

Web services

Service oriented architecture (SOA)

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Last content

- ✦ XML
- ✦ Web services ASP.NET
- ✦ AJAX

SOA

- + Why SOA ?
- + SOA Definition
- + Why not SOA ?
- + SOA characteristics

Why SOA ?

- + An interesting 'story' from reference [4]: [WhySOA.pdf](#)
 - + The Management and IT *try to*:
 - Turn existing software assets into reusable services that can be used no matter how the business change
 - Implement new business ideas using existing IT programs, now are provided as services
 - Further extend these services for future business development
- Better Living through **Reuse**

Why SOA ?

Consider a smaller example of purchase order process:

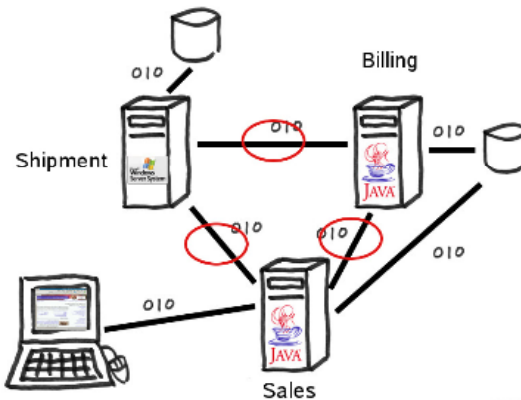
- + The customer submits a purchase order (via the Internet):
 - Sales department check with credit card department if credit is okay
 - Sales department check with inventory department if the goods are on stock
 - Sales department informs the billing department to bill the customer
 - Sales department informs the shipment department to send out the goods
 - Shipment department sends the goods to customer
 - Shipment department informs the billing department to send the invoice
 - Billing department sends the invoice to the customer

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Why SOA ?

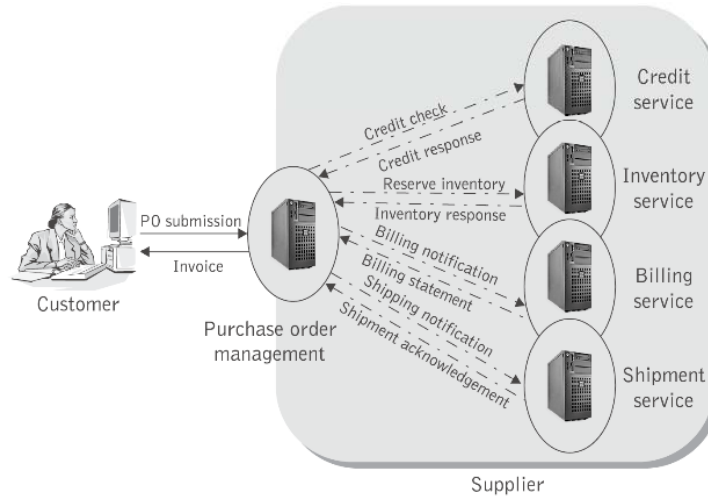
- + This purchase order is a *business process* involving different IT systems with different components and technologies.
- + *Automation* of this business process requires these IT systems of the departments to **interact**.



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Why SOA ?

→ Each department provide *services* for the others to use

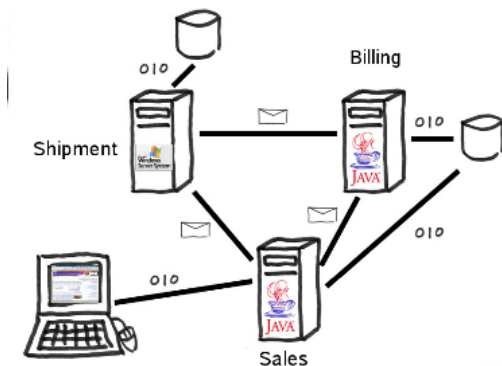


→ This automatic system has service oriented architecture (SOA)

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Why SOA ?

✦ Web services provide an implementation for the solution



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Why SOA ?

- ✦ Need more case studies of SOA

SOA - Definition

- ✦ SOA is an architecture for building business applications as a set of loosely coupled black-box components composed to deliver a well-defined level of service by linking together business processes.
- ✦ At its most basic, SOA is a collection of services:
 - communicate with each other in the context of a business process.
 - involve either simple data passing or different services coordinating some activity.

SOA - Service

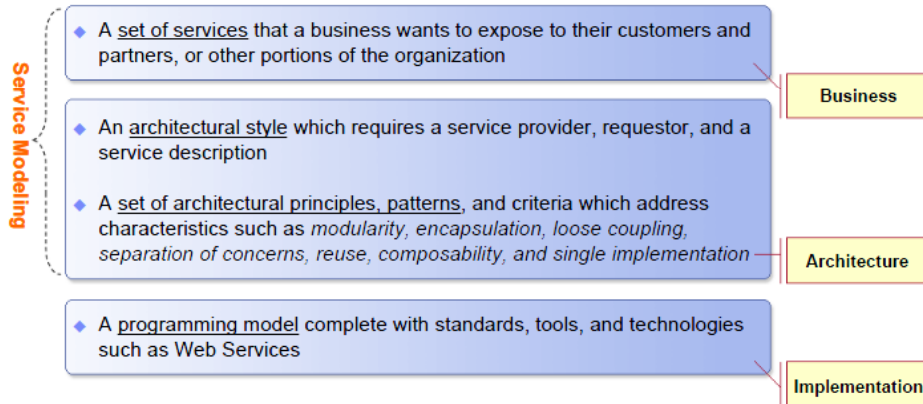
- ✦ Service: the performance of work (a function) by one for another.
 - E.g. restaurant services: customers, waiters / waitresses kitchen, cleaning, supply-ordering ...

