Introduction to Enterprise Application Integration (EAI & B2B) at Metso Corporation

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Metso in brief

- Global technology company
- Serves the pulp and paper industry, rock and minerals processing, energy and selected other industries
- Net sales of approx. EUR 4 billion in 2004
- Approx. 22,000 employees in more than 50 countries
- Listed on the Helsinki (ME01V.HEX) and New York (MX.NYSE) Stock Exchanges
- Approx. 27,000 shareholders
Metso’s global operations & sales

Metso characteristics

• International
  - languages
  - legislation
  - different time-zones
• Focus on engineering and manufacturing
  - low-medium volumes
  - often highly customized
• Changes of corporate structure each year
  - divestments and acquisitions
• Heterogeneous information systems
• Extensively outsourced IT & carefully budgeted IT spending
• A single IT system cannot serve all the needs
  --> many IT applications
  --> Need for enterprise application integrations
Enterprise Application Integration (EAI) at Metso Corporation

• EAI & B2B basics
• EAI Management
• Message & terminology standardisation
• Visio for BPM & SOA

Business Integration Environment

Standard Library for Business Messages and Processes (XML, RosettaNet, SOAP, WSDL, etc.)

Portal
Business Management Platform
EAI Hub
Integration, Message Flows and Business Process Automation
S2Si

People
Customers

Employees

Vendors & Partners

Data Warehouse
ERP
PDM
Finance
HR

CMMS
CRM
Notes
Billing

Other Application

Business Process Management (Business Process and Workflow Modeling)
What enterprise application integration is

- On-line message flows
  - A portfolio of methodologies and expert services to integrate distributed (in time and space) business applications together to run a business process
- Develop and modify flows
  - An expert service to develop and install the integrations
- Monitor flows and environment
  - A monitoring system and processes to detect failures in message delivery
- Recovery and error control
  - An expert service to recover from delivery failures
- Logging system
  - A business message log / audit trail system (e.g., SOX requirements)
- Environment
  - Some software and hardware

Products being used today

- IBM p630 AIX 5.xx
- IBM DB2 universal db
- IBM WebSphere MQ
- IBM WMQ Broker
- MOM API Adapter
- Message Warehouse
- Custom File adapter
- IBM WebSphere MQ Workflow
  - (one pilot made)
Metso EAI / B2B Architecture & Protocols

**SUPPLIERS**

- B2B GTW

**EAI**

- Metso Email router
- eMail
- FTP / ssh/pgp
- HTTPs
- WEB Transfer
- WMQ
- WMQ

**NOTES**

- Whatever protocols
- Operator’s B2B Service
- Operator’s WEB Transfer

**PARTNERS**

- Metso Applications

**CUSTOMERS**

- Whatever protocols
- Operator’s B2B Service
- Operator’s WEB Transfer

**A message flow through the EAI system**

- Sending Application
  - Java Adapter Script
- MOM
- MQ
- HW & OS

- Message Warehouse

- Receiving Application
  - Java Adapter Script
- Trigger Adapter Script
- MOM
- MQ
- HW & OS

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Reusable Message Broker sub-flows

- During the EAI-setup project the reusable sub-flows were implemented to Metso Message Broker environment.
- Purpose of common sub-flows for the Metso EAI Hub are:
  - reading WMQ queue
  - message identification
  - message routing
  - error handling
  - message warehousing
  - transformations & code conversion
  - Adding / removing adapter header to / from message
  - writing to WMQ queue
- These sub-flows are used to build every dataflow created to the Message Broker, to ensure quality and reduce the amount of implementation work.
Some basic guidelines of integrations

- All the messages are routed via broker to enable efficient re-routing, if needed
- ONLY asynchronous messaging from and to broker (not B2B srv)
  - No HTTP, JDBC, SMTP, telnet, FTP etc calls
  - That is, de-coupling the applications
  - High performance, no stalling software processes over the network (except. Broker-SAP R/3, which has caused some problems)
- Avoidance of database integrations (JDBC etc.)
  - Integrations through interfaces offered by applications/application servers
  - Application business logic changes and database changes do not affect the interface
  - Validation of the messages by the applications
- The above principles are no more valid for SOA approach!

