Context in Integration

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A surprising fact

• There are a lot of different ways in which an industry model can be used to integrate a number of overlapping systems and the organizations that use them
Basic Elements

Integrated Schema

Unconstrained Sub-Schema

Virtual Schema

Constrained Sub-Schema

Unconstrained Sub-Schema

Integrated Schema

Persistent schema

On-line Two way mapping

On-line (only master held)

Off-line (copy at each end)

Off-line two way mapping
Integrated System

- Constrained Sub-Schema B
- Constrained Sub-Schema C
- Constrained Sub-Schema D
- Constrained Sub-Schema F
- Constrained Sub-Schema G

- Unconstrained Sub-Schema A
- Unconstrained Sub-Schema E
On-line Messaging

A

A'

1

C'

A

B

A A'

C

B' 3

C'

2

C

C

B

C

A

C

B

A

C

C

A

C

B

A

C

C

B

A

C

C
Off-line Messaging
Off-line Messaging with Façade
Shared Database

1
X

X

Shared Database

Y

Y

Z

Z

2

3
Loosely Integrating Database
Model Integration

In SQL terms M1 and M2 are views of IM1
Integration into more than one integration model
Integrating integration models

IM_3

IM_1

M_1 M_2 M_6

IM_2

M_3 M_4 M_5
A limited integration model

Context

Scope

AM_1

AM_2
Integrating an application model and a limited integration model

Outside Context
Using an integration model with a broad model context

Integration Model

Mapping

External Model

Context

Expanding scope

A

B

D

C

C+
Integrating additional application models
What is “Context” in the context of integration?

• What is assumed in an ontology and not made explicit.
Federation and Integration

Federation
- Can take advantage of local context – improves performance
- A lot of interfaces – high maintenance costs

Virtual Integration
- Best of both worlds?
- Processing in local context
- Maintainable interfaces

Monolithic Integration
- Everything brought into a single context – performance hit
- No interfaces to maintain
- All eggs in one basket
Primitive Concepts

Top Level Ontology

Foundation Concepts

General Concepts

Discipline-specific Concepts
A full integration model

- Foundation Concepts
- General Concepts
- Discipline-specific Concepts
Integrating application models with an integration model

Integration model
Analyzing the application models
Adding any missing concepts to the integration model
Identifying the subset of the integration model
Creating the mapping between the integration model subset and the application model
Data consolidation

Consolidate
Conceptual Model
Mapping
External Model
Summary

- There are lots of different ways you can integrate systems/ontologies.
- Context in integration is what is assumed in an ontology/system and not made explicit.
- Domain ontologies/systems can take advantage of simplifications that improve performance, but do not apply more generally.
- A Top Level Ontology is a way to provide a universal context (or at least very broad) to provide a framework to make the context of domain ontologies explicit.
- Mapping domain ontologies/systems into an integrating ontology is about filling in the missing context and ensuring consistency across domains. Your TLO needs to be suitable for that.
- Integration does not require a monolithic system, you can have virtual integration with a databus that uses the integration ontology which you map in and out of.
- Extensibility is important in an integrating ontology, which requires a universal context.