Service Engineering and Management for Wireless Authentication
Narasimha R Gujja

Abstract

This paper will explore service engineering and service management in the perspective of software development.

Service engineering looks at development, design, and production of services and aims at improving the efficiency and quality of the service as well as its delivery. Service management is concerned with the specification, implementation and evaluation of services, and related processes. Service management helps to improve service levels, overall employee productivity, and enforce service level agreements and is highly dependant on the type of business.

To better understand this aspect, the technology providing wireless network authentication is taken as an example.

Throughout this paper various aspects of service engineering and management will be explained referring to the on going research on wireless network authentication.

Introduction

Software engineering’s goal will always try to produce quality software, delivered on time, within budget and importantly satisfying customer’s need. During the software development various aspects come into picture, among them service engineering and service management is an important one, especially in the areas of service creation or product development and delivery.

Service management is a hot topic in the research community for the last couple of years [1]. Due to complexity of these services, they are not implemented typically be a single person, instead this is a collaboration work [1]. In this paper some aspects of service management will be explained with an example and show how important this is for the software development.

The focus of service engineering process is to have a consistency of performance in the development of software. Designing, implementing and installing systems which include hardware, software and people will typically sum up the system engineering approach in the context of software development [5]. Service engineering requires a great deal of cooperation among the software developers and with the customers. Systems must be designed to last many years in a changing environment [5]. This is important especially because the proportion of software in the systems is increasing and the problems in the systems engineering are similar in software engineering [5]. Therefore it’s important to
consider the service engineering in the aspect of software development process because of growing interest and collaboration between these two.

This paper is arranged in the following manner: at first the service management is dealt with in section 1, later in section 2 service engineering will be dealt. Since service management and service engineering can be best explained with an example, we discuss an ongoing research of wireless authentication as an example and in this various service management and service engineering aspects will be covered, this will be dealt in section 3; finally we will have a conclusion of this paper.

1. Service Management

Service maintenance is one of the most important and costly issues today in software development [4]. Service maintenance involves information updates and content management, navigation management, version management and service migration [4]. Typically management of services is an integral part of the service itself [1].

An inherent characteristic of every service is that it involves two major players: namely service provider and customer. These two entities interact to accomplish a service [1]. Therefore it is important that there is a proper understanding between these two parties.

Some methods [2] propose integrates the analysis of business process and the design and implementation of systems. There are some methodological guidelines discussed in [2] namely:

- Use-case model should be used for external functionality of service management.
- The UML notation should be used both internally among stakeholders and externally with the software developers.
- Reusable software and documentation should be specified at the beginning.

In [2] a business requirement model is proposed which helps in identifying the requirements in complex multi-domain situations.

![Fig 1 Business requirement model (source [2])]
The two main entities of this model are explained below:

**The business process model:** This represents the process required to conduct to perform the business functions and the information flow that may pass between business process and the users.

**The business system model:** This model defines the organization, business role, and responsibility and service management systems [2].

This resulted in a service model describing the relation between the customer and service provider.

2. Service Engineering

Service engineering plays an important role in software development today, due to increase of deployment of software in almost all development process. That is why it is important to understand the implication of service engineering in the software development. There are some important features when dealing with systems some of them are:

1. Systems are not independent, but exist in an environment [5].
2. Environment affects the functioning of the system [5].
3. Involves engineers from different disciplines who must work together [5].

Typically service engineering will begin with analyzing the requirements, defining customer architecture, optimize or evaluate alternatives, verifying the system [6].

For all this methods various tools are available namely; visual modeling, use-case analysis, high level analysis, analysis refinement etc.

To better understand below is a typical service engineering process:

![Fig 2 Typical Service engineering (source [5])](source.png)
3. Wireless Authentication

So far we have discussed service management and service engineering their various processes and how they are helpful for the overall software development. Now we will discuss the above processes with an example namely in the wireless authentication.

Before talking about the aspects of service engineering and service management in this aspect, first let’s understand the technology behind it.

The tools and software required for this will be:

- **RADIUS**: Remote Authentication for Dial-in User Service.
- **Access Point**
- **Wireless card enable tablet PC (or laptop)**.

The wireless architecture typically looks like the following figure:

![fig 3 wireless authentication architecture](image)

**Fig 3 Wireless Authentication Architecture**

The above architecture depicts a WLAN authentication model, though all WLAN may not reflect this, this can be considered a standard method. Before discussing further let us discuss the various software and tools in detail.

**LDAP**: LDAP stands for Lightweight Directory Access Protocol, is a protocol for accessing directories. LDAP is based on the standards within the X.500 standard.

**RADIUS**: RADIUS stands for Remote Authentication for Dial-in User Service, an accounting, authentication used by many ISP’s.
Access Point: This is a hardware device that acts as communication hub for users of a wireless device to connect to wire LAN.

Our scenario is that a customer employs a service provider to establish a WLAN. Here we will discuss why the above discussed service engineering and service management will be important. A typical customer specification may provide the following:

- Access control list for all the users in the WLAN.
- Accounting details on each user.
- User integrating policy described firmly.
- To Use the existing technology rather to re-build it all.
- Allow Future expansion.

If the service provider does not practice the service engineering and service management, there could be delay in the project and may result in customer dissatisfaction. The possible clashes with the customer may as follows:

- Providing access to all wireless network cards.
- Irregularities in the accounting.
- False integrity check.
- Starting from scratch.
- Not providing enough room for future expansion.

To overcome the above mentioned clashes with the customer, following measures can be employed:

- Better communication between the client and service provider.
- Involving the client in each step of software development.
- Take the initiative.
- Customer satisfaction is key.

**Conclusion**

This paper discussed the importance of service engineering and service management, explaining the processes of each aspect. Wireless authentication example was given to depict a scenario where such aspects come into picture and how they will affect in the overall software development. It was showed that without practicing service engineering and service management, it is most likely that the service provider will not be able to deliver a quality product. In order to better understand the customer needs, low cost, and customer satisfaction it is suggested to practice the above aspects.

**Reference:**
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