Do you know where your data is?
How FIBO Makes Data Smarter and More Governable

Financial Industry Management Association
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David N. Saul, Senior Vice President and Chief Scientist, State Street
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Agenda

• Do you know where your data is?
• What was thought to be this… in 2008 turned out to be more like this…
• The need for smart contracts
• Four “do you know” questions
• Traditional approach to conflicting business requirements
• Semantic data is smart data - Semantics standards enable data synergy
• Financial industry standards
• Financial Industry Business Ontology (FIBO)
• FIBO interest rate swaps representation
• FIBO Proof of Concept
  – Architecture
  – Approach
  – Findings
• Trust is the product of cross-financial system collaboration on semantic standards
• Perspectives on FIBO
• Next steps
Do You Know Where Your Data is?
What Was Thought To Be This …

The Economies, Pre-2008
In 2008 Turned Out To Be More Like This …
Financial Economy Interconnectedness and the Real Economy

Illustrative
The Case for “Smart Contracts”
Contracts were there, but not machine readable

<table>
<thead>
<tr>
<th>Current state</th>
<th>Smart Contracts</th>
</tr>
</thead>
<tbody>
<tr>
<td>Opaque</td>
<td>Transparent</td>
</tr>
<tr>
<td>Complex</td>
<td>Functional decomposable</td>
</tr>
<tr>
<td>Inconsistent</td>
<td>Well-defined</td>
</tr>
<tr>
<td>Error-prone</td>
<td>Trusted</td>
</tr>
<tr>
<td>Proprietary</td>
<td>Open standard</td>
</tr>
<tr>
<td>Imprecise</td>
<td>Verifiable</td>
</tr>
<tr>
<td>Manual</td>
<td>Automated</td>
</tr>
<tr>
<td>Paper</td>
<td>Machine readable</td>
</tr>
<tr>
<td>No meaning</td>
<td>Semantic</td>
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A **Smart Contract** is standardized executable code that identifies all components of a legal instrument, precisely defining all economics, legal characteristics, logic and contingencies of valid financial transactions and exchanges.
Four “Do You Know” Questions

1. Do you know where your data is?
   - Do you know where your data is?
   - Do you know who owns your data?
   - Do you know what your data means?
   - Do you know how your data is related to other internal and external data?
   - Can you take advantage of your data in new ways?

2. Do you know which regulations apply to you?
   - Do you have a way to keep track of regulations?
   - Do you know how and where regulations apply to you and your stakeholders?
   - Can you meet your regulators’ expectations, especially during times of stress?

3. Do you know what your solution providers are doing for you?
   - Do you acquire and use the data and the tools that you need?
   - Can your providers elevate you to “best data practices”?

4. Do you know how standards can help you?
   - Do you ensure that standards meet your requirements?
   - Do you exploit standards?
   - Do you influence standards that affect you?
The Reality of Traditional Divided Initiatives for Data
Redundant, inflexible, and slow
Dual Conflicting Business Requirements for Financial