Service Engineering

Methodology for 3G beyond 3G Service Development

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1. Introduction

Fast amortisation of investments is a key success factor for all industrial sectors. Distributors need to shift from selling products to providing services that add value to the customer's business processes. In particular the network operators have invested a lot for purchasing UMTS licences and to build up an infrastructure. There is no question that generating significant profit from innovative, value added services is essential in this context. Available and emerging technologies around 3G will deliver those services even to mobile users.

In order to gain acceptance in the market, those services need to meet a set of requirements. To be accepted by the user, such services need to be personalisable, network independent and must ensure security issues. Moreover, they need to support innovative features, such as mobility, device-independent usage, seamless handover, location as well as situation awareness, and they should adapt intelligently. From a provider's perspective, easy integration of content and other services, scalability, robustness, and maintenance are key issues.

Value added services need to be developed, tested, deployed, and maintained in an efficient and effective manner. In order to support the whole development life-cycle process a comprehensive service engineering methodology is required which has to be supported by a corresponding Serviceware Framework. Service engineering has to cope with the requirements of the particular involved roles, being developers, providers, and users. Among the requirements are the definition, evaluation, and management of business models, usability issues, security, privacy, and barrier-free service access. These rather generic requirements will have specific characteristics in different application domains and will be complemented by further application-specific demands. Considering this diversity, it is therefore essential to think of a general service engineering scheme serving as a generic process engineering meta model and being supplemented by domain-specific service engineering methodologies that take the applications' characteristics into account. The availability of a well-suited service engineering methodology will be crucial to the success of the future world of services.

This document will give a sketch, of how service engineering will look like in 2006, and what role each market actor will play in that process.

2. The Future Services World

The telecommunication world will experience in a near future important changes in the provisioning of new and innovative services. Taking a break to throw a short glance on the evolution of the telecommunication world during these last years, one realizes that it is a long ago that services are no more simply limited to the provisioning of mobile telephony and even less fixed. With the advent of the UMTS more possibility are offer for the development of innovative and multimedia applications over the mobile telephony. And it is not all. When one thinks of technological progress realized in the field of the infrastructures, as well for the devices, equipments and software, there are serious reasons to believe in a real improvement of the quality of the services to offer in the future. Some advanced features will constitute the prerogative of the services of tomorrow. While considering the current assets, They will most probably go in the direction of device-independent usage, seamless handover, location as well as situation awareness.

All this will inevitably involve deep changes in the practices of the consumers of telephony and by rebound increase their requirements as regards content, quality, usability, privacy, pricing, security and interoperability. The following paragraph gives an outline of these requirements still called the key success factors of the next generation of the telecommunication services (figure1):

Pricing:

Security:

Content:

Usability:

Privacy:

QoS:

Interoperability:

