

SAP White Paper



APPLICATION-TO-APPLICATION INTEGRATION WITH SAP NetWeaver™

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The SAP NetWeaver™ technology platform helps IT organizations align with their enterprise business requirements. This paper describes the alignment process and demonstrates how the platform generates both immediate and long-term benefits.

SAP NetWeaver enables companies to leverage their existing IT assets, adopt new components gradually, and implement all changes in the context of a services-oriented architecture. It not only produces immediate return on investment (ROI) but also helps companies achieve the flexibility and adaptability they need while containing costs.

OVERVIEW

Project Goal

Develop a road map for integrating applications within the enterprise

Challenges

Integrate applications at multiple levels of interaction to make them fully effective

Resolution

Enable success through a four-step SAP NetWeaver implementation method that includes:

- Integrating application data
- Implementing one-way process integration
- Implementing two-way process integration
- Adding business process management (BPM) capability

Benefits

Enhance the company's competitive advantage and contain costs by improving the speed and efficiency of application interaction

PROJECT GOAL: DEVELOP AN INTEGRATION ROAD MAP

Most companies rely on a variety of software applications – for managing the supply chain, improving customer relationships, processing orders, keeping track of financials, and much more. Frequently, each application is set up to automate its own range of tasks; each has its own internal organization and definition of data; each gets tended to by its own support staff; and each has been acquired from its own supplier.

As companies rethink business processes and strive for new levels of efficiency, they are finding it imperative to make these disparate applications work together as much as possible. That requires overcoming innate technical differences and getting different brands and categories of software to exchange information and execute transactions smoothly, as if they were a unified entity. Such integration can reduce redundancies and lower costs while boosting the effectiveness of the IT infrastructure.

This integration process is defined as application-to-application (A2A) integration. A2A integration is now a top priority at most large enterprises and an enduring challenge for nearly every IT department. It has one fundamental goal: the creation of a new software infrastructure whose total function, performance, and productivity are greater than the sum of its parts – an arrangement that can squeeze the slack from a collection of applications and improve the business processes those applications support.

The techniques used to implement A2A integration vary considerably, based on the nature of the applications. The integration process can be long-term and complex. That's why savvy IT organizations frequently choose to build skill levels gradually, beginning with simple, read-only A2A integrations, then moving on to more complex ones.

CHALLENGES FOR IT

As every IT executive knows, getting enterprise software applications to work together is one of the most difficult challenges to overcome. A variety of technical dimensions must be addressed – in addition to the concerns of those who work with the system every day, from data-input specialists to senior managers. From the user perspective, nonintegrated applications mean:

- Time wasted switching back and forth between screens, applications, or entire systems
- Lowered confidence in the data and information produced (which results from the fact that the user is often left to piece different results together)
- A higher frequency of calls to the IT help desk for assistance with application conflicts
- Frustration on the part of senior management that the enterprise cannot grow significantly without adding more complexity to already shaky IT underpinnings

As for the technical dimensions, challenges can range from daunting to severe. Generally speaking, the integration of applications calls for providing the data or services of one application within the context of another. Here are a couple examples of how integrated applications should work:

- While processing an incoming order, application A needs to reach out to application B and request a specific piece of pricing data. Application A receives and uses the data as easily as if it had been generated or stored locally.
- Two pieces of related data, each generated by a different application, show up next to each other on the same Web page, thereby maintaining context and preserving meaning.

Achieving this seeming simplicity presents the IT team with a number of challenges. For instance, the integration between two separate systems can take place at any of several application layers, from lower-level data exchanges to higher-level application programming interface (API), process, or user-interface interactions.

In addition, any combination of integration methods can be employed to accomplish a specific task. The choice of where to make the connections between different pieces of software must take into account factors such as run-time performance, ease of programming and maintenance, and flexibility in adapting to new business conditions and requirements.

Finally, integration projects can involve a complex combination of applications – in both single- and multi-vendor systems. They can also cross technical, organizational, and geographical boundaries.

RESOLUTION: STEP-BY-STEP INTEGRATION VIA SAP NetWeaver

The SAP NetWeaver platform enables companies to take an incremental approach to change that moves them step-by-step through increasingly advanced layers of integration by deploying specific SAP NetWeaver components. Each step brings its own success. And as the steps build upon one another, benefits multiply.

The platform meets even the most complex A2A challenges with a comprehensive set of integration tools – tools that support integration of applications regardless of vendor, design, function, location, or “owner.” It allows firms to “think big” at the systems architecture level but to start small, with incremental projects that deliver value along the way.