Message Queue Interface

Program A sends a message to program B via Queue 1
File based / API based interfacing

- De-facto style is to use filesystem in exchanging messages between the application and EAI environment
  - A Metso-standard method for integration
  - Easy to develop by using export and import routines found from most applications
  - Archiving of sent messages in sending server
    - Technically not the best, e.g. filesystem errors (read/write) difficult to detect
    - Need for directory polling e.g. with 1 minute interval
- Program-to-program (Java/C) API calls used in some high-volume integrations
  - Errors can be monitored by sending and receiving application on program level
  - Immediate messaging
    - Extensive coding & testing needed

Enterprise Application Integration (EAI) at Metso Corporation

- EAI & B2B basics
- EAI Management
  - Message & terminology standardisation
  - Visio for BPM & SOA
Metso STD EAI Message Header

<?xml version="1.0" encoding="UTF-8"?>

<!DOCTYPE MessageHeader SYSTEM "MetsoEAIMessageHeader_1.0.dtd">
<MessageHeader>
    <SenderAppID>MPFIBANP1</SenderAppID>
    <SenderApp>BAN</SenderApp>
    <SenderAppDesc>Metso Paper production BAAN</SenderAppDesc>
    <ErrorEmailRecipient>EAI@metso.com</ErrorEmailRecipient>
    <Date>20031125</Date>
    <Filename>data1234.txt</Filename>
    <GroupReferenceID></GroupReferenceID>
    <HeaderVersion>1.00</HeaderVersion>
    <MessageID>PURCHASE_ORDER</MessageID>
    <MessageFormat>OAGISXML</MessageFormat>
    <MessageReferenceId>1234567890</MessageReferenceId>
    <MessageSize> </MessageSize>
    <ReceiverAppID>MCFISAPP1</ReceiverAppID>
    <SenderBA>MP</SenderBA>
    <SenderLegalCompany>MP123</SenderLegalCompany>
    <SenderDept>MPABC</SenderDept>
    <SenderMA>EMEA</SenderMA>
    <Time>141013</Time>
    <Usage>PRD</Usage>
    <ReceiverBA>MP</ReceiverBA>
</MessageHeader>

EAI Message Management

RosettaNet Based classification

Message type classes

- EAI XML
- All internal XML
- ANY/THING
- For broken messages

- CSV
- OAGIS 7.0 XML
- OAGIS 0.9 XML
- Proprietary ASCII
- Proprietary XML
- RosettaNet
- SAP/IDOC XML
- cXML
- XML Table
Metso Message Warehouse

additional views
**Message Status Descriptions**

- **Sent**: Message is sent from the sending system or from the Message Broker.
- **Received**: Receiving system or the Message Broker has received the message.
- **Accepted**: User has accepted the message in some error status.
- **Completed**: When all the leaf (child) messages of the node (father) message have reached their target system(s).
- **Error**: Some error has been detected in the message transfer.
- **Adapter error**: Error in adapter has been detected.
- **Application error**: Error in application has been detected.
- **Timeout error**: Leaf (child) messages have been sent but not marked as received/accepted within the time limit, thus the node (father) message’s status is updated to this.
- **Broker error**: Error in broker has been detected.
Request for Quotation of integration (RFQ)

1. Create RFQ
2. Attach needed documentation
   - func. reqs.
   - mapping table
   - data table
   - func test plan
   - tech. spec.
   - tech test plan
   - tech test report
   - func test report
3. Approve
4. More info needed
5. Approve
6. Develop flow
   - func. reqs.
   - mapping table
   - data table
   - func test plan
   - tech. spec.
   - tech test plan
   - tech test report
   - func test report
7. Perform development env
8. Flow ready for test env
   - func test report
   - mapping table
   - data table
   - func test plan
   - tech. spec.
   - tech test plan
   - tech test report
   - func test report

New integration (to TEST)

1. Create ticket
2. Attach needed documentation
   - func. reqs.
   - mapping table
   - data table
   - func test plan
   - tech. spec.
   - tech test plan
   - tech test report
   - func test report
3. Approve
4. More info needed
5. Approve
6. Perform tech test
7. Document & report changes
8. Close ticket
   (resolve for 14 days)
New integration (to PROD)

Requester
1. Create ticket &
2. Attach needed documentation

Approver
3. Approve
4. More info needed

Performer
5. Perform work & QA
6. Check configuration
7. Document & report changes
8. Close ticket
   (resolve for 14 days)

