



SAP White Paper
SAP NetWeaver

ENTERPRISE SERVICES ARCHITECTURE – AN INTRODUCTION

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EXECUTIVE SUMMARY

Changing business models, growing competition and globalization, tighter regulation, and increasing merger and acquisition (M&A) activity are combining to accelerate the pace of business change. More than ever, success rides IT's ability to adapt rapidly to evolving business needs. Chief information officers (CIOs) need a robust, cost-effective way to leverage and extend a heterogeneous collection of enterprise applications to support new requirements and enable innovation. It is increasingly costly and inefficient to stitch together new business processes that span disparate applications or cross-organizational boundaries or that require analytics and collaboration. For IT organizations to enable business agility, they must ensure that enterprise applications are not only high-performance business engines driving efficiencies, but also that they become flexible building blocks of future business systems. A clear blueprint for evolving existing architectures is needed.

The mid-1990s answer to these problems, enterprise application integration (EAI), has proven to be costly to implement and even harder to change over time. More recently, Web services enabled a large step forward toward flexibility across a heterogeneous landscape. However, current implementations have yet to unlock the true power of Web services. Most Web services today expose functionality of individual applications and are too fine-grained to be efficient building blocks for enterprise-wide business processes.

Creating new value from existing IT assets calls for new answers. SAP's answer is Enterprise Services Architecture, an open architecture for adaptive business solutions, enabled by the SAP NetWeaver™ platform. Building on the benefits of Web services, it delivers on the promise of services-oriented architectures, enabling both flexibility and business efficiency without increasing costs. With Enterprise Services Architecture, companies have a cost-effective blueprint for composing innovative new applications by extending existing systems, while maintaining a level of flexibility that makes future process changes cost-effective.

Enterprise Services Architecture will move IT architectures step-by-step to dramatically higher levels of adaptability and help companies move closer to the vision of the real-time enterprise.

CHALLENGES FACING IT ORGANIZATIONS

IT today plays a larger role than ever in driving business success. The systems created, managed, and maintained now serve as the engines of the enterprise. The time required for IT providers to deliver solutions and IT's long-term structural cost have become crucial considerations in whether or not to go forward with new business initiatives. As companies focus on core competencies and outsource non-differentiating operations, even standard processes, like order management, suddenly become more complex since they now cross enterprise boundaries. Transforming core business processes to create strategic advantage increasingly involves people, processes, and information across multiple organizations and systems.

IT organizations must enable these new business initiatives by finding a cost-effective way to leverage and extend existing systems to support new business needs. This means that traditional IT architectures that supported process automation in a departmental context must evolve. They must seamlessly integrate processes and information from disparate applications regardless of where they reside; enable collaboration between departments, suppliers, partners, and customers; and manage and adapt processes to the pace of business change.

To deliver against these requirements, IT organizations must address two major hurdles posed by the current environment:

- **Heterogeneity** – The agile IT organization must support the new generation of business requirements in an increasingly heterogeneous system landscape. Today's landscapes are dominated by a mix of packaged enterprise suites, best-of-breed applications, and legacy systems. To complicate matters, most large companies have gone through multiple acquisitions and divestitures, leaving their IT infrastructure a web of disparate, stand-alone systems carried over from these business changes. As a result, implementing even simple business processes means cobbling together processes spanning different organizational units, different systems, or even external service providers. Over time, the cost of maintaining and adapting these processes can increase exponentially, as business structures and customer needs change.

- **Applications designed for efficiency, not reuse** – Traditional application architectures that form the business backbone of today's enterprises were designed as high-performance transactional engines that drove operational efficiencies. Since they were built for efficiency around a tightly integrated set of functions, they often do not have a clear distinction between user interface, business logic, and data. Modifying these systems to support the addition of new channel partners, the introduction of new products or services, or to target new customer segments, can result in unforeseen costs and complexity. While the integrated nature of these applications serves their intended uses well, IT organizations must find a way to transform these tightly integrated business engines into the flexible, reusable building blocks of future systems. Reusability is the key to increasing productivity and flexibility while reducing total cost of ownership (TCO).

For IT organizations to enable business change, they must find a cost-effective blueprint to evolve existing architectures towards greater flexibility across heterogeneous landscapes.

No Silver Bullets

In the mid-1990s, these constraints gave rise to EAI, which attempted to stitch together business scenarios using specific application-to-application (A2A) interfaces designed for performance and reliability. But EAI has not produced an integration architecture that is cost-effective in the long run, and it has proven to have its own problems. More recently, Web services have held out great promise, but their true power remains to be tapped.

EAI Only Provides a Partial Answer

While EAI tools can successfully link individual applications, they require that programmers understand the inner workings of both sides, which creates a tightly coupled integration. Programmers then have to maintain these links over the useful life of the applications. Creating and maintaining these hardwired links is expensive and resource intensive. Every process change triggers expensive and complex programming and testing.

