

Information System

ITEC-522

First Semester Third Year

Information Technology

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Week #9



Information Systems Integration

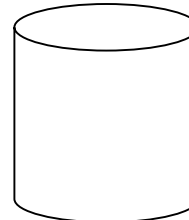
- The need for integration is not new but, it existed since applications moved from central processors to distributed systems and networks.
- This need has emerged as disparate Information Systems (IS) that automate business processes have run on different computer platforms and have been based on a diversity of standards, operating systems and computer languages.

The Integration Problem

Sold to party: C100

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|----|------|----|
| 10 | 6301 | 10 |
| 20 | 6412 | 10 |
| 30 | 1507 | 25 |

Sales



Database

Change Unit Cost Estimate List Screen - 1

Conting Edit Goto Functions Settings System Help

Base planning object **DEM_E** DEM

| Item | C | Resource | Plant/Activity | Quantity | Unit | Indi | Value - total |
|------|---------|----------|----------------|----------|------|----------|---------------|
| 1 | MINT_01 | 0001 | 10 | KG | | 1.000,00 | |
| 2 | MINT_02 | 0001 | 20 | KG | | 3.000,00 | |
| 3 | S | | | | | 4.000,00 | |
| 4 | MS0015 | | 5 | H | | 400,00 | |

Item

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Research and Development

Change Unit Cost Estimate: List Screen - 1

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Base planning object DEMO_E DEM

| Item | C | Resource | Plant/Activity | Quantity | Unit | Indi | Value - total |
|------|---------|----------|----------------|----------|------|----------|---------------|
| 1 | MINT_01 | 0001 | 10 | KG | | 1.000,00 | |
| 2 | MINT_02 | 0001 | 20 | KG | | 3.000,00 | |
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| 4 | MS0015 | | 5 | H | | 400,00 | |

Item

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Financials

Change Unit Cost Estimate: List Screen - 1

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Base planning object DEMO_E DEM

| Item | C | Resource | Plant/Activity | Quantity | Unit | Indi | Value - total |
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| 1 | MINT_01 | 0001 | 10 | KG | | 1.000,00 | |
| 2 | MINT_02 | 0001 | 20 | KG | | 3.000,00 | |
| 3 | S | | | | | 4.000,00 | |
| 4 | MS0015 | | 5 | H | | 400,00 | |

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Marketing

Change Unit Cost Estimate List Screen - 1

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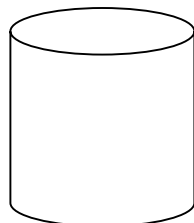
Base planning object DEMO_E DEM

| Item | C | Resource | Plant/Activity | Quantity | Unit | Indi | Value - total |
|------|---------|----------|----------------|----------|------|----------|---------------|
| 1 | MINT_01 | 0001 | 10 | KG | | 1.000,00 | |
| 2 | MINT_02 | 0001 | 20 | KG | | 3.000,00 | |
| 3 | S | | | | | 4.000,00 | |
| 4 | MS0015 | | 5 | H | | 400,00 | |

Item

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Production and Manufacturing



Database

Change Unit Cost Estimate: List Screen - 1

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Base planning object DEMO_E DEM

| Item | C | Resource | Plant/Activity | Quantity | Unit | Indi | Value - total |
|------|---------|----------|----------------|----------|------|----------|---------------|
| 1 | MINT_01 | 0001 | 10 | KG | | 1.000,00 | |
| 2 | MINT_02 | 0001 | 20 | KG | | 3.000,00 | |
| 3 | S | | | | | 4.000,00 | |
| 4 | MS0015 | | 5 | H | | 400,00 | |

Item

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Human Resource

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Operations and Logistics



Problems

- Integration is a serious problem
- Each application has its own meaning of enterprise objects
- Redundancy of data
- High operational costs
- Functional problems

Cont:

- Initially, enterprises attempted to address integration by interconnecting their disparate applications but the number of interconnections required increased rapidly, as in many cases each application had to be interconnected with all the others.
- Themistocleous *et al.* (2001) estimate that for x applications a total of:

$$x*(x-1)/2$$



Cont:

- To achieve interconnectivity among systems, programmers map data from source's application format to target's since applications require compatible data to store and manipulate them.
- In support of this, programmers invade and alter the code of systems in order to map data and automate these interconnections.



