Model Driven Message Interoperability

ABSTRACT

The need is to reliably send information from one enterprise to another. The problem is there are too many message standards, and too many active versions of each standard. SWIFT planned to migrate from the legacy FIN messages formats, which carry the bulk of all inter-border bank transactions (MTxx) to the new XML based ISO 20022 harmonized payment message formats (MXxx). The banks said "no" as it would cumulatively cost billions, instead instructinf SWIFT to support both standards indefinitely. In HealthCare, HL/7, which is the primary healthcare message standards body, has released a new XML message standard (HL/7 v.3) to replace the current EDI-based message standard (HL/7 v.2). The transition to HL/7 v3 has been painfully slow.

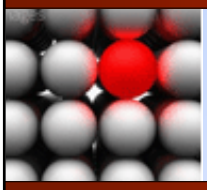
The Object Management Group's (OMG – the organization which publish software development standards) recently approved the Model-Driven Message Interoperability (MDMI) standard. It promises dynamic, flexible, quality-assured information exchange between message formats. This allows new message formats to comfortable coexist with existing legacy formats thus allowing a much faster, economically efficient adoption of new standards. MDMI is scalable. It only requires an entity to know its own message formats and how to map those elements to existing industry standard concept dictionaries. The utilization of MDMI in finance and healthcare enables future improvement in message payload carrying capacity and diversity while saving billions of dollars today in unnecessary application recoding and expensive revisions of proprietary mapping products.

BIOGRAPHY

Mark Eisner
Chief Technology Officer
Firestar Software

Mark Eisner is the CTO of FireStar Software. FireStar is the latest in a series of innovative entrepreneurial enterprises each of which he was a co-founder. The area of his work has been in IT infrastructure, with the last fifteen years focused on inter-enterprise, application-to-application messaging. In this regard, he has been a consultant to major clients such as IBM and Progress Software. In particular, he has consulted to SWIFT on aspects of the SWIFT standards and gateway technology.

For the last five years, as co-chair of the OMG Finance Domain Taskforce, Mark spearheaded the effort to create the MDMI specification.



MDMI – Improving the quality of message interoperability among independent entities

July 2010

OBJECT MANAGEMENT GROUP

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MDMI -- Model-Driven Message Interoperability an Object Management Group public standard

- MDMI is a practical way to achieve message interoperability within a distributed SOA community of independent enterprises.
- Use of MDMI should significantly improve:
  - The Reuse of existing legacy applications and current data formats
  - The Cost to achieve data interoperability in a large community
  - The Time to implement interoperability
  - The Scalability and scope of interoperability
  - The Supportability of data exchanges
  - The Flexibility allowed for each participant
  - The Autonomy allowed for each participant
- MDMI will improve the **Quality** of data exchange
  - MDMI can provide significant value to each enterprise of a community, as well as the community as a whole.

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The difficulty of Message Interoperability today

- Current Problem
  - Numerous message formats abound - external and internal to enterprises
  - Legacy applications preclude easy adoption of new standards
    - A single change to a message can cost banks $1B for labor and several months of development time.
  - As a result, message formats become overloaded, human intervention is common, and disparate bilateral or localized conversions exist
  - Large and unnecessary (but often accepted cost-of-business) expense maintained for most domains
- Current "costs"
  - New more powerful message formats are not adopted
  - New versions of a message format take years to be adopted
  - Messages do not remain current with market demands
    - Old message formats cause bottlenecks that slow changes for new markets
    - Within finance, the most commonly used cross-border payment message format was designed forty years ago.

