SAP NetWeaver BPM White Paper

Introduction

The only constant in business is change. Simply driving cost and delay out of core operations no longer guarantees success. Efficiency remains vital, but to compete in today’s business environment companies also need to be agile, flexible, and innovative. They need to take a holistic view of the enterprise, across organizational and geographic boundaries, product boundaries, and system boundaries. In fact, the business’s “value chain” is no longer even confined within the company walls. Customers, suppliers, and third parties have become an integral part of the end-to-end business processes defining the new extended enterprise.

Business process management is an attempt to provide that holistic view. It provides a new management discipline, a new suite of software technologies and tools, and a new IT implementation style based on concrete links between strategy and execution. This white paper explains SAP’s place in the BPM landscape and describes its new offering in that arena, NetWeaver BPM.

What Is BPM?

As a management discipline, BPM views the business not from the perspective of org charts and systems, still largely fragmented along traditional functional lines, but from the perspective of processes that cut across the silos. It provides tools that allow the company to model those processes end-to-end for analysis and governance, promoting consistency with policies and best practices, and fostering innovation by making the flow logic visible to the business.

BPM also provides a suite of tools and technologies that support the management discipline by making those new and improved process models executable. That is, the model can be deployed to a process engine that actually automates the process – chaining execution of business services, delegating human tasks to their assigned participants, enforcing business rules, translating between the disparate data models and programming languages employed in business systems that touch the process.

And while it is running the process, BPM continually takes snapshots of business data and aggregates it to make business performance, at the end-to-end process level, visible in real time. Continuously monitoring operational performance not only keeps the business running smoothly, but contributes to the broader sphere of business intelligence that ultimately drives insight and innovation.

One of the most important innovations of BPM is strengthening the link between strategy and execution (Figure 1). Strategy is primarily a business concern, execution an IT concern. Historically, their central goals have not been perfectly aligned. On the execution side, IT focuses on efficiency, security, and reliability, all critical to keeping the core business operating smoothly. But business has come to recognize that efficiency by itself no longer guarantees competitiveness. Strategy thus places increasing value on innovation, flexibility,
and rapid response to changes in the competitive environment. These factors tend to conflict with efficient execution, which relies on stability and standardization.

**Figure 1.** BPM attempts to align business strategy with IT execution by adding insight and flexibility to efficient automation. Source: SAP

BPM forges concrete links between strategy and execution by making process models executable. A process model is not code but a diagram, a business-oriented view of the business process: what steps are performed, by whom, and in what order, including exception paths. For governance and analysis, models can be extended to describe things like the objectives, policies and rules, roles and responsibilities, and key performance indicators (KPIs) for each part of the process.

Prior to BPM we had such models but employed them purely for business process analysis. They could identify gaps between strategy and execution and suggest changes in the IT domain in the form of “business requirements,” but could not make those changes happen any faster. To be implemented, they would first have to be translated into IT models – using a different modeling “language” – and from there into code. The net result was frequently loss of agility and imperfect business-IT alignment.

BPM attacks these problems by creating a new modeling language shared by business and IT, and by generating implementation from the models themselves. These executable models describe more than just the workflow. They include also the forms in the task user interface, the business rules, and other components of the process implementation, all created using graphical tools within a unified design environment. Thus besides a new management discipline and a new set of software tools and technologies, BPM represents a new business-IT interaction style, one based on direct collaboration and shared modeling artifacts.
SAP’s BPM Strategy

Standardize, Integrate, Innovate

SAP is perhaps the world’s leading supplier of process automation technology – over half of the world’s business transactions, involving 12 Million users in 120 countries, touch one of 140,000 SAP systems – but is only now making a full entry into the BPM arena. The applications in SAP’s Business Suite, such as ERP and CRM, already automate the majority of its customers’ core process logic, and in doing so deliver both efficiency and standardization. But BPM is just as much about business-IT alignment, linking strategy to execution and governance to business integration, as it is about process automation. SAP recognizes this, and its approach to BPM must harmonize these new dimensions with its customers’ substantial existing investment in process automation via the SAP Business Suite. In that sense, the company’s BPM strategy differs from that of a pureplay BPM technology vendor or a SOA middleware supplier. SAP offers a set of mutually reinforcing BPM building blocks that leverage existing customer investment while providing a unification roadmap for the future.