-1. func. reqs.
-2. mapping table
-3. data table
-4. func test plan
-5. tech. spec.
-6. tech test plan
-7. tech test report
-8. func test report

MINT
OK
NOT OK

EAI service prod env
EAI Managmnt

11. Accept ticket

Some Statistics

- 270 integrations (a message X from application A to B)
- 85 applications integrated
- ~50 servers (separate IP addresses)
- ~ 8000 messages/day
- 95% of integrations are made via directory systems by using files
- 40% of messages are in XML format
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- Message & terminology standardisation
- Visio for BPM & SOA

XML Basics, MultiChannel Architecture

XML

Style sheet
(XSL FO)

Create output

Transformation
(XSLT)

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Message standardization by XML

- Trying to use "standard" XML schemas
  + XML message data items self-describing, single message content can vary without problems
  + No need to re-invent the wheel (develop own XML formats)
  + Messages are parts of wider chain of business processes (e.g. purchase order message contains the necessary data for invoice message, so same tags and data items can be partly used)
  + same data can be used for various layouts & tools
  - STD:s often time consuming to learn and master
  - No support by the applications, extensive coding needed

- Trying to avoid ASCII files
  - Fixed structure, changes difficult
  - Not "self-describing"
  + Comma-separated import & export format quite common

Motivation by Gartner Research

Gartner Research, Aug 2003
Choosing the Right Data Formats to Share Product Content,
• Lack of std’s will be a problem in product data transmission also in the future
• Organisations should take part of the standardisation
• There is no authority, that could force companies to use same naming for data
• XML as a technology does not help, because the problem is NOT TECHNICAL

Gartner Research, May 2006,
Sharing Semantics Across Applications,
Rita E. Knox, Ted Friedman, Jess Thompson

Question 8: Does the cost justify the required effort to enable semantic integration?

Yes. The basic reasons are critical to any company’s success. At the very least, semantic integration:
- Enables sharing across applications within a company, and with partners, suppliers and customers.
- Reduces the cost of integration and building services by simplifying data mapping.
- Reduces the amount of software that has to be uniquely created to process data.
Motivation by Microsoft

MS Office XML Strategy

Built –by design– for Interoperability: Office 2007

Strategic Alignment XML Web Services - Support XML standards
Remove barriers to enable data interoperability e.g. Servers
Smart Client for XML Web Services e.g. Office
Enabler for Mobile Devices, Multiple Form Factors
Enable new scenarios - Document and Data intertwined

Primary issues needed to avoid xml-chaos

• Metso Uniform Message/ Schema Library
• Metso Basic Dictionary (Ontology), ( for markup naming )
• Domain specific dictionaries (using namespaces)
• Platform and Service to support these
  = Message & Dictionary Services (MDS)

• The above issues will hopefully be some of the basic steps on the road towards SOA
• we are just in the beginning in this
The fact: Own data model & schema for each application
- point-to-point connections need much more transformations and cost than transforming each schema to Metso std "uniform" schema.
- all data manipulations and calculation tools for reporting etc needs are much cheaper, if all data in EAI is in same std format:
  - DATA ITEM NAMES
  - DATA ITEM CONTENTS
  - SCHEMAS

This same strategy is used by operators and major companies having large experience in B2B messaging too.

The challenge here is:
For the first connection between A/ B using proprietary schemas, a point to point connection needs only one transformation, which is from the project's point of view always cheaper, that transforming A-->MetsoML and MetsoML-->B.
No project is willing to pay the extra for a more generic solution.

Metso Dictionary Approach
Terminology for XML-tags for messages

Where we are now:
Taken some preliminary steps in dictionary specs.
Prestudies by:
- HUT
- VTT

For use at EAI & BPM for mapping
Comparing terminology

RosettaNet | xCBL | UBL (Invoice-sample.xml)
--- | --- | ---
fromRole > BuyerParty > BuyerParty>
toRole > SellerParty > SellerParty>
billTo > BillToParty > PaymentMeans>
shipTo > ShipToParty > Delivery>

>PartnerRoleDescription/ContactInformation> >Party/xxxContact/xxx/Contact/> >Party/Contact/>

