ISSEUS for ROR
(2nd Edition)

Sept.04, 2008
Hajime Horiuchi
What is ROR

• ROR (Registry of Registries) is the key objectives of the MFI standards to materialize the interoperability among industries business processes
  – MFI: ISO/IEC 19763 (Metamodel Framework for Interoperability)

• Goal:
  – Reification of the interoperability among heterogeneous domain registries

• A formal committee under IPSCJ(JTC1 Japan)
  – SC32WG2 + TC184/SC4 + ECOM + LCDM members
  – Just started at officially on this April
Background of ROR: Industrial Requirements
Original goals of ISO/IEC19763 standards

Heterogeneous Registries

Registry Interoperation
Some of actual registries in Japan

– JEITA (ECALGA, PLIB)
– JEMA (Heavy electric parts)
– JEMIMA (Electric Measurement Instruments)
– CEDI (Petro Chemical)
– JAPIA/JAMA (Automobile)
– JASTPRO (Shippers codes)
– JEDIC (EDI standards)
– JICFS/DRS (Company code, Item code in retailing)
– JACIC LCDM (Construction Engineering)
– www.registry.go.jp
etc.
Cross Industries Information Sharing

EDI by ebXML

EDI by ECALS

Supplier

Wholesaler

Distributor

Retailer
Emerging needs for the Model Sharing

Actual reification of Cross Industries Interoperation is needed

Product Life Cycle Management

Retailing

Logistic & Distribution

Manufacturing

Hazardous Materials Management

Industrial Waste Processing

Product Traceability

Consumer

Artery & Vein
Every domain has own Registry

- Product Life Cycle Management
- Manufacturing
- Retailing
- Logistic & Distribution
- Hazardous Materials Management
- Industrial Waste Processing
- Product Traceability
- Artery & Vein

Registry
A Draft of Framework for Information Infrastructure (ECOM, 2007)

Web Service Providers

- Item Reg. Service
- Ordering Service
- MSDS Reg. Service
- Part Retrieval Service
- Accounting Service

Portal Service

Business Oriented Process Integration

ROR

Material Lifecycle Oriented Process Integration

Retail Item DB
PLIB
MSDS
Cargo Tracking
Tax DB
Trace-ability in EU

- General Food Law
  - Regulation EC/178/2002 (欧州食品安全庁)
- TRACEプロジェクト（http://www.trace.eu.org/）
Food Trace-ability by RFID tag

Registry

牛肉の場合…
個体識別番号

<table>
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<tr>
<th>個体識別番号</th>
<th>出生の年月日</th>
<th>順番の別</th>
<th>月牛の個体識別番号</th>
<th>種別（品種）</th>
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(例)(平成9年12月29日現在)

(株)牛産官庁検査認可機関
Foods Recycling

• “Local Produce & Local Consumption”
• Less “Food Mileage”

Agriculture

Dairy farm

Animal husbandry

Restaurant

First Food shop

Hotel

University

Registry
There must be registries

Supply Chain

Registries

Agriculture-Commerce-Manufacture-Alliance
Positive TRACE-ABILITY

- Not only tracking products
- Feedback from consumers
Trace-ability Framework

Registration Process
Data quality requirements
Interchange formats & Service protocol
Normative data elements
Normative Codes
Unique ID

Automatic Data Capturing (RFID, QR)
ROR: Registry of Registries

TO SUPPORT CROSS INDUSTRIES
Mission of ROR

Heterogeneous Registries

Registry Interoperation
Current status of the registry

• Today, a lot of actual registries are enforced and working in various business domains.
• They were developed mostly according to requirements in their specific domains.
• Each registry has own structure, fashion and procedure.
• Most of them did not pay attentions to other registries.
• Even if, they could follow particular standards, most of those standards themselves might be domain specific.
ISSUES FOR ROR & MFI Standards
ISO29002

- ISO/TC184 SC4WG3
- ISO/CD-TS 29002-5
  Industrial automation systems and integration — Exchange of characteristic data
ROR Service

- Access to a target Registry
- Select a target Registry
- Analyze difference Registries
- Discovery & enumerate Possible Registries
A Use Case in the study

ISO13584 standards
Electronic Parts Category
PLIB
Product-Number
Mapping
Item Master DB
Item-Number
Home Electronic Category
GS1, EPCG
Home electronic Products
Mapping

How different from Google

Google:

• Discovering Non-structural and textual web page by full text search
• Too many hit results (sometime more than $10^8$)
• No semantic operations
• Does not provide any assurance on the result

Is it available to use business transaction processing
Issues

ISO13584 standards
Electronic Parts Category

Home electronic Products

GS1, EPCG
Home Electronic Category

Product-Number
Mapping
Item-Number

PLIB
Item Master DB

Mapping

Data Quality Specification
Mapping
Change Control
Ontology

RA/RO
Registration Procedure
Global Unique ID
Casting
How to Cast a registry call

Level 1

Level 2

Level 3

M1

M2

ROR

Search

Inquire

PLIB Metamodel

ITEM Master Metamodel

PLIB Model

PLIB Model

ITEM Master Instance

JAITA

JAMIMA

PLIB Metamodel

ITEM Master Metamodel

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ROR: Registry Of Registries

Level 1
- Registration
- MFI Model Registry
- Inquire
- Search
- URI

Level 2
- PLIB Metamodel
- ITEM Master Metamodel

Level 3
- PLIB Model
- JAITA
- JAMIMA
- ITEM Master schema

M1

M2

Model Registration
Scope

- Discovery Layer
- Interoperate Layer
- Domain Layer
- User
- ID Center
- Authentication Center

ROR
- Level 1 Registry
- Level 2 Registry
- Level 3 Registry
- Level 4 Registry
- Notification
- RA
- RSS
Level 1 & 2

RoR

UNCEFACT/ebXML

JEMIMA

LCDM Portal

Registry
Repository

LCDM アダプタ

Operational Data
Level 1 Mapping Variation

- Exactly Same
- Similar to
- Looks like
ROR Service

Web service

Inquire

URI

ROR

URI

contents

...
Cross Domain ROR

- Model Mapping Service
- Ontology Search Service
- Registration Authority
- MFI Registry
  - Domain Model
    - Data Elements
    - Value Domain
- Basic Ontology
- Terminology
- Registration Procedure
- Registration Quality

Domain A: UID, Domain Ontology, RA, Registry, Terminology, Industrial domain
Domain B: UID, Domain Ontology, RA, Registry, Terminology, Industrial domain
What is the Registry, again

- **Registry** has several meanings, all of which generally relate to its original or historical meaning as a written, official or formal record of information, or the place where such records are kept.

- Office where registrations are recorded; database for storing system configuration information.

*(Wikipedia)*
The Registrations

Regulation & Standards

Authority

Registry

Evidence of Approval

Request for Approval

Approval

Public Area

It should be official, reliable and sustainable.
DISCUSSION
Questions/Issues

• How to support different Registry standards
  ➔ describing their metamodels by MFI2
• How to Discover and Cast registries
  ➔ Web Service
• Should we register metamodels at the Level2
• Should we ask the target model to be described by MFI2 or MOF
• Should we Integrate the Administrative ITEM
• Should we provide the Model Mapping
• Should we provide a Universal ID
• Should we require Data Quality
• Registration Procedure
Establish Liaison & Collaboration

- XMDR
- OOR
- NCI
- DOD
- TC184/SC4
What is MFI

- Metamodel Framework for Interoperability
- ISO/IEC19763 series of standards
- A set of Metamodels for;

  **Registering Models**

  (Not for describing model or ontology)

- MFI is an Application of MOF (1.4)
ROR by MFI

MFI (ISO/IEC19763) series of standards

- Metamodel for process registration
- Metamodel for model mapping
- Core model
- Metamodel for ontology registration
- Registration Procedure
- ROR (Cross Domain Registry)

Industrial registries
How to Map

• MFI-2 (Core Model) is used for registration of metamodel
• MFI-4 (Model Mapping) to be used for describe model mapping
• The ebXML Core Component to be used for type matching
Use case 2

- Stock take Metamodel of target registries
- If they do not have any metamodel, metamodel should be developed using CWM metamodels
- Assign Core component of the ebXML to each element of the Schema
Metamodel Mapping

- ebXML CC Metamodel
- Item Master Metamodel
- PLIB Metamodel
- Mapping Rule Instance
- MFI: Metamodel for Mapping

CWM

Mapping Process
MFI 4: Model Mapping
Type Matching through CC

ebXML Core Component

1 1

* *

PLIB Element

Mapping

Item Master Element

GS1 ID

TS- TV-42- name (ACC-nn)

TV-42-Toshiba name (ACC-nn)
ebXML Core Component

• Standardized Information elements for Business Information to be used in the electronic business
Metamodel of CC

