

# Part 1 - Service Engineering

**Successful introduction of Service-Oriented Architectures (SOA) using Business Process Choreographies and Business Document Standards**

Research Studio Inter-Organisational Systems  
Project Public Private Interoperability

- The Research Studios Austria
  - Organization and structure
  - Know-How
- Service Engineering
  - Capturing requirements of inter-organizational systems
  - From business processes to service-oriented architectures
  - Benefits of Service Engineering

Research Studio iSpace

Research Studio Smart Agent Technologies

Research Studio Micro Learning & Information Environments

Research Studio Pervasive Computing Applications

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## Modeling for SOA

UN/CEFACT's Modeling  
Methodology

UN/CEFACT's Core  
Components

Health Level  
Seven (HL 7)

UBL

## Modeling

Business Process  
Modeling Notation (BPMN)

ER-Modeling

Unified Modeling  
Language (UML)

## Implementation

C#

Java

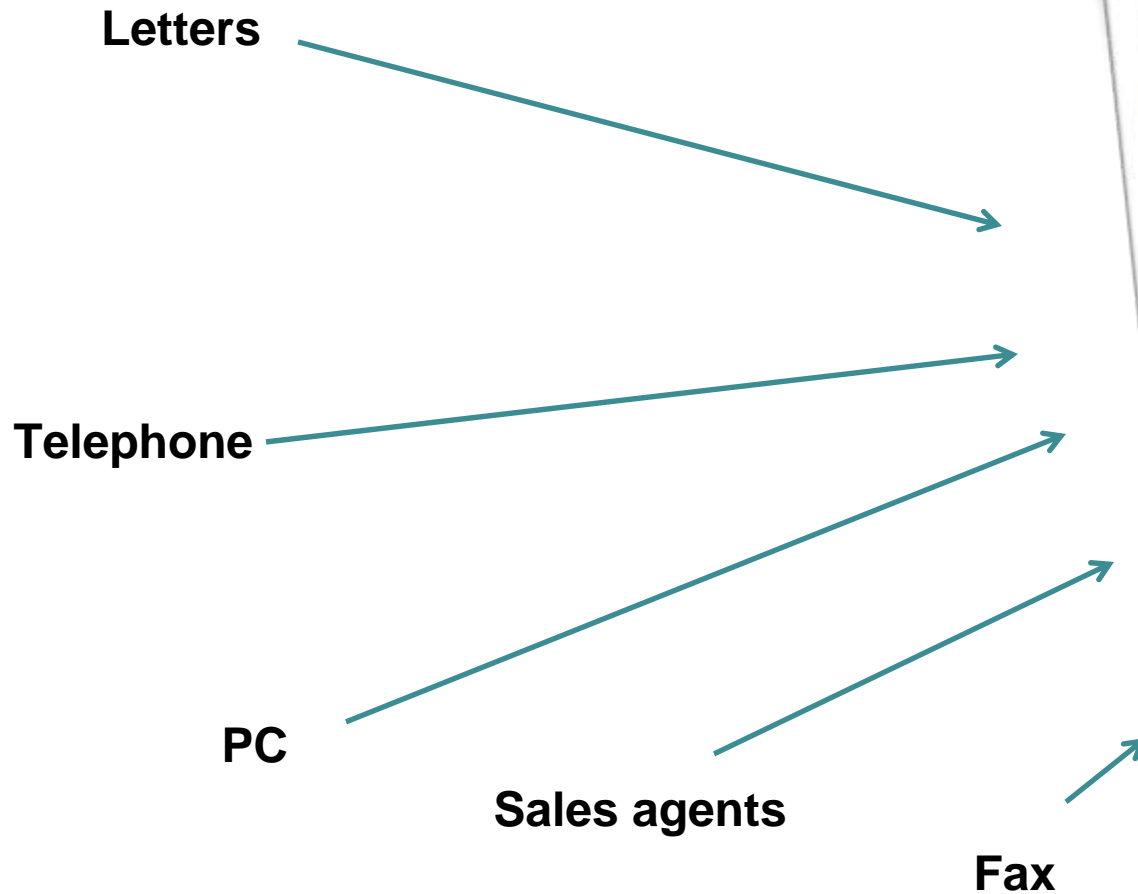
XML Schema

Visual Studio

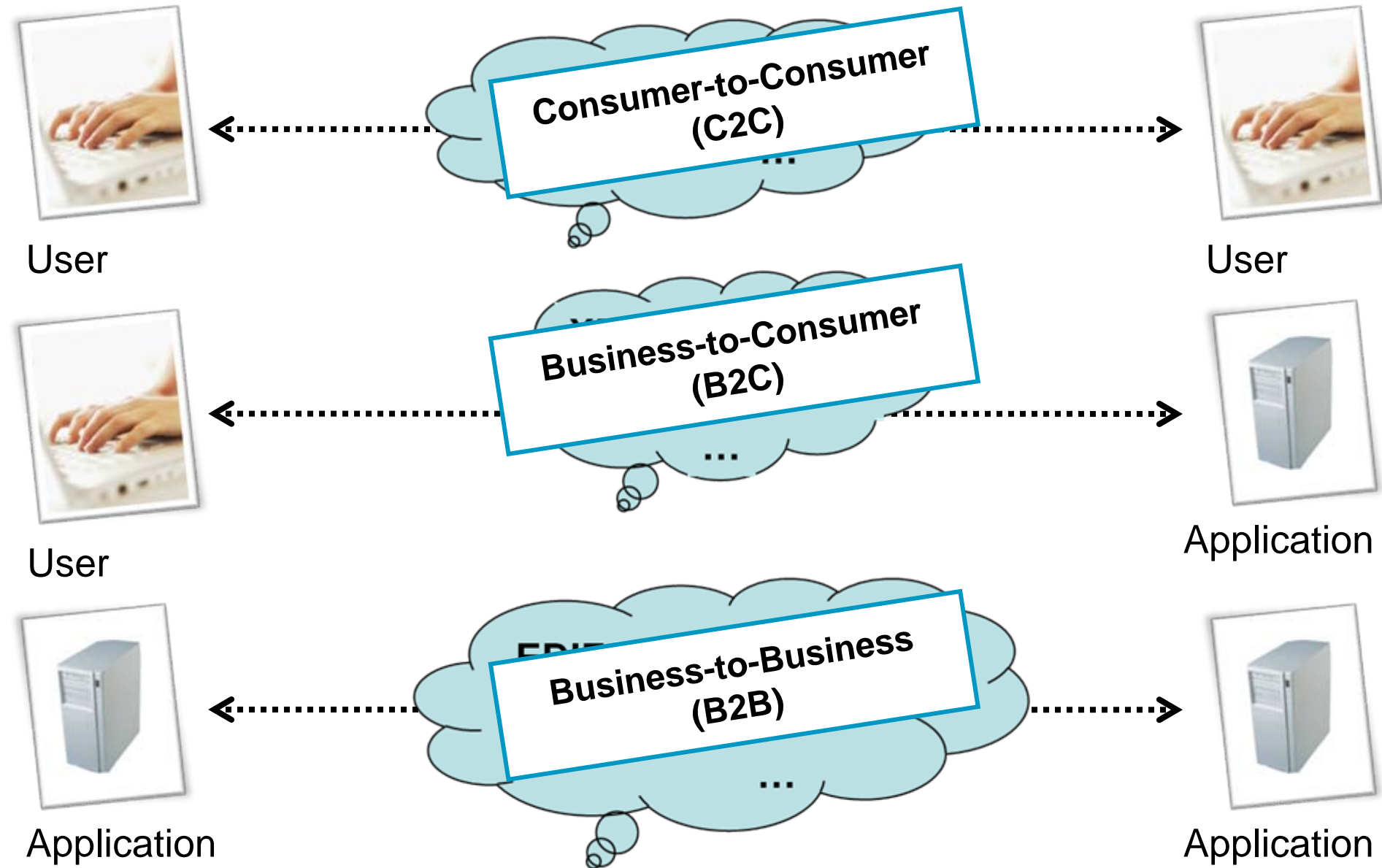
Eclipse

Enterprise Architect Extensions

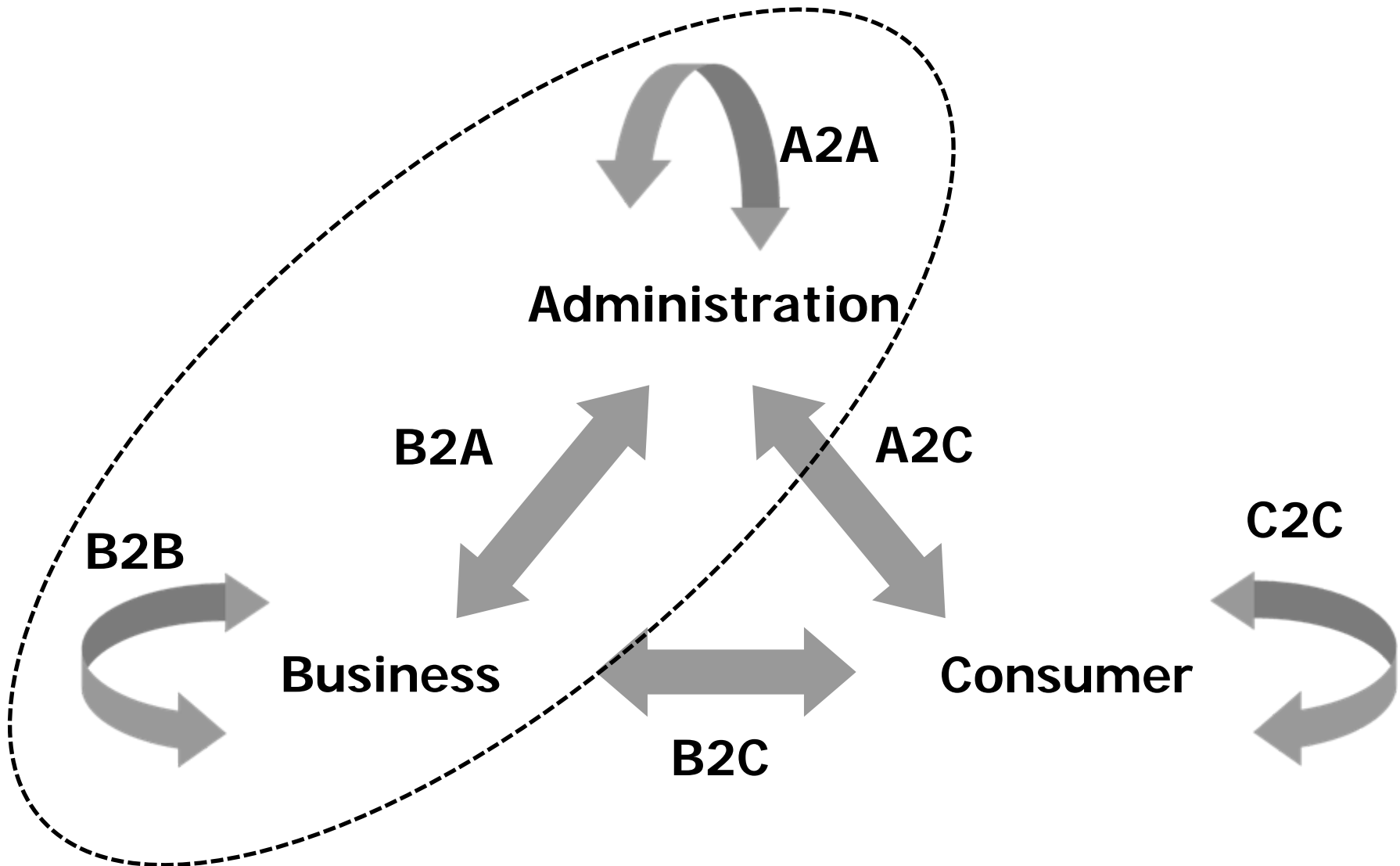
# Communication in an enterprise



The goal of Electronic Data Interchange (EDI) is the seamless communication between enterprises – independent of software, hardware, or communication protocols



