System integration with Web Services and XML

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System integration with Web Services and XML

- **Target audience**
  - Developers, architects and IT-managers
- **Objectives**
  - Experiences from a real world project
- **Non-Objectives**
  - Intro to Web Services

To learn more

- *Gå inte in i väggen, när du kan använda dörren*
- Peter Norrhall
- O'Reilly, 2003
- ISBN 1111-2222-3333

- We accept all major credit cards
- 10 % off in the bar tonight

Gå inte in i väggen när du kan använda dörren

O'REILLY

[illegible]

Agenda

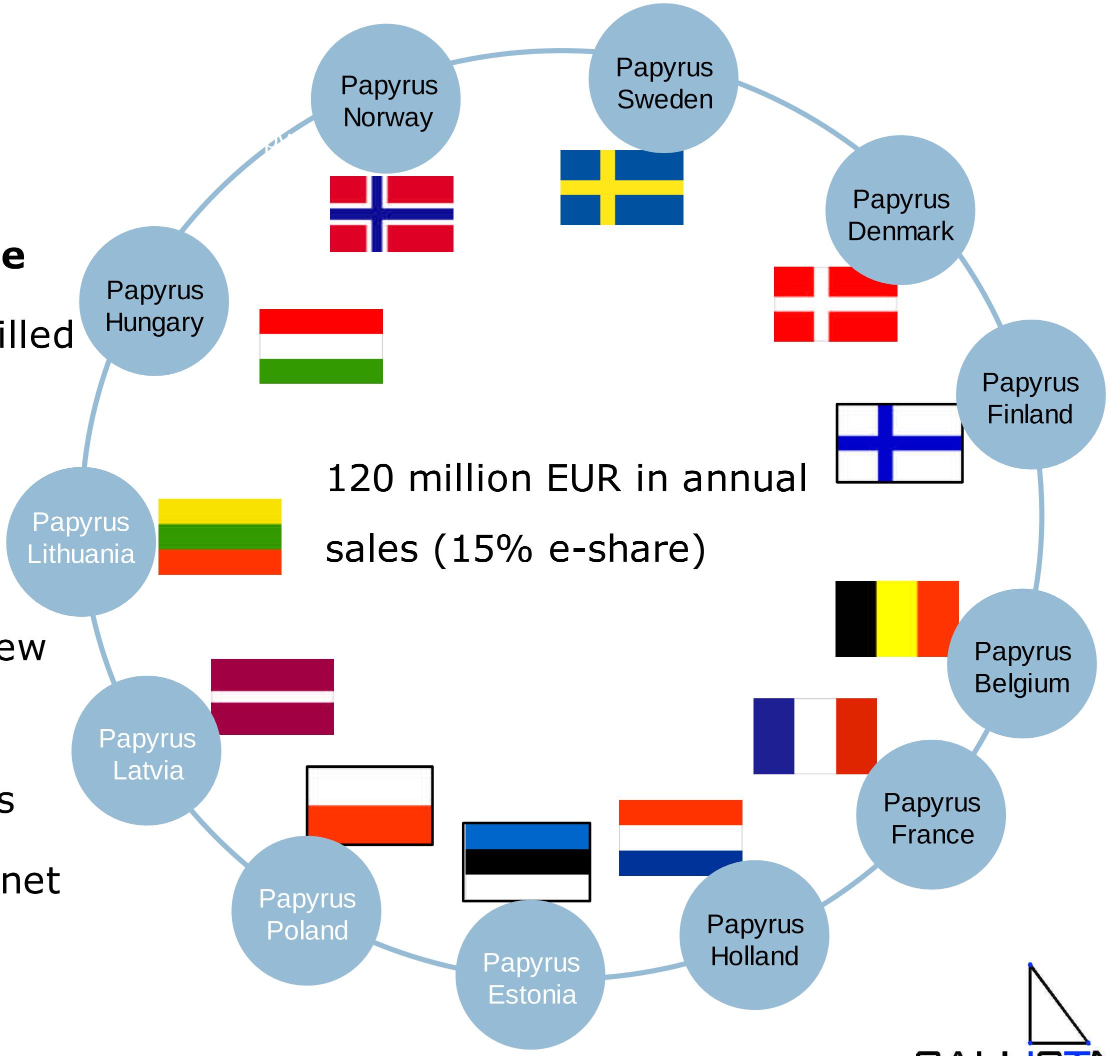
- Papyrus e-services
- Technical issues
- Business issues
- Summary

PAPYRUS

E-business vision

- **Customer's preferred choice**
- All routine communication fulfilled through internet

- **Industry market leader**
- Leading the development of new e-services
- Focus on value adding services
- Significant business over internet



