

Application Integration Challenges

Vendor Middleware-based Integration Beats Custom
In-house Solutions, Provides On-ramp for SOA Era

About this White Paper

Enterprise-wide regulatory mandate compliance, SOA adoption, business and Application Integration (AI) and security all remain top CIO IT priorities for 2006/2007, and are closely linked.

Enterprises today are actively improving/streamlining their core business processes by integrating internal business/application silos, and across their extended ecosystems. They seek to integrate processes, people, and information seamlessly. AI is the vital underpinning of such business integration/process improvement. Enterprises also seek to ensure compliance with multiplying regulatory demands, and AI is thus also central to compliance delivery. AI has been a major, ongoing effort for many years, but this faster pace of business change has greatly increased AI demands.

Many enterprises have also now adopted Service Oriented Architecture (SOA), the game-changing new "software as services" architecture for flexible and adaptable business applications, and all leading analysts now project widespread further adoption.

Despite rationalization, application portfolios remain large (*up to 1,000 systems in the largest 500 global firms and up to 400 in the next top 10,000 enterprises*). The number of integration points needed is also high (*averages of 1,000 and 500 respectively for these two groups*).

Robust, advanced Vendor Application Integration Middleware (VAIM) platforms (*that make AI much faster and cheaper to implement/support, and provide superior operational attributes*) have been available for almost fifteen years. These platforms, based on Message-Oriented-Middleware (MOM) technology, have advanced greatly and proven these benefits at thousands of customer sites. Today, such platforms also provide the "message-based backbone" underpinning the "Enterprise Service Bus" that is central to the SOA approach. They thus provide one of the major "on-ramps", or entry points, to SOA.

VAIM adoption is near universal (~100%), amongst the largest 500 global enterprises, but plummets below 50% amongst the next 10,000 largest firms, and is only 20% amongst the next 250,000 medium-sized businesses worldwide. Even amongst adopters, we found the proportions of the integration projects performed using VAIM were surprisingly low (*30-45%, 15-25%, and 25-30% on average respectively*). These findings raise important questions, including:

- What methods have enterprises actually used to deliver their completed AI projects?
- Why are even VAIM adopters still using other methods on some AI projects?
- Why are the proven benefits of VAIM platforms not more widely accepted/understood?
- What is the relationship between VAIM platforms and SOA?

Our shocking research finding was that custom-built, in-house, hard-coded AI solutions (*a majority using free FTP software*) have been the most widely-used approach. Such links take 2 to 4 times as much time/effort to build as VAIM-supported AI projects, and need similar multifold maintenance/support efforts. They are also insecure, fragile, and vulnerable. Enterprises relying heavily on this approach (*as it seems many still do*) have built intrinsically weak links into their application infrastructure. They have also wasted precious development/support resources needlessly.

Many clearly fail to understand why good VAIM/SOA platforms provide far superior, universal, cost-effective and maintainable AI solutions. In this updated White Paper, Software Strategies reviews the drivers for AI today, and examines the global size/scale of the AI challenge. We also uncover the actual methods companies have used to deliver AI to date. We further analyze the adoption/internal deployment levels of VAIM platforms by enterprises of different sizes, and suggest VAIM/SOA platform selection criteria, and review strategies to improve the present situation.

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White Paper

Application Integration Challenges – Vendor Middleware-based Integration Beats Custom In-house Solutions, Provides On-ramp for SOA Era

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1. Executive Summary

This Executive Summary overviews our findings, assessments, and recommendations for IT users, detailed/developed fully in the White Paper itself.

1. **Top IT Priorities for 2006-2007:** Regulatory compliance, SOA adoption, business integration, and security all remain rated top IT priorities for 2006-2007 in most CIO surveys, and are closely linked.
2. **Strong Applications Integration (AI) Demand Growth:** AI, the linking of separate applications to exchange information, has come to the foreground as enterprises again increase IT investments, and seek top-line business growth. The above priorities, plus business transformation, continue to drive many new AI projects. (*We introduce AI in Section 2, and assess its main drivers in Section 3.*)
3. **Distributed Computing Increased AI Challenge:** When most enterprise applications ran on mainframes, application portfolios were smaller and within-single-platform integration at one central location was much simpler. Wide deployment of distributed computing applications multiplied AI challenges, adding many new applications plus multi-platform AI complexity.
4. **Soaring Service Oriented Architecture (SOA) Adoption Now Changing Application Landscape:** Now, in late 2006, we see explosive adoption/growth of SOA, fast becoming the dominant model for next-generation business applications. Indeed, connectivity/integration needs are one of five main entry points companies are adopting SOA to address, and improved approaches to AI are integral underpinnings for an SOA. A great SOA strength is the extensive reuse of existing software assets it allows, and the incremental implementation that it permits.
5. **Enterprise Application Portfolios Must be Better Connected:** Enterprises assembled wide application portfolios on multiple IT platforms over recent decades (*400-1000 systems in top 500 global enterprises*). Many more internal, and external ecosystem partner application, links are still needed. This application connectivity challenge is sharply illustrated in Figure 1. SOA, with its many other benefits, is increasingly the preferred means of such portfolio AI connectivity improvement. (*We size this AI challenge in Section 4.*)

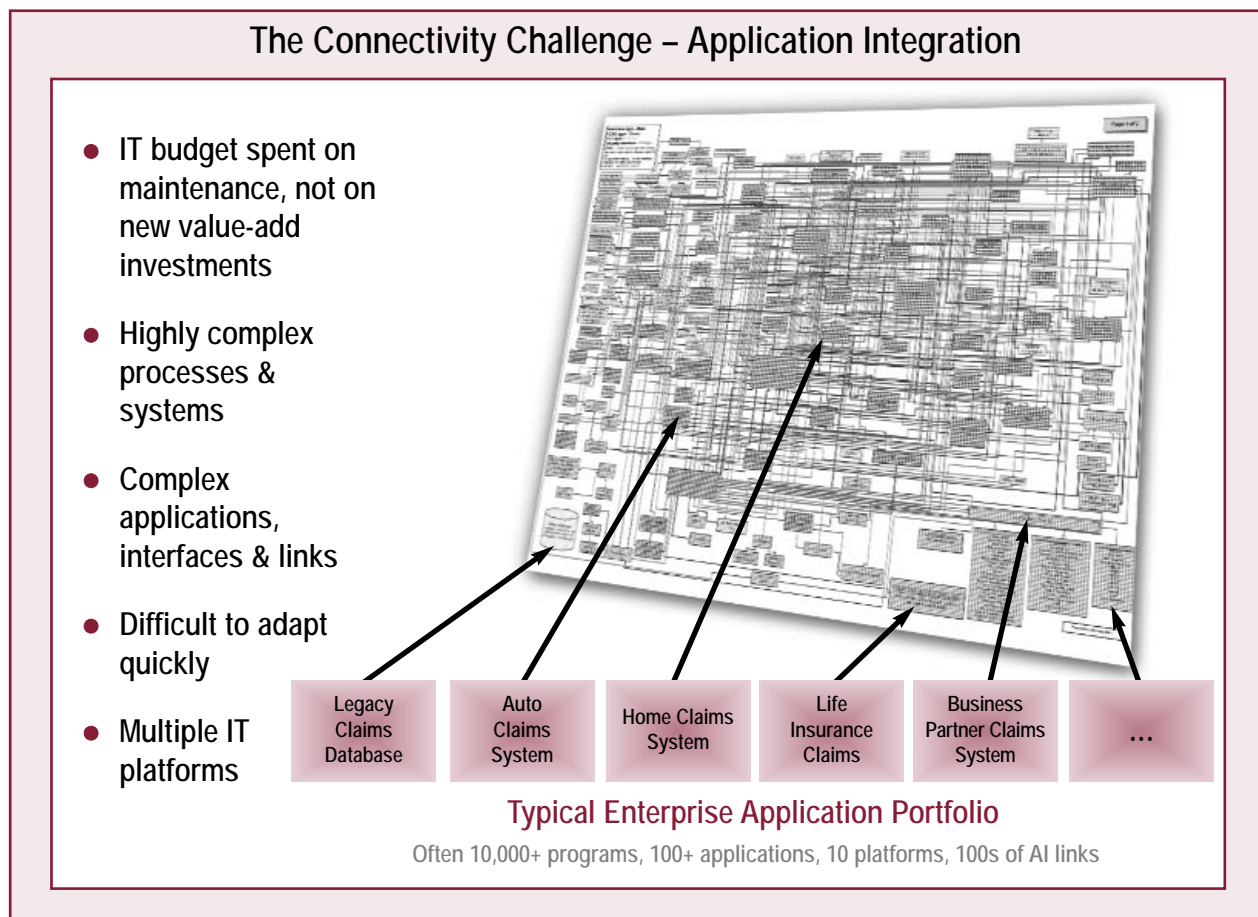


Figure 1: The Connectivity Challenge – Application Integration

6. **Vendor Application Integration Middleware (VAIM) Platforms Well-proven:** VAIM platforms make AI much faster and cheaper to implement/support, and provide superior operational attributes. Such suites have been available for over ten years,

...we counsel prospective purchasers to adopt a single, enterprise-wide VAIM/SOA platform...

became wide platforms, and have proved compelling benefits for thousands of customers. We found adoption near universal (at ~100%) amongst the largest 500 global enterprises. Why are other firms not yet making full use of this proven technology?

7. **VAIM Also Messaging Backbone for SOA:** VAIM platforms also provide the messaging/integration backbone for the Enterprise Service Bus (ESB) connectivity pattern central to SOA, as well as serving their traditional AI role. Thus, adopting VAIM now to support pressing AI needs is a big step towards, and enabler of, SOA adoption.
8. **Many Enterprises Still Missing Out on Proven VAIM Benefits:** Our research found barely 50% of the next 10,000 largest enterprises, and just 20% of the next 250,000 largest medium businesses, have adopted VAIM platforms to date. Given their proven benefits, non-adopter firms are missing out badly on this more flexible, faster and cheaper way to meet their burgeoning AI needs, and to begin their SOA adoption journey.
9. **Even VAIM Adopters Usage Not Universal:** Reality is even worse than the above suggests. Amongst VAIM adopters, we found that percentages of VAIM-based AI projects to date was low (30-45% for the 500 largest enterprises, 15-25% amongst the next 10,000 largest enterprises). What alternative methods had they used to implement AI solutions, and why were they still using these? (We examine VAIM adopter usage levels in Section 6.)
10. **Integration Methods Used Surprising:** We found that the mostly widely-used AI approach has been custom-built, in-house-developed, solutions. Built with low-level languages, most used free File Transfer Protocol (FTP) software for data movement. Such basic approaches need lengthy/costly development, are fragile, and need heavy/costly support. It is hard to understand why they are still so widespread! (We assess which AI methods have been most used in Section 5.)
11. **Custom-built Integration Users Wasting Time, Money:** Countless companies are thus still using slower, more staff-intensive, less secure and lower-performing AI approaches. (Gartner estimates that up to 35% of IT budgets are spent on integration). These create heavy/costly burdens of future support; surprising when affordable, more productive VAIM-based methods are easily available. Our firm advice is to "cease and desist forthwith".
12. **Problem Has Low Visibility:** Many CIOs must be unaware of how widespread such custom-built AI became in their portfolios, or what it was really costing them. AI work certainly has a low profile, and is commonly buried within larger application projects. Asking pointed questions, to find out the current extent, exposure and risks of this problem, is therefore advised.
13. **VAIM/SOA Platforms – The Way Ahead:** VAIM/SOA platforms provide comprehensive, broad-ranging capability for all AI needs on a common platform that also underpins SOA. Today, we counsel prospective purchasers to adopt a single, enterprise-wide VAIM/SOA platform, rather than the jumble of multiple point products otherwise needed.
14. **VAIM/SOA Benefits Not Understood Widely Enough:** Our analysis found almost 50% of the enterprise IT market and 80% of medium businesses have not yet adopted VAIM. We conclude that they still do not yet understand how deep VAIM benefits are, or the quick ROI readily obtainable. We counsel them to rapidly adopt this beneficial technology, now easily affordable, for their immediate AI needs and to underpin future SOA adoption.
15. **Open Standards Vital to AI/SOA:** Open standards play a disproportionately crucial role in enabling the integration and inter-operation essential for AI/SOA. Many open standards apply to AI/SOA, including the open J2EE™ programming model, the Eclipse open AD tools platform, Web services, TCP/IP networking, Secure Sockets Layer (SSL) security, and many more. VAIM platforms must fully support all these (and other) standards, for maximum potential, and proprietary middleware approaches should be avoided.
16. **VAIM/SOA Market Concentration Eases Selection:** A few vendors today offer complete, integrated, open VAIM/SOA platforms; these now lead the market in software revenue share. These leaders won share as customers sought quality, security and vendor endurance in a sector undergoing turmoil/consolidation through this decade. A huge wave of SOA innovation has also just matured. (We list and cameo a selection of leading VAIM vendors in Section 7.)
17. **High-level Criteria for VAIM/SOA Selection:** The VAIM/SOA market has consolidated (after the earlier profusion of vendors/offerings), but care/caution in selection is advised. Special VAIM/SOA platform characteristics demand rigor in vendor/platform short-listing/selection. We examine these factors in Section 7 and propose seven high-level criteria that sharply differentiate between the available alternatives. Prospective customers will find these helpful in making the right choice.

- 18. VAIM/SOA Platform Example:** In Appendix B we profile/assess the market-leading example of a VAIM/SOA platform (*IBM WebSphere MQ and related*) to illustrate the broad functionality/capabilities such products now provide. Those unfamiliar with this class of platform will find that this provides a useful overview of the sort of capabilities now provided.
- 19. Customer Benefits Striking:** In Appendix C we profile four diverse, recent customers adopting this VAIM platform, who gained striking benefits from its deployment. These illustrate, confirm, and underline the generic benefits cited above with specific and quantified gains.

2. Introducing Application Integration

About This White Paper

Software Strategies first published this popular White Paper in April 2005. It examined/assessed how enterprises have implemented their AI to date. Specifically, we researched how widely VAIM has been deployed, and what advantages it offered over traditional alternatives. We found surprisingly large areas for major improvement in how IT organizations have tackled their AI challenges to date. Now, in November 2006, we have completely revised/updated the White Paper to cover this vital topic from an end-2006/2007 viewpoint. SOA has now become the definitive architecture for next-generation business applications, and we explore and explain the close relationship between VAIM and SOA. The findings and conclusions presented here are ours alone.

Who Should Read This White Paper?

This new White Paper was created for CIOs, CTOs, Heads of Development and other Senior IT Executives in large IT organizations concerned with delivering enhanced, better-integrated applications portfolios to their businesses. It also addresses IT Managers in medium-sized businesses, who face similar AI challenges, albeit on a smaller scale. ISVs and SIs, often concerned with selecting and supporting AI middleware, for and with their customers, will also find this new White Paper of value.

1990-2006 Enterprise Application Portfolio Expansion Fuelled AI Growth

Today in late 2006, the explosive growth and widespread adoption of SOA, rapidly becoming the dominant model for business applications software, is also fuelling many new AI and connectivity demands. Indeed, connectivity/integration needs are one of the five primary entry points that companies are beginning their SOA adoption to address. But where did our application portfolios today come from? How did they evolve?

For years, IT organizations (*large and small*) needed to develop/support an expanding number of AI links to interconnect their many diverse applications (*often on different platforms*). The rapid 1990s proliferation of distributed computing (*Novell NetWare, Windows/Intel, and various RISC UNIX flavors, etc.*), alongside established host mainframes, midrange systems and large PC populations, also found in most enterprises, was a major AI driver. These distributed platforms supported new client/server applications that became pervasive and important components of today's enterprise application portfolios. Departmental and workgroup productivity, e-mail and collaboration, EDI, Enterprise Resource Planning (*ERP*), Customer Relationship Management (*CRM*), and Supply Chain Management (*SCM*) were foremost examples, requiring many new AI links between existing transaction/business systems and these newer applications.

The huge, late-1990s wave of e-business and Web applications was the next major driver of AI projects, adding Web sites, Web serving, B2C, B2B, and many other new types of Web-based application, most requiring multiple integration links with other enterprise applications.

AI Approaches – Early Evolution

AI has always involved moving data out of one application, often across platforms, and into another. It often performed other intermediate processes (*extraction, cleansing, transformation, aggregation, security, and logging, etc.*) on the data en-route.

AI links were originally all custom-developed by IT teams, using familiar, low-level 3GL languages, scripting tools, any available proprietary interfaces or exits, and file and database managers. This custom development was costly, both in initial development time/effort, and in the ongoing maintenance/support resource they consumed.