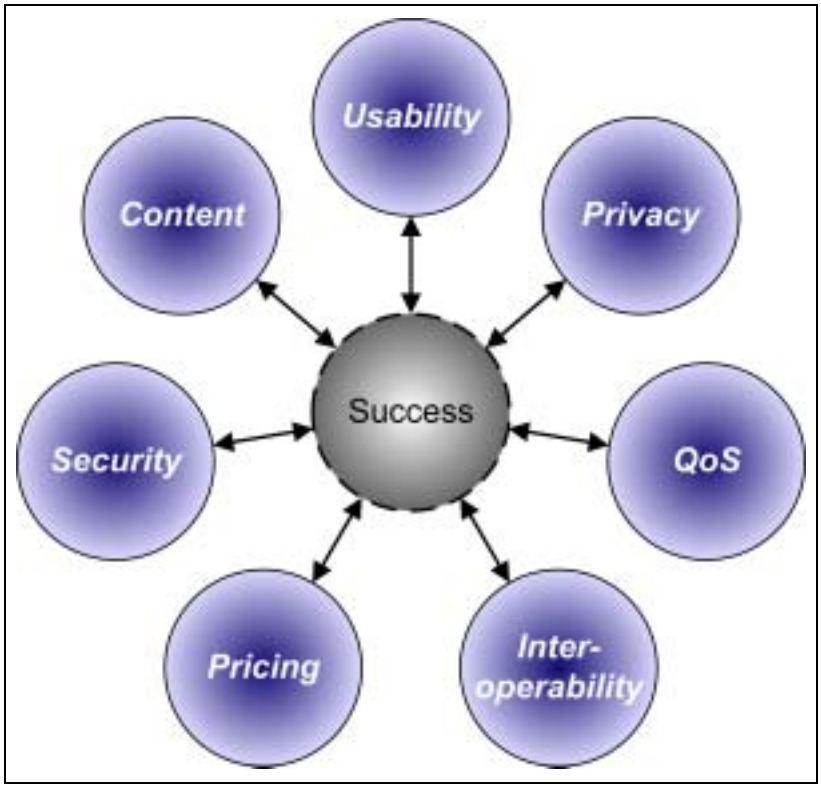

Figure 1: Key Success Factors

In order to take into account all these requirements in the development of a service, it will be essential to reconsider the existing methodology for the telecommunication service development. When one throws a glance on the existing services, one realizes that there is very often a gap between the various elements intervening in the provisioning of this service. This brings to wonder whether these services were developed in accordance with an specified methodology. The majority of the disfunctions observed are found on a side in the use of an limited application on the top of a network with great bandwidth, thus limiting all its advantages or on the contrary one tries to perform a multimedia application requiring a great data flow on the top of a network with low bandwidth. The result is the same. The innovations in the application could not be put forward. Other side, the services until now were technology-driven. The capital cost on the infrastructures did not make it possible any more to remain a balance quality-pricing. Therefore the development of the telecommunication services must move away from this disorganized way for a better organized, in which not only the failures observed higher, but also the key success factors and the requirements of the innovative services will be taken into account.

3. The vision

The vision is the provisioning of a service engineering methodology which is well-suited for the efficient and effective analysis, design, implementation and deployment of innovative telecommunication services. The methodology will provide a set of methods, guidelines and tools for supporting the roles of the particular actors involved in the development process in doing their work, the service life-cycle and the workflow of establishing the provisioning of new services. All this with the corresponding infrastructures will be gathered under a Serviceware Framework. The following picture gives a global approach of this vision.

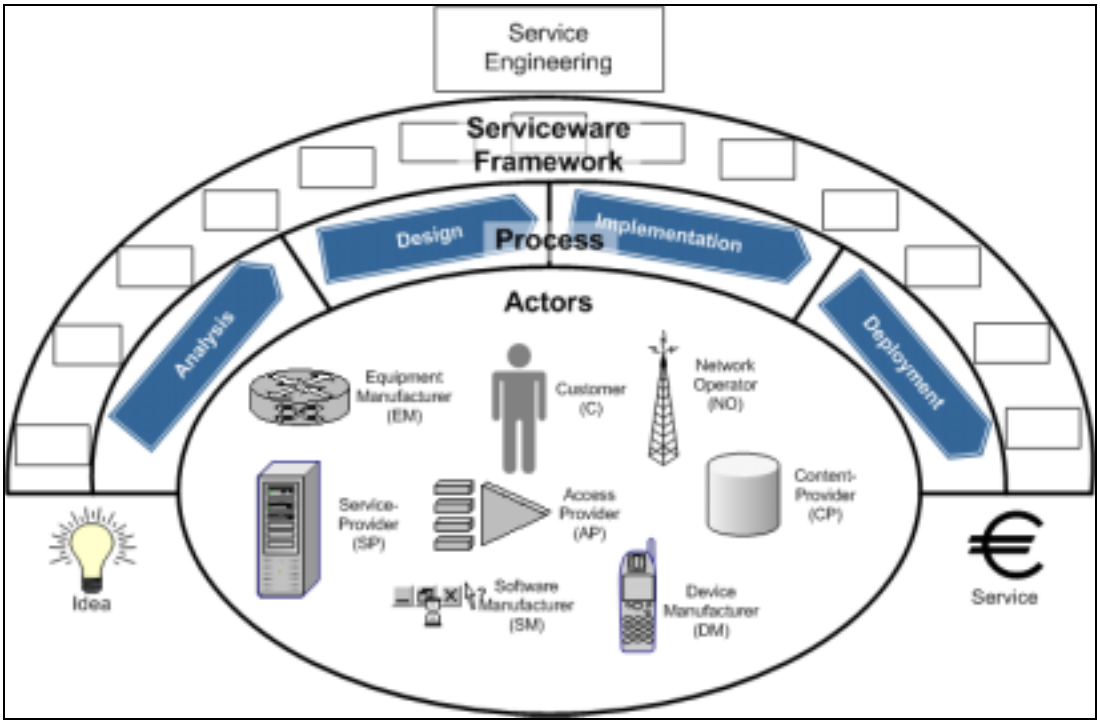

Figure 2: Service Engineering

Service engineering has to cope with many, possibly conflicting, requirements of the particular roles. These particular requirements have to be analysed in detail from the viewpoint of every involved actor and his internal roles. Having done this, a service engineering methodology with dedicated phases and activities can be developed and linked to a corresponding Serviceware Framework. All these efforts are motivated by the major issue of providing to the end-user/customer new telecommunication services respecting 7 key success factors, as illustrated in figure 1. The next section will give explicit details on what hides behind this vision.