Papyrus Norway

Papyrus Sweden

Papyrus Denmark

Papyrus Finland

Papyrus Belgium

Papyrus France

Papyrus Holland

Papyrus Estonia

Papyrus Poland

Papyrus Latvia

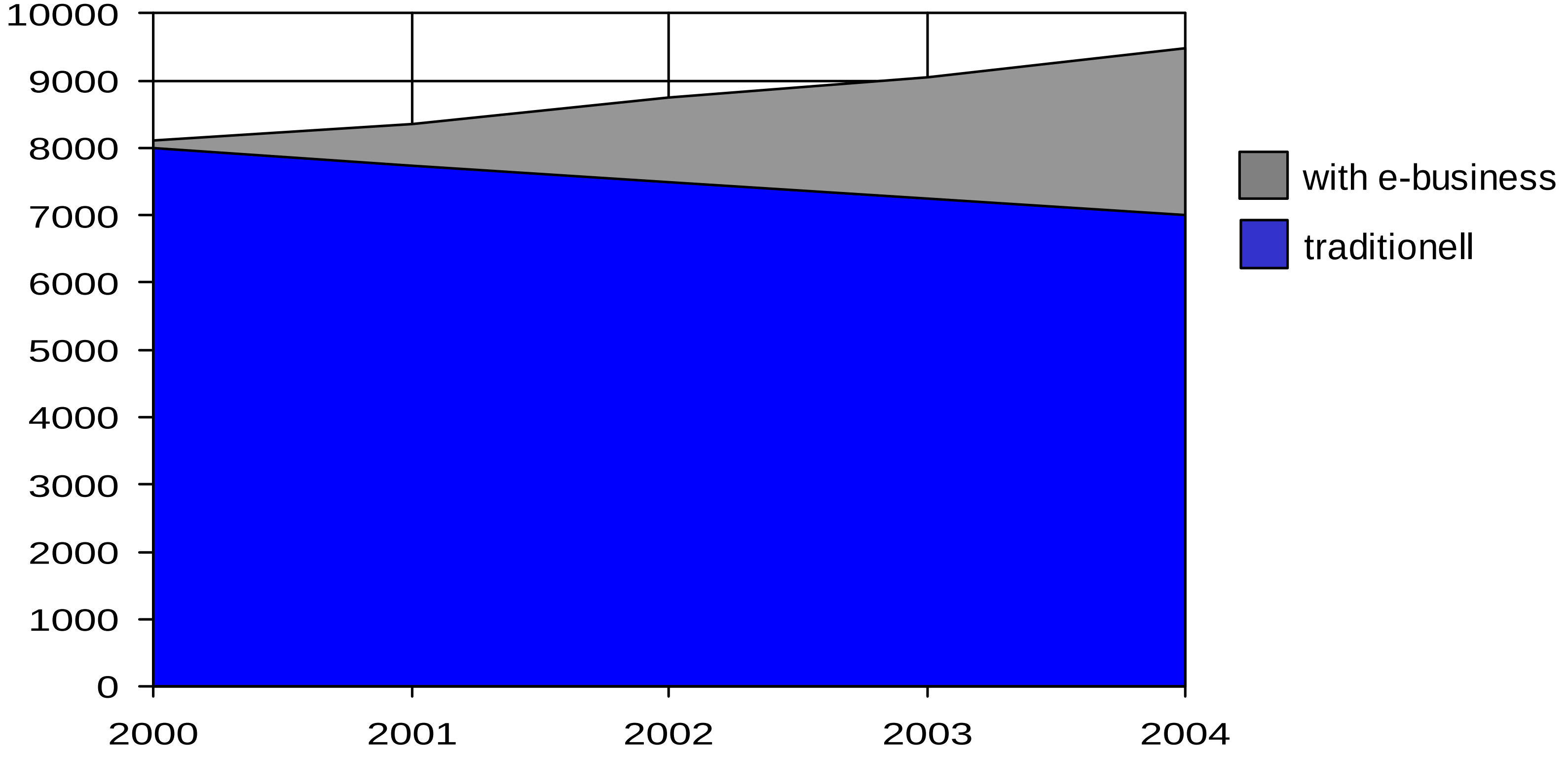
Papyrus Lithuania

Papyrus Hungary

120 million EUR in annual sales (15% e-share)

E-business is growing

Key European markets, KTON



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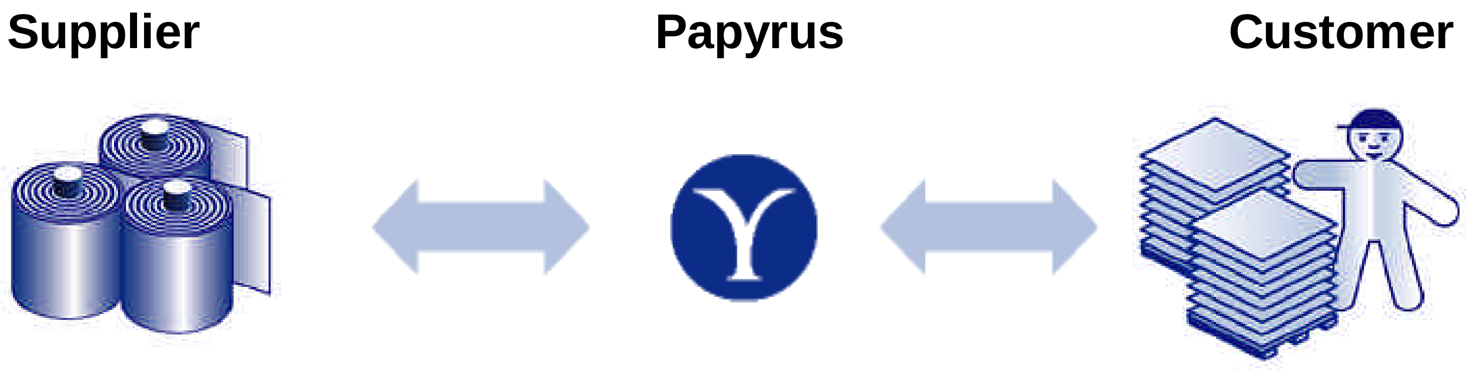
Papyrus e-business history