Cont:

- Therefore, the maintenance of these interconnected IT solutions becomes a serious issue for concern, as changes in one system often required the altering of all interconnected applications.
- As a result, interconnection has proved a complex, cost consuming, non-flexible and non-manageable solution.

Enterprise Resource Planning Systems






ERP Systems

- During the 1990s, Enterprise Resource Planning (ERP) technology emerged as an approach to integration problem.
- ERP systems do not integrate disparate applications but, replace the need to integrate.
- ERP systems are integrated software packages that automate core corporate activities such as finance, human resources, manufacturing and supply and distribution.





ERP Problems

- Implementation is time consuming
- Cost consuming , Not flexible
- Problems with existing applications
- Integration can not be achieved even if a company buys all its software from one ERP vendor.
- ERP packages can not automate more than 30% of company's applications. (Seeley, 1999).
- ERP systems amplify the need for integration

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- ERP systems as monolithic solutions that are not designed to co-operate with other applications. As a result, enterprise integration can be achieved when organisations abandon existing applications and develop a complete ERP solution.



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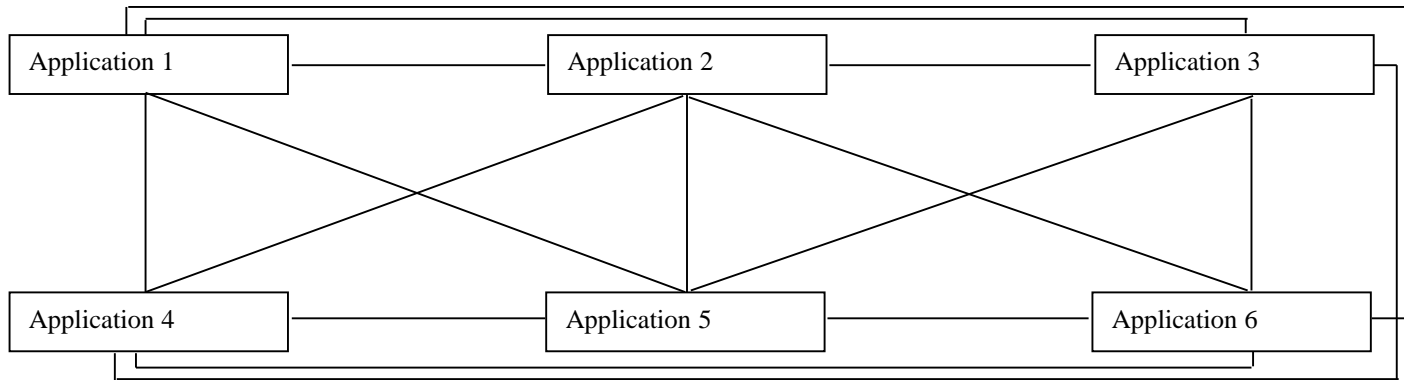
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- Themistocleous *et al.* (2001) indicate that companies often do not adopt *all* ERP modules but a subset of them.
 - The reasons are many including: (a) enterprises use existing systems alongside ERPs; (b) ERP modules cost considerable amounts of money and, (c) there is a lack of time or justification to replace existing systems with new ERP modules