4. The Actors

Various actors are involved in the provision of mobile services. Therefore, a detailed examination is needed for the determination of the elements of a policy and R&D vision. The actors' roles contents and objects have to take into consideration, especially the commercial and economic interests of each one of them. Since a company is often operating in two or more of these categories, balancing these interests is a complex task.

3G beyond 3G service provisioning may involve several or even all of these following actors:

Content Provider / Aggregator (CP): Mobile Service provisioning involves the intensive use and distribution of data and information by so-called content providers. Some of them see the mobile device as an additional channel to provide users with push-pull capabilities to access data and information. Generally, these are generalist or specialized news companies. Other actors, called content aggregators, combine and distribute different kinds of information and data to target specific users. There are, for example, an increasing number of independent commercial players aggregating and re-packaging financial data. Multimedia content is finding its way through new channels towards all kinds of devices. Content aggregators often create mobile portals that are accessible from mobile phone screens, PDA or other wireless devices.

Service Provider (SP): The Service Provider is offering services through software applications. It is the opposite side role of the service. The SP may offer the service as such and in a certain way. He will make sure that the service can be used and can be used in a certain quality. The SP will assure that the user will pay for the service or for a certain quality of a service. The provider is not always generating or producing the service by himself. He may use services by himself to generate a new service or a value-added version.

Network Operator (NO): In this context, network operator are defined as the traditional network owner. They provide and maintain the running basic infrastructure, high-speed backbones, gateways to other networks, points-of-presence resp. mobile access points, and administering services in it.

Access Provider (AP): Mobile Access Provider probably play the most important role in enabling mobile commerce. More importantly, they are best positioned to benefit from the introduction of new revenue-generating information services since they have an established billing relationship with their customers. Especially in the case of mobile telephony, they often control the opening portal of a mobile phone, which is on the SIM card of a mobile handset. Mobile Access Provider may also provide parallel services such as access to wireless computing services or assisting users to integrate their Internet functionalities within their mobile telephone handset. Finally, AP may provide the basis for so-called mobile virtual operators. These do not own spectrum and/or network infrastructure. Instead, they have business arrangements with traditional mobile operators to buy capacity which is then sold to their own customers. They also have control over the SIM card, branding, marketing, billing and customer care operations.

Device Manufacturers (DM): Device manufacturers are critical elements of the mobile commerce value chain. They provide the platform through which users access value added mobile services. Consequently, they are constantly striving to develop a wider variety of products since future applications and services will need innovative features to download and listen to music and video, or play games and manage personal lives. Handset manufacturers, therefore, are working to find ways to come closer to the traditional PDA or wireless computing manufacturers by devising so-called “smart phones” or “communicators” with combined functionalities. The integration of these different devices has just started and it is predicted to continue over the next five years.

Equipment Manufacturers (EM): Infrastructure equipment vendors provide the tools for delivering wireless or mobile services. These solutions range from gateways, platforms, routers and network management tools to next generation signalling solutions. They also provide the necessary software solutions, i.e. middleware, for the integration of these tools and, consequently, the delivery of the expected functionalities. Several established players with a long tradition presently provide these hardware and software solutions.

Software Manufacturer / Technology Platform vendors (SM): Technology platform vendors include companies providing operating systems and/or specific enabling applications such as micro-browsers. It comprises, therefore, both established companies such a Microsoft, AOL Netscape or industry consortium such as Symbian, whose members include Motorola, Sony-Ericsson, Nokia and Panasonic. There is also an increasing set of smaller companies trying to explore the functionalities of open source software to devise advanced technological solutions, mostly software-based solutions like micro-browsers.

Customer (C): Business models and services and applications can not be devised without a detailed understanding of the needs of potential customers of valued added mobile services. The user is the target of a service. He will be served to fulfil his needs and to create satisfaction which will be the benchmark for service. The user may pay for the service as such, a certain quality, and in certain way.

5. State of the Art / Related Work

The idea behind the service engineering methodology is new. Up to now the development and provisioning of new telecommunication services were basically technology-driven. The market and other considerations such as some points on the above defined 7 key success factors were not with the considered priority taken into account. Furthermore, all the actors were not integrated in all phases of the development, so that their interests and requirements were not always considered. Only few organisations have recognized this gap and some of them are following the idea in research. It is the case of the research into Artifacts, center for engineering of the University of Tokyo [1]. This group focuses on realizing an industrial structure in which service and knowledge play a major role to generate more value added, through research in service engineering as a methodology to increase the service contents within product life cycles. The research targets building new environments for service production and defining a new dimension of value for more security and safety with individual care. The DAI-Labor at the Technische Universität Berlin has been involved in several projects in the telecommunication sectors using an agent based Framework (JIAC) for the development of agent based applications for the realisation [2]. They recognize the gap by the way JIAC is on the way to become a Service ware Framework including a service engineering methodology to help building new innovative telecommunication services.

