

DATA INTEGRATION

strategic directions

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The **Integration Imperative:**

Creating New Value
*By Leveraging
Legacy Systems*

CSO

CIO

Custom Publishing

The Agile Enterprise ■ A Brave New World ■ Tools of the Trade

CONSTRUCTING THE Agile Enterprise

IT'S HARD—BUT NECESSARY—TO MAKE BUSINESS LOOK EASY

With each passing year, businesses have less time to do business. A few years ago, for instance, responses to call center inquiries took about eight hours. Now a typical response occurs in 10 seconds. Building a personal computer used to take six weeks; these days it's accomplished in just 24 hours.

Staying competitive and successful as the velocity of business processes escalates means



THE DANGERS OF COMPLEXITY

Between now and 2007, 65 percent of enterprises will mismanage technological complexity and risk.

Outcome: Stifled productivity and earnings, cost inflation of at least 25 percent.

Source: Gartner, Inc.

rethinking and reengineering not only the processes themselves but the IT systems and networks that help manage and execute them. Isolated, stovepipe applications and data stores just won't cut it anymore.

"Traditionally, IT departments have supplied solutions that provided approximations of the business requirements and functionality actually needed. Worst-case scenario was that the business had to change its processes to meet the requirements of the IT solutions," says Markus Nitschke, vice president of corporate marketing at Attachmate Corp. "This situation is clearly unsatisfactory and needs to be

addressed with a revolutionary approach to software and system design."

Yet few enterprises can afford to junk the multi-generational IT infrastructure they've spent decades creating. Building a whole new IT environment from scratch is not only prohibitively expensive, it's also impossibly disruptive to the business.

The solution? Integrate legacy systems with each other and with emerging capabilities to inject new value into the enterprise.

"Extending the life of legacy systems and data stores by remodeling and integrating those components with new application initiatives is essential for running a business in zero-latency mode," says Nitschke.

The Information Daisy Chain

But the process isn't easy, according to AMR Research. Consider the following (from the 2003 AMR Research article "Rethinking Integration Decisions to Support Your Customer Requirements"):

- The typical company has five order management systems and four order fulfillment systems.
- Many companies require customers to place different orders through separate systems.
- Many companies have little or no linkage between their front- and back-office systems.
- In most organizations, customer data is not centrally managed, resulting in errors, duplication and task redundancy.

According to the research company IDC, organizations have an average of 49 applications and 14 databases that need to be integrated. Generally, no

more than 20 percent of customer data is housed in a single location.

That's because in most organizations, minimal integration is built into new development projects. By pulling in only the data and processes required by the new application, companies have created unwieldy daisy chains of data that support a frail and costly tangle of software.

Those that have attempted large-scale integration have had to use brute force to construct customized interfaces to legacy environments—which is expensive and never ending.

“Application integration, software development, process automation/workflow and business intelligence are no longer discrete disciplines that CIOs can afford to practice independently,” says Trevor Matz, InterSystems Corp.’s managing director of application integration.

Although the enormous volume of transactional data and messages generated by corporate silos—such as data, applications and systems—is processed in a point-to-point and therefore very disjointed fashion, it needs to be pooled, shared and married to business processes, often in as close to real time as possible, and without sacrificing security.

“To ensure sound system security when integrating data, CIOs should consider real-time solutions that record operational activities as they occur on

Hiding Complexity With Services

Cost-effective integration requires something else: hiding the arcane complexities of earlier generations of IT infrastructure—not only the mainframe monoliths and subsequent two- and three-tiered distributed architectures, but also the data, the business logic, the user interfaces and the process workflows—behind layers of abstractions based on industry-accepted standards.

INTEGRATION CHALLENGES

- Avoiding culture wars: Partnership and merger/acquisition demand cultural as well as technical integration
- Unifying new technology and legacy systems
- Coping with the complexity of integrating many diverse systems and environments
- Coordination and cooperation
- Lack of sufficiently evolved standards, immature technologies
- Lack of appropriate skills

For this to work, companies must do two things:

- Use an agreed-upon abstract language to translate the arcanities of their data, business logic, operating environments and even business processes.
- Encapsulate both the processes and much of the technical knowledge and skill needed to engage in them as modular services.

“Extending the life of legacy systems and data stores by remodeling and integrating those components with new application initiatives is essential for running a business in zero-latency mode.”

Markus Nitschke, vice president of corporate marketing at Attachmate Corp.

source applications,” says Nigel Stokes, CEO and president, DataMirror Corp. “The solutions should be capable of tracking changes made to an application database, identifying users and recording other pertinent information. With real-time auditing capabilities, companies can take advantage of an integrated enterprise while ensuring all data remain secure, end to end.”

Once that happens, data, applications and business processes can be universally accessed, shared, reconciled, recombined and analyzed automatically and without the aid of expensive experts. And companies can continue to use (for a while, anyway) their legacy databases, applications and platforms.

Furthermore, the service modules in effect make corporate IT functionality available on the network

The Power to Manage, Monitor and Protect Corporate Data in Real-Time

COMPANY PROFILE

DataMirror is a leading provider of live, secure data integration and protection solutions that give companies the power to manage, monitor and protect their corporate data in real time.

Since its inception in 1993, DataMirror has continued to position itself as an innovator and thought leader in the real-time data integration market and has played an instrumental role in pioneering the concept of the real-time enterprise (RTE).

UNLOCK *the experience of now*™

DataMirror's comprehensive family of LiveBusiness™ solutions helps customers easily and cost-effectively capture, transform and flow data throughout the enterprise. DataMirror unlocks *the experience of now*™ by providing the live, secure data access, integration and availability companies require today across all computers in their business.

DataMirror is a publicly funded, financially stable company with a strong business model that has helped the company progressively grow quarter over quarter and year over year.

TREMENDOUS ROI

With more than 1,800 successful customer implementations worldwide, DataMirror is an established leader in the data integration and resiliency market. DataMirror's customer list reads like a "who's who" of industry leaders—Baxter Healthcare, Campbell Soup, Debenhams, FedEx Ground, Harley-Davidson, Pfizer, Tiffany & Co and

Union Pacific Railroad, just to name a few.