For SAP customers, the efficiency dimension of BPM is addressed by the SAP Business Suite, representing SAP’s traditional strength and experience. Process automation is out-of-the-box, standardized and efficient. SAP value scenarios like “integrated sourcing and procurement” are packaged end-to-end solutions based on configurations of SAP Business Suite components. The insight dimension is addressed by SAP’s business intelligence tools, now enhanced by the recent acquisition of Business Objects. These tools provide performance insight not only via SAP application data but external application data as well. The flexibility/agility dimension is addressed by the SAP NetWeaver platform, which allows customers to compose their own applications based on executable models and business-IT collaboration.

NetWeaver BPM is a key part of that offering, but just a part of the company’s BPM strategy. While today focused squarely on the flexibility side of BPM, SAP has signaled that down the road NetWeaver will impact the efficiency dimension as well.

SAP’s BPM strategy could be summarized as standardize, integrate, innovate (Figure 2). The company’s mantra is standardize if you can – using SAP Business Suite – and then use BPM to extend, integrate, and innovate. Standardize refers to the process automation logic built into SAP Business Suite for core application processes. Integrate refers to NetWeaver Process Integration, which provides a BPEL process engine and associated design tools to extend the business network, connecting core application processes with those of trading partners and with business services throughout the enterprise. Innovate refers to the new capabilities introduced by the NetWeaver Composition Environment, including NetWeaver BPM.
Figure 2. SAP’s BPM strategy advocates “standardize where you can”... then go further with integration and composition. Source: SAP

NetWeaver BPM is a key component of the NetWeaver Composition Environment, which in addition provides tools to compose user interfaces for information display and business services for SOA. NetWeaver BPM is primarily intended for executable modeling of edge processes - outside the boundaries of core application processes - although it has been used successfully to implement local variants of core application processes. NetWeaver BPM, in conjunction with other NetWeaver foundational components - portal, business intelligence, identity management, document management, lifecycle management, systems management, service and development repositories - actually provides a complete BPM Suite, supporting human tasks and automated services, business rules, and business activity monitoring (BAM).

Role of the Business Process Expert (BPX)

NetWeaver BPM supports executable modeling based on the BPMN standard from OMG. In the world of BPM, BPMN has emerged as the primary enabler of business empowerment in process implementation. The notation is business-oriented and can be used “abstractly” (without technical detail), but is semantically expressive and precise, a requirement for execution. The result is that BPMN process models are more than just “business requirements” requiring translation to a new IT language, but a continuous business view of the process design throughout the implementation lifecycle. This facilitates business-IT alignment and collaboration, and gives business a more direct voice in process implementation.

Thus BPMN is raising the bar with regard to the skills and responsibilities required in order to collaborate in this way. Business now needs to learn this new shared modeling language and apply the kind of discipline in its use demanded by its collaborators in IT. SAP believes this new role, and its associated skill set, is so important that it has given it a name - Business Process Expert (BPX). Moreover, the company has created a methodology, online community, and certification program to foster its growth. Since the launch of the SAP Business Process Expert community in 2006, more than 425,000 individuals have become registered members.
SAP defines a BPXer as “a person with the ability to quickly understand business needs and translate that understanding into a form that leads to the creation/composition of better solutions.” BPXers contribute process knowledge and modeling skills, knowledge of methods and tools, quality and maturity assessments, and project support. SAP believes these skills will become as important in the next generation of business technology as database analysts were in the previous generation.

To that end, SAP has launched a program for certifying Business Process Experts based on their mastery of SAP principles of BPM Governance, BPM Methodology (Figure 3), and BPM technology. These involve a practical approach to connecting the enterprise process architecture models of SAP Enterprise Modeling (IDS Scheer ARIS) and the executable BPMN models of NetWeaver BPM. To find out more about this program, see https://wiki.sdn.sap.com/wiki/display/SAPBPX/Home.

