

# Enterprise Integration

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## Enterprise Application Integration (EAI)

- EAI is the practice of linking many legacy systems, commercial-of-the-shelf (COTS) systems and current systems to consolidate the operations in an enterprise.
- Simple solution is the store-forward of data between systems.
- Where data are exchanged between many sources and many destinations a message broker facility is used to direct the flow.

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## EAI (contd.)

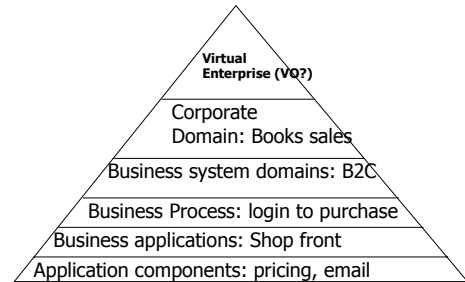
- EAI provides for exchange of information as events occur rather than periodic transfer of files.
- It streamlines business processes.
- It provides the flexibility of routing of messages to meet new requirements for information, including operations monitoring and the initiation of corrective action on a timely basis.

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## Enterprise System Pyramid



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## Goals

- Adaptable systems and processes
- Streamlined processes
- Management information
- Support for electronic commerce
- Integrated security
- Replaceable components
- Reliable and recoverable systems
- Scalability

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## General Characteristics

- Distributed computing
- Component-based applications
- Event-driven systems
- Loose coupling of business functions
- Decision support systems
- Workflow management
- Internet access and personalization of interfaces

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## Distributed systems

- Scalability: it should be possible to accommodate increased number of user, increased number of transactions, or expand the scope of functionality.
- It should be possible to add servers, and sites without any major changes to the basic design of the architecture or applications.
- It should accommodate diverse computing platforms with proper use of interoperability standards and middleware.

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## Event-driven process

- Businesses are driven by events: an order is placed, a shipment is received, a machine fails, a person is hired.
- Processes must be streamlined.
- When a problem requiring management attention occurs in production, appropriate manager should be notified immediately. This requires a change in the design of systems and the way they interoperate. (Project 1)
- Event Notification/ Event Handlers

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## Loose coupling

- Traditional: large, monolithic solutions.
- Desired: highly coherent focused solutions linked through the transfer of transactions in an asynchronous mode of communication.
- Messages queues are used for comm.
- Loose coupling allows for independently developed applications to interact without concern about time, internal information format, and technology.

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## Infrastructure

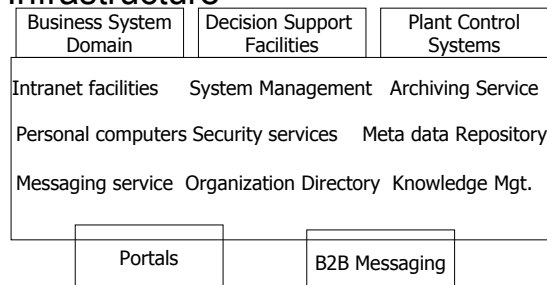
- Integration of the enterprise relies on an enterprise-wide infrastructure to support communications and shared services.
- An enterprise infrastructure provides the backbone management and communications that link the business systems.
- Collection of services and facilities that link business systems, management information systems, and portals for customers, employees and other partners.

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## Enterprise Integration Infrastructure



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## Messaging Services

- Sometimes called Message Oriented Middleware (MOM) provide communication between Business System Domains (BSD) and their applications in a "store-and-forward", asynchronous mode of communication.
- An sender application posts a message to a queue for later delivery.
- The receiver application removes the message from the queue to process the message.
- Queue guarantees once-only-once delivery.
- Message is ready for delivery only after a transaction associated with it has committed.

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## Messaging (contd.)

- To provide flexibility and to reduce the number of connections between applications a message broker service is used.
- An additional capability called publish-and-subscribe service allows applications to publish the occurrence of an event that other applications have subscribed for.
- Messages can be filtered to have a certain characteristics before getting forwarded.
- Message transformation is another service associated with asynchronous messaging.

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## Messaging and XML

- Currently XML is the preferred format for messages.
- Transformations can be specified using style sheets (XSLT).
- Store and forward also helps realize loose coupling requirement of enterprise systems.

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## Portals

- Portals are windows on the enterprise using the internet.
- Enterprise portal: public interface of the enterprise to the outside world.
- Employee portal: services and references of interest to employees: benefits portal
- Retail Portal: for conducting business with general public.
- Customer service portal: for customer relation management.

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## Project1: Phase 2

- Integration of VOs
- IRS Portal
- (messaging (with or without Message Driven Bean) can be used to realize loose coupling)
- (Web Services can be used to realize XML-based messaging)
- Simple JSP-based application the federates information from various VOs.
- Suggestion: You may use session bean as a Façade for your entity beans.

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## Project 1: Phase 2 (contd.)

- Step1: Get missing VOs (ears) from other groups and deploy on your server to test your application.
- Step 2: Let your VOs be in a server1 and other VOs be another server, say, server2.
- Step 3: Let all groups deploy their VOs and services. Your application will work inter host working among truly distributed servers.
- Step 4: (optional) you may decide to choose the service based "quality of service" offered by a VO's service!

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## Summary

- We studied the server side support offered by J2EE model for enterprise computing.
- Next we will start looking into how Grid technology addresses many of the challenges posed by enterprise integration.

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