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## THE ENTERPRISE NEWSLETTER

Issue No: 34

# DIRECTIONS FOR ERP, CRM, SCM, SRM

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By [Clive Finkelstein](#)

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## Editorial

October 25, 2006: This issue of TEN follows the announcement of availability of my latest book: "[Enterprise Architecture for integration: Rapid Delivery Methods and Technologies](#)", which was published by Artech House, Norwood, MA on March 31, 2006. You can [read the review](#) of the book by Karen Lopez of InfoAdvisors, Inc in Toronto, Canada in the last issue: [TEN#32](#). Links are also provided in the review so you can order the book online now, if you wish.

Previous issues of TEN have been based on extracts from the first edition of the book. This issue continues the new focus of TEN started in the July issue: [TEN#33](#). I will use TEN to provide you with early availability of material that will eventually be published in the second edition of the book. This will enable you to keep updated on the latest methodology developments, products and technologies relating to Enterprise Architecture, Modeling Tools, Web Services, SOA and BPM.

If you do not want to receive future TEN mailings, please email [unsubscribe@ies.aust.com](mailto:unsubscribe@ies.aust.com) with "Remove" and your email address in the Subject line.

Clive Finkelstein  
Publisher, The Enterprise Newsletter (TEN)

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## 30th Anniversary

This issue we celebrate an important anniversary.

- This month is the 30th Anniversary of the formation of Information Engineering Services Pty Ltd (IES) in Melbourne, Australia in October, 1976.
- Since its establishment, IES has made an important contribution to the IT industry, through the development and continuing refinement of Information Engineering (IE). Today, the latest version of IE is Enterprise Engineering (EE): which is used for the rapid delivery of Enterprise Architecture (EA).
- White Papers are at <http://www.ies.aust.com/>. Click on the **Papers** link from any page.

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## Upcoming Events

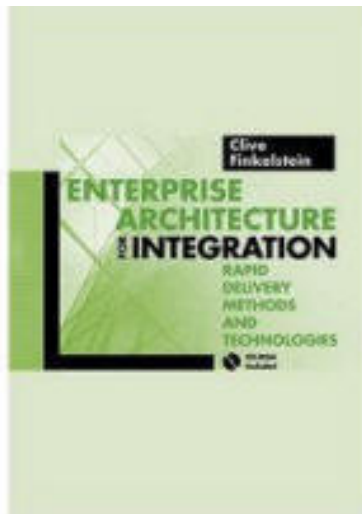
I will be presenting two courses in London: [Rapid Delivery of Enterprise Architecture for Business Integration](#) on Nov 13-15 and [Rapid Delivery Technologies for Enterprise Integration](#) on Nov 16-17, 2006.

- Further details are available from the links above or from the IRM UK web site at <http://www.irmuk.co.uk/59/> for the Nov 13-15 course or at: <http://www.irmuk.co.uk/56/> for the Nov 16-17 course.

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## Book Review



### [Enterprise Architecture for Integration: Rapid Delivery Methods and Technologies](#)

Clive Finkelstein's latest book: ["Enterprise Architecture for Integration: Rapid Delivery Methods and Technologies"](#) tackles the problems of designing and implementing architectures while trying to balance the need for speed prevalent in IT projects.

Read the [Book Review](#) and use the included links to purchase the book online, if you wish.

[More...](#)

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## Purchase the Book

You can purchase the book from the publisher's Online Store by clicking the links

below: from the front cover image of the book; from the book title; or from the **Purchase Book** link below.

At the publisher's Online Store, use "*Enterprise Architecture*" to search for the book Title, or "*Clive Finkelstein*" to search for the Author. When you add the book to your shopping cart, click on your country in the world map that is displayed, to calculate the cost of shipping the book to you.

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## Enterprise Architecture Blog

To answer the many questions that I receive by email, I have now set up an EA Blog so that people can ask me questions more easily, following their purchase of the book, or related to White Papers or past Issues of TEN. This will also enable others to see these questions and answers. Hopefully it will lead to a dialog that benefits many more than do isolated answers to individual emails.

- The EA Blog is accessible from <http://www.ies.aust.com/>. Click on the **EA Blog** link from any page.

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## BEye Network Articles

I was recently invited by the BEye Network in the USA to write a series of articles on Enterprise Architecture. The first series of four articles, to be published over the next few months, cover:

- Introduction to Enterprise Architecture
- Strategic Modeling for Rapid Delivery of Enterprise Architecture
- Enterprise Architecture in Banking
- Enterprise Architecture in Government

When these articles have been published by BEye Network, I will upload them as PDFs to the IES web site, so you can download and use them within your own organization. Their availability on the IES web site will be announced in a future issue of TEN. At that time, use the following link:

- Visit <http://www.ies.aust.com/>. Click on the **Papers** link from any page.

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## Enterprise Architecture Projects

Please contact me if you feel I may be able to assist you with an upcoming EA project or with EA training at your organization. I am happy to help. You can get more information from the IES web site as follows:

- Visit <http://www.ies.aust.com/>. Click on the **Projects**, **Courses** or **Project References** links from any page. Email me via the **Contact Us** link from any page.

