Executive Summary
The increasing complexity of today’s business and IT environments makes it more difficult for organizations to design an enterprise architecture that supports the company’s business objectives and enables the IT staff to deliver applications that align with business goals.

Integrated modeling is one of several strategies that can help organizations to better understand their business needs and design effective enterprise architectures.

This white paper describes some of the business and technical challenges that organizations currently face, the criteria that must be considered when designing or evaluating an enterprise architecture, and the benefits offered by integrated modeling. It also briefly describes the solutions that Computer Associates International, Inc. (CA) offers to address these concerns.

Growth of Business and Technical Complexities
A survey of CIOs conducted by CA revealed that all of them felt that their organizations had to deal with increased complexity, and more than a third of them indicated that the complexity was growing exponentially.

This increased complexity is being driven by many factors: new technologies; shorter application development life cycles; iterative development; more geographically distributed projects and resources; increased tool diversity; and higher risks.

These factors compound the challenges that many IT organizations face in integrating disparate business processes, enterprise applications, supply chains, data warehouses and legacy systems. In addition, business executives are placing increased emphasis on making sure that the solutions developed by IT are aligned with the business’ needs. These requirements must be met even as IT teams are being asked to improve productivity and quality.

To address these issues, IT managers, architects and designers must look beyond isolated application or database development needs. Even smaller project teams and individual developers must now devise strategies to integrate their projects into larger, enterprise-level efforts.

Without a comprehensive enterprise architecture that takes into account these new realities, IT organizations and the businesses they support might not develop the agility and adaptability demanded by changing market dynamics.

Overview of Enterprise Architecture
At a high level, enterprise architecture can be defined as “…an enterprise-wide, integrating framework which incorporates: business architecture (strategy, governance, organization, process); data/information architecture; application (systems) architecture; and technology (IT) architecture” (ISWorldNet, 1997).

With its multilevel classification schema, the Zachman Framework developed by John Zachman provides a deeper, more detailed understanding of the enterprise architecture, defining and describing the many perspectives of complex enterprise systems.

However, it’s not enough to simply understand the enterprise architecture conceptually; that conceptual understanding must be transformed into implementation.

Criteria for Successful Enterprise Architectures
Before plunging into any approach to understanding or implementing an enterprise architecture, however, it’s important to define the criteria for success and its measurement. These criteria can be categorized into three distinct but closely related levels:

- The business level
- The organizational level
- The operational level

The business level focuses on enhancing value. Is the enterprise providing the appropriate value to its customers? Are market share and shareholder value increased? Are the products and services offered leaders in the marketplace? Is the return on investment meeting requirements? Is the enterprise extending its vision and values into the industry?

At the next level, the organization is measured by efficiency. Are the enterprise’s products and services delivered to both external and internal customers in the necessary time frame? Is the use of human and technical resources optimized? Are the right skills and technologies available and deployed properly? Are project cost targets met? Are the internal operations efficient?

The operational level addresses function, performance and quality. Are the IT solutions developed to support the enterprise aligned with the enterprise’s business needs? Are the business requirements defined, understood and implemented in the solutions? Does the functional and physical design fulfill all the requirements, including capacity, performance and quality? Can the solutions be deployed and maintained at a reasonable cost?

Failures, suboptimum performance or misaligned solutions at the operational level will have...
immediate effects on the other levels. For example, a poorly designed application can adversely affect organizational efficiency, which in turn can reduce the value of services provided to customers.

To compound the problem, these adverse effects might be difficult to detect if measures to meet the success criteria are not well implemented or coordinated between the levels.

**Strategies for Effective Enterprise Architectures**

At least three strategies can have a significant impact on understanding and designing effective enterprise architectures: requirements management; life cycle management; and integrated modeling.

**Requirements Management**

A principal reason for failure in projects ranging from a single application to complex systems is an inadequate or incomplete requirements definition.

Adequate requirements management solutions can range from simple documentation for small projects to database-driven management technology that includes workflow integration with project management, change management, and test systems for complex or enterprise-level projects.

Good requirements definition is critical at the business level and especially helpful in linking the business needs to IT solutions developed at the operational level.

**Life Cycle Management**

Life cycle management is a major success factor for enterprise-level projects. All phases of successful projects — from planning and portfolio management, to project and resource planning, to monitoring and measurement of the design and implementation — benefit from a robust life cycle management infrastructure.

**Integrated Modeling**

Of the three strategies, modeling provides the methods and technology to support the visualization, understanding and design of enterprise architectures at the operational level. Integrated modeling can be used to create conceptual, logical and physical models of the enterprise that can be used to improve enterprise architecture and performance, as well as link business requirements and infrastructure management.

