Proposal for business process modelling and development in condition of complex telecommunication market

Kristina Musa, M.Sc., Darko Markulin, M.Sc.
Service Management and Customer Operations Department
HT d.d.
Kupska 2, 10000 Zagreb, Republic of Croatia
Phone: (385) 1-4912 721 Fax: (385) 1-4917 777
E-mail: darko.markulin@t.ht.hr, kristina.musa@t.ht.hr

Abstract – In condition of complex and competitive telecommunication market time reaction of Telecommunication Operator in case of implementation new telecommunication service is very important. Another situation when fast reaction of Telecommunication Operator is very important is satisfaction of Regulator’s requests. These requests are mainly demanding and with the short deadline. Business processes in these situations are playing one of the key roles. Most of these processes are complex and it is very important to model these processes on optimal and easy applicable way.

In this paper kind of business process modelling suitable for complex business processes are introduced. Model is consisted of more modules which contain activities for realising of certain configuration in telecommunication network. Modules have to be designed on optimal way so that implementation of new processes and change of the existing ones is easy. Syntax of UML activity diagram is used for modelling. Diagram is suitable for modelling of system support and human behaviour. It gives visual picture of business support which is acceptable for all participants in business process and system support design.

Key words - business processes, scenarios, module, complex telecommunication market, business process modelling, UML activity diagram

I. INTRODUCTION

Telecommunication market is becoming more and more complex. Increasing number of new services, increasing number of customers who requests more services at once, migration from one kind of service to another (e.g. migration from PSTN service to VoIP), migration of customers from one Operator to another, different requests of Agency for Telecommunication etc. are some of reasons why telecommunication market is complex and dynamic. In accordance with this fact business processes are complex too. Dynamic of new processes introduction and changes in existing processes is very large. It is very important that processes can support all possible situations during the service provisioning, customer migration or service migration. On the other side competitive telecommunication market requires fast introduction of new services on market which means, among the others, fast development of needed system support. Another situations which requires fast reaction and development of system support are Regulator’s request which are frequent, demanding and with the short deadline.

To satisfy these two basic requirement for introduction and changes in business processes design and development of business support has to be enough precise and flexible. Business support has to be enough robust that changes in process does not demand much changes in existing system support. Design of system support has to be such that implementation is as far possible easier and faster. It is especially important in cases where many of business processes are complex.

One of the possible kind of business process design was given in this paper. Business process was modelled with the aim to allow easier and faster implementation of complex business processes through the system support for telecommunication service provisioning. Business process implemented in workflow system has to be independent in relation to system support platform and focused on actions which are needed for service provisioning in telecommunication network.

UML activity diagram was taken like tool for modelling business processes. Diagram is suitable for modelling of business processes and obtained model is suitable for understanding of requested system support for all side included in development. UML is tool which uses graphical presentation of modelled system and this kind of presentation is suitable for specification of business rules, actions and messages between systems [6].

II. MODEL OF COMPLEX BUSINESS PROCESS

Business processes in telecommunication have to ensure all possible scenarios in service provisioning and every scenario has impact on some of network elements, CPE, kind of service installation, manual work of technician on network or customer side [6]. Basic elements of business process model were defined in [5].

These elements are:

A. Start and end nodes

Denote start and finish of the business process and corresponding subprocesses.
B. Manual tasks

These are activities which represent tasks for job. Job belongs to some of the participants of the business process.

C. Outgoing and incoming signals

Signals perform interaction between systems which participate in business process.

D. Subprocesses

Contain similar actions in the business process or actions which are repeated more times in one business process or in more processes.

E. Decision nodes

Denote decision which branch in process will be chosen. It depends about the option chosen in manual task, data from CRM system, network elements or answer from the other system.

F. Split node

Denotes place where two or more parallel branches started in the process.

G. Join node

Denotes place where two or more parallel branches are joined in the process.

H. Time control

Time control which finishes waiting for an answer which the system is asking after an outgoing signal.

I. Process interruption

This is moment when CRM system cancels a process. It could be happened at any moment during the process and it will not be modelled here.

In [5] these elements were described in detailed. Syntax of UML diagram activity corresponds to these denominated elements [5], [6].

Critical moment in such design of telecommunication process is decision how to use parts of the process within the possible scenarios which are part of service provisioning. Part of the process which presents similar activities in telecommunication network could be module and process is consisted of these modules. For example, module could be activities for network configuration before manual actions in the network or manual actions in the access network. Process construction from the modules should be easy. Every scenario is represented by single process. Every change in service provisioning should be easy made by change in the single module.

