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An architecture for efficient, flexible enterprise system integration

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University of Auckland

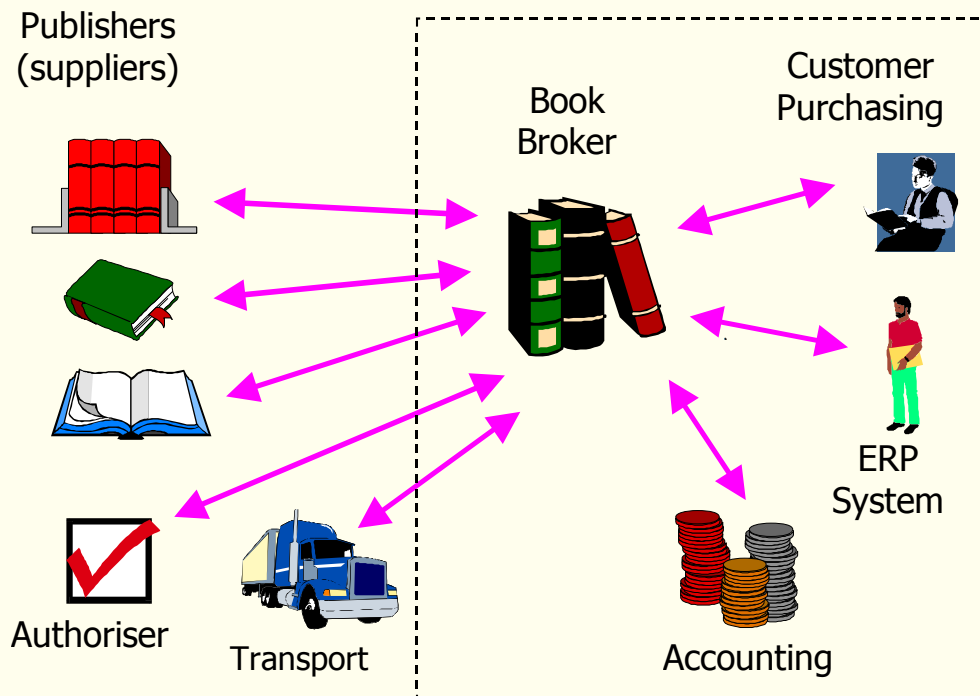
John Blackham, XSol Ltd



Outline

- ❖ Motivation
- ❖ Related Work
- ❖ Our Approach
- ❖ Architecture & Implementation
- ❖ Example
- ❖ Future work