There are several ways to assess the mobile marketplace and its technology. Varshney and Vetter propose a 4-level integrated framework for mobile commerce, based on application classes, such as finance, advertising, or logistics. Network requirements of these classes, supported by existing and emerging mobile networks are also discussed [15]. Pedersen and Ling designed an adopting framework based on the view of technology user, end user, and network member. It is also suggested to apply this framework for designing guidelines for market players to predict end users adoption of mobile services [14]. Lehner and Watson concentrate on a stakeholder, a service and application, and market players perspective. They propose relevant research problems, such as alliances and their driving forces, market players and their interaction, and business models, among others [12]. Bria et al. discuss the demand for a long-range strategic planning in the area of infrastructure deployment and the broad adoption of new behaviours and practices, which is a slow and costly process. Therefore, they suggest a scenario-based forecasting approach, based on economy, politics, and global technology trends using a Delphi survey among leading scientists and industrials [3]. Camponovo and Pigneur focus on the mobile market players' arena. They provide a tool for analysing and visualising the key players, their business models, their interactions, and their dependencies [4],[5].

All these works focuses on the mobile marketplace stakeholders. However, the objective is not only the sketching of conceptual models but a concrete agent-based realisation for the introduction of next generation telecommunication services. Other approaches come from Software Systems and Process Engineering which are to be considered as much more influential for industrial applications due to the quasi-standard state they have.

The Software Process Engineering Metamodel (SPEM) [6] of OMG defines a metamodel for describing software development processes. Since no domain specific assumptions are made, SPEM could serve as modelling framework for the Service Engineering Methodology.

OPEN [7], [8] (Object-oriented Process, Environment and Notation) is another methodological approach to the development of object-oriented and component-based software applications. It contains a repository of process components, a meta model defining the use of these components, and guidelines for using these process components to construct endeavor-specific processes. Although not devoted to multi-agent systems, OPEN addresses a wide range of target groups and could therefore provide useful input for the design of the Service Engineering Methodology.

FIPA Methodology TC [9] is engaged in agent methodologies for the development of multi-agent systems. This TC concentrates on the role of the developer, who will construct a concrete development methodology from a method base by assembling pieces of method fragments. The Service Engineering Methodology extends this approach by involving other actors of a service engineering process as well.

Another FIPA activity, being the Modelling TC [10] will provide notations for the modelling of autonomous multi-agent systems. Similar to our proposed Service Engineering Methodology the work plan takes into account business process management and the need for flexible negotiations between agents. Therefore, the Modeling TC could well provide most of the notation forms for the Service Engineering Methodology.

- ODP => Roles and Views

- Service-oriented Engineering

- Rational United Process

6. Approach towards Service Engineering

We understand service engineering methodology as a set of methods, guidelines and tools helping the different actors involved in the creation, development and deployment of innovative telecommunication services to perform their tasks in an effective, cooperative and coordinated manner. The defined methodology will represent a way of using an ordered set of instructions in well-defined activities to solve the different tasks of the process. The guideline will provide a recommendation detailing a proposed practice with developed procedures for in-house use. The set of tools designed to support the specified methodology will provide technical infrastructures to achieve those specific tasks.

The goals motivating this vision are based on the necessity of:

- defining clear roles (business and technical), rules, and approaches in accordance to the interests and domain of competence of the actors;

- defining clear reference points, interfaces, input/output schemes for/between the particular phases;
- viewing the complete process under one scope by different actors;
- defining clear negotiation protocols to avoid and handle conflicts and build synergies;
- having well-defined steps in each phase of the development through macro and micro processes;
- focusing on a customer-centric view through the consideration of the key success factors in each step;
- enabling an easy integration of content, infrastructures and services in a later phase through early commitment;
- supporting the Quality of Service through macro and micro QoS Instances;
- enabling innovative features support such as mobility, device-independent usage, seamless handover, location as well as situation awareness and security;
- reducing the time-to-market for new services;

providing a service-ware Framework supporting the development with suitable tools.

6.1. Scenario

A significant amount of users is willing to pay for reliable, high-quality news that adapt to their needs. In The following, a scenario of an innovative information service in the aim of research will be considered:

Herein, the customer is interested to efficiently find these research results, which are relevant and useful for his/her daily work. Moreover, he/she is interested in receiving relevant information to funding programs in his/her area of interest in a periodic manner. For receiving broad information about special areas of research, not only websites but also other sources, such as in-house databases and organisations like CORDIS and DLR are being used, which contain results of public funded projects.