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## Feature: Directions for ERP, CRM, SCM, SRM

This issue of TEN covers directions and products to address the problems of inflexibility that have previously been associated with Enterprise Resource Planning (ERP), Customer Relationship Management (CRM), Supply Chain Management (SCM), Human Resource (HR) and Supplier Relationship Management (SRM) product suites from vendors such as SAP. We will examine the capabilities of SAP NetWeaver in this issue, for transformation of the SAP product suites into highly flexible application support environments.

The success that SAP had through the 1990s with SAP R/3 highlighted its vulnerability to the rapid change environment of the 21st Century. It had to change so that its customers could use its ERP, CRM, SCM, HR and SRM software products more flexibly. The emergence of SOA and Web Services in the 21st Century today offer it a capability to support rapid business change.

With its purchase of TopTier in 2001 as the SAP Enterprise Portal, SAP now has a flexible user interface (UI). This enables it to change its product direction to support SOA. The catalyst and foundation for SOA support is provided by SAP NetWeaver. We will examine SAP NetWeaver in some detail in this issue, as it offers comprehensive SOA capabilities.

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## SAP Enterprise Service Architecture

- From a *technology* perspective, the SAP system has to support communication based on the Web Services standards stack
- From an *application* perspective, the SAP system has to provide meaningful services to prospective client applications



**Figure 1: SAP Enterprise Service Architecture [Source: SAP]**

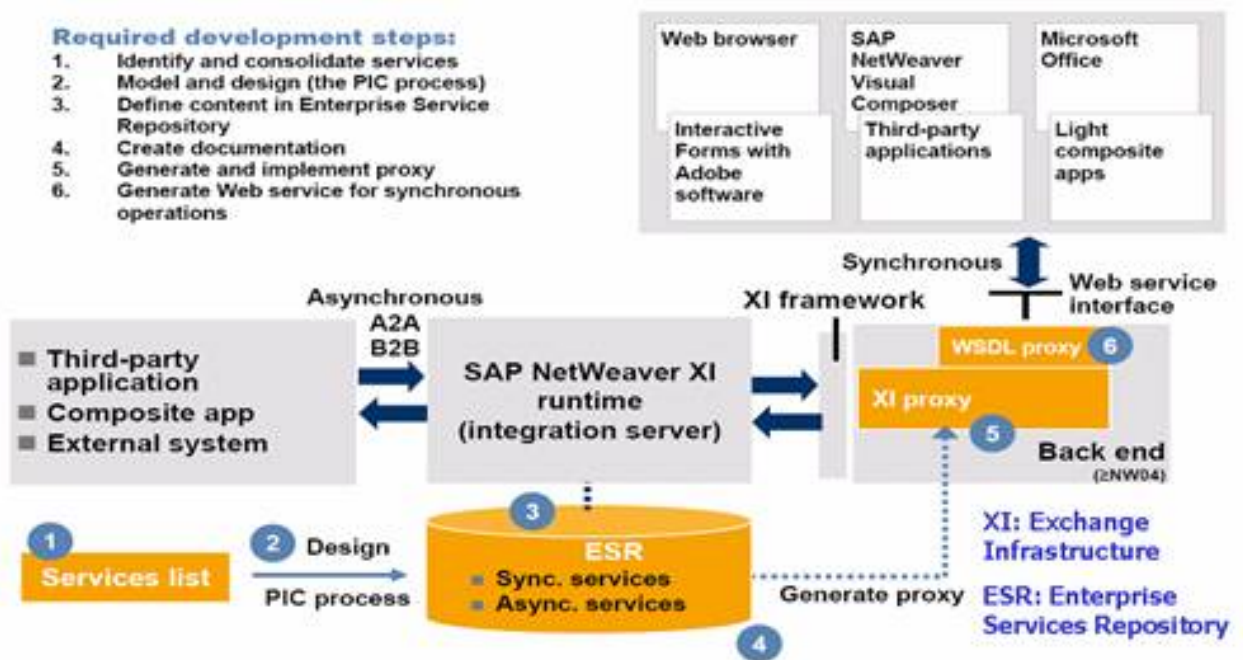
[Figure 1](#) illustrates the SAP Enterprise Service Architecture. According to Woods and Mattern, commenting in their recent book on SAP's use of this term:[\[1\]](#)

“Enterprise Service Architecture (ESA) was created to satisfy the needs of modern businesses that are interested in process innovation, which means being able to automate new processes as well as improve and optimize stable processes to take advantage of new challenges.”

“The demand for flexibility to automate new processes and improve existing ones changes the landscape dramatically. The standard processes of enterprise applications explode into smaller bundles of enterprise services built to execute proportionally smaller tasks. So now, for example, one service might accept a purchase order and another one might validate that order to a defined set of rules. A metaservice might control the handoff of data from one service to another as it's passed along a string of orchestrated processes designed to reflect how the real-world business process actually works.”

“ESA preserves the gains of the previous generation of enterprise applications while introducing flexibility. All of the standard processes that made ERP, CRM, and other enterprise applications so vital to efficient operations will stay in place. Instead of being powered by monolithic architectures, however, they will be powered by services. The existence of services is the engine of flexibility. It's not important where those services originate – whether in ERP, CRM, or SCM – because it's now possible to orchestrate them independently. The Enterprise Services Repository (ESR) incorporates a central tank of services that SAP has created for customers, and it will include services that companies create on their own. All of these services will be stored for use and reuse, subject to the rules and standards implicit in ESA.”