Core and Edge Processes

Implicit in SAP’s BPM strategy is a segmentation of customer business processes. Core application processes – the processes that actually run the core business – remain defined by, and embedded in, SAP Business Suite. Stability and efficiency are more important for these core processes than responding to continual change, and SAP Business Suite provides this by standardizing the process logic across the enterprise. Standardizing core processes across the enterprise is generally a good idea. It enhances compliance and adherence to best practices, while speeding time to implementation, and simplifying global integration. While they define the basic structure of these processes, SAP Business Suite applications are not closed and monolithic; many process details can be configured and extended by developers. Thus SAP Business Suite and its embedded process logic remains a critical component of BPM for SAP customers.

SAP believes that the processes subject to continual change are not the customer’s core application processes. Sometimes called edge processes, they include functionality...
generally outside the realm of SAP Business Suite, as well as local variations of SAP Business Suite processes that cannot be accommodated by application configuration alone. SAP refers to their implementation as composite processes, and has introduced a new NetWeaver Composition Environment to handle them.

Understanding Core Processes

For SAP customers, the first step to effective business process management is understanding the core application processes packaged with SAP Business Suite and standardizing them throughout the company through reusable enterprise services. Over the past three years, SAP has service-enabled SAP Business Suite, and today offers over 2800 enterprise services out of the box, for both cross-industry applications (ERP, CRM, supply chain) and industry-specific (manufacturing, transportation and logistics, financial services, healthcare, government, etc.). To help customers understand and configure those services, SAP offers a set of tools and a SOA-oriented Process Component Modeling Methodology.

Today, SAP Enterprise Modeling Applications by IDS Scheer (Figure 4) provide service-oriented analytical modeling of SAP Business Suite functionality using IDS Scheer’s event-driven process chain (EPC) notation, supporting documentation and understanding of current (as-is) processes as well as planning and configuration of improved to-be processes. These models are not executable, but used purely for planning and optimization. SAP Solution Manager provides the touchpoint between these models and executable SAP Business Suite configuration, synchronizing them at the EPC level.

Figure 4. SAP Enterprise Modeling applications by IDS Scheer complement the Business Process Management capabilities of SAP NetWeaver. Source: SAP

Going forward, SAP is moving SAP Business Suite modeling toward a true SOA framework supporting governance and model-based executable design using NetWeaver. The next version of SAP Enterprise Modeling Applications will link with SAP’s Enterprise Service Repository. The repository is included with SAP NetWeaver Process Integration 7.1 and NetWeaver Composition Environment 7.1. Besides managing service interfaces, operations, and datatypes, the repository provides tools for data mapping and BPEL orchestration design. Process designers in the NetWeaver environment will be able to find SAP Business
Suite enterprise services in the repository and import them into the BPM environment for incorporation in extended and composite process solutions.

Figure 5. NetWeaver Process Integration provides BPEL orchestration and standards-based middleware for application-to-application and B2B integration. Source: SAP

Extending and Integrating

An important aspect of BPM in SAP environments is extending the reach of core processes across the customer’s business network, both to B2B partners and to non-SAP systems within the enterprise. NetWeaver Process Integration (Figure 5) provides a high-performance standards-based EAI/B2B stack including messaging, brokering, an ESB, BPEL orchestration engine and associated graphical design tools. Over 2,800 customers have deployed NetWeaver Process Integration, the majority of which are used in mission-critical applications including B2B integration. It is also incorporated in a number of SAP value scenarios. NetWeaver Process Integration supports important SOA integration standards such as WS-RM, WS-Policy, and WS-Security, and is tightly integrated with the Enterprise Service Repository.