Model of the process is made by basic elements which are modules. Module is presented by subprocess and module itself is mainly made from one or more subprocesses. On the lower level subprocesses has another elements like signals or manual tasks. In a case of complex process consisted of activities which are related to more services every module is a set of activities related to only one service. It is important to respect before mentioned rule that module is a set of similar activities in telecommunication network. Thereby model gain in flexibility and simplicity of implementation. Service provisioning is consisted of more scenarios which are constructed from modules like base units.

III. EXAMPLE OF MODELLING COMPLEX BUSINESS PROCESS

Like example of modeling complex business processes, processes related to VoIP connection was taken. VoIP connection is a relatively simple process which is consisted of several basic modules. These modules are technical feasibility for service, network configuration and actions on the field and during the service activation. Modules were chosen like one unit. In the process depicted on figure 1 end of the one module is condition for start of the following one. Here all business logic is located in modules. Structure of the modules will be described later in the text. It should be noted that process defines all what is needed to do to connect service. It includes needed actions and correct order of these actions. Architecture of the systems for business support is not considered because focus is on business process and way of implementation must follow these rules.

![Figure 1: Process for VoIP connection over ADSL](image)

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Of course relatively simple process for VoIP connection is not only possible situation during the service provisioning. There is connection of the other services together with VoIP, relocation of the ADSL alone or with the other customer connections, disconnection of the service, disconnection of the service because customer crossing to other Operator with or without number portability, temporary disconnection and so on. Some of these scenarios could be covered with the existing process for VoIP connection, but for the most ones there is need for new processes. From the above it is obvious that business process modeling for telecommunication service provisioning is very complex and demanding. Figure 2 depicts one of the possible scenarios. Process is much more complex than single process for VoIP connection. Here we have actions on two different location and three possible situations. Customer can request service disconnection now, on defined date and when service will be connected on the new location. Because of that in this process level decision nodes are needed. It is needed to stress again modules are basic units and process is constructed from them. Figure 3 depicts another scenario where ADSL connection has to be disconnected because customer is crossing to another Operator. Process is simpler and rule is: first prepare the network for crossing of the customer to another Operator and then disconnect the service.

Since the service provisioning for telecommunication service has many scenarios it is needed to provide fast and effective creation of business processes. Using modules it is possible to create processes combining these modules. Every module has its defined role. Change in one module could have impact on more processes. Therefore it is necessary to define modules on optimal way that change in module does not cause additional changes in basic processes.

Next level of modeling is modeling of modules. Figure 4 depicts module “Configurations in network (ADSL)”. Module contains flow with actions which are directed to configuration of network elements for ADSL connection. Which actions and subprocesses will execute in module depends on input data, result of previous actions, result of automatic configuration of network elements and result of communication with the other systems in system support. Figure 5 depicts subprocess “Switch configuration (LE, IN)” whose execution starts in presented module. Like module, subprocess can contains actions and another subprocesses.
As well as in the case of modules subprocesses in modules have to be designed so the change in subprocess does not cause unnecessary changes in modules or basic processes. Figure 6 depicts subprocess “Configuration on DSLAM”. Subprocess gathers actions related to actions on DSLAM in ADSL connection, change, relocation, suspension or disconnection process. Change in subprocess could have impact on one or more basic process but does not require changes in them. Basic process, for example ADSL connection, is shown simple over modules. Modules contain more details, decision nodes, actions and subprocesses and could be used by one or more basic processes. Subprocesses are deeper in process and could be used in one or more modules. It is very important that one change in existing service provisioning causes one change in module or subprocess and does not causes changes in basic processes. That principle enables flexible and easy change in business processes.

Such kind of modeling business processes for implementation in workflow system is used in HT. Two basic reasons why it was done are to get clear picture of business processes which are needed for service provisioning and to get clearer and simpler model of complex business process. Complex processes are consisted of more simple process related to one of the services and it is need to synchronize actions execution needed for proper provisioning of these services. Such modeling gives good results especially in specification of the points in the complex process where part of the simple process should be synchronized. It is easier to follow required changes in business system support and to avoid mistakes in development of business process for service provisioning.

IV. CONCLUSION

In this paper proposal for one of the possible complex telecommunication business processes modeling was given. Modeling is based on scenarios and modules. Scenario is...
one of the possible business processes which can be appear during the service existence and module is a basic unit for business process constructing together with the basic business rules. Model itself comprises actions, business rules and subprocess related to similar activities in telecommunication network. It is important to design modules on optimal way. Module could be use in more processes and change in module does not cause additional change in basic processes.

Proposed way of modeling business process allows flexible and clear design of process provisioning for telecommunications service. Business processes are focused on actions which are need for service activation and they are independent of system support platform.

REFERENCES


