Model Driven Data Interoperability (MDMI)

An OMG Finance Domain task Force
Presentation
12/11/2008

By Mark Eisner, co-chair

FireStar
SOFTWARE

Some of the problem

- The current messaging environment inhibits change
  - Legacy software to is expensive to change (remember Y2K)
    - Can't take advantage of new message formats and technology
    - Can't respond fast enough to market changes
  - Too dependant on least-common-denominator definitions
    - Message variants squeezed into restrictive syntax and semantics

- Conversion of message information not standardized
  - Ever app or EAI solution coded separately, no standard for conversion
  - Versioning is costly and slow

- STP still out of reach
  - Semantic meaning of fields between message not consistent
  - No standardized mechanism to move information between standards
  - Information integrity not maintained throughout a transaction

FireStar SOFTWARE

Objectives for MDMI

- Be UML-compliant
  - A well structured modeling paradigm (as opposed to XML)
- Express standard as open and public UML profiles
  - However, message definitions and conversion "content" can be proprietary, semi-private or public.
- Make it easily for Financial Services standards bodies
  - Separate syntax from semantics – be wire format independent
  - Provide for model (semantic) level compliance
- Enable enterprises and vendors to implement industry standard data conversions applications

FireStar SOFTWARE

What is the MDMI standard

- Models the conversion of "message elements" instead of messages
  - Describes how to take elements out of a message or insert it into a message
- Separates syntax and semantics
  - Localizes the complexity of overloaded legacy messages
  - Allows for semantic level mapping
- Message elements mapped to a central domain data dictionary
  - Standards bodies or enterprises need only map to business elements
  - Hub and spoke model creates a linear set of transformations
- Robust creation of domain data dictionaries
  - Dictionary comprised of truly reusable business elements
  - Semantic distance maintained
    - Synonyms and near-synonyms in a separate "thesaurus"
- Maps can be created using industry standard tools
  - Based on UML models
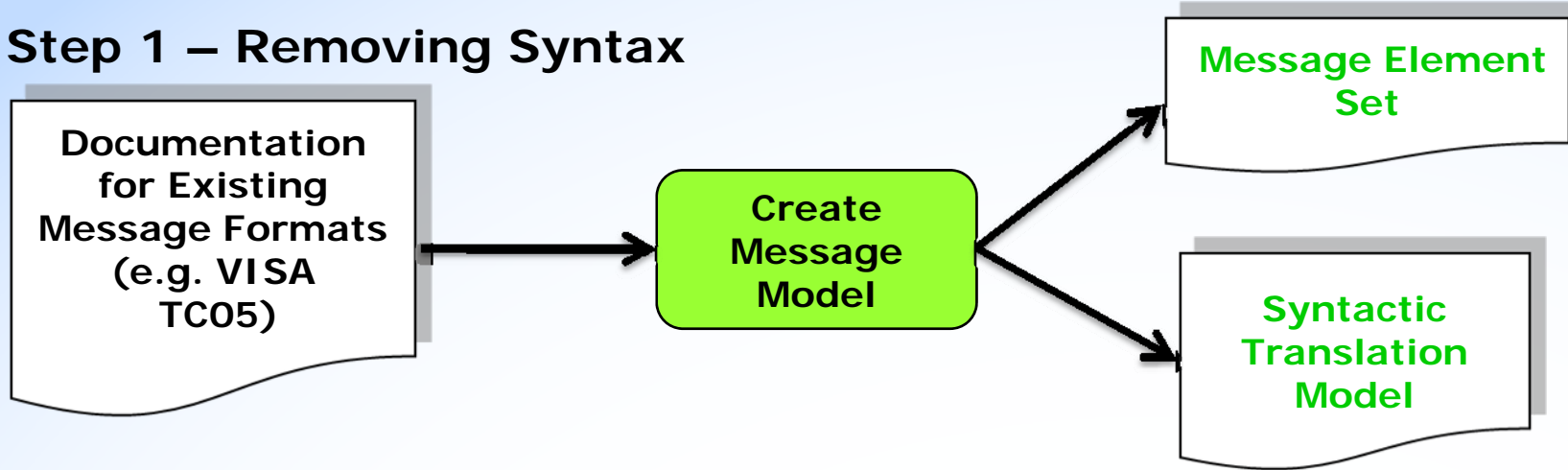
FireStar SOFTWARE