The SAP NetWeaver capabilities for application-to-application integration are delivered by the following components and tools:

- SAP® Enterprise Portal (SAP EP)
- SAP Master Data Management (SAP MDM)
- SAP Web Application Server (SAP Web AS)
- SAP Composite Application Framework (SAP CAF)
- SAP Exchange Infrastructure (SAP XI) integration broker and BPM capabilities

The following pages describe a four-step method for A2A integration (see Figure 1) that will satisfy the needs of today’s most demanding enterprises. It represents just one of many different methods that can be used to implement SAP NetWeaver solutions. These are the four steps it includes:

1. Integrate application data
2. Implement one-way process integration
3. Implement two-way process integration
4. Add BPM capability

STEP ONE:

INTEGRATE APPLICATION DATA

This initial step is the easiest and least risky to take. It involves a simple exchange of data between applications. The essence of data integration is making the data from one application available to another, and SAP NetWeaver offers several methods for achieving this. They include:

- **Message passing**

SAP XI functions as an integration broker, deploying adapters, passing messages between applications, and translating among different data-level formats. (Note: The open SAP XI adapter framework can translate virtually any format.)

- **Web services**

SAP Web AS is used to construct Web services that allow one application to retrieve data from another.

- **Repository sharing**

Using SAP XI to synchronize replicated data, SAP MDM creates a unified central repository of data that can be used by several different applications.

STEP TWO:

IMPLEMENT ONE-WAY PROCESS INTEGRATION

A more challenging integration, this step involves moving all of the data required in a cross-functional process from one application to another. This was the objective of traditional stovepipe integrations, which used only APIs from each application and resulted in brittle integrations that were expensive to maintain. SAP NetWeaver offers a configurable approach, building on the capabilities for data integration offered by its portal and integration broker.

SAP EP, the user interface framework for all mySAP™ Business Suite applications, can also be used to create either role-based or process-based views of cross-application processes, with SAP XI moving data from one application to another as previously mentioned. Some of the world's largest companies employ SAP EP as their primary intranet interface because it is capable of integrating employees to information from business intelligence solutions such as SAP BI as well as from other SAP and non-SAP operational systems.

STEP THREE:

IMPLEMENT TWO-WAY PROCESS INTEGRATION

This stage involves more advanced integrations that enable a process to move back and forth between applications, with each application changing the state of the other in significant ways. A two-way conversation between applications begins with the user interface and data integration steps already described, but also requires more sophisticated process control and synchronization mechanisms as well as the functionality encapsulation made possible by Web services.

SAP NetWeaver provides advanced process automation at two levels. On one level, the business workflow management system of SAP Web AS models, controls, and automates the business processes taking place within a software component and integrates the users with the business processes. On another level, cross-component BPM, a function of SAP XI, drives and controls complex business processes across business applications and enterprise boundaries.

Communication between applications can be abstracted and encapsulated using Web services constructed via SAP Web AS. These services can also provide primitive operations that can be orchestrated by process control frameworks.

STEP FOUR:

ADD BUSINESS PROCESS MANAGEMENT CAPABILITY

Advanced A2A integrations involve the automation of complex interactions between two or more applications through a many-to-many message flow that streamlines execution of business processes with increased levels of monitoring. Building on all the functionality previously described, SAP NetWeaver offers two ways to help manage the complexity of such integrations: 1) the BPM capability of SAP XI and 2) SAP CAF.

With its BPM capability, SAP XI creates a complete process-modeling environment that can handle asynchronous coordination of processes between many different applications. As a result, the messages and services for data exchange and process management can be orchestrated in such a way that modeling, rather than coding, controls the integration.

SAP CAF enables the creation of advanced applications in a model-driven development environment so that IT designers can model and configure all aspects of the A2A integration. It also allows business process owners to construct new views of the progress of a process across applications and to compose new applications out of the parts created for A2A integration.

BENEFITS: ENHANCED EFFICIENCY, SHARPER COMPETITIVE EDGE

A2A integration can greatly improve the speed and efficiency of application interaction, resulting in both strategic and tactical advantages. At the strategic level, it can clear room to grow beyond the artificial limits of redundant or “siloes” applications. This positions a company to take advantage of new product- or market-driven competitive opportunities.