Composing Edge Processes

While packaged core application processes and BPEL integration processes are important to SAP customers, the third leg of the strategy – represented by NetWeaver BPM and the rest of the NetWeaver Composition Environment – is what marks SAP’s entry into what we call the BPM market. NetWeaver BPM entered the ramp-up stage in December 2008 and will become generally available in early 2009. In its initial release, NetWeaver BPM is focused on composition of edge processes, i.e., those outside the scope of SAP Business Suite processes, or local variants of core applications difficult to implement by configuration alone. It is optimized for human-centric processes – emphasizing the flow of human tasks – since straight-through integration-centric processes are already well supported by NetWeaver Process Integration.
NetWeaver Composition Environment represents customer extensibility of the SAP platform through graphical modeling. It provides a unified Eclipse-based environment (Figure 6) containing three composition tools for creating composite views (information screens or mashups), composite services, and composite processes. NetWeaver BPM provides a unified Eclipse-based environment (Figure 6) containing three composition tools for creating composite views (information screens or mashups), composite services, and composite processes. NetWeaver BPM provides a unified Eclipse-based environment (Figure 6) containing three composition tools for creating composite views (information screens or mashups), composite services, and composite processes. NetWeaver Composition Environment represents customer extensibility of the SAP platform through graphical modeling. It provides a unified Eclipse-based environment (Figure 6) containing three composition tools for creating composite views (information screens or mashups), composite services, and composite processes. NetWeaver BPM provides the core of a BPM Suite (BPMS) based on the NetWeaver platform. It supports the full BPM lifecycle, from graphical design of activity flows, task user interfaces, process roles and task management, business rules, data, and events to runtime execution to process monitoring and business intelligence reporting.

Based on the BPMN standard, its tools are intended for the BPX community. Targeted initially at “process architects” – not developers but at the more technical end of the BPX spectrum – NetWeaver BPM will in future releases add a more business-friendly modeling view supporting the broad majority of BPXers.

**BPM in the NetWeaver Platform**

While SAP considers its key customer value to be packaged core processes (value scenarios) rather than middleware, the addition of Composition Environment turns the NetWeaver platform into a BPM-on-SOA stack comparable to those offered by IBM or Oracle, as seen in Figure 7.

- NetWeaver Process Integration provides connectivity to customer and partner applications, including non-SAP and legacy, and B2B integration services. In addition, it provides a service bus, event enablement, and cross-component BPM – BPEL orchestration linking process components exposed by the SAP Business Suite as well as other NetWeaver Platform Services, such as Master Data Management and Business Intelligence. On top of all that, it provides an Enterprise Service Repository for SOA design governance.

- NetWeaver Composition Environment provides a unified Eclipse environment for composing services and events, business objects, user interfaces, business rules, and business processes. Leveraging the acquisition of Yasu’s QuickRules, the NetWeaver Composition Environment tightly integrates BPM with a powerful business rules management platform. In fact, the combination of “native” BPMN and business-friendly rules modeling puts NetWeaver CE ahead of Oracle and IBM in those critical areas.
While its initial release emphasizes edge processes, SAP is evolving NetWeaver BPM to become a common process layer for core application processes as well. Extension points exposed by SAP Business Suite applications will be accessible both to integration via NetWeaver Process Integration and composition via NetWeaver BPM (Figure 8). In addition, NetWeaver will provide additional tools for business-IT alignment and collaboration, from line of business executives to process architects and developers. This evolution of SAP functionality from configurable packaged applications to new and user-customizable end-to-end value solutions will proceed over a span of two or three years, protecting existing customer investments in mission-critical core applications.
A Closer Look at NetWeaver BPM

NetWeaver BPM supports a model-driven approach to managing business processes throughout their lifecycle. It provides an integrated design and runtime environment that enhances collaboration between business and IT through shared BPMN models, providing descriptive context for both implementation design and performance monitoring. Business-IT alignment and agility are also enhanced by close integration between BPM and business rules throughout the lifecycle as well: modeling, execution, and management. While focused on edge processes, NetWeaver BPM can also be used to compose core application processes, such as local variations within a global enterprise. With its close integration to SAP’s Enterprise Service Repository and existing enterprise services, SAP is trying to evolve NetWeaver BPM into the BPM S of choice for SAP Business Suite customers.

Originally code-named “Galaxy,” NetWeaver BPM includes the following principal components:

- **Process Composer**, a BPMN-based modeling and executable design tool, part of the NetWeaver Composition Environment
- **Process Server**, the JEE-based runtime execution engine. Unlike the orchestration engines of some of SAP’s competitors, SAP’s process server is BPMN-native, so that flow semantics are not lost in translation between modeling and execution. Avoiding the notorious “roundtripping problem” is critical to business-IT alignment.
- **Process Desk**, the process runtime user environment within the NetWeaver Portal supporting dynamic role-based views.