Classifications of System Types that are Integrated

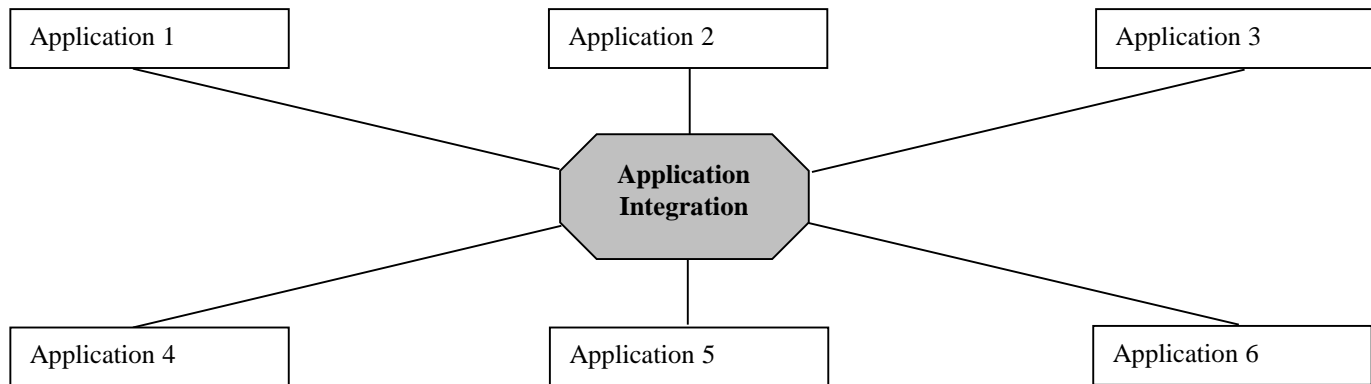
| Classifications of System Types | Description |
|--|--|
| Custom to Custom Integration | Custom applications like legacy applications and data warehouses are frequently integrated in a common infrastructure, to fully automate business processes. A typical scenario of this classification could be the incorporation of legacy systems that deal with promotions management (e.g. stocks, suppliers accounts). |
| Custom to Packaged Integration | This is a common approach when organisations adopt EAI since packaged applications like Enterprise Resource Planning (ERP) systems have in many cases failed to achieve integration and co-exist alongside custom applications. A typical scenario of this type could be the integration of a legacy system that deals with production and an ERP module that handles customer orders or suppliers' details/accounts. |
| Custom to ebusiness Integration | Many ebusiness solutions require a close collaboration with legacy applications to support ebusiness enabled processes and tasks. As a result, custom applications (e.g. stocks) are incorporated with ebusiness systems to integrate and automate inter-organisational business processes. In many cases the functionality of an ebusiness solution is used to support custom systems. For instance, an e-store updates a custom system that deals with stock availability. The information provided by the ebusiness solution is critical not only for the functionality of stock application but, also for the whole supply chain as it supports the automation and integration of specific business processes. |
| Packaged to Packaged Integration | In this case, disparate packaged systems such as different versions of an ERP system or many ERP modules that exist in one organisation are unified into a common integrated infrastructure. For instance, after a merger or acquisition there is a need to integrate the various ERP systems that exist both in mother company and its subsidiaries. |
| Packaged to ebusiness Integration | Organisations take advantage of EAI and Electronic Commerce technology when they integrate their ebusiness solutions with packaged applications as ERP systems can be used as back-office system to support the ebusiness functionality (front end application). In this case, processes that usually deal with e-sales, e-procurement and e-supply chain management can be integrated with packaged systems. |
| Ebusiness to ebusiness Integration | In this approach, an ebusiness application is integrated and supports the functionality of another ebusiness solution. For example an electronic point of sales is incorporated with e-supply chain management to share data that are important for the latter application (e.g. customer orders, customer details etc). |
| Custom to Packaged to ebusiness Integration | Such approaches focuses on the development of an integrated infrastructure that integrates processes and applications on departmental, enterprise or cross-enterprise level. For instance, an estore is integrated with the financial module of an ERP system and a legacy system that deals with stocks availability. |