At the tactical level, A2A integration can:

- Improve process and technical efficiencies by untangling proprietary software interfaces
- Save the time wasted by frustrated multi-application users as well as by those on the IT help desk
- Wring wasted costs out of the entire IT infrastructure by preserving existing resources

MOVING TOWARD ENTERPRISE SERVICES ARCHITECTURE

Ultimately, the step-by-step approach to integration described in this paper serves another purpose: It prepares companies to take advantage of a services-oriented architecture that SAP calls Enterprise Services Architecture. This architecture is a blueprint for structuring Web services in such a way that they create a flexible foundation for transforming existing applications into services-based business processes.

Enterprise Services Architecture defines two layers of Web services – application services and enterprise services – and assigns each a clearly defined role within the IT infrastructure. It shows IT organizations how to package existing applications for reuse as application services. Once packaged, the applications can be combined into enterprise services that can be quickly reconfigured to meet changing business conditions. In the blueprint laid out by Enterprise Services Architecture, application services provide the detail while enterprise services put everything together. The result: An architecture that enables the composition of flexible business processes that span multiple systems and organizations.

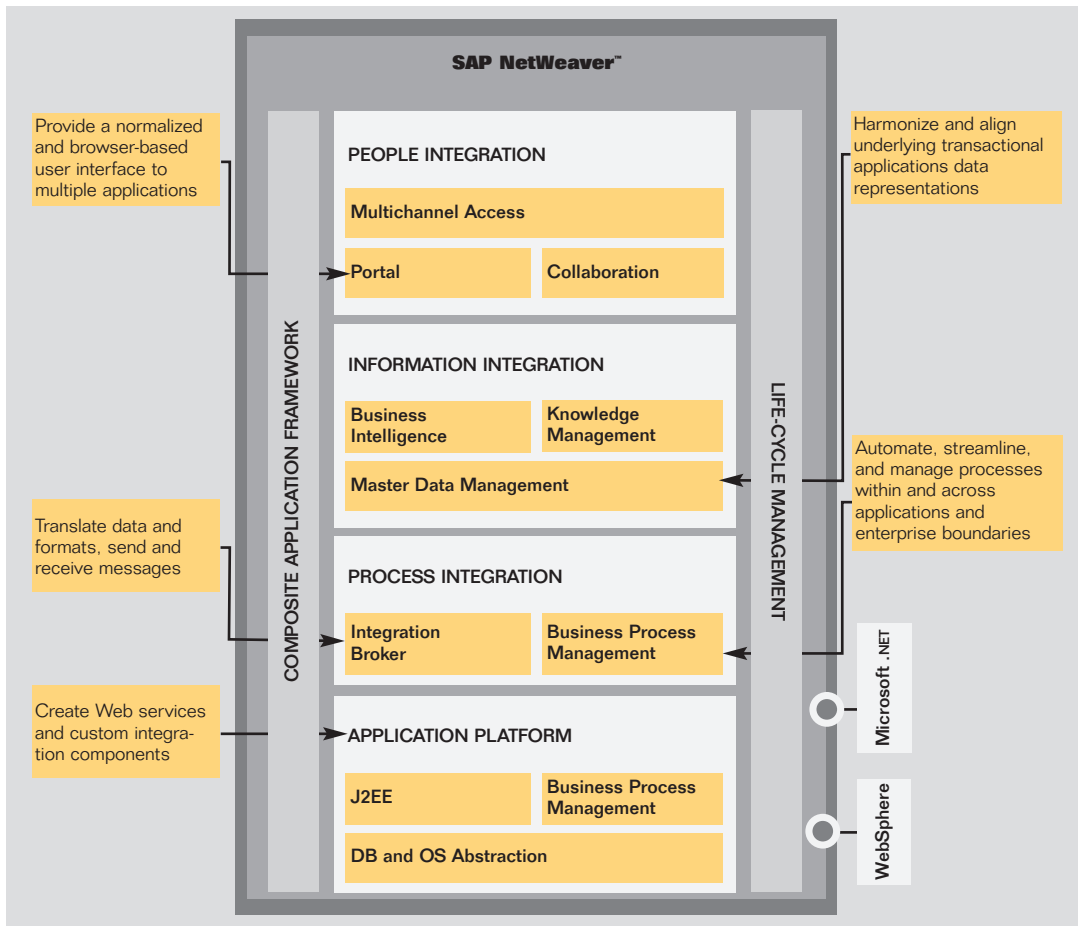


Figure 1: Application-to-Application Integration via SAP NetWeaver

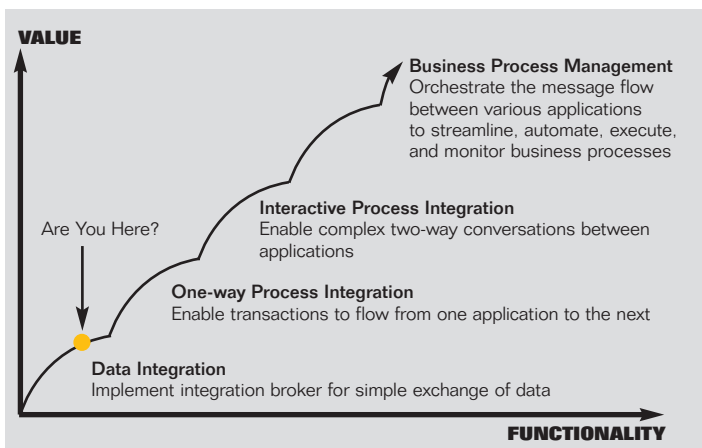


Figure 2: Value Road Map for Application-to-Application Integration

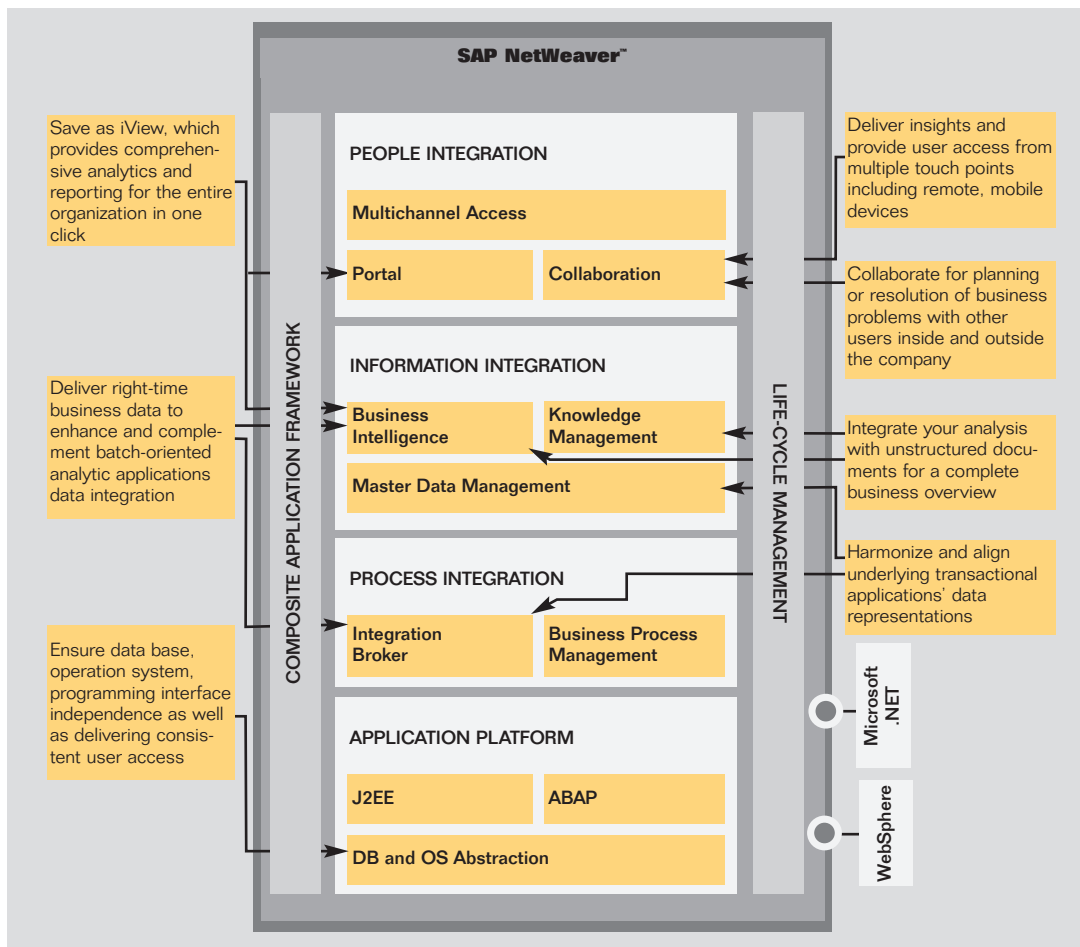


Figure 3: Integrating People, Processes, and Information Throughout the Enterprise

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