Supplier

Papyrus

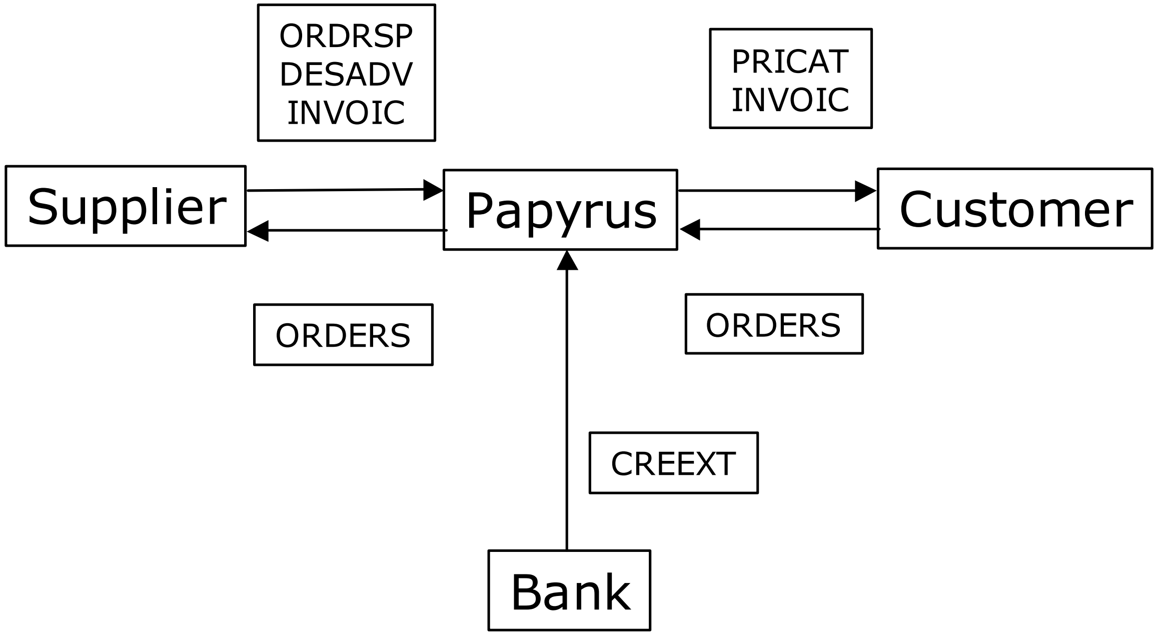
Customer

1975 First Integration

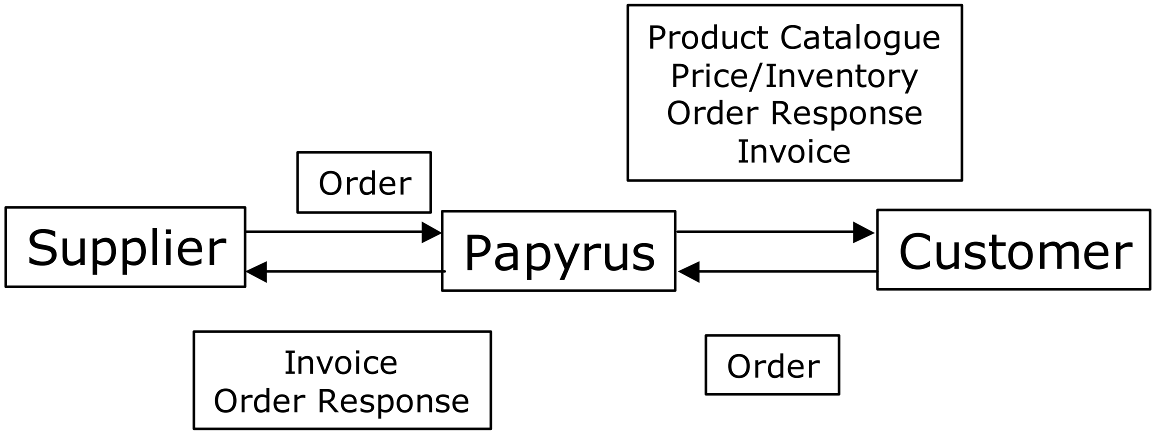
Replaced by EDI

1985	Partner 1.0, online system
1989	EDI solutions
1997	Partner 2.0, internet based
1999	papyrus.com
2000	Papyrus e-point
2002	Papyrus e-services

System Integration
EDI



System Integration
XML



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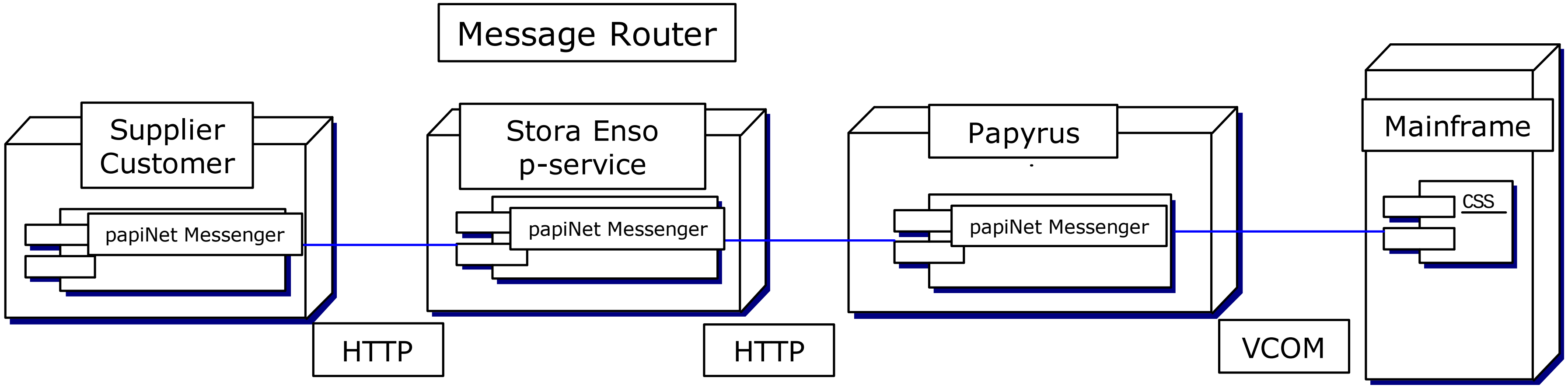
papiNet.org