Furthermore, reusing functionality developed in these distributed environments becomes very difficult. EAI too often becomes a high-cost path, with companies spending five times as much in services and support as they do on EAI tools. This complexity and cost stands in the way of “IT enabling” business change.

Any answer to the challenges of enabling flexible processes spanning heterogeneous landscapes must emphasize long-term adaptability and cost reduction. And it must leverage the same infrastructure, whether the integration methods are between applications within a department, across enterprise boundaries, or some combination of the above.

Web Services Begin to Address IT Challenges

Addressing Issues of Heterogeneity and Reuse

A **Web service** represents a self-contained, self-describing piece of application functionality that can be found and accessed by other applications using open standards. A Web service is **self-contained**, because the application using the Web service does not have to depend on anything other than the service itself, and **self-describing**, because all the information on how to use the service can be obtained from the service itself. The descriptions are centrally stored and accessible through Web-standards-based mechanisms to all applications that would like to invoke the service. In summary, Web services answer the need for a standardized and vendor-agnostic way to cope with heterogeneity and to create interoperability and compatibility among various applications.

Instead of requiring programmers to establish and maintain links between applications, Web services are **loosely coupled**, making connections simpler and more flexible and allowing application architects to more easily find and understand services offered by other cooperative applications. Applications can access a Web service across a network using mechanisms based on Web standards.

Web services provide a standards-based way for an application to expose granular functionality such as “delete order,” which would remove an order from one particular system. To do this, Web services make use of highly standardized interfaces to hide how the underlying functionality is implemented.

Web services begin to answer the challenges faced by IT organizations:

- **Heterogeneity** – The ability to communicate with other applications using standards-based mechanisms simplifies connectivity across heterogeneous landscapes. Web services can easily be discovered for use by applications that require them, as standardized catalogs of services are developed. Similarly, the abstraction of functionality provided by Web services is very useful in heterogeneous environments, since it serves to conceal the differences between systems on a technical level. Since Web services hide implementation details of the underlying applications, a developer “using” Web services to build a new solution needs no knowledge of the structure of the applications that deliver the service. By the same token, he or she can feel secure that their solution using the Web service will not be impacted if the underlying applications change.
- **Reuse** – Web services also provide preliminary answers to the issues of flexibility and reuse. Changes can be made in the underlying implementation or in the program calling the Web service, as long as the behavior of the Web service stays the same. This provides the basis for combining and reusing Web services without creating a spaghetti-like maze of unmanaged complexity.

ENTERPRISE SERVICES ARCHITECTURE EXTENDS WEB SERVICES BENEFITS

Enhancement Needed to Support Enterprise Scenarios

Today, Web services are largely being used to expose functionality delivered by single applications. An example could be a Web service to delete an order in one particular system – a task that might be a single step in a larger process.

However, Web services are too granular to be efficient building blocks for enterprise business scenarios. The process of canceling an order illustrates this point. From a business perspective, the directive to cancel an order encompasses several cross-functional and cross-application activities, including sending a confirmation to the customer, removing the order from the production plan, releasing materials allocated to the order, notifying the invoicing department, and changing the order status to “inactive” or deleting it from various systems. Each of these activities may be a Web service offered from different systems. The ability to build a complex end-to-end solution to cancel an order would be a very powerful enterprise-level business service. Clearly, efficiently developing new business solutions that leverage existing applications calls for business-level building blocks that aggregate the benefits of multiple Web services.

Realizing this need, SAP has defined Enterprise Services Architecture. Enterprise Services Architecture takes Web services standards and services-oriented architecture principles and extends them to meet the needs of enterprise business solutions. It helps IT organizations leverage existing systems to build and deploy flexible solutions that support end-to-end business scenarios across heterogeneous landscapes. Enterprise Services Architecture addresses the business issue that most companies are facing – extending existing IT assets to support business change and innovation, while lowering total cost of ownership.

What is Enterprise Services Architecture?

Enterprise Services Architecture is SAP’s open architecture for adaptive business solutions. The fundamental premise of Enterprise Services Architecture is the abstraction of business activities or events, modeled as **enterprise services**, from the actual functionality of enterprise applications. Aggregating Web services into business-level enterprise services provide more meaningful building blocks for the task of automating enterprise-scale business scenarios. Enterprise services allow IT organizations to efficiently develop **composite applications**, defined as applications that compose functionality and information from existing systems to support new business processes or scenarios. All enterprise services communicate using Web services standards, can be described in a central repository, and are created and managed by tools provided by SAP NetWeaver. The order-to-cash business scenario illustrates the benefits of Enterprise Services Architecture.

