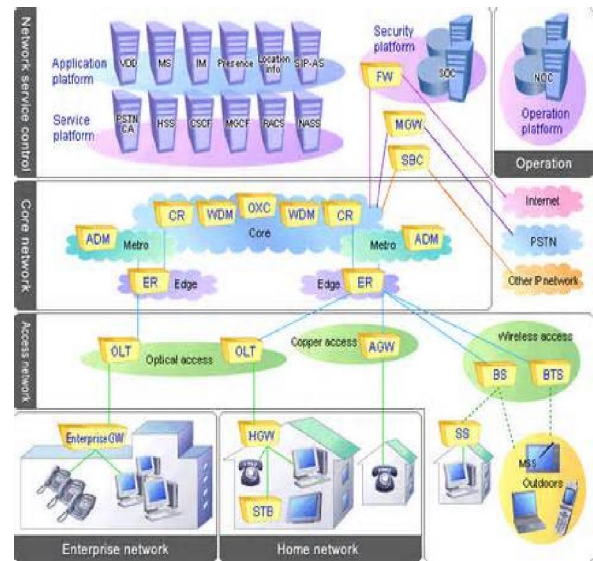

Figure 5: NGN management architecture in terms of service-oriented architecture

Conclusion

In this paper whit regard to importance of next generation network subject first expressed general goal in management of these networks and also stated general structure of management in NGN and finally addressed to service – oriented architecture and various models used in network management. Many works and researches have done about service management. These researches are highly in the field service management development and require more core. network and service layer at most models are related together and cannot warrant independence between service delivery and network preparation in NGN challenges of next generation network management aren't ended to above-mentioned issue and we can mention the cases such as network selection, cooperation capability whit the other parts and standardization. therefore, all of these features in addition to unique features such as service reusability, combinatiyeness, irregularity connection looseness, self-government and independency of services in SOA causes giving new management model for next generation networks based on service – oriented architecture has the most flexibility, agility, reduce in cost, time and satisfaction of customer.

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