- XML DTD and Schema (Order, Invoice, RFP, etc), Case Studies, Business Flow
- papiNet Messenger

papiNet


Message Router
Supplier Customer
papiNet Messenger
Stora Enso p-service
papiNet Messenger
Papyrus
papiNet Messenger
Mainframe
CSS
HTTP
HTTP
VCOM

ERP/Portal Integration using Web Services

- Technical Issues
  - Interoperability
  - Security
- Business Issues
  - Business Rules
  - Business Model

Interoperability

- Pick a ”limited” number of target ”client” platforms
  - MS (SOAP Toolkit, .Net), Java (Apache Axis, Apache SOAP, Sun WSDK, IBM WSTK, Systinet WASP, Oracle), Delphi/Kylix, Perl, ...
- http://www.ws-i.org
  - Basic Profile : XML Schema 1.0, SOAP 1.1, WSDL 1.1, UDDI 1.0
- http://www.soapbuilders.org
- http://www.w3.org/2002/ws/

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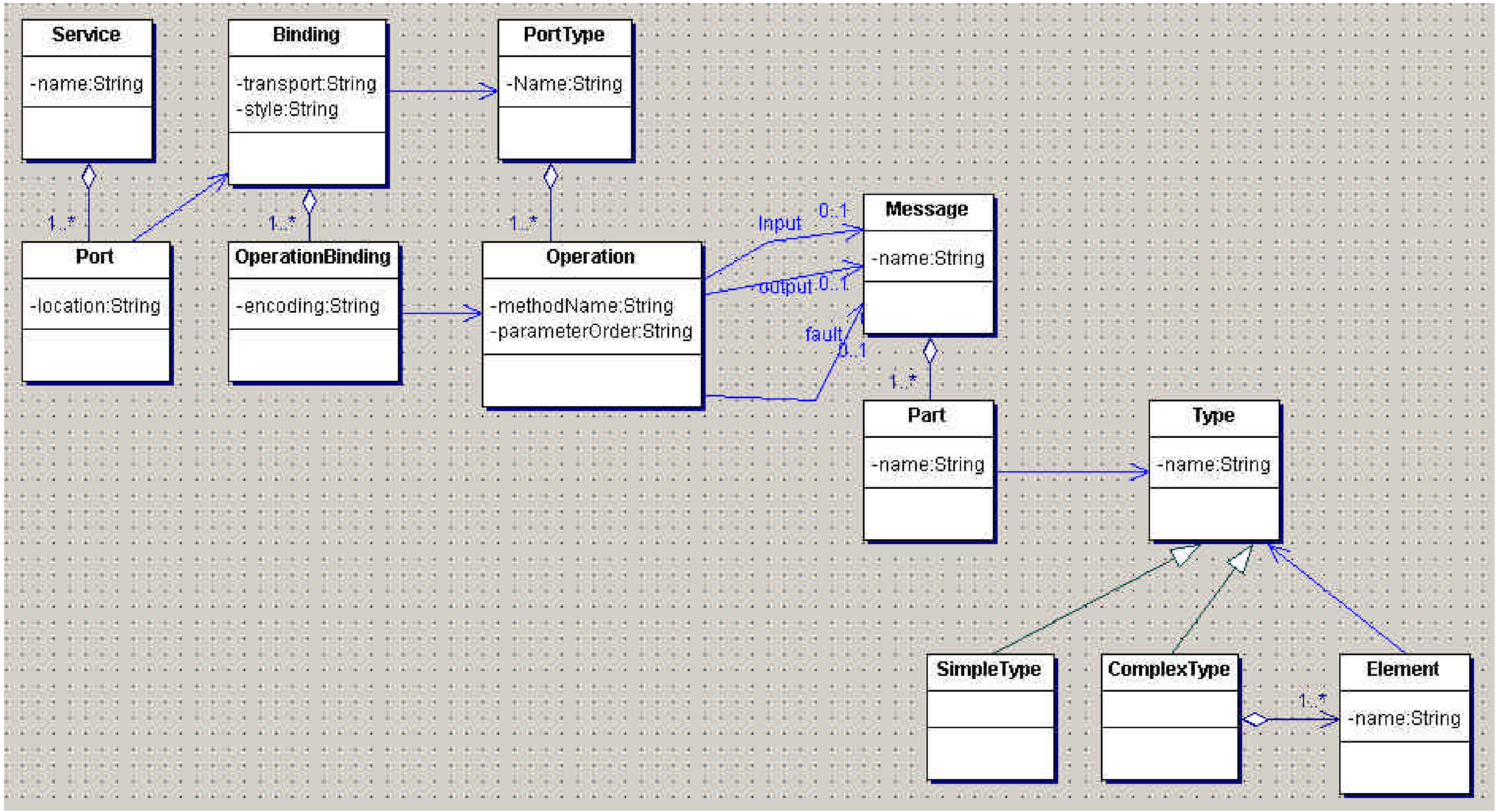
WSDL

- IDL – start writing the interface
  - WSDL2Java, WSDL.exe, ...
- RPC (JAX-RPC)
  - Structured
- Document (JAXM)
  - Unstructured
  - Recommended by WS-I, MS, SOAP 1.2
  - XML Schema
- Message (Axis – non-standard)