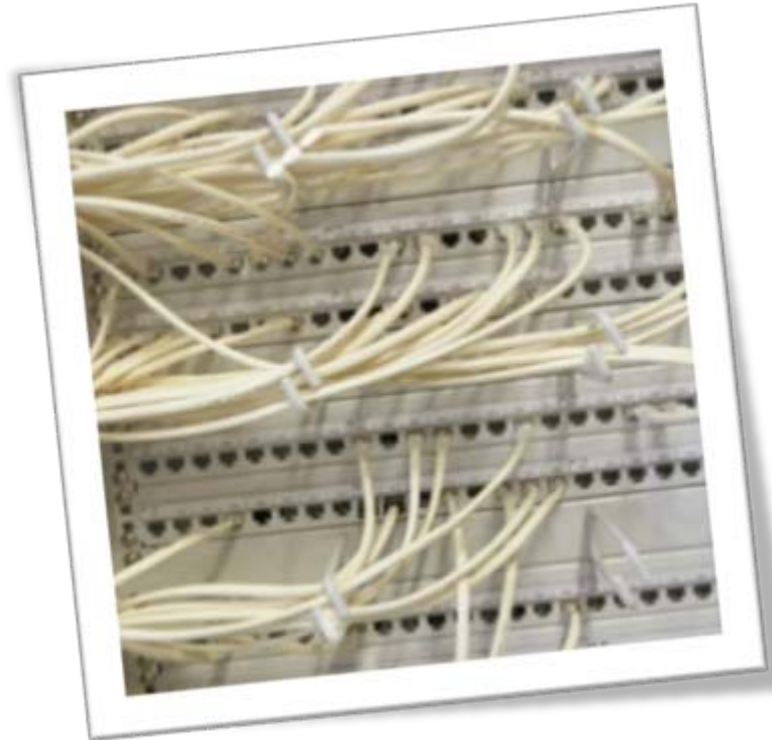
# Application scenarios of B2B systems



# B2B systems are replacing paper-based solutions. However, several problems remain



**yesterday**



**today**



# Challenges for B2B systems

- Increasing competition
- Higher process flexibility
- Heterogeneous and decentralized IT environments
- Heterogeneous process definitions
- Missing coordination between processes
- Necessary decrease of total cost of ownership



# A simple solution is necessary

A B2B solutions must be as simple as a fax machine.



SOA promises to be exactly this simple solution

# One of many definitions of a SOA:

*"A system for linking resources on demand. In an SOA, **resources are made available** to other participants in the network **as independent services** that are accessed in a standardized way. This provides for more **flexible loose coupling** of resources than in traditional systems architectures".*

- Sybase.com

# Unfortunately not everybody talking about a SOA has the same perception about it

- Depending on the viewpoint one might interpret the concept of a SOA differently – like a blind person touching an elephant...



# Different viewpoints of the same concept... **r s a**



**A tube**



**A piece of  
leather**



**A column**



**A branch**



**A wall**

# By the term SOA I understand...



**Web Services**



**integration**



**agile  
behavior**



**process management**



**unfortunately  
nothing?**

# A SOA is not a specific architecture but methods and models how to reach a specific common architecture

- SOA is a concept for the aggregation of distributed and heterogeneous application beyond company boundaries
- SOA is a concept that consists of numerous elements
  - Methods for Business Process Management
  - Service definitions
  - Process models for the realization of business processes using services

# What is a service-oriented architecture

- **Service**

A process delivering a certain business functionality (e.g., invoicing) that may be aggregated in higher-level processes and that itself may consist of lower-level processes.

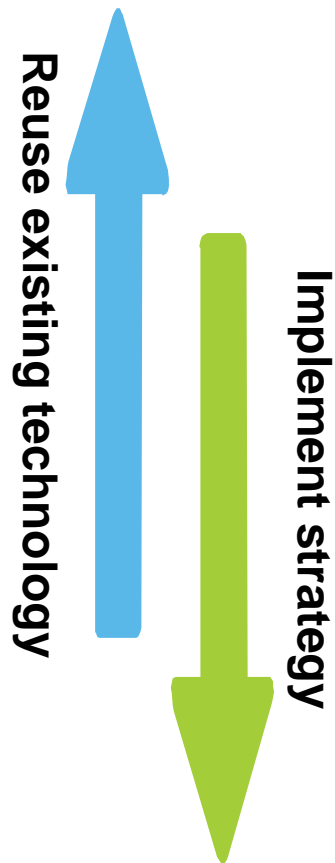
- **Service-oriented architecture (SOA)**

An assembly of different services for the coordination and realization of business processes beyond company boundaries.



- Flexibility
  - Changed process requirements may be quickly reflected in the IT systems through reuse of modular services
  - Easy exchange of existing services through loose coupling
- Higher flexibility implies higher productivity
- SOA reuses existing solutions
  - Only the required IT functionality is offered as a service
- Higher process transparency
  - Service flow data may be used for the analysis and optimization of processes
- Better out-sourcing possibilities through modular service design
- ...

# Different views on a service-oriented architecture



<b>Strategy</b> Define new product and process strategies	Business Strategist
<b>Business Activity Monitoring</b> Permanent analysis of end-to-end processes. Real-time process control.	Business Analyst
<b>Business Process Management</b> Analysis, automatation and reengineering of processes	Process Designer
<b>Services Layer</b> Definition of services, standardization of services, reduction of implementation effort through service reuse	System Architect
<b>System integration</b> Technical realization of services	Software Engineer

# Goal of the Research Studio: enable a better business/IT alignment using process choreographies and business document definitions