Proprietary system/application architectures on multiple platforms, lacking common unifying standards, amplified the effort/cost of building such custom integration links. They were tightly-coupled, hard-coded, and point-to-point. They were thus inflexible, and vulnerable to changes in any part of the connected infrastructure. Analysts would therefore not expect to find this approach widely used today in late 2006.

The 1990s rise of TCP/IP networking, now the near-universal enterprise network/Internet Protocol standard, brought FTP, a simple, standardized method of moving files from one location/platform to another. Enterprises began using basic FTP software tools (*often free and widely available*) within their custom AI solutions. FTP software provided core data-moving functions, and the customer wrapped it with still-considerable custom logic code to perform the other needed functions, with the same rigidities as above, but with some savings in effort. Amazingly, our research revealed that this simple, unsophisticated approach to AI remains the most widely-used solution approach found today.

Vendor Application Integration Middleware

To address this near-universal and fast-growing wave of AI, a new class of VAIM products/suites emerged from the early 1990s. The uptake of such middleware has grown steadily to date. One market research firm (*WinterGreen Research: August 2004 EAI Report*), for example, recorded \$2.5 billion in 2003 Enterprise Application Integration middleware software license and direct services revenues, and forecast growth to \$5.9 billion by 2009. Many new vendors had entered this market (*over 200 at its 2000 peak*), with diverse integration solutions. These included many proprietary and point offerings, and a few open standards-based universal platforms. By 2003/04, after much consolidation/turmoil, a well-defined VAIM market, dominated by a few major players, had emerged. Over the period from 2004-2006, this market morphed into today's SOA-centric middleware market that now encompasses and includes VAIM as one of its numerous domains and strengths.

VAIM – What Does it Do, and why is it Needed?

All VAIM products simplify, speed, and ease AI by providing middleware software engines that offer all common functions/services required in integration scenarios. Their use increased flexibility, and greatly reduced AI custom development and maintenance effort, at the cost of software license fees. The better products delivered broad and compelling benefits. As in any new software market, many technologies/approaches were tried, a few offering general **VAIM platforms** for integration, but most offering point solutions/specialized approaches. Over this fifteen-year period, the winning technologies (*based on Message-Oriented-Middleware (MOM) message-passing technologies*) and vendors emerged, and proved their value at thousands of IT-user sites. The earlier profusion of small AI middleware vendors has now been sharply consolidated through mergers, acquisition or failures. VAIM platforms now form the message-based underpinnings for wider SOA platforms.

With high and continuing pressure on enterprise IT teams to “do more with less”, readers would expect such now-mature VAIM platforms (*well proven to deliver “better, faster, cheaper” AI solutions*) to be universally used on all AI projects.

SOA Adoption Changing the Application Landscape, Driving VAIM Adoption

SOA is a business-centric IT architectural approach that supports integrating the business as linked, repeatable business tasks, or services. SOA helps users build new-generation, flexible, adaptable, composite applications that draw upon new and existing

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functionality from multiple sources, within and beyond the enterprise, to support horizontal business processes. SOA uses standard interfaces and Web services to turn software components into reusable “services”, and provides unprecedented agility, flexibility and speed in creating new applications that better support improved business models/processes. Existing application software components, packaged as services, can thus be heavily reused in new SOA composite solutions. All/connectivity is thus one of the principal entry points to SOA. SOA applications have an architecture using a loosely-linked, services/component-based (*many reused traditional components*) model that is very different from traditional, monolithic enterprise applications. SOA adoption amongst Enterprise IT users has been rising rapidly from 2004, as the data in Figure 2 (*on page 9*) shows, and is now in the “early majority” adoption phase.

VAIM platforms have been extended recently to provide the messaging and connectivity backbone for the Enterprise Service Bus connectivity architectural pattern which underpins SOA, which itself also requires a new generation of additional SOA middleware and tools. Every full SOA adopter will therefore require a VAIM platform component: these today have become part of comprehensive, integrated VAIM/SOA middleware/tools suites. Adopting a VAIM platform brings immense direct benefits in complex, traditional application environments, but also provides the connectivity entry point and enabler for SOA.

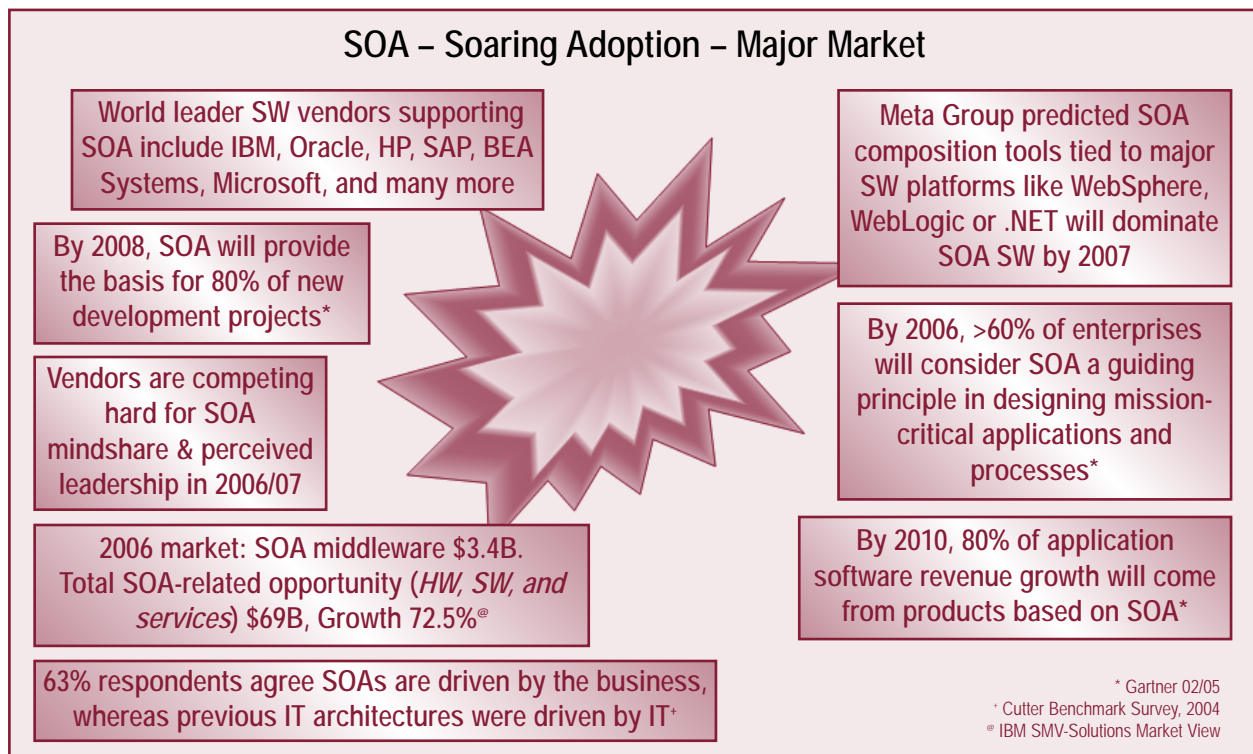


Figure 2: SOA – Soaring Adoption – Major Market

Our Research Reveals Shocking AI Practice Truths

For this White Paper, we researched and analyzed how businesses had, in reality, implemented their AI solutions to date. In descending order, these were:

- **Custom-developed, free FTP package-based approaches.** Amazingly, far the most widely used AI method deployed to date (*in all sizes of business*).
- **VAIM platform-based solutions** were the second most widely used approach
- **Custom-built, in-house solutions (not using FTP)** were the third most widely-used method of integration
- **Vendor “Enhanced FTP-based” middleware point integration solutions** were the fourth most widely used AI approach.
- **Manual AI functions/processing.** Incredibly, business change consultants discovered numerous cases of whole staff departments employed wholly/mainly to provide manual AI operations.

These surprising, even shocking research findings are more fully presented/discussed in Section 4.

Findings Pose Important Questions for IT Management

These findings pose challenging questions for CIOs (*and other senior IT executives*) responsible for enterprise IT strategy and technology, including:

- Why are such primitive and costly AI approaches still so widely used today, fifteen years after the first AI middleware solutions (*offering a much superior approach, and now long-proven to work well*), became available?
- Do companies, still widely using the primitive approaches above, realize how much more these are costing them than VAIM-supported solutions, and how much higher the risks are?
- Amongst those who have introduced VAIM platforms (*clearly recognizing their benefits*), why have they only deployed it on moderate proportions of their whole AI portfolios, when the benefits are universal and now very well established?

We amplify, discuss, and answer these questions, and provide our recommendations for improvement, in this White Paper.

Our Analysis

AI is a universal need that has expanded greatly over the last 15 years as application portfolios grew wider. Today, numerous powerful drivers are pushing enterprises hard to implement many more AI links for compelling reasons, including regulatory compliance demands. The rapid rise of SOA is now one of the foremost of these drivers.

Traditional “hand-tools-based” and “do-it-yourself” in-house approaches to AI remain widespread, despite their serious disadvantages and costs, and the long availability of well-proven VAIM platforms that do a far better job.

The leading VAIM platforms have been near-universally adopted by the largest 500 enterprise IT users, but by a far lower percentage of other enterprise IT users, and by a still lower percentage of medium-sized businesses.

...enterprises are therefore wasting large amounts of scarce development and support resources by continuing to build and maintain AI links with such basic techniques.

In our assessment, many enterprises are therefore wasting large amounts of scarce development and support resources by continuing to build and maintain AI links with such basic techniques. In doing so, they are adding to their legacy software burden. These links soak up unnecessary support resources and, with their fragility, create far higher risks of disruption of the business.

3. Application Integration Growth Drivers

Research Reveals Eight Main AI Drivers

Our research identified eight principal 2006/07 drivers of the rapidly growing demand for AI at IT organizations (*large and medium*) throughout the world. These are highlighted, and ranked by importance/frequency of occurrence, in Figure 3. We briefly discuss each of these below.

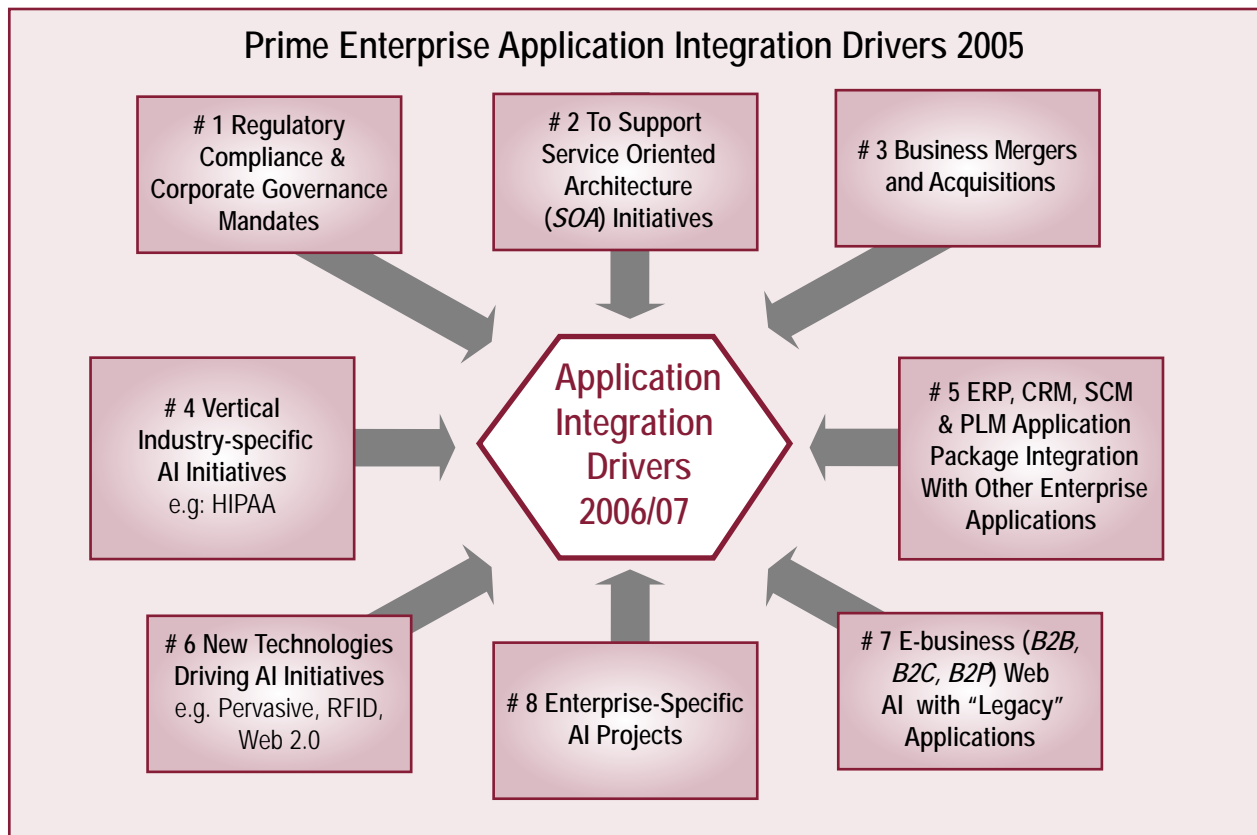


Figure 3: Prime AI Drivers 2006/2007

- **# 1 Regulatory Compliance & Corporate Governance Mandates:** Most analysts continue to rank today's large and growing wave of regulation/compliance demands, now placed on enterprises in every marketplace and every geography, as the strongest current driver of AI projects. Many of these initiatives place stringent demands for assured integrity, security, risk reduction, traceability (*and other such attributes*) on the regulated organization. These are now a principal concern of boardrooms everywhere. These regimes place extreme pressure on the enterprise IT systems that support the core business, which usually involve new AI links. Efforts to improve corporate governance lie behind many of these regimes. We amplify and discuss this important driver more fully in Appendix A on page 26. (*Ranked # 1.*)
- **# 2 To Support SOA Initiatives:** SOA has exploded as the most transforming new business applications software architecture ever seen, with enterprise adoption now climbing rapidly. SOA offers many decisive advantages over earlier, monolithic application architectures, providing new, better ways to integrate and reuse the wealth of existing application components as callable services, via Web services and open standards. Based upon the pattern of an Enterprise Service Bus that interconnects all the "services" across the enterprise, SOA is underpinned by advanced messaging-based VAIM middleware that provides the application component integration/communication services needed to link services/components, without requiring any rewriting or replacing of the services or components themselves. SOA can be implemented incrementally, step-by-step and area-by-area, for early payback. SOA is crucial for those enterprises aiming to become On Demand businesses by better-integrating their processes, people and information, streamlining their core business processes, and becoming better able to respond quicker to fast-changing demands. SOA therefore supports business integration, process integration, and people integration, and AI is fundamental for all of these. (*Ranked # 2.*)
- **# 3 Business Mergers & Acquisitions (M&A):** The global number and value of M&A transactions hit high levels through 2005/2006 and are continuing apace. In every closed M&A transaction, integrating the systems and applications of the acquired firm with those of acquirer, quickly and cost effectively, is often critical to achieving the planned merger/acquisition business benefits sought. Cost reductions from IT systems, data centers, staff and applications consolidation and rationalization are one major type of benefit. Improved business processes with faster cycles, lower costs, and better services, cross-selling, and increased productivity from deployment of "best-of-breed" processes, solutions and applications from both parties across the whole merged enterprise, are the other major type of M&A benefit. Regrettably, many M&A transactions fail to yield the synergistic benefits hoped for, with the difficulty of IT integration often a major cause. Advanced VAIM platforms drastically simplify, speed, and enable such complex system and application transitions, and thus deliver M&A benefits faster and more securely. (*Ranked # 3.*)
- **# 4 Vertical Industry-specific AI Initiatives:** In many vertical industries, networks, exchanges, and markets, data interchange standards are already important elements within that industry's ecosystem. These all require AI between the enterprise applications of the industry network members. Early examples included the SWIFT network and financial message exchange standards for inter-bank transactions, the SITA network and its protocols in the airline industry, and many others. Recently emerging are fundamental new models/standards, such as HIPAA in the US healthcare industry. This seeks to electronically integrate and standardize the whole healthcare provider, healthcare insurer, and healthcare management nexus of that industry around a common framework, to achieve large cost savings of benefit to all participants. The national standard interfaces that integrate bank systems to the national clearing system in each market are another typical example. As more industries understand the large benefits and cost-savings such industry-wide initiatives bring to all participants, their number has steadily increased. All require extensive AI. (*Ranked # 4.*)
- **# 5 ERP, CRM & SCM Application Package Integration With Other Enterprise Systems:** Several \$100Bs were spent worldwide purchasing, implementing and deploying a new generation of packaged, standardized, enterprise applications over the last dozen years. ERP, CRM, SCM and Product Lifecycle Management (*PLM*) were the four most widely deployed categories. Their implementation proved a massive, time-consuming effort, not least because of the many AI links needed to connect these (*originally somewhat monolithic, proprietary applications*) to other existing customer applications. Openness/integration options provided in such enterprise application packages have improved considerably today. The better VAIM platforms also now offer standard adapters/connectors to these major packages that greatly simplify their integration. Wider deployment of such packages continues, so new AI link projects of this type continue to be a major driver. Over the next three years, the leading application vendors have also promised next-generation versions of their packages based on SOA architectures, which will start a decade-long cycle of replacement of today's installed package inventory, driving further long-term AI work from this area under SOA architectures. (*Ranked # 5.*)
- **# 6 New Technologies Driving AI Initiatives:** Another important driver is newly-emergent technologies that require extensive AI links with existing systems. Four examples illustrate this group nicely. **Pervasive/mobile computing**, connecting workforce mobile devices to corporate systems, has spread widely in recent years as a new productivity and communication support for increasingly mobile workforces, using mobile devices such as cell-phones, pagers, notebook PCs, and handheld computers, etc. All pervasive and mobile computing deployments require extensive AI links. Another, also now gathering real momentum, is **RFID (Radio Frequency Identity Detection)**, which promises to allow dramatically better tracking of supply chain and inventory/goods throughout their manufacturing, transportation, distribution, sale and "in-service" lifecycle phases. RFID is now beginning to move beyond early pilot and POC trials to real deployments, will generate floods of new data, and will always require extensive AI with existing systems. **Sensors and Actuators-based systems** are another fast-growing and widely used newer technology, for example, remote monitoring of instrumented pipelines, process or manufacturing plants, and transportation systems. These have sensors attached to detect statuses, and actuators to change plant/equipment controls that can be remotely monitored and operated respectively over networks. These applications often require considerable AI to connect them to other subsystems. The so-called **Web 2.0 generation** of rich-media/UI and user contributed content applications, is a fast-emerging fourth of these drivers. (*Ranked # 6.*)