These and other customers have gained tremendous ROI from their DataMirror software implementation. Examples include:

- A financial services organization integrating 15 million transactions each day
- A food and beverages company saving 38 person-days of development work on its data warehousing project.
- An insurance company bringing to market a new web initiative in half the scheduled time
- A mutual funds company reducing system recovery time from 12-48 hours to 30 minutes
- A telecommunications company estimating saving US\$350,000 an hour in downtime costs
- Most significantly, a Fortune 500 manufacturing company reporting saving US\$2.9 million over two years in data warehousing costs and US\$30,000 an hour in downtime costs, while reducing overall IT spending by approximately 20 percent.

To discover how your business can benefit from DataMirror's solutions, contact a representative today: **DataMirror**, 3100 Steeles Avenue East, Suite 1100, Markham, Ontario L3R 8T3; Phone: 905-415-0310 (toll free: 1-800-362-5955); Fax: 905-415-0340; E-mail: info@datamirror.com Web: www.datamirror.com

DataMirror®
THE EXPERIENCE OF NOW.™

as discoverable entities that can be recombined by users to invent new capabilities, with little or no help from IT staff.

It's not hard to see how powerful this kind of abstraction—collectively called web services and service-oriented architecture—can be both to IT integration efforts and the automation, monitoring and management of business activities.

"Service-oriented architecture implemented across diverging IT systems within an organization will not only solve the integration challenges, but also put the infrastructure in place to release future applications that meet business requirements more effectively, in a less time-consuming fashion," says Attachmate's Nitschke.

For example, at the Florida Department of Children and Families (DCF), as much as 80 percent of client information resides in legacy systems that would cost hundreds of millions of dollars to replace. Fortunately, DCF has found a way to save 90 percent of that potential expense. Using InterSystems Corp.'s Ensemble platform, the DCF has integrated the information in 59 different applications running on a variety of operating environments into a composite portal application, called OneFamily, that provides a single view of all relevant data about an individual client.

OneFamily has improved DCF services delivery and eased IT support requirements. And thanks to Ensemble, its relational database support requirements were cut in half.

“Application integration, software development, process automation/workflow and business intelligence are no longer discrete disciplines that CIOs can afford to practice independently.”

—Trevor Matz, InterSystems Corp.’s managing director of application integration

Event-Driven Architecture: Do You Subscribe?

Another integration challenge lies in managing business processes that are event-driven. They need to respond to less predictable, multiple asynchronous events occurring simultaneously.

Event-driven architecture (EDA) addresses such circumstances with applications composed of services that send messages when multiple asynchronous events trigger them. The messages move between decoupled service modules that are totally unaware of each other.

When an event occurs, an event-driven application sends a message to middleware software, which passes it on to subscribing programs wanting to be notified of such events. Thus, the message gets sent to many at once. Rules-based event processing agents monitor events, sometimes thousands of them at once and undertake actions such as filtering, mapping and applying constraints to event data.

EDA designs are effective for:

- Large distributed applications aimed at unpredictable, asynchronous or parallel activities
- When data has to go to multiple destinations
- Quickly and inexpensively reusing business components in new business processes

EDA standards are incomplete—developers are still learning their way around complex event processing. Moreover, key parts, such as development tools, security and management capabilities, still must be assembled by developers.

Nevertheless, observes Attachmate’s Nitschke, “Enabling legacy data sources and applications by delivering them as web services can be the initial step toward a full service-oriented architecture. Service-oriented and event-driven architecture can be

applied not only to new development and design efforts, but to all existing legacy assets as well.”

Solutions to the complexity and confusion that typify much of data, application, system and process integration are not just visible on the horizon. They’re here. It’s 3 a.m.—do you know what your main competitor has integrated?

Leveraging The Mainframe: Where 60 Percent Of Corporate Data Still Resides

LONG THE HEART OF BUSINESS IT INVESTMENT, mainframe operating systems and the host-class machines on which they run continue to serve as key platforms for critical corporate workloads, like online transaction processing (OLTP) and large single-system image databases. In fact, IDC estimates that in 2002, enterprises spent \$12.8 billion on these high-end systems.

Although burdensome to maintain and outdated in technology, companies hold on to their legacy systems for several reasons. The first is cost: the

200 million lines of Cobol code still in use today would cost in the neighborhood of \$7 billion to replace (at \$35 per line of code). What’s more, mainframe environments are easier and cheaper to control—and easier to secure—than distributed computing environments.

But mainframe applications are



Speed Matters

Examples of Integration in Action

“Nothing is more frustrating to someone than stale data—unless, of course, it’s no access to the data at all,” observes Jim Lupton, vice president of information systems at American Fidelity Assurance Co. “It’s frustrating to the customer not to have the data at their fingertips when it is convenient for them.” When business matters are at stake, smart companies such as the following find ways to make sure they can get at their data anytime, anywhere:

Lyndale Foods Group: Delivering the real-time data warehouse. Since deploying DataMirror’s Transformation Server as part of a data warehouse initiative, U.K.-based Lyndale Foods Group has standardized reporting across business units and boosted hardware performance without upgrading or buying more storage. Sales analysis is delivered 400 percent faster and with more confidence because it’s based on accurate, up-to-date data.

BG Group: Building an integrated enterprise portal. The U.K.’s BG Group trades in the gas market and wanted to replace its slow, manual processes with an easy-to-use system that would

link 10 applications for gas operations, prompt traders and allow them to access the latest figures, all from a single desktop.

BG Group built an integrated enterprise portal that aggregates all of this data—refreshed in real time—onto a single dashboard. Attachmate’s Smart Connectors pulls data from each of the applications and feeds the information into an Oracle-based repository. The Java-based application defines standard XML interfaces and methods for integrating with multiple environments, including IBM mainframe, Oracle applications and Internet bulletin boards. The payoff: BG Group gas traders’ improved situational awareness has enabled them to recoup the cost of the new system within six months.