WSDL


Service
-name:String
Binding
-transport:String
-style:String
PortType
-Name:String
1..*
1..*
1..*
Port
-location:String
OperationBinding
-encoding:String
Operation
-methodName:String
-parameterOrder:String
Input
0..1
output
0..1
fault
0..1
Message
-name:String
1..*
Part
-name:String
Type
-name:String
SimpleType
ComplexType
1..*
Element
-name:String

Data Types

- Simple (XML Schema Part 2 : Built-in Datatypes)
- Types that work
  - String, boolean, int, ...
  - Simple Complex Type (JavaBeans)
  - Array of any valid type
- Beware of language specific types
  - Floating-point, decimal and date data types
  - Unsigned
  - Enumeration
  - java.util.HashList
- XML Schema

Encoding

- UTF-8
- Base64Encoding
- Attachment

Attachments

- Non XML documents
- Business documents (Order, Invoice, ...)
- Interoperability problem
  - DIME vs MIME
  - Different implementations
- Axis, SAAJ, JAXM

Example

WSDL

```
…
<message name="receiveCategoryInput">
    <part name="pId" type="xsd:string"/>
    <part name="pCompleteTree" type="xsd:boolean"/>
  </message>
  <message name="receiveCategoryResponse">
    <part name="result" type="xsd:string"/>
  </message>
 <portType name="CatalogServicePortType">
   <operation name="receiveCategory" parameterOrder="pId pCompleteTree">
      <input message="tns:receiveCategoryInput"/>
      <output message="tns:receiveCategoryResponse"/>
    </operation>
</portType>
…
```

Example

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Example

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 </message>
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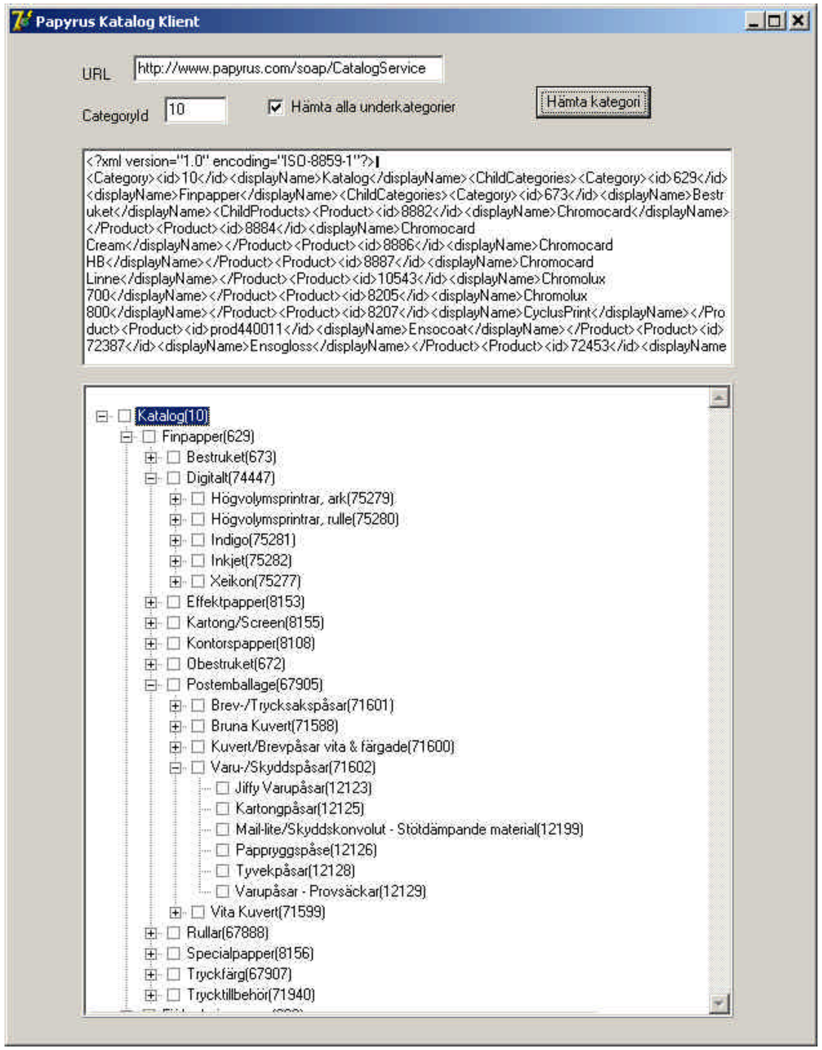
  <operation name="receiveCategory" parameterOrder="pId pCompleteTree">
    <input message="tns:receiveCategoryInput"/>
    <output message="tns:receiveCategoryResponse"/>
   </operation>
</portType>
…
```

Delphi

```
CatalogServicePortType = interface(IInvokable)
  ['{639DAB2C-6AF6-E86A-AF07-F958993627F8}']
    function  receiveCategory(const pId: WideString; const pCompleteTree:
     boolean): WideString; stdcall;
end;
```

Example



URL http://www.papyrus.com/soap/CatalogService

CategoryId 10

☑ Hämta alla underkategorier

```
<?xml version="1.0" encoding="ISO-8859-1"?>
<Category><id>10</id><displayName>Katalog</displayName><ChildCategories><Category><id>629</id>
<displayName>Finpapper</displayName><ChildCategories><Category><id>673</id><displayName>Bestr
uket</displayName><ChildProducts><Product><id>8882</id><displayName>Chromocard</displayName>
</Product><Product><id>8884</id><displayName>Chromocard
Cream</displayName></Product><Product><id>8886</id><displayName>Chromocard
HB</displayName></Product><Product><id>8887</id><displayName>Chromocard
Linne</displayName></Product><Product><id>10543</id><displayName>Chromolux
700</displayName></Product><Product><id>8205</id><displayName>Chromolux
800</displayName></Product><Product><id>8207</id><displayName>CyclusPrint</displayName></Pro
duct><Product><id>prod440011</id><displayName>Ensocoat</displayName></Product><Product><id>
72387</id><displayName>Ensogloss</displayName></Product><Product><id>72453</id><displayName
```

