

Information Technology—Reuse Technologies and Applications

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Introduction

The previous issue of the *AT&T Technical Journal* on information technology (IT) focused on best practices in IT design and development, addressing both project management and technical areas. Reuse technologies and applications are discussed in this issue.

Reuse Technologies

The success of future IT systems development will be critically dependent on reuse technologies. As systems become larger and more complex, they will be developed with reusable components. In the paper by Cleaveland, Fertig, and Newsome in this issue, *domain engineering* is defined and an important argument is made for the organizational separation of component and product developers. This helps avoid the inevitable conflicts in development priorities. The authors advocate the use of module interconnection languages to promote the integration of components into products. In addition, they provide insights into achieving component standardization (commonalities) and parameterization (variabilities).

Kythe describes an approach to building reusable business software. Components are built by using commercial object-oriented (OO) architectures, such as the Microsoft *Component Object Model (COM)* and the Object Management Group (OMG) *Common Object Request Broker Architecture (CORBA)*. For accessing business logic and data, a transaction monitor must also be included in the architecture. To manage complexity, commercial frameworks can be used to create components for a particular industry.

Huang et al. address the important problem of robust design by introducing *software dynamics*, the study of the dynamic (execution) behavior of an IT system. They describe a platform containing a set of reusable components to support fault

tolerance. Furthermore, they define the concept of *software rejuvenation*, the process of periodically terminating an application and restarting it at a clean internal state.

Whetzel describes an innovative way of combining World Wide Web and database technologies into a framework for rapidly constructing graphical user interface (GUI)-based distributed client/server applications.

Applications

Reuse technologies are stressed in the application case studies included in this issue. Bergholm et al. describe an OO attribute design database system that can be reused and customized both easily and rapidly for diverse applications. This has been achieved through the employment of attribute and rule-based methodologies.

Carlson, Brook, and Haynes describe their experience of using distributed objects and CORBA in the implementation of a national quotation system for life insurance in the United Kingdom. It is interesting to note that the decision for using new technology was made only when it became clear that business needs could no longer be met using a more traditional approach.

In the last paper on applications, Gelman and Peck discuss a data warehouse that supports business decisions. They address the key issues of flexible viewing, data synchronization and integrity, security, and handling a very large volume of data.

While it is recognized that IT systems development includes both hardware and software components, the principal focus of this and the previous edition is *software*. Hardware issues have been codified in the science of engineering. Such codification is developing and a science of software engineering is emerging. The hope is that the technologies and applications discussed in these issues of the *AT&T Technical Journal* will add to that effort.

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