- **# 7 E-business (B2B, B2C, and B2P) Web AI Links with “Legacy” Applications:** Since 1997/98, a long-running driver of many new AI links has been e-business. Pulling together new Web applications to support B2B, B2C and B2P online applications required, and continues to require, a profusion of AI links and services to interconnect newly-written functionality, legacy applications and enterprise package applications, such as those listed above. Most analysts now categorize this type of integration under the SOA banner, with its newer Web services technology, and true open industry standards-based, componentized integration approach. The new “Web 2.0” technologies are generating a further new wave of this type of development.
- **# 8 Enterprise-specific AI Projects:** There are also many other company- or geographically-specific AI links needed. These combine in this last category as they fall outside the other drivers mentioned above.

Few enterprises will experience all eight types of driver on their business development roadmap at any one time, but many will be focusing on at least three or four. All require extended AI capability.

Our Analysis

SOA has now become the most important new architecture for business applications in IT history, and adoption is progressing rapidly.

SOA has now become the most important new architecture for business applications in IT history, and adoption is progressing rapidly. SOA provides new flexibility, adaptability, tighter business alignment, easier reuse of existing software assets, and many new ways of more easily integrating the enterprise's business processes, people and information. SOA is based on

the ESB pattern of a standardized, simplified means of communicating between application and system “services” (or components). An ESB is in turn underpinned by the same VAIM message-based technologies that have long provided the most effective conventional AI solutions, extended with support for event-driven interactions, and business process management. AI connectivity is therefore one of the five main entries points driving customers to early SOA adoption. SOA adopters will therefore implicitly be following our advice to use such VAIM platforms. It essentially also allows much of today's enterprise application portfolios software to be reused as services in next-generation business applications in an incremental manner quickly and easily.

The traditional AI challenge has long been substantial, but the eight drivers above continue to increase it. With global IT investment continuing to grow through 2006/07, most critical business initiatives will fall into one or several of these categories, each demanding additional AI work.

Regulatory compliance mandates cannot be ignored and remain a top-priority, externally compelled driver. All other enterprises wishing to cope better/faster with their continuing, large wave of AI, and also wanting to avoid adding further future support burdens, should also ensure that they are using more productive VAIM platform approaches on all/most of their new AI projects. If they have not yet adopted VAIM platforms, now would therefore be a good time to do so, whether or not SOA is yet on their development roadmap.

Enterprise portfolios of older, custom-programmed AI links cannot be swept away overnight, but should be systematically replaced, rather than patched, whenever substantial upgrades are required, or whenever their linked applications are overhauled for justifiable business reasons. Deployment of the SOA approach for an application area provides another good opportunity to retire more of these fragile, costly custom links. Over a period, consistent application of this recommended policy will steadily reduce the legacy maintenance burden this link portfolio represents today, and sharply cut business risks, at modest incremental cost. We also recommend companies make this approach a formal internal standard, to ensure the migration occurs as fast as possible.

4. Sizing Today's Application Integration Challenge

How Big is the AI Challenge?

What is the scale of the AI challenge for large and small business enterprises? We found three metrics determine the amount of AI needed by an enterprise/business.

- **Existing Enterprise/Business Application Portfolios:** The number of applications in a customer portfolio is an obvious determinant. Most IT groups recognize/use this metric; enterprise application architecture charts and/or inventories commonly summarize the portfolio. Their typical size and complexity was graphically illustrated in Figure 1 on page 5. Year 2000 portfolio cleansing retired/replaced many obsolete applications, and funded refreshes of many others. Enterprise package deployments eliminated more legacy applications. Post-2000 cost-cutting/modernization/consolidation further trimmed portfolios. However, new e-business, Web, and now SOA applications have been steadily added. Overall, enterprise applications portfolios are in much better shape today than in 1999, but will experience further heavy change, simplification and componentization as SOA is adopted.

- **Number of Potential Integration Points:** The second measure is how many “integration points” does the business now need? Both internal links (*Internal Integration Points – between the enterprise’s own internal systems*) and external links (*External Integration Points – between external ecosystem applications and internal systems*) must be considered, the sum being the total Number of Potential Integration Points (*NPIPs*). Most enterprise application portfolio charts show currently implemented links, and dotted lines sometimes indicate new links needed/planned. Traditional NPIP rises both with the size of firm’s application portfolio, and with the size/complexity of its external ecosystem. However, under an SOA approach using an ESB, each service or software component needs only one link to the ESB, dramatically reducing the number of integration links needed.
- **Number of Different IT Platforms:** The more different IT platforms used to support the applications portfolio (*internal and external*), the more complex, difficult and costly AI implementation becomes. It is easier, faster and cheaper to integrate applications on the same platform than across different technologies. Consolidation/simplification/virtualization of platforms has been in progress for the last five years, but still has far to go, and we often still find large enterprises using over 20 different IT platforms. An important further benefit of SOA is the transparency and platform independence its open connection standards bring to multi-platform applications.

We observed wide variations in these metrics between different industries and sizes of enterprise, depending on their IT histories, platform preferences, and the typical application portfolios that have evolved in each industry. For example, larger banks have long used in-house application development for core systems, based on centralized mainframe platforms, but have added many other applications and platforms around these central systems. By contrast, many larger manufacturing firms have moved to standard, pre-integrated ERP packaged software for their core manufacturing/inventory/distribution/financial applications.

The AI Challenge – How Web Services & SOA Dramatically Simplify

Figure 4 graphically shows, and the text bullets highlights, the main differences between AI in a traditional monolithic enterprise application portfolio, in a Web services environment, and under a full SOA approach. The former requires a profusion of point-to-point, inter-AI links.

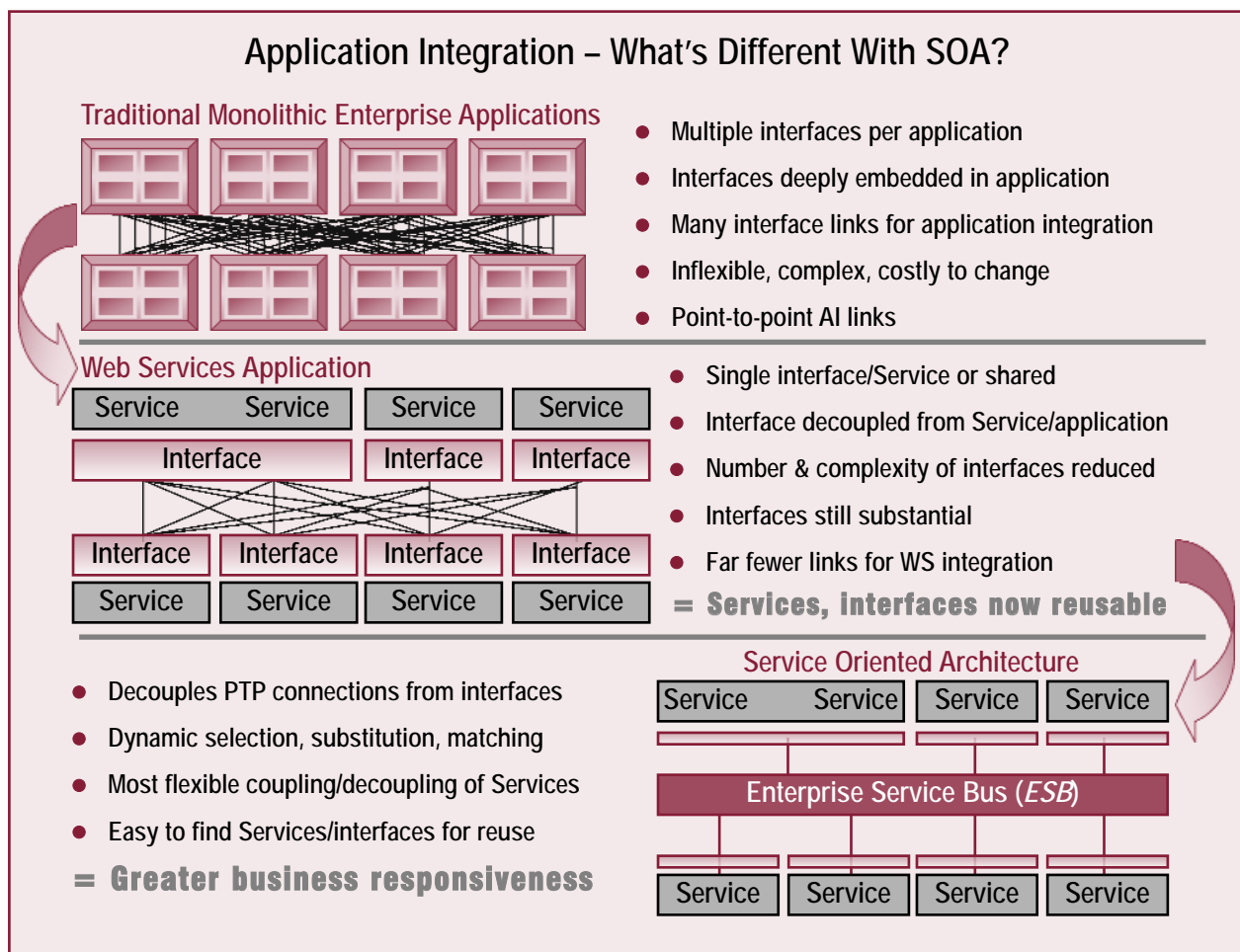


Figure 4: AI – What’s Different With SOA?

Web services separates the interface from the application (*now a set of Web services*), and allows many fewer links between the interfaces, although these are still point-to-point. SOA uses much slimmer service interfaces, and its central ESB element, with just one link between each (*service*) interface and the ESB. Far fewer links are thus required, and standard communications are used in SOA. The simplification of AI needs between the traditional model and SOA is dramatic, and contributes hugely to its greater flexibility and business responsiveness.

Findings by Size of Company

Figure 5 shows averages of these measures (*from many research sources*) for the four classes/sizes of organization that use most of the world's IT. These are the global 500 largest enterprises; the next 10,000 largest enterprises; the next largest 250,000 substantial medium businesses, and the next largest 5M small businesses worldwide. (*The latter excludes firms with under 10 employees, typically the threshold for IT above PCs, excluding many millions.*)

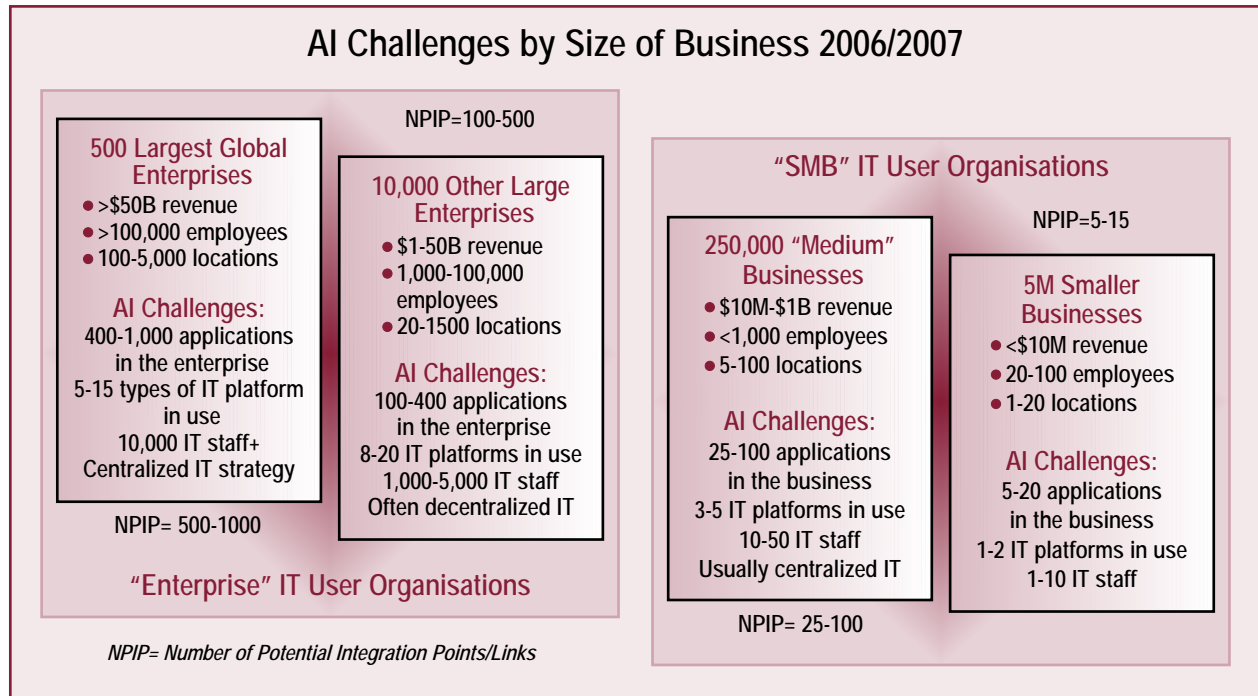


Figure 5: AI Challenges by Size of Business 2006/2007

The chart shows broad average business size metrics, IT environment size – by application portfolio, number of different IT platforms used, and the number of IT staff – for each class. From Figure 5, the findings by size of enterprise can be summarized as:

- **The 500 largest global enterprises**, giants with revenues over \$50B and usually with more than 100,000 employees, commonly have 10,000 plus IT staff, and a portfolio of 400-1,000 enterprise applications. (*NPIP= 500-1000*)
- **The next 10,000 largest enterprises** typically have \$1-\$50B in revenues and 5,000-100,000 employees, with applications portfolios averaging 100-400 applications. (*NPIP=100-500*)
- Our **next largest 250,000 medium enterprises** typically generate \$10M-\$1B in revenues, have up to 1,000 employees, and run average application portfolios of 25-100 systems. (*NPIP= 25-100*)
- Our **"smaller businesses"** class, at the other end of the scale, have revenues of up to \$10M, up to 100 employees, and typically have 5-20 applications. (*NPIP= 5-15*)

Other IT market research studies provided these broad IT market demographics. Enterprise application portfolio sizes and NPIP estimates come from enterprise application portfolio reviews for each size category across industries and geographies encountered in our analysis work.

Our Analysis

We draw the following headline conclusions (*amplified in the paragraphs below*) from this indicative picture:

- **AI – Universal Need.**
- **Number of IT Platforms Drives Up AI Costs.**
- **Growing AI Demand, Much More Still Needed.**
- **Larger Enterprises Have the Greatest AI Challenge.**
- **Smallest Businesses Use Standard Package AI Options.**
- **Hard-coded AI Links =Heavy Link Support Burden.**

AI is a universal need in every size and type of business, from the largest global firms downwards. Improving business processes demands better integration between previously siloed applications. Today's much higher dependence on IT applications, and their greater diversity, has expanded this need, which has spread into even modestly-sized businesses.