Core Component (CC)

Aggregate Core Component (ACC)
+ Object Class Term: String

«abstract»
ACC Property
+ Cardinality
+ Sequencing Key: String

Usage Rule
+ Unique Identifier: String [0..1]
+ Name: String [0..1]
+ Description: String
+ Formal Constraint: String [0..1]
+ Formal Constraint Type: String [0..1]
+ Condition Type: String [0..1]

Basic Core Component (BCC)

Localized Information
+ Language Code: String
+ Other Language DEN: String [0..1]
+ Other Language Definition: String
+ Other Language Business Term: String [0..*]

Common Information
+ Dictionary Entry Name (DEN): String
+ Definition: String
+ Business Term: String [0..*]

ASCC Property
+ Property Term: String

Association Core Component (ASCC)
+ Association Type: Association Type = aggregation (readOnly)

ASCC Property

BCC Property
+ Representation Term: String
+ Property Term: String

Registry Class
+ Unique Identifier: String
+ Version Identifier: String

CCTS : Core Component Tech. Spec. V-3.0
CWM: Relational Data model
CWM: Metamodel for Record

Figure 11.1 - Record Package

Traditional COBOL file, CSV file
PLIB Class (Not UML)
PLIB Property (Not UML)
Mapping

PLIB Class

Part

PLIB property

Part_Number

RecordFile

ITEM_Master

RecordField

Item_Number

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DISCUSSION
Thank you

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A Taxonomy of Architecture Types

Target of the Standardizations

Process ↔ Contents

High (Narrow)

Domain Specialty

Low (Generic)

Diversity of Stakeholder

10^2 → 10^8 → High

Model Dependent (Structural)

Metadata Dependent (Non Structural)

SOS
System of Systems

limited Alliance

Cross Industries

ROR
Registry Of Registries

Cross Homes

SOA/SaaS

High

Low

10^2

10^8
Metamodel Framework for Interoperability (MFI)

- ISO/IEC19763-1 Reference model
- ISO/IEC19763-2 Core model
- ISO/IEC19763-3 Metamodel for ontology registration
- ISO/IEC19763-4 Metamodel for model mapping
- ISO/IEC WD19763-5 Process model registration
Objectives for MFI Core

■ Registering sharable modeling constructs
  ● Metamodel
  ● Model
  ● Ontology
  ● Profiles
  ● Pattern

■ Classification for components
  ● From viewpoint of “Sign-Concept-Instances”

■ Selection of instance sets for a particular purpose usage
  ● Assembly (Composition) of registered components
  ● Plug and Play with selection

■ Core Framework for registering Ontology and Model Mapping
Common facility of MDR(ISO/IEC11179)

MDR standards

Metamodel for MDR(ISO/IEC11179)

MFI Core model

ODM

Metamodel for DL

Metamodel for OWL

Describe

Any Ontology

Ontology by ODM

Any Concept

Administer Record

Data Elements

Value Domain

Conceptual Domain

Terminology

Administer Record

Conceptual Domain

Data Elements

Concept

Value Domain

Any Concept

Administer Record

Describe

Any Ontology

Ontology by ODM

Any Concept

Administer Record

Describe

Any Ontology

Ontology by ODM
Issues for WG2

• Consolidation of MDR & MFI

• Service Interfaces
Overview of MDR Metamodel

MDR Metamodell

- describe
- describe
- describe

- Naming
- data element
- owner

- Identification & Classification
- Stewardship
- Registration Authority
Overview of MFI Metamodel

MFI Metamodel

describe

describe

describ

e

Naming

Models

Identification & Classification

Stewardship

Registration Authority

owner
Expected Evolution of MDR & MFI (1)

Common Administration Information

"Common Facility" for both MDR & MFI

Metadata Registration
- ISO/IEC11179 Edition 3
- ISO/IEC11179 Edition 2
- ISO/IEC11179 Edition 1
- Data Elements
  - SC14

Model Registration
- ISO/IEC19763
- MOF (ISO/IEC19502)
- MOF (OMG)
- IRDS (ISO/IEC 10728)
Expected Evolution of MDR & MFI (2)

MDR+MFI
Registration & Maintenance Procedure

- ISO Directive
- JTC1 Directive
- IEC Common Database Procedure
- IEC 29002
- ISO 9000

ISO/IEC 11179-4; Formulation of data

Registration Procedure
ISO/IEC19763-6
ISO/IEC11179-6