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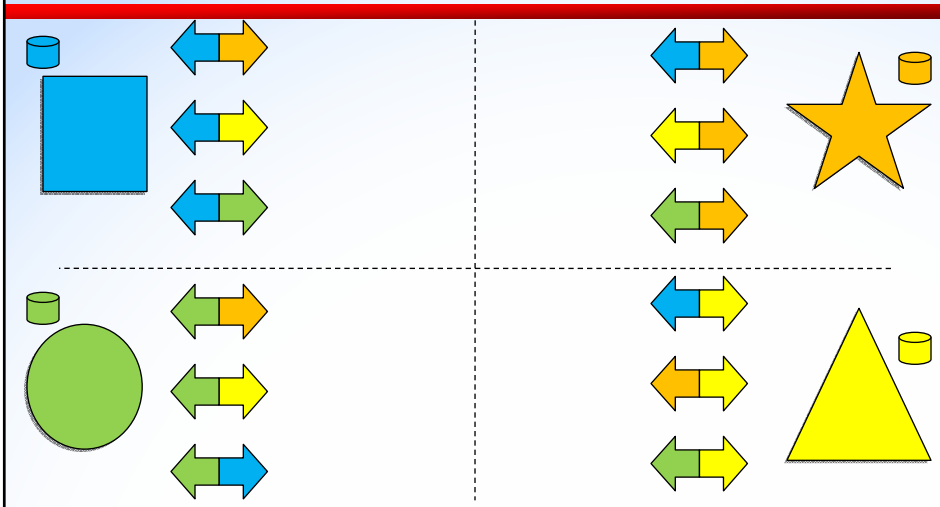
Conversion Programs are too difficult to maintain



Today: Each participant builds and maintains N conversion programs.
Works for small communities – albeit painfully.
Won't work for large communities

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Current industry solutions are necessary but not sufficient

- The focus is on entirely new message standards, which are created to fit current market needs and formats
  - Usually done by groups of industry experts
  - Most often, the approach is based on top-down formal modeling of industry processes
    - UML process modeling or the creation of a structured ontology
  - These efforts provide insight but do not help the interoperability problem
    - Object modeling does not result in semantic clarity at the field or business concept level, a requirement for interoperability with existing message formats
    - An ontology over-requires semantic structures making it hard to match with real world business concepts
- **The result – very slow adoption of these new message formats and loads of errors when using older formats**

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Data Standards are necessary, but not sufficient

- Over decades the Financial world has painfully recognized that standard data formats are not, *by themselves*, a viable way to achieve effective interoperability.
- Since Legacy formats are too valuable to be abandoned – they must be utilized.
  - Conversions between numerous legacy formats only work if based on **semantic** interoperability.
- To achieve semantic agreement, the conversion **process** needed to be standardized, simplified and supported.

MDMI is about a standardized conversion Map– leveraging the domain standards already in place

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MDMI -- the sufficient condition to allow information interoperability

- Focuses on standardized conversion maps to add to traditional standardized message formats
  - MDMI Maps are rich enough to handle mapping the semantic elements mapping of any legacy or internal message format.
  - The maps describe how to move a semantic element out of or into a message
- Provides semantic interoperability through a domain dictionary containing business elements
  - Same linear structure used in Webster's dictionary to describe the basic semantics of English
- MDMI in:
  - Syntax independence
  - Flexibility in its ability to expand
  - Provides for the co-existence of different message versions
  - Ability to move data between different message formats within a multi-step transaction
  - Public conversion Maps, created once, and supported by Standards bodies.

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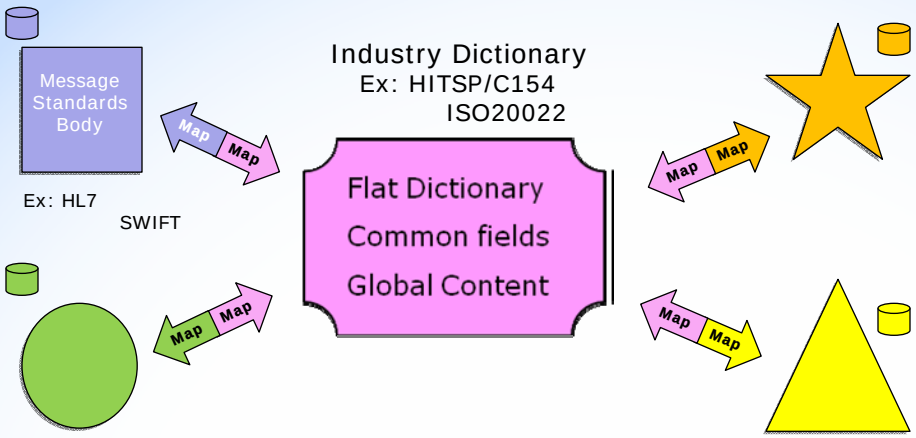
Step 1 – create the map