For such a service idea many different and sometimes conflicting parameter have to be taken into account. At the very beginning the target end-user and the special wishes need to be identified. The service-usage and acceptance needs to be defined. Here, European researchers are the main target. They have the requirement to easy access the service (i.e. high usability). The high information overflow needs to be managed by a powerful filtering mechanism to aggregate and personalise the content. The service should deal with privacy and security issues and should be accessible through a broad range of access alternatives. The market and possible competition needs to be analysed. Since such a research information service has not been introduced so far, a short time to market is fundamental to realise the first mover competitive advantage. Possible service introduction strategies and the planned product lifecycle need to be assessed. Also, regulation mechanisms (e.g. CORDIS database access) need to be discussed.

Powerful partnerships and alliances are, as mentioned above, crucial for a successful introduction. CORDIS and other Content Provider have to deal with the Service Provider, who plans to realise such a service. Revenue-sharing models, costs-benefit calculations, the cash-to-cash cycle, the profit in terms of EBITA or ARPU, and finally a proof break-even analysis have to be planned. Now, concrete negotiations and resulting contracts are set up.

A fundamental public relation strategy needs to be developed. For the proposed research information service, it seems appropriate to confront researchers on conferences or other conventions with an impressive demonstrator version.

After starting the technological development, a permanent control has to be put into place. The task of such a explicit control mechanism is to check the above described goals in terms of achievement.

When a first research information service prototype has been developed the reached customer awareness and satisfaction need to be checked. At this point the public relation strategy has to be executed. Presentations, conference participation and other activities have to be performed in order to reach Europeans researchers. Besides, the own competitive advantage needs to be reviewed. In that moment, other service application providers have the chance to react to the first move. Therefore, the real market share has to be persistently monitored.

After introducing the service on a large scale, lots of effort has to be undertaken to review and supervise all above mentioned factors. If necessary, the strategy has to be adopted, in terms of pricing for instance.

From the technical point of view there also will be general estimates about what the service is about and what it is not about. The above scenario may lead to a kind of filtering the technology of which can be used from the serviceware framework. The user will answer questions about his field of interest or otherwise questioned to get

an imagination of what content must be acquired. Location awareness may only be needed if someone wants to build other services on it. The serviceware framework will than be checked against the general estimates: does it contain filtering and will the actual filtering technique satisfy the needs in this scenario. If something is not done in the serviceware framework (connection, special content, formats, QoS, etc.) this must be addressed during service development by integrating the according technology into the serviceware framework. Afterwards the overall architecture with its sub-services and interfaces must be created, i.e. in the above scenario arrange the content sources to filtering and how could the filtering results delivered to the customer. You then have to implement the sub-services (e.g. filtering), configure it, and test it. Last you will integrate the sub-systems and bring it to the real environment. The sub-sequent work will address the robustness and stability of the service while loads of customers will access it. And, finally if the EU-FP7 comes out the service must be adapted to the new framework program.

6.2. Service Engineering Process

The section above has brought a clarification on the roles of the different actors involved in the aiming at providing future innovative telecommunication services. The development and deployment of such complex services are intended to a favourable issue only if each actor provides an optimal contribution and plays fairly his specific role in the global scope. To help the actors in this regard for avoiding and handling conflicts, and for building true synergies clear reference points have to be defined.

6.3. The Actors' Reference points

No single actor in the marketplace can develop and provide an end-to-end mobile service solution on its own. Therefore, viable alliances and partnerships is a major task for a successful mobile services landscape. Partner and customer relationship management (PRM and CRM) is becoming a core competence of the player in the mobile marketplace.
Therefore, it is not enough to define market players, their roles and requirements. Moreover, their reference points (i.e. interactions) need to be analysed and assessed. Every actors has the individual role to add value to a service. Finally, the end-user is able to use and pay for such an added-value service. After defining the roles of different actors in the mobile marketplace it is important to accurately define their relationships. These interconnections are called reference points. Herein, it is important to analyse supplier relationships and identify possible conflicting roles. For each actor, examples of decision-making processes and technical steps of realisation need to be surveyed and analysed. Thereby, interactions with other actors, conflicts and synergy potential can be exploited. The goal is to define an ideal future model of relationships for the whole mobile marketplace. Using this model, technical as well as business interactions can be clearly designed, implemented, and deployed.

In Figure 3, such an ideal future service world is shown.