## ■ Enterprise Service may include several web services



**Figure 2: Enterprise Services through MySAP Business Suite [Source: SAP]**

According to Woods and Mattern, Enterprise services (see [Figure 2](#)) typically fall into one of four main categories:[\[2\]](#)

### Process services

"Trigger a process and manage its consistent execution."

### Component services

"Keep track of the context—the relationships, data, and external information—related to an important business function. Commonly, this context takes the form of a set of rules applied to the operation of other services. When one service inputs data to a purchase order, for example, a second component service determines—based on the identity of the supplier and corresponding contractual relations—how the purchase order should be handled."

### Entity or engine services

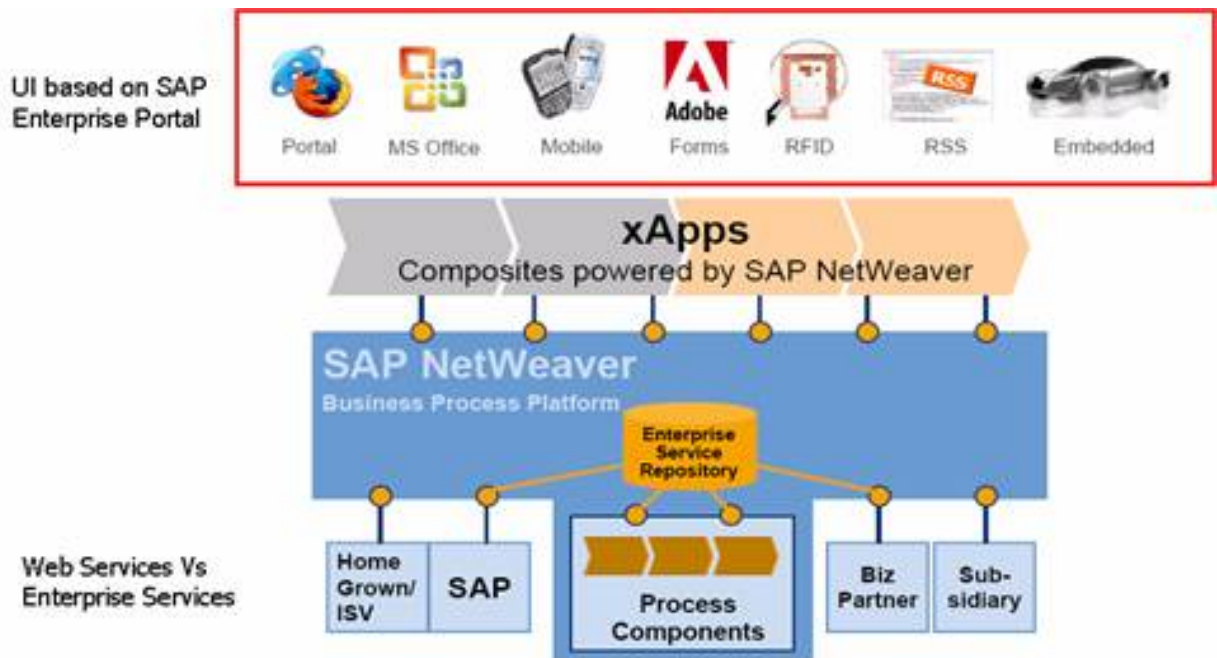
"Provide access to a business object or a discrete piece of functionality, such as a pricing engine, and manage all of the necessary events and activities triggered by the service."

### Utility services

"Perform a common function for other services. A service providing the required values for a specific field—the "value help service"—is a classic

example of a utility service.”

The diagram in [Figure 3](#) shows some of the NetWeaver architecture. Enterprise Services from SAP, independent software vendors (ISVs), business partners and other process components are managed in an Enterprise Service Directory, where they are utilized in Composite Applications (XApps): used in the Composite Application Framework (CAF). These can be accessed by the SAP Enterprise Portal UI from a variety of devices as shown in [Figure 3](#).



**Figure 3: SAP NetWeaver Architecture [Source: SAP]**

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## Duet by Microsoft and SAP

As an example of some of the User Interfaces that can be used by NetWeaver, SAP and Microsoft have released Duet (see [Figure 4](#)). This is a jointly-developed product that enables SAP products to be accessed from within Microsoft Office: Word; Excel; PowerPoint; Outlook; and InfoPath for example. It was designed to leverage investments in SAP and Microsoft: Office users can also become SAP users, working within a familiar Office environment.



**Figure 4: Example of Duet by Microsoft and SAP [Source: SAP]**

At the time of writing, the following enhancements were planned for Duet:

**Duet 1.0** (Released June 2006) supports the following scenarios: Time Management, Leave Management, Budget Monitoring, Organization Management in English through access to MySAP ERP 2004 and MS Office 2003, Professional Enterprise Exchange Server 2003 and Windows 2003 Server.

The screenshots in [Figure 4](#) show Microsoft Outlook and InfoPath being used to access SAP ERP products through Duet for Budget Transfer.

**Duet Value Pack 1** (Q3 2006) supports Recruitment Management, Travel Management, Analytics and Reports with additional languages (French, German, Japanese, Spanish, Portuguese) through access to MySAP ERP 2005.