```
⊟ □ Katalog(10)
    ⊟ □ Finpapper(629)
        ⊞ □ Bestruket(673)
        ⊟ □ Digitalt(74447)
            ⊞ □ Högvolymsprintrar, ark(75279)
            ⊞ □ Högvolymsprintrar, rulle(75280)
            ⊞ □ Indigo(75281)
            ⊞ □ Inkjet(75282)
            ⊞ □ Xeikon(75277)
        ⊞ □ Effektpapper(8153)
        ⊞ □ Kartong/Screen(8155)
        ⊞ □ Kontorspapper(8108)
        ⊞ □ Obestruket(672)
        ⊟ □ Postemballage(67905)
            ⊞ □ Brev-/Trycksakspåsar(71601)
            ⊞ □ Bruna Kuvert(71588)
            ⊞ □ Kuvert/Brevpåsar vita & färgade(71600)
            ⊟ □ Varu-/Skyddspåsar(71602)
                □ Jiffy Varupåsar(12123)
                □ Kartongpåsar(12125)
                □ Mail-lite/Skyddskonvolut - Stötdämpande material(12199)
                □ Pappryggspåse(12126)
                □ Tyvekpåsar(12128)
                □ Varupåsar - Provsäckar(12129)
            ⊞ □ Vita Kuvert(71599)
