Enterprise Architecture – IT meets Business

Applies to:
Diploma thesis about “The Impact of the Enterprise Service-Oriented Architecture on the Future Role of the Enterprise Architect” written at the University of Applied Sciences, Karlsruhe / Germany.

Summary
The advent of enterprise SOA represents a major change in the way IT and business have to deal with each other. In order to face this change it is necessary to find an interlink between the world of IT and business. Regarding enterprise SOA this interlink is represented by enterprise services. The concept of these services as well as the viewpoints and supporting elements of an appropriate enterprise SOA perspective are the issues of this article.

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Author Bio
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Article at a Glance

Historically, enterprise architects have been limited in designing an architecture that supports the business with flexible and adaptable IT solutions. With the advent of enterprise service-oriented architectures (enterprise SOA), IT now faces a dramatic expansion of the world of the possible. Enterprise SOA represents an architectural concept that meets desired characteristics of a future enterprise architecture. A future architecture is identified by systems that are built to change. Furthermore, these systems must be horizontally integrated to allow process-oriented composition. The answer to why enterprise SOA really meets characteristics of a target architecture lies in its enterprise services - the fundamental building blocks.

This article will describe the concept of enterprise services in greater detail because services represent an offspring of a synthesis of business and IT. In addition, the article will compare and delineate a vanilla service-oriented architecture (SOA) approach with an enterprise SOA. Lastly, there is a mapping of enterprise architecture viewpoints and supporting elements of an appropriate enterprise SOA perspective.

Definition

Enterprise SOA can be defined as the sum of enterprise services and service-oriented architecture. A system that simply exposes its functionality as services can be defined as service-oriented architecture (SOA). However, enterprise SOA is more than just SOA. It is defined in the following way:

*Enterprise SOA is a business-driven architecture that increases adaptability, flexibility, openness, and cost efficiency. With an enterprise SOA, companies can compose applications and enable business processes rapidly using enterprise services. With enterprise SOA, organizations can improve their reuse of software and become more agile in responding to change.*

Enterprise SOA wants to facilitate cross-functionality and incorporates business processes based, not only on individual Web services, but on enterprise services charged with business semantics and defined in a central enterprise services repository. As the foundation for enterprise SOA, SAP NetWeaver allows companies to decouple their business processes from underlying IT systems. So they are able to manage these processes quite easily without interrupting daily operations [WoMa06].

When we talk about enterprise SOA and other related terms and issues we mainly refer to the architecture of mySAP Business Suite².

IT Meets Business

It is not a new phenomenon that IT and business departments often fail to communicate and collaborate effectively. This situation is often due to divergent architectural viewpoints, incoherent concepts and different terminologies of IT and business groups. Historically, business and IT have had their own visions. Both groups primarily wanted to realize their individual goals. Many business people preferred to create dedicated business models and diagrams that were mostly loosely defined and without a uniform shape. These guys expect that a holistic architecture would be too technical and too formal for them [WiMy04].

Another inefficient approach has happened in the IT department over the past years. Many IT specifications were created with purely functional analytical methods (functional analysis). When designing applications, IT technicians basically aimed to derive specifications for software components from specific business functions. This inevitably led to applications that were very inflexible. Unfortunately, changing business requirements always affected all dependencies between those programs. Emerging object-oriented programming then enabled programmers to encapsulate functionality, re-use software components and
utilize new development methods. Long-time object-oriented analysis based on UML (Unified Modeling Language) appears to be the adequate answer to closing the gap between business and IT. However, UML did not become a general language to describe the business [LoAn05].

Today, the concept of services primarily intends to interlink the world of IT and business. Hereby, services illustrate common building blocks that span the bridge between the functional approach of business departments and the object-oriented approach of IT divisions. Services (e.g., enterprise services or Web services in the broader sense) have the potential to actually facilitate the consolidation of business and IT. Services exchange data in the form of standardized messages. This feature makes services that powerful and independent unlike any other implementation technologies in the past. Figure 1 shows the bridge between business and IT and its paving realized by services.