So what are MDMI benefits

- Allows standards bodies to automate versioning
  - Supports version map injection
- Provides a viable pathway to new wire formats like XML
- Defines a real world process to incrementally build a domain data dictionary
  - Based as much on existing messages as on industry modeling
  - New well-structured business elements easy to add
- Delivers on the ISO 200022 promise of effective, but flexible re-usability
  - Entities can create whole new message formats from business elements
- Creates a mechanism for federating domains through standard dictionaries
- Reduces cost and improve quality for financial institutions
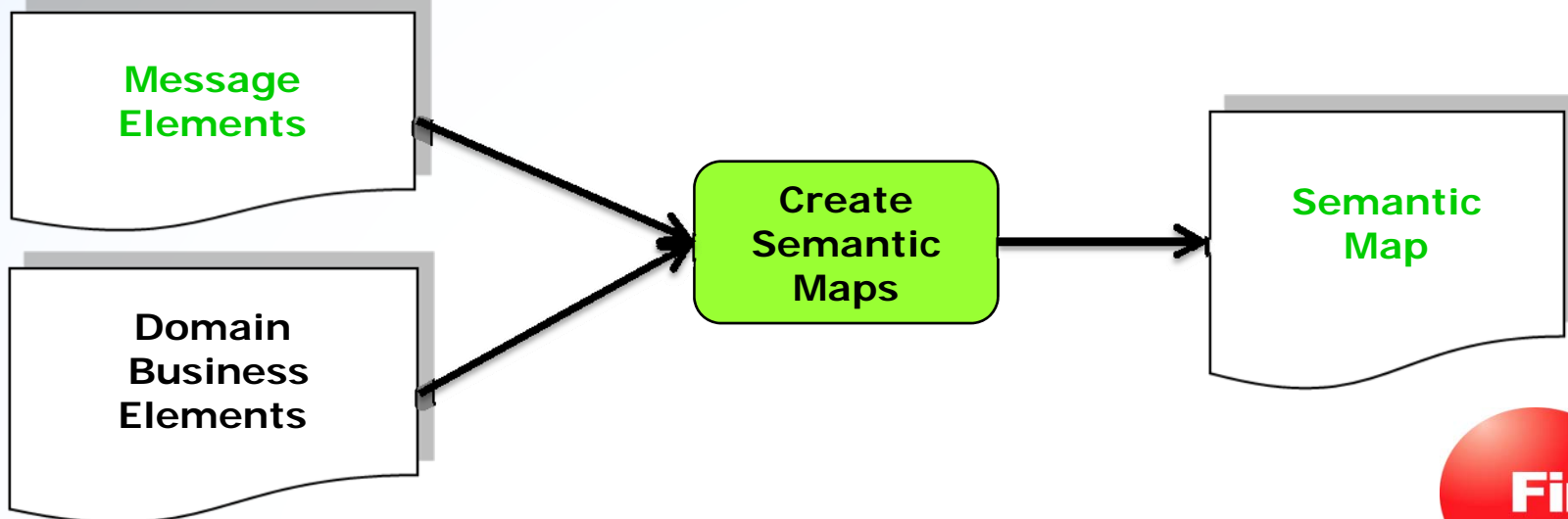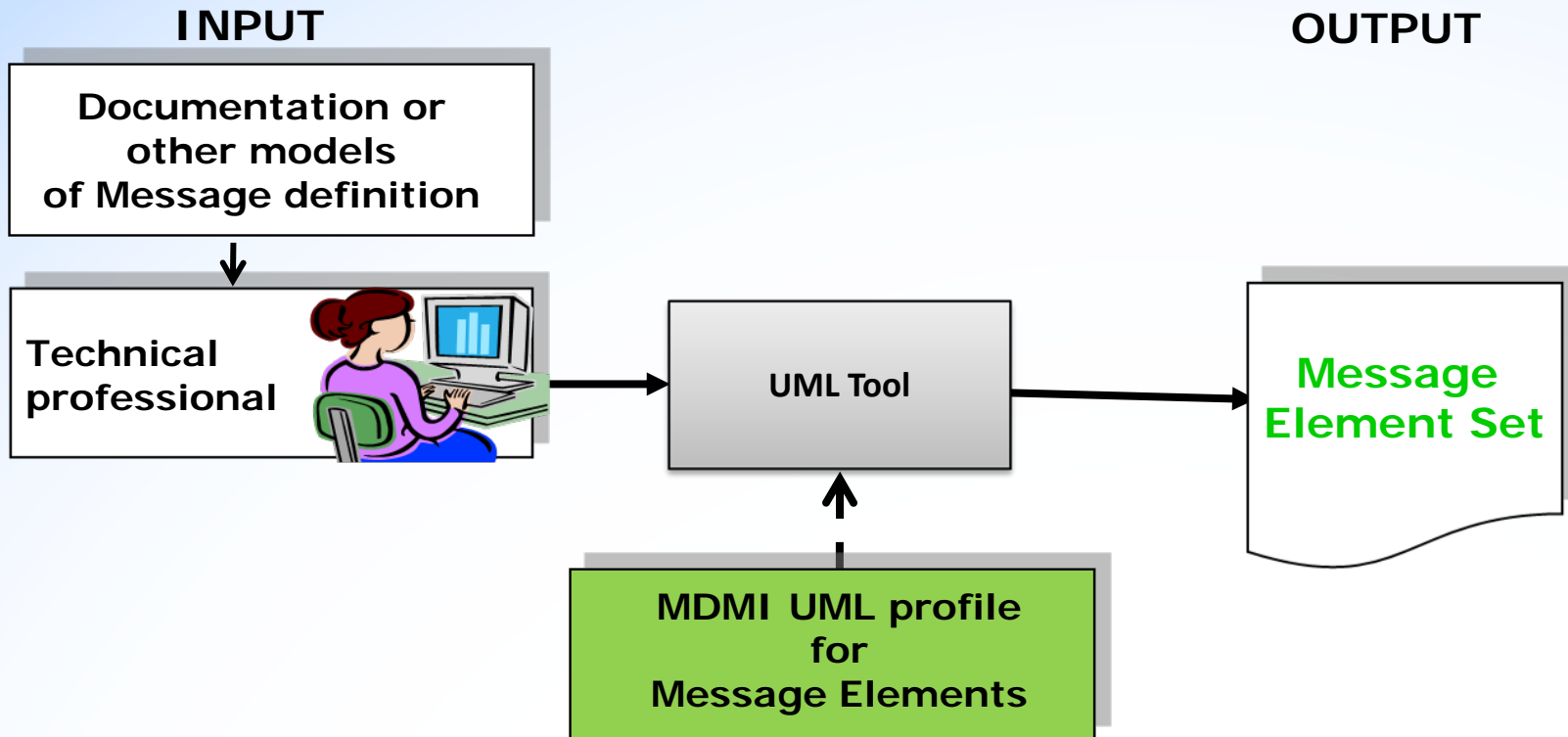 - Internal data can be easily mapped to inter-enterprise message standards

FireStar SOFTWARE

High Level view of MDMI Design Process

Step 1 – Removing Syntax

Documentation for Existing Message Formats (e.g. VISA TC05) → Create Message Model → Message Element Set

