

Predicts 2004: Application Integration and Middleware

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Application integration will continue to define the agenda of innovation and drive the evolution of application infrastructure and middleware products.

ANALYSIS

Application integration remains one of the core drivers of innovation in the software industry. Monolithic, isolated application stovepipes are being left behind. New systems are partitioned, distributed, integrated and designed to be integrated. Yet, the new world of coexistence and cooperation of independent yet interdependent application systems carries its own risks and challenges. Driven by technology enthusiasm and the desire to explore new opportunities, the industry has brought itself to the point of confusion, proliferation of redundant technologies, ever-growing assemblies of software tools and rapidly escalating complexity. Reducing complexity will be imperative to the software industry if it is to avoid massive setbacks and user revolts. Gartner predicts that the next round of new enterprise tooling will arrive under the banner of reducing the complexity of software engineering, deployment and maintenance. We believe that complexity can — and indeed will — be gradually reduced by way of consolidation and pruning of the many redundant and overlapping products and product types. However, we also believe that, despite simpler-to-use environments, the engineering of complex systems will continue to require advanced competence on the part of IT architects. Unnecessary complexity will be reduced, but the demand for engineering competence in design, development and maintenance of complex systems will increase.

Prediction — Messaging will emerge as the strategic middleware model for software projects, transcend the limitations of Web services, and create synergy between services and events.

Messaging middleware has been used for large-scale system software projects for decades. The fastest and the most scalable transaction-processing platforms on mainframes (IBM's TPF and IMS) and on Unix (BEA Systems' Tuxedo) are all based fundamentally on a messaging communication model. The alternative to a messaging model is remote procedure calls (RPCs). Ever since the introduction of Distributed Computing Environment (DCE), the RPC model has dominated modern platform middleware products. Java Remote Method Invocation (RMI) and Microsoft .NET Remoting are both based on the RPC model, inspired by the DCE RPC. As distributed platforms are deployed for larger-scale and more mission-critical applications, the limited scalability and manageability of the RPC model become more apparent. As application integration becomes a common element of mission-critical software projects, the tight coupling of the RPC middleware becomes a problem. Gartner predicts that IBM, Microsoft and most of the other large software infrastructure vendors will update their platform technology to move a messaging transport to the core of their technology stacks.

Called to larger tasks, the messaging technology itself will continue to evolve. Gartner predicts that the traditional message-queuing middleware will be replaced by an enterprise service bus (ESB) technology. ESB will take messaging to the next level. The new ESB backbone, which will enable the next generation of integration and application platform products, will bring radical improvements to the software infrastructure of most enterprises. In addition to simply improving the manageability and throughput of enterprise intersystem information traffic, the new ESB-based platforms will include support for such fundamentals as multiprotocol service-oriented architecture (transcending the current quality of service limitations of Web services), event-driven architecture, coordinated systems management, business activity monitoring and other high-level enterprise-scope expansions to the quality of service of modern IT. More than any other technological advance, the transition of the core application platform infrastructure from RPC-based to ESB-based will enable enterprises to take a major step toward routine real-time-enterprise agility in their information processing.

Gartner predicts that the industry transition to messaging and ESB as the core application platform infrastructure model will mark an inflection point — triggering a new, massive wave of

innovation around businesses' use of their information resources, capitalizing on the architecture of events. This will dispel any recently raised doubts about the critical role that IT can play in strategic business differentiation.

Prediction — Mission-critical applications will adopt composite multimodal architecture.

The choice of buy vs. build for software solutions is being extended with a third option: compose. Composition of new business processes and business transactions from partly new and partly old software and data is in fact a combination of the build and buy approaches. In effect, the best practice of software engineering is moving toward the model of build, buy *and* compose. As more enterprises build successful composite applications, using integration and business process management technologies, confidence in the architecture and its enabling tools grows, and so does appreciation for the benefits of this architecture. Gartner predicts that, through 2008, the number of the high-end mission-critical applications that adopt composite service-oriented architecture will increase more than three times compared with 2003. This will make composite service-oriented architecture a mainstream architecture option for enterprise software engineering, which in turn will make integration and composition features essential in all enterprise-class software tools.

Mission-critical composite applications will differ from current, smaller-scale composite applications. The mission-critical composite applications will build on the established foundation of enterprise systems and platforms, surrounding those with more-recent multichannel technologies. As a result, the mission-critical composite application will rely on multiple architectures, from back-end mainframe transaction-processing monitors, to proprietary packaged applications, to the current Java 2 Platform, Enterprise Edition (J2EE) and .NET architectures, and the leading-edge innovations of specialist vendors. Gartner predicts that nearly half of the new mission-critical applications will follow the multiplatform, multimodal topology of enabling platforms. This trend will make the management of mission-critical systems more difficult and will give a strong competitive advantage to the vendors that are able to offer a management environment that supports a heterogeneous, multimodal transaction-processing application style. Leading software infrastructure vendors will scramble to meet this requirement.

Prediction — Interenterprise networks will use dedicated gateways and new value-added networks (VANs).