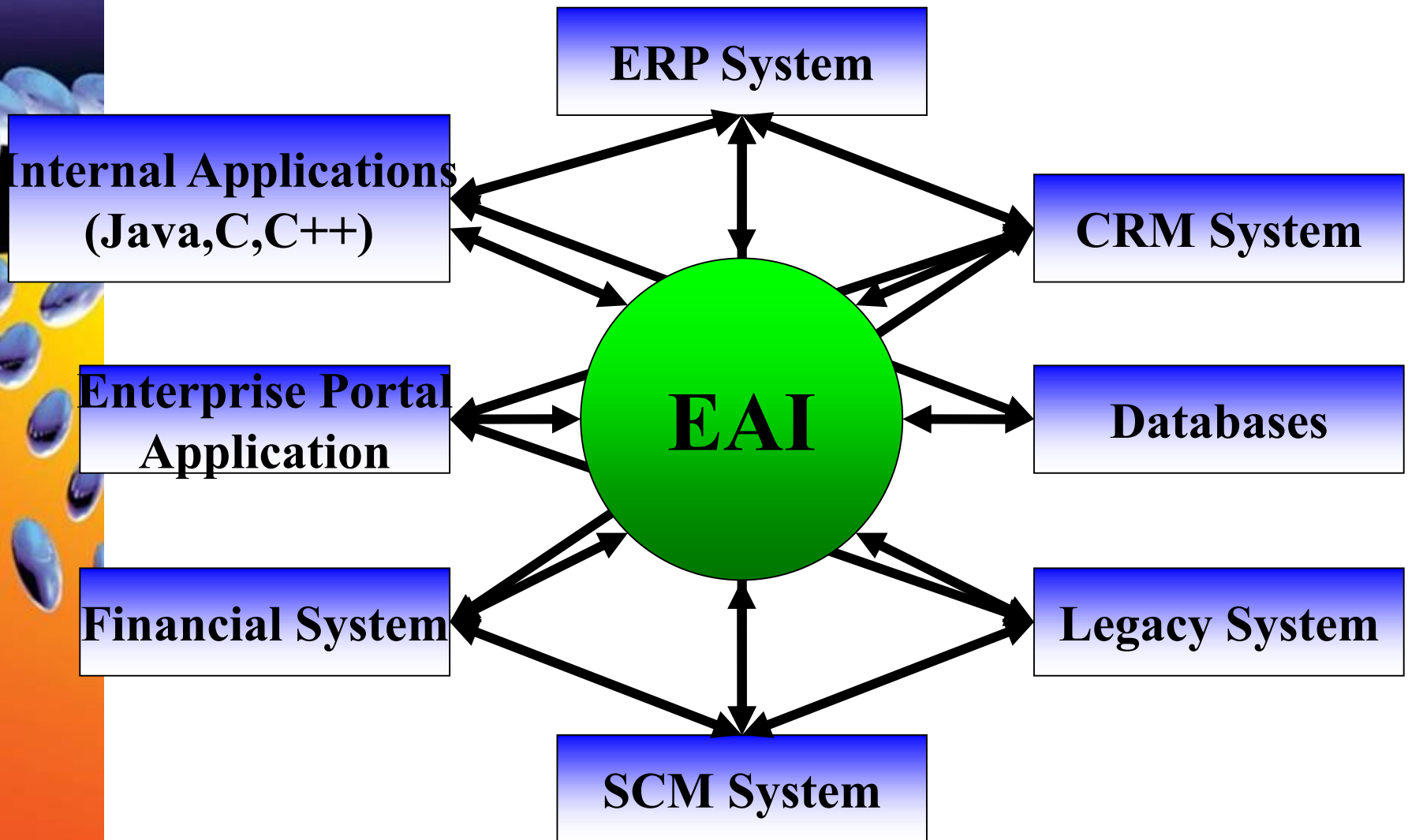
Application Spaghetti Vs Enterprise Application Integration


Traditional Integration Approaches - Application Spaghetti





Enterprise Application Integration





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- Supply Chain Management (SCM) needs to be integrated with intra and inter-organisational systems, as it shares critical information between the partners of a supply chain (e.g. suppliers, distributors, retailers etc.).

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- According to Morgenthal and La Forge e-commerce applications have to be incorporated with back-office systems to automate and integrate business processes and support real-time transactions.

