

It's the 21st Century, Do You Know Where Your Information Is?

A discussion on the shift from information processing to information movement.

Author's note: This is the third update to this white paper since it was first published in the mid 1990's. Although the terminology has changed, the basic concepts have stood the test of time – they remain essentially the same.

The title may not be grammatically correct, but the message is clear. We are leaving the era of data processing where information just supports the business, and moving to the age where information is *becoming* the business. The signs are all there. Amazon.com, Dell, Fedex, Google, and UPS, are but a few of the names, new and old, where information and the Internet are making them the new market leaders. ERP vendors, who were king of the hill in the 1990's, are trying to stay in the ball game with Internet enablement and other information management tools while they can redesign their systems. Business Intelligence, Web Services, Portals, and Service Oriented Architecture (SOA) have become the buzz words of the day.

The list goes on, which is why senior executives are putting off implementing "information technology (IT) for technology's sake" until they can fully understand the new relationship between information technology and business value. They are learning that their success in the future is *not* going to be based on the limited information that just supports the business, but on gathering all of the information possible that is needed to *run* the business. This is a major change in how we think about information, its usefulness and its vulnerabilities. It is, perhaps, the most significant change in the way we will use information to run our businesses since the introduction of the computer itself.

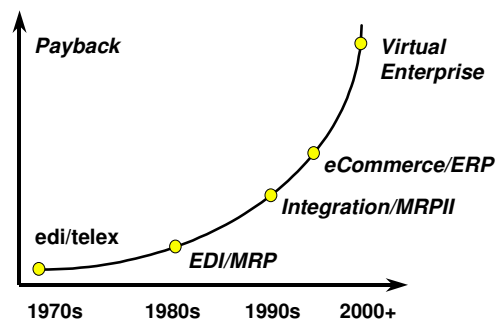
To be successful in the new millennium, businesses will have to become more agile, flexible, and dynamic than ever. A business will have to shed its stand-alone identity. It can no longer be the 'center of its own universe'. It must become part of a much larger community that extends around the world. It must learn how to increase the level of cooperation with its customers and suppliers by sharing the information that is needed to make *everyone* successful. It will have to respond to supply chain initiatives such as lean manufacturing and inventory reduction. And the list goes on...

Instant and interactive access to information has never been more important. Today, supply lines extend around the world at the same time as compliance, regulation, and homeland security add more layers of complexity. Collaboration, not process, is the new key word. Collaboration means the exchange of information needed for knowledge management -- instantly, accurately, effectively, and at the right time, information that has filtered out the noise, and turn what is left into knowledge and wisdom.

The need for more and better information will be joined by an equivalent need for greater content accuracy and better security -- all forming part of the new architectures that are being used for information infrastructure, information movement, and content control. If you don't know where your information is, you won't know where your business is, either.

The Changing Importance of Information

Why have information and its management become so much more important? A quick look at where we have been and where we think we are going may give us the answer. We have been using information technology (IT) to conduct business electronically since the early 1970's. First there were homegrown and proprietary computer systems, which were followed by the first commercially available systems to cover basic EDI and Material Resource Planning (MRP). During the 1980's we learned how to integrate EDI and expand MRP to include the rest of the manufacturing (MRPII) process. It was during this time that we also introduced the personal computer and intelligent work station. We could now bring the information to our desk and work independently.



By the late 1990's MRPII had been expanded to include human resources and other corporate functions, to create full functioning Enterprise Resource Planning (ERP). Added to this were new products that provided business intelligence and managed workflow. The increase in the popularity of the Internet and the introduction of eCommerce led to a gaggle of new ways to improve our productivity. Supply Chain Management (SCM) and Customer Relationship Management (CRM) became just two of the newest three-letter acronyms.

Perhaps the biggest impact came from Web services and unified communications. We could now communicate electronically at will and keep a permanent record of what was "said". E-mail replaced the phone as the primary means of communication, enabling us to revisit working together. Collaboration was born. We were now poised for our big move to the virtual enterprise of the 21st century, creating the demand for better command and control of our information.

For some managers, the march toward the virtual enterprise is an unwelcome, but necessary evil. For others, it is the key to an uncertain, but promising future. Whatever the view, all agree that significant change in the business process and how we will use information is, if nothing else, inevitable. The change is, for all practical purposes, the result of the globalization of the supply chain and the continuing need to reduce product costs and eliminate inventory. While the upside of this new direction is greater productivity with fewer resources, the downside is more dependence on others to get there. It

is another way of 'putting your information eggs in someone else's basket'. Just-in-Time Manufacturing, Vendor Managed Inventory, Touch-Tone ordering and On-Line banking are just a few of these emerging business processes that extend the tentacles of one corporation into the bowels of another. All are based on the quick and easy access to information.