In general, the figure above shows services as fundamental building blocks that close the gap between business activities and IT; however, you can look at the figure to demonstrate the concerns of building each enterprise solution as well. Business wants to rapidly translate its demands into flexible IT solutions that can be shared across business departments or sourced from partners in a business process. Consequently they look for services that perform their required business functionalities. On the other hand, IT professionals consider services to be reusable building blocks that facilitate the composition of enterprise solutions.

After all, there is a strong demand to link IT and business to create synergies between both activities. But what is the right way? Where do both disciplines meet each other and what technology facilitates this effort?

The Evolution of the Enterprise Service-Oriented Architecture

Before we go further into the question above, we first turn toward the evolution of enterprise SOA and how services fit into the holistic concept of enterprise architecture.

The beginning of enterprise applications occurred during the mainframe era. Early mainframe applications were directly developed on the mainframe’s operating system. There was no division of concerns, which assumed different layers such as the user interface (UI), the application or the database layer. The final outcome of this architecture was an enterprise application characterized by a huge monolithic collection of functionalities and tasks that had to be performed entirely by the application itself [Wood04].

In the late 80’s and early 90’s, applications could run on personal computers and were connected to other applications in the network. For the first time, the implementation of enterprise application was done with consideration to three major layers (UI, monolithic application and database). In addition, personal computers were much cheaper and more powerful than traditional mainframe systems. Today, the enterprise architecture of most companies typically consists of a collection of those monolithic enterprise applications (figure 2).
Such architectures have the following main drawbacks [Wood04]:

- **Build to last**: This inflexible, architectural concept mainly hinders innovation (both business and process innovation) and creativity, which are basic characteristics of successful enterprises within a changing business environment.

- **Tight integration**: Systems are tightly integrated. That makes it difficult (and sometimes even impossible) to adapt and update them. Changing a software component of an application can lead to undesirable side effects in other systems and may have dramatic impact on their operation.

- **Code-oriented development**: As discussed and already indicated in the first article traditional enterprise applications naturally provide an inflexible basis for the solution architecture. Enterprise solutions are built by development teams who consolidate expensive custom code into cost-efficient standard applications. Software components need to be implemented within multiple systems and cannot be reused.

- **Technical complexity of the IT**: The architecture is often characterized by proprietary technologies that make it difficult to create an interoperable platform. This is the reason why there is a fundamental gap between business and IT.

Consequently, silo-oriented architectures do not provide an agile foundation that is required for successful business execution. Thus the enterprise architecture needs to be enhanced to achieve a next enterprise architecture maturity stage. Modularized approaches such as enterprise SOA fulfill the requirements of future-proof enterprise architectures [WoMa06].

<table>
<thead>
<tr>
<th>Today’s Architecture</th>
<th>Target Architecture: Enterprise SOA</th>
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<tbody>
<tr>
<td>Build to last</td>
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<tr>
<td>Tight integration</td>
<td>Loose horizontal integration</td>
</tr>
<tr>
<td>Code-oriented development</td>
<td>Process-oriented composition</td>
</tr>
<tr>
<td>Technical complexity of the IT</td>
<td>Interoperable architecture for business and IT</td>
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</table>

Table 1: Architectural characteristics - today and in future
Table 1 lists and compares the characteristics of both a today’s, silo-based architecture and an enterprise SOA. A target architecture should be characterized as follows:

- **Build to change**: Once an application is created it mostly needs to get optimized and adapted to current requirements. Companies need to implement or change systems within weeks and months to have a real impact. In general, flexibility can only be meaningful by little costs at the same time. In order to prove this first characteristic the survey delivers a similar result. Future-proof enterprise architectures must deliver a roadmap for change, not for last.