- ✦ Business service: the logical encapsulation of business function.
 - E.g. order-taking service, meal-preparation service...




SOA - Service

- ✦ Service in SOA:
 - From a business perspective, services are IT assets that correspond to real-world business activities or recognizable business functions and that can be accessed according to the service interface that have been established.
 - From a technical perspective, services are reusable IT assets that have well-defined interfaces (a.k.a. service contracts) that clearly separate the services' externally accessible interface from the services' technical implementation.

SOA - Definition

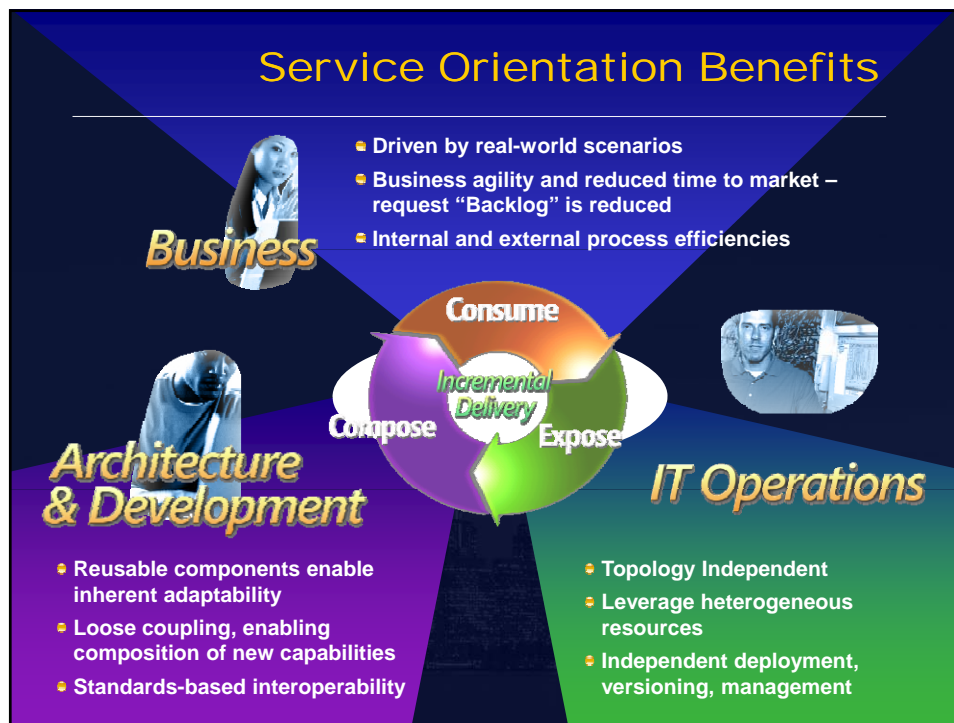


Programming Paradigm

Programming Paradigm	Real World Analogy
<p>Object Orientation: Aligned with fine-grained business objects Reuse of source code based on the notion of types Increased maintainability and modifiability of the program code through encapsulation</p>	<p>Wire together to build a small device</p> 
<p>Component Orientation: Aligned with mid-grained business functions Reuse based on prefabricated, executable code Increased maintainability and modifiability of the application through composition</p>	<p>Put together to build a complex device</p> 
<p>Service Orientation: Aligned with coarse-grained business processes Flexibility and extensibility through composition, federation, and orchestration of services Increased interoperability and scalability through loose-coupling</p>	<p>It is there and running, simply connect and use.</p> 

SOA benefits

- ✦ Business Agility
- ✦ Cost Savings
- ✦ Maximizing IT Investments
- ✦ Aligning IT to Business Processes



Why not SOA ?

- ✦ For a stable or homogeneous enterprise IT environment, SOA may not be important or cost effective to implement.
- ✦ If an organization is not offering software functionality as services to external parties or not using external services, which require flexibility and standard-based accessibility, SOA may not be useful.
- ✦ SOA is not desirable in case of real time requirements because SOA relies on loosely coupled asynchronous communication.

SOA & web services

- ✦ Different from web services ?

SOA & web services

- ✦ Web services are a breed of Web application. They are self-contained, self-describing, modular applications that can be published, located, and invoked across the Web. Web services perform functions, which can be anything from simple requests to complicated business processes. ... Once a Web service is deployed, other applications (and other Web services) can discover and invoke the deployed service.

SOA & web services

- ✦ Web service:
 - Use of standards: HTTP, XML, SOAP, WSDL, . . .
 - Providing functions (services) to other computer programs (**not** to Web browsers).
 - Exchange of messages:
 - One way
 - Two way: request / response

SOA & web services

+ Different from web services:

- SOA is an architecture. It is more than any particular set of technologies, such as Web services.
- Web services are one possible way to implement SOA. Additional, it is the most common way because web services are established as the standard technology; so, they provide high interoperability.

Next week

- + (Some) Design for SOA
- + WCF – the latest Microsoft's solution to implement SOA designs

References

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7. David Sprott, Lawrence Wilkes; Understanding Service-Oriented Architecture, 2004, MSDN