<b>Strategy</b> Define new product and process strategies	Business Strategist
<b>Business Activity Monitoring</b> Permanent analysis of end-to-end processes, Real-time process control	Business Analyst
<b>Business Process Management</b> Analysis, automatation and reengineering of processes	Process Designer
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# SOA – current status quo

- High expectations
- Several project initiatives
- Some isolated success stories (research prototypes)

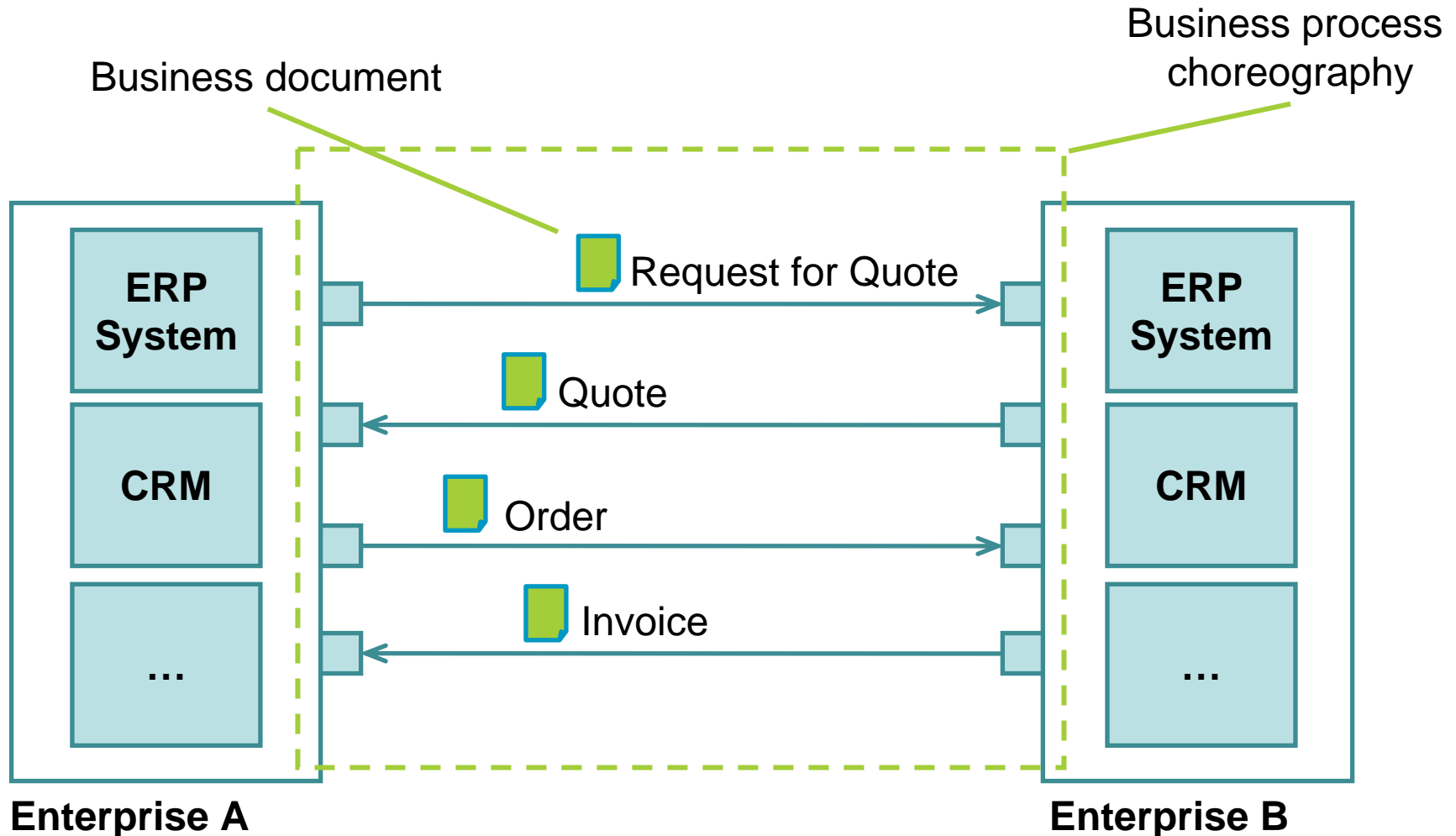
**Missing reconciliation in the area of B2B is currently the main obstacle towards a sustainable and cross-enterprise success**

- No unambiguous definition of inter-organizational processes
- No common basis for the exchanged business documents
- Different terminologies and expectations from the IT and the business
  - Mismatch in expectations and requirements leads to unsatisfactory solutions