Landstar System Inc.: Accelerating data movement to near-real time. Landstar System, a provider of transportation capacity, needed a scalable solution that would integrate data from multiple systems in real time. After implementing DataMirror’s Transformation Server, Landstar reduced data movement time from 30 minutes to just over five seconds. The business payoff: Landstar’s partners can quickly access the most current data, improving their ability to serve their customers.

often a bear to use, while training staff to run them also eats up time and money.

The key is to expand access to mainframe environments, which results in more efficient, less costly operations because information can be more quickly and easily shared, response to changing business conditions are more timely and tasks once handled by staff can be self-serviced off to users and customers.

The goal, of course, is to be able to reuse the business logic and data locked away in mainframe environments. This can be done if mainframe data, process logic and functional code are abstracted in

a standard, commonly accepted way so that they can be widely accessed, put into reusable formats and then integrated with newer web-based applications where they can be repurposed.

For example, with 200-plus requests a day for mainframe data, each one handled manually, IT managers at AgStar Financial Services knew something had to change. They chose Attachmate’s Smart Connectors, which integrate legacy host information and business logic with new and custom e-business applications. AgStar uses the Smart Connectors’ .NET web services to integrate custom applications and mainframe transactions.

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Ensemble Makes Rapid Integration a Reality

COMPANY PROFILE

Executives today are making major demands of their IT investment. They want to increase efficiency by providing enterprise-wide access to vital information and by extending access to customers and suppliers. They want to cut costs by leveraging investment in current applications. They want to compete more effectively and react more quickly to changing business requirements. And they want to achieve it all very quickly.

These are the business drivers that have made integration the #1 priority in most organizations today. These are the demands that can be met with Ensemble's universal integration platform from InterSystems.

Ensemble incorporates the capabilities of an integration server, application server, high-performance object database and a seamlessly integrated development and management environment in a single, architecturally consistent product. The result? Rapid, easy, efficient integration.

INTEGRATION OF POWER AND EASE

Ensemble's unique fusion of these previously independent technologies delivers the power to handle any scope of integration project with the ease to quickly integrate and rapidly develop.

Industry analysts and customers recognize the potential rewards of this comprehensive integration approach.

"InterSystems' Ensemble product presents a unique mixture of technology not commonly found in today's integration software that unifies the data-, process- and application-centric integra-

tion worlds. It is here that vast gains are anticipated by their customers," says Sandra Rogers, a senior analyst with International Data Corporation.

"Ensemble uniquely offers the all-in-one solution we needed to integrate information and applications, create reports across our 59 systems and leverage new technologies," says Ben Harris, deputy secretary operations and information technology for the Florida Department of Children and Families and 2004 recipient of a Computerworld Premier IT 100 Leaders Award.

A PROVEN TRACK RECORD

InterSystems, with its CACHÉ database, has built its reputation over 26 years by delivering high-performance, extremely scalable, enterprise-level data management software that sets the standard for developing high-performance and highly scalable applications.

Committed to delivering the same top-tier results with Ensemble, InterSystems recently introduced its rapid universal integration platform after a year of successful early adopter projects around the globe. The savings of time and cost realized in those projects were dramatic.

To learn more about how any enterprise can rapidly integrate applications, visit www.InterSystems.com/Ensemble



Some of the results:

- Electronic fund transfers that used to take 30 minutes now get done in about two, and with greater accuracy (always nice when money's involved).
- Some 25 steps were consolidated into a single task that allows frontline staff to easily process loan conversions, so the data involved no longer need to be sent to other departments.
- Annual savings of time and effort add up to \$328,000. Scottish Power confronted the unenviable chal-

lenge of integrating MVS, AIX and Solaris operating systems with Oracle, Sybase and DB2 databases without sacrificing data integrity or consistency. The firm opted for DataMirror's Constellar Hub enterprise application integration tool. The result? When Ernst & Young consultants conducted an audit of the project, they concluded that Constellar Hub had achieved a return on investment of 237 percent, with a payback period on the entire cost of the project of just a year.

The Payback for Comprehensive Connectivity to Legacy Data and Business Logic

BY PROVIDING A WIDE RANGE of standard interfaces to legacy data sources and applications, Attachmate myEXTRA! Smart Connectors enable any client to access any legacy resource, ensuring that the solutions you develop today will work tomorrow.

A study by IDC of the impact of implementing Attachmate's myEXTRA! products, including Smart Connectors, shows that companies were able to

- Lower IT staffing costs by an average of more than \$230,000 per year
- Shave more than \$900,000 a year from outsourcing, hardware and training expenses
- Generate an average of nearly \$1.9 million in savings from higher user productivity
- Boost new revenue by an annual average of almost \$2.3 million (including capture of previously lost revenue)

Topline Value: How Integration Makes Money

AS THE FOLLOWING COMPANIES can attest, integration does more than make systems work better. It can also make money.

Scotts Co.—Automating data cleansing. When fertilizer maker Scotts Co. began installing an enterprise resource planning (ERP) system, it discovered that plenty of its data was just plain wrong. After working hard to cleanse its data, Scotts decided to press the advantage and improve its forecasting and replenishment planning by incorporating point-of-sale data from its customers.

Ascential DataStage™ and Ascential QualityStage™ automatically transform the POS data according to Scotts' rules, funnel it into the ERP system and send out alerts when the data doesn't add up. Another result: Scotts' customers fixed their own POS data, improving information up and down an entire supply chain.

Novo Nordisk—Reducing costs by automating data integration. Pharmaceutical firm Novo

CREATING THE ZERO-LATENCY ENTERPRISE WITH BUSINESS INTEGRATION

HOW CLOSE ARE YOU TO ZERO-LATENCY? DataMirror CEO Nigel Stokes suggests answering these questions:

Q: How many different databases scattered throughout your organization contain partial information about a single customer? How easy is it to consolidate this data into a single version of the truth?

Q: How long does it take to compile meaningful sales figures or customer data for analysis? How confident are you that business intelligence is delivered fast enough to all the analysts and decision makers who need it? Is your analysis always based on the most consistent, accurate and up-to-date information?