        ⊞ □ Rullar(67888)
        ⊞ □ Specialpapper(8156)
        ⊞ □ Tryckfärg(67907)
        ⊞ □ Trycktillbehör(71940)
```

Security

- Basic Authentication and Security
  - Server and client X.509 certificates
  - SSL encryption
  - Userid and password sent in the message

- WS-S – endorsed by IBM, MS, Verisign, Sun, OASIS

- http://www.oasis-open.org/committees/wss/

Security

- The weakest link problem :

Sessions

- Do not rely on session support
- Depends on the application server and the client
  - HTTP sessions/Cookies
  - SOAPHeader
  - sessionId in message
  - Dynamic endpoints (.Net remoting)
- Performance issues

UDDI

- ✍ Not used
- ✍ JAXR

Testing

- Write, deploy, test
- Tools (OpenSource)
  - Soap/Tcp Monitor
  - Anteater – http://aft.sourceforge.net
  - TestMaker - http://www.pushtotest.com/ptt

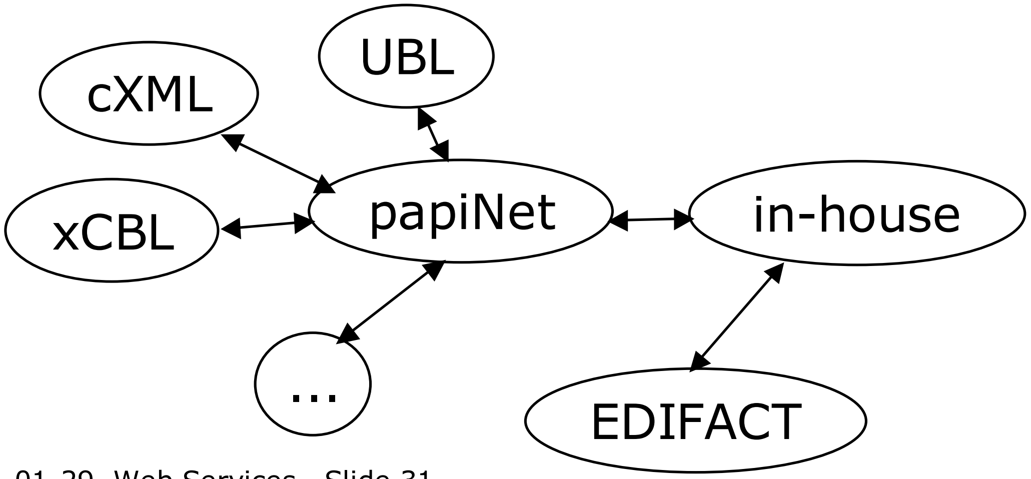
Business Issues

Pricing

- Customer unique
- Units –