Motivation – An Example

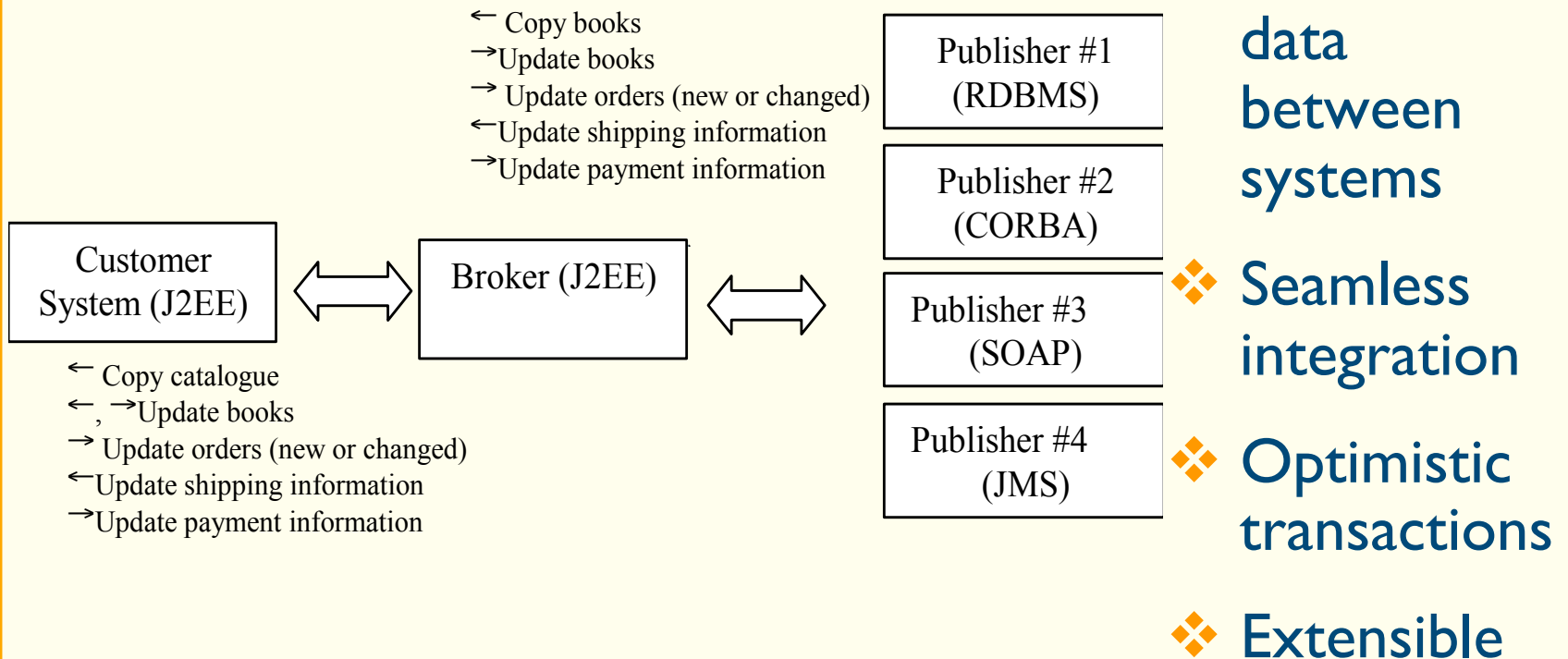


- ❖ Book orders brokering
- ❖ Range of systems to integrate
- ❖ Want to do in seamless, open way
- ❖ See BRE project

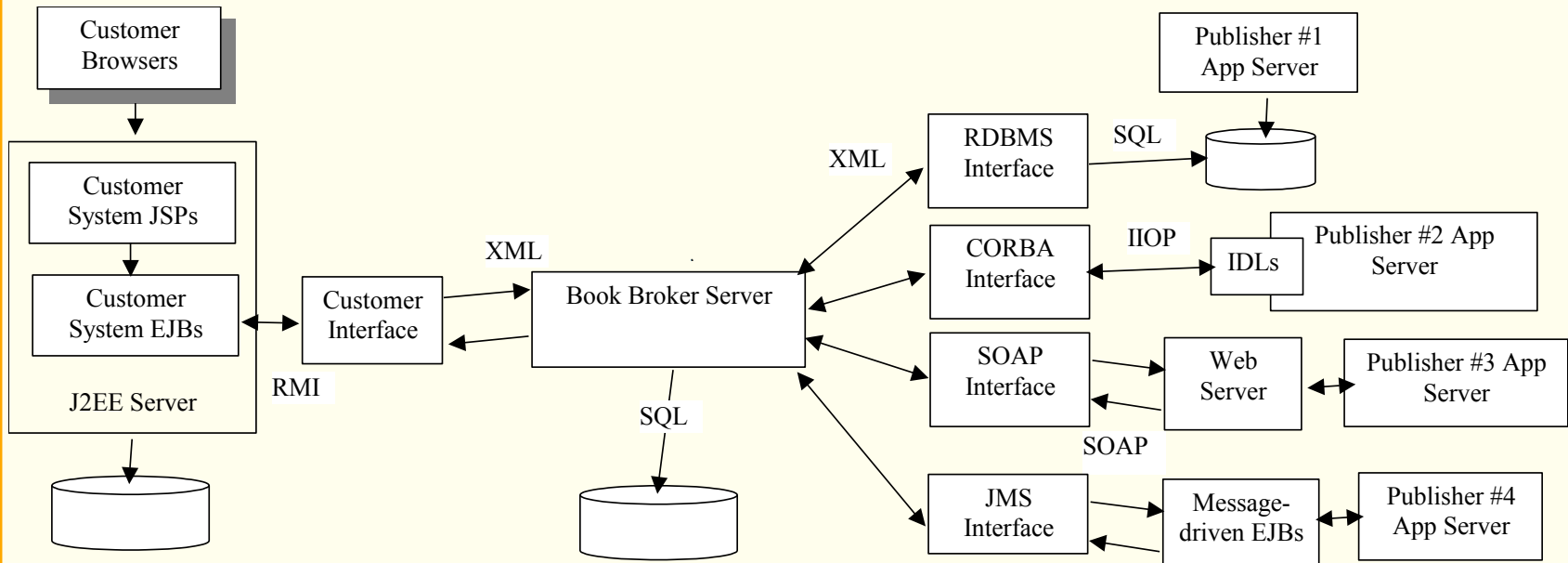
Related Work

- ❖ Bespoke solutions e.g. CONNET – BRE book broker
- ❖ CORBA, SOAP, XSLT, Portal infrastructures
- ❖ Virtual databases e.g. OpenLink Virtuoso™
- ❖ Message integration systems e.g. MQ Integrator™
- ❖ B2B integration e.g. BizTalk™, Vitria™, eXcelon™
- ❖ Business Process Management (BPM) systems