<table>
<thead>
<tr>
<th>contactName</th>
<th>ContactName</th>
<th>Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>EmailAddress</td>
<td>ListOfContactNumber/ContactNumberValue</td>
<td>ElectronicMail</td>
</tr>
<tr>
<td>telephoneNumber/CommunicationsNumber</td>
<td>ListOfContactNumber/ContactNumberValue</td>
<td>Telephone</td>
</tr>
</tbody>
</table>

| PartyID/Identifier/Agency/AgencyCoded/ID |
| PartyID/Identifier/Ident |
| Address> (or DeliveryAddress or FinancialInstitution or FinancialInstitutionBranch)> |

PhysicalLocation/GlobalLocationIdentifier PartyID/Identifier/Ident ID
PhysicalLocation/PhysicalAddress> NameAddress>

| addressLine1 | Name1 | AddressLine |
| addressLine2 | Name2 | AdditionalStreetName |
| addressLine3 | Street | StreetName |
| postOfficeBoxIdentifier | POBox | Postbox |
| cityName | City | CityName |
| NationalPostalCode | PostalCode | PostalZone |
| GlobalCountryCode | CountryCoded | Country |

Unpredictable usage of Capital letters UpperCamelCase usage of Capital letters UpperCamelCase usage of Capital letters

Metso Schema Library
for Messages

Define Namespaces for domains
• Purchase process
• Delivery process

RosettaNet
XCB
UBL
EBXML CC
OAGIS
Others?

Search a needed schema first from these

If not found, define own

Metso defined schemas

Choose terms
Upgrade new terms

Metso Dictionary

For use at EAI & BPM for mapping & transforming

Mapping rules/transformations between schemas

Mapping rules between terms
1. Dublin Core:
   - <xs:element ref="title"/>
   - <xs:element ref="creator"/>
   - <xs:element ref="subject"/>
   - <xs:element ref="description"/>
   - <xs:element ref="publisher"/>
   - <xs:element ref="contributor"/>
   - <xs:element ref="date"/>
   - <xs:element ref="type"/>
   - <xs:element ref="format"/>
   - <xs:element ref="identifier"/>
   - <xs:element ref="source"/>
   - <xs:element ref="language"/>
   - <xs:element ref="relation"/>
   - <xs:element ref="coverage"/>
   - <xs:element ref="rights"/>

2. ITIL (IT Infrastructure Library)

<table>
<thead>
<tr>
<th>Process</th>
<th>Term</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Service Desk/Problem Management</td>
<td>Alert</td>
<td>Warning that an incident has occurred.</td>
</tr>
<tr>
<td>Configuration Management</td>
<td>Asset</td>
<td>Component of a business process. Assets can include people, accommodation, computer systems, networks, paper records, fax machines, etc.</td>
</tr>
<tr>
<td>Configuration Management</td>
<td>Asset management</td>
<td>Oma sisustus (Own Infrastructure)</td>
</tr>
<tr>
<td>Availability Management</td>
<td>Availability</td>
<td>Useit (Availability)</td>
</tr>
<tr>
<td>Availability Management</td>
<td>Availability management</td>
<td>Oma sisustus (Own Infrastructure)</td>
</tr>
<tr>
<td>Change Management</td>
<td>Back-out</td>
<td>Palautus (Reversal)</td>
</tr>
<tr>
<td>Change Management</td>
<td>Business process</td>
<td>Liiketoimintakeske (Business Process)</td>
</tr>
<tr>
<td>Change Management</td>
<td>CAB Member</td>
<td>Muutostenjohtajakunta (Change Advisory Board)</td>
</tr>
<tr>
<td>Service Support</td>
<td>Category</td>
<td>Luokka (Classification)</td>
</tr>
<tr>
<td>Service Support</td>
<td>Change</td>
<td>Muutos (Modification)</td>
</tr>
<tr>
<td>Change Management</td>
<td>Change Advisory Board (CAB)</td>
<td>Muutostenjohtajakunta (Change Advisory Board)</td>
</tr>
</tbody>
</table>

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### 2. ITIL (IT Infrastructure Library)

- **Change Management**
  - Change Advisory Board (CAB)/Emergency (CAB/ERC)
  - Muutustutkimus
  - Muutuksennimiksi
  - Muutuksen valvonta
  - Muutoksen suunnittelu
  - Muutoksen valkoinen