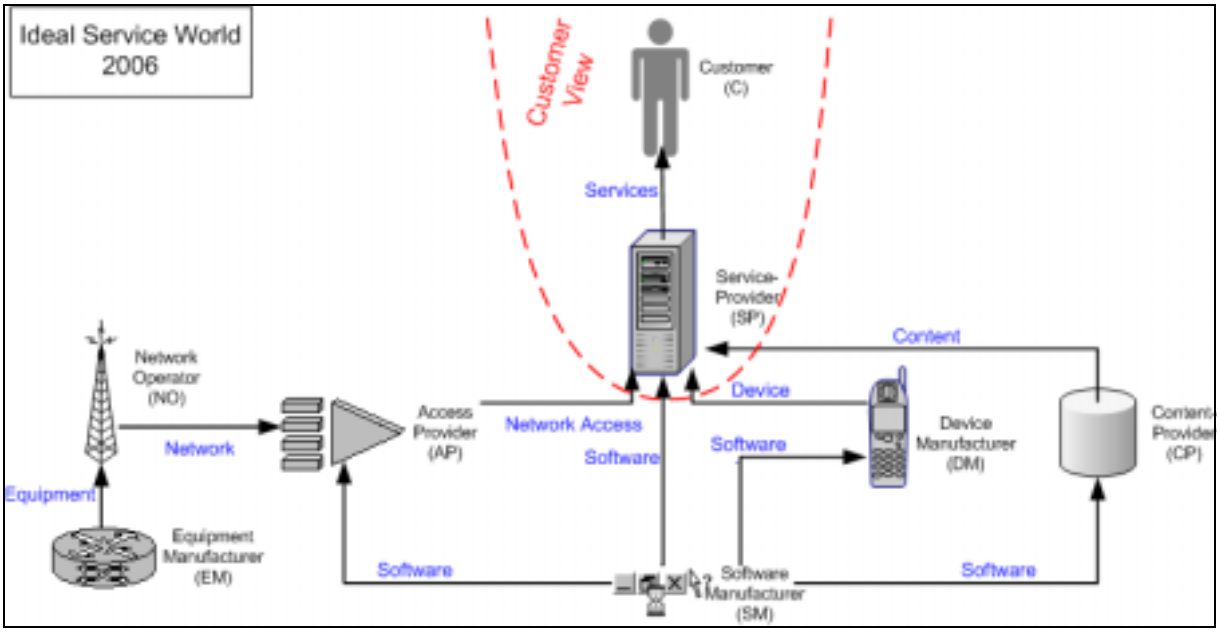

Figure 3: Actors' Reference Points

It can be seen that the whole system is customer-based. He plays the major role on the market place. From his point of view the Service Provider is the only relevant actor for provisioning of mobile services. This SP is responsible for the final provision of a service. He comprises an explicit control entity for the rest of the players and their performance. He gets content aggregated and in the right format from the Content Provider (CP), deploys end devices provided by the Device Manufacturer (DM), and uses access to heterogeneous networks provided by the access provider. These entire tasks are based on specialised software developed and provided by a Software Manufacturer (SM). This SM also supplies CP, DM, and AP with individualised solutions. The AP is served by the Network Operator (NO) providing the raw infrastructure. Therefore, the NO is using network equipment from the Equipment Manufacturer (EM).

6.4. The proposed Methodology

The proposed methodology covers 4 major phases to complete the whole process (analysis, design, implementation and deployment) as the following figure shows. It is aimed to have a controllable, well documented, and reproducible way of producing services at a well-defined quality level. Its particularity is based on the idea of bringing in each phase of the development, the business and the technical requirements together. In an early step inside each phase the actors will concentrate their energies on playing only their specific role and in a later step negotiations will take place helping to reach agreements. Each agreement has to be settled with a well-defined output scheme used as input for the next phase. A phase is made up of a set of sub-phases dealing with specific micro-tasks so that at the end the macro-task will be solved. The next section gives a global view of the activities going on in these 4 phases.