Our Approach



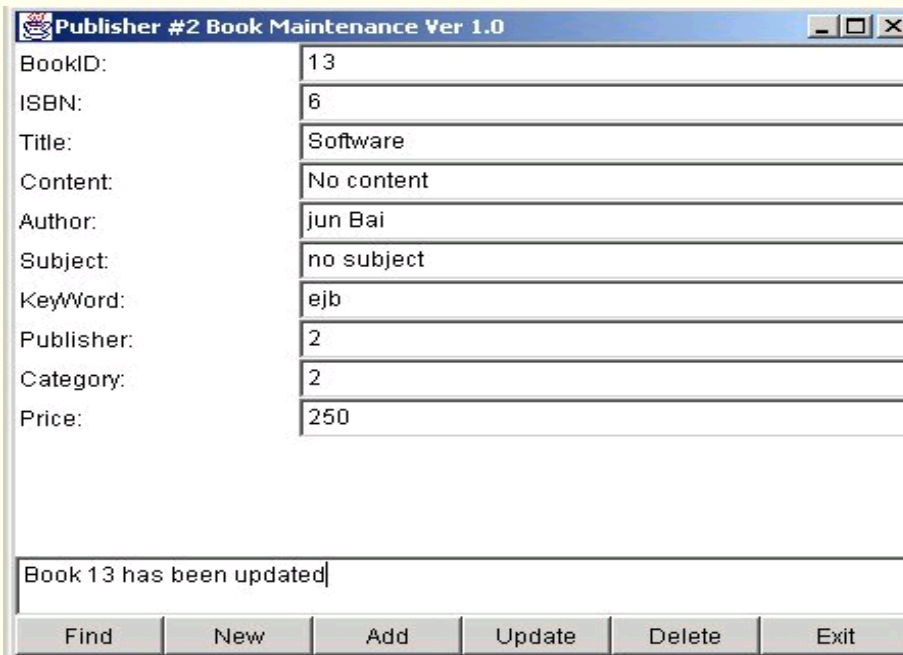
Our Architecture



Implementation

- ❖ Integration engine, integration connectors (“agents”)
- ❖ XML datasets to/from external systems
- ❖ Data caching for reliability, asynchronous support
- ❖ Technologies:
 - JDBC, XML, XSLT for broker
 - J2EE, EJBs, J2EE Connector architecture for broker/customer system
 - CORBA, RMI, SOAP, Java Messaging System remote system IFs
 - JSPs, Swing for UIs

Examples in Use...



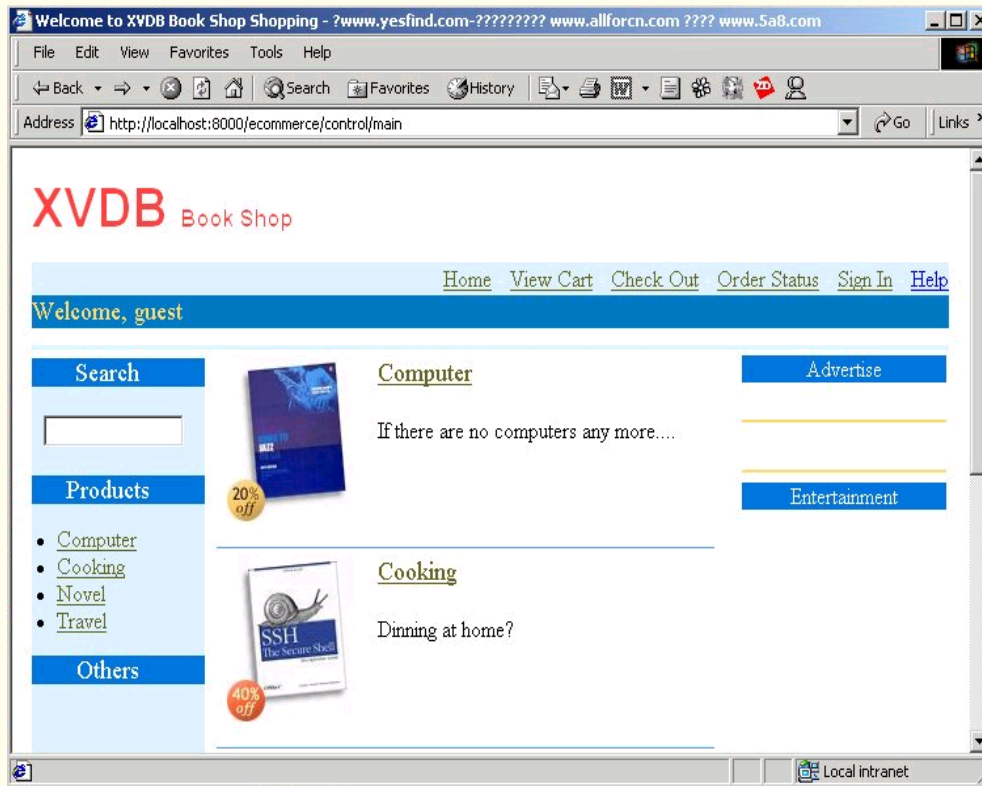
BookID:	13
ISBN:	6
Title:	Software
Content:	No content
Author:	jun Bai
Subject:	no subject
KeyWord:	.ejb
Publisher:	2
Category:	2
Price:	250