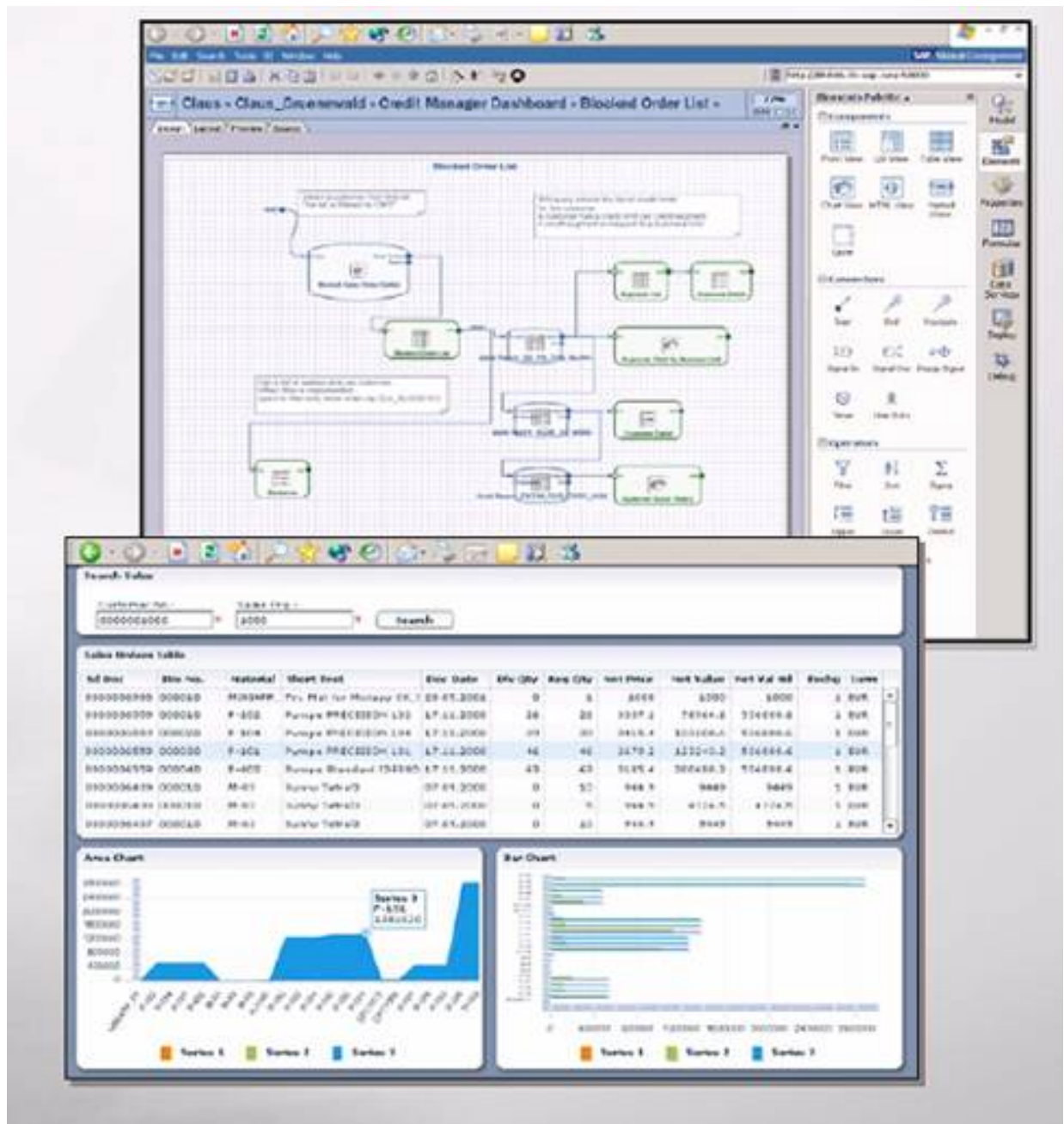
**Duet Value Pack 2** (Q4 2006) supports Sales Management, Purchasing Management with support for Microsoft Office 2007.

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## SAP NetWeaver Visual Composer

SAP NetWeaver uses the NetWeaver Visual Composer as shown in [Figure 5](#) for visual process modeling and rapid application development. This runs on the J2EE engine of the SAP Web Application Server. It supports Adobe Flex / Flash and

provides connectivity to non-SAP environments such as PeopleSoft and Siebel. It connects to web service repositories to discover and incorporate web services into Visual Composer models.



**Figure 5: SAP NetWeaver Visual Composer [Source: SAP]**

As we have discussed, SAP is structuring its product suites around an Enterprise Service Architecture (ESA). It is service-enabling all of its products[3] for use with Enterprise Services. While a web service may be defined as Cancel Order, an enterprise service also includes within it other required services, such as: Cancel Shipment, Cancel Invoice, Update Inventory and Update Account Balance.