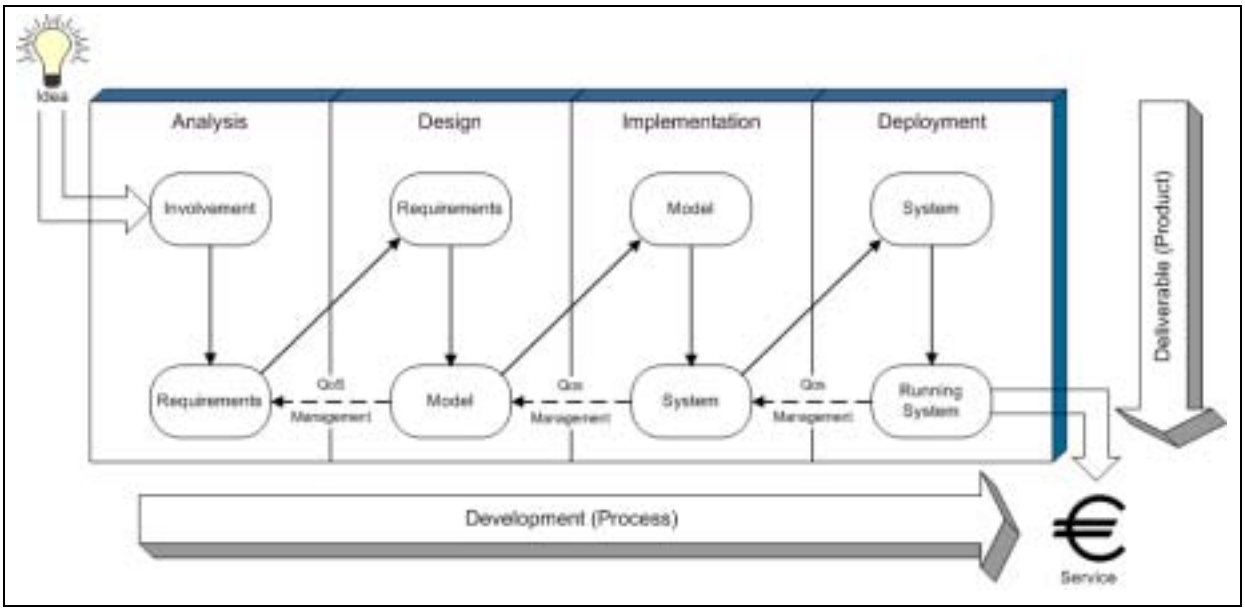

Figure 4: Service Engineering Methodology

Analysis

The analysis phase begins with examination of the involvement state in which all the actors concerned by the provisioning of the service will come together to check up the new idea. Each actor will first of all express his intention in playing a specific role in the whole process. Thereby he will provide/ask for the necessary input in accordance to this role. As mentioned above, the particularity of the methodology is that business and technical actors have to work together during the whole process, so that their different interests should be always considered. The first step in this phase is defined as the early requirements analysis. The focus of the business actors herein is to determine if the idea is economically feasible and interesting in term of investment, amortization of the costs, revenue-sharing, profit, time, image, reputation, contact, etc… A market simulation will help answering these questions. The result of this step will be the expression of a clear "Go or No Go" statement for the participation of the concerned business actors.

On the other hand, the technical actors will size the technical aspects of the service idea such as performance (Network, Equipment, Content, Device, and Software) of the system/infrastructures on which the service will be built, taking into account some major characteristics as value added, interoperability, etc… A service simulation based on various technical parameters will also help these actors to decide about the technical feasibility of the intended aim.

This step will end with some negotiations so that the business and technical requirements will be in agreement. This will lead to the writing of a service requirements definition paper. The next step will start under the name of requirement refinement concretizing the preparatory work through the signing of different contracts for financing, managing, developing and coordinating the activities. Furthermore, the result of the system and infrastructures analyse will be specified under a functional and system requirement definition paper.

Design

The design phase receives its input from the requirements defined in the analysis phase. These requirements serve as basis for the design of the formal service model which will be obtained at the end of this phase. The analysis phase, through its requirements has expressed the will of building a telecommunication service based on specific network, equipment, device, content, software and dealing with the point of view of the customer who expressed it through a list of the 7 key success factors. The actor playing the role of the service provider is guarantor of the respect of these considerations by the design. Each actor responsible for the provisioning of a mentioned infrastructure above will play his role by providing a formal model designing its part.

In a later stage, the different inputs will be put together, leading to an architecture describing the interactions between the different infrastructures as well as the service operation, management, accounting, etc…, with links to the corresponding micro-scheme detailing specifically the interfaces and internal functionalities.

The obtained model will undergo a QoS-check at this step to verify its conformity with the functional and system requirements of the intended service.

Implementation

Each actor assuming his role will assure the implementation of his part. The agreement reached by the design phase and settle through a system formal model will serve as basis for the implementation. It means that the micro-models will be realized taking into account the global model requirements for example value added, interoperability, etc., so that the puzzle will be easy to reconstruct in a later phase. The service provider will continue to assure the respect of the customer viewpoints.

As for the two previous phases the last step will deal with the integration of the different developed infrastructures, leading to the complete new telecommunication service. At this point, the whole system will undergo a complete test in which the functionality, the robustness, scalability, security, management, QoS, etc., will be checked. A re-engineering phase will be started if some exceptions, failures or infraction on one of the 7 key success factors are found. This will readjust the system and prepare it for the deployment.