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- The reason for this is that e-commerce applications are not integrated solutions. As a result, there is a need to piece together ecommerce solutions with existing IT infrastructures to allow them to function in an integrated way thus, allowing enterprises gain e-commerce advantages.



Enterprise Application Integration (EAI)

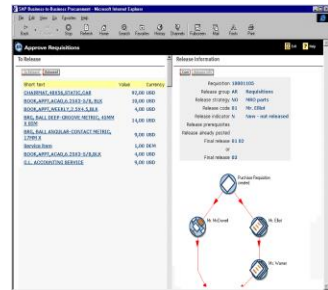
- EAI is a new generation of integration software that incorporates functionality from disparate systems and leads to flexible and maintainable solutions.
- It addresses more effectively the need to integrate both intra and inter-organisational systems by incorporating functionality from disparate applications and thus, maximise their benefits from the use of e-commerce and e-business applications.



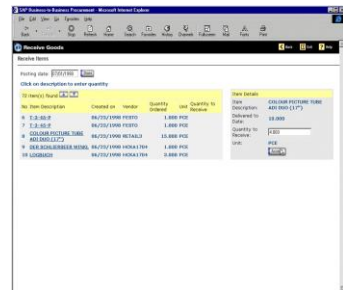
Enterprise Application Integration (EAI)