Each participant builds and maintains ***ONE*** map of the data elements of their messages to the Industry dictionary.

Message standards bodies also create Maps to the industry dictionary

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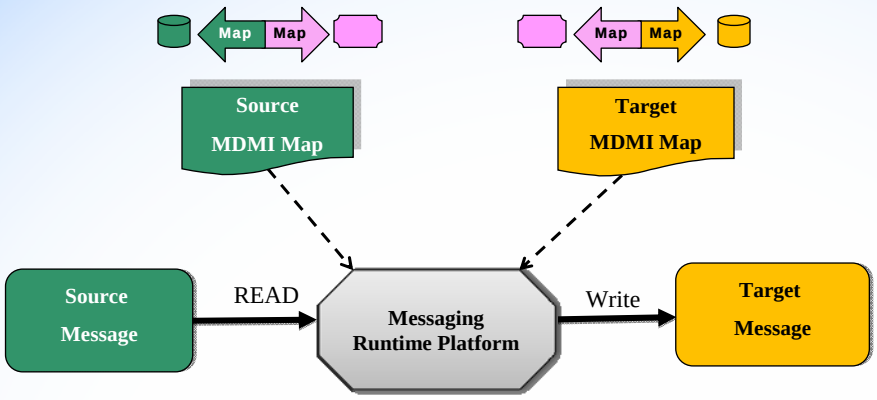
Step 2 – Message conversion



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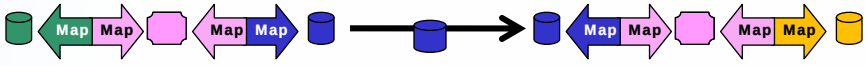
Message Conversion options

- Conversion at the originator's site

- Conversion at the receiver's site

- Conversion at Both sites – send message in industry standard



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Comparing Approaches

Today's approach:

- Agree standards (ISO,C154, etc.)
- Engineer thousands of conversion programs
- Everyone must be aware of multiple target formats and variations.
- Unable to efficiently scale beyond a few dozen entities
- Burden of large communities falls on all
- Begin the standard process again, and again…
- Many years from now, after billions of $$ spent, it still won't be sufficient.

Repeat

The MDMI method:

- Map to an agreed semantic standard
- Each entity maintains and publishes only map of their formats to the central dictionary
- Each entity is autonomous – need only understand their own Map
- Unlimited scalability – no incremental impact to existing members
- Interoperability achieved in months, not years or decades
- No procedural conversion programs
- No re-tooling of installed solutions
- As message standards evolve, change the maps, not the applications

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MDMI Key Principles

- MDMI is a formal specification that defines a "machine readable" map.
  - Each entity creates a map to/from its current data format to an agreed semantic Industry-approved Dictionary
  - Anyone can create maps and distribute them to their partners.
  - Distribution can be open, private or proprietary.
- Fundamental principles of MDMI:

1. Decompose each message format into its syntactic elements and its semantic elements.
2. Map semantic message elements to business elements within a domain dictionary.
3. Each business element has a unique id so extracting a semantic element from a message and inserting into another message is fast at runtime

