CIO Update: Client Issues for Software Platform Architecture

Gartner tackles the problems enterprises face when building software platforms to support new and complex applications. Changing technologies and business needs mean enterprises must continually refine their IT architectures.

Abandoning Traditional Approaches

The way enterprises design, implement and execute their applications will continue to change dramatically in response to technology like the Internet and business forces like globalization. Enterprises are abandoning traditional, monolithic, technically homogeneous approaches that are based on synchronous communication models and focused on a single user type. Instead, they are adopting more service-oriented, heterogeneous, event-driven and multichannel-oriented patterns.

What the Future Holds

Applications will increasingly be “composites,” implemented by combining new developments and existing systems, and by linking business components — often referred to as “services” — that run on multiple systems.

Business strategies, like business process fusion, zero latency, the real-time enterprise and straight-through processing, will encourage developers to use event-driven design patterns. Event-driven applications will interoperate through the real-time exchange of asynchronous messages. Those applications may be limited to a single company or linked to systems operated by business partners, customers and outsourcers.

Applications will be designed to serve different users — office-based clerks, knowledge workers, business travelers, self-service users, occasional Internet users and external contractors. Each type of user operates differently and will access applications through a variety of stationary and mobile devices, and wired and wireless networks.

Those new business process styles will enable companies to be more efficient, responsive and agile. But they will also force difficult and risky organizational and technological changes. Emerging
business process styles will dramatically affect the architecture of the software platforms that underpin application systems.

**Why Is Architecture Relevant for Software Platforms?**

Gartner defines IT architecture as “The grand design or overall concept employed in creating a system ... an abstraction or design of a system, its structure, components and how they interrelate.” Specifically, it is “A family of guidelines (concepts, principles, rules, patterns, interfaces and standards) to use when building a new IT capability.”

When implementing an application, developers must design the structure of the associated software platform to fit predefined, reusable design templates like three-tier client/server, thin client or service-oriented architecture (SOA). Developers have to select middleware components that fit the chosen design pattern. The implementation of a new application means defining the architecture of its software platform in terms of the middleware components needed and their relationship.

The goal is to define a middleware-based platform capable of supporting business and technical requirements effectively. Business requirements may include flexibility, multichannel access, real-time notification of business events and business-to-business (B2B) interactions with partners. Technical requirements may include performance, scalability, reliability, security, integration with established applications, ease of deployment, low cost and compatibility with existing technology. Multiple choices are possible, but the architecture must obey well-defined, yet flexible, concepts if it is to be easy to maintain and develop, and prove to be a good investment.

Every enterprise defines its software platform architecture. Architectures should incorporate industry best practices and proven products, to minimize risk and cost, and advanced technologies, to support business innovation.

Enterprises often implement software platforms without following rigorous architectural guidelines. The result is a chaotic assembly of communication middleware, application platforms, integration technology, B2B gateways and protocols, user interface technology, and other elements. A badly defined structure will have no clear separation between the component parts. This makes management of applications harder, and compromises security, reliability, scalability and performance. Application elements will rarely be reusable.

Enterprises will have to develop their software platforms to support innovative technologies and enable emerging business process styles to exist alongside traditional approaches. The software platform must provide applications with a reliable, secure, manageable and efficient runtime environment that developers can access effectively through powerful and easy-to-understand interfaces.

**Expect Changes**

Classic approaches can be a starting point, but won’t work in the new environment. The days when technical uniformity and large mainframes were sufficient for every new application are long gone. Two-tier client/server setups cannot enable multichannel applications. Even three-tier architectures with thin clients and Web browsers are often too weak to support event-driven design.
New architectural concepts for software platforms will emerge through the combination of well-established and new approaches, including Web services, mobile and wireless computing, event management, multienterprise grids, and B2B integration. They will combine with lessons learned from leading-edge enterprises, like use of multitier client/server, composite applications, SOAs, integration brokers, operational data stores and data warehouses.

Gartner’s research agenda will help enterprises identify emerging application topologies and refine their software platform architecture by investigating those ongoing changes through the following client issues.

**How will business and technology trends affect enterprises’ software platform strategy?**

Enterprise software platforms will be under constant pressure to change, to cope with evolving business requirements and to incorporate new technologies. Companies must recognize the next wave of innovation early if they are to be ready for it. Separating the hype from the useful trends will allow companies to avoid wasting time in useless software platform redesign endeavors. Gartner will examine emerging business and technology trends and help customers understand which ones are relevant to them.

**How will enterprises take advantage of emerging software platform architectures to drive business innovation?**

Software platforms should be designed to fulfil a company’s business goals, not the other way around. Technical advances and emerging architectural patterns can inspire business innovation, if business leaders understand the technology. Gartner will continue to investigate how emerging architectural patterns and platform technologies can help companies implement fresh business strategies.