Create Message Model → Syntactic Translation Model

Step 2 – Mapping Semantics

Message Elements → Create Semantic Maps

Domain Business Elements → Create Semantic Maps → Semantic Map

FireStar SOFTWARE

Process to remove syntax

INPUT   **OUTPUT**

Documentation or
other models
of Message definition

Technical
professional

UML Tool

Message
Element Set

MDMI UML profile
for
Message Elements

- Modeling done by Technical Professionals
  - No (or minor) domain knowledge necessary
  - Except for specifying Business Rules and associations
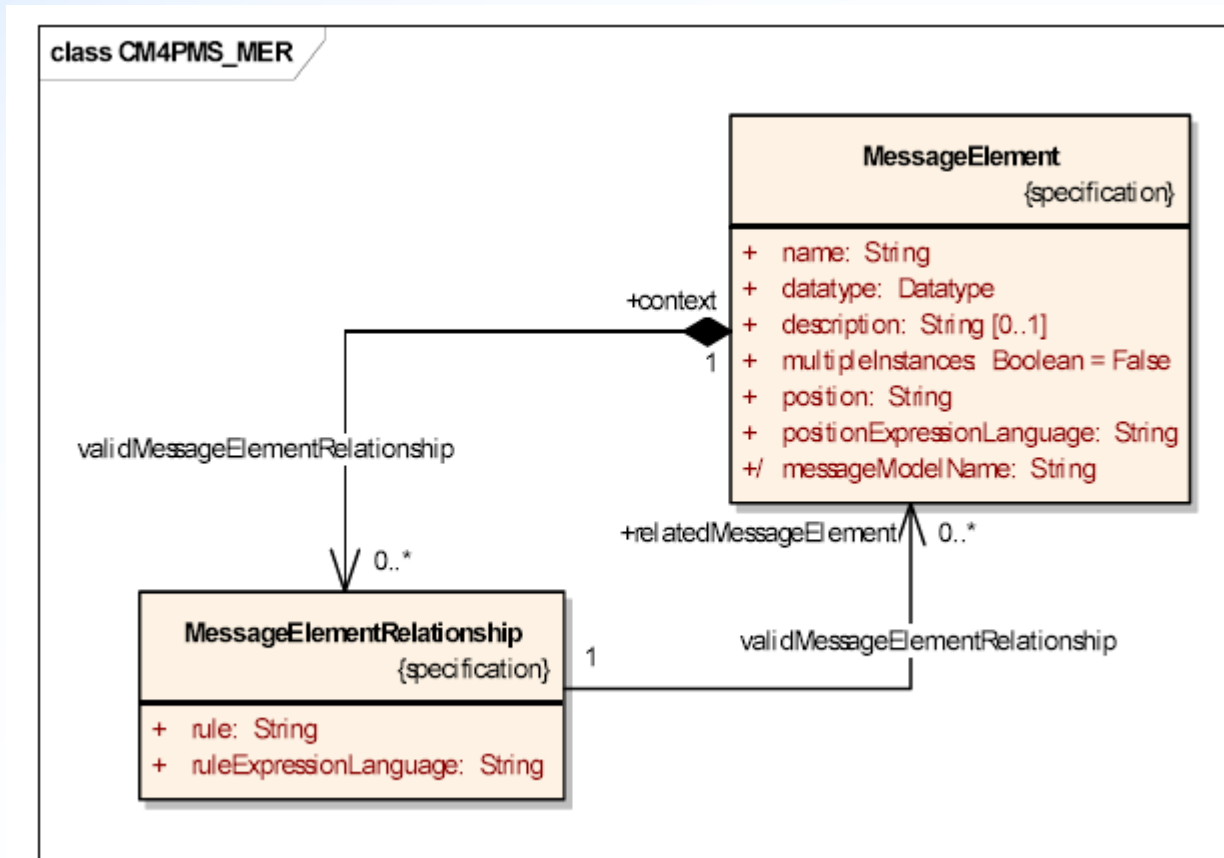
FireStar SOFTWARE

A Description of the Message Element Set

- Definition of the Message Element Set
  - A set of classes representing the smallest semantic elements in a message
  - Independent of any type of message syntax or physical format representation
- The MDMI Profile for Message Elements
  - Class description
  - Business Rules associated with a Message Element
  - Datatype rules
- Message Element relationship model
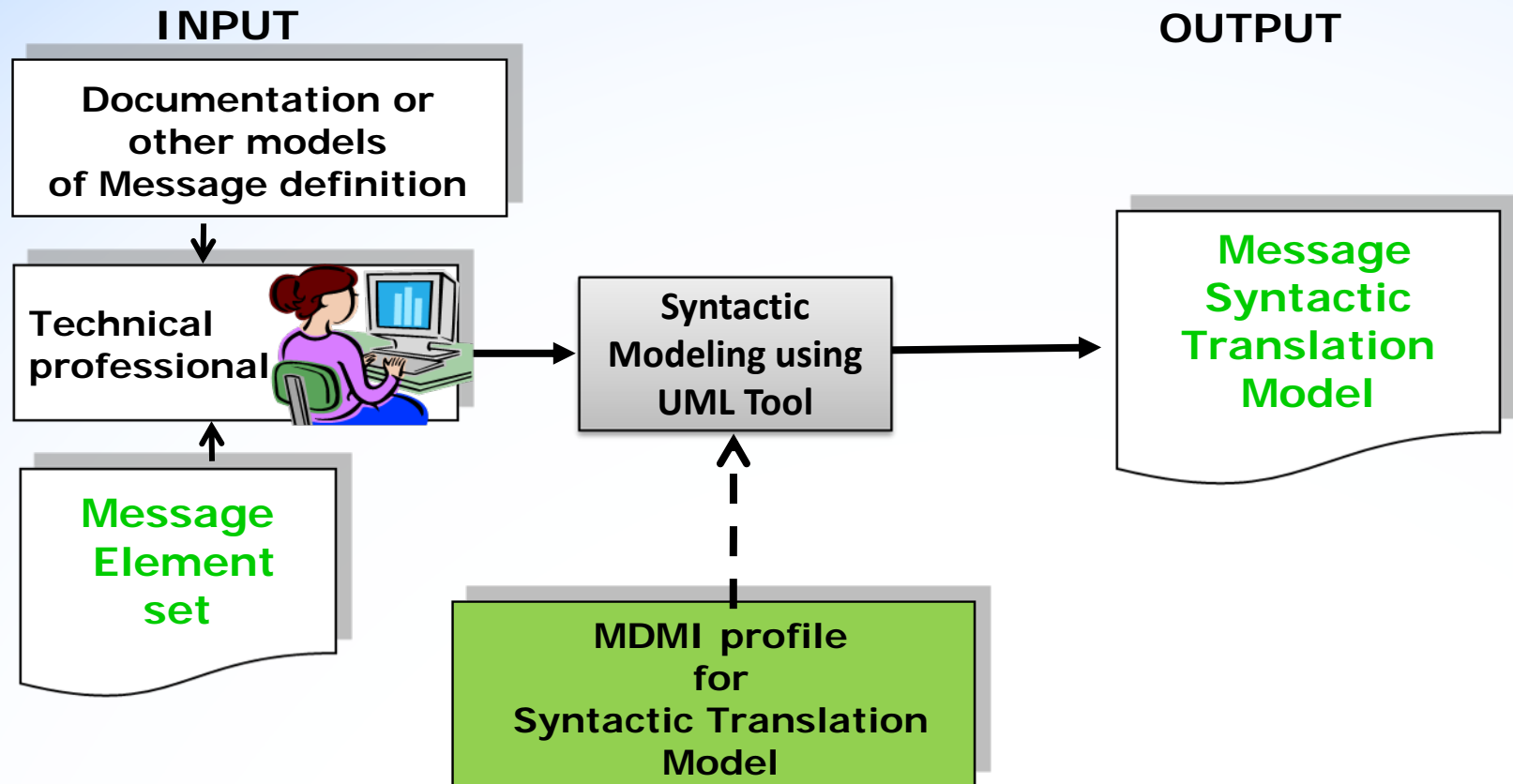 - Directed model of the context of each Message Element