Order-to-Cash Scenario Without Enterprise Services Architecture

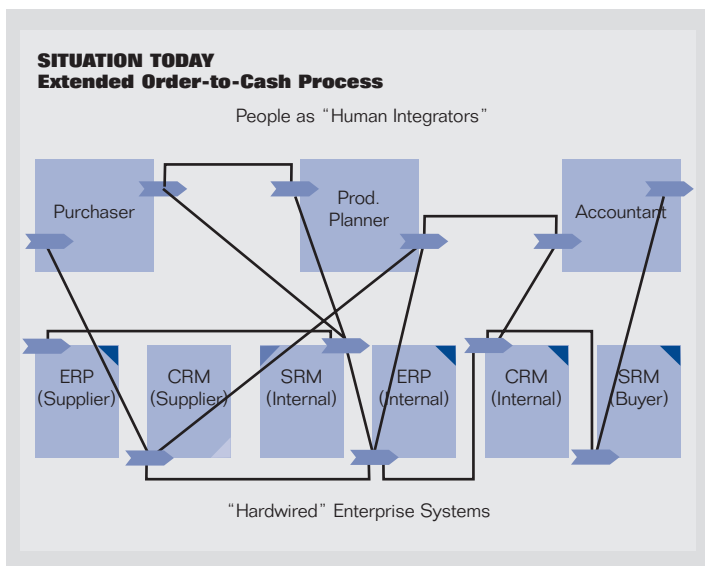


Figure 1: Order-to-Cash Scenario Without Enterprise Services Architecture

As Figure 1 shows, order-to-cash involves multiple applications – customer-facing applications, such as customer relationship management (CRM), supplier-facing applications, such as supply chain management (SCM), and enterprise resource planning (ERP) systems where the order resides, and where all transactions and fulfillment entities are stored. In the typical order-to-cash scenario, employees act as human integrators, sitting in front of many different applications, transferring information from one to the next by copying and pasting and retyping information, making process-flow decisions as needed. The applications, when they are communicating, are hardwired through brittle connections that are expensive to maintain.

Order-to-Cash Scenario with Enterprise Services Architecture

With Enterprise Services Architecture, a composite application can use enterprise services to automate the flow of information from application to application. Each user in the business scenario has a role-based interface that provides exactly the information and functionality required to meet their goals. The process is defined, controlled, implemented, and managed at a business level, with SAP NetWeaver providing the environment to construct enterprise services to control the flow of information from one enterprise application to the next.

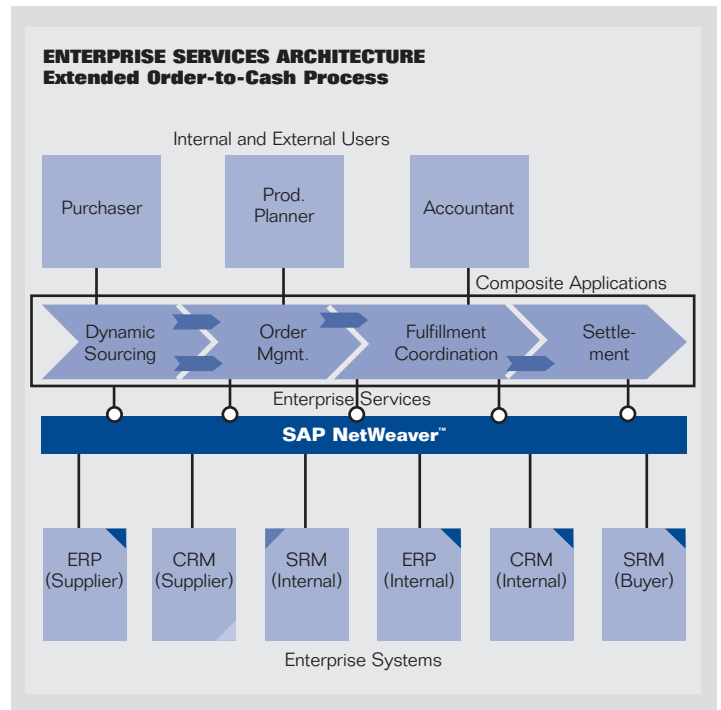


Figure 2: Order-to-Cash with Enterprise Services Architecture

Key Characteristics of Enterprise Services Architecture

The key characteristics of Enterprise Services Architecture listed are crucial to implementing business scenarios like the order-to-cash scenario:

- **Enterprise Services Architecture extends the benefits of Web services to enterprise business scenarios** by aggregating existing systems functionality into business-level enterprise services.
- **Enterprise services are modeled from an “outside-in” perspective.** While the core set of enterprise services identified by a company may be substantially enabled by legacy or enterprise applications (including those from SAP), they are not defined or constrained by SAP or any other vendor’s applications. In other words, Enterprise Services Architecture defines or models services “outside-in” for any application that is based on business events relevant to enterprise business processes, not necessarily on an existing application or implementation. SAP will evolve its applications to support enterprise services designed for each business domain or industry that it currently addresses.
- **Enterprise Services Architecture offers a blueprint for enterprise-wide business process evolution with complete investment protection.** Enterprise Services Architecture is a blueprint for a customer’s entire IT landscape, as well as an application architecture for SAP. Leveraging its breadth and depth of industry knowledge, SAP is defining an inventory of enterprise services that promote reuse of functionality across SAP® solutions and third-party solutions. SAP expects that customers will independently select a core set of enterprise services needed to support their key business scenarios. They will then match these with enterprise services available from SAP, develop custom enterprise services where needed, and build flexible business solutions by leveraging existing IT systems.
- **Enabled by SAP NetWeaver, Enterprise Services Architecture offers a gradual path to flexible, service-centric system landscapes.** Enterprise Services Architecture allows for a gradual and nondisruptive transition of existing applications and architecture to higher levels of flexibility and value.
- **Enterprise Services Architecture allows new business processes to be developed, deployed, and changed independently of existing applications.** “Consumers” of enterprise services are isolated from changes in applications that “provide” the service. Enterprise Services Architecture leverages an abstraction layer between the way an enterprise service is used, and the way the corresponding functionality is implemented within an enterprise application. This abstraction allows composite applications or custom user interfaces (UIs) using the service, or its so-called “consumers,” to be decoupled from the applications “providing” the service. As a result of the decoupling, IT can leverage the rich functionality and best practices of enterprise applications to support new, innovative business solutions, and yet evolve these solutions independently of changes in the underlying applications.

Enabling Enterprise Services Architecture with SAP NetWeaver

SAP has designed SAP NetWeaver to support the integration and application platform needs of enterprise architectures, while enabling standards-based interoperability with other platforms that may be part of the landscape. SAP NetWeaver enables the **development, deployment, and administration** of enterprise services. SAP NetWeaver can help customers “service enable” their system landscapes by supporting communication based on Web services standards. With SAP NetWeaver, customers can leverage services that are part of enterprise suites like mySAP™ Business Suite, as well as create custom services as needed.

In addition to providing tools for creating and managing enterprise services, SAP NetWeaver also supports the design, implementation, and execution of applications that use those services, like composite applications and custom UIs. SAP has developed a framework for quick and easy assembly of composite applications in a repeatable fashion. SAP NetWeaver provides a unified application development platform that contains the tools, methodologies, rules, user interface patterns, and services that allow SAP, its partners, and customers to build composite applications – either as products for sale or custom applications for use by one company.

WHAT ENTERPRISE SERVICES ARCHITECTURE MEANS FOR CUSTOMERS

With Enterprise Services Architecture, the traditional challenges of system landscapes no longer stand in the way of IT support for business initiatives. Enabled by SAP NetWeaver, Enterprise Services Architecture helps customers manage heterogeneity of systems landscapes. This allows the underlying application components that supply the functionality represented by the enterprise service to be altered, without impacting applications “using” the service. Furthermore, Enterprise Services Architecture enables customers to see their existing systems not merely as powerful business engines for today, but also as the building blocks of future business processes.

Enterprise Services Architecture intrinsically supports an incremental development process. Its use of abstraction makes it relatively easy to combine and recombine functionality from different applications as needed, and without having to pull solutions apart and starting over. This quality is mirrored in SAP NetWeaver, which supports an upgrade path that begins with a portal interface for Web services, and leads to an evolving array of services and composite applications of ever-greater complexity and scope.

Whether called upon to free up capital by reducing TCO, enable business change, or support innovation, IT organizations can now leverage and extend IT assets towards these goals.

Leverage Existing IT Assets

With Enterprise Services Architecture and SAP NetWeaver, customers can create predictable cost structures by consolidating their IT landscapes to reduce TCO. From a one-time investment in service enablement and SAP NetWeaver deployment, they can get repeat benefits easily by being able to build and deliver a variety of solutions. User productivity solutions are one such category that represents immediate return, helping IT organizations drive significant incremental value out of existing IT assets. Other benefits include:

- **Reducing TCO through consolidation** – Leveraging integrated business solutions powered by SAP NetWeaver, SAP customers can reduce TCO and create a more sustainable IT cost structure. At the same time, they can introduce a Web-services-based foundation for the future. The same infrastructure can be leveraged for both A2A as well as business-to-business (B2B) solutions, making the borders of the enterprise transparent.
- **Enhancing user productivity** – Enterprise services allow interaction logic to be abstracted from the underlying business logic and applications, allowing IT organizations to choose the appropriate interface and technology for each type of user. This allows user productivity to be enhanced in a number of ways, including the following:
 - Role-specific portals enriched by business intelligence can be developed in any technology, meeting the needs of professional as well as occasional users. Wiring together heterogeneous data and logic from existing systems and solutions like mySAP ERP, these portals provide information, alerts, and monitoring tailored to the users’ business needs.
 - Interactive forms and other types of desktop technologies allow users to work with familiar user interfaces in occasionally connected (online/offline) scenarios.
 - Self-service components (for example, customer self-service to complement call center operations) can be built to extend existing applications and deployed both within and outside the enterprise.