The diagram in [Figure 6](#) shows the environment for web services and enterprise services, which are accessed through the SAP XI (Exchange Infrastructure). Woods

and Mattern state that:[\[4\]](#)

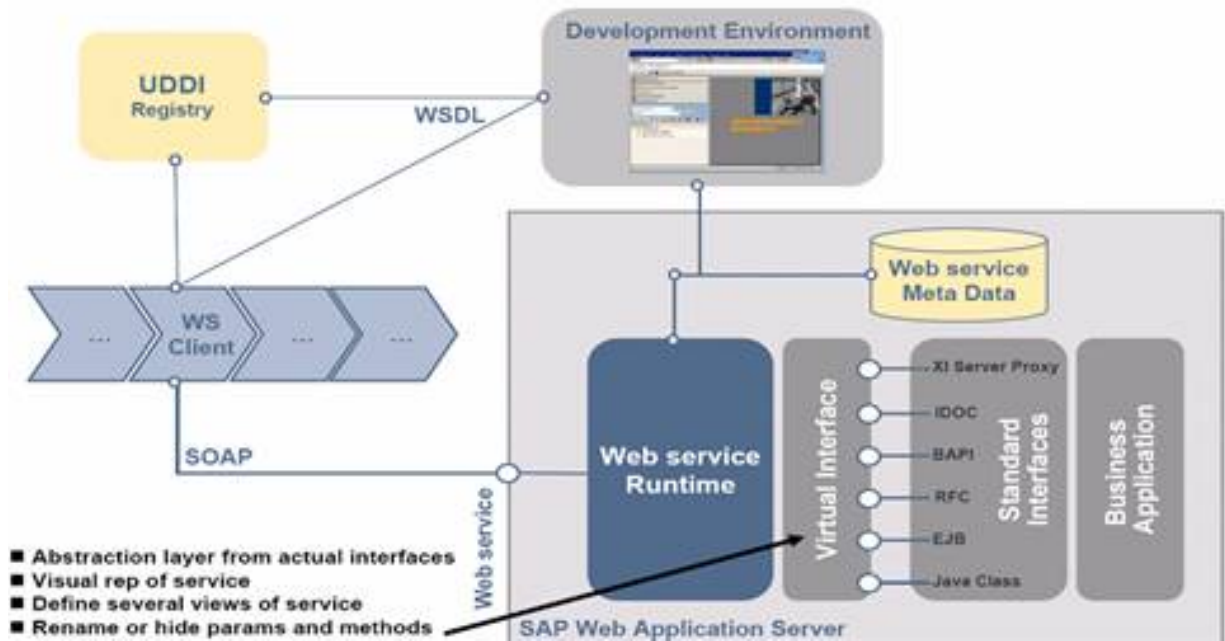
“The architectural challenges of ESA stem from the violation of the implicit assumptions referenced earlier: the ideas of the database as a point of integration and the application as a process boundary no longer apply.”

“The first challenge is flexibility. Once services are created and processes are automated, optimization and innovation depend on a company’s ability to not only implement processes, but also be able to change and improve them based on experience. This is a huge challenge, considering the average optimization cycle of today’s custom application projects, which may range anywhere from 9 to 18 months – a timeframe that is no longer acceptable. Companies need to implement a new IT system within weeks and months in order for it to have an impact. The tradeoff for flexibility has traditionally been cost – it’s easier to make changes to a system when development costs are no object. But that implies the system was never very flexible in the first place. Inherent flexibility implies a corresponding reduction in cost to make changes because flexibility has to be affordable in order to be meaningful.”

“The second challenge facing ESA is data consistency – how to unify and synchronize all of the information and process flow in an automated process where data is stored in lots of different databases and lots of applications are supplying services.”

“The third challenge is heterogeneity. The modern enterprise can’t assume that all of its software and systems will always come from a single vendor. A heterogeneous computing environment is a given in today’s world. In fact, it is inevitable. Even if management consciously set out to choose a single vendor, mergers and acquisitions would make it inevitable that systems from a different vendor will arrive from some acquisition down the road. And even if the company is an island, homegrown applications or specialized tools from a niche vendor will ultimately introduce complexity at some point.”