While technically separate from NetWeaver BPM, NetWeaver Business Rules Management should be considered part of the BPM Suite. NetWeaver BRM is an evolution of Yasu QuickRules and is embedded within the NetWeaver Composition Environment. Rules are modeled in business-friendly decision tables based on process variables, and are executed as service tasks in a business process.

In this section we’ll take a closer look at process modeling, human interaction, and business rules.

Modeling

The Process Composer tool (Figure 9) provides graphical modeling of activity flows using BPMN, with implementation properties of each selected node in the diagram defined via point-click property selection. Unlike some other BPM Suites that claim to be BPMN-based, NetWeaver BPM supports message flows and intermediate events, including attached error events. BPMN allows event- and exception-handling to be described explicitly in the process diagram. This is critical to BPM’s objective of enhancing business-IT collaboration and alignment.
Process Composer distinguishes human tasks from automated services. Service interfaces can be found from the Enterprise Service Repository and bound to tasks in the BPMN model. Mapping process data to the service inputs and outputs makes them executable from the Process Server.

The BPMN diagram created in Process Composer also provides visual context for process monitoring at runtime. The Process Overview popup window in Process Desk (Figure 10) provides a visual context for monitoring the current status and processing history of a selected instance.
Human Interaction

Human interaction is important in all three of SAP’s process environments: SAP Business Workflow embedded in SAP Business Suite applications, human task callouts to SAP Business Workflow from cross-component BPM (NetWeaver Process Integration), and human tasks in NetWeaver BPM. The common thread of human interaction in BPM is the need to get the right tasks to the right people and provide them with the means to complete those tasks on time and with the best result.
any SAP application. UWL aggregates work items from multiple systems into a single prioritized list, from which assigned users can select and perform work regardless of the source. Even third party sources can create alerts and workflow tasks using SAP’s workflow connector API. Process-specific views can be customized for advanced users. This simplifies task management for participants and provides a consistent user experience.

In the future, UWL will support WS-HumanTask, part of the BPEL 4People standard in OASIS. SAP was one of the principal developers of that standard, which allows a human task management service to be shared by a process (such as NetWeaver BPM or Process Integration) and an application such as SAP Business Suite.

NetWeaver BPM also leverages SAP’s user interface design framework, called Web Dynpro. Web Dynpro is a developer-oriented tool supporting the Model-View-Controller design pattern. It is used in NetWeaver BPM to create task user interface forms and screenflows. In NetWeaver Composition Environment, the Web Dynpro View Designer is WYSIWYG, can perform lookups and data validation, and supports AJAX drag-and-drop editing. A task form in the Process Desk is shown in Figure 12.

Business Rules

Business rules are a widely misunderstood aspect of BPM. They are not the same as routing rules that govern branching at gateways - the diamond shapes - in the BPMN process model. Business rules describe decision logic that is independent of process logic. In many cases, a business rule implements a policy that is applicable across multiple processes, perhaps all processes, yet managed and maintained in a single place - a Business Rule Management System (BRMS). The definition of a “gold” customer, the management approval threshold for a purchase request, or the sales tax applicable to a particular
combination of customer and order item are all examples of decision logic well suited to implementation by business rules. In BPM, a process can make use of these business rules by invoking a decision service exposed by the BRMS.

The hard part in bringing rules and BPM together has always been combining complex decision logic – such as that required by the three examples above – with business-friendly rule modeling with built-in access to process data. With the acquisition of Yasu Technologies’ QuickRules and its incorporation into the NetWeaver Composition Environment, SAP has solved that problem. Renamed NetWeaver Business Rules Management (BRM), it provides business-friendly decision table modeling with built-in support for all the business object elements defined in a BPM project.

In addition to complex policy-based decisions such as the examples given above, business rules can be used to compute complex task assignments, based on properties of both the instance and available participants, or to validate process data, or to calculate exception path routing in the process diagram. NetWeaver BRM is more than just a design tool and evaluation engine, but a true business rule management system (Figure 13). It provides decision modeling and rule design, rule validation, testing, simulation with what-if analysis, and optimization.