Book 13 has been updated

Find New Add Update Delete Exit

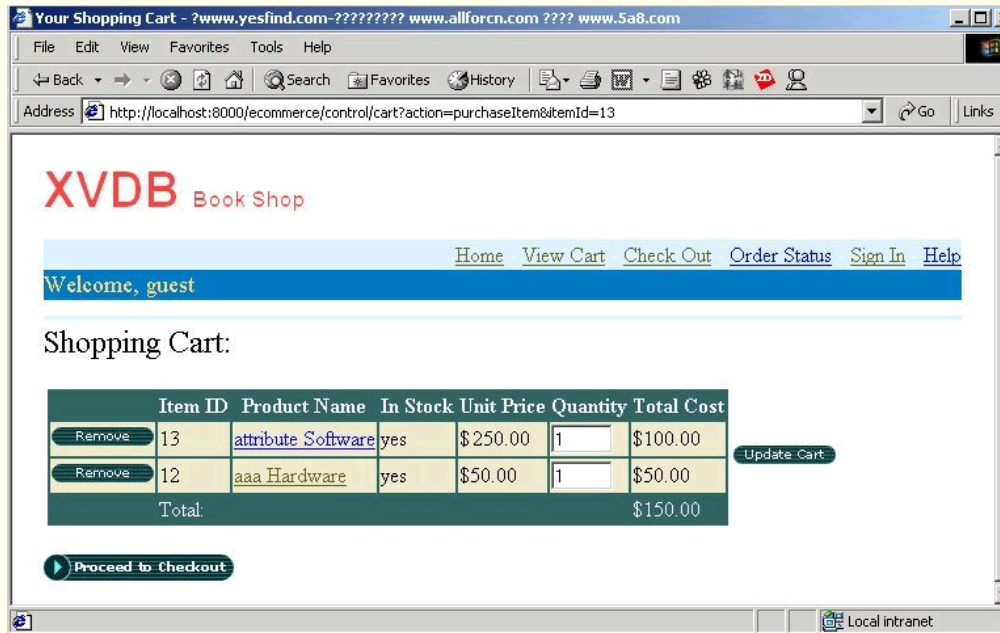
1. Copy book data (+ refreshed...)
2. Customer order
3. Publisher order
4. Order shipping (may change order...)
5. Payment

Examples in Use...



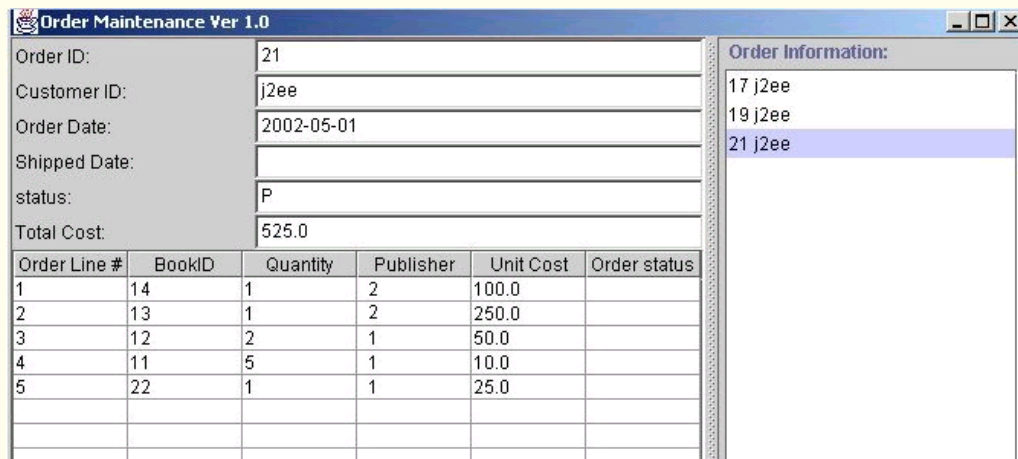
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Examples in Use...