AI is a universal need in every size and type of business...

Our research clearly indicates that the bigger the business, the larger the AI challenges. For example, our best estimate of NPIP for the top global 500 was that (*on average*) 500-1000 significant integration points were needed; for the next 10,000 largest enterprise, the NPIP average needed was 100-500, and even for the smaller businesses above, it was 10-25.

Using multiple IT platforms (*as many still do*) greatly adds to AI cost/effort. Interestingly, the largest 500 global enterprises have less platform diversity (*5-15*), than the next 10,000 enterprises (*8-20 platforms average*), because the former operate more centralized IT governance with stricter platform diversity controls. It seems the second group devolved more IT governance to Line Of Business (*LOB*) units, resulting in their wider platform diversity. Our class of "medium businesses" were much less diverse, averaging just 3-5 different IT platforms in use.

The many millions of very small businesses (*below our 10-employee threshold*) typically use PC desktop platforms (*possibly networked*), with integrated SMB business application suites for commercial applications. The standard external interfaces provided in these suites, standard tools (*e.g. MS Office*), plus external Web-based services (*such as e-banking*) meet most integration needs amongst this large group. This Paper thus excludes this class.

AI needs have grown rapidly with expanding application portfolios since the early 1990s. In larger enterprises, a few hundred integration links have often already been implemented, but many more are needed, fuelled by regulatory compliance, SOA, new technologies, and the other drivers shown in Figure 3 discussed in Section 3. Too many links implemented to date, according to our research, were hard-coded and point-to-point, using the primitive methods highlighted in Section 5.

Supporting hard-coded links (*and their software, scripting, operating processes, etc.*) consumes too much skilled developer/support resources better used for new developments. Their support, maintenance and modification effort is so high because these integration links are highly sensitive to changes/failures. Any changes to the applications, their platforms, the operating systems, or to networking transports, such as new releases, changes in protocols, hardware or software failures, etc., can all easily "break" such links. Because these events happen so frequently, they demand a large support effort to keep all the integration links running, and this worsens with each new addition.

To productively implement new integration needs, we recommend that enterprises **review their integration approach**, the methods and technologies they actually use for AI. Unless they do so, they will continue adding to this legacy burden, create inflexible and unresponsive applications environments, and condemn their businesses to the penalties of insecure, fragile and far from seamless interoperation links between applications. These are serious risks and burdens no modern business should lightly assume at a time when most need to move faster, be more flexible, increase IT responsiveness and connect up better with their ecosystems.

Blending and integrating many parts of the existing application portfolio with new components, and thereby incrementally improving the applications, remains the only feasible, affordable and realistic way forward for most organizations. SOA is increasingly the architectural approach and enabler for this renewal and integration.

With the right VAIM/SOA platform technology, point-to-point direct connections between every pair of applications requiring integration (*as is the case with custom-built links*) can actually be eliminated. Essentially, one connection from each application/service/component can support all links needed to/from that service to all others. The term "ESB" is now used to describe this key middleware integration function that is the foundation of SOA: we discuss this ESB architectural pattern and example products that support it, in Appendix B. The concept is analogous to the "bus" in computer hardware. Each application (*device*) just connects to the integration middleware "bus", and this enables any-to-any application connection. This dramatically reduces the number of individual links that are needed, compared to custom-built, point-to-point integration. Message-based middleware is the principal underpinning enabler of an ESB, and thus the core technology for effective AI and SOA.

5. What are the Main AI Integration Options Actually Used Today?

Introduction

Section 4 highlighted the high investment effort, time and cost that enterprises face to develop, implement and support all the new AI links now required, as well as to support all those already implemented. So what technologies/approaches have companies actually used to implement their AI links to date?

Many readers will recall loud marketing from AI middleware vendors since the late 1990s. From this noise, readers could easily assume VAIM-based solutions must, by now, be absolutely dominant in this space. Surprisingly, the reality is rather different.

So How Are Enterprises Actually Performing AI Today?

Our research discovered some surprising, even frankly astonishing results. We used market reviews, other published analyst studies, talks with scores of enterprise customers, software vendor feedback, and from SI project systems consultants (*well placed to give objective assessments*). We identified the five approaches that have been most widely used for AI to date. These are shown (*in descending frequency of use order*) in Figure 6 below.

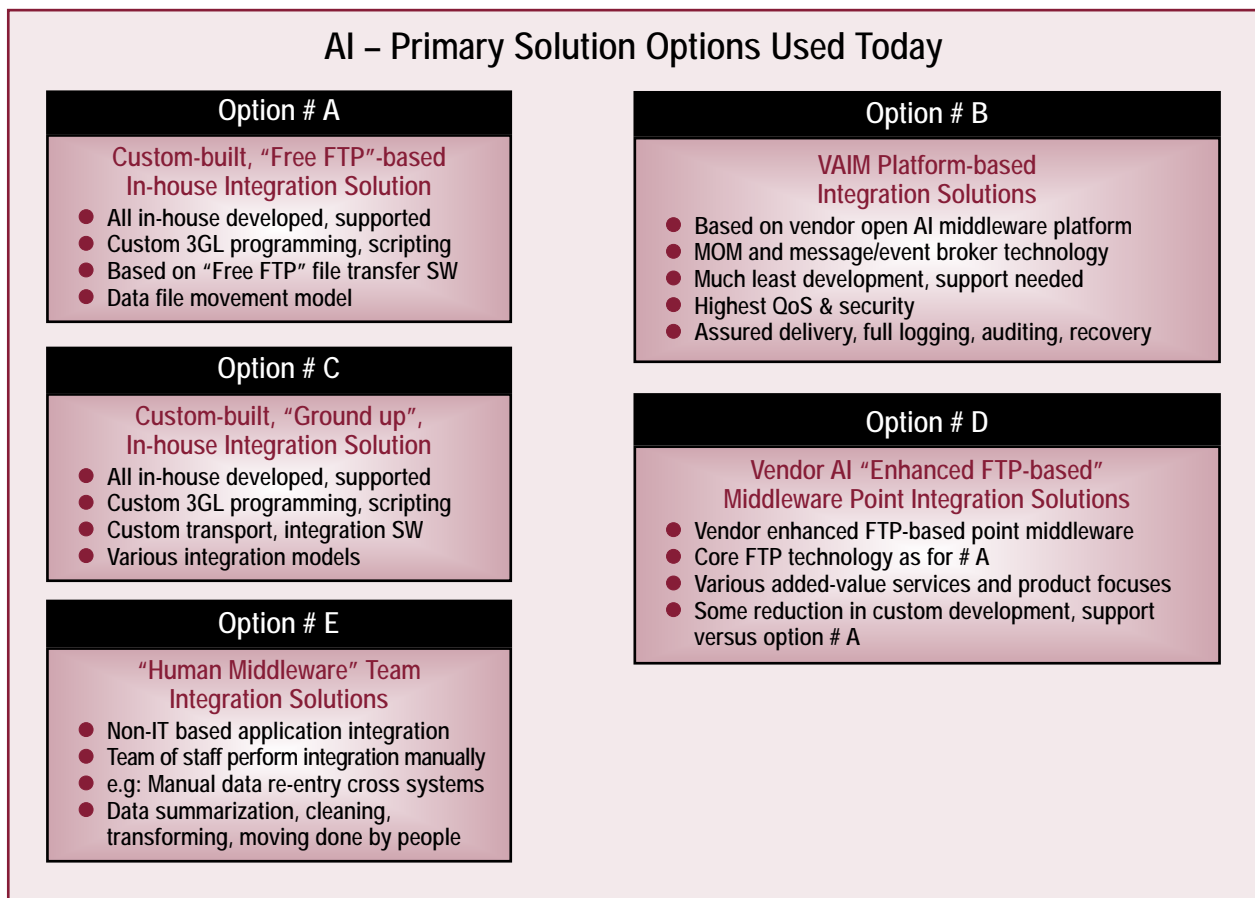


Figure 6: AI – Primary Solution Options Used Today

We explain, characterize, and discuss the merits and demerits of each approach below:

- Option # A – Custom-Built, "Free FTP"-based, In-house Integration Solutions:** The most widely used AI approach found was "custom-built, free FTP-based, in-house integration solutions". FTP is the standard file transfer capability for TCP/IP networks. Simple FTP programs come with operating systems, or are available free from other sources. AI requires data movement out of one application and into another. These solutions wrap the basic FTP data transfer operation (*provided by the FTP package*) in custom 3GL-coded integration logic. This may perform transformation, aggregation, cleansing, validation, etc., on the file contents and can be complex. A scripting layer, to manage transfer operations and to provide basic control services, is usually added. These are therefore complex, low-level software modules that need much development effort.

Standard, free FTP packages may cost little/nothing, but offer few value-added capabilities. Maintaining/supporting many such modules is burdensome, consuming much skilled resource. Any changes to the linked environment (*that often occur*) will impact this code, typically disrupting each custom-built link at least yearly. This triggers continual rework/re-testing, and thus generates high and recurrent maintenance/support burdens. Often, actual failure/disruption of such links first signals that environment changes have occurred, so application service reliability/availability is poor. This approach therefore has serious, costly, intrinsic problems. We were surprised, even shocked, that such a crude/basic approach is still so widely used today.

Why is this so common? This wide usage arose because IT developers, like any building craftsmen asked to tackle a new household job, pick up/use the basic “hand tools” in their immediately-available toolkit (*3GL, scripting, FTP packages*). They use these even when higher-powered, much faster and more productive power tools, which could safely do the job better and faster, exist but are not immediately to hand.

IT management should be greatly concerned both at the costs/effort level this basic integration approach creates, and at the still more important business rigidity, lack of flexibility, and unresponsiveness such hard-coded links cause.

- **Option # B – VAIM Platform-based Integration Solutions:** VAIM products first emerged from around 1990. They have matured/extended/flourished widely ever since. They provide a robust, universal, standard means to integrate applications and platforms. Now offering a wide array of value-added services, their core technology is Message-Oriented Middleware (*MOM*). They allow loosely-coupled AI by exchange of messages, and message/event brokering. Their value-added services greatly reduce custom development, because these do most of the work. Link coding is thus dramatically reduced. Because the middleware vendor maintains/supports all environment advances (*in operating systems, databases, networks and standards*), far less link maintenance/support is required from customer teams. Once customers learn the relatively simple skills of exploiting such middleware, successive projects can be delivered much faster, and support burdens are much lower. The number of integration links needed is also slashed when their advanced integration models (*e.g. publish-and-subscribe rather than point-to-point, also extending to an ESB*) are used. The QoS of these integration solutions in production is also much higher, because the standard value-added services (*including assured delivery, enhanced security, logging, and workload distribution, etc.*) result in more dependable integration operations in production.

This category market leader, by a wide margin, is IBM's WebSphere MQ family. This also provides the messaging underpinning for the giant's broader WebSphere SOA Foundation suite. To illustrate what a leading example of this software category offers today, we provide our overview/assessment of the latest WebSphere MQ suite releases and related products, in Appendix B on page 28.

Such VAIM platforms are now deployed in almost 100% of the 500 largest enterprise IT users, but in barely 50% of the next 10,000 larger enterprises. However, even amongst adopters, most are using it only for the more recent of their completed integrations, many others pre-dating introduction.

- **Option # C – Custom-built, “Ground-up”, In-house Integration Solutions:** Similar to Option A, but without using FTP packages. Here, the “heavy lifting” of the integration is developed/supported entirely using custom 3GL programming, scripting, and standard interfacing facilities. The latter includes application exits/interfaces, operating systems services, utilities, DB/TP system options, sockets programming, or the use of RPCs. Some of these may themselves be relatively stable/established interfaces, but the overall custom-built integration solution suffers all the time, cost, risk, maintenance burdens and other disadvantages of Option # A without even the modest productivity benefits use of a basic FTP engine allows.

This type of integration is also widely deployed, often predating the middleware technologies of Options # B above and # D below. Many are still used under the old IT principal of “if it ain't broke, don't fix it”. Reworking old but running integration modules is neither popular nor exciting. Most IT teams would rather do more interesting new development, and most LOB groups are reluctant to spend money fixing “plumbing” that apparently still works. We analysts see such integration solutions as costly “weak links” in customer applications infrastructures. Business inflexibility and unresponsiveness to rapid change is inevitable where this AI approach is widely embedded.

With this Option, the business must also repeatedly rework/fix links that (*as we discussed under Option # A above*) are continually “broken” by environment changes disrupting their operation. Given the high/continuing costs/effort needed, the business case for replacing them with a more robust, lower-effort approach (*e.g. Option # B*) is convincing.

- **Option # D – Vendor “Enhanced FTP-based” Middleware Point Integration Solutions:** The second most widely used VAIM-based integration approach today. Several ISVs offer “enhanced/value-added FTP-technology-based” integration products, originating in their markets. Each offers base FTP file transfer integration, with various value-added services aimed at their market focuses. Examples are products from Sterling Commerce from its EDI market focus, and MetaStorm from its B2B integration focus. (*PIM4Data from MetaStorm is exclusively resold by IBM, and uses WebSphere MQ as the transport mechanism for moving files between FTP-enabled applications to add the reliability, security, and managability plain FTP lacks.*) For projects in their target focus, such products can be sound point solutions. Their useful, value-added services reduce custom development and supplement basic FTP omissions, and can offer relevant standards support/interfaces for their usage sector. The better products therefore offer worthwhile benefits over Options # A or # C, if the requirement lies within their focus. However, they remain tactical, point solutions for specific needs, not a broad integration platform. Their smaller vendors may also pose vendor-related business risks.

- **Option # E – “Human Middleware” Team Integration Solutions:** Amazingly, business change consultants have often found whole staff departments performing essentially “human integration middleware” roles. These groups operate multiple silo IT applications, extract information from one and re-enter it in others, manually manipulate information, or provide human links in fractured business processes, to bridge gaps between their IT systems/processes. Often located within LOB organizations, these departments grew as tactical fixes to overcome critical AI and business process gaps. Such departments are clearly costly, unreliable, and unnecessary functions. Discovering one or several such groups in your organization pinpoints compelling needs, and good cases, for early AI solutions/streamlined business processes that will show high ROI.

So How Big is the AI Challenge?

How many integration solutions are companies currently supporting, and how many more are needed? Figure 7 shows our estimates of the average number of applications, NPIPS, the number of existing integration links, and the number of additional links still needed, extending the data of Figure 3 (*on page 10*). The percentage of integration links needed that have already been implemented averages 65% for the largest enterprises, is around 55% for the next 10,000 largest, is around 45% for the next 250,000 medium businesses, and is some 25% for the 5M next smaller firms. The global 500 largest enterprises, on average already support several hundred existing AI links (*260-650*), and need to implement a few hundred (*140-350*) more, etc.

Metrics	For the largest 500 global enterprises	For the next 10,000 global or national larger enterprise	For the next 250,000 medium-sized businesses	For the next 5M smaller businesses worldwide
Application Portfolio Size:	400-1000	100-400	25-100	4-20
No. of Potential Integration Points (NPIP)* Needed:	400-1000	100-500	25-100	5-15
% of NPIP Already Implemented:	65%	55%	45%	25%
No. of Existing Software Integrations Being Supported/Maintained:	260-650	55-275	11-45	1-4
No. of Extra Integration Points Needed:	140-350	45-225	14-55	4-11
No. of Additional Integration Points to be Developed Per Year (<i>4-year horizon</i>):	35-87	11-56	3-13	1-3
Source: © 2006 Software Strategies Estimates * Adoption of an ESB drastically reduces NPIP, to 1 per service.				

Figure 7: Estimated Number of AI Links Built to Date & Still Needed, by Size of Business

Individual figures vary widely (*for all sizes of company*) depending upon industry, business complexity, and the degree of application portfolio rationalization/modernization undertaken to date. These averages do, however, provide a useful problem-sizing guide. They are large numbers, and clearly indicate that:

- **The burden of continuing support/maintenance/updating** of existing AI links (*which depends upon on how they were implemented*), is considerable, and is increasing as additional new links are implemented.
- **New development/implementation costs/efforts**, to put in the tens/scores of additional needed links per year, is a considerable annual new development effort, the level of which again depends on the solution approach now being used.

Restructuring/modernizing application portfolios, adding new applications, and updating enterprise IT infrastructure, is a continuous process in most enterprise. This process clearly throws up additional AI link needs. Many older existing links will also need replacing with more modern, secure solutions. Thus, a continuing flow of integration development/replacement will be needed for the foreseeable future in all sizes of business. Indeed, today’s emphasis on business transformation, modernizing core business processes, and on adopting SOA technologies, is accelerating these demands. SOA connection architectures themselves dramatically reduce the number of links needed.

