

## Architecting for Agility

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The RTE automates, accelerates and improves the efficiency of critical business processes within the enterprise, with customers and between trading partners. Software infrastructure is the brains and brawn behind this process.

## ANALYSIS

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### A Vision and Approach for RTE Software Architecture

The software infrastructure for a "real-time enterprise" (RTE) is not a single piece of software — it is a comprehensive portfolio of technology and applications that enables enterprises to more-efficiently and accurately execute critical business processes (for example, order entry and logistics). The RTE software infrastructure integrates people and applications (for example, via application integration and mobile computing) and empowers workers with higher-quality information (for example, via knowledge management and business activity monitoring). The RTE automates, accelerates and improves the efficiency of critical business processes within the enterprise, and between the enterprise and its customers and trading partners.

Enterprises cannot purchase an RTE — there is no such product. Enterprises build the RTE software infrastructure application by application, process by process, partner by partner — using a combination of new and existing applications systems and integrating middleware so that, ultimately, the collaboration between people and the IT infrastructure mirrors critical business processes. Although building an RTE is a challenging task, all of the necessary technology (albeit in various degrees of maturity) is already available.

Every RTE relies on an IT infrastructure that enables disparate applications to collaborate on related business processes; thus, application integration projects are essential to the overall development of an RTE. CIOs, CTOs and IT architects should use architecture to guide the development of their RTE systems, in the same way that application designers use architecture to guide the development of modern, distributed applications. The first step toward building an RTE is a clear vision of the IT infrastructure that supports it — the "grid" — and of its supporting architectural framework — a service-oriented architecture (SOA). The grid is a network-based, application-aware software infrastructure that links application systems and trading partners in real-time at the business-process (not just communications) level. An SOA defines the nature of the interfaces that the participating application systems use to link to the grid. These interfaces enable enterprises to flexibly introduce new integrations into the RTE as business requirements change. Yefim Natis and Roy Schulte define these concepts in "The RTE: Service-Oriented Architecture in Action."

The grid and SOA define the software architecture that supports an RTE, but how do integration projects really impact the enterprise? Integration projects affect business process behavior and create a RTE by linking critical business processes so that they execute faster and more efficiently. The zero latency enterprise (ZLE) and straight-through processing (STP) are two principles that will make processes run faster and more efficiently. ZLE defines how business process information should be disseminated at the "right" speed to consumers, while STP defines how that data should be handled using automated interfaces. Jess Thompson and Benoit Lheureux expand on these two important RTE principles in "Use ZLE and STP Strategies to Build a Real-Time Enterprise."

One of the challenges of building a software infrastructure to support the RTE is that business processes need to become increasingly event-driven. Usually, when an order entry application system in a traditional (non-event-oriented) process captures a new order, the sales reporting, manufacturing and billing systems and their respective end users in the business units can be unaware of the event for days. This causes conflicting and obsolete views of the data and an inability to process the order quickly. ZLE principles call for the immediate propagation of the information associated with such events in real time (or something close to it) to ensure that the consumers of such information are always accurately informed. But RTE solutions cannot be built using only request/reply and batch-design patterns that have historically been used for to support

integration projects. A new method of integrating applications, called an "event-driven system," uses event triggers to proactively propagate event information to application systems and knowledge workers in real time. Roy Schulte expands on the need for event-driven systems in an RTE in "A Real-Time Enterprise Is Event-Driven."

### **Overcoming Key Challenges in Building a RTE**

As described above, a RTE heavily relies on an IT infrastructure — the grid — which links application systems into a single, virtual distributed system that mirrors critical business processes. However, most business processing logic today is still locked up within an enterprise's portfolio of packaged applications. Many of these applications were not inherently designed for integration, and as enterprises deploy their RTE they will strain application interfaces, not just because more data flows through them, but because these interfaces must be changed more frequently to accommodate the increasing number of RTE-driven business process changes and application upgrades. What should enterprises do to ensure that applications can not only link to, but also be able to flexibly participate in, the evolving RTE software infrastructure? Brian Wood and Jeff Comport explore this key issue in "Package Applications as Part of the Real-Time Enterprise."

RTE implementation produces an increasing requirement to capture information about critical business events (for example, product delivery) at the point of origin in real time, rather than collecting such events and batch processing them remotely later (for example, after transferring a file using electronic data interchange or FTP). In the past, critical business applications were executed in the data center or on the desktop, but RTE implementation is driving enterprises to capture more accurate and timely information from its point of origin (for example, as packages are loaded onto trucks). Enterprises also must deliver essential information in a more timely manner to key decision makers—regardless of their location (for example, while traveling). What can enterprises do to accommodate increasingly mobile workers and more-widely dispersed sources of relevant information? Massimo Pezzini explores how emerging mobile technology can extend the RTE's reach in "Real-Time Enterprises Need Mobile-Enabled Middleware."