Q: What level of drill-down detail are you able to achieve on the data? Can you obtain data on particular products or regions and granular levels of detail, such as seasonal or quarterly sales variations or sell-through figures in time slots as small as half an hour?

Q: How informed are your customer service representatives? Do they have access to a view of all historical interactions between your company and the customer on the phone? Are they equipped to respond rapidly to customer needs and resolve issues in real time?

Q: Do queries sometimes affect the performance of the production systems that drive your business?

Q: In the last year, how many times have your employees been affected by planned system downtime (software or hardware upgrades and other scheduled maintenance)?

Q: How many times in the last year have your web site or email systems been affected by system downtime, whether planned or unplanned?

LiveBusiness™ Helps Companies Compete in the "Now" Economy, Executive Overview by Nigel Stokes, CEO, DataMirror

Universal Connectivity Through Common Hub Increases Efficiency, Reduces Costs and Improves Safety

RxHub LLC, based in St. Paul, Minnesota, is an innovative technology company connecting the health care industry via shared prescription and benefit information. Recognizing that universal connectivity through a common hub would increase efficiency, reduce costs and improve patient safety, RxHub's vision was to create a nationwide electronic information exchange to share prescription and pharmacy information.

And that's exactly what RxHub achieved using Initiate Systems' solution. Initiate enables customer-focused business strategies by providing trusted customer data on demand. Initiate's solution improves the integrity of the data in each source, virtually integrates data across disparate sources and makes complete, accurate, up-to-the-moment data available to people and systems across an enterprise—and even across organizational lines.

ON-DEMAND TECHNOLOGY

RxHub leverages the Initiate Identity Hub™ software to foster significant new levels of affordability and patient safety for approximately 250 million individuals. RxHub links doctors, pharmacists and leading prescription benefit managers via the Internet. At peak times, Initiate's on-demand technology handles 300 secure transactions per second.

"Initiate Identity Hub software is the cor-

Initiate™

nerstone of the transaction switching capabilities we've created at RxHub. The ability to quickly and accurately match patients is the basis for the rest of the transactions we support, including formulary access, medication history, and generation of new prescriptions and renewals," says J.P. Little, RxHub's CIO.

What's more, he adds, RxHub can now update the Master Person Index (MPI), the medical community's equivalent of customer data on the fly, *with no downtime*, for millions of records daily—"critical for supporting the service levels that participants in the RxHub network expect."

QUANTIFIABLE MEASURES OF SUCCESS

At startup, Initiate loaded and cross-referenced nearly 100 million records in approximately two hours. Now, with 250 million lives at stake, Initiate typically finds matches in 250 milliseconds, or a quarter of a second per record.

This enables RxHub to provide secure access to prescription benefit information in less than four seconds from the initial request until a physician or certified staff member receives the complete information. During open enrollment periods, RxHub processes as many as 3 million records per prescription benefit manager in about an hour.

For more information visit www.initiatesystems.com



Nordisk has realized 60 percent cost savings by using the Ascential Enterprise Integration Suite™ to easily integrate critical non-SAP data. And development time has been reduced by 66 percent because Ascential DataStage™—a core component of the Ascential Enterprise Integration Suite—eliminates the need for customized tools.

Henkel Consumer Adhesives—Doing more with the same IT staff. By providing Henkel Consumer Adhesives with a complete view of its business across several otherwise incompatible data environments, the Ascential Enterprise Integration Suite enables the firm to save substantially in annual dis-

tribution costs. Ascential DataStage enhanced sales information has also led to the capture of even more revenue per year using more highly targeted marketing campaigns and to an ability to confidently decide which product lines to continue or discontinue distributing.

Henkel Consumer Adhesives estimates that the Ascential data integration solution is 10 times more efficient than previous methods. The firm's data warehouse designer has said that Ascential's solution enabled the company to double in size and handle a significant increase in data management without adding IT staff. **SD**

A Brave New World

WEB SERVICES, SOA AND EVENT-DRIVEN ARCHITECTURE

The complex, even chaotic state of many corporate information technology environments is approaching crisis, exacerbated by unrelenting competitive pressure to do more, faster, with fewer resources.

Small wonder that new ideas about software architectures have begun to take hold in a big way. The old way to develop applications—‘build it and the integration will come’—clearly needs to give way to a world of service-oriented, built-to-be-integrated applications that expose key functionality via commonly defined interfaces and can be implemented as service interfaces in which one application invokes another as a service.

A new type of middleware based on XML and a few other standard protocols, web services piggyback on Internet protocols and infrastructure to overcome crucial limitations of traditional middleware, including:

- Inability to work via the Internet
- Lack of support for heterogeneity

- Resource-intensiveness
- Difficulty of use
- Fragility

For example, after replacing 100,000 applications with 6,000 web services, the U.S. Navy has reported a number of significant benefits:

- By making a single operation-planning application into a web service, \$8 million per year is being saved because of lower management costs.
- New applications now take months rather than years to develop.
- Strategic processes such as mission planning have been improved thanks to web services that aggregate and centralize weather reports.

Web services utilize a new software design idea called service-oriented architecture (SOA), which undoes application integration to enable business integration—and deliver it using the Internet.

Its benefits include:

- **Loose coupling.** Unlike tightly coupled traditional applications, loosely coupled web service applications are designed with few connections

Q & A: JOHN HUMMEL, SUTTER HEALTH, ON INTEGRATION CHALLENGES

WITH A CHAIN OF 27 HOSPITALS and 18 clinics producing annual revenues of \$5.5 billion, Sutter Health is one of the nation’s leading not-for-profit networks of hospitals, doctors, nurses and other healthcare services. Sutter Health CIO John Hummel, who has overseen the development of a portal strategy that relies on Initiate Systems’ products, talks here about the issues and opportunities of inte-

grating in an unwieldy industry.

Q: How do you hook up 5,000 doctors, 27 hospitals, 18 clinics and 20 other assorted healthcare providers? How do you deal with the auxiliary issues, like the political (who owns the data), HIPAA (who can see the data) and medical licensure (who can use the data)?