Product Change Request Scenario – Enhancing User Productivity with Enterprise Services Architecture

The product change request (PCR) process provides an illustration of how Enterprise Services Architecture can transform a business scenario from a challenge to a strategic advantage, and significantly enhance user productivity. The PCR process is initiated in manufacturing firms when an important part needs to be changed because either the design or the materials used to build it have changed. Sometimes PCRs result from the needs of a particular customer or from regulatory requirements. In all cases, a PCR means that the entire manufacturing process must be examined to make sure that the change will not adversely affect the product.

It is important to be able to audit this process as fully as possible to ensure that all required reviews are obtained and errors prevented. The standard operating procedure for PCRs at most firms is paper based. Each reviewer examines the PCR document and gathers information from the systems of record that they rely on, entering and reentering data as needed. The result is a process that moves along slowly with little visibility or automation. But in the end, the required approvals are all obtained.

In the next version of mySAP™ ERP, PCR will be implemented as a composite application based on enterprise services. The paper request will be replaced with a set of interactive forms that allow users to work on entering the required information offline, but then can be submitted and automatically transferred into underlying systems. Much of the information in the forms is automatically populated, avoiding costly and error-prone entry and reentry of data. Enterprise services move the data back and forth from the many different systems needed to populate one form. All of the information moves intact from one approver to the next.

The foundation of enterprise services takes the PCR process beyond the simple automation of a paper process. Decoupling the end user's view, the forms from the underlying systems provide unprecedented flexibility. Fields can be added to forms, and the process can be changed on the fly. Using the SAP® Composite Application Framework tool within SAP NetWeaver™, an end user can decide that an additional review by an engineering expert must take place and add a process step to obtain that review on the fly. Information from legacy systems can be incorporated into the process through Web services. In a recent implementation, automation of this process reduced the time for a PCR to a mere 5% of what it had been.

Extend IT Assets to Deliver New Business Value

With Enterprise Services Architecture, customers can build new applications by extending existing systems that support business needs while maintaining investment protection. Enterprise services provide efficient, reusable, business-level building blocks with which to compose industry-specific solutions delivered as composite applications. Rather than being forced to follow the traditional cycle of “rip and replace,” composite applications will free customers to extend the lifespan of their legacy applications and mix and match underlying components from SAP and other vendors.

Composite applications not only enable new scenarios, but also benefit traditional processes such as invoice verification. While the invoice verification process is fairly structured, it spans multiple departments across the entire enterprise – such as procurement, accounting, and logistics – often relying on different enterprise applications, third-party products, legacy systems, or even external services. Invoice verification will often need to be reconfigured to adapt to business change or systems evolution, and therefore, implementing invoice verification as a composite application would deliver obvious benefits.

Composite applications can be built, deployed, and adapted more quickly and cost-effectively than traditional software. First, a composite application can be built with no knowledge of the architecture, interfaces, and development platforms of the underlying applications that deliver the functionality, since enterprise services are a standards-based abstraction. Second, composite applications that “use” an enterprise service are now isolated from changes in the underlying applications and systems. In the past, when an individual piece of application functionality was changed, all interfaces and applications that touched this component would have to be changed as well. For B2B solutions that crossed enterprise boundaries and touched systems and processes from customers and partners, the com-

plexity increased exponentially. These barriers to new business processes are significantly reduced. Finally, composite applications can be easily deployed across heterogeneous landscapes, following the same approach both within and across enterprise boundaries.

Innovate

Enable Adaptive Business Solutions

Enterprise Services Architecture enables adaptive business solutions, which can be developed rapidly, deployed easily across heterogeneous landscapes, and adapted quickly and efficiently as business needs change. As SAP customers progressively adopt Enterprise Services Architecture, it becomes possible to leverage and integrate existing IT assets into innovative new business processes, while still maintaining a level of flexibility that makes future process changes cost-effective. CIOs can at last reconcile the inflexibility of current architectures with the CEO’s requirement that IT support business initiatives quickly and efficiently. IT organizations can now deliver flexible solutions with a sustainable long-term cost structure without trading off efficiency and rapid time to market.

Integrated Exploration and Production

Asset maintenance for the oil industry is equivalent in stature to cash management for banks. Oil companies own assets whose value stretches into the trillions of dollars. Many of the assets, like equipment on oil rigs or at refineries, are remote, complex, or both. Downtime of even a few hours can cost millions.

The process of asset maintenance in the oil industry involves many specialists and experts. When the progress of drilling slows on a rig or a glitch appears in the refining process, there could be hundreds of reasons. Under current practices, the field engineer assembles the evidence and calls in experts to help. Crucial information about part availability, supplier contracts, budgets, and so forth are spread across different systems of record.