- **Change Management**
  - Change Authority
  - Muutoksen hyväksyntä

- **Change Management**
  - Change control
  - Muutoksen valvonta

- **Change Management**
  - Change request
  - Muutoksen suunnittelu

- **Change Management**
  - Change document
  - Muuttodokumentit

- **Change Management**
  - Change history
  - Muutoshistoria

- **Change Management**
  - Change implementor
  - Muutokseen käytäntöta

- **Change Management**
  - Change initiator
  - Muutokseen tekijä

- **Change Management**
  - Change log
  - Muutokset

- **Configuration Management**
  - Change baseline
  - Konfiguraatiokilta

- **Configuration Management**
  - Change control
  - Konfiguraatiokontrollo

**ITIL as a whole is not directly implemented in UBL**

- E.g. birth. date (000012) vs. BirthDateTime

---

### UBL/ebXML/OASIS Core Components

- **Dictionary examples**

<table>
<thead>
<tr>
<th>Core Component Type</th>
<th>Examples of business information entities</th>
<th>Representation Type</th>
<th>Datatype</th>
<th>Examples of business information entities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Code Type</td>
<td>country. code (000032)</td>
<td>Content</td>
<td>String</td>
<td>code. value (000091)</td>
</tr>
<tr>
<td>Identifier Type</td>
<td>party. identifier (000016)</td>
<td>Indicator</td>
<td>Boolean</td>
<td>charge price. tax inclusion.indicator (000130)</td>
</tr>
<tr>
<td>Date Time Type</td>
<td>birth. date (000012)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Amount Type</td>
<td>charge price. amount (000127)</td>
<td></td>
<td></td>
<td>currency exchange. rate(000120)</td>
</tr>
<tr>
<td>Quantity Type</td>
<td>chargeable. quantity (000121)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Text Type</td>
<td>person. name (000098)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Core component types are implemented in UBL**
- **Dictionary as whole is not directly implemented in UBL**
  - E.g. birth. date (000012) vs. BirthDateTime
### UN / CEFACT Core Component types, CCT 1/4

<table>
<thead>
<tr>
<th>CCT Dictionary Entry Name</th>
<th>Definition</th>
<th>Remarks</th>
<th>Object Class</th>
<th>Property Term</th>
<th>CCT Components</th>
</tr>
</thead>
</table>
| Amount. Type              | A number of monetary units specified in a currency where the unit of currency is explicit or implied. | Amount | Type | • Amount. Content  
  • Amount Currency. Identifier  
  • Amount Currency. Code List Version. Identifier |
| Binary Object. Type       | A set of fixed-length sequence of binary octet. Shall also be used for Data Type representing graphics (i.e., diagram, graph, mathematical curves or similar representations), pictures (i.e., visual representation of a person, object, or scene), sound, video, etc. | Binary Object | Type | • Binary Object. Content  
  • Binary Object. Format. Text  
  • Binary Object. Name. Code  
  • Binary Object. Encoding. Code  
  • Binary Object. Character Set. Code  
  • Binary Object. Uniform Resource. Identifier  
  • Binary Object. Filename. Text |

### UN / CEFACT Core Component types CCT 2/4

| Code. Type | A character string (letters, figures, or symbols) list for brevity and/or language independence may be used to represent or replace a definitive value or text of an Attribute together with relevant supplementary information. Should not be used if the character string identifies an instance of an Object Class or an object in the real world, in which case the identifier Type should be used. | Code | Type | • Code. Content  
  • Code List. Identifier  
  • Code List. Agency. Identifier  
  • Code List. Agency Name. Text  
  • Code List. Name. Text  
  • Code List. Version. Identifier  
  • Code. Name. Text  
  • Language. Identifier  
  • Code. Uniform Resource. Identifier  
  • Code List. Scheme. Uniform Resource. Identifier |
|------------|------------------------------------------------------------------------------------------------|-----|------|------------------------------------------------|
| Date Time. Type | A particular point in the progression of time together with relevant supplementary information. Can be used for a date and/or time. | Date Time | Type | • Date Time. Content  
  • Date Time. Format. Text |
| Identifier. | A character string (i.e., a finite set of characters) generally in the form of words of a language. | A character string (i.e. a finite set of characters) generally in the form of words of a language. | A list of two mutually exclusive Boolean values that specify the only possible state of a Property. |
| Identifier. | Content | Identifier. | Content |
| Identifier. | Identification Scheme, Identifier | Identifier. | Identification Scheme, Identifier |
| Identifier. | Identification Scheme, Name, Text | Identifier. | Identification Scheme, Name, Text |
| Identifier. | Identification Scheme, Version, Identifier | Identifier. | Identification Scheme, Version, Identifier |
| Identifier. | Identification Scheme, Uniform Resource, Identifier | Identifier. | Identification Scheme, Uniform Resource, Identifier |