Business-to-business (B2B) interactions have been central to business operations in retail, manufacturing and other industries. More recently, many enterprises invested in trying to use the new Internet-based technologies and networks to bring down the cost and complexity of such exchanges. These efforts resulted in proliferation of experimental connections, often using various technologies of limited long-term viability. Some users have outsourced their B2B interactions to third-party VANs, whereas others deployed one or another of the newly developed B2B connectivity and integration products in-house. The promise of lower-cost connectivity has typically been fulfilled — but at the price of greatly reduced quality of service. For many enterprises, the old-fashioned electronic data interchange and file transfer mechanisms remained the preferred long-term solution.

The emergence of Web services and extended Web services standards brings new attention to the B2B problem and drives users to experiment with new B2B technologies again. This time, users are building on their prior experiences. To avoid further proliferating the "spaghetti" network of incompatible opportunistic connections, users look to vendors to support centrally managed B2B gateways capable of serving as multiprotocol, interenterprise connectivity ports for the entire enterprise. Gartner predicts that integration and platform vendors will follow this trend and will offer stand-alone, multiprotocol B2B gateway products to be deployed as the enterprise's B2B communication ports with central management, monitoring, security and integrity controls.

Providing a competitive level of quality of service over standards-based networks will continue to be difficult. Web services standards alone will not fulfill this role. Users will again turn to the third-party VANs for the additional support of security, manageability and integrity of their interenterprise interactions. Gartner predicts that the VAN offerings will return to a new phase of market growth as a technology platform for production use of Web services in mission-critical, interenterprise contexts.

Prediction — Excellence in metadata management will differentiate leaders in application integration.

Early deployments of integration technologies in most enterprises focus on a small number of applications and messages. The designers of the architecture usually "own" all the context and understand the essentials of the functioning of the integrated transactions. Over time, as integration grows and as central integration technology is selected to support a growing number of projects, reliance on the architects or architecture teams becomes insufficient. The human-managed architecture picture must be passed on to a more systematic, automated system. The architecture components of an integrated environment include the definitions of services and other interfaces, messages, transformation rules, business activity rules, routing directives, addressing instructions, business process controls, error processing setups, security profiles and many other control-type datasets. Traditionally, each component part of an integration suite used its own proprietary metadata set. The growing importance of business process management, including the modeling of human process flows, system process flows and combinations of both, increasingly requires modeling and simulation tools, also heavily dependent on the creative use of complex, partly standard and partly proprietary metadata. Traditionally, typical integration suites contain a number of incompatible and partly redundant metadata formats. The best of integration products are now only beginning to offer a central integrated metadata repository for consistent management of all of the integration-related metadata.

Gartner predicts that, as integration becomes essential to daily operations of mainstream enterprise information systems and as integration products become involved in most software development efforts, the ability to manage changes to integration procedures in a consistent manner with productivity and integrity will become essential. Platform and integration technology vendors offering leading-edge metadata repositories will be able to exceed the levels of service of their competitors. Ability to find service interfaces, adapters, rule specifications and other control data when they are needed, to analyze the impact of change, and to automatically keep all affected components in line with the changes or additions to the integration configurations will become essential to reduce the escalating complexity of management and maintenance of integrated software platforms. Gartner predicts that the metadata repository and its surrounding tools will become a key differentiating feature of the leading platform and integration products, leading to acquisitions of specialists and the demise of some generalists that are too late to fulfill this essential requirement.

In Conclusion

Application integration and platform middleware technologies will provide the strategic backbone for the new stage of innovation in the business's use of its information assets. By itself, the enabling infrastructure technology may not move enterprises forward. However, in combination with the new application styles and new development and user engagement tools, the new service-oriented and event-driven enterprise application platform infrastructure will lead the IT industry to its next stage of high-impact innovation and growth. Enterprises must remain agile in their architectural projects: Technologies and products will change, the complexity will rise before it declines, costs will increase before the productivity savings and the new revenue sources are realized, and market turmoil will probably bring down some old vendor names and bring up some new ones. The period ahead is not one of quiet business-as-usual stability, but one of innovation,

transformation, risk and opportunity. Well-informed and well-equipped users will see a dramatic increase of productivity and business growth from their ongoing investment in IT. Slow-changing and risk-averse users will have to catch up with their more aggressive competitors or face challenges to their business-competitive viability. Gartner predicts that, five years from now, the real-time event-services-based enterprise infrastructure will be not an option, but an essential competitive requirement for most industries and enterprises.

Features

"Predicts 2004: AIM Markets Grow Despite Consolidation" — Through 2004, application integration, platform middleware and portal software vendors will consolidate and fight for market share while they move to new product lines and continue to build their components into integrated suites. **By Joanne M. Correia**

"Predicts 2004: Enter the B2B Gateway" — Business-to-business initiatives will succeed if flexible architectures enable you to easily and effectively manage your trading partners, connect to your partners in a variety of ways, and centrally manage interactions with trading partners. **By Frank Kenney**

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This research is part of a set of related research pieces. See "Integration Leads the Way to Next-Generation Applications" for an overview.

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