- **Loose horizontal integration**: Today you cannot assume that a company only runs systems from one single software vendor. Heterogeneous system landscapes are inevitable and may result from homemade applications, special software products from external vendors or mergers and acquisitions. This requires loose integration of systems and enabling of cross-functional, end-to-end processes. At the same time the architecture needs to manage the consistency of data properly to get valid, accurate, usable and consistent databases across the entire system landscape.

- **Process-oriented composition**: Service (re)composition means the plug-and-play assembly of process components in order to orchestrate and tweak business processes. Composing basically enhances flexibility and shortens development time when building custom specific solutions.

- **Interoperable architecture for business and IT**: Since IT is seen more as an enabler of growth, the enterprise architecture is shared with empowered employees who are on the front lines of business. An interoperable environment, though, needs to have easy-to-use, comprehensive model-driven and pattern-based development tools to support the attempts of process innovation. These tools are the future offspring of a synthesis of business and IT.

The key idea differentiating enterprise SOA (and the SOA approach in general) from earlier approaches of distributed computing lies in the notion of enterprise services as the least common denominator. Enterprise services meet all architectural requirements outlined above. This architecture enables innovation and standardization in an environment that allows the IT management to deliver at the speed and efficiency required by the business [WoMa06].

Figure 3 illustrates the concepts of vanilla SOA and enterprise SOA. The left graphic shows the service-oriented architecture. SOA describes the general approach of loosely coupled services to support business processes.
SOA is not implicitly restricted to a specific technology\(^4\), though it is mostly realized via Web services. However, vendors who offer applications based on SOA often lack the answer to how companies can utilize and oversee Web services of their systems landscape to adapt their processes or build their own composite applications\(^5\) [WoMa06].

By contrast, the right graphic above demonstrates the enterprise SOA blueprint. Comparable to the design of a service-oriented architecture, functionality of existing systems (service providers such as CRM, an ERP or SCM systems\(^6\)) is exposed as a collection of services. On top of these systems, the SAP NetWeaver\(^7\) composition platform provides extensive integration capabilities of people, information, processes and applications, and it enables standards-based interoperability with other platforms. At the same time, SAP NetWeaver provides the services of the underlying systems in a central, unified enterprise services repository - and that is one key difference between enterprise SOA and other SOA approaches. The enterprise services repository is the actual container in SAP NetWeaver that includes descriptions and metadata about enterprise services, business objects and business processes available across a company’s service landscape. This repository actually holds a wide variety of services from SAP, customers and partners. Companies can draw upon the contents of the repository to not only run SAP solutions but also to design, compose and run their own solutions. Enterprise services change the way of developing applications - especially the one type of applications called composites, or composite applications. The key characteristic of composite applications is that they “run across applications and systems”. To build them, you need to look at all the participants in a business scenario from an end-to-end perspective and compose them by using enterprise services. Finally, there are various technologies that enable users to access composite applications and to participate in the process. Around enterprise SOA, SAP furthermore delivers tools for modeling user interfaces and orchestrating processes based on enterprise services [WoMa06].

To get to the bottom of this discussion, the survey is consulted to deliver an extra insight in regard to enterprise SOA and its real importance in current processes of enterprise architecture planning (graph1).
Question II.4: How does enterprise SOA fit in your EA planning?

The key to why enterprise SOA successfully meets requirements of target architectures is the enterprise services themselves.

On the one side, more than two third of the participants (67%) assume that enterprise SOA is the right concept toward a flexible and innovative enterprise architecture. There is a basic consent (48%) that loosely-coupled, standardized components are the right way to build mature enterprise architectures. Linking customers, partners and suppliers close to companies’ business processes represents a relatively large benefit of 40%.

On the other side, 32% of the participants are more skeptical and suggest enterprise SOA as one possible architectural blueprint among others. 28% find fault with the technical maturity of the current concept, and less than one-tenth of the participants (9%) basically do not put enterprise SOA on the agenda.