Making the Transition from Processes to Information

While more and more managers are 'extending' their appetite for information, and as Service Oriented Architecture (SOA), Voice Application Integration (VAI), Portals, Dashboards, Unified Communications and Messaging Strategies, and Web Services are working their way into the vocabulary of executive suite, many managers are still having trouble making the actual transition. Those who have plunged ahead without understanding the new role of information management are still in the grip of enterprise applications and transaction processing. For them, information and IT will always be the "stuff" down the hall in the computer room that supports the business -- the much hated, but tolerated, ERP system. They are having trouble getting out of first gear.

Those who have taken the time to step back and focus on information instead of processes as the key to their future will be far more successful. They have learned that the Internet, with its ability to instantly move information anywhere in the world, can reduce time and space to near zero. These managers now gather all the information they need at once, make global decisions from the home office, and operate around the clock on a daily, hourly, and in some cases, by the minute basis. They have also learned that sharing information, as well as keeping it accurate and up-to-date, is much easier when the source data is where they can keep an eye on it. Their processes are still important, only this time for a different reason -- managing information, not making widgets.

What has been slowing the change (if not bringing it to a dead stop) is the role of our enterprise applications. For the two decades leading up to the 21st century, ERP has been at the center of our business and thinking. When we needed other processes beyond the capabilities of our ERP systems, such as Advanced Planning (APS) and CRM, we reached out and 'attached' products from other vendors to our ERP system. We also reached out to the Internet through "enablement" when we wanted to communicate with our trading partners.

But it didn't really work, and herein lies the problem. ERP, with its transaction-based architecture, still has many of us under its tight control. Although the shift in focus from processing data to "moving information" has resulted in a new generation of IT tools, we have been reluctant to use them. Perhaps, it is because we don't understand the difference, or that we already have made significant IT investments in ERP and the financing well has run dry. Who knows?

What we do know is that using the right tool for the right job delivers better results every time. For example, we don't use a wrench to hammer a nail. A wrench can do the job, but not very efficiently, because it is not the right tool.

However, when it comes to IT, we have trouble applying the same logic. We are reluctant to accept that ERP and other application-based

A Special Note about ERP Systems

The ERP market seems to be making a comeback. With the downturn in the economy, and the ERP vendor shake-out behind us, interest in ERP is starting to return. Decision makers now are faced with a new problem -- migrating to a "new" product as the result of a vendor merger, buying a totally different system from a different ERP vendor, or taking a different tack altogether. Decisions, decisions, decisions.

In most cases, deciding which ERP system is the best is not the issue. What is more important is determining what solution will provide the best value for the business? Although ERP vendors are upgrading their products to reach out more easily to other applications and information sources outside the organization, some industry analysts have suggested that the users take a different approach. Rather than expand the current code-based, inside-out architecture of host ERP applications to include web-enabled e-Business, they propose finding compatible information movement solutions that are using more flexible architectures that focus on information movement and rapid system configuration.

This is not to say that ERP cannot and does not play an important role. ERP was, and is, still a good investment. It has its place in the applications spectrum. When it comes to managing internal processes and transactions, ERP does the heavy lifting better than any other technology. ERP does what it was designed to do - accounting and transaction processing.

The SOA and portal products available today are ready for prime time. They can be used to create the dynamic environment you need for today's market. SOA enabled, single point-of-access portals are in everyone's future. So if your ERP system is doing what it was intended to, just leave it alone. Apply the money no longer needed for an ERP upgrade toward implementing an information movement strategy. You can do this at a fraction of the cost.

technologies, with their roots in accounting and batch processing, are not the best tools when it comes to moving data. Because they are code-based, their 'logic stream' has to be programmed in advance, making them slow and inflexible.

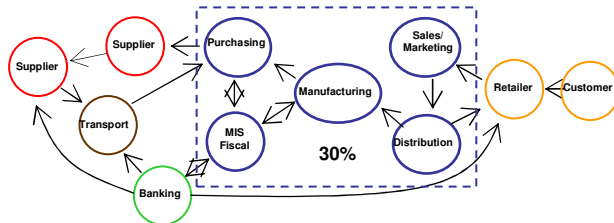
Information movement-based and presentation technologies such as portals, mobility, XML and Web Services, on the other hand, do a much better job. They are rules and message-based, and are free of the restraints of any content. They don't care about the information, they simply move it. Nothing more, nothing less. Thus, they are the best tools for the job -- easier to use, much faster, and considerably less expensive.