  - Sheet
  - Package
  - Pallet
- Total quantity
- Promotions

Business Model

- ✍ Data Mapping – Agreement
- ✍ File formats
  - ✍ XML (papiNet, UBL, cXML, ...)
  - ✍ EDIFACT
  - ✍ in-house (flat file)
- ✍ Mapping tools and/or XSLT/XPath



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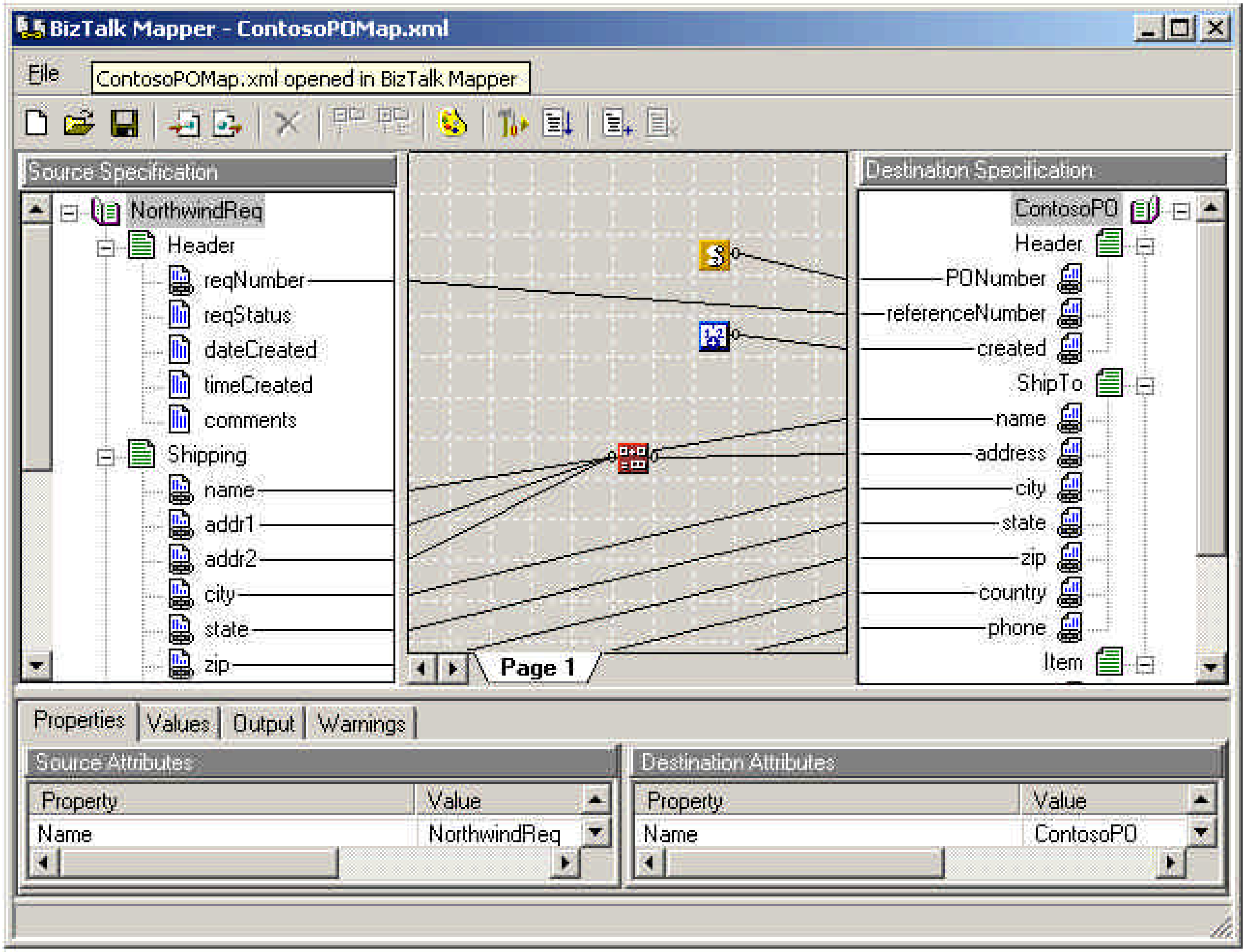
BizTalk Mapper

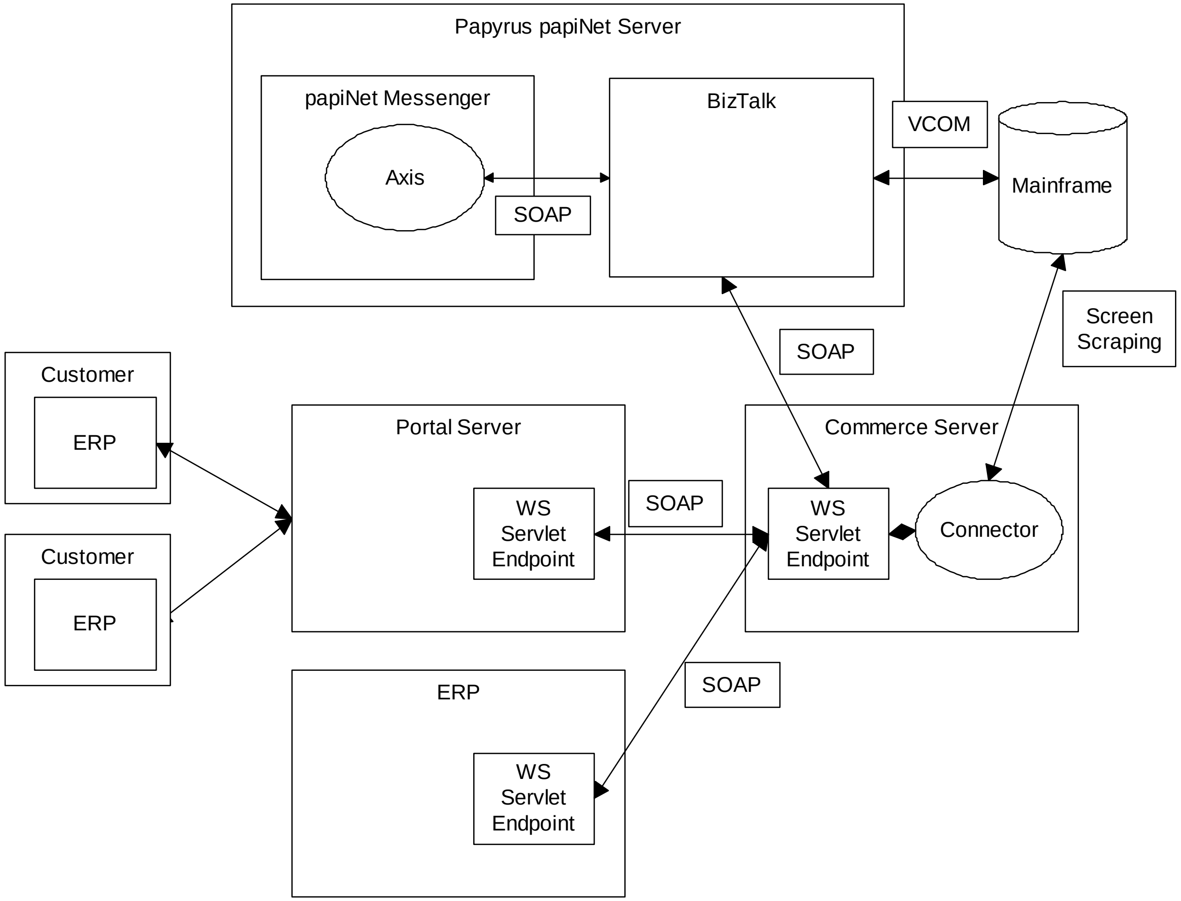


ContosoPOMap.xml opened in BizTalk Mapper

Property	Value
Name	NorthwindReq

Property	Value
Name	ContosoPO

Architecture



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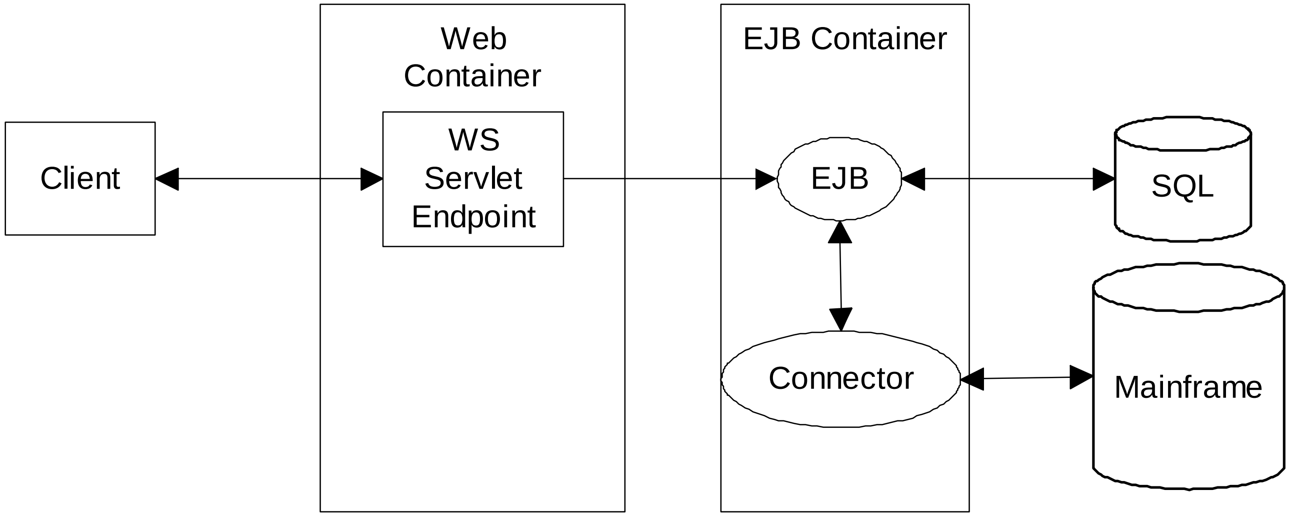
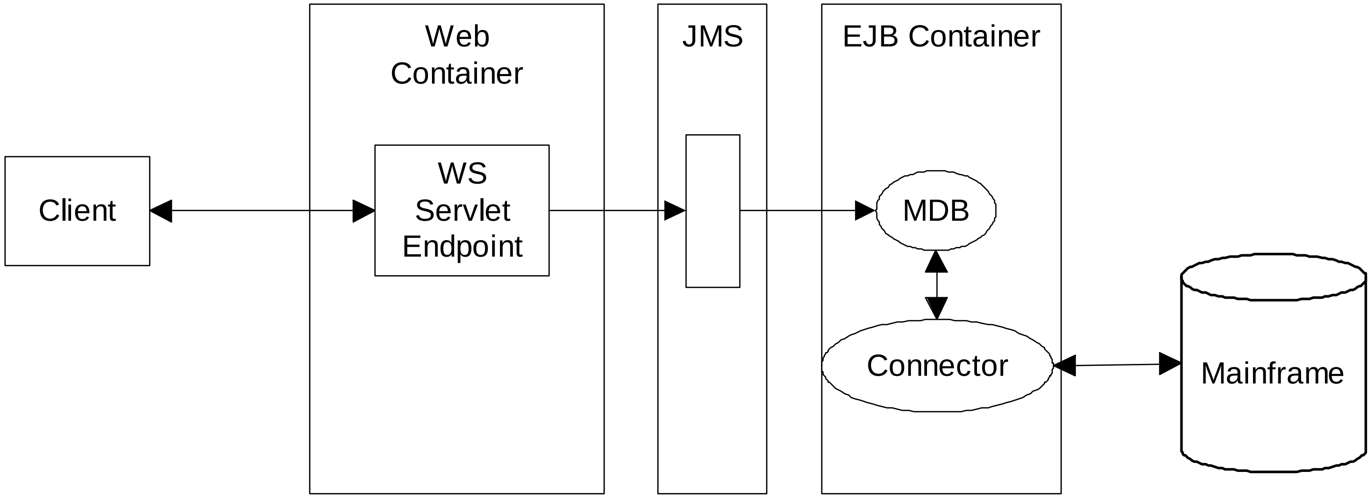
Synchronous



Asynchronous



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Summary

- It works
- Stay simple
- Tools is a ”must”
  - IDE (JBuilder, JDeveloper, ...)
  - XML editor
  - Ant
  - ...
- Is Web Services the answer for your business?

Questions?