FireStar SOFTWARE

Example of Message Elements (from MT103)

Message Relationship Model

- Providing the message context for a Message element

Process to Create Message Syntactic Model

INPUT

OUTPUT

Documentation or
other models
of Message definition

Technical
professional

Message
Element
set

Syntactic
Modeling using
UML Tool

MDMI profile
for
Syntactic Translation
Model

Message
Syntactic
Translation
Model

- Modeling still done by technical professionals
  - Only minor domain knowledge necessary

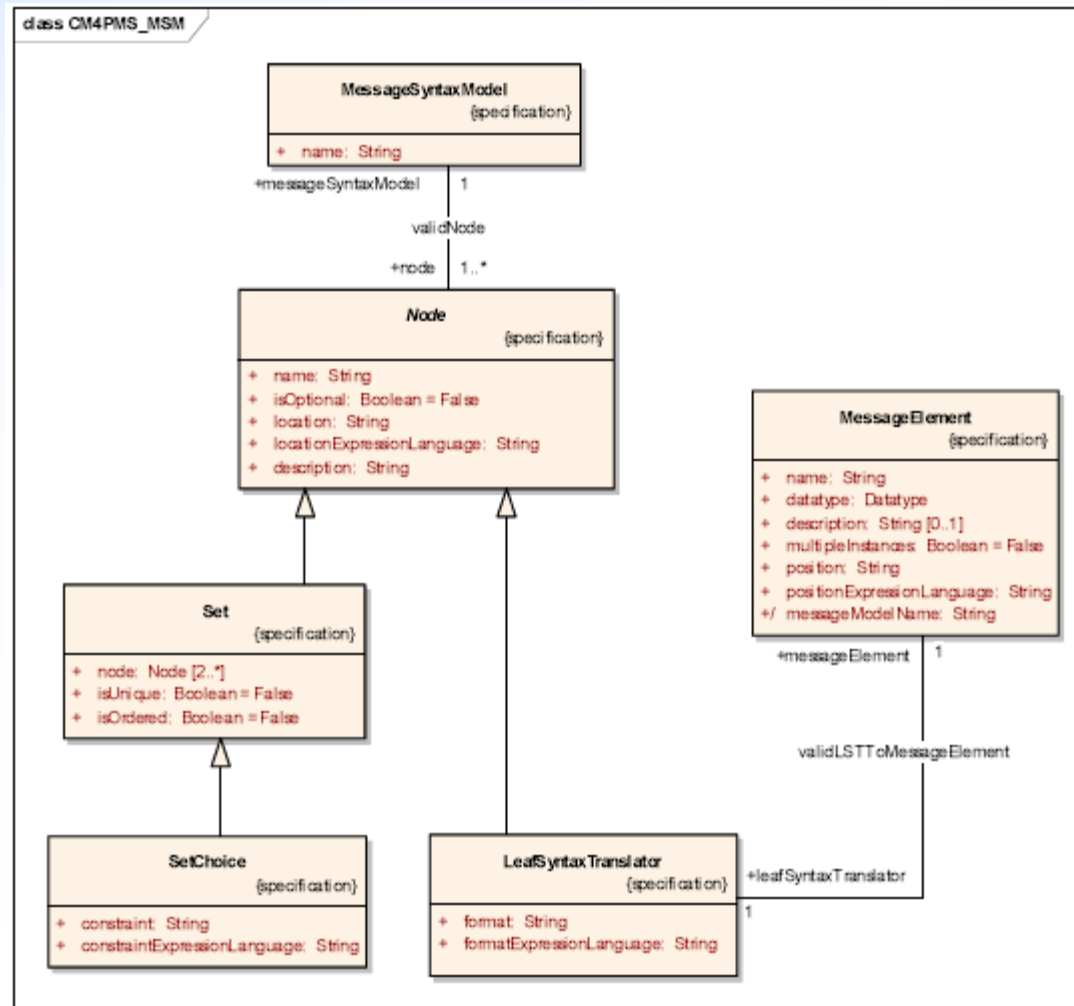**FireStar** SOFTWARE

A Description of
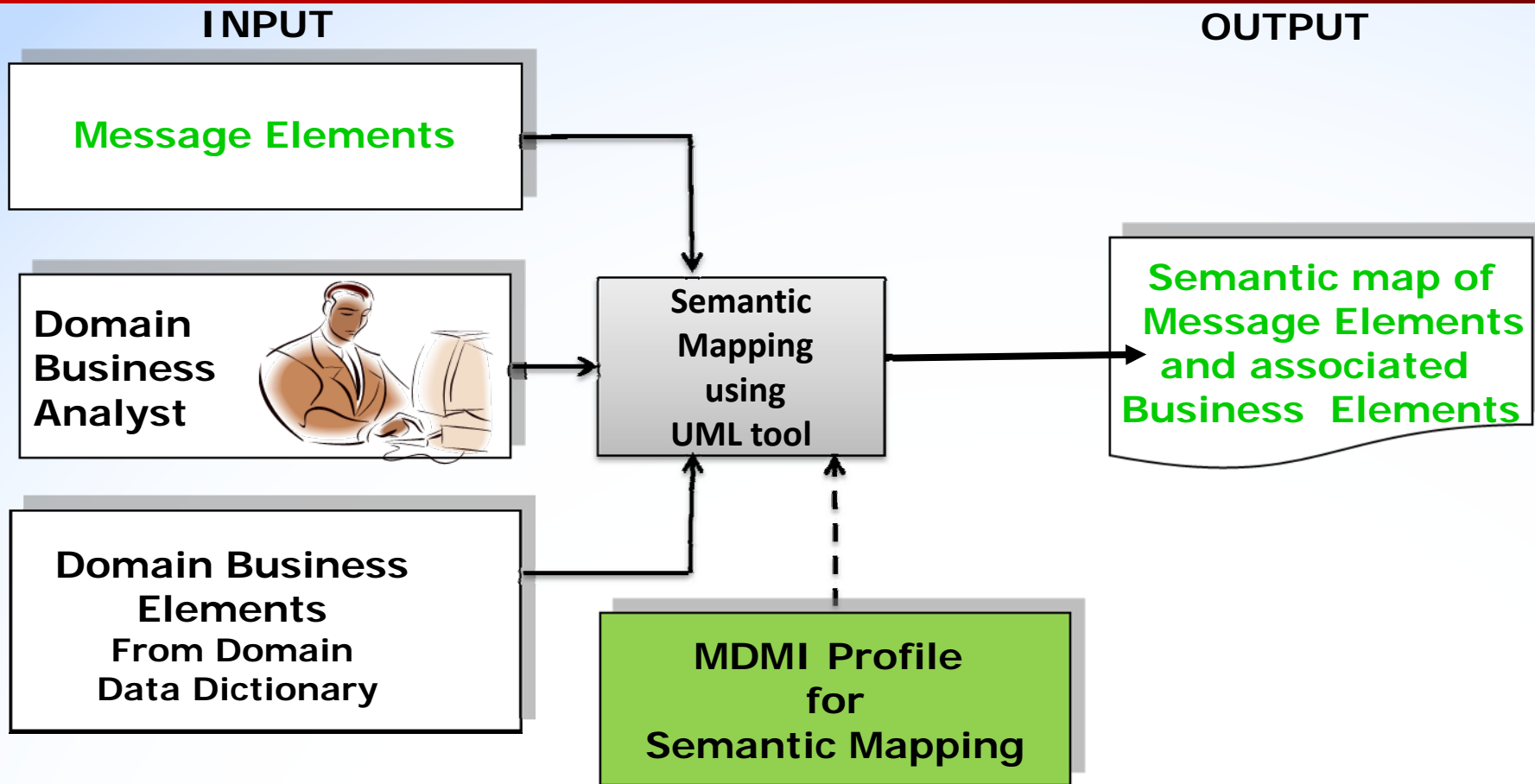# Message Syntactic Model