Like it or not, information is now at the center of our universe. We create it, move it, share it, mine it, store it, and replicate it. We want to get it to the right people, at the right time, and in the right place. Therefore, we need to use information movement tools to do the work -- to deliver "the mail", to facilitate the collaboration. If we need to

process the information along the way, we can go outside of the information domain, select an application of choice, execute, and return to the flow path. The applications needed to do this can be located anywhere, internally or from on-demand hosted services such as Software as a Service (SaaS). Our world is turning upside down, so we need to change our thinking about information if we are going to change with it.

So What Do We Know About Information?

There is an old saying the “only 30 percent of all computer output is available from input”. This means that the other 70% comes from somewhere else. Since information is what fuels computers and, therefore, businesses, we are, in effect, saying that 70% of the information we need to run the business comes from outside the organization. This concept applies to everyone who participates in the supply chain – customers and distributors at the front door, and suppliers at the back. Each trading partner has their own information - the 30% that they create ‘inside the box’, but must collaborate with their trading partners to get the other 70%. This is the hard part.



Getting Greater Access

It is a relatively straightforward process to identify and make improvements inside the box. This is because the environment is under the control of a single organization and has host-based processing (ERP) and other applications. However, going from ‘inside the box’ to ‘outside the box’ to get the other 70% is a different story. Here, the barriers quickly pop up as disparate organizations with differing technologies, struggle to meet the demands of the supply chain, while at the same time protecting their business self-interest and avoiding unnecessary costs.

Collectively, we all want each other’s information, but individually, our inside-out, processor-based thinking keeps getting in the way of meaningful information exchange. But we *are* getting there. We are learning how to cooperate and collaborate. We are beginning to share information and understand how to think outside-in. We are gaining a new respect and understanding of the importance of moving and managing information. On-line banking and parcel tracking are just two examples that are leading the way.

Speed Counts

The 30% rule also describes how we spend time managing information. Ask anyone and they will tell you they spend 70% of their time looking for information, and only 30% actually using it. The cost and the value of information are a function of time. In the new century, the half-life of information is less than a day, maybe even more so. Those who have the information first and who can act upon it in a timely manner, win the race. Knowing when things go bad, *as they go bad*, enables you to recover and move on. Better yet, knowing when something is likely to

happen *before* it happens gives you an even better advantage. Knowing what the customer wants before he buys is valuable. Knowing about a material shortage before it shuts down a production line is valuable. Knowing market demand before the competition is valuable. When it comes to information, speed counts – period! You can’t waste time looking for it, or getting it to the right person in the right way.

Consecutive vs. Concurrent

The new information movement technologies are also triggering changes to the business process itself. Traditional, linear processes of consecutive functions (order, make, ship, bill, and collect) are being replaced by concurrent activities. Time is no longer linear -- it is a matrix. We can now gather all of the information we need, make our decisions, and broadcast the results to those in the supply chain who will carry out the execution -- all at once, concurrently, at the same time.

Source Data

Creating databases and information banks is easy, maintaining them is hard. The new model is the *source data model* that consolidates all information in one or more host databases and keeps it there. Thus, the need for re-entering and cross-referencing from different systems is eliminated. So is the need for synchronization of data. Updates and maintenance are done once, one place, and then shared. The source data model is necessary for meaningful collaboration because all users need to work from the same data that is being constantly updated to reflect the latest business conditions.

Portals and Architectures

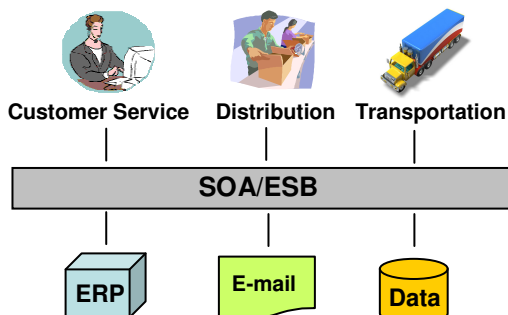
The next step in the march toward the virtual enterprise is to provide direct and universal access to as much information as possible using rules-based portal, open-source (Web Services) and information management architectures (SOA). This means enabling customers and suppliers, in addition to internal personnel, to bypass applications and use connectors, sockets, adapters, and other devices to access the information they need, no matter its location. Doing this creates the opportunity for information self-service – finding the information you need, extracting it, moving it, storing it, sending it to an application, displaying it on a dash board, or presenting it on a customized report, all without assistance, technical or otherwise.

For some time now, ERP vendors have web-enabled their existing products to reach out more easily to applications and other information sources outside the organization. Their critics, however, have suggested taking a different approach. Rather than trying to expand the current inside-out architecture of host applications to include e-Business functionality, they propose the use of portals and other collaborative technologies as the starting point for working from the outside-in. They also recommend starting over using the right tools for the job – Portals, Web Services and SOA. Their opinion is that it will not only be quicker but much less expensive.