A: If I can get my MDs to use Microsoft’s .NET—95 per-

cent of them are on PCs using Microsoft products—I can leverage all our systems in virtual databases and streamline data acquisition through a combination of service-oriented architecture (SOA) and event-driven architecture (EDA).

We could hook up *everyone* in the healthcare family through a zero-latency distributed system running

and dependencies among their elements. So any given web service can work independently of the other services that comprise an application. And applications are easier to modify and update because only a few elements—that is, services—require attention.

- **Easy to integrate and access.** Since they're written to publicly available standards and exploit universally deployed Internet protocols, web services are essentially interchangeable, potentially enabling integration wherever applications are designed or adapted to use them. And because web services standards establish the format, developers can spend their time creating better business logic rather than worrying about web services infrastructure.
- **Webifies service-oriented architecture—and the legacy.** Business processes that make up a service-oriented application have been dis-integrated into independent components (services) that are easily distributed. These services interoperate across machines and business processes—including legacy environments—to complete the solution they provide.

Thus, chunks of data and processes from spreadsheets, word processing documents, e-mail, instant messaging, calendars, ERP and CRM systems, production systems and so on can be cohesively but flexibly interlinked to streamline processes and activities across the previously impassable boundaries of technology, corporate culture and habit.

Although the promise is huge, service-oriented architecture does have some limitations:

- Underdeveloped standards mean that developers are stuck with lowest-common-denominator standard middleware, proprietary schemes or clunky gateways.

- Service reusability isn't always straightforward, especially between disparate development teams and plenty of application-specific services cannot be reused.
- Semantic differences between applications don't get solved by SOAs.



TIGHTLY BOUND VERSUS LOOSELY COUPLED INTERFACES

Tightly bound RPC interfaces:

- Map application functions to web service interfaces via WSDL
- Invoke the application using SOAP calls

Loosely coupled event-driven interfaces:

- Use messaging to communicate among several peer applications—each application responds to incoming asynchronous messages that represent business data and/or business events.
- Result in more independent applications—each one parses incoming messages and reacts to their contents, so the only contact between applications is a shared message format.
- Isolate business logic from overall interapplication event flow, making it easy to change.

What an Enterprise Service Bus Can Do

Traditional, tightly bound, distributed application environments are so complex that they're tough to monitor and troubleshoot. They're also populated with many kinds of middleware and integration mechanisms—remote procedure calls, message-oriented

on a virtual private network. This could give all caregivers the tools they need to treat the patient with *all* the needed information.

Q: How close are you to making this real?

A: I think we're in the process of really setting these directions and strategies. In the next few weeks, we'll be installing our first ATM/MPLS* wide area net-

works. We're also getting our first pilot projects up with a few selected vendors, and are figuring out how to best introduce and utilize the .NET system to achieve our doctor and patient portals.

So we're now strategically linking our vendors, thanks to their ability to run on .NET. This allows us to use .NET and Biztalk, along with Microsoft's Share and Info

Point products (for web and portal applications), to build enterprise integration.

The power of this to our industry is enormous. Regardless of the application vendor our physicians or nurses may be using, the data connectivity will provide both increased patient safety as well as cost savings.

* Asynchronous transfer mode/multi-protocol label switching

The U.S. Navy has replaced 100,000 applications with 6,000 web services, saving millions.

middleware, object request brokers and web services.

Using XML, the standard at the heart of web services, helps. It's universally understood, hides implementation details, employs a common communications protocol and interface definition, makes files self-describing and furnishes fixed formats.

But there are things XML doesn't do: it doesn't escape the tight binding of the client/server model; integration logic remains inflexible because it's embedded in the applications; and the integration itself is still point-to-point.

As a result, some organizations are turning to enterprise service buses (ESBs), integration environments that implement a loosely coupled service-oriented architecture. ESBs deal with applications as event-driven services and support orchestration, messaging, routing, legacy applications, application servers and middleware.

"Web services have proven to be a viable option for lowering integration costs, as has the application platform approach provided by such vendors as BEA, IBM, Oracle and Microsoft," says Nucleus Research analyst Kathy Quirk. "With the mix of products now available, organizations have greater possibilities for selecting products that provide the best ROI for their integration needs."

Some products, like InterSystems Corp.'s Ensemble rapid integration platform, bridge event-driven and service-oriented architectures, since they support the event-driven solutions needed in long-running business processes as well as service-oriented request-reply solutions.

Ensemble unifies architecture, development, management and storage across four tiers of enterprise business management: the data management server, the integration server, the application server and the portal server. It can be used to:

- Build adapters
- Transform data
- Handle rule-based routing
- Graphically model business processes
- Develop composite applications
- Develop dashboard-based business activity monitoring

The result? "A single comprehensive platform for rapidly building and deploying new business fusion solutions," says Trevor Matz, InterSystems managing

director for application integration. This platform, he notes, leverages the functionality of existing applications, orchestrates previously autonomous business and operational processes, and integrates information from across the enterprise.

The ROI of Web Services

Among the key benefits you can expect from web services:

Improve IT productivity

Development teams can do more in less time, thanks to graphical tools, a reduced need to custom code and architectures that promote reuse. "To keep costs down, squeeze more efficiency from existing systems and stay on par with competitors, it makes good business sense to implement real-time technology that supports a wide range of systems, thereby allowing existing technology assets to be leveraged," says Nigel Stokes, CEO and president of DataMirror Corp.

Improve business productivity

American Fidelity Assurance Co. uses Software AG products to run a data-integrating, self-service portal used by thousands of customers, brokers and account managers. "Why not push the work to a customer who is more than happy to do it for you?" suggests Jim Lupton, vice president of information systems at the company.

Reduce total cost of ownership

Simpler infrastructure is cheaper infrastructure, thanks to the use of standards rather than customized integration links, fewer license agreements to be maintained and so on. "Flexible multiplatform solutions," says Stokes, "help breathe new life into legacy and operational systems and reduce the total cost of ownership."

Lower training costs

"Easier-to-use tools and platform extensions lower the learning curve because developers can work within a familiar environment and extend their skills to build integration applications," says Nucleus Research analyst Kathy Quirk.

And, of course, proper planning has a huge impact

New Data Warehouse Slims Jenny Craig Expenses By \$1 million

CASE STUDY

Using software from Ascential Software Corporation, weight management advisor Jenny Craig, Inc. built a new data warehouse that synthesizes client and transaction information from approximately 650 Jenny Craig Centres around the world, giving the company a 360-degree view of each of its clients. Armed with this comprehensive view, Jenny Craig has brought its outsourced direct marketing programs in house—saving the company an estimated \$1 million in outsourcing and IT development costs in just one year.

According to Jenny Craig, the company began the project to address three specific problems: a lack of information about its customer base; the high cost of outsourced marketing campaigns; and a lack of real-time access to its own marketing campaign results, which prevented the company from doing the kinds of analytics and segmentation that it needed for effective campaigns.

The company's new data warehouse allows all employees to communicate—using consistent information—with Jenny Craig customers and Centres. By taking charge of its customer data, Jenny Craig was able to shed the vendor to whom it was paying more than \$750,000 per month, along with all the redundant data and multiple disparate databases.

INTEGRATED SOLUTION SPANS FULL DATA LIFE CYCLE

The Ascential Enterprise Integration Suite is the only integrated solution that spans the full data life cycle and the only enterprise data integration vendor that approaches data profiling, quality and transformation as closely connected, interdependent operations.

Installing the Ascential Enterprise Integration Suite enabled Jenny Craig to lay the foundation needed to extract data from multiple data sources, clean the data and upload the cleansed, non-duplicated data into a central location. The project cost \$500,000 and will take only six months to pay for itself. The company will also create its own marketing campaigns, conduct its own analysis and maintain its own database, contributing to the \$1 million in savings.

Because of the Suite's efficiency, the weight management firm reassigned one-third of its IS staff and flattened its hierarchy, giving everyone in the department a chance to spread their wings, to take some responsibility for important projects and improve their day-to-day work experiences.

For more information on how Ascential Software Corporation can integrate your company, visit www.ascential.com



on ROI. "Only organizations that have a clear business need and a definite roadmap for exploiting integration software will achieve efficiencies and cost savings," Quirk notes.

Integration Best Practices to Remember

"WHILE THE IMPORTANCE OF INTEGRATION to creating an 'on demand' business presence cannot be overstated, it will not be easy to achieve," says Steve Garone, chief analyst and managing partner at The AlignIT Group. Some advice from the trenches:

Align IT with the business. Begin strategically by

aligning your deployment of web services with the needs of your business. You might want to make this part of a larger effort to map your IT infrastructure and capabilities to your organization's goals and needs.

Design a service-oriented architecture for your organization. Don't deploy web services without first developing a service-oriented architecture that's been aligned with business requirements. (One go-slower possibility: adopt a transition architecture that introduces the concept of service orientation but not the technologies.)

Don't give up on the legacy—but know when to fold. It's common sense to look for ways to reuse legacy logic and systems before scrapping them. Services added on to legacy environments cost less, especially when using development tools that support the creation of web services.

“Use the business and security rules built into the systems as they exist today,” advises Jim Lupton of American Fidelity Assurance Co. “Don’t duplicate rules in the new environment.”

But the functional capabilities of legacy systems are limited. These limits define the point beyond which integrating them isn’t worth it.

Pick your targets carefully.

Incorporate web services only where you believe they will add value, such as automating the manual processes hidden in distributed activities like customer support or field sales. Get line-of-business managers to help you both identify where web services can make a difference and pick pilot projects. Likely best bets: core applications running in stable legacy environments, applications that are costly to integrate and manage, well-defined trading partner applications, and applications that require special skills to develop or use or need special hardware or adapters to interoperate.

Do your homework. Make sure you have a thorough knowledge of the business model for which the service is being designed as well as the technologies the service uses. Do multiple pilots and anticipate that some will fail. One starting point: wrap SOAP and WSDL around existing interfaces to attain one-way, point-to-point integration that apes traditional data-centric APIs.

Don’t forget ROI. Nothing provides proof-of-concept like solid evidence of positive return on investment. That means measuring performance before as well as after web services are implemented.

Stick to the standards. “I’m still a big fan of XML and the promised standards,” says Lupton. “As more and more companies implement them, the need to care about whose data is the most critical and who will have to convert should be eliminated.”

Plan to implement and migrate in increments.

Doing web services in increments gives you the ability keep things simple and on budget—and to generate the incremental ROI that will keep support for web services development high.



Because web services are loosely coupled, they can be phased in incrementally at different levels, and your staff can learn about them as they go. Don’t let your web services project momentum get ahead of your organization’s knowledge curve.

Some organizations are implementing web services in successively more mature stages. They begin with read-only, data-centric services that imitate existing APIs, move on to two-way transactional services that can leverage emerging standards and products and finally field document-oriented, asynchronous services addressing sophisticated business processes.

Choose your weapons. You’ll need to decide on a core services platform. Many use as a foundation the work they’ve done on Windows and J2EE servers. Or you can turn to enterprise software platforms, which are being adapted to deliver web services, or newer service- and/or event-oriented integration platforms.

Design for the future. This means you’ll want your web services efforts to be fully scalable. Among the issues to keep in mind are:

- **IT infrastructure integration.** Use web services standards across your entire enterprise; use naming conventions to label your infrastructure. Build shared infrastructure services to ensure security, reliability and manageability (candidates include: data transformation and logging applications).
- **Web services that are integration-agnostic.** The more kinds of integration you can support, the better. After all, your organization needs:
 - Interface integration, to deliver a single, interactive user experience
 - Data integration, to federate data and transport enterprise information
 - Application integration, to bring true interoperability to infrastructure architecture
 - Process integration, to orchestrate applications and services
- **Process-centric web services.** Before selection of data types or APIs, each web service should be designed as a discrete task with business process inputs and outputs.

“With the mix of products now available, organizations have greater possibilities for selecting products that provide the best ROI for their integration needs.”