**UN / CEFACT Core Component Types CCT 3/4**

| Identifier. | Type |
| Identifier. | Type |
| Identifier. | Type |

| Identifier. | Type |
| Identifier. | Type |

**UN / CEFACT Core Component Types CCT 4/4**

| Indicator. | Type |
| Indicator. | Type |
| Measure. | Type |
| Measure. | Type |
| Numeric. | Type |
| Numeric. | Type |
| Quantity. | Type |
| Quantity. | Type |
| Text. | Type |
| Text. | Type |
### Table 8-2. Approved Core Component Type Content and Supplementary Components

<table>
<thead>
<tr>
<th>Name</th>
<th>Primitive data-type</th>
<th>Definition</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Amount. Content</td>
<td>decimal</td>
<td>A number of monetary units specified in a currency where the unit of currency is explicit or implied</td>
<td></td>
</tr>
<tr>
<td>Amount Currency. Code List Version. Identifier</td>
<td>string</td>
<td>The Version of the UN/ECE Rec. 9 code list.</td>
<td></td>
</tr>
<tr>
<td>Amount Currency. Identifier</td>
<td>string</td>
<td>The currency of the amount.</td>
<td>Reference UN/ECE Rec. 9, using 3-letter alphabetic codes. The UN/ECE Rec. 9 is also published as ISO 4217, but is available in electronic form and free of charge.</td>
</tr>
<tr>
<td>Binary Object. Content</td>
<td>binary</td>
<td>A set of finite-length sequences of binary octets.</td>
<td></td>
</tr>
<tr>
<td>Binary Object. Format. Text</td>
<td>string</td>
<td>The format of the binary content.</td>
<td></td>
</tr>
<tr>
<td>Binary Object. Mime Code</td>
<td>string</td>
<td>The mime type of the binary object.</td>
<td>Reference IETF RFC 2045, 2046, 2047</td>
</tr>
<tr>
<td>Binary Object. Encoding. Code</td>
<td>string</td>
<td>Specifies the decoding algorithm of the binary object.</td>
<td>Reference IETF RFC 2045, 2046, 2047</td>
</tr>
<tr>
<td>Binary Object. UniformResource.</td>
<td>string</td>
<td>The Uniform Resource Identifier that identifies where the Binary Object is located.</td>
<td></td>
</tr>
</tbody>
</table>

...and so on...

### UBL 1.0, CAC

**Common Aggregate Components**

- Address.................................. 43
- AddressLine .................................. 45
- AllowanceCharge.......................... 46
- BasePrice.................................. 48
- Branch.................................... 49
- BuyerParty.................................. 49
- CardAccount.................................. 50
- CommodityClassification............... 51
- Communication............................ 52
- Contact.................................... 52
- Contract.................................... 53
- Country.................................... 53
- CreditAccount............................. 53
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- OrderLineReference........................ 79
- OrderReference............................ 80
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- PartyTaxScheme............................ 82
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- PaymentTerms.............................. 86
- Period...................................... 87
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- Shipment.................................... 93
- SalesConditions............................ 91
- SecondaryHazard............................ 91
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- ShipmentStage.............................. 95
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- TaxScheme.................................... 96
- TaxSubTotal.................................. 97
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- Temperature.................................. 98
- TransportEquipment....................... 98
- TransportEquipmentSeal................... 99
- TransportHandlingUnit.................... 100
- ...and so on...
Before messages can be exchanged, also data content must be harmonized

- Two level harmonizing: Data name / Data content
  - challenge in B2B, but also internally at EAI
- The same customers and suppliers have different codes in different systems
  Metso Paper Baan 3498724 = Metso Automation MfgPro FFLKJFD = "UPM-Kymmene Oyj"
  - How to know how much we have sold to each customer?
  - How to know how much we purchased from each supplier?
  - How to invoice the same customer on a single invoice from all the business units (ERPs)?