Relative Costs/Efforts of These AI Approaches

How different are the costs and efforts between the different AI approaches used today? What impact do these differences have on an enterprise’s overall development effort and costs for their existing and annual new AI link development effort?

This impact is illustrated by Figure 8 below, which shows the relative total costs/efforts of implementing and supporting an increasing number of AI Integration links. Clearly, Option # C (*all custom in-house developed*) is much the most resource- and thus cost-intensive. The most widely used Option # A is modestly better than Option # C because the use of free FTP software packages for the transport requires less custom coding. Option # D (*vendor enhanced/value-added FTP*) is considerably better than either Options # C or # A, because the value-added software services provided in such point-middleware further reduces custom development time and cost over these Options. Their limitation is that these somewhat targeted middleware products can only be used within their design-focus scope.

VAIM platform-based solutions (*Option # B*) require much the lowest cost/effort for both initial development and for ongoing support, and are universally applicable to almost all integration project needs.

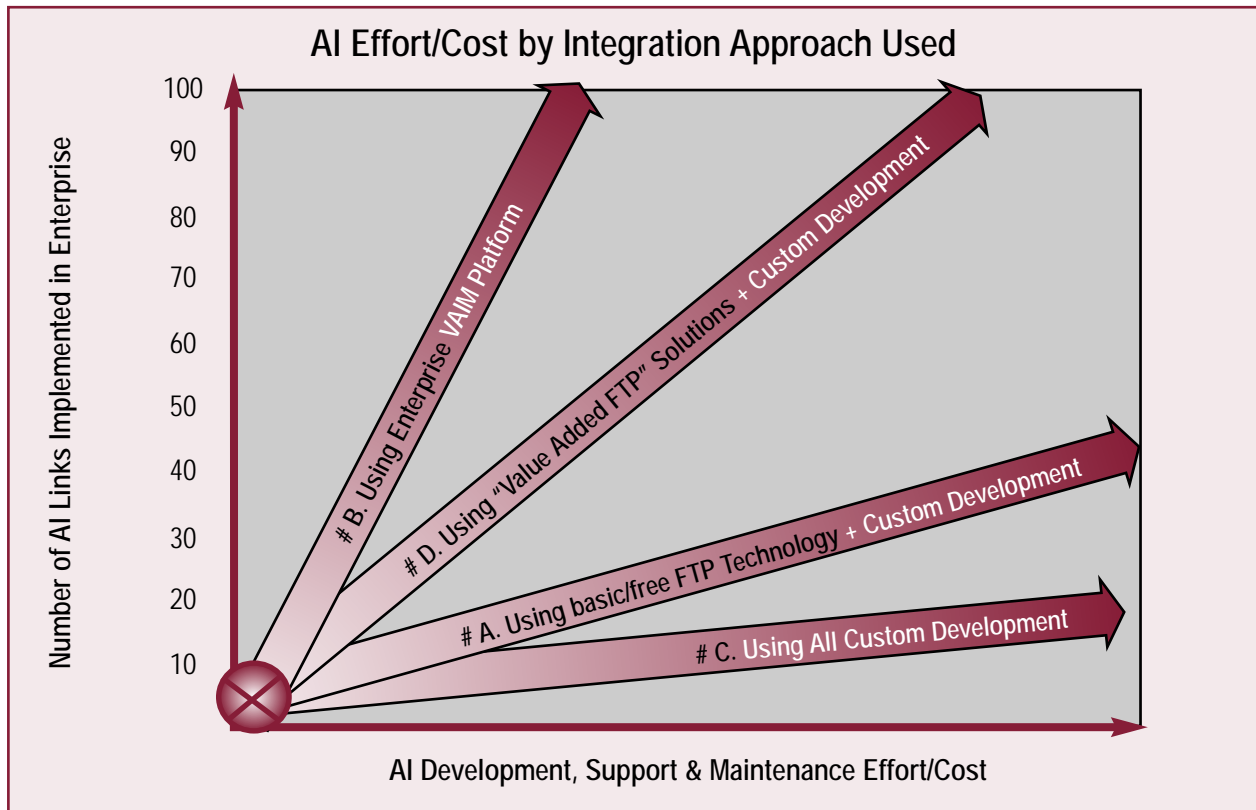


Figure 8: AI Effort/Cost by Integration Approach Used

Information from enterprise developers experienced in both routes indicates that, with Option # C as the baseline, Option # A (*custom-built + free FTP*) is typically 10-15% lower in effort/cost and elapsed time to value. These developers also report that **Option # B (VAIM platform-based) is 65-75% lower in effort/cost and elapsed time** than Option # C. Option # D (*vendor-enhanced FTP*) falls between these, averaging 40-45% lower effort/cost, but this gain varies widely between specific products, depending on the strength of the value-added software services they offer.

Putting it another way, **effort/cost/time is 3-4 times higher with Option # C, 2.4-3.6 times higher with Option # A, and 1.3-2.2 times higher with Option # D**, each compared with the most productive Option # B approach.

Our Analysis

We consider that SOA-based application architectures are rapidly becoming the universal model for next-generation business applications, and that adoption of SOA will spread rapidly across all categories of firms. SOA is based on an ESB approach to universal application (*service*) connectivity/integration, and is underpinned by VAIM platform technology based on open industry standards. Adopting VAIM platforms now is therefore also an excellent first-step entry-point, and a crucial enabler of SOA adoption. SOA also greatly reduces the number of links required. SOA is clearly the future of application and integration architecture, but what of today's actual AI portfolio?

We were surprised, even shocked, to find the most widely-used method of implementing AI today is still the relatively primitive Option # A approach, of custom in-house development using a free FTP package for file transport. The significant number also still using fully custom-built, in-house solutions (*not even based on FTP*) was even worse. Businesses using these approaches are, we estimate, using 2.4 to 4 times more resources for their integration development/support than if they had adopted/used a VAIM platform. Even after paying software fees for the VAIM platform, a high ROI can be expected by switching, projects can be delivered much faster, and many fewer staff resources will be used. Inflexible and hard to change, such links inhibit business flexibility and responsiveness.

That business change consultants have commonly found “human middleware AI departments” almost beggars belief.

The Vendor-enhanced FTP middleware-based solutions (*Option # D*) are specific in focus/scope: where the requirement matches their focus, they provide useful advantage, but cannot be universally applied. An enterprise using these may therefore need to acquire, learn and support several such point products, adding complexity, requiring different skills, and incurring multiple license costs.

The scale of traditional AI need varies with the size of the enterprise, but even medium-sized businesses have significant numbers of links (*and need many more*) and larger enterprises need hundreds. Figure 7 on page 18 gave our estimates of these numbers. SOA connection topologies can greatly reduce these link numbers.

If the advantages, both in development effort/cost and in production operations QoS, of VAIM/SOA solutions are so superior to these alternatives, why is this approach still not universally used today? Do senior IT management realize how much development/maintenance effort is being wasted within their organizations by their widespread use of the custom-built, in-house approaches? The fragility and vulnerability of these links also poses significant risks to these organizations, and it seems these risks are still not properly recognized. Using such approaches also creates a high dependence on the staff who built/understand these links; where these have moved on or out, a “black hole” in support capability probably exists.

6. VAIM Platform Deployment

VAIM Adoption/Deployment

How has adoption and internal deployment of VAIM platforms proliferated in the market since their introduction? The rate of deployment of the technology since its first adoption by customers is a good proxy for how valuable customers have found its benefits.

Figure 9 below shows our VAIM platform adoption and deployment penetration estimates (*as a % of customer AI portfolios*) to date, for the company, together with some of the key differentiating factors we found between them.

Average Measures & Adoption Factors	For the largest 500 global enterprises	For the next 10,000 global or national larger enterprise	For the next 250,000 medium-sized businesses	Next 5M Smaller Businesses
Application Portfolio Size:	400-1,000	100-400	25-100	5-20
AI Needs:	Highest	High. Much M&A	Medium	Lowest
% VAIM Platform Adoption:	~100%	45-50%	25-30%	10%
% AI Portfolio Deployment With VAIM Platform(s):	30-45%	15-20%	25-30%	30-40%
VAIM Platform Adoption:	Earliest adopters from 1990 on. Penetration strongest.	Adoption 1995 to date. Usage more variable, project-by-project.	Recent adoption. Typically 2000 on.	Most recent. Typically 2000 on.
Typical IT Governance: Centralized shops drive more internal deployments of technologies like VAIM.	Centralized, strong standards & controls.	Less centralized, more LOB influence, less standards driven.	More centralized, less diverse.	Centralized, 1 IT manager.
No. of IT Platforms: More means more application integration needed.	5-15 Diversity limited by central policy.	8-20 Highest diversity from LOB decisions.	3-5 Low er diversity, simpler infrastructures.	1-2 Lowest diversity. Much Wintel.
Strategic IT Infrastructures / Architectures Investor: Will front learning costs for earlier benefits of technology.	Strongest investors & enforcer.	Variable. More driven by LOB current tactical needs.	Variable, lower budgets limit pre-investment.	Normally use packaged, standard AI options from main vendors.
SOA Adoption: VAIM platform essential pre-requisite for SOA.	Earliest SOA adopters from 2004 on, most now heavily into SOA.	SOA adoption rising fast in 2005-06.	Modest SOA adoption beginning 2006.	NA
Other Comment:	Strongly committed to fully exploiting VAIM platforms across enterprise.	Project-by-project decisions, many point AI tools here, as well as much VAIM.	VAIM only affordable here 2000 on, good implementers when started.	Microsoft software most widespread.

Figure 9: AI – VAIM Platform Adoption/Deployment to Late 2006 – By Class

Our headline findings from the Figure 9 analysis (*amplified in the paragraphs below*) were:

- % AI Portfolio Deployment with VAIM Platform(s) Remains Moderate.
- Centralized IT Governance-style Shop Adopters Deploy VAIM Better/Faster.
- SOA Adoption Driving Wider VAIM Deployment – Highly Synergistic.
- Mandating VAIM as the AI Standard Brings Strongest Benefits.
- Project-by-project AI Decisions Anathema.
- VAIM Unbundling, Price Reductions Enables Wider Use/Smaller Customers.
- Smallest Businesses Use Package AI Options and/or MS-Windows AI Capabilities.

The percentage of AI links implemented with VAIM platforms amongst their adopters remains moderate to low depending on their size. Even in the largest, longest-standing users, this averages 30-45% to date, so far wider deployment would be highly advantageous to all adopters.

More centralized IT organizations (*who apply tighter common standards, and stricter policies on platforms and architectures*), exploit beneficial new enterprise IT platforms such as VAIM and now SOA, better, faster and more widely than decentralized IT governance shops. The latter adopt more tactical, project-by-project solutions, driven by immediate LOB needs, and are less effective at standardizing on/deploying strategic technologies like VAIM. As a result, these firms often end up with an assortment of point middleware solutions and custom-links, each chosen on a project-by-project basis.

SOA adoption is progressing rapidly amongst our top two classes of company, and is now also being adopted by some smaller firms in our third class. This new strategic applications software model of composite applications linked by Web services standards under the SOA approach, requires a VAIM transport underpinning for its ESB pattern of loosely coupled connectivity of these applications components (*aka services*). The advance of SOA will therefore drive much wider VAIM deployment to support these needs.

Those adopting enterprises that mandated VAIM as their standard method for AI are most advanced in deployment, and are achieving the greatest savings and benefits.

Where decisions on AI technology are left solely at a project-by-project level, costly custom-built solutions (*such as Options # A & # C in Section 5*) or point-solution middleware (*Option # D*) solutions were often applied. The former display the negative characteristics we portrayed earlier, and the latter causes customers to acquire/support a patchwork of tactical middleware products of limited general applicability.

Those adopting enterprises that mandated VAIM as their standard method for AI are most advanced in deployment, and are achieving the greatest savings and benefits.

By early this decade, most VAIM platforms had been simplified, unbundled, and their entry prices/options had fallen substantially (*now start at c \$5,000 per platform*), bringing their benefits well within reach of all our classes of customers. This also allowed incremental purchase and deployment as needed, rather than needing a “big-ticket/up-front buy”.

10% of our ‘smallest firms’ group (*the next 5M smaller firms worldwide*) have adopted VAIM platforms, which are now often within their financial means. They run smaller application portfolios, rely heavily on packaged applications, and mostly adopt integration options from their package and/or hardware/OS platform vendors. Because Windows/Intel platforms predominate here, Microsoft VAIM software is the most widely used by this class of business.

Deployment Experience Indicates Wider VAIM Proliferation Ahead

Almost all the largest global enterprises are already using VAIM platforms, and continue to increase their already substantial deployment. These adopters are now aware of the effort reduction, cost saving and QoS improvement benefits of the technology. They are comfortable with, and skilled in, its use, and are deploying it more broadly as new integration projects arise. SOA adoption, highest in this group, is further driving this proliferation of VAIM as the key integration and communication underpinning for SOA. This wide adoption speaks volumes for the benefits VAIM has delivered for these users.

We see many VAIM platform adopters extending their early project successes, and the skills gained, into an integration Centre Of Expertise (COE)/team. These quickly attract other internal integration projects. The higher VAIM platform productivity, and their team experience/expertise, allows them to deliver more robust integration solutions much quicker. This COE approach accelerates proliferation of the technology across the enterprise, and is today also being used for SOA as a whole. Where a software technology proliferates rapidly like this within customer sites, it means the benefits are unambiguous and compelling, easily/clearly verified on the early in-house projects. (*See Xerox profile, Appendix C, page 33 for a good example.*)

Major Savings Available from Wider VAIM Deployment

Gartner Group (2005) estimated that a strikingly high 35% average of enterprise IT budgets were spent on supporting/maintaining AI links.

Gartner Group (2005) estimated that a strikingly high 35% average of enterprise IT budgets were spent on supporting/maintaining AI links. (Most still being custom-built links of the Option # A or # C type). Supporting existing applications/infrastructure overall consumes on average 65-80% of total IT budgets in most enterprise IT shops. Gartner's

estimate means that AI maintenance/support averages 44-54% of these total "status quo" support costs. This huge burden prevents enterprise IT groups moving forward with vital new business and technology initiatives.

Non-adopters can thus achieve large savings by switching to the far more productive/lower maintenance cost VAIM platform AI approach. We quantified their relative productivity advantage in Section 5. "Full use" would involve converting all existing AI links of other types to VAIM technology, and also doing all new AI projects with the technology.

Based on our VAIM adoption/deployment data, average IT budgets, and Gartner's data, we estimate the average potential annual savings that full use of VAIM platforms, for our three categories of firm, are as follows:

- **Largest 500 Enterprises:** Average IT Budget \$2.2B (4.5% of revenue), AI support cost \$788M (35% of IT Budget), potential cost savings \$295.3M per year per firm (62.5% of links done TD not yet on VAIM).
- **Next 10,000 Largest Enterprises:** Average IT Budget \$150M (3.0% of revenue), AI support cost \$52.5 (35% of IT Budget), potential cost savings \$18.4M per year per firm (90% of links done TD not yet on VAIM).
- **Next 250,000 Medium Firms:** Average IT Budget \$3M (3.0% of revenue), AI support cost \$1.05M (35% of IT Budget), potential cost savings \$390K per year per firm (93% of links done TD not yet on VAIM).

These are the potential savings from switching all existing, other-approach AI links implemented to date onto VAIM technology in one year. These potential savings equal 13% of total IT budgets for each size of firm. Whilst no firm could instantly convert their many existing custom-built AI links to VAIM platform implementations overnight, this analysis shows that rich, long-term savings with high ROIs are obtainable here.

Many new, additional AI links also still need to be built (35%, 45% and 55% more respectively for the three size groups we found in Figure 6). This means large further savings (60% of initial development effort and ongoing annual support costs, we found) can be delivered by using VAIM platform-based, not custom-built integration approaches, for these new needs.

For those already implementing an enterprise SOA effort, VAIM adoption will already be central because it underpins all SOA communications and integration – the savings obtainable above may indeed make integration/connectivity the main entry point/rationale for their SOA initiative.

For those not yet started with SOA, we recommend a strategy of actively replacing custom integration links, and enforcing a policy of building all new links on a standard VAIM platform. This will bring rising savings on both new developments, and for on going link support, freeing up IT resources for new development. It will also position the enterprise for fuller SOA adoption (when desired) by introducing one of its key foundation technologies (VAIM).