# The Research Studio solution: Service Engineering

- Service Engineering builds upon existing development best-practices and software tools in order to
  - Model and implement inter-organizational business process choreographies
  - Model the exchanged business information in a business process choreography in an unambiguous way
  - Bridge the gap between conceptual models and deployment artifacts (e.g. XML Schema), used to configure IT systems
- The overall goal of Service Engineering is the **better alignment between business and IT** by introducing a successful service-oriented architecture

# Goal: Define processes and documents in an unambiguous manner



- Common document definitions help to reduce costly interfaces and to avoid potential incompatibilities
- Common business process choreographies capture the inter-organizational business process in an unambiguous way and help to foster a common understanding among the different stakeholders
- Service Engineering delivers blue-prints for a successful introduction of Service-Oriented Architectures



**Significant reduction of development and maintenance costs**

# There are two major requirements for inter-operability between two enterprises

- **How** are documents exchanged?

- Definition in which exact order documents are exchanged in an automated manner (process choreography)
- Technologies for the description of business process choreographies are necessary

- **Which** documents are exchanged?

- Definition of the artifacts which are exchanged in an inter-organizational process
- Business document standards are necessary



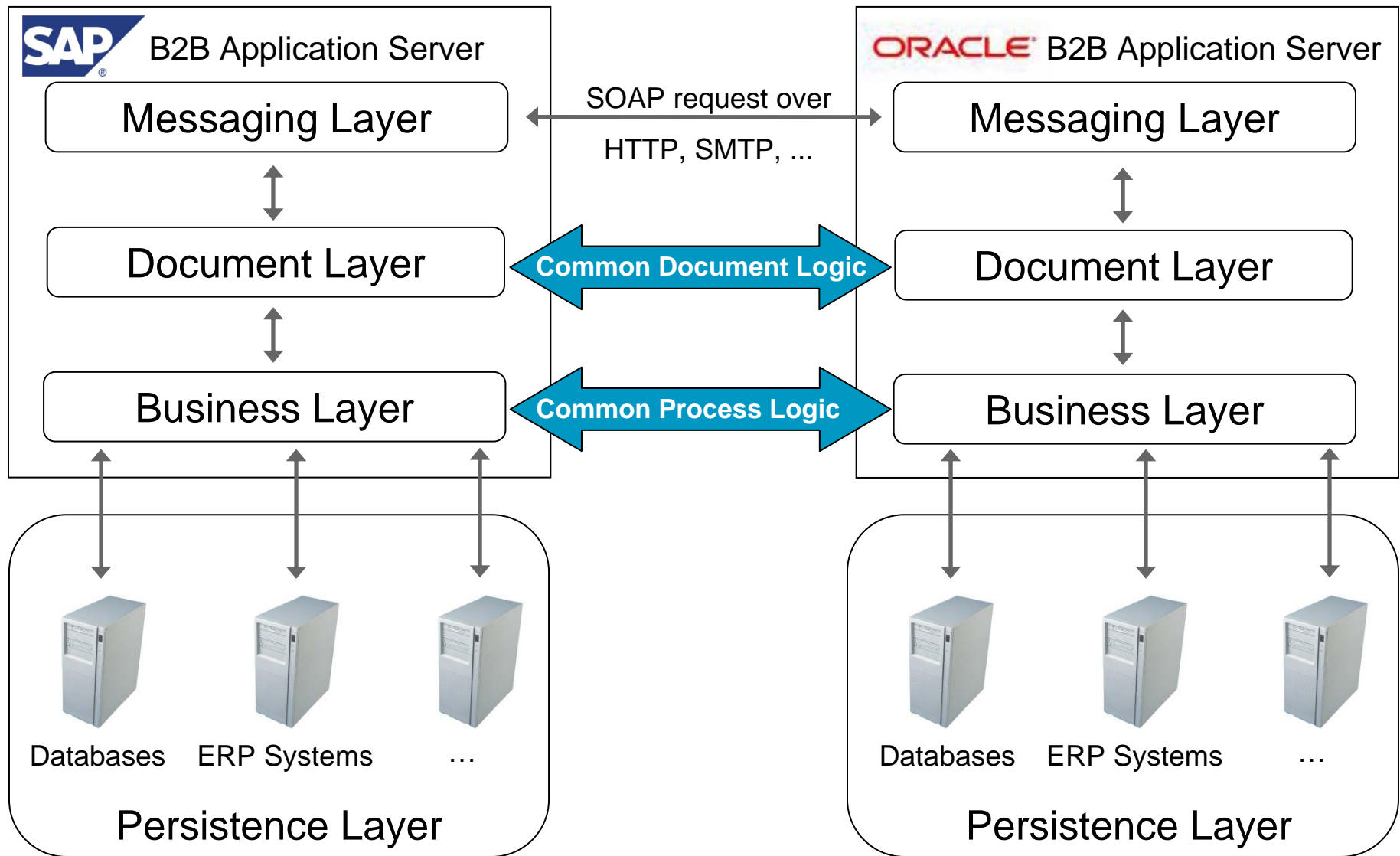
# The Research Studio builds on internationally acknowledged standards

