

Predicts 2003: SOA Is Changing Software

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Service-oriented architectures and Web services are becoming mainstream. This will affect application design, many types of software products and even the nature of business-to-business value-added networks.

ANALYSIS

The state of the art in software will evolve markedly in 2003. Innovation and technical progress march on, even though the revenue growth of most software vendors was slowed by poor sales results in 2001 and 2002. Regardless of whether the rate of new IS development projects returns to the high activity levels of the late 1990s and 2000, new software technology will be brought to market, products will be repackaged and repositioned, and new standards — particularly Web services — will begin to mature. All these factors will help foster a new, more agile and efficient generation of application systems. As enterprises shift their buying habits, a new set of winners and losers is emerging among software vendors.

Service-Oriented Architecture Grows in Popularity

The single, most-important theme in modern application development is service-oriented architecture (SOA). SOA applications are built using two or more software tiers. The user-facing, or "presentation," tier is separated from the back-end, business logic tiers. The latter are composed of business components: coarse-grained chunks of business logic that provide services to client programs that are in the presentation tier or in a business logic tier. The business logic tier may include business process management (BPM) software that orchestrates a sequence of steps implemented by the business components. SOA works well with three-tier or multitier client/server topologies, but it is not the architecture used in common thick-client, two-tier client/server architectures (such applications combine presentation and business logic in the client, using the server only for data access logic).

SOA components leverage two important design principles:

- Modularity — dividing big problems into smaller problems
- Encapsulation — hiding the data and logic in each module (or "black box") from uncontrolled external access

Client and server modules communicate with each other only through documented interface "contracts." Encapsulation helps protect data and code in the components from careless or malicious misuse. It also shields external developers from having to understand the internals of a module they are leveraging.

SOA clarifies design, makes it easier for large or geographically distributed development teams to work together, and enables software reuse because modules can be reconfigured and tailored in new ways to meet new purposes. SOA uses some of the same principles as object-oriented (OO) programming, but does not use the OO concept of implementation inheritance, so it is not the same as OO. SOA can be implemented with OO programs or non-OO programs.

Limited Use in 1980s: SOA is not a new concept. Computer scientists understood its principles by the mid-1980s when distributed computing and remote procedure calls came to market. However, its use during the 1980s and 1990s was limited to leading-edge projects whose architects had the vision, discipline and money to invest in the initial stages of application development, knowing they would later reap SOA's rewards of scalability, agility and reuse.

There was no standard middleware infrastructure, or even a standard application programming interface and protocol for SOA interfaces, despite attempts like the Open Software Foundation's (OSF's) Distributed Computing Environment (DCE) and the Object Management Group's (OMG's) Common Object Request Broker Architecture (CORBA) to provide such standards. SOA-enabling development tools and runtime middleware based on DCE and CORBA did not achieve universal

usage, despite successes in particular projects and even within entire industry sectors (for example, CORBA in telecommunications).

Entering the Mainstream in 2003: SOA is finally entering the enterprise mainstream (see "Predicts 2003: SOA Comes of Age via Web Services"). Several factors are enabling this change, including:

- The unrelenting pressure from business units for agility. When a business wants to modify its processes, products or services, it cannot afford to wait for long IS development cycles. It must be possible to change the way application systems work by simply altering the components that are already in use, rather than buying or coding new components or whole systems from scratch.
- The flexibility of SOA-based Web services to support multichannel applications that span Internet, extraNet, voice, mobile and other access methods.
- The unanimous vendor acceptance of Web services standards, especially the basic Simple Object Access Protocol (SOAP) and Web Services Description Language (WSDL) specifications. Unlike CORBA and DCE, Web services standards have no naysayers among vendors. Rather, vendors invested heavily in Web services in 2001 and 2002, even before mainstream buyers were ready to use them. Web service standards are — so far, at least — narrower in scope than CORBA or even DCE, which has helped make them widely acceptable to many vendors. The ability of SOAP to cross firewall boundaries, leveraging the ubiquitous HTTP, has also encouraged the acceptance of Web services.

Although Web services standards have significant limitations, they are better for SOA purposes than any previous offerings. Most new SOA application sets will use Web services for at least some of their internal interfaces, and most enterprise-scale applications with long expected life spans will be built using SOA.

The increased importance of SOA ensures that Web services will be widely used, affecting virtually all types of development tools and runtime middleware. Web services are but one of several factors affecting middleware markets, but they are the common link across many of them.

Application Servers Add Web Services Support

Application servers, the platform middleware products that host business application logic, are adding Web services support. Despite agreement at the Web services level, there remains a fundamental battle between Java 2 Platform, Enterprise Edition (J2EE) application server vendors and Microsoft, with its .NET initiative, for the remaining application server features. J2EE standards are nearing maturity, but major aspects of application servers will remain proprietary. The battle lines and standards are shifting in this core technology area (see "Predicts 2003: SOA to Stir Up Application Server Market").