- The same parts have different item codes in different systems (AD69693 = IUWEEEW01 = 15x85 mm bolt)
  - What are the amounts of each type of parts we have bought?
  - How to plan the production?
  - Who is the alternative parts provider?

- Avoid using cross-reference tables?!
  - in practice not possible

EDI / B2B partner Identification codes

<table>
<thead>
<tr>
<th>ICD (InternationalCodeDesignator,ISO 6523,BSI)</th>
<th>UN/EDIFACT (ISO 9735)007 Partner IdentCodeQualifier</th>
<th>DUNS (DataUniversalNumberingSystem/DunAndBradstreet)</th>
<th>DUNS+4 (4 digit suffix company specific)</th>
<th>LY-tunnus (Suomen Kaupparekisterissä, Verohallinto)</th>
<th>Metso FA-code (Metso's internal for legal companies)</th>
<th>OVT-tunnus (Metso's internal)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0015+EDI( ?)</td>
<td>1 DUNS</td>
<td>123456789</td>
<td>1234567891234</td>
<td>87654321</td>
<td>MI123, VA130</td>
<td>FI+LY+FA</td>
</tr>
<tr>
<td>0031+EDI Parter IC</td>
<td>4 IATA</td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>0037+LY-tunnus</td>
<td>9 DUNS+4</td>
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<tr>
<td>UN/EDIFACT (ISO 9735)007 Partner IdentCodeQualifier</td>
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<tr>
<td>DUNS (DataUniversalNumberingSystem/DunAndBradstreet)</td>
<td>30 ICD</td>
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<tr>
<td></td>
<td>31 DIN</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Example: Alternative codes for MetsoPaperJarSparePartsServices:

| DUNS+4   | = 391539570306 |
| ICD-DUNS | = 006039153957 |
| ICD-DUNS+4 | = 0060391539570306 |
| ICD -EDI PIC | = 0031????????? |
| ICD -LY   | = 003715391809 |
| ICD -LY+4 | = 0037153918090132 |
| OVT      | = FI15391809VA130 |
Mapping data at EAI / B2B
Item classification and identification

- Component manufacturer: ABC123
- System manufacturer: LMN999
- Mill: XYZ321

- GUID: Global Unique IDentifier
- PUID: Product Unique IDentifier
  - ABB:12345
  - VAL7654321
- Designation
  - Position number
  - Type code
  - Name / Title
    - Dictionary is needed

Mill Product item classification efforts: FISGMS & PSK (59,74) etc

Enterprise Application Integration (EAI) at Metso Corporation

- EAI & B2B basics
- EAI Management
- Message & terminology standardisation
- Visio for BPM & SOA
BPM & SOA for B2B processes??
Anyway standardized language is needed

- Metso Customers
- Metso Suppliers
- SOA concept?
- RosettaNet?
- eBXML, xCBL?
- Portals Proprietary?
- Hubs Proprietary?
- Business Process definitions
- Dictionaries Schemas
- Web Services
- Invoicing operators
- Business Hubs

B2B GTW
Firewall
EAI HUB
Metso

Metso Applics

SOA Solution View
(by IBM / David Soper, jun 2006)
Towards BPM & SOA at Metso ????
Possible Software Components (no schedule or any decisions made at all yet)

**Step z**
- Development tools
  - Portal Development
  - Rational Application Developer v6
  - Business Process Modeling
- WebSphere Business Modeler v6
- Business Process Integration Development
- WebSphere Integration Developer v6
- Message Flow Development
- Message Broker Toolkit v6

**Step y**
- Monitoring and management
  - Business Process Monitoring
  - WebSphere Business Monitor
  - Message flow Monitoring
- TE Message Warehouse
- Infrastructure Monitoring
- BMC Patrol
- Version Management
- CVS

**Original slide by Tietoenator/ Jani Jääskeläinen 15.9.2006**

**Practical Challenge:** A huge effort to motivate, get funding and rewrite these almost 300 interfaces to become SOA compatible!!

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**Thank You**

**questions?**