## ■ XI: Exchange Infrastructure



**Figure 6: SAP Web Services Overview [Source: SAP]**

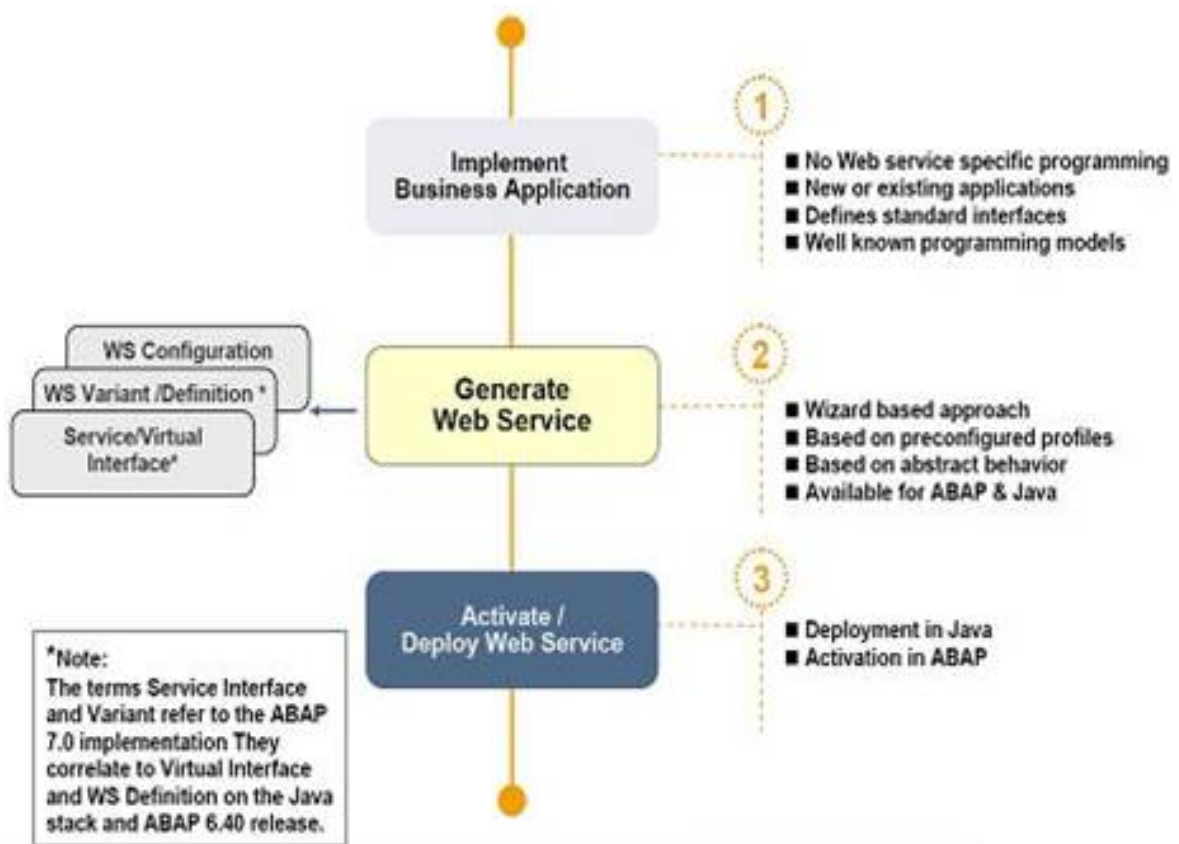
“The fourth challenge is the user interface (UI). Now that companies have the ability with ESA to combine and recombine enterprise services in any manner they wish, designing the most efficient and the most appropriate interfaces for the delivery of the right functionality to the right person becomes extremely important. As processes are developed, roles must be developed in tandem for the employees charged with collecting information, evaluating that information, and making a decision based on that analysis. ... Previous generations of enterprise applications had been built as reflections of the database’s internal structure rather than as reflections of the roles people play in the application’s process. In practice that meant that performing a simple real-world task required using 4, 5, 10 or even 15 UIs reflecting different aspects of the database structure instead of accessing a single screen specifically created so that person could perform the task. The UI challenge is one of bringing together and making affordable the creation of many role-based interfaces for the convenience of human users.”

“All of these challenges point to a tremendous impact and change in IT development. The need for inexpensive flexibility, along with the demand for customized interfaces throughout the organization, implies that development must become cheaper and faster in a hurry. That will require the demystification of IT. Development must become simple enough that not only will highly trained programmers and information architects but managers outside of IT will as well. SAP has envisioned the role of the business analyst, a manager versed in IT but lacking traditional development skills, though she has a much deeper understanding of the actual business processes being automated than the developers in IT do. While IT focuses on exposing services and maintaining the architecture, business analysts will receive the tools to create the necessary applications and interfaces to extend process automation even further.”

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## Web Services with SAP NetWeaver

The steps involved in generating web services from SAP are illustrated in Figure 7. Woods and Mattern say that: [5]



**Figure 7: Creating a Web Service from SAP [Source: SAP]**

“An enterprise service is a web service designed as a reusable component in process automation.”

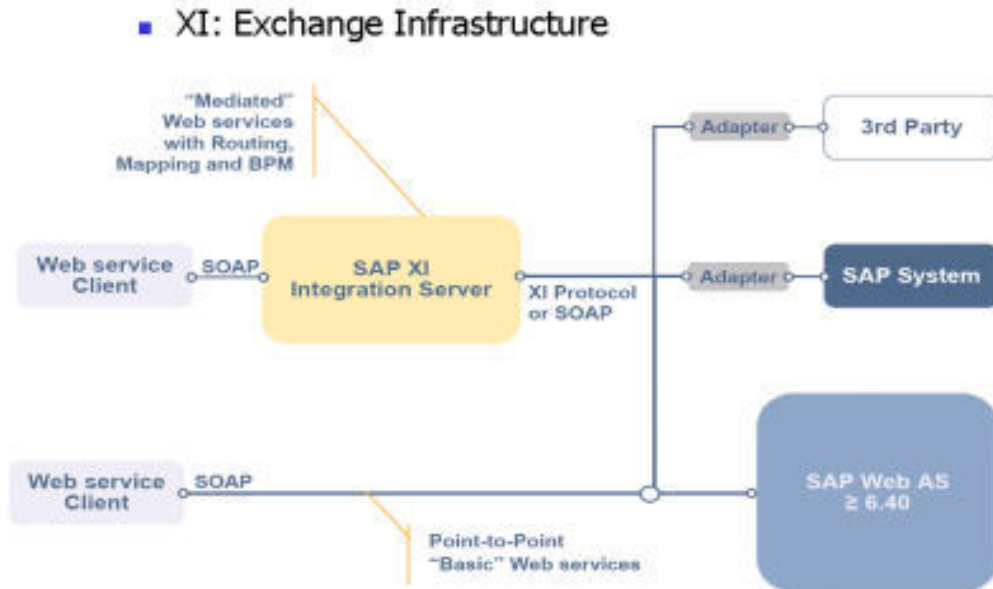
“It exists within the larger context of ESA, and it contains metadata about its functionality and about how it connects to other services. Web services contain much of the same functionality as enterprise services—usually at a more granular level than is useful for process orchestration—but the soul of an enterprise service is that it's there to help you, and it contains enough functionality to make a meaningful difference in processes. Enterprise services are large enough that combining and recombining them is a fairly easy task.”