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5 = highest impact

*Possible impact of strategies on success*

**Describing Enterprise Architectures With Integrated Modeling**

Using integrated modeling methods and technology to understand the enterprise architecture offers significant benefits as long as the modeling methods and grammar are conceptually easy to understand and use, and are accurate and precise enough to adequately characterize the elements of the architecture. The supporting modeling technology, in turn, must support extensible information capture and analysis in addition to the basic grammar. These features are necessary so that sufficient information about the enterprise elements can be documented and processed.

Modeling can give excellent visibility to the conceptual, logical and physical elements of the enterprise. From an IT perspective, this includes the information/data within the enterprise, and how, when and where that information is used to support the business. Modeling can also be used to describe the physical components of the architecture, the roles within the organization and the operational processes. Lastly, interactions with information from legacy systems can be understood and accounted for in the architecture.

**Data Modeling**

Information is at the heart of any business. You need to know what you have and where it is. In Zachman terms, creating logical data models or reverse-engineering legacy database systems into logical data models describes the “what” of the business.

Mapping the logical data to physical databases is the first step in understanding both the logical and physical elements of the enterprise. For enterprises that include packaged enterprise resource planning (ERP) applications, these applications must also be modeled or the enterprise architecture will remain inadequately described.
Process Modeling

The next step is to describe where the information is used (both logically and physically) and how it is used. To accomplish this step successfully, it’s mandatory to understand the business processes and associate the data with those processes.

This might ultimately involve several different types of modeling: business process modeling; work flow modeling; and information flow modeling. For example, individual entities and attributes from the logical data model (such as “customer”) can be linked to both business objects (such as “credit application”) and business actions (such as “check credit”).

Benefits of Integrated Modeling

The combination of logical data models (including ERP packages and legacy systems) and process models provides a complete visualization and description of the enterprise architecture.

With this achieved, more detailed analyses can be accomplished. These might include cost analysis, gap and impact analysis, process and data design optimization, and cycle time analysis.

As business activities and their supporting IT systems become increasingly complex, it becomes even more important for organizations to develop a risk management model. A modeling approach to describing and analyzing the operational level of the organization can provide key insights into existing systems and allow executives to adequately assess the enterprise architecture before making major investments in additions or changes.

Well-designed modeling methods and technologies give business and IT architects and designers additional value by enabling process optimization. Significant reductions in operating costs can be realized because these technologies allow users to:

• Identify gaps or missing steps
• Verify that appropriate processes are in place to achieve the desired results
• Identify required resources
• Identify costs
• Verify time-to-value or cycle time
• Identify capacity
• Identify potential bottlenecks

Integrated modeling further allows organizations to:

• Identify breakdowns in process/data interactions
• Develop more effective solutions through concurrent process and data integration
• Capture and communicate business needs accurately across the enterprise
• Achieve faster time-to-market
• Improve cost management and avoidance

Integrated modeling provides an effective means for describing, analyzing and designing enterprise architectures that can reduce risk as the complexity of business activities and related IT projects increase. In fact, modeling can and should be used early in the business requirements cycle (whether for changing existing systems or implementing new systems) to provide early validation of architectural concepts to provide additional risk and cost mitigation.

CA's Solutions for Enterprise Architectures

As part of its AllFusion™ family of application life cycle management solutions, CA provides market-leading technologies in integrated data and process modeling, ERP meta data analysis and integration, and database design.

AllFusion™ Modeling Suite provides best-of-breed tools that constitute a complete modeling solution for requirements gathering, analysis, design and application development. By providing a comprehensive, well-engineered and integrated modeling environment, AllFusion Modeling Suite enables an organization’s business and technical experts to rapidly collect and objectively analyze requirements and data, effectively communicate, and successfully design solutions using sound methods based on established standards and criteria. This solution simplifies and accelerates the complex aspects of analyzing, designing and implementing an enterprise architecture.

More information about AllFusion modeling products and AllFusion life cycle management solutions can be found at ca.com/allfusion/.

Conclusion

An effective enterprise architecture is critical in helping organizations to provide value to their customers, optimize their internal resources and meet their business needs.

Requirements management, life cycle management and integrated modeling can help organizations design and implement effective enterprise architectures. Integrated modeling in particular provides the methods and technology that the operational level of the organization needs to link business requirements with data management.

The modeling solutions from CA can help organizations implement an enterprise architecture that can contribute to their business success.

For more information, call 1-800-783-7946 or visit ca.com