—Kathy Quirk, analyst, Nucleus Research

Harbor Federal Savings Bank Enhances Secure, Scalable Banking Services

CASE STUDY

With \$2.4 billion in assets and 34 full service banking branches, Harbor Federal Savings Bank (Nasdaq: HARB) is one of the largest independent financial institutions in Florida. It also has the distinction of being rated the *number one safest* bank in the state.

As a longtime Attachmate customer utilizing a Unisys ClearPath NX host, Harbor Federal knows the importance of working with a vendor with expertise in both host access and Unisys legacy systems.

INTERNET-SAVVY CUSTOMERS REQUIRE ONLINE ACCESS

Early on, the bank recognized the benefits of using the Internet to provide customer service, says Annetta Smith, IT director for Harbor Federal and asked Attachmate consultants to codevelop an application to get the bank "where we needed to be."

Using Attachmate SDK technology, Harbor Federal's Internet banking services rolled out in 1999, offering customers retail banking via the Internet (account information and transfer of funds). Online banking proved so popular with customers that the bank has continued to add more features, such as external funds transfers.

Recently, it has rolled out a check-viewing feature. Attachmate worked with Image Soft to reproduce check images and create the onscreen presentation. Nearly 100 customers a week are signing up for the option.

Currently, Harbor Federal has about 24,000 commercial and retail customers using online services, with 10,000 transfers a month. Thirty percent of the bank's accounts are online and about \$2 million per month is moved via the web. With increasing levels of activity, it continually enhances online services, which it treats as its highest-volume-transaction "branch."

SMART CONNECTORS TAKE ONLINE SERVICES TO THE NEXT LEVEL

The first bank in its area to offer secure bank-to-

bank transfers, Harbor Federal is adding more features and functionality by migrating to Attachmate myEXTRA! Smart Connector technology.

Smart Connectors allows the bank to automate processes from the front-end user interface by making the link to the back-end host functions necessary to complete the transactions. Processes previously done manually, like stop payments, will be automated. Customers will be able to transfer funds to other banks with preverified forms.

"Information will be auto-populated, so there is no need to type in data. Customers simply pick and choose options," adds Smith. New commercial functionality will include check verification, wire transfer and ACH origination via the Web.

"This is just amazing," says Smith. "Smart Connectors allows us to go in different areas, improve efficiency and gives us more management capabilities, plus it's a lot easier. And we don't have to disturb our current online system while we implement the new technology. Customers will still enjoy the simplicity of the interface, without disruption of service."

ATTACHMATE SOLUTION SIMPLIFIED IT TASKS

Harbor Federal wanted easy maintenance and the flexibility of integrating data from multiple sources, accessing various types of database engines.

"We looked at other vendors with good database applications, but where those vendors were required to talk to the mainframe, there was a breakdown. We selected Attachmate because of its expertise in host access and especially its Unisys knowledge," says Smith. "I met with Attachmate and said 'I think we can make this work,' and we did."

For more information on how Attachmate can help you, visit www.attachmate.com

attachmate™

- **Migration path awareness.** Web services should be designed to accommodate anticipated migration paths.
- **Development using a standard component framework.** This promotes reuse of modules and systems, enabling you to migrate legacy assets to web services as need and opportunity demands.
- **Adaptability to new IT models.** Notably, CIOs should consider on-demand computing, portal-based clients and grid computing.
- **Expect to make changes you don't expect.** Surviving and thriving depends on one's ability to adapt to evolving circumstances. Pragmatism rules.

What is Service-Oriented Architecture?

SOA is a software design principle that promises to:

- Incrementally develop and deploy business software
- Reuse business components in multiple channels and environments
- Assemble new business processes at low cost
- Bring clarity to application topology

How it works: A description language defines all functions as services that have invocable, platform-independent interfaces that perform business processes when called. All services:

- Are based on a platform-independent interface contract, so clients from anywhere, in any operating environment, using any language, can use the service
- Can be dynamically located and invoked
- Are self-contained, so each service maintains its own state

Web services are one way to implement an SOA, providing a kind of service-oriented architecture in which network-accessible software functions (application services) are made accessible using platform-independent web standards. These standards define protocols for communications and interfacing that can be provided

via a server or invoked from any application client. Key web services protocols include XML (eXtensible Markup Language), SOAP (Simple Object Access Protocol), WSDL (Web Services Description Language) and UDDI (Universal Description, Discovery and Integration), which work as follows:

XML tags the data.

XML enforces document rules using a standard alphabet, punctuation and words to encode messages and describe interfaces, so developers can create customized tags that define, transmit, validate and interpret data between applications and organizations.

SOAP transfers the data.

SOAP describes the content of a message and how to process it—called the SOAP envelope—and provides a binding framework for exchanging SOAP envelopes, including an ability to represent application-defined data types and remote procedure calls and responses.

WSDL describes available services.

WSDL is an XML format that defines network services by abstractly describing messages and operations and then binding them to specific network protocols and message formats to define an endpoint. Such abstraction makes WSDL a very flexible way to describe complex web services applications.

UDDI lists available services.

UDDI is a set of protocols and a public directory of a network's registered web services that can be accessed in real time, enabling the hosting of multiple versions of a service, management of services access and creating aliases to services.

Web services can be used—and importantly, reused—in any type of network environment without the user needing to know implementation details, so web services support a wide range of data interactions, including business-to-business and peer-to-peer. In effect, an enterprise's IT functionality is made available on the (public) network as a collection of discoverable services. **SD**

“While the importance of integration to creating an ‘on demand’ business presence cannot be overstated, it will not be easy to achieve.”

—Steve Garone, chief analyst and managing partner at the AlignIT Group

Tools of the Integration Trade

BEGIN WITH THE DATA

In 2002, about five exabytes (one exabyte = 1018 bytes) of information were generated in print, film and magnetic and optical storage, according to a study by the University of California-Berkeley. That's roughly 800 megabytes of recorded information per year for every human being on the planet.

Such massive amounts of data are intensifying the strain on corporate information systems already

struggling with serious data quality problems—problems that cost U.S. businesses about \$600 million in 2002, according to estimates from The Data Warehousing Institute. Data quality issues are triggering failure in more than 50 percent of CRM initiatives, say analysts at Gartner.

Arguably, then, IT integration starts with the data. Businesses that don't integrate their data can't expect to do more than behave as a collection of noncollab-

THE FOUR-STEP APPROACH TO ATTAINING GREAT DATA

Proper integration means making data quality a top priority. CIOs can improve data quality by taking these key steps:

1 ENSURE DATA CONSISTENCY

- **Profile all of your source systems** (using reconnaissance software) in terms of data content, data dependencies and data quality.
- **Establish enterprise-wide data definitions and metadata** and possibly rules and processes for data capture.
- **Centrally store master data dictionary**, enterprise metadata and related information about processes so it's universally available.
- **Standardize the data** your enterprise depends on to do business (for example, product/service information, customer names).
- **Match records across data sources** to resolve any conflicts or redundancies between sources (and the business processes they support).
- **Apply uniform rules, procedures and processes** to new real-time data as well as batch data cleansing.

- **Automate data integration chores** that are manually tedious and resource-intensive, such as data extraction, repurposing, transformation and loading so these processes are reliably repeatable and can be adapted easily to changing business conditions.
- **Deploy information lifecycle management tools** to help maintain data value and integrity over time.

2 ADJUST YOUR IT INFRASTRUCTURE TO ACHIEVE DATA CONSISTENCY

- **Opt for interoperability**, which is achievable these days in two ways:
 - 1) *Deploying suites* that include data quality, profiling, integration, metadata management and other key data functions in a single platform
 - 2) *Adopting open standards* such as XML and web services, J2EE and .NET, to integrate legacy data and systems including those in other enterprises.
- **Employ a scalable architecture and platform environment**, so you can adapt to evolving business conditions, manage large amounts of data

and respond to growing data volumes and integration requirements.

3 KNOW THY DATA

- **Understand how your business creates its information**, including how data emerges from the ways your business touches its customers and prospects.
- **Apply a single enterprise wide set of business rules** to the integration of all customer data, regardless of its source or use.

4 IMPROVE THY DATA

By developing new ways to use it, like combining real-time customer data with customer transaction histories, demographic data and financials, companies will find that their data yields better and more useful insights, all in support of the legendary 360-degree view of the business and its customers.

"To create trusted information," says Mark Battaglia, senior vice president of marketing at Initiate Systems, "CIOs must become as vigilant about data integrity and data integration as they are about data storage and data movement."

orative neighboring units. “Data is the fuel of the on-demand enterprise,” says Mark Battaglia, senior vice president of marketing at Initiate Systems. “Without accurate, up-to-the-moment data, on-demand just enables you to make mistakes faster.”

And as more data get created with each passing



WHAT'S IN A BYTE?

Gigabyte = 1,000,000,000 bytes (10^9 bytes)

Terabyte = 1,000,000,000,000 bytes (10^{12} bytes)

1 Terabyte = 50,000 trees made into paper and printed

Petabyte = 1,000,000,000,000,000 bytes (10^{15} bytes)

200 Petabytes = production of digital magnetic tape in 1995

Exabyte = 1,000,000,000,000,000,000 bytes (10^{18} bytes)

2 Exabytes = total volume of information generated worldwide annually

5 Exabytes = all words ever spoken by human beings

Zettabyte = 1,000,000,000,000,000,000,000 bytes (10^{21} bytes)

Yottabyte = 1,000,000,000,000,000,000,000,000 bytes (10^{24} bytes)

minute, it's no longer practical for organizations to use third-generation languages (3GLs) and scripts to hand-code the extract-transform-load (ETL) work that underlies their data integration initiatives.

These days, ETL—still at the heart of data integration—encompasses several core capabilities:

- Automated data profiling to uncover source data structure and content
 - Assuring consistent data quality
 - Strong ETL functionality that can integrate data from any source and load it to any target
 - End-to-end metadata management so there's uniformity in the ways an organization defines, tracks and manages its data
 - Scalability to handle integration tasks involving ballooning data volumes and shrinking time frames
- “Hard returns related to data cleansing efforts often come from the reduction or elimination of the labor costs associated with hand-coding data cleansing applications and manual reconciliation of individual records,” says Pete Fiore, president of Ascential



Software. “Productivity gains delivered by automating previously manual processes are substantial, especially in view of the increasing demand to profile and cleanse data in large scale across the enterprise.”

For example, WesTrac Equipment, an Australian dealer for Caterpillar, needed its SQL Server-based purchasing application to interact with other business applications and numerous web applications required database-resident business information in real time. DataMirror's Transformation Server did the trick, delivering ROI faster than WesTrac expected: the three-year ROI of the measured WesTrac applications and services that rely on Transformation Server is roughly \$3 million.

Customer Data Integration

Much of business and IT integration contributes to enterprise cost savings that improve the bottom line. Adding to topline revenues, however, is another matter.

For many companies, a first step to boosting revenues is improving the quality of its customer data: when you know who your customers are and how you've interacted with them, you can identify the most profitable products, relationships and strategies.

“Obtaining an accurate, single view of the enterprise, including external relationships, can directly translate into expanded and longer relationships with less attrition,” says Ascential's Fiore.

But launching an enterprise-wide data quality initiative can be complex and resource-intensive in its

own right. It requires that you deal not just with data volume, but also:

- The many and varied channels through which customer data flows
 - Customers' high mobility—direct marketers estimate that about 2 percent of a typical consumer database “goes bad” each month
 - The lack of integration among systems and applications
 - A growing collection of regulations and compliance requirements that drive how data is collected, used, stored and secured
- “Regulatory or legal requirements such as Sarbanes-Oxley or HIPAA are the impetus for a better understanding of data quality and its impact on the business,” Fiore says. “The mandate for better corporate governance and financial transparency has also been a significant driver and has raised the stakes, because poor data hygiene can result in criminal and civil penalties.” **SD**