“The question then becomes, does this act help the larger business process of canceling an order? The larger scope of that process includes many actions beyond deleting a record in the ERP system. There might also be a CRM system handling the sales aspect, an SCM system containing its own order objects, and so on. Therefore, the business process of canceling an order contains many

steps: revising the supply chain plan, flagging the material into stock, notifying the customer that his order has indeed been cancelled, and so on.”

“Whereas a web service simply deletes the record, an enterprise service is able to orchestrate the larger process of canceling an order by sending individual messages to each of its systems, and most likely many more.”

The SAP XI (Exchange Infrastructure) – see Figure 8 – supports “mediated” web services, with routing, mapping and Business Process Management.

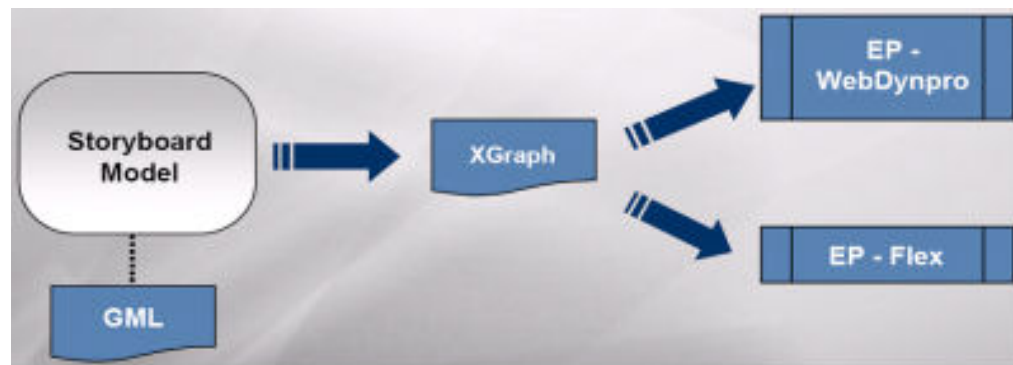


**Figure 8: Web Services with SAP XI [Source: SAP]**

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## NetWeaver Execution

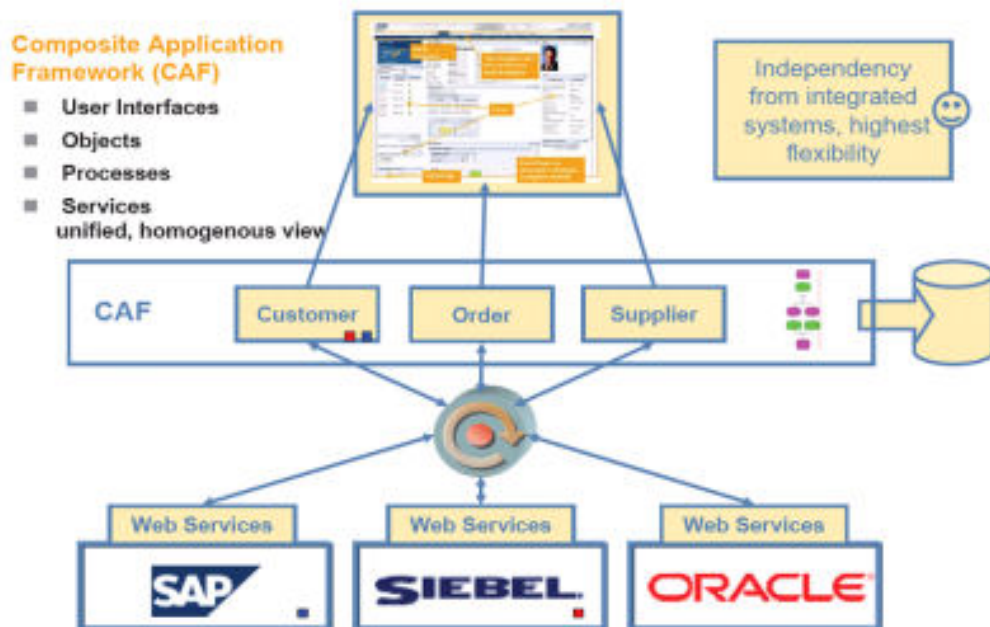
Rather than use BPMN for code generation (see [Figure 9](#) and [TEN#31](#)), it appears that SAP generates XML from Visual Composer using a GUI Modeling Language (GML), producing an Execution Graph (xGraph) which uses a library of Flex components from Adobe. From that XML and Flex library they then generate Java for execution and iViews for portal use: effectively the model is compiled into a Flex (Flash) movie.



- SAP generates XML from Visual Composer using a GUI Modeling Language (GML)
- This produces an Execution Graph (xGraph) which uses components from Adobe Flex Library
- From xGraph they generate Flex (Flash) and JSP iViews for portal execution.