Recent developments in portal and service oriented architectures support this approach. Today, the latest portal technology coupled with SOA and its companion, the Enterprise Service Bus (ESB), can deliver the information functionality you need, functionality that extends beyond the constraints of ERP.

SOA and ESB

How then should we 'think information' as we go about redesigning our processes? If we look at the next graphic and visualize an 'architecture zone' comprised of middleware, service buses, collaboration and messaging architecture, and workflow tools that surrounds our information, we can get a better perspective on how information can be used to better manage our business.



The architecture zone as a concept has several benefits: It provides a clean way to separate information from activities and events. This allows us to send supply chain information along different paths, independent from, and well ahead of supply chain activities -- a requirement for continuous improvement and concurrent processing. When combined with portal technology, it also serves as a single point of access that connects a company internally as well as with the outside world. It is this feature that provides a platform for superior information management as well as addressing the problem of disparate protocols and different formats. And best of all, with your information in one place, moving it to databases and applications inside and outside of the company, will be that much easier. You will always know the where your information is, if it's accurate and if it is complete.

By deploying SOA and ESB, new levels of flexibility, rapid development, and control can be used to plan and organize the flow of information. SOA and ESB become your enablers for information consciousness. SOA can be used to model and manage the information flow for the entire organization through the use of reusable service objects that enabled changes to be made in a fraction of time used with code-based systems. Changes can be made 'on paper' and modeled before they are implemented. What-if scenarios that go beyond the limitations of application-based systems can be created and tested in order to define the best remedies for problems and institute change. With business flow models such as the Supply-Chain Council's Supply Chain Operations Reference (SCOR) model or the retail industry's Collaborative Procurement Fulfillment and Replenishment (CPFR) model to provide the direction, the new generation of tools can make the exchange of information much easier.

The SOA Game Plan

One of the lessons we have learned from the 1990's is that ERP and other core applications are proving to be too unwieldy to operate in today's fast paced business environment. While traditional enterprise application integration (EAI) can help organizations link their applications and create a more streamlined, cross-application data integration infrastructure within the organization, it does a poor job of achieving truly meaningful application integration where it counts -- externally, up and down the supply chain. Simply stated, code-based structure is too slow to react on a daily basis. This is an area best suited for SOA, e-business, collaborative messaging and the faster and more flexible information movement technologies.

What, then, is the best way to shift to an information-centric mindset and implement information technology? What is the SOA game plan? How should you proceed in creating an information-based architecture as the focal point for managing our business? While no one has the answer (thinking about information as being *the* business is still rather new), here are a few rules of thumb.

Strategize First, Build Later

Make your mistakes on paper before you implement and model your what-if's before you take action. Change is more dynamic than ever. Develop an IT strategy first. Learn all you can about the new technologies. Put a modeling infrastructure in place and use it every day. Make thinking about information and IT a way of life.

Think Outside-In

Your success will be based more on how you relate with others than what you do inside your own organization. Businesses can no longer afford the arrogance of self. They must think about community and relationships and building portals to the outside. Those that do the best job of sharing information will be the most prosperous.

Place Business Value First

Start with your business process and business information. The best information systems in the world won't work if they don't reflect your business value.

Focus on the Portal Functionality

Above all, focus on two things: the user interface and how to integrate it with all of the available information sources. The human element is important. People are the primary generators and users of information. Each has his or her own special needs. Give each one a personalized view of their world and you will have increased their productivity immeasurably. But remember, the view will be only as good as the architecture that brings the systems together, that unites the disparity and forms a unified infrastructure that makes this all possible. Make sure it is "open" and componentized with lots of Java and XML for growth and flexibility.

Separate Information From Activities

The information that initiates or accompanies each step in the workflow process typically follows a linear path process. This will be changing over time as broadcast-and-subscribe and other Internet technologies become more pervasive. Information no longer needs to be slow and consecutive. It is now instant and concurrent. It is separating itself from the activities it was once tied to and moving outside of the production process where it can be more efficiently shared, exchanged, and used to collaborate - where it can be used to anticipate and not just react.

Closing Thought

In a recent conversation about the future of portals and SOA, one of the participants stated with firm conviction the "all business will eventually have some form of a portal and SOA or they will no longer be in business." The knee-jerk response by another participant was quick and to the point. "That's what they said about the Internet." Then the third participant jumped in and said "And that turned out to be a true statement, didn't it?" Portals and SOA are no longer an "if", but a "when". Better information management is in everybody's future. Do you know where your information is?