The Increasing Importance of Enterprise Service Buses

Several new variations of infrastructure middleware, including enterprise service buses (ESBs), Web services brokers, XML routers and Web services networks (WSNs), are coming to market to support Web services and other, complementary, communication mechanisms (see "Predicts 2003: Enterprise Service Buses Emerge"). ESBs combine Web services and message-oriented middleware (MOM), supplemented with a bit of transformation and routing intelligence from the world of the integration broker suites. Web services, which initially ran mostly on HTTP, will increasingly run over MOM, SMTP, instant messaging and other protocols. More than half of large enterprises will adopt ESBs by 2006, to enable the interactions that must span the

boundaries of heterogeneous application servers and independently designed application systems when one application server is insufficient.

The Integration Broker Market Shakes Out

Integration broker suites, which comprise a market about equal in size to that of the application servers, are undergoing a market shakeout. The major software generalists, particularly IBM and Microsoft, are leveraging their overall size and strength to increase their penetration of this historically highly fragmented market. Enterprises are struggling to maintain architectural sanity, while being pressured to introduce multiple integration brokers, each tied to a different application server, packaged application, development tool or integration suite. The solution Gartner recommends is for enterprises to implement an integration competency center to coordinate their integration and Web services efforts (see "IBS Market 2003: No Tsunami, but Several Smaller Waves").

Business Process Management Tools Increase Agility

To extract the maximum business value from the new generation of application servers, ESBs and integration brokers, enterprises will increasingly use BPM tools. The point is agility — that is, to orchestrate the life cycle of a business process without having to "hard code" the flow rules in rigid third-generation (3G) language logic. Like SOA, BPM emerged in the 1980s, but it is only now on its way to mainstream use, enabled partly by Web services and other advances. The technologies of rules engines and BPM tools are being combined to get the benefits of both (see "Agile Process Integration Is Emerging in BPM").

Value-Added Networks: Not Just for EDI Anymore

The Internet, and now Web services standards, are continuing to affect business-to-business (B2B) communication among trading partners (see "In 2003, VANs Will Support EDI Through Web Services"). The workhorse electronic data interchange (EDI) value-added networks (VANs) that process millions of transactions and billions of dollars of business daily are evolving rapidly because of the addition of new data formats and protocols, such as Web services. Just as Web services are becoming a ubiquitous feature of software products, so they will become ubiquitous in B2B VANs.

Business Activity Monitoring: From Leading-Edge to Mainstream

Technology advances in many areas, including application integration, application servers, BPM products and event management software, will fuel the growth of business activity monitoring (BAM). BAM is a leading-edge business practice, used today in particular areas of a limited number of industries to monitor call center operations, enhance financial or energy trading, improve airline operations and facilitate other high-impact, real-time business processes.

The major growth of BAM spending will not ramp up until 2004, but vendors of many different kinds of software must invest during 2003 to develop the features they will need to participate in this important trend. The small, pioneering BAM specialists will struggle to stay alive during the next several tumultuous years, but major rewards await the more-adroit of these pioneers (see "Predicts 2003: Business Activity Monitoring Growing Pains"). User enterprises in virtually all industries should expect to implement BAM solutions in certain areas of their operations, sometime within our five-year planning horizon.

Overall, the rate of change in software shows no signs of abating. During 2003, we will experience another year of change and opportunity, along with some confusion and disappointment. Expect Web services to be the most-discussed single theme, but prepare for significant evolution in many other aspects of enterprise software architecture, too.

Features

"Predicts 2003: SOA Comes of Age via Web Services" — Service-oriented architecture will drive value through agility, especially in multichannel business strategies. **By Massimo Pezzini and Yefim Natis**

"Predicts 2003: SOA to Stir Up Application Server Market" — Making the transition to a service-oriented architecture will dominate the agendas of vendors and users. **By Yefim Natis and Massimo Pezzini**

"Predicts 2003: Enterprise Service Buses Emerge" — The enterprise service bus joins the range of technologies that enterprises can use as the enterprise-nervous-system backbone. **By Roy Schulte**

"IBS Market 2003: No Tsunami, but Several Smaller Waves" — Integration broker suites will continue to deliver value, but sourcing integration broker technologies will become more complex. **By Jess Thompson and Benoit Lheureux**

"Agile Process Integration Is Emerging in BPM" — Business process management is pursuing business rules engine technology and building on a proven track record of return on investment. **By Jim Sinur**

"In 2003, VANs Will Support EDI Through Web Services" — Enterprises that want to outsource their non-electronic-data-interchange business-to-business operations have new options. **By Benoit Lheureux and Frank Kenney**

"Predicts 2003: Business Activity Monitoring Growing Pains" — Business activity monitoring requirements indicate that vendors are in for a busy 2003. **By Roy Schulte and David McCoy**

This research is part of a set of related research pieces. See "Predicts 2003: Application Integration and Middleware" for an overview.

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