- Definition of Message Syntactic Model
  - UML Model of the syntax of a message
    - Should works for any type of existing message format, e.g., EDI, TCxx, XML, etc

- Contains LeafSyntaxTranslator for each Message Element
  - Provides information necessary to insert or extract a Message element value
  - Key attributes include Location and Format

FireStar
SOFTWARE

Message Syntactic Model

Process to Create Semantic Map

INPUT

OUTPUT

Message Elements

Domain Business Analyst

Domain Business Elements
From Domain Data Dictionary

Semantic Mapping using UML tool

MDMI Profile for Semantic Mapping

Semantic map of Message Elements and associated Business Elements

- Modeling done by content-aware professional
  - E.g., Business Analyst who understands Domain

FireStar SOFTWARE

A Description of the Message Semantic Map

- Map of Message Elements to Business Elements in a Domain Dictionary
    - E.g., Business Elements derived from the attributes of UNIFI business components

- Semantic Mapping constraints
    - Defines allowed association between Message Elements and Business Elements
    - *Key - Allowed mappings provide boundary to determine whether new Domain Semantic Element is required.*

FireStar SOFTWARE

Importance of Semantic Mapping

- Semantic mapping failure implies new Business Element
- Business Elements for domain dictionary can be discovered
  - Through formal modeling (ISO 20022)
  - Through reverse-engineering of existing messages
  - Through submission by User's driven by market needs
- Semantic mapping constraints identify synonyms and near synonyms
  - Support well-structured data dictionary
  - Provide semantic distance between Business Elements
- Semantic mapping can be used federated domain dictionaries
  - E.G., Wholesale banking domain linked to Insurance domain
 - Will increase quality across multi-step transactions

FireStar SOFTWARE

Message Element Semantic Map
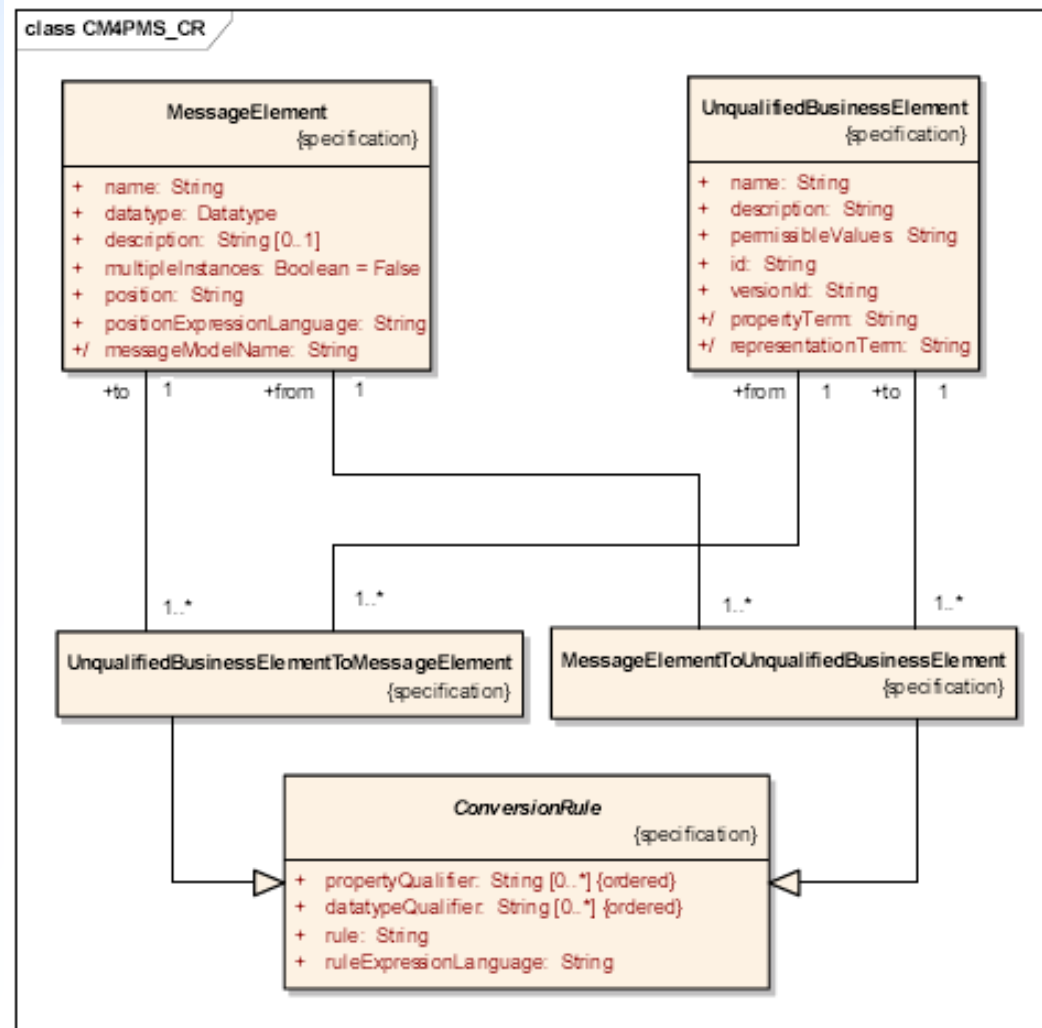
Runtime Implementation