ERP



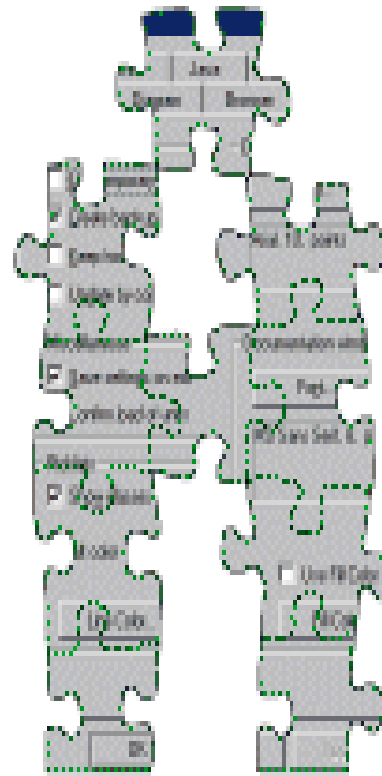
eSCM



eStore



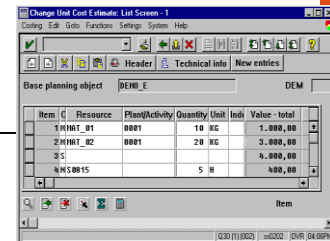
Enterprise



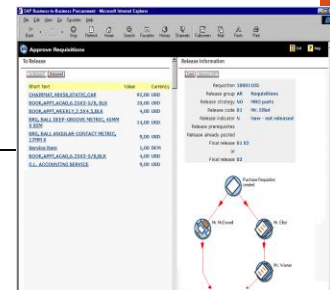
Application



Integration



Custom Application



eCRM

Sold to party: C100

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Legacy System



Integration Technologies

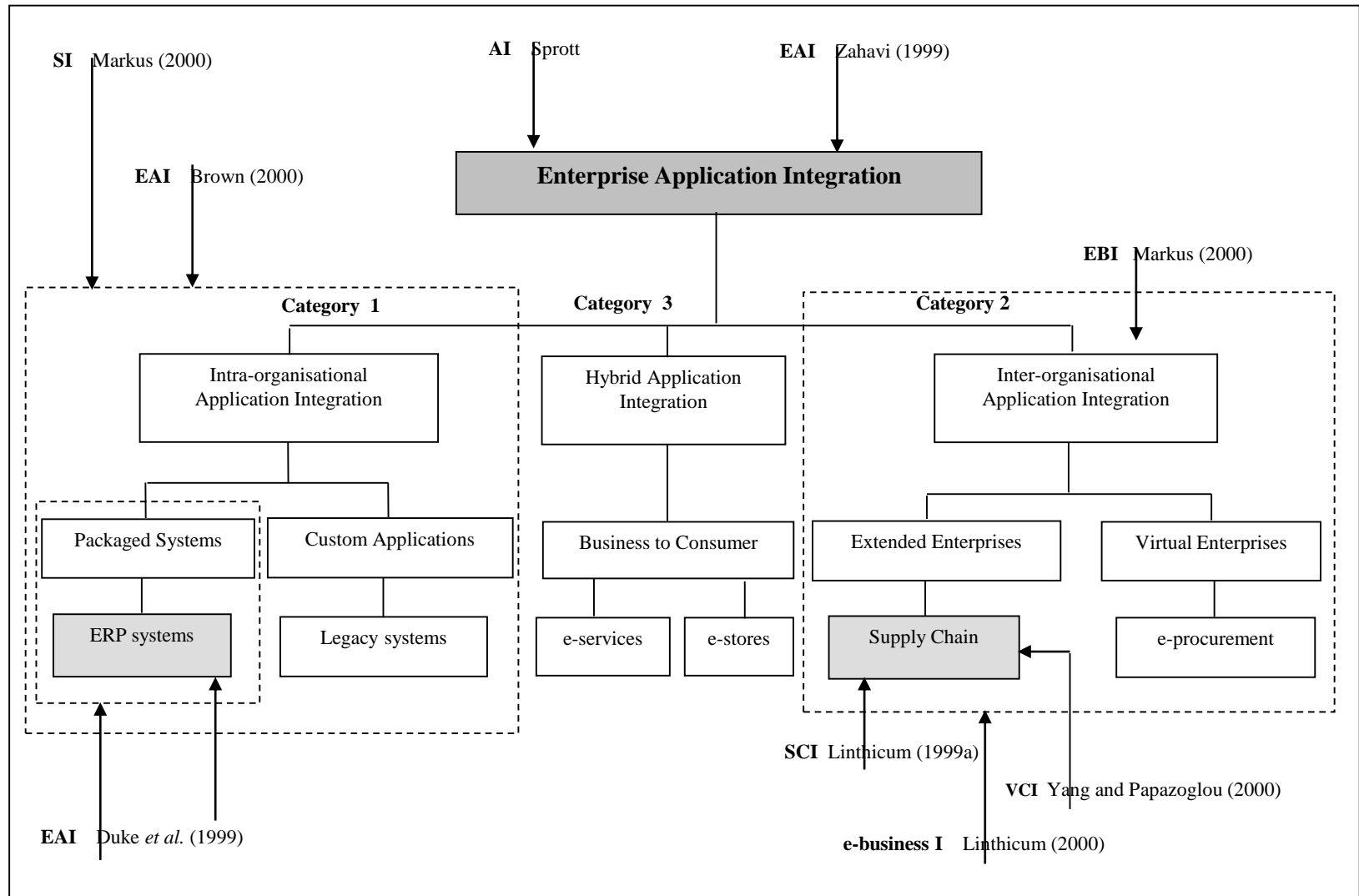
- Database Oriented Middleware
- Message Based Technologies
- Transaction Based Technologies
- Distributed Object Technologies
- Interface Based Technologies



Cont:

- EAI results in supporting data, objects and processes incorporation as well as custom applications, packaged systems and e-business solutions integration.

A Novel Taxonomy for Classifying Types of EAI





| Application Elements | Integration Layers |
|---|--|
| <ul style="list-style-type: none">•Data•Objects•Processes | <ul style="list-style-type: none">•Transportation Layer•Transformation Layer•Process Automation Layer |
| Classification of System Types | Integration Requirements |
| <ul style="list-style-type: none">•Custom-to-Custom•Custom-to-Packaged•Custom-to-ebusiness•Packaged-to-packaged•Packaged-to-ebusiness•Custom-to-Packaged-ebusiness | <ul style="list-style-type: none">•Maintainability•Flexibility•Scalability•Portability•Reusability•Maturity•Complexity•Non-invasive•Performance•Real-Time•Mainframe compatible•Non-Mainframe compatible |



Discussion

Questions?