Deployment

At this phase, the technical actors are installing the developed system and are configuring the different micro-systems for the provisioning of the new service; the business actors are preparing the entrance of the new service into the telecommunication market. A method providing well-defined instructions will give advises during the process so that all the elements playing a major or minor role in the service provisioning will be considered. These refinements will lead to the entrance of the new service into the market. Now it is time for the service provider to provide the beloved service and for the other actors to assure that their tasks in the deployment are well done. During the operation, the system has to be managed. The Service Provider and Content Provider may want to install new patches or to replace an outdated service by a newer version. A maintenance method assisted by suitable guidelines and tools will allow this feature. Furthermore, analysis methods are required for the operation phase in order to detect and forecast shortcomings that may emerge due to a changed environment, high numbers of satisfied customers, or changes in societal conditions.

7. Approach

Ähnlich wie ODp; Rollem and Views, Interaktionen.

Analysis

On the business side, different perspective needs to be taken into account for each phase. Four perspectives, the customer, the employee, the business process and partner, and the finance perspective have to be considered.

In the customer perspective during analysis, the service characteristics need to be evaluated. Herein, usability, content, privacy, security, pricing, QoS, and interoperability issues have to be designed. The end-users awareness and satisfaction and possible impacts on the firm's image and reputation are other factors. In the employee perspective, necessary education and training, impacts on general motivation (e.g. capacity for teamwork, ideas)

and informal structures are key issues. The business process and partners perspective has to deal with the market, possible competition, and conflicts. Partnerships and alliances need to be planned. Questions of product portfolio, the planned product lifecycle, possible branding and pricing issues have to be solved. Finally, problems of regulation, standardization, and legal issues have to be taken into account. In the finance perspective, the cash-to-cash cycle, a break-even analysis, the investment decision, and the planned profit (EBITA, ARPU) among others have to be considered.

In the all phases we aim at assisting the developer while he is developing the service. During analysis he will identify, collect, organize, and represent the relevant information in the service to come. He will have to analyze existing systems (esp. their weak points) their development histories, knowledge captured from domain experts, consider commonalities and differences of the services and the new one, and represent this understanding in a useful way. The outcome of the analysis phase must be communicated to the connected roles and the overall model must be adjusted by the affected participants. The methodology could help to find the required information according to the role an actor is playing by applying appropriate domain specific methodologies plus an additional guidance for the service as a whole.

Design

In the customer perspective during the design phase, the customer awareness and satisfaction, customer relationship impacts (e.g. reachablity, transparency, time of reaction), and an extensive public relation strategy have to be considered. In terms of employees' perspective, their satisfaction, loyalty, and productivity have to be considered. Readiness for marketing, time to market, competitive advantage, and relationships among market player have to be designed in the business process and partner perspective. Finally, the finance perspective has to deal with the planned return on Investment (ROI) and needs to check the analysis results.

In design phase the developer will take the products of the analysis and design the overall architecture of the service system, its sub-systems, and interfaces. We propose the study of design reuse and generic architectures (i.e. serviceware framework) to shorten this process and to concentrate on the service itself. The methodology will aid the process of designing the missing artefacts and combination of role specific design models represented in a number of domain specific notations.

Implementation

In the customer perspective during the implementation phase, end-users awareness and satisfaction needs to be monitored. The public relation and marketing roll out takes places. Employees' satisfaction, loyalty (Fluctuation), and productivity have to reviewed and studied. Concrete negotiation with potential partners will be held and contracts will be signed. Reference-points and clear revenue-sharing-models have to be designed. At the end, a complete business model needs to be issued. Financial plans and forecasts have to be permanently checked.

In near future we will be using serviceware frameworks for implementing services. The service engineering will concentrate on constructing reusable components, configuring the framework to the proposed environment, combining the necessary parts and elaborated testing. Our goal is to provide the developer with a number of tools which help him efficiently and fast building the service out of components according to his role during service development.

Deployment

During the last phase, each perspective needs to be reviewed and if necessary adapted. In the customers perspective, the reached customer awareness, satisfaction, loyalty, retention, new customer acquisition, and the profitability (ARPU) need to be measured. The market share and power and the pricing strategy have to be adapted. In terms of employees, the reached satisfaction, loyalty, and productivity have to be studied. An image review, product lifecycle and branding control, and observation of the actual reference point and revenue-sharing model are focused in the business process and partners perspective. The real cash-to-cash cycle, turnover, cash-flow, and the ROI, among a solid break-even review, need to be undertaken.

During deployment phase we will address the release and maintenance of the running service system with a bunch of monitoring, controlling, and management methods and tools. It is especially important to measure the customer's satisfaction and communicate the results to all actors. In case of dissatisfaction we will propose a number of methods to adapt the service system to changing requirements. We also aim at guidance through the processes of monitoring and evaluating related service systems, legislature, and advancing technologies to keep the service provisioning system state-of-the-art and satisfying to all involved actors.

8. Summary

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