The current process relies on best efforts by all involved, based on a sporadic unmanaged flow of information between different participants via spreadsheets, documents, e-mails, and presentations. Attempts at automating this process have run straight into a mountain of integration problems.

Enterprise Services Architecture sorts out the integration challenges through the use of enterprise services, composite applications, and the integration capabilities of SAP NetWeaver™. The SAP® xApp™ Integrated Exploration and Production (SAP xIEP) packaged composite application implements a business scenario for asset maintenance that gives all the project participants the tools to use the real-time data, accessing the same database to collaboratively expedite a solution potentially in a matter of hours.

SAP xIEP uses enterprise services to bring together the technical, project management, and financial information about a potential solution into an intuitive format for all participants. Intracompany and intercompany access permissions can be controlled to allow virtual teams to collaborate in real time. One interface and one repository for information keeps the team knowledgeable about the big picture and important technical and financial details, including integration of data from third-party sources. Experts can subscribe to specific points in the remediation process so their contact information is ready when needed. Management can use the information captured by the system to monitor the performance of everyone involved.

With data from all systems being available in real time, more informed decisions can be made quickly. The asset maintenance process becomes transparent and the information is accessible through the Internet in one consistent interface. The return on investment (ROI) case is dramatic. Avoiding even one hour in certain situations can pay for the entire solution.

The implementation of SAP xIEP takes place through a portal that is designed for maximum usability and accessibility. The guided procedure feature of the SAP Composite Application Framework allows processes to be adjusted on the fly by participants and configured to a company's specific needs. SAP xIEP will continue to be expanded with functionality and services to cover further business scenarios including all aspects of the upstream value chain including exploration planning and execution, field ticket management, logistics management, production management, upstream financials, complex procurement, and well planning and delivery.

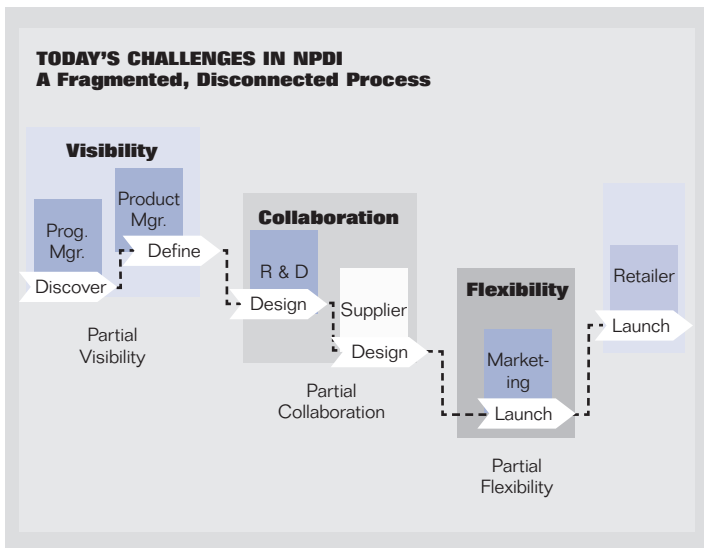


Figure 3: New Product Development and Introduction (NPDI) Before Enterprise Services Architecture

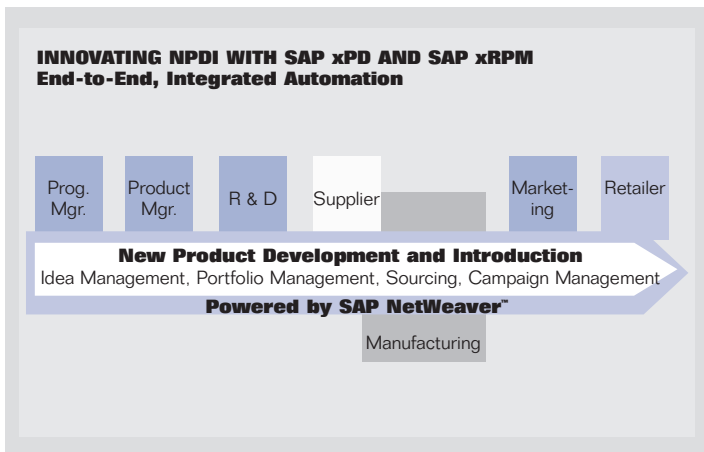


Figure 4: New Product Development and Introduction After Enterprise Services Architecture

Enterprise Services Architecture will drive a positive cycle – once core applications are abstracted into reusable components by a layer of enterprise services, it will create composite applications that will carry less risk and take less time, thus leading to new services that also become reusable throughout the enterprise. As early composite applications become the building blocks for

their more complex successors, they create the potential for modeling business solutions without the long development costs of previous generations of software. New categories of applications that leverage services-oriented architectures, business intelligence, and collaboration become possible once SAP NetWeaver is deployed as an integration platform in addition to a next-generation application platform.