**Which software platform architectures will prevail, and which will fail to gain industry support?**

Several architectural models, like SOAs, event-driven and multichannel patterns, Web services, composite applications and thin clients, have emerged since 1998. Developments in technology will trigger the appearance of more. Some architectures, like client/server technology in the 1980s and Web architecture in the 1990s, revolutionize the industry. Others fail or are relegated to niche status. Gartner will track emerging architectural models and advise companies how viable and widely adopted they are.

**How will enterprises manage the benefits and the pitfalls of composite applications, service-oriented, event-driven, multichannel, operational data store, business-to-business integration and other emerging software platform architectures?**

No architectural model is inherently bad or good — each has its costs and benefits. Companies need to understand if and when the advantages of a given model outstrip its drawbacks. Architectural approaches for specific applications must meet the company’s requirements like return on investment, time to market, expected life span, flexibility, integration with established systems, reliability, scalability, performance, security and support for diverse access devices. Gartner will continue to evaluate the advantages and disadvantages of software platform architectures and advise clients when to adopt what, based on a variety of industry requirements.
How will event-driven design change business strategies, application systems and software technology?

Event-driven business processes and application systems help enterprises sense and respond quickly and precisely to rapidly changing conditions. Business strategies like the zero-latency, real-time or event-driven enterprise and business process fusion cannot be fully realized without event-driven design.

Events have been widely used in system software, like operating systems and network and system management tools. But events have not been used extensively in business applications, partly because developers are unfamiliar with them. Adoption of event-driven processes is a business decision that affects a company’s enterprise software platform. Gartner will investigate how event-driven business strategies can be implemented with underlying event-driven application systems and software platforms.

How will service-oriented architecture and Web services affect enterprises’ and vendors’ software platform strategies?

Because of the popularity of Web services, SOA is quickly becoming a mainstream practice. But SOA is a set of architectural guidelines. It is not associated with any one technology, and Web services can be used to support design patterns other than SOA. Gartner will continue to investigate the benefits, drawbacks and best practices of SOA, its relationship with Web services technology and its impact on the software industry.

How will business-to-business strategies be affected by emerging software platform architectures?

Companies will continue to establish closer relations with their customers, partners and suppliers. Their software platforms must be designed to accommodate collaborative, B2B processes. Gartner will analyze major B2B trends and will help customers identify architectural structures and associated technologies that can lead to effective collaboration with their partners.

Which technologies will enterprises strategically adopt to implement their software platform?

The software platform technology market is far from mature. The latest innovative technologies are promoted as enabling easier integration, quicker development, faster performances, greater scalability and offering lower costs. Most new technologies are still solutions looking for problems. Gartner will help companies monitor new software platform technologies and understand the role they will play.

How will ongoing standardization efforts affect the software platform strategies of enterprises, independent software vendors and service providers?

Successful standards, such as SQL, TCP/IP, HTTP/HTML, XML and Java, have had a profound impact on company strategies. They have presented new opportunities and threats to independent software vendors and service providers. Some of the standards emerging in areas like B2B protocols, Web services, mobile and wireless, and agents will dramatically transform the market.
Others will turn out to be irrelevant. Gartner will advise clients on the impact of the key standards initiatives, helping customers to prepare for the most-crucial software platform standards.

**How will vendors react to changes in software platform architectures?**

The advent of distributed systems, client/server and Web architecture created turmoil in the software platform market. Leading vendors went into decline and new leaders emerged. History will repeat itself as new architectural structures appear — some of the established vendors will falter, and some newcomers will thrive. Gartner will monitor the rise and fall of vendors in the market, and their strategies, and will advise companies which vendors we expect to succeed.

**What will be the critical success factors and the main risks that enterprises will encounter while implementing an effective and enduring software platform architecture?**

A successful software infrastructure project depends on a variety of factors: technology, organization, tools and vendors. Companies can learn from the experience of leading-edge enterprises. Gartner will share its findings about best practices and help companies adopt low-risk, high-return strategies for software platform architecture design and implementation.

Technology changes have repeatedly disrupted the enterprise software platform market. New architectural guidelines, built on the lessons learned in the past, will slowly emerge to help enterprises redefine their software platform architecture. But companies will not be able to settle on a stable software platform through 2008 because of relentless change in technology, business process styles and business requirements. Gartner’s research on software platform architectures will help companies minimize risks and optimize investments. It will identify key technology trends, the best practices to adopt and strategic moves by vendors.

Written by Edward Younker, Research Products

Analytical source: Massimo Pezzini, Gartner Research

For related Inside Gartner articles, see:

- “CIO Update: Client Issues for Application Platform Decisions,” (IGG-11122003-01)
- “CIO Update: A Look at What’s Ahead in Servers for Transaction Processing,” (IGG-06182003-01)