- UN/CEFACT's Modeling Methodology (UMM)
  - Definition of business process choreographies
- UN/CEFACT's Core Components (CC)
  - Definition of business documents, based on reusable components

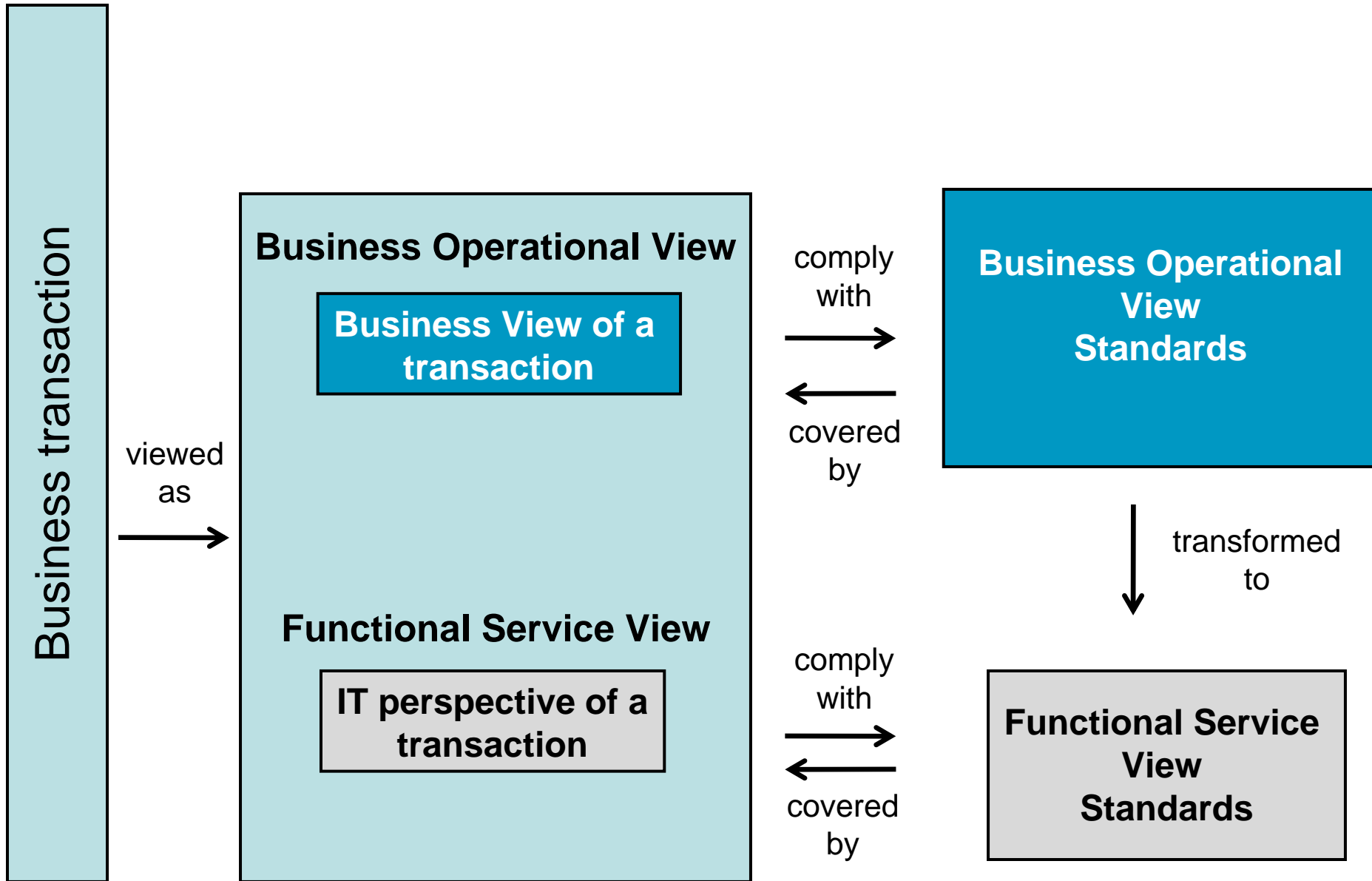
## Benefits:

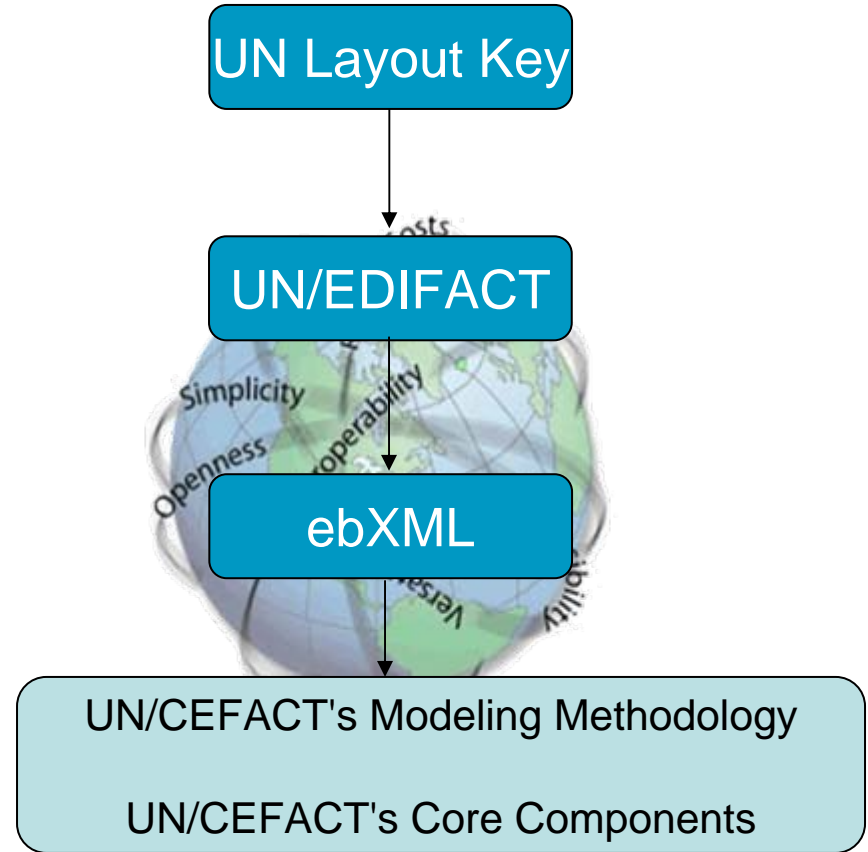
- Unambiguous definition of the inter-organizational processes and thus acknowledgment by all stakeholders
- Focus on reuse of existing models and definitions
- Internationally recognized and accepted

# B2B Application Computing



# Open-edi Reference Model – IO 14662



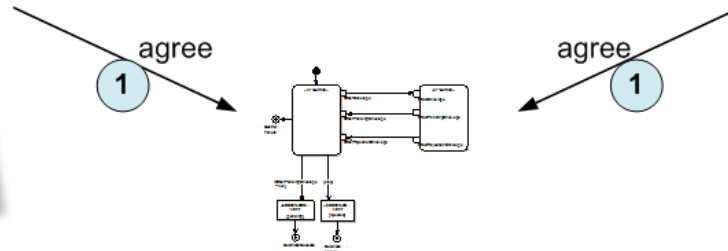




**Buyer**



**Seller**



**UMM/UPCC  
model**

```
<wsdl:portType
name="Buyer">
....
</wsdl:portType>
```

**Buyer.wsdl + XSD**

```
<process>
<partnerLinks/>
<variables/>
<sequence/>
</process>
```

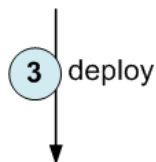
**Buyer.bpel**

```
<wsdl:portType
name="Seller">
....
</wsdl:portType>
```

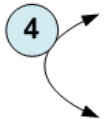
**Seller.wsdl + XSD**

```
<process>
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<variables/>
<sequence/>
</process>
```

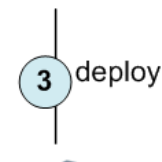
**Seller.bpel**



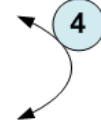
add  
service  
bindings



**Business Service  
Interface Buyer**



add  
service  
bindings



**Business Service  
Interface Seller**

# Thank you for your attention

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