Abstract. Information systems ranging over wide areas show properties that must be carefully analysed and designed in order to meet the needs of the customers. Thus the development of such information systems is to be guided by software engineering methods that address problems like distribution of data and processes, communication aspects and fault tolerance.

This paper shows the basic modelling concepts and the development process employed by the BOS-Engineering Method to meet these requirements. The BOS-Engineering Method applies the concept of business transactions to specify behaviour in the early analysis phase. Appropriate abstraction levels are defined to reduce the complexity of specifying distribution issues.

The development of complex distributed information systems needs a rigorous life cycle model. The BOS-Engineering Method relaxes the waterfall life cycle model to allow controlled look ahead and feedback up and down the abstraction levels.

Keywords: Distributed Information Systems, Requirements Analysis, Requirements Engineering Method, Business Modelling, Development Process

1 Introduction

Developing distributed information systems in a systematic, cost-effective way is the challenge for the software engineering community during this decade. The technology for appropriate hardware and system software is available. But stringent methods for developing distributed information systems are not.

There is a rapidly increasing desire for information systems which range over wide areas. The common European market demands for systems allowing Europe wide exchange and administration of information, e.g. EURES (European employment information system) and EDIS (Electronic data interchange for the social domain). Trends towards common markets can also be observed on the Asian and the American continent.

Each of the information systems needed in this application area consists of a considerable number of cooperating data processing systems. Currently island solutions are connected by ad-hoc approaches. But methods are needed that support the comprehensive planning and
construction of distributed information systems. An examination of well established systems engineering methods as Structured Analysis [Yourdon 89], SSADM [SSADM 90] or Merise [Tardieu et al. 89] reveals that all are targeted to the construction of centralized information systems. Neither takes into account distribution aspects like communication, locality of data and processes.

The work in [ABR 92] has shown that geographically distributed information systems have properties that must be addressed already on a high level of abstraction early in the development process. The requirement for fault tolerance, for example, makes the analysis and design of robustness and consistency inevitable.

The European Methodology & System Center - a joint initiative of the companies Bull, Olivetti and Siemens-Nixdorf - developed the BOS-Engineering Method to support the development of trans-european information systems. This paper presents the basic concepts of the BOS-Engineering Method that allows to model and develop geographically wide distributed information systems.

The BOS-Engineering Method roots in a harmonization and extension of the software engineering methods Merise/Omega from Bull, MOiS from Olivetti and GRAPES®/Domino® from Siemens Nixdorf. It enhances these methods by additional concepts that capture distribution issues and track them through the levels of abstraction.

This paper introduces basic notions of distributed information systems engineering. It presents their use to describe information systems on appropriate levels of abstraction. Also a case is made for structuring the engineering process according to a relaxed waterfall model. The conclusion summarizes the contributions of the paper.

For illustration we use throughout the paper parts of a project in which the BOS-Engineering Method was used to model a car rental company with many rental stations. The main business of the company is to let cars. Car acquirement and sale were also covered by the project.

2 Concepts of the BOS-Engineering Method

The basis of every systems engineering method is the precise definition of the concepts the system analysts and designers have to deal with. The concepts of the BOS-Engineering Method are related to real world terms but are used throughout this paper with their defined meaning. We give here a short overview to make the presentation self-contained, a complete glossary can be found in [BBPU 92].

2.1 Information System

The BOS-Engineering Method considers an information system as a system that steers the execution of enterprise services and keeps track of services the enterprise relies on. Similar to Structured Analysis, SSADM and Merise, information systems are considered to do event processing. Interaction with an information system is achieved by the exchange of messages. An event is the sending or receipt of a message or a defined point in time. All activities in an information system are triggered by events.