Beside 30% of the criteria that show that enterprise SOA is not very relevant for companies, 70% of the criteria clearly demonstrate the importance of enterprise SOA.
Exposing Business Functionality via Enterprise Services

In contrast to traditional software components that exchange data by passing parameters based on proprietary protocols, services communicate by transmitting messages based on open standards [LoAn05].

Since enterprise services have become fundamental building blocks for the enterprise SOA, we ultimately map them to all previous characteristics of traditional and target architectures. The answer for meeting future, architectural requirement is in the characteristics of enterprise services (see table 2).

<table>
<thead>
<tr>
<th>Today’s Architecture</th>
<th>Target Architecture: Enterprise SOA</th>
<th>Enterprise Services: Characteristics</th>
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<tbody>
<tr>
<td>Build to last</td>
<td>Build to change</td>
<td>Service-enabled systems to increase flexibility</td>
</tr>
<tr>
<td>Tight integration</td>
<td>Loose horizontal integration</td>
<td>Open standards to ease integration</td>
</tr>
<tr>
<td>Code-oriented development</td>
<td>Process-oriented composition</td>
<td>Reusability to leverage productivity</td>
</tr>
<tr>
<td>Technical complexity of the IT infrastructure</td>
<td>Interoperable architecture for business and IT</td>
<td>Business semantics to empower enterprise SOA</td>
</tr>
</tbody>
</table>

Table 2: Architectural characteristics and the role of enterprise SOA

This leads to the following properties of enterprise SOA and enterprise services:

- **Service-enabled systems to increase flexibility.** Each enterprise service provides a stable interface, which ensures the same way of invocation both today and in future releases. This makes it easy to adapt functionality in service-enabled composite applications because you only need to recompose enterprise services and do not have to change the implementation of underlying enterprise services.

- **Open standards to ease integration.** Enterprise services are based on non-proprietary industry standards (e.g. Odette, RosettaNet, etc.) and technology standards (e.g., XML, SOAP, UDDI, WSDL, BPEL4WS, etc)⁹. This makes it possible to integrate applications (A2A; application to application), enterprises (B2B; business to business), and different user interfaces.

- **Reusability to leverage productivity.** Defining enterprise services requires determining a special level of granularity. This is very critical because, dependent on this specification, enterprise services can be (re)used more or less effectively. Ultimately, an advanced pool of documented and well-defined enterprise services enable the efficient composition of enterprise solutions.

- **Business semantics to empower enterprise SOA.** Enterprise services are structured according to a harmonized enterprise model based on process components, business objects and global data types. Enterprise services are mostly defined by utilizing an “outside-in” approach. It is an approach that comes, not from the data, but from the top down, from the business side, and it is driven by business requirements and by the benefits it provides to the customer. You first model the enterprise service interface for a special business purpose and then lead the implementation of the service⁹. This approach enables even non-IT professionals to contribute to shaping IT around real-world scenarios and business processes. That makes enterprise services understandable even for employees outside the IT domain. But enterprise services can be designed “inside-out” as well. This approach exposes existing function modules of the backend systems and so directly pre-defines the interface of the enterprise service.

Enterprise services in mySAP Business Suite provide business functionality and enable service consumers to develop composite applications on top of the application mySAP ERP. From the technical point of view,
enterprise services can be compared with Web services\textsuperscript{10}. But from the business perspective enterprise services are charged with business semantics, thus they stand out from common Web services \cite{ABBG06}:

*Enterprise services are Web services that have been co-defined by SAP and/or partners. Enterprise Services provide business processes or business process steps that can be used to compose business scenarios while ensuring business integrity and ease of reuse.*

Sometimes, enterprise services are categorized by the role they play in composite applications or by the business value they deliver. This classification associates enterprise services with categories such as master data management, business intelligence consumer services, analytics, knowledge management, collaboration and mobile services. Ultimately all services attempt to expand the value and functionality of composite applications to meet users’ needs \cite{WoMa06}.