As the RTE emerges, enterprises will struggle with an inherent conflict between increasing their management and control of critical business processes (to automate and accelerate them), while extending these processes to more internal users and external trading partners. However, expanding business processes to include more applications and users strains existing security policies and systems. How does the RTE architecture affect security, and what should enterprises do about it? John Pescatore explains what enterprises can do to improve security, even as their RTE grows, in "Frictionless Security Isn't an Oxymoron."

### **Software Infrastructure That Supports Your Greatest RTE Asset: People**

As enterprises deploy the RTE, they will find that critical business processes become faster and more efficient. With enough capacity (for example, memory, central processing unit and storage), machines and computers can effectively deal with the associated increasing workloads. However, the greater velocity and volume of business transactions increase the burden placed on the enterprise's accountants, engineers, line managers, purchasing agents and knowledge workers — all of whom are expected to make more decisions — with higher accuracy — in less time.

Managing increasing volumes of information will strain traditional delivery methods, such as phone, fax, e-mail and portals. Two solutions — content management systems and enterprise information portals — have traditionally been used as separate stand-alone methods to efficiently manage and deliver large amounts of information. As enterprises accelerate their business processes and generate more information, they will use a hybrid combination of these solutions. In "Content Management and Portals Power the RTE," Gene Phifer and Mark Gilbert explain what enterprises can do to combine these two solutions to better manage information flow.

As enterprises build the RTE, the time available to make the decisions that have not been embedded in applications and tools will inevitably shrink. This will strain traditional, rigid escalation and decision-making procedures (for example, approving a purchase order that exceeds a preapproved credit limit) that require resolution by a person using an unautomated, undocumented procedure. As the automated component of critical business processes accelerates in the RTE, the need for corresponding manual components that require decisions from people also will grow. In "Knowledge Management: RTE Processes and Technology," Kathy Harris identifies how enterprises can better respond to critical business events and empower decision makers.

### **Bottom Line**

Building an RTE software infrastructure is not an IT project — it is an ongoing, strategic endeavor that spans multiple IT projects. The RTE cannot be purchased. It must be assembled over time from a combination of new and existing packaged applications, integration middleware and productivity tools. Architecting for agility should be guided by key principles of process improvement, STP and ZLE, resulting in an operational grid, to which participating application systems are connected using an SOA. (See the Enterprise Architecture Special Report for a through examination of the elements of the new architecture; Enterprise Architecture). By implementing an RTE software infrastructure, enterprises will accelerate and improve the efficiency of their automated and manual business process activities.

### **Features**

"Use ZLE and STP Strategies to Build a Real-Time Enterprise" — Enterprises must employ two key principles — ZLE and STP — to guide application integration projects and improve business process efficiency in the RTE. **By Jess Thompson and Benoit Lheureux**

"A Real-Time Enterprise Is Event-Driven" — Successful RTEs apply the concepts of events, messaging, and publish-and-subscribe at the business and technical levels. **By Roy Schulte**

"Package Applications as Part of the Real-Time Enterprise" — Packaged applications can contribute significant architectural benefits to real-time operations. **By Brian Wood and Jeff Comport**

"Real-Time Enterprises Need Mobile-Enabled Middleware" — Mobile middleware will enable zero-latency notification and capture of business events. **By Massimo Pezzini**

"Frictionless Security Isn't an Oxymoron" — Responding to warnings from events in the external environment, monitoring internal operations and reporting results to the outside world are key aspects of the RTE. **By John Pescatore**

"Content Management and Portals Power the RTE" — Content management tools that enable real-time publishing and portal tools are key underpinnings of any RTE initiative. **By Mark Gilbert and Gene Phifer**

### **Recommended Reading and Related Research**

Enterprise Architecture — Gartner's new enterprise architecture contains a set of frameworks, guidelines, tools, methodologies and solutions that facilitate collaboration within and between enterprises. **By Jeff Schulman and Jeff Comport**

"The RTE: Service-Oriented Architecture in Action" Enterprises that adopt SOA as their preferred architecture are better prepared for the RTE. **By Yefim Natis and Roy Schulte**

"Knowledge Management: RTE Processes and Technology" — Knowledge management and its enabling technologies are vital to the construction and management of RTE processes. **By Kathy Harris**

This research is part of a set of related research pieces. See "It's Time for the Real-Time Enterprise" for an overview.

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