- MDMI artifacts can be "injected" by standards bodies
- Enterprises can efficiently map conversions of internal message and data formats
- A vendor can use the MDMI standard to create industry standard message data conversion applications
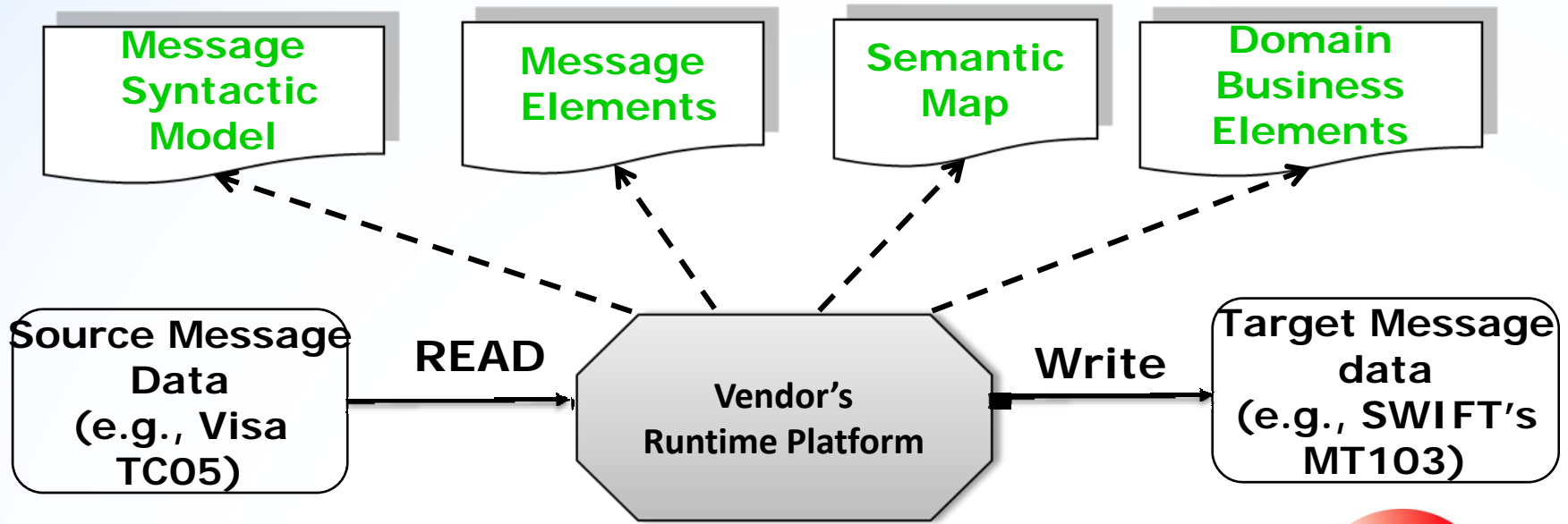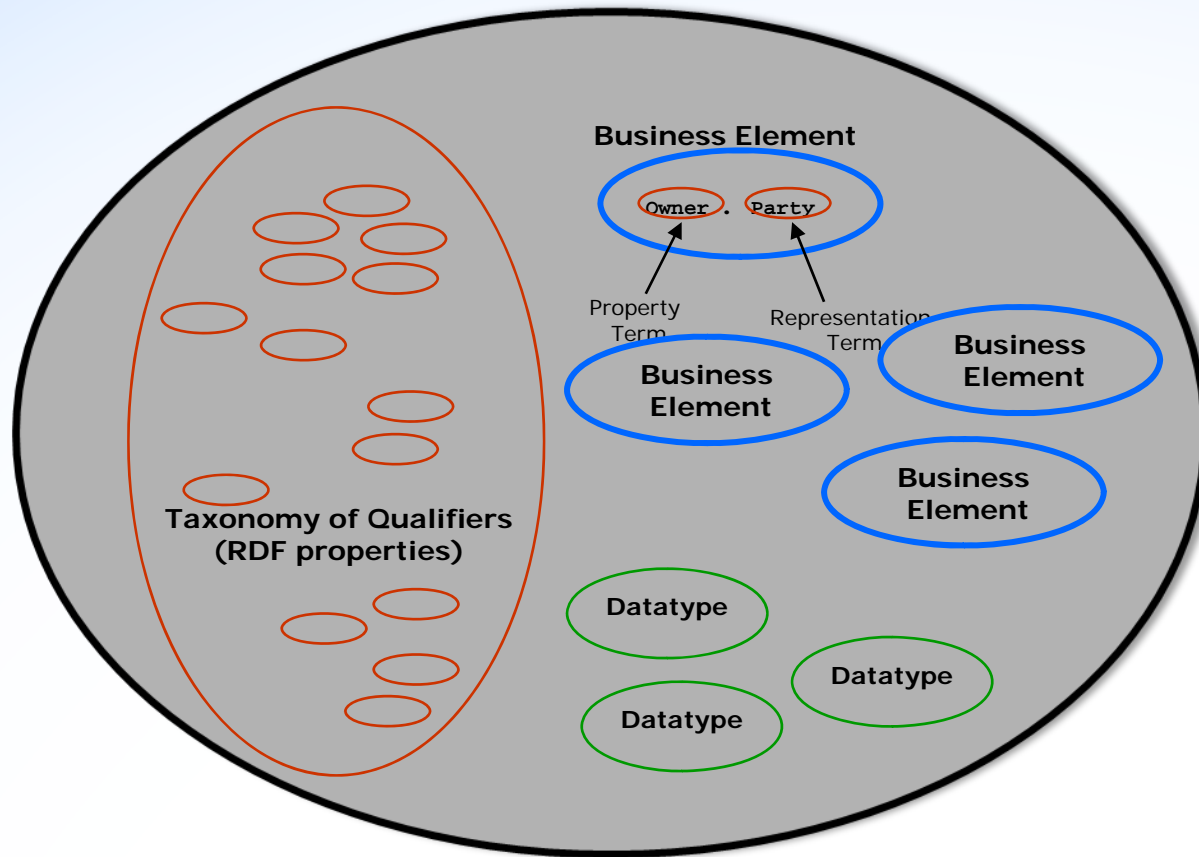
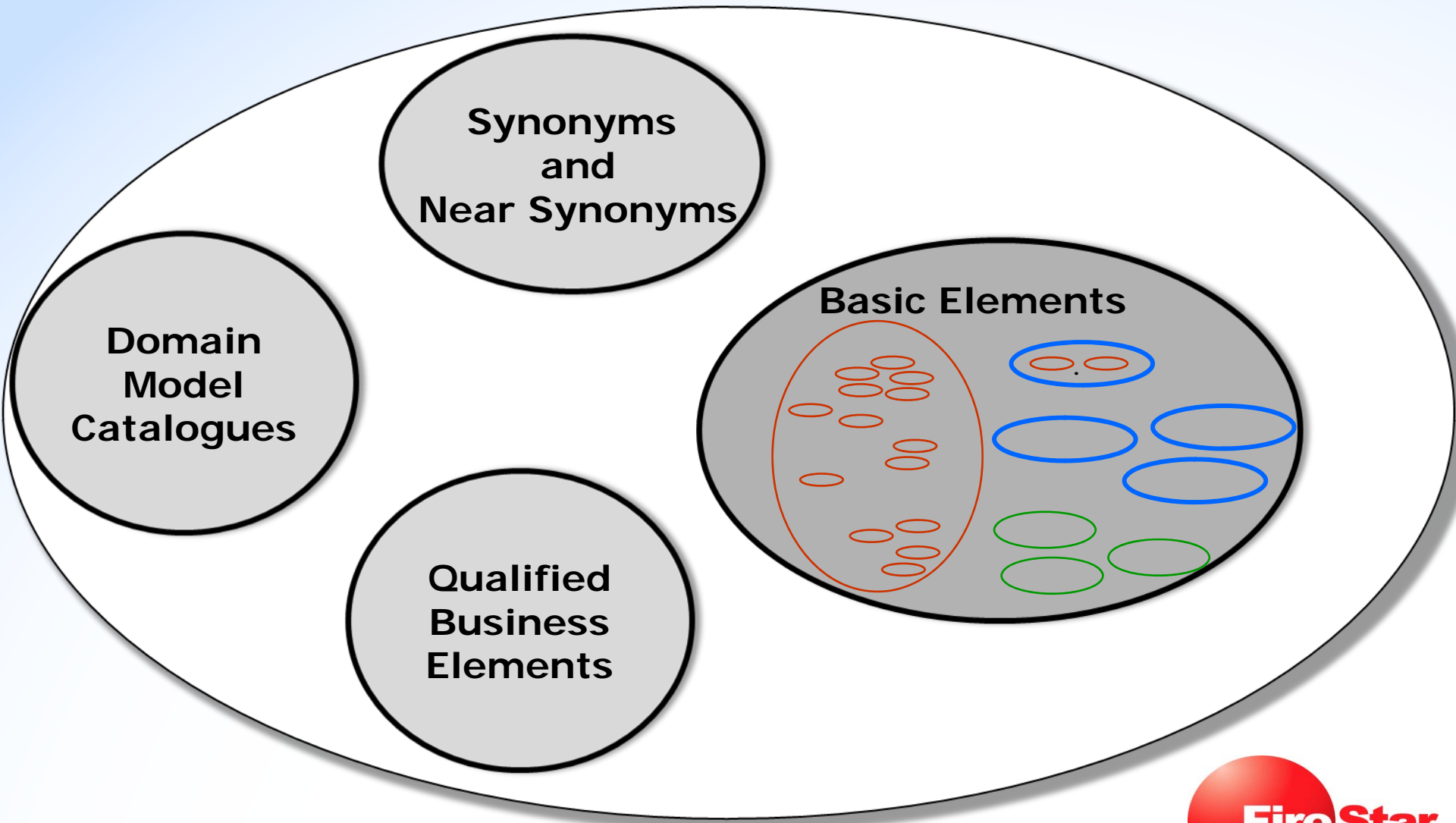# Using Semantic Mapping for well-structure Data Dictionaries