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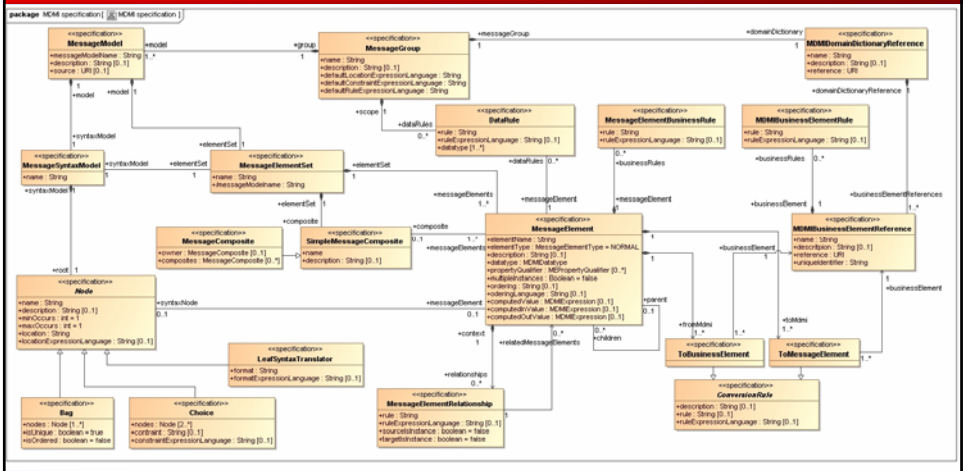
MDMI Specification



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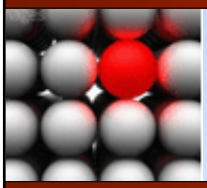

Lets look at a simple example:

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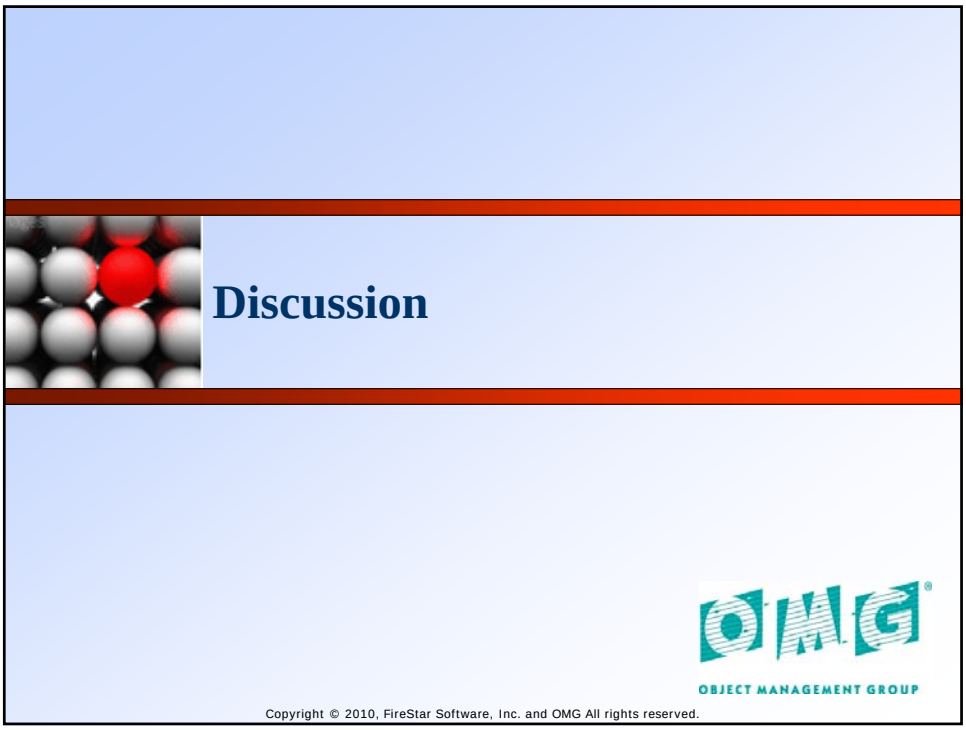
Discussion
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