**Figure 9: SAP NetWeaver Execution [Source: SAP]**

Figure 10 illustrates SAP's use of Composite Applications. Woods and Mattern go on to say that:[\[6\]](#)



**Figure 10: SAP NetWeaver Composite Applications [Source: SAP]**

“Composite applications are about reuse. Another shade of meaning enters when we think of the verb composing.”

“Composite applications are composed rather than developed. Composing means assembling all the required services and orchestrating them so that they work together to perform a new task. Composing frequently takes place through use of modeling rather than coding in traditional languages. Development of composite

applications is accelerated in another way. Modeling and the use of services mean that the logic connecting the services is not nearly as complex as traditional applications and is clearly separated into layers. This makes adapting a composite to meet new purposes much easier and faster. So, what are composite applications about? They are about reuse, speed of development, and flexibility.”

“Composite Applications are used to combine the parts of existing applications to initiate new business practices without having to start from scratch.”

“They are built and deployed on top of enterprise services. Operations are provided by components, combining these service operations with new application logic, user interfaces, and business process orchestration. Composite Applications are loosely coupled to the components on which they are based, resulting in a new logical application tier which can be deployed and upgraded independently of the component infrastructure.”

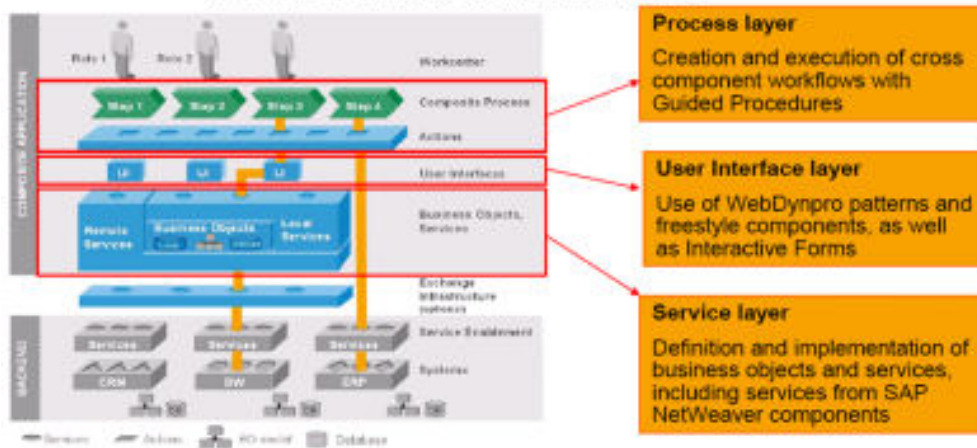
“xApps are packaged Composite Applications that are sold separately from MySAP Business Suite, AI, and Business One, with their own price tag and release schedule. They are stand-alone, packaged composite applications that deliver innovative, differentiated business processes.”

“The Composite Application Framework (CAF) provides an environment for modeling the processes to build applications, leveraging NetWeaver. It comes with predefined generic patterns for reuse in different development projects.”

Composite Applications in Figure 11 enable companies to define innovative business processes by leveraging existing IT investments. The SAP Composite Application Framework (CAF):

- Provides a methodology and toolset to efficiently develop and manage composite applications, following the SAP Enterprise Services Architecture blueprint
- Enables the modeling of Entity and Application Services. Entity Services encapsulate business objects including their local or remote persistency whereas Application Services compose and orchestrate services for implementing new business logic allows the modeling, managing and execution of new collaborative business processes.

- Processes are defined with business users, then assembled with Composite Application Framework (CAF)
  - A Methodology and toolset to develop and manage composite applications following SAP Enterprise Architecture blueprint



**Figure 11: Anatomy of a Composite Application [Source: SAP]**

- Actions decouple process steps from services and user interfaces to allow business experts to model processes on a non-technical level.

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## References

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- [1] "Enterprise SOA: Designing IT for Business Innovation", Dan Woods and Thomas Mattern, O'Reilly, Sebastopol: CA, April 2006 (p93).
  - [2] "Enterprise SOA: Designing IT for Business Innovation", Dan Woods and Thomas Mattern, O'Reilly, Sebastopol: CA, April 2006 (p93).
  - [3] SAP is service enabling SAP ERP 2004, SAP ERP 2005 and MySAP Business Suite.
  - [4] "Enterprise SOA: Designing IT for Business Innovation", Dan Woods and Thomas Mattern, O'Reilly, Sebastopol: CA, April 2006 (pp95-97).
  - [5] "Enterprise SOA: Designing IT for Business Innovation", Dan Woods and Thomas Mattern, O'Reilly, Sebastopol: CA, April 2006.
  - [6] "Enterprise SOA: Designing IT for Business Innovation", Dan Woods and Thomas Mattern, O'Reilly, Sebastopol: CA, April 2006 (p103).

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## AUTHOR

Clive Finkelstein is the "Father" of Information Engineering (IE), developed by him from 1976. He is an International Consultant and Instructor, and Managing Director of Information Engineering Services Pty Ltd (IES) in Australia.

Clive Finkelstein's books, online interviews, courses and details are available at <http://www.ies.aust.com/cbfindex.htm>.

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