Our Analysis – Barriers to VAIM Adoption/Deployment

To analysts like us, advocates of such middleware for nearly 15 years, it was amazing to find custom-built, in-house (using FTP or 100% custom) AI approaches still remain the most widespread type used today. They clearly incur several-fold higher development and support costs/effort, provide less robust/secure operational performance, and suffer high fragility to environment changes. How can this be explained? Why does this remain the case? Where does responsibility lie?

We conclude that many **CIOs must remain unaware** how widely their organization uses/depends upon such primitive and costly AI links. Were they aware, most would surely be replacing them, to increase application portfolio resilience, and cut costs. Perhaps other business-driven development priorities pre-empt such improvements where these links are at least working. Hidden "plumbing improvement" tasks like these are not high-profile.

AI efforts are also often buried within the AD and maintenance resource assigned to the overall applications, and may thus **remain invisible above project level**. The real cost/effort of integration across all enterprise AD projects/applications will therefore also not be clearly visible, and yet this may be consuming, according to Gartner, 35% of enterprise IT budgets – a staggeringly high figure.

Where technical authority rests with project technical leaders, and no corporate standard guidance is given, many turn to **familiar, freely-available “hand tool” AI means**. They may not hold overall lifecycle cost responsibility for the application, and thus be unable to make the ROI case for the “power tool” VAIM solution on their single project. Whilst VAIM will save several-fold both on the initial build cost and lower lifetime support, it requires a VAIM software buy, often outside the authority of such staff. We recommend that project leads of all current AI efforts should meet/communicate regularly, to share experience and best practice. They can then combine to support the case for a common VAIM platform, where not yet adopted, or for more universal deployment where already installed.

Pre-2000, VAIM software license costs were a real adoption barrier. The “big-ticket enterprise platform” bundling and high price-tags then were a real deterrent for medium/smaller enterprises. Today’s more granular packaging and lower unit prices mean that **price is no longer a real barrier**. Microsoft (*with its high-volume, lower-cost, often OS-inclusive middleware offerings*) drove price commoditization at the lower end of the market. However, as most enterprise AI projects involve multiple unlike hardware platforms, Microsoft’s Windows-centric solutions have had limited overall impact.

We must also conclude that many CIOs, CTOs, AD and project leaders in yet-to-adopt VAIM enterprises still remain **unaware of these compelling/substantial VAIM benefits**. This is a paradox, because VAIM was a heavily-marketed software category between 1995 and 2003. Considerably more market education seems to still be needed, outside the top 500 global enterprises, to overcome this inertia, and lack of knowledge.

In our assessment, these customers should now re-evaluate their AI approaches and adopt a VAIM platform for projects going forward, as well as for rewrites of older links falling due for replacement. Those who have already adopted the technology

...customers should now re-evaluate their AI approaches and adopt a VAIM platform...

are advised to apply it on a higher proportion of their future projects. In many cases, SOA adoption initiatives will provide an additional major rationale and justification for VAIM adoption, and for this newer, more granular application approach.

7. Selecting the Right VAIM Platform/Vendor for SOA: The Way Forward

Our High-level Criteria for VAIM Platform/Vendor Selection

Many software vendor/product selection guides begin with detailed product descriptions and extensive feature-function comparisons, and this remains an important aspect of any selection. The VAIM/SOA software market is fast evolving and embraces a complex web of hardware platforms, operating systems, software platforms, open industry standards, and tooling requirements. Because of these specific VAIM/SOA characteristics, we consider that a handful of higher-level selection criteria are especially important in this sector to guide vendor candidate short-listing. AI solutions implemented in the enterprise with the chosen VAIM platform will form an important part of that customer’s enterprise application environment for many years after their implementation, and will provide the crucial underpinnings of their migration to SOA. Businesses should therefore not run the risk of facing disruptive product/vendor changes that would cause major rework arising from smaller vendor failure.

We recommend VAIM platform/vendor selection should be guided by the seven primary selection criteria explained below:

- 1. Product Line Track Record, Market Share, Customer Base and Reputation:** Market success, endurance, market share and customer base size are the acid tests of the long-term merits of a VAIM/SOA platform, and high ratings in these areas indicate a low-risk, well-proven and attractive platform/vendor combination.
- 2. Vendor Financial Strength/Staying Power – Vital for VAIM/SOA Platform Customers:** VAIM/SOA platforms will underpin their customer’s enterprise application portfolios, integration efforts and business process management developments for the next decade or more. Customers must therefore select a VAIM/SOA platform whose vendor has enduring financial muscle. This is vital to support the platform long-term, to bring out the new technology/innovation needed, and to support/extend a broad, multi-component product set globally with continuous, heavy R&D. This criterion has long been rightly used to select in other foundation software categories (*such as database systems, application servers, and for major enterprise applications*) where similar considerations apply.
- 3. Deep, Ongoing Product/Vendor Support for Open Industry Standards:** AI and SOA depend critically upon open industry standards that facilitate interoperation/interconnection of software assets, services and components. It is thus imperative that the chosen VAIM/SOA platform supports all the key standards that interplay in AI/SOA, and continues to do so as these evolve. These include networking/communications standards (*TCP/IP and others*), messaging (*e.g. JMS*), industry-standard programming models – notably J2EE™ and .NET, security (*e.g. SSL*), Web services, and development tool standards (*i.e. the Eclipse Platform*). For products to remain at the leading edge here mandates that their vendor is an active leader in the open standards creation/development process.

4. **Comprehensive Product Support for All Main Platforms, Programming, Network, Security Models, etc.:** Every prospective AI user will have a different IT infrastructure and enterprise application portfolio mix. In selecting a VAIM/SOA platform, ensure that it supports all your IT platforms and integration “touch points, with servers, links and robust adapters/connectors. This minimizes custom development and the need to add point-middleware products.
5. **Closely Integrated Companion SOA Platform Available From the Same Source:** VAIM is an extremely important IT infrastructure foundation technology. However, it is not sufficient for next-generation SOA Web applications. A robust, comprehensive, SOA middleware and tools platform must include closely coupled and tightly pre-integrated VAIM capabilities that together provide the complete “stack” needed for next-generation SOA applications. Otherwise customers would be forced to integrate these inter-dependent platforms themselves. Major advantages thus accrue from selecting a VAIM platform whose vendor also offers/integrates a complete SOA software platform layered upon their VAIM offering.
6. **Modular Packaging, Incrementally Deployable, Affordable Entry Pricing but Highly Scalable:** Until the late 1990s, VAIM platforms were offered under monolithic, “complete package-big-ticket” commercial terms. Today, enterprises rightly demand more granular, incremental and affordable product packaging/licensing to enable them to build up their AI infrastructure in smaller steps, each allowing the business benefits from implemented projects to deliver faster pay-back. Today’s best entry VAIM products are better packaged, and simpler to install, learn and use, as well as more affordable, and have become suitable both for smaller (*SMB*) businesses, and for proof-of-concept-type projects at larger enterprises.
7. **Vendor Capacity to Maintain the Extensive Cross-testing and Continuous R&D Especially Needed in VAIM/SOA Middleware:** We estimate that the testing/validation of VAIM platform software absorbs 50% plus of vendor total R&D resources, over two-and-a-half-times the software industry average (*of around 20%*). Enterprise-class VAIM platforms must provide long-term, current release support for: multiple hardware platforms and operating systems, multiple software platforms and ASSPs; J2EE™ and .NET platform and Web services standard levels/generations; communications protocols like TCP/IP, security standards like SSL; and popular enterprise applications (*such as SAP and Oracle*). The resulting combinatorial explosion of VAIM software configurations, which must all be developed in parallel and be fully tested before packaging, is enormous, and demands dedicated laboratory resources continuously devoted to testing advances in the VAIM platform software.

Focusing on these overriding criteria will ensure that a sound shortlist can be constructed and the best solution selected after a detailed technical review.

“VAIM” Platform/Vendor Candidates for Consideration

So, which possible VAIM product suites/vendors should enterprises consider for their shortlist? Our high-level criteria above, and the customer’s existing IT infrastructure will narrow the range considerably. A helpful starting point is to consider six important industry companies with major VAIM and SOA offerings, five of them industry majors, and one a leading pure-play AI provider. Figure 10 (*on page 25*) provides our cameo overviews of these six vendors from a VAIM/SOA perspective.

VAIM Platform Example

To illustrate the capabilities that enterprise customers can expect to find in modern VAIM platforms, we include our overview of one example. This shows what such a platform offers to provide a better approach to AI than the (*still-widespread*) use of custom-built, in-house solutions. We chose the market leader in this sector – IBM’s WebSphere MQ – as a useful benchmark for readers. This overview may be found in Appendix B on page 28.

Our Analysis

This industry, for decades, first met emerging new business application needs with custom-built software applications written in available, then-standard lower-level languages and tools. Where such a class of application became widespread/important, the industry often created new middleware technologies to simplify their development/deployment.

Each abstracted common programming tasks (*originally custom-coded by the developer*), replacing these with standard software services delivered by the middleware engine. Custom-coding was much reduced and simplified, the middleware offered additional, value-added functionality, and a more robust solution was delivered. Where well-conceived/implemented, such middleware engines were widely adopted, to become standard enterprise development/runtime infrastructure elements. Notable examples include:

- **Transaction Processing Monitors.**
- **Database Management Systems (*DBMS*).**

Candidate Strategic VAIM/SOA Platform Vendor List	
Vendor VAIM/SOA Platform/Product	Our Cameo VAIM/SOS Overview
TIBCO Software	Largest, longest-established, pure-play VAIM software vendor, offering a business integration and process management middleware platform. Open standards support weaker than some (<i>tools not on Eclipse Platform, but is Sun J2EE™-Licensee</i>). Limited SOA offering, no application server. Strongest user base in financial services industry.
SAP AG SAP NetWeaver®	German ISV world-market leader in enterprise application software with mySAP.com enterprise resource planning suite centerpiece. Also offers SAP NetWeaver™ Platform middleware software underpinnings. Available on major hardware platforms, on the IBM and Microsoft middleware software stacks, and on Linux. Now developing new, SOA-based, next-generation application portfolio, expected to arrive incrementally through 2008/2009, as updates to mySAP ERP 2005. With thousands of enterprise customers, "SAP-centric" organizations are commonest in manufacturing and distribution. VAIM offerings aimed at users viewing their SAP applications as the "centre-of-their-IT-universe". Products are sound and secure, good open standards commitment (<i>including J2EE™, Eclipse for tools, Web services, and Linux open source OS support</i>).
Sun Microsystems Enterprise Java™ System	Market third-ranking server vendor also offers its Enterprise Java™ System middleware stack, used primarily on its proprietary Solaris RISC UNIX server systems. Portfolio's AI/SOA capabilities extended by SeeBeyond acquisition. Sun has struggled to build a viable business model from its software assets, and is not today regarded as a main segment player/competitor. Of interest only to Sun Solaris server-centric users. Excellent J2EE™ support as inventor/initiator, and good general open standards posture. Recent Linux adopter, but remains committed to its own Solaris operating system. Own proprietary J2EE™ tools, not on Eclipse platform.
Oracle Corporation Oracle Fusion Middleware	Major database and enterprise application software vendor. Oracle has greatly extended its portfolio with its PeopleSoft, JD Edwards, Siebel and other application acquisitions, now successfully absorbed, making Oracle a strong # 2 to SAP in enterprise applications. Has now built out its Oracle Fusion Middleware a database-centered stack, including SOA, AI and BPM capabilities. Is actively developing next-generation SOA-based applications portfolio, branded Oracle Fusion Applications, to be underpinned by the Fusion middleware, and slated for 2008 delivery. This relatively new middleware stack appeals to "Oracle-DB/application-centric" accounts. Good open standard supporter (<i>strong commitments to J2EE™, Eclipse for tooling, SOA, Web services, and Linux OS platform</i>). Only now (<i>in late 2006</i>) becoming a significant player in VAIM/SOA middleware.
Microsoft Windows Server System & Services (<i>Inc. MSMQ</i>)	Major industry force. Offers sound AI portfolio within its Windows Server Platform middleware, targeted to help "Windows-centre-of-the-universe" customers integrate Windows applications to those on other platforms over its proprietary .NET Web services programming model. Market AI leader within the SMB segment, where Windows/Intel is a ubiquitous platform. Software runs only on Intel processor-based, distributed hardware, but can communicate with (<i>although not run on</i>), UNIX, mainframe and some other platforms. Good Web services standard support, but otherwise proprietary. Has now toned down earlier attacks on Linux somewhat.
IBM Corporation WebSphere SOA Foundation Suite & WebSphere MQ Family	Industry market leader in servers, IT services, and enterprise middleware software (<i>including database, application servers, VAIM, and SOA</i>). Extremely strong WebSphere SOA Foundation Suite is the clear SOA market leader with 48% of SOA market. WebSphere MQ VAIM platform long-established segment leader, with 10,000+ customers, runs on over 80 platform configurations, and supports newest standards and technologies. Deep open standards support, including J2EE™, Eclipse tool platform, Web services connectivity and others. WebSphere MQ is tightly integrated with WebSphere SOA Foundation Suite, underpinning its "Enterprise Service Bus Without Limits" approach. Strongest System z mainframe and System i VAIM/SOA capabilities, and excellent support for all other major IT platforms. Leading advocate and supporter of Linux operating system. Extensive SOA/AI services capability from IGS.
Listed in reverse alphabetical order, excludes other smaller VAIM/SOA vendors (<i>BEA Systems, Sonic Software, etc.</i>).	

Figure 10: Candidate Strategic SOA/VAIM Platform Vendor List

Few organizations today would attempt to deploy significant transaction applications without using a TP monitor or a complex data management application without using a DBMS. It is universally accepted that these engines greatly simplify application development, and provide much superior run-time execution for these tasks.

These provide exact parallels with the AI area. VAIM platforms have been available for nearly 15 years, and reached full maturity by 2000. They greatly reduce the time, effort, and cost of developing AI links, and provided a richer, more secure, and better-featured run-time environment. They also provide the messaging backbone for SOA, and are thus one principal entry-point to SOA.

Our finding that 50% of the next 10,000 largest enterprise users have adopted VAIM platforms to date shows this segment midway through the adoption cycle.

Why therefore (*in 2006*) did we still find much the most widely-used AI approach is still custom-built, in-house AI (*with or without using FTP*), with all the disadvantages of that route?

The answer lies in the adoption pattern of such middleware technologies. Initially, the new middleware "Release 1.0" is first tried by pioneering, large, and rich, "early adopters". When refined enough for the benefits to outweigh the downside and

the usually high early prices, the middleware proliferates amongst other equally rich and sophisticated, but more cautious, mainstream adopters. Later, the technology is adopted much more widely by more cautious, and by smaller, users.

Today, for example, we found ~100% VAIM platform adoption amongst the 500 largest global enterprises. Over time, software prices usually fall as sales volumes rise, skills and knowledge become more widespread/accessible, and success stories become widely known. This encourages the next tier of enterprises to move through the adoption curve a few years behind these larger firms. Our finding that 50% of the next 10,000 largest enterprise users have adopted VAIM platforms to date shows this segment midway through the adoption cycle.

Risk-averse businesses also often wait until a growth software market has settled down, and the number of vendors has consolidated to a few clear leaders. They can then feel confident in safely choosing a partner without high vendor risk. The VAIM market saw a profusion of vendors emerge in the 1990s, but has now heavily consolidated and is well past this point today.

In fact, VAIM technology is now also available at price points, and in appropriately packaged, low-complexity offerings, that are affordable/manageable for every "medium" business, and even by many of the smaller businesses group.

The remaining barriers to adoption appear now to be lack of knowledge of the benefits, lack of experience with the technology, and scarcity of skills.

In the light of our findings in this White Paper, we therefore recommend that enterprise IT organizations should:

- **Survey and quantify their current AI portfolio**, and the effort/resource being expended on its annual maintenance and support. They will commonly find this is a far heavier burden than expected, which creates a call for action.
- Where a VAIM platform has already been adopted/proven, steps should be taken to **rapidly spread the skills gained**, and to ensure this **approach is used on most/all new AI projects**. An active program of replacement of older, in-place custom integration links is also recommended, to cut their high recurrent support costs/effort.
- Those **enterprises yet to adopt VAIM platforms are now urged to do so** for their next high-profile AI projects, and to follow the path above when early successes have been delivered.
- **AI vendors, consultants and IT analysts can help** by providing guidance, education and training, and access to references, which can accelerate the learning process.
- If using external **systems integrators**, be clear that their business interest is in selling maximum billable days for each of your integration projects, creating a longer-term dependency on their services for future support. **Their interests are diametrically opposed to yours**. Such firms are thus less likely to propose the more productive, economical, VAIM-based solution approach. We recommend that you make the use of your chosen standard VAIM middleware a condition of all such contracts.

