



Integration Challenges

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“There is no simple answer for enterprise integration”

In our opinion, anyone who claims that integration is easy must be incredibly smart (or at least a good bit smarter than the rest of us), incredibly ignorant (okay, let’s say optimistic), or have a financial interest in making you believe that integration is easy.



Agenda

- **Need for integration**
- **Distributed application vs. integrated application**
- **Fundamental and integration challenges**
- **Messaging**

- **Common integration scenarios**

Distributed application vs. integrated application

□ Distributed application

- Tightly coupled
- Depend direct on each other (dependences between layers)
- Communication tends to be synchronous
- In most cases used by human users

□ Integrated applications

- Independent applications
- Coordinate in a loosely coupled way
- Use asynchronous communication
- Can proceed without response

Fundamental and Integration Challenges

- Networks are unreliable**
- Networks are slow**
- Any two applications are different**
- Change is inevitable**

- Software has to map the enterprise communication structure**
- Far-reaching implications**
- Change of legacy systems is not possible in most cases**
- Only a few standards (XML, XSL, Web Services)**
- XML exchange standardizes the syntactic elements**
- EAI integration is a complex task**



Four main approaches

- File transfer**
- Shared database**
- Remote procedure invocation**
- Messaging**



Messaging

- Typically integrated in middleware-platforms
- Called (message-orientated middleware)

- **Main task:**
 - Move message from one computer to another
 - Computer networks are connect in a unreliable way



Main steps:

- Create**
- Send**
- Deliver**
- Receive**
- Process**

- Important messaging concepts**
 - Send and forget
 - Store and forward

Benefits of messaging

- Remote communication
- Platform/language integration
- Asynchronous communication
- Variable timing
- Throttling
- Reliable communication
- Disconnected operation
- Mediation
- Thread management



Challenges of asynchronous messaging

- Complex programming model**
- Sequence issues**
- Synchronous scenarios**
- Performance**
- Limited platform support**
- Vendor lock-in**



Commercial Messaging Systems

- Microsoft Message Queuing (MSMQ)**
- Oracle AQ**
- Sun JMS (in combination with JEE AS)**

- IBM WebSphere MQ**
- MS Biztalk**
- TIBCO**
- WebMethods**
- ...**



Common integration scenarios

- Information portals**
- Data replication**
- Shared business functions**
- Service-orientated architectures**
- Distributed business process**
- Business-to-business integration**



Information portals

- ❑ **User has to access more than one system to fulfill a task**
- ❑ **E.g. verify status order and customer representative**

- ❑ **Aggregate information from different sources**

Data replication

- Redundant data**
- Same data is needed in different applications**
- E.g. customer data for shipping system and billing system**

- Different approaches are possible**
- Some database tools have replication functions**



Shared business functions

- Redundant functionality**
- E.g. check social-security number**

- Build up global functions**

Service-orientated architectures

- **A service is a well-defined function that is universally available**
- **Managing services becomes critical**

- **Needs for:**
 - Service repository
 - Interface description



Distributed business process

- Single transaction is spread across different applications**
- Coordination between applications**
- Use of a business process component**



Business-to-business integration

- Business functions from outside suppliers**

- Communication across internet or other network**
- Handle securities issues**
- Standardized exchange formats**

Summary

- **Integration is no easy task, but common for a lot of projects**
 - Use of patterns
- **In most cases a combination of different integration approaches will be useful**
- **Message-Middleware build up a new abstraction layer**
 - Try to hide frequently arising problems
 - Make reliable communication easier to handle



Bibliography

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Thanks for your attention.