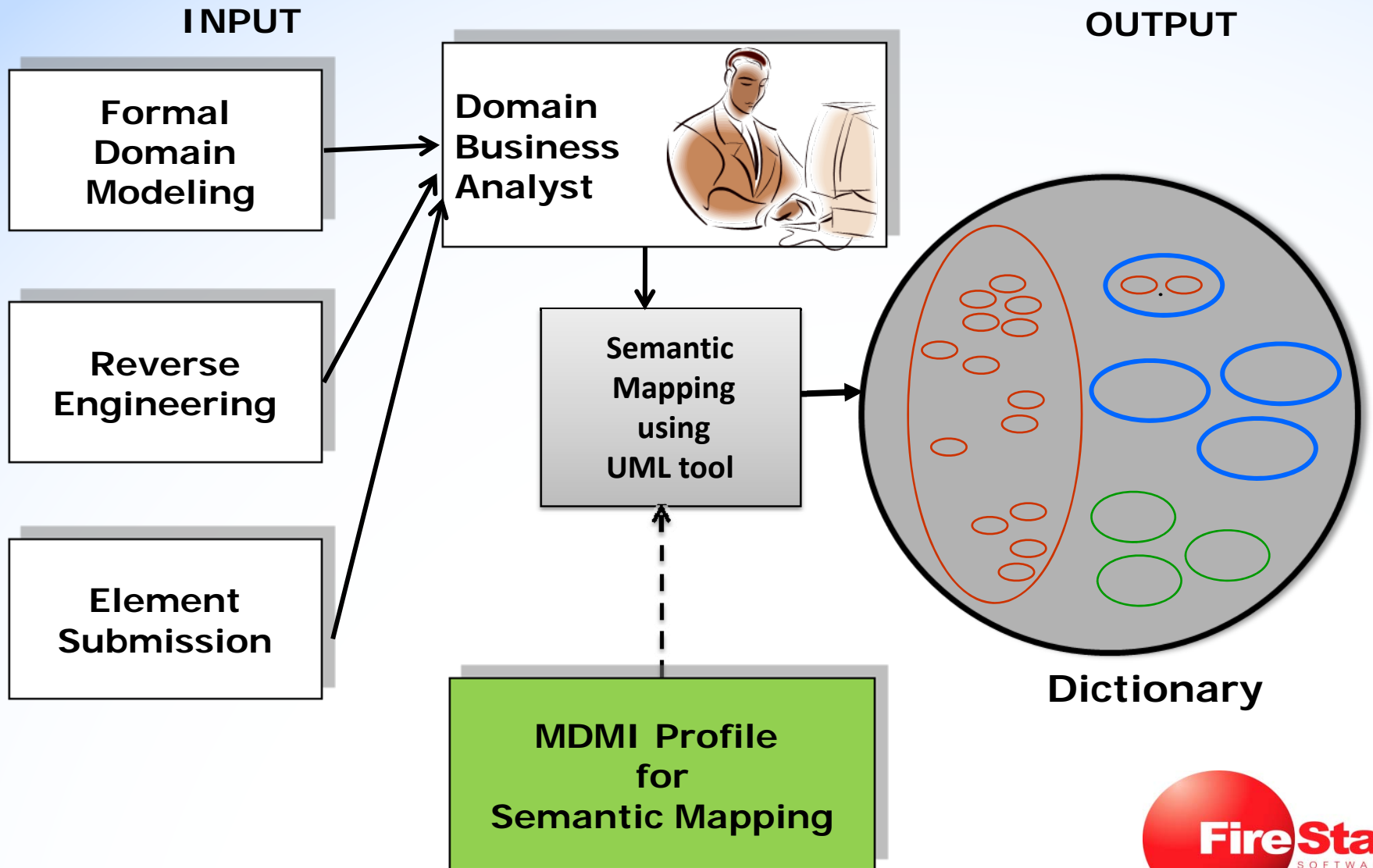# Proposed UNIFI Data Dictionary

- OMG's Finance Domain Task Force has been working closely with members of the TC68 –WG4

The Whole Data Dictionary Shebang

Process to Add to Domain Dictionary

INPUT

OUTPUT

Formal Domain Modeling

Reverse Engineering

Element Submission

Domain Business Analyst

Semantic Mapping using UML tool

MDMI Profile for Semantic Mapping

Dictionary

Fire Star SOFTWARE

Federating or linking Data Dictionaries

Semantic Map

Dictionary Domain 1   Dictionary Domain 2
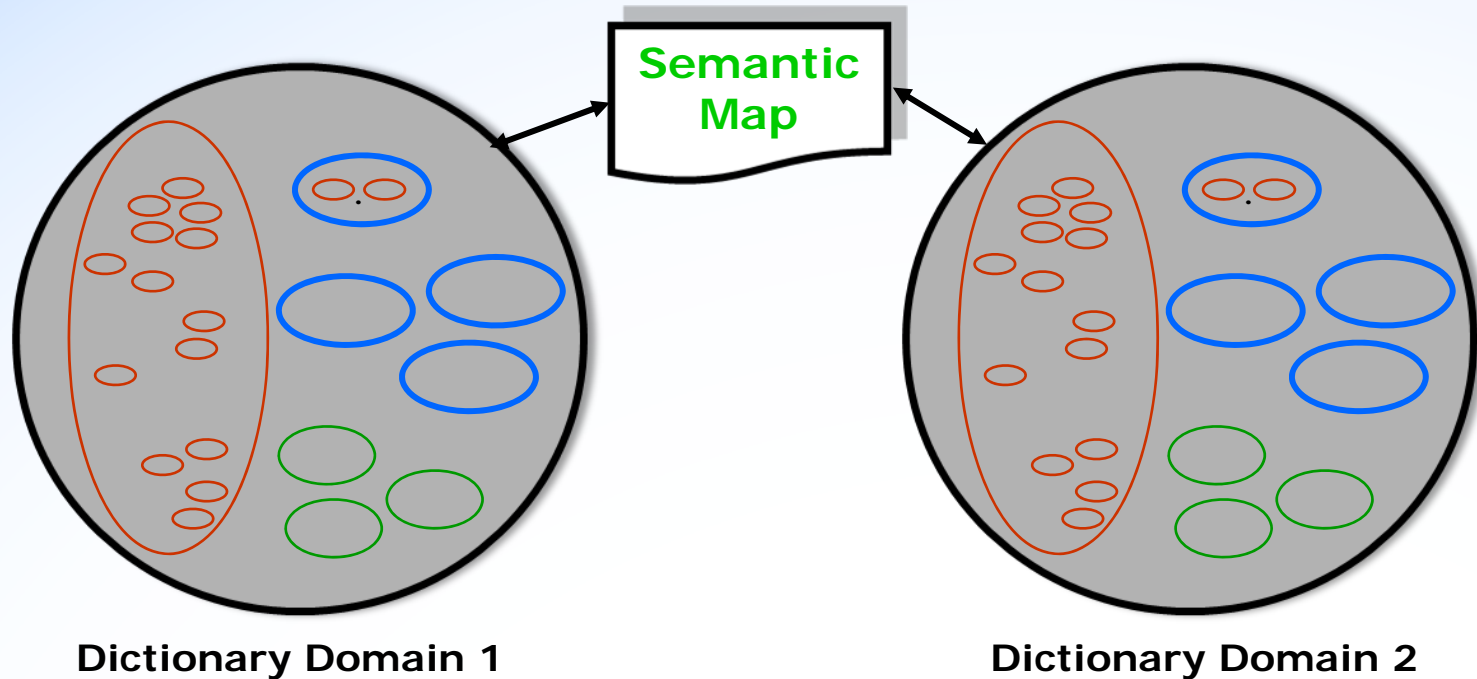
- Enterprise Domain to Industry Domain federation
- Industry Domain to Industry Domain federation
- Entire STP movement of data can be automated

FireStar SOFTWARE

The (potentially) glorious future of MDMI

- Choice of appropriate wire format based on need
- Creation of dynamic message formats based on business elements
- Can be a framework for lossless conversions
- Introduction of an indirect reference standard will improve security

FireStar SOFTWARE

In summary

- This standard can reduce costs
  - Injection reduce costs of conversions

- Increase quality
  - Standards bodies focus on domain they know best

- Improve STP
  - Through integral movement of data
  - Automated movement of data across federated domains

- Provide market flexibility
  - Focus on truly reusable components
  - Create well structured domain dictionaries
  - Allow for the incremental growth of dictionaries based on market need.

FireStar SOFTWARE

How can you help

- Much practical work is needed to fill out the standard

    - The devil is always in the details

- A successful proof-of-concept will result in a major standards body implementing the standard

    - That will start a snowball rolling down the mountain

- So participate with the MDMI consortium and help lead the way to this promised land

    - Founding members – FireStar, SWIFT, HSBC

FireStar SOFTWARE