1. Copy book data (+ refreshed...)
2. Customer order
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Examples in Use...



Order Maintenance Ver 1.0

Order ID: 21
Customer ID: j2ee
Order Date: 2002-05-01
Shipped Date:
status: P
Total Cost: 525.0

Order Information:
17 j2ee
19 j2ee
21 j2ee

Order Line #	BookID	Quantity	Publisher	Unit Cost	Order status
1	14	1	2	100.0	
2	13	1	2	250.0	
3	12	2	1	50.0	
4	11	5	1	10.0	
5	22	1	1	25.0	

1. Copy book data (+ refreshed...)
2. Customer order
3. Publisher order
4. Order shipping (may change order...)
5. Payment

Exception Handling

Order Status - ?www.yesfind.com-????????? www.allforcn.???? www.5a8.com

Address http://localhost:8000/ecommerce/control/orderstatusdetail

XVDB Book Shop

Welcome, Jun, Bai

Order ID	Order Date	Order Status	Shipping Date
30	2002-05-03	Failure	

Order 30 detail information:

Action	Order line #	Item ID	Product Name	In Stock	Unit Price	Quantity	Total Cost	Order Status
Remove	1	12	aaa Hardware	99	50	1	50	Completed
Remove	2	13	attribute Software	98	250	1	250	Invalid Data

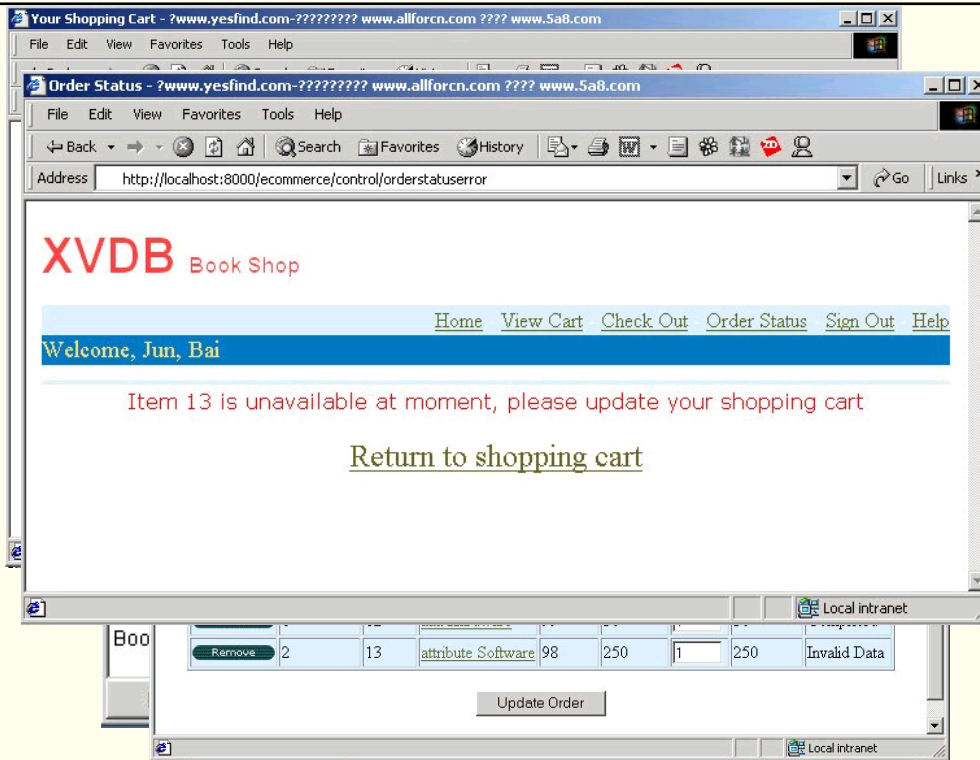
Update Order

Exception handling:

- Changes to e.g. book data
- Locked data
- Transaction failure e.g. order rejected

Inform user & support
LRT across systems

Exception Handling



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Exception Handling

Order Status - ?www.yesfind.com-????????? www.allforcn.com ??? www.5a8.com

File Edit View Favorites Tools Help

Address <http://localhost:8000/ecommerce/control/orderstatus>

Home View Cart Check Out Order Status Sign Out Help

Welcome, Jun, Bai

Order ID	Order Date	Order Status	Shipping Date
21	2002-05-01	Failure	
30	2002-05-03	Failure	

Failure Order(s) detail information:

Action	Order ID	line #	Item ID	Product Name	In Stock	Unit Price	Quantity	Total Cost	Order Status
Remove	21	1	14	attribute Hardware	0	100	<input type="text" value="1"/>	100	No book left
Remove	21	2	13	attribute Software	96	250	<input type="text" value="1"/>	250	Over CR limit

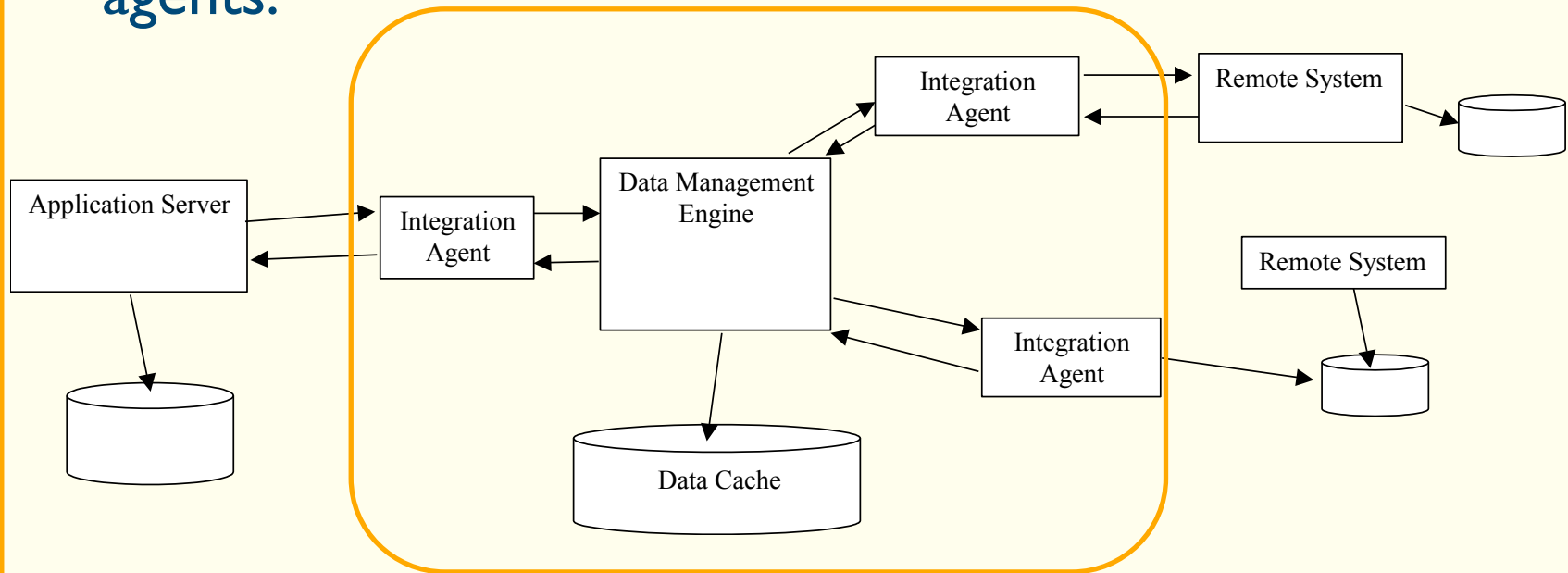
Exception handling:

- Changes to e.g. book data
- Locked data
- Transaction failure e.g. order rejected

Inform user & support
LRT across systems

Current Work

- ❖ Developing a generic integration engine + integration agents:



See: www.xsol.com

Summary

- ❖ Evaluated with:
 - Performance analysis
 - Multiple users of customer/publisher systems
- ❖ Performance for most tasks very good; exception handling suitable; users generally satisfied with system
- ❖ Integration approach isolates systems and provides data-oriented mechanism to integration problem
- ❖ Generic data integration prototype developed