Now instead of just enabling efficiency, IT can now become an enabler of change. Solution implementation then falls away as a barrier to change, enabling innovation.

Enable Flexible Organizational Structures

Enterprise Services Architecture creates a clear hierarchy of components that provide the building blocks (such as ERP, general ledger, and human resources) from the high-value composite applications. Since it no longer matters where the applications physically reside, more flexible deployment models become possible. This enables offshoring and outsourcing of any components that are found to be non-differentiating, allowing a more rational and cost-efficient organization of IT inside and outside of the enterprise.

New Product Development and Introduction (NPDI) – Innovation with Enterprise Services Architecture

The development and launch of new products is a high-stakes game in which companies bet huge sums developing ideas into prototypes and finally into products and brands for consumers. The importance of NPDI makes it a cross-functional activity including the marketing, research and development (R & D), supply chain management, manufacturing, finance, and other departments. NPDI usually starts with the identification of an opportunity in the market and ends with the successful launch of the product. In between are many activities to define the requirements, develop and test a product concept, fully define and develop the product, source the suppliers involved, plan the manufacturing and supply chain, and

prepare marketing programs. On top of that, a product strategy must be defined, a product program must be managed, and all the projects needed to drive the NPDI process must be monitored.

In most markets and especially those relating to consumer products, the number of new product introductions per annum has increased dramatically. Driven by consumer demand and fuelled by advances in technology, companies have to bring more and more products to market to remain competitive. The companies best able to execute NPDI will clearly have an advantage as they reduce time to market and make effective use of scarce internal resources. Many companies lack an overall process for NPDI. Instead, the new product passes through a number of organizational “silos” with no single individual or group being responsible for the outcome. Best practices for new product development involve creating a set of increasingly demanding gates that each idea must pass through to move to the next stage. Healthy processes for new product development save money by identifying problems as early as possible and using a cross-functional team in all stages of the process. Assembling information from systems of record, managing flexible collaboration within the company as well as with partners in the overall value chain, and adjusting the process to meet the needs of identifying and processing different sorts of ideas are all key to success.

Classic barriers to an effective new product development process include the difficulty of assembling information from existing systems, the challenge of reconciling the need for strict evaluation criteria and a flexible process, the assembly and coordination of a cross-functional team, and the management of large amounts of unstructured sales, marketing, market research, and product data. Automation of the NPDI process frequently is stopped cold by the disconnect between the loose collaborative systems use in R & D and the more

structured transactional systems in manufacturing and finance, where much of the relevant information resides.

Enterprise Services Architecture bridges these gaps by encapsulating systems and processes in enterprise services, and then orchestrating flexible processes, collaboration, and document management using the capabilities of SAP NetWeaver.

The new SAP® Composite Application Framework tool built into SAP NetWeaver™ enables SAP to create new applications targeting cross-functional business processes. Two new applications from the SAP xApps™ portfolio of packaged composite applications are part of the NPDI offering:

- SAP xApp™ Resource and Portfolio Management (SAP xRPM) is a solution designed to improve a multiproject environment by focusing on project portfolio monitoring and management.
- SAP xApp Product Definition (SAP xPD) is designed to address the hurdles and inefficiencies of the first phases of the NPDI process: idea and concept management, concept evaluation, and product definition. It supports NPDI that is implemented with a collection of enterprise services. Information from systems of record about costs, budgets, financial projections, and bills of materials are extracted and linked to less structured material from marketing and market research. The process of evaluation starts with a set of steps and criteria that can be modified if needed by the process owners. The result is that a process that was a mélange of presentations, spreadsheets, and documents becomes a flexible, harmonized flow of information. Bad ideas are flagged and killed early, minor changes sail through, and the amount of money spent on evaluation is focused on taking as much risk out of the process as early as possible. When it comes time for development of a prototype or limited production runs, the information flows back into the systems through enterprise services.

Enterprise Services Architecture Changes How Solutions Are Built

“Companies whose competitive edge is defined by their ability to quickly deliver new IT systems to meet the businesses needs will need to begin evaluating, planning for, and migrating development staff to at least one of the two alternative and more efficient forms of development over the next 18 to 24 months or risk losing their competitive edge to their competition.”

— Beyond Code-Centric Development, Forrester Research, 2003

Enterprise Services Architecture changes the way solutions are built and deployed, for both SAP and its customers. The current development approaches involve creating hardwired one-to-one integrations and heavily customizing elements of core applications like ERP and CRM to meet the requirements of new business scenarios. This approach comes with significant drawbacks – it requires one-off integration efforts to bring together underlying applications and systems; it calls for teams of business analysts and highly skilled technical resources who must translate business requirements to the language of IT; it is expensive and time consuming, requiring that IT organizations traverse the entire development life cycle from requirements definition to rollout; and it is costly to maintain and change, driving up costs in the long run.