Appendix A: Expanding Regulatory Regimes/Compliance Demands Drive Application Integration Workloads

Regulatory Compliance Demands Soar – Impact IT

The fast-increasing panoply of regulatory compliance demands, from many sources, are imposing stringent new controls and demands on enterprises in most industries and geographies. Meeting these tough new regulatory compliance mandate demands almost invariably requires complex changes to, and new integration levels amongst, the enterprise's application portfolio and across the IT infrastructures that support the business. This regulatory torrent emanates from many sources: global institutions, supra-national bodies (*e.g. European Union*), national governments, standards bodies, and vertical industry regulators.

Some are well known, such as the Basel II Convention (*which sets new international standards for banking operational, credit and market risk management*), which has driven many new IT requirements (*including higher levels of information availability, delivery and monitoring*), and came into effect from late 2006. Another major example is the stringent US Sarbanes-Oxley legislation concerning the integrity of reported company financial results. There are many others applying to specific vertical industries, nations, professional functions (*accounting, for example*), and to other specific market places, etc.

Why This Regulatory Flood?

Several major triggers have each driven this much-increased regulation in recent years; many of these regimes are now in effect or are due to become effective soon. We highlight these main regulatory regime triggers in Figure A1.

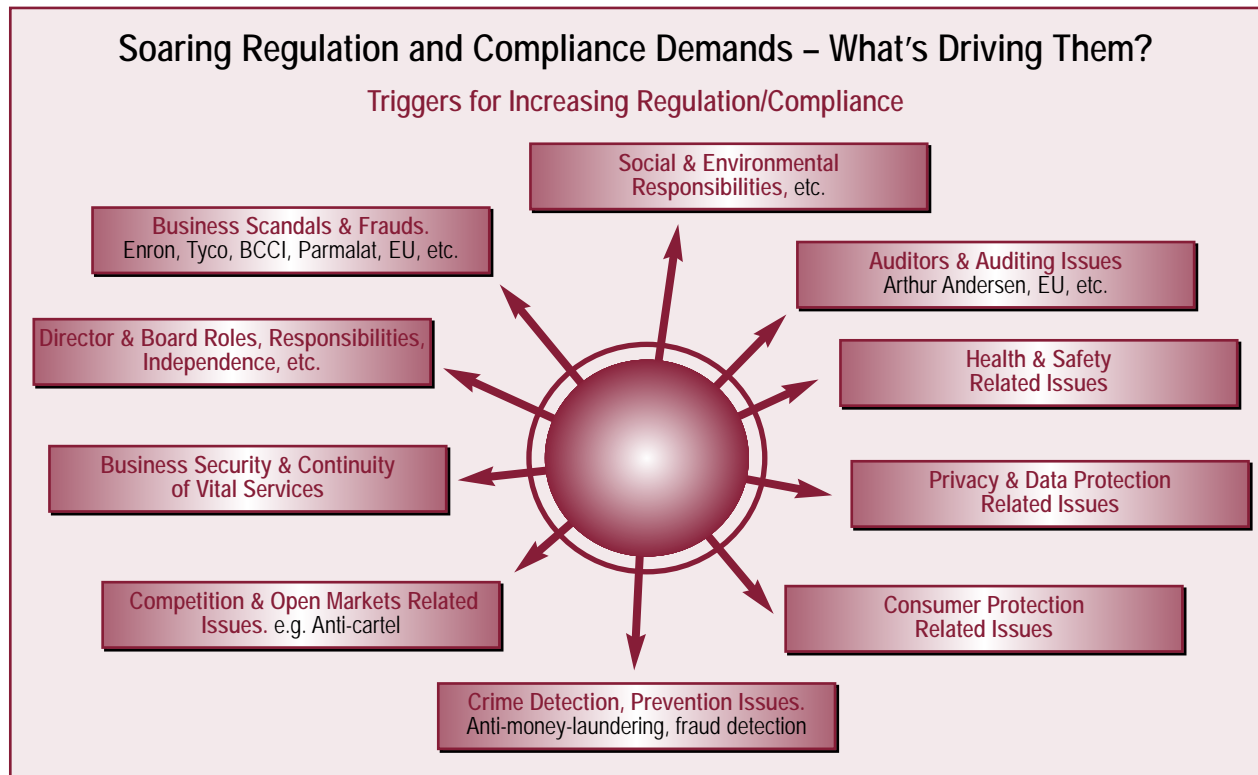


Figure A1: Soaring Regulation and Compliance Demands – What's Driving Them?

Big-business scandals and frauds have been a major trigger, driving calls for better corporate governance and improved executive and board behaviors. The need to ensure the integrity of company financial results by properly accounting for business and risk to appropriate standards is a related aspect. Market competition rules and constraints apply in many sectors, aiming to prevent monopolistic behavior, market abuse, and unfair competition. Many important industry sectors have thus become “regulatory hotspots” where, for a variety of motives, regulation and control levels are especially high.

Regulatory compliance thus remains right at the top of 2006/07 board agendas in most firms...

Many of these newer regulatory regimes impose direct and personal liability on the board of directors and senior executives, with serious sanctions for non-compliance, that have got their full attention. Regulatory compliance thus remains right at the top of 2006/07 board agendas in most firms, a priority invariably reflected through onto their IT team's priorities.

IT Heavily Impacted – Compliance Demands Application Integration

These regulatory regimes each add new, and often stringent, requirements/demands upon enterprise IT organizations; these demands usually include a combination of:

- Demands that enterprises can show/report complete **customer histories**. (*Many cannot easily do so.*)
- **Anti-money-laundering regulations** that demand more stringent identification and documentation of customers and the tracking of all customer contacts.
- Financial reporting and accounting systems that can assure full **enterprise compliance with accounting and company results integrity standards**.
- Regulations that extend the need to **retain data and records**, often for many years, with a retrieve-on-demand requirement, or a full ILM implementation, needed.
- More **demanding regulatory reporting** that requires extensive integration to assemble and combine the required information.

- **Extended audit trail and logging requirements**, to provide extended traceability of transactions, goods, and products, etc.
- **Business service continuity requirements**, which impose new IT resiliency and continuity levels demanding more extensive Disaster Recovery (*DR*) and Business Continuance (*BC*) investments.

It is clearly apparent that all of these regulation-driven IT changes require/depend upon more advanced application and systems integration, and often also on better management and control facilities, for the main business processes that the systems are supporting.

In 2006/2007, regulatory compliance therefore again **remains the top driver of new AI requirements**, and thus a top priority for corporate and IT management alike. Whilst the IT industry has responded with many new point solutions, products and regulatory compliance-related services, there are few “quick fix”, “plug-in-a-box” solutions that can “magic away” the problem. A strategic VAIM platform – that can enable/support/deliver all such integration needs in a common, consistent, and economical manner – is therefore now absolutely essential. Adoption of SOA application architectures provides a more comprehensive, flexible and adaptable application services portfolio that can more readily meet future regulatory changes easier and faster over the typically mid-term SOA deployment timescale. Since early VAIM adoption is also a main entry-point to SOA, it not only provides immediate relief in implementing pressing compliance needs today, but also installs the message-based underpinnings for the ESB connectivity model needed for SOA deployment within the enterprise to expand.

Appendix B: Example VAIM Platform – IBM WebSphere MQ V6, Late 2006

VAIM Positioning/Introduction

VAIM platforms providing secure, reliable, easy and fast-to-implement, robust, efficient messaging services that enable enterprises to create, deploy, operate and manage the many-needed integration links, are a hugely important category of middleware software. These platforms offer open standards-based, multi-platform-based capabilities to provide loosely-coupled integration between applications, using messages to transfer data and actions/events between the different applications involved, greatly simplifying integration development. The prime technology that accomplishes this goal is MOM.

For over almost fifteen years, IBM’s WebSphere MQ has been the world’s unambiguous market-leading VAIM platform, and now also provides the messaging backbone/ESB underpinning for IBM’s WebSphere SOA Foundation Suite. IBM has rapidly built out the latter to create the industry’s most comprehensive and complete SOA middleware/tools software suite, capturing a commanding 48% SOA market-share lead. This Suite adds an extensive set of SOA capabilities on top of the WebSphere MQ transport backbone layer. It now offers an “ESB Without Limits” approach to provide complete SOA connectivity and integration, illustrated in Figure B1.



Figure B1: IBM SOA Connectivity/Integration Offering – An ESB Without Limits

This shows the IBM “ESB Without Limits” providing universal connectivity and integration far beyond the capabilities of a conventional ESB. Products delivering these capabilities are the new WebSphere ESB (*for pure Web services integration*), WebSphere Message Broker (*advanced ESB*), WebSphere MQ (*messaging integration backbone*) and other critical capabilities provided (*SOA appliance accelerator hardware, Web services Registry, etc.*). This “ESB Without Limits” provides built-in transaction coordination, connections for third-party JMS providers, complete integration with the WebSphere SOA platform, and has massive scalability – all with the performance to match back-office transaction processing systems.

VAIM Platform – WebSphere MQ Backbone Capabilities

WebSphere MQ servers enable AI by helping business applications to exchange information across different platforms by sending and receiving data as messages. They take care of network interfaces, assure ‘once and once only’ delivery of messages, deal with communications protocols, dynamically distribute workload across available resources, handle recovery after system problems, and help make programs portable.

WebSphere MQ ensures the reliable delivery of messages, including XML documents and SOAP messages, connects applications and Web services, spans important programming environments such as J2EE™ and Microsoft .NET, and supports 80-plus platform configurations. More than 500,000

MQ servers have to date been deployed by more than 10,000 different customers, to make the award-winning WebSphere MQ the industry de facto standard in this space. These customers process hundreds of million messages, and trillions of \$ worth of transactions, reliably and securely every month, with their WebSphere MQ software.

Integrated support for the latest Java™ Messaging Service interface standard, JMS V1.1 – including publish-and-subscribe messaging – makes WebSphere MQ the JMS provider of choice for multi-platform environments. (*with WebSphere Application Server the JMS provider of choice for J2EE™ environments.*) WebSphere MQ also provides comprehensive security options using SSL, the Internet standard for secure communication. The standardized interfaces of WebSphere MQ also simplify the development of Application Programming Interface (API) exits to allow monitoring and implementation of local customer standards. The middleware also automatically and dynamically distributes workloads across available server resources, and ensures that all data is delivered free from errors and safe from unauthorized access.

With these advanced MQ services, new AI needs are much quicker and cheaper to implement, and to support and maintain over their lifecycle. In production they run more reliably, efficiently and securely than any custom-built, in-house AI solutions. This frees up enterprise development programming resources to better deploy their skills to handle essential business requirements, instead of wrestling with underlying network complexities.

WebSphere MQ Version 6 (*released in Q2 2005*), is the current major version and was further enhanced with important incremental improvements through 2006. New Eclipse-based open development standards configuration tooling makes the set up of MQ easier and faster on all platforms. Enhancements in WebSphere MQ problem determination and reporting aid and assist in the efficient management of integration services, and in more rapid issue resolution.

A selection of four recent enterprise customer profiles, outlining their successful experience with WebSphere MQ and the benefits they derived, are presented in the following Appendix C.

WebSphere MQ Product Family

The core WebSphere MQ family now includes the following offerings that each target specific needs:

- **IBM WebSphere® MQ:** Core flagship enterprise product of the family delivering all the enterprise-class MQ capabilities described above and available for all major IT platforms.
- **WebSphere MQ for z/OS®:** Optimized, extended version of WebSphere MQ tightly integrated to exploit unique System z9 mainframe capabilities under the flagship z/OS operating system. Enables simple message passing between different OS/390 or z/OS address spaces. Supports CICS/ESA®, IMS/ESA®, MVS Batch, TSO, plus others. Fully exploits the high integrity, reliability, availability, and serviceability techniques of OS/390 and z/OS. WebSphere MQ for z/OS Version 6, which has been available from Q2 2005, is the latest major version.
- **IBM WebSphere® MQ Extended Security Edition:** WebSphere® MQ Extended Security Edition expands the security services available in WebSphere MQ. It provides an application-level data protection model and enterprise-wide, remote management of security policies on queues, securing business end-to-end. These advanced features enable customers to secure current production environments without changing or modifying any existing WebSphere MQ applications.

With these advanced MQ services, new AI needs are much quicker and cheaper to implement, and to support and maintain over their lifecycle.

- **WebSphere® MQ Everyplace:** Connects pervasive, mobile and wireless applications with the enterprise. It uses secure, robust and dependable application messaging, extending application and business integration to mobile devices and workers anytime, anyplace, and anywhere. It provides **end-to-end connectivity**, operating over fragile networks, across a broad range of platforms and devices, and offers extensive customization options for this new class of applications.
- **IBM WebSphere® Message Broker (advanced ESB):** Transforms and enriches in-flight information to add intermediation between applications that use different message structures and formats, offering an advanced ESB for mixed Web services and traditional application environments. WebSphere® Message Broker adds significant value to an MQ environment. It supports enriched real-time information distribution from multiple, disparate sources through a network of access points and/or a centralized broker, offering a valuable new way to unify organizations. Close integration with databases enables the product to perform message logging, data merge, and database update functions. It also simplifies integration of existing applications with Web services, by transforming and routing SOAP messages and logging Web services transactions.

Complementary “ESB Without Limits” products now offered are described in Figure B2 below.

WebSphere Product	Core Capability & Functionality	Latest Version Advances/Benefits
WebSphere MQ	Proven, reliable messaging backbone for SOA connectivity, provides support for virtually any commercial IT system – over 80 platform configurations, delivers end-to-end data integrity – even single transactions updates to multiple IT systems, and supports C, C++, Java JMS messaging and C# .NET applications.	Ease of use is dramatically enhanced with new Eclipse workbench plug-ins for graphical JMS configuration, graphical publish-and-subscribe configuration, and for configuration testing, problem determination & diagnosis from a PC workstation.
WebSphere Message Broker	IBM's advanced ESB for standards-based and non-standard applications, offers an unmatched ability to integrate heterogeneous systems, platforms, devices, APIs, etc, and provides universal transformation, high performance, and fully integrated, complex event processing.	Offers enhanced ease of use and productivity via enhancements to the Message Broker Toolkit, support for SOA governance with integration with new WebSphere Service Registry and Repository, and improved flexibility and faster time to production with enhanced administration, testing, and platform support.
WebSphere ESB	WebSphere ESB provides pure Web services connectivity, JMS messaging and Service Oriented Integration, offering improved time to value and seamless integration with the WebSphere SOA platform.	Now provides enhanced ease of use, enabling better business flexibility through dynamic selection, administration and configuration, and an accelerated development cycle. Performance and throughput is enhanced. Enhanced use of existing assets and support for true governance is provided by improved integration with WebSphere MQ, new JMS capability, and support for WebSphere Service Registry and Repository. Systems management is improved by extended support for IBM ITCAM for SOA and IBM WebSphere Business Monitor. Remote access to mainframe DB2 resources is now also supported.
WebSphere Transformation Extender	WebSphere Transformation Extender provides universal transformation deployable anywhere in the enterprise, offering consistent data transformation and validation across any infrastructure, and faster application deployment with reduced development and maintenance costs.	Provides enhanced ease of use and globalization with new functionality and language support. It also offers extended platform choice, with new System z platform options for z/OS Batch, CICS, IMS, and Unix System Services. Improved time to value, and support for the latest application and industry standards, are provided by updated Enterprise and Industry (<i>accelerator</i>) Packs.
WebSphere Adapters	WebSphere Adapters allow service-enabled applications to participate in an SOA. The full WebSphere Adapter portfolio, available from one vendor, provide for all end-to-end SOA needs, and also provide first-class, in-depth support for major applications such as SAP and Oracle.	Provides accelerated ESB connectivity through new and enhanced open standards-based adapters. Tools for the extended development community provide users, ISVs and partners with an Enhanced Toolkit for developing custom adapters. Also, enhanced ease of use and productivity is provided by close integration with the common WebSphere integration tooling – WebSphere Integration Developer – an advanced, Eclipse-based SOA tool.
WebSphere DataPower	WebSphere DataPower specialized IBM hardware appliances simplify, help secure and accelerate SOA (<i>XML</i>), offering the higher levels of security assurance certifications that only comes with hardware, ESB functions in a hardware form factor, and hardware-assisted performance and scale for SOA.	Now offers improved time to value with advanced connectivity and Gigabit-speed SOA processing. They provide enhanced security and governance, with advanced Web services standards and security, and with robust end-to-end SOA management. Their use is extended with an improved WebGUI interface. They also offer improved administration to compare and “roll-back” configurations.
WebSphere Service Registry & Repository (<i>WSRR</i>)	WSRR provides an integrated service metadata repository to govern services and manage service lifecycle. It allows companies to seamlessly publish and find services capabilities across all phases of an SOA. WSRR facilitates services reuse with dynamic and efficient interactions between services, promoting visibility, consistency and reducing redundancy in an SOA environment.	Promotes reuse and eliminates redundancies by enabling user firms to publish and find services and related metadata through all stages of SOA, and to provide integration and federation with other standard registries and repositories. It enables optimized access to service metadata. It enriches SOA runtime interaction by managing service interaction and policies, is supported by CICS and key WebSphere products, and facilitates managing the service lifecycle with guards for state transitions. WSRR also provides better control of SOA with governance, with its ability to analyze impacts of service introduction, deletion or alteration by maintaining relationships, and capabilities to manage role-based access to services, changes, versioning and service retirement.

Figure B2: IBM “ESB Without Limits” Product Support

Our Analysis

WebSphere MQ and the wider WebSphere MQ family has been the **clear market-leading AI platform** for almost fifteen years, and with its associated product family today, now provides comprehensive SOA and traditional AI solution enablement for businesses of all sizes. It provides the message and event broking services, secure message transmission, QoS, and AI management **services that are required of an advanced ESB**, with publish-and-subscribe, assured message delivery, sophisticated event handling, and broking to trigger business activities in defined circumstances as base value-added services. The latest Version 6 and enhancements substantially extend and strengthen the platform that is central to AI. It also comprehensively supports industry-wide migration to SOA-based, composite applications that reuse existing software assets combined with new components written in modern languages like Java connected through Web services standards.

Appendix C: Representative WebSphere MQ Customer Experiences

Real-world customer experience and results with VAIM/SOA platform middleware provides the most compelling evidence of the benefits of these powerful technologies. We include below a selection of recent profiles of the benefits delivered by WebSphere MQ at four varied enterprise users.

1. Crowley Maritime Reduced Application Delivery Time/Costs, Improved Efficiency/Productivity with VAIM/SOA Solution from IBM/Ultramatics, Inc. (October 13th 2006)

Crowley Maritime Corporation (*headquartered in Oakland, California, logistics center in Jacksonville, Florida*) is a global provider of maritime services, employing 5,000 people. Founded by Tom Crowley in 1892, and family run ever since, the firm offers maritime services ranging from tugs and barges to container ships, with operations from Central America and the Caribbean to Alaska's North Slope. Crowley needed to reposition its business operations to meet the challenges of its second century of operations – including reducing operating costs; increasing profits and ROI from existing routes/platforms; and addressing legacy application modernization. Crowley selected an IBM Advanced Enterprise Service Bus/SOA based-solution, designed/implemented by Ultramatics (*IBM Premier Business Partner – “SOA Specialty” certified, Tampa, Florida*) that included:

- IBM WebSphere Message Broker.
- IBM eServer zSeries 890 mainframe.
- IBM WebSphere MQ.
- IBM WebSphere Process Server.

Crowley had previously been heavily dependent on many hand-coded, point-to-point, custom-built integration links between its legacy applications, each typically taking 300 hours of IT development. Ultramatics recommended an IBM advanced ESB solution that quickly showed a reduction (*by at least half*) of the usual time/costs incurred in tying new, third-party applications into the Crowley core infrastructure, which included a 30-year-old, heavily-customized, mainframe-based, customer-information system. Business/strategic benefits were even more important. In 1H 2006, Crowley implemented a new transportation management application for inter-modal transportation, to automate the routing of its cargo containers (*hundreds per day*) to dozens of terminals across North America. This major new application easily “plugged into” the IBM advanced ESB/adaptor framework, quickly integrating this major addition with existing systems. This delivered unprecedented efficiencies, with the routes chosen proving better, cheaper and faster, and delivering much-improved customer service/satisfaction.

The Crowley/Ultramatics team has now built at least 20 major interfaces with the advanced ESB by way of the adaptor framework – including interfaces to equipment control systems, the legacy Accounts Receivable system, Customer/Vendor information system, and others. The IBM advanced ESB solution now provides Crowley with a robust middleware backbone for all its future corporate, business and AI.

“This [SOA] solution directly translates to \$225,000 in savings for Crowley over our previous practices. Not to mention the soft dollar implications on resource utilization costs and efficiency as those resources can now focus their efforts on other fronts.”

Jerry Dresch, Director of Application Services, Crowley Maritime Corporation

The IBM/Ultramatics solution reduced application delivery time and costs by half, saved \$15,000 per integration interface, and showed an anticipated \$225,000 saving over previous practices. It also gave significant improvements in business efficiency, productivity, and business flexibility, whilst reducing errors and omissions. It also added years of productive life to Crowley's legacy applications.

The IBM/Ultramatics solution showed an anticipated \$225,000 saving over previous practices.

2. GROHE Enjoys Integrated Solutions on Tap with IBM Service-enabling Software (September 13th 2006)

GROHE AG is the largest water technology solutions provider in Europe, is the largest exporter of faucets, bath mountings and other household/commercial fixtures worldwide, and is renowned for its highly-functional, well-designed, attractive fixtures. The 5,600-employee company is based in Hemer, Germany, and has 20 subsidiaries and 12 sales offices across more than 130 countries. Annual 2005 sales were 865 million Euros (*US\$1.1 billion*), 80% exported.

GROHE needed to integrate its new SAP ERP modules with its existing mainframe systems. These included duty and plant applications, delivery, invoice and product catalog systems, bar coding, logistics and inventory management software. They identified that 14 new interfaces were needed between these and the new SAP ERP modules, which were needed quickly to meet a launch deadline. The options were to implement these with hand-coded, point-to-point links or to purchase/deploy a VAIM/SOA platform to speed this vital AI task. After considering several vendor proposals, GROHE implemented an IBM advanced ESB solution for SAP integration, using IBM WebSphere business/AI software, aided by experienced AD/SOA services from SerCon GmbH (*an IBM company*). The solution uses the following IBM WebSphere SOA/integration software:

- IBM WebSphere Adapters.
- IBM WebSphere Adapter for mySAP.com.
- IBM WebSphere Adapter Framework.
- IBM WebSphere Adapter for JDBC.
- IBM WebSphere Message Broker.
- IBM WebSphere MQ.

It also uses a high-performance IBM System p 670 server running the WebSphere Message Broker that controls message flow, distributes incoming business objects to the right queues, and transforms messages into the format required by recipient systems. WebSphere MQ provides scalable, assured delivery of messages over the company's Gigabit LAN. Passing/transforming between 5,000 and 25,000 messages per day, the IBM advanced ESB solution enabled a global exchange of information via services between decoupled front- and back-end applications. The SOA used standardized interfaces with common message formats (*XML and SAP Intermediate Documents*), ensuring GROHE business services remain stable and well-defined, yet easy to change for new business needs.

"Using the older method of point-to-point integration, it would have taken up to six months to program one interface. With the IBM WebSphere integration solution, it took two months to complete all 14 projects. This was a stunning success for our team and our company. In fact, we have now service-enabled our legacy systems, which will facilitate all future business integration projects."

Armin von Dolenga, Software Manager, GROHE AG

With the new approach, von Dolenga estimates that his IT group can now bring a new service online within just two to four weeks. The IBM solution decreased average integration time by up to 84% (*two-to-four-weeks versus up-to-six-months*), and reduced total time/cost of integrating the legacy applications with new SAP modules (*compared to hand-coded, point-to-point integration techniques*). It also provided more reliable and highly available data transfers, and SOA-enabled GROHE's legacy systems for reuse of their software assets on demand.

*The IBM solution decreased average integration time
by up to 84% ...*

3. Banco de Chile Reduces Application Deployment Cost With IBM Integration Solution (June 21st 2006)

Based in Santiago, Chile, Banco de Chile, the second largest bank in Chile, provides commercial banking services to a diverse customer base that includes large corporations, small and mid-sized businesses, and individuals. The bank's 9,000 employees deliver financial products/services through a nation-wide network of ~250 branches, more than 1,000 ATMs, and other electronic distribution channels. At March 31st 2005, Banco de Chile showed total assets of \$17 billion, loans outstanding of \$12.1 billion, deposits of over \$10.5 billion, and shareholders' equity of \$953 million. With a formidable leadership position to maintain, Banco de Chile faced the same pressures as other banks worldwide, needing to improve the way it does business to thrive in fiercely competitive markets. The Bank sought to enhance its competitiveness by enabling a faster, simpler and more flexible applications infrastructure that could support new business processes targeted at improving service for customers

This required streamlining its AI process to save time-consuming and unproductive point-to-point programming. Developing these point-to-point interfaces previously took a great deal of time, delaying the implementation of new applications, and also made it difficult to respond to ever-changing business needs. Maintaining the growing number of interfaces was also expensive. Existing bank applications were not built on open standards, so they could not evolve/grow to meet new bank integration needs. The bank therefore also planned that new applications should be based on industry-standard technology, such as J2EE™, to improve operational efficiency and reduce maintenance costs.

Banco de Chile chose IBM's WebSphere SOA/advanced ESB offerings as the ideal software platform for its growing IT environment. The Bank deployed:

- IBM WebSphere Message Broker.
- IBM WebSphere Business Integration Adapter for WebSphere Message Broker.
- IBM WebSphere InterChange Server.
- IBM WebSphere MQ.

This WebSphere software integrates disparate applications by translating received message formats to those needed by legacy back-end systems. IBM WebSphere MQ provides the assured, secure delivery of the XML messages. IBM WebSphere Business Integration Adapter for WebSphere Message Broker software enables the applications to access the centralized broker without manual coding. IBM WebSphere Interchange Server synchronizes changes made to the multiple data repositories, including the bank's Siebel CRM application. Banco de Chile is currently routing approximately 1.2 million messages per month using this solution.

"The WebSphere Message Broker solution is part of a business initiative to streamline processes and solutions, and provide our customers with stellar service, while increasing our revenue. Based on IBM open standards software technology, our integration architecture makes us more efficient and better poised to compete by offering customers the new services they demand."

Ruben Farias Sasia, Senior Vice President, Technological Development, Banco de Chile

While Banco de Chile implemented WebSphere Message Broker without needing assistance, IBM Global Services helped the bank shorten time to market by deploying WebSphere InterChange Server. The bank also benefited from education provided by IBM services. The solution eliminates the need to develop/maintain complex, unique point-to-point interfaces between applications. Because integration logic is hosted outside each individual application, the bank can add new applications quickly, and make on-the-fly changes to existing applications, without writing custom code. This IBM advanced ESB-based SOA solution has helped Banco de Chile reduce application development/integration time and maintenance costs, and improve its response time to changing business requirements. It now provides a flexible application infrastructure, allowing the bank's IT staff to focus new line-of-business requirements, improving IT service whilst reducing the need to hire and train additional personnel.

4. Xerox Enhances Productivity with IBM Enterprise Service Bus Solution and SOA (October 28th 2005)

Xerox Corporation (*Xerox*) revolutionized office work, and made its name synonymous with its flagship product, the copy machine. Xerox research is also credited with many innovations that define personal computing today, including Ethernet, the graphical user interface and the mouse. Based in Stamford, Connecticut, Xerox (www.xerox.com) has 58,100 employees worldwide.

While copying has been good to Xerox, the widespread duplication of efforts to custom-code new business applications for its many product divisions became a bottleneck that hampered productivity. These divisions need a steady flow of new business applications to automate manual processes, serve customers better and achieve demanding marketing goals. However, building each from scratch was a waste of effort, since many shared common company back-end databases, ERP, and CRM systems.

Xerox sought an ESB-enabled SOA software solution from a vendor fully able to support its software with deep R&D-backed future product development. It evaluated middleware from IBM, BEA Systems and webMethods. IBM showed the SOA leadership, stability and commitment to the market that Xerox required, and helped Xerox implement an Advanced Enterprise Service Bus-enabled SOA environment. This allowed easy integration of Xerox back-end databases with new, decoupled front-end application without custom development.

To centralize its new programming efforts, and bring costs under control by using this more efficient method of application development and integration, Xerox created its Integration Competency Center. This group, dedicated to integrating Xerox's business applications with back-end systems, built an SOA architecture that would enable them to reuse coding assets and leverage a common infrastructure for integrating a large number of applications.

To provide this universal connectivity solution, Xerox implemented an advanced ESB with full failover capabilities using the message-oriented, event-driven and Web services capabilities of IBM WebSphere software, including:

- IBM WebSphere Message Broker.
- IBM WebSphere Application Server Network Deployment.
- IBM WebSphere MQ.
- IBM WebSphere Studio Application Developer Integration Edition.

IBM Business Partner Software Spectrum provided the software solution in a timely manner to help Xerox meet its target project deadline.

"With IBM's help we have moved forward with a service oriented architecture that helps us respond to today's challenges and gives us a flexible architecture to respond to future challenges. Not only did IBM meet our requirements for scalability, availability and performance, it differentiated itself from the competition with its ability to follow through with R&D that continuously enhanced its portfolio of offerings."

Ram Sunkara, Manager, Integration Competency Center, Xerox

Among the 50 applications that now run on Xerox's new WebSphere infrastructure are Web services for looking up service providers for Xerox's customer support teams, performing credit authorizations, managing customer problem calls, fulfilling parts orders and capturing user profiles for printers. WebSphere MQ, which provides assured delivery of more than two million messages

...Xerox estimates that it is saving \$720,000 annually in the cost of making changes to its applications...

monthly, provides an essential part of the solution and contributed to its 7*24 availability. Xerox also uses IBM WebSphere Studio Application Developer Integration Edition to build modular applications that are designed to adapt quickly to changes.

With its new advanced ESB-based SOA solution IBM WebSphere software, Xerox estimates that it is saving \$720,000 annually in the cost of making changes to its applications, which formerly required custom coding to reintegrate with back-end systems.

Other Related Software Strategies Research

1. **"New System z9 Mainframes Hit Mid-market, Refresh Top End – Powerful New SOA & Data-serving Software Delivers New Enterprise-wide Roles."** Software Strategies Mainframe Spotlight Report, July 2006, 60 p.p., 21 charts and tables. (*In-depth evaluation of new System z9 BC and EC mainframes and System z9 WebSphere SOA software.*)
2. **"Information as a Service Unfolds – System z9 Mainframe/DB2 Premier Data & Information Server for SOA."** Software Strategies White Paper, February 2005, 74 p.p., 30 charts and tables. (*In-depth assessment of IBM's "Information as A Service (IAAS) strategy, supporting extended information management product portfolio, and the role of the System z9 mainframe as the enterprise SOA data serving and information delivery hub.*)
3. **"SOA Takes Off – New WebSphere SOA Foundation Extends IBM's Lead with New System z9 Mainframes as the Hub of the Enterprise."** Software Strategies White Paper, 2nd Edition, November 2005, 56 p.p., 20 charts and tables. (*In-depth assessment of the case for adopting SOA, evaluation of the IBM WebSphere SOA Foundation software, methods and services, and the role of the System z9/zSeries mainframe as the enterprise SOA hub.*)
4. **"IBM WebSphere Business Integration Leads the Way with Fullest J2EE™ and Eclipse Support – Business Integration Software Swings to Open Standards."** Software Strategies White Paper, 2nd Edition, September 2004, 24 p.p., 16 charts and tables. (*Comparative evaluation of WebSphere Business Integration Suite & open standards.*)

Software Strategies

Software Strategies is a specialist analyst firm focused on e-Infrastructure platform strategies and issues. Since 1997 we have published reports, white papers and newsletters, hosted and spoken at numerous successful industry events, and have worked closely with industry leaders, including: IBM; Microsoft; Intel; ICL; Unisys; Computer Associates; BMC; Stratus Computers; Misys Plc; Notability Solutions; and many others.

Specialist expertise in mainframes, servers, storage, processors, Microsoft technology on Intel environments, operating systems, and on enterprise middleware/tools, have been a common threads. Many thousands of enterprise IT users have benefited from our authoritative events, presentations, conferences, newsletters, white papers, and reports.

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This revised/updated White Paper was researched and written by Ian Bramley, Managing Director of Software Strategies, and published in November 2006. The views expressed are those of Software Strategies, and are based on our proprietary research. Bramley founded Software Strategies in 1997, is an experienced enterprise infrastructure analyst, a keynote speaker at many industry events, and has published many reports and papers. Before this, he served as Director of Enterprise Platforms at Butler Group and was Founder/Chairman of the Enterprise NT Management Forum from 1998 to end-2000. Previously, he held a variety of business/marketing/sales executive positions with international software vendors over a 25-year industry career.