Figure 13. NetWeaver BRM provides a complete business rule management system tightly integrated with NetWeaver BPM. Source: SAP

Figure 14 shows a decision table in NetWeaver BRM’s Rule Composer, that determines when special approval is necessary based on the requestor’s address, request category, and total amount.

Once defined, rulesets and decision tables (2-dimensional rulesets) are deployed as executable decision services. They can be discovered from the Enterprise Service Repository, and bound to automated tasks in the process model (Figure 15). In addition, NetWeaver BRM can be used independently of NetWeaver BPM to provide decision logic for any kind of application or composite service.
Using NetWeaver BPM

For companies using SAP to run their core application processes, the experience of beta customers like Coca Cola Erfrischungsgetraenke AG illustrates how NetWeaver BPM can be used in the near term. Coca Cola is a typical SAP customer in the sense that a key objective is standardization of processes at global enterprise scale. Coca Cola’s enterprise BPM program includes over 50 cross-functional business processes in 36 variants, involving 6500 users in all functional areas with ERP backend integration, processing 500,000 instances a year. It’s big, and from an architectural perspective it’s all modeled in IDS Scheer ARIS. The architecture includes a template-based initiative called Coke One, in which 80% of the processes are standardized globally and 20% are based on regional adoption of process templates.
One such regional template, for marketing promotion processes, could not be implemented through configuration of the SAP Business Suite, so it is being implemented using SAP NetWeaver BPM instead. Coca Cola in Germany processes around 2500 requests for promotion crews at marketing events each year. While the process is planned centrally, it is executed in regional fashion, and is not available as SAP standard process. The current process, based on Excel and email, is time-consuming and inefficient. With NetWeaver BPM, Coca Cola was able to implement an improved process involving human and automated activities connected to SAP standard processes via clearly defined flows.

To illustrate the ease of implementation, Coca Cola demonstrated it live at SAPPHIRE 2008 in Germany in a presentation called “No Detours from Modeling to Execution.” Steps in the live demo included mapping request data to a standard form, filling out the rest of the form (Figure 16), handling confirmations and approvals (Figure 17), and resolving errors (Figure 18).

Figure 16. Coca Cola promotion crew request form in NetWeaver BPM. Source: SAP

Figure 17. Confirmation and approval step. Source: SAP
The Bottom Line

SAP’s entry into the BPM arena is deliberate but forward-leaning. It’s deliberate because SAP Business Suite applications already run customers’ core mission-critical processes, and changes to that infrastructure have to evolve slowly. SAP’s approach to human tasks, for example, recognizes that users will continue to receive tasks and notifications directly from SAP Business Workflow, yet need a single point of access for task management, whether assigned from SAP Business Suite applications or new composite processes. Because its customers’ processes are bigger than most, its approach has to be gradual. SAP’s go-to-market approach is conservative by software industry standards, but appropriate in the context of core processes delivered globally across multiple industries and applications. The company relies on a long period of beta delivery and ramp-up before it declares new offerings like NetWeaver BPM to be generally available.

Figure 19. Analytics can monitor the status of running processes. Source: SAP

Yet SAP’s BPM strategy is forward-leaning because it embraces business-oriented standards like BPMN – for execution as well as modeling – rather than hoping, as its chief competitors do, that the problems of roundtripping between BPMN and an IT-centric execution language will magically disappear. It’s also forward-leaning by embracing full-fledged business rules management within the BPM suite, including business-friendly decision table modeling. And it’s forward-leaning in recognizing that if a new generation of BPM technology is really
going to empower business, new skills and methodologies are needed in its customer base, and thus has embarked on a major effort in BPX education, certification, and community support.

NetWeaver BPM is off to a good start. There were around 50 beta customers by the end of 2008, and additional “ramp-up” in early 2009 before general availability. SAP’s roadmap, in which today’s tools for process architects are joined by new ones for business analysts, stretches out into 2010. Ultimately, SAP is selling process solutions, not middleware. For SAP customers, that’s a comforting thought.

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