With Enterprise Services Architecture, enabled by SAP NetWeaver, the language of business becomes the language of IT. Enterprise services are defined at a granularity where they can be understood by business analysts, rather than requiring a developer’s intervention. With the model-driven approach of Enterprise Services Architecture, and SAP NetWeaver tools that support the entire life cycle from business process modeling to code generation, a business analyst can “assemble” enterprise services into composite applications that enable new business scenarios. This approach is clearly more efficient and helps customers build, deploy, and maintain solutions with significantly greater agility, cost-efficiency, and speed.

This allows composite applications supporting business scenarios to be built rapidly, with a minimum amount of coding. However, this approach is distinguished from older, rapid development paradigms in that it is not merely about creating new modules of code quickly. It is about modeling business processes that can then be assembled by wiring together existing data and business logic across a heterogeneous landscape.

As SAP’s own development processes evolve from a traditional development paradigm towards solution assembly, customers can also expect to see a shift in the speed in which SAP delivers new solutions.

SAP Road Map for Enterprise Services Architecture

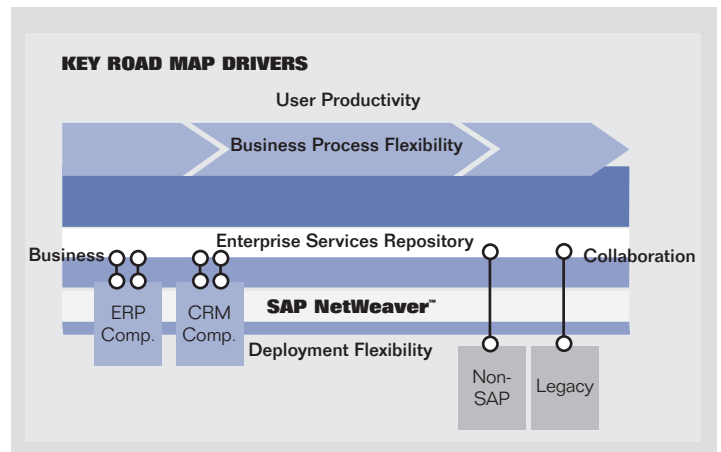


Figure 5: Key Drivers for the Enterprise Services Architecture Road Map

SAP NetWeaver already enables enterprise services as well as applications leveraging these services, and will continue to enhance support for these. SAP is progressively evolving its business applications such as mySAP Business Suite towards Enterprise Services Architecture, increasingly abstracting their rich functionality and best practices into services that will support the needs of future IT landscapes. The SAP road map to Enterprise Services Architecture will be driven by customer value, and will occur in a phased fashion, as discussed below:

- **2004** – Service-enablement efforts for this year are focused on enhancing user productivity and collaboration. In addition, SAP is also carrying out a systematic inventory and prioritization of enterprise services, based on the enterprise business scenarios featured in the new industry solution maps.
- **2005** – SAP will publish an inventory of its enterprise services – available for planning purposes for customers and partners. This list of enterprise services can be leveraged in customers’ and partners’ composite applications and for longer-term road-map planning. Additional service-enabled scenarios will be made available, focusing on business process flexibility and anticipating the needs of new composite applications.
- **2006** – An enterprise services repository will be published in 2006, based on the next release of SAP NetWeaver™. All relevant enterprise services will be actively available from the repository for use by selected partners and customers.
- **2007** – SAP applications, including mySAP™ Business Suite, will now fully reflect the Enterprise Services Architecture paradigm. (For example, all enterprise services will be described in a central repository, and created and managed by SAP NetWeaver.)

Figure 6: SAP's Enterprise Services Architecture Road Map

CONCLUSION

Enterprise Services Architecture is a flexible set of rules like grammar. Learning how to speak the language of Enterprise Services Architecture is a gradual process. The alphabet of Web services must first be assembled into the words of enterprise services, and then from these, sentences formed. To use the grammar of Enterprise Services Architecture effectively, an enterprise must know what needs to be said – a business scenario that demands a software solution and will deliver business value. Then, even the simplest “sentences” can deliver tangible results and lower TCO.

Enterprise Services Architecture changes the way enterprise solutions are built and deployed, for both SAP and its customers. With Enterprise Services Architecture, SAP takes the concept of services-oriented architecture from the technical level to a comprehensive blueprint for adaptive business solutions:

- Enterprise Services Architecture will drive the way SAP delivers its own solutions for increased leverage of existing assets, extended reach into growth business scenarios, and innovative growth strategies.
- Enterprise Services Architecture is also a blueprint for customers to enable them to plan the evolution and rationalization of complex IT landscapes, based on open standards, for lowered cost and long-term stability.

With Enterprise Services Architecture and SAP NetWeaver, SAP is more than ever delivering on its commitment of serving as its customers’ trusted innovator to support their business strategies and providing the means to transform their IT into a powerful enabler of change.

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