The subsequent graphic (figure 4) shows a typical business scenario. The figure illustrates an order management process in the form of a composite application.

\begin{figure}[h]
\centering
\includegraphics[width=\textwidth]{composite_application.png}
\caption{Example scenario about a canceling an order process}
\end{figure}

This composite may be able to create, modify or delete an order\textsuperscript{11}. During its run-time, the composite application must access business functionalities implemented in the existing systems. One action, which is described in more detail, is the cancellation of an order. You would probably expect that the order be deleted in only one particular system (e.g., the ERP system) when choosing “Delete Order” in the menu of your user interface; however, there are more activities required to completely cancel an order. The record might also exist in the customer relationship management (CRM) system, which deals with the sales aspects of the order. And there is the supplier side and a Supply Chain Management or SRM system, which could also contain order objects. So the process of canceling an order has many different steps. For instance, when the order is deleted, you would also send a confirmation to the customer, remove the order from the production plan and reorganize your production, flag the corresponding materials, and finally, notify the billing department to revise the calculation.

**How can companies discover enterprise services?**

Enterprise services can be browsed and tested in the Enterprise Services Workplace (ES Workplace). The ES Workplace provides frictionless and complete information about enterprise services productized within SAP systems\textsuperscript{12}. Starting from the business point of view you can choose the appropriate business
processes from a solution map and then drill down to its functional details until you discover assigned enterprise services. Another approach for searching enterprise services can be taken via the enterprise services index. The ES Workplace will be discussed as one crucial tool for enterprise architects within the enterprise SOA environment.

How can companies get new enterprise services?

Packages of enterprise services will be released by SAP as part of enhancement packages. In general, these enhancement packages help to relieve chief information officers (CIOs) of the most common dilemma they face today.

Once my system is up and running, you can touch my core once every 5 years ... and I need it to be a Saturday … and my CEO wants me to innovate every quarter.

Source: CIO, Fortune 1000 Manufacturing Company

On the one side CIOs basically want to keep the core of their systems untouched and only change them once every five years. On the other side the chief executive officer (CEO) demands business and process innovation quarterly. This means that the enterprise architecture must be able to respond to those business needs. That is exactly where enhancement packages come into play. These packages are optional and enable companies to take advantage of continuous innovation without interrupting the operations of a business with major system upgrades. Enhancement packages are structured modularly and so enable companies to use and activate only the features and functionalities they require. They include enterprise services and provide new functional and industry-specific features in order to improve shared services, end-to-end business processes (e.g. order-to-cash, "hire-to-retire"), as well as supplier collaborations. The first enhancement package was released with mySAP ERP 2005 in December 2006.13
The Enterprise SOA Approach in the Context of an Enterprise Architecture

While enterprise SOA introduces a new architectural concept, it does not require changing the basic approach to enterprise architecture. Companies that address enterprise SOA need to expand their views of the architectures and adapt their architectural strategy. When managing the adoption of enterprise SOA it is essential to clearly describe the business, technology and information architecture of the enterprise. So the enterprise architecture group is able to effectively lead this architecture initiative and develop a well-balanced service portfolio to construct a solid foundation for business execution [CuAl06].

The following table lists the architectural viewpoints and demonstrates the perspective of enterprise SOA and its supporting elements.

<table>
<thead>
<tr>
<th>Enterprise Architecture: Viewpoint</th>
<th>Enterprise SOA: Perspective</th>
<th>Enterprise SOA: Supporting Elements</th>
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<tbody>
<tr>
<td>Business viewpoint</td>
<td>• Define business functions to be service-enabled</td>
<td>• Model-driven development tools for designing high-level business processes and backend business processes</td>
</tr>
<tr>
<td></td>
<td>• Use the enterprise SOA ecosystem to gain more value from enterprise SOA</td>
<td>• Communities around enterprise SOA</td>
</tr>
<tr>
<td>Technical viewpoint</td>
<td>• Define the strategic platform for the operation of the architecture</td>
<td>• SAP NetWeaver infrastructure</td>
</tr>
<tr>
<td>Information architecture</td>
<td>• Standardize communication and harmonize business objects</td>
<td>• Global data types and business objects</td>
</tr>
<tr>
<td></td>
<td>• Ensure broad applicability of enterprise services</td>
<td>• Integrated and standardized development tools</td>
</tr>
<tr>
<td></td>
<td>• Promote consumability of enterprise services</td>
<td>• Enterprise services repository</td>
</tr>
</tbody>
</table>

Table 3: How enterprise SOA fits into a company’s enterprise architecture
**Business viewpoint**

To migrate the existing business architecture toward enterprise SOA companies often utilize an outside-in approach by determining business functions of their systems to be service-enabled. Since modeling is the organizing principle of enterprise SOA, SAP therefore provides a variety of specific modeling tools. For instance, tools are available for adapting high-level business processes (ARIS for SAP NetWeaver) and backend business processes (SAP NetWeaver Exchange Infrastructure’s Cross Component Business Process Management). When processes are designed in an interoperable services-based environment, steps within business processes can be linked together to create process automation. By automating the tasks between systems and humans (particularly realized by analytical tools\(^\text{14}\)) you generally increase the overall efficiency of the process. Enterprise SOA makes it possible to realize innovation by flexibly combining processes that can go beyond traditional boundaries of an organization [WoMa06].

In order to improve the value from an enterprise SOA, the architecture comes with an extensive ecosystem including system integrators, independent software vendors, consultants and hardware suppliers. Companies that adopt enterprise SOA can join this vibrant ecosystem and participate in diverse communities such as the Enterprise Services Community (ES Community)\(^\text{15}\) or the Business Process Expert Community (BPX Community)\(^\text{16}\). These communities provide a wide range of contributions for everyone’s benefit [WoMa06].

Today communities are important for keeping a competitive position at the front of IT and business progress. An ecosystem around a concept such as enterprise SOA is a totally new approach of leveraging the quality of the architecture.

**Technical viewpoint**

Enhancing the enterprise architecture to better drive business change basically means providing a flexible, technical foundation. The SAP NetWeaver platform represents the technical foundation for the enterprise SOA. SAP NetWeaver unifies integration technologies in a single platform based on open standards. It reduces the need for custom integration and ensures that mission-critical business processes are reliable, secure, and scalable. SAP NetWeaver provides a whole modeling and operating environment for enterprise services. This includes a set of technology and tools that primarily want to ensure secure, reliable, and optimized communications between service providers and service customers. This allows the implementation of enterprise SOA accordingly to architectural guidelines, accounting for Web service standards, design patterns, security and transaction mechanisms [WoMa06].

**Information viewpoint**

Because enterprise SOA focuses on integrating and composing many end-to-end business processes - especially those that span heterogeneous systems, multiple organizations and relationships with business partners - it is important to have a keen understanding of business data. For instance, the order canceling process explained above has several key data artifacts (business objects), such as the order, the customer, the production information, the material, the invoice and the confirmation receipt. Describing these artifacts in a standard way is important for an enterprise SOA approach to ensure that each service that participates in the process can understand the data equally. In the enterprise SOA environment this is realized through global data types\(^\text{17}\).

Enterprise architects need to expand their architectural viewpoint by fostering a broad applicability of enterprise services. This basically means that services need to be designed as simply as possible. Architects and developers utilizing integrate development tools must define the appropriate level of granularity of these reusable assets. In practice the level of granularity is mostly dependent on the functionality of a specific enterprise service.
The next important aspect that changes the viewpoint of information architecture is consumability of enterprise services. It is not sufficient to create a pool of enterprise services that eventually can be used in diverse business situations. In order to use and consume enterprise services, they provide metadata about their specific usage scenarios and are stored in a central enterprise services repository [BlJa03a].

The enterprise services repository is a searchable archive for reusable enterprise services. The enterprise services repository stores metadata about how enterprise services are linked to business processes and the way that they may be accessed at runtime [WoMa06].

**Solution viewpoint**

Well-defined business, technology and information architectures are the foundation for adopting enterprise SOA in a managed way. Finally, the migration of those architectural viewpoints affects the solution architecture and changes the way that applications are designed and built. Applications move away from being hard-coded and rigid entities toward dynamic compositions of services. In order to prevent that application teams from developing these enterprise services for whatever they want, the solution viewpoint must be expanded with a service portfolio view. This portfolio categorizes enterprise services and shows their basic relation to business units and business processes. It basically shows available capabilities of the enterprise for building and composing a specific application. The enterprise services portfolio provides an overview of “as is” services and helps the enterprise architecture group to decide what services are needed for future initiatives (“to be”) [CuAl06].

Managing these services of the service portfolio is a continuous process driven by changing business and IT requirements. Ultimately, this is a crucial point that shows the differences between a service portfolio management and a traditional software development lifecycle\(^8\).

**Coming up next:**

The implementation of enterprise SOA goes along with changes in the field of responsibilities of enterprise architects. Next week’s article will lead you through the first three steps of setting up an enterprise architecture. Moreover, it will show you the distinct responsibilities of enterprise architects in each of these steps.
Bibliography

[ABBG06] Aschenbrenner, Peter; Böder, Jochen; Buck-Emden, Rüdiger; Grüne, Bernhard; Lünzmann, Martin; Saalfrank, Christian: SAP Architecture Bluebook - mySAP Business Suite Service Provisioning. October 17, 2006.


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1 Adapted from: http://www.sap.com/platform/esa
2 mySAP Business Suite is a “comprehensive family of adaptive business applications, providing best-of-breed functionality built for complete integration, industry-specific functionality, unlimited scalability, and easy collaboration over the Internet” (source: http://www.sap.com).
3 This kind of architecture is sometimes called “silo architecture” because each application represents a separated IT silo. That makes it difficult to support cross-functional processes.
4 A service-oriented architecture can be implemented by using technologies like CORBA, DCOM, REST, RPC and Web services.
5 Composite applications consist of functionality drawn from several systems and sources within an enterprise SOA environment.
6 In general, a systems landscape of a company incorporates systems to manage customer relationships (CRM), supplier relationships (SCM), and all the data and processes of the company itself (ERP).
7 The SAP NetWeaver platform helps companies align IT with business requirements. Because SAP NetWeaver unifies integration technologies in a single platform, it reduces the need for custom integration and ensures that mission-critical business processes are reliable, secure and scalable.
8 Interoperability standards are not yet common in the IT industry; they are just evolving and the services concept is one driver. There are standardization organizations like WS-I (Web Service Interoperability Group) which is responsible for defining web service standards. Similar groups are the World Wide Web Consortium (W3C) and OASIS.
9 Enterprise services are aligned with the unified enterprise model. In short, an enterprise model consists of special elements (e.g., people, processes, resources, information) that describe the structure of the enterprise, as well as its goals and business constraints.
A Web service is a software system designed to support interoperable machine-to-machine interaction over a network. It has an interface described in a machine-processable format. Other systems interact with the Web service in a manner prescribed by its description using functions like “Order_Delete” or “Flag_Material” are Web services that expose special functionalities, for instance by wrapping a BAPI (business application programming interface) from a particular system.


Further information about SAP’s first enhancement package and its concrete contents are available on the SAP Developer Network.

Analytical tools enable the automation of processes. These tools provide the opportunity to react instantly to a specific event by analyzing the process.

ES Community: http://www.sap.com/platform/ecosystem/escommunity/index.epx
BPX Community: https://www.sdn.sap.com/irj/sdn/bpx
Global data types place a constraint upon the interpretation of data to ensure that data in transferred between enterprise services in a standardized format. Business objects are collections of functionality that represents a business entity.

Further reading regarding to modeling of service-oriented solutions: