



Chapter I

Information Modeling in the Internet Age— Challenges, Issues and Research Directions

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Despite the rapid advancement of technology in the last few decades, accurate, on-time and on-budget completion of information systems development projects is still a vision rather than a reality. The software crisis is still very much alive in the new millennium as it was in the last. The sudden popularity of Internet and electronic commerce poses a new challenge to the software engineering community. With the increasing importance of electronic commerce in the beginning of the new millennium, organizations will be competing to design and develop Web-based applications. However, existing information modeling methods might not be suitable for supporting such activities. This chapter looks at some of the challenges and issues involved in engineering methods for analysis and design of Web-based information systems. It then discusses some of the research directions for information modeling in the new millennium.

INTRODUCTION

Even though research in systems analysis and design has been going on for about 40 years, successful software development is still an art rather than a science. In the 1980s, Jones (1986) observed that a typical project is one year late and 100%

over budget. Yourdon (1989) reported application backlogs of four to seven years or more. The maintenance phase typically consumes up to 70% of programming effort, and it is errors, not enhancements, that account for 40% of maintenance (Yourdon, 1989). Jones (1986) wrote: "It looks as if traditionally we spend about half our time making mistakes and the other half of our time fixing them."

IBM's Consulting Group (Jones, 1986) released the results of a survey of 24 leading companies that had developed large-scale distributed systems. The numbers were unsettling: 55% of the projects cost more than budgeted, 68% overran their schedules, and 88% had to be substantially redesigned. One high-profile failure is the \$193 million Denver Airport baggage-handling system, partially responsible for delaying the opening of the airport for 18 months at a cost of more than \$1 million a day. The Standish Group research (Jones, 1986) predicted that a staggering 31.1% of projects would be canceled before they ever get completed and 52.7% of projects would cost 189% of their original estimates. We do not expect the numbers to improve in the dawning years of the 21st century.

The latest challenge to the software engineering community is Web-based information systems development. Propelled by the popularity of Internet and electronic commerce, analyzing and designing Web-based systems will soon become the norm and a new breed of information modeling methods is needed for this purpose. Engineering information modeling methods to support Web-based applications is expected to be one of the main areas of research in next few years when companies and organizations move from designing Web pages to developing Web-based applications, and from developing intranets (i.e., intra-organization Web-based systems) and extranets (i.e., inter-organizations Web-based systems) to developing e-commerce and e-business systems. The need for suitable analysis and design methods becomes even more acute when enterprises start connecting their enterprise wide, and even industry wide, ERP and other planning systems to the Web and their Web applications.

INFORMATION MODELING AND METHOD ENGINEERING

Information modeling is concerned with the construction of computer-based, symbolic models that capture the meaning of information and organize it in ways that make it understandable and useful to people (Mylopoulos, 1997). It involves investigating the requirements of the users and organizations and building an accurate and correct requirement specification for the purpose of understanding and communicating information systems design and development processes between the various parties. Information modeling is to information systems engineers what architectural drawing is to architects. It is an indispensable component of information systems development.

To perform information modeling, modeling methods are required. Some of the popular methods include the flow chart, data flow diagram, entity-relationship approach, object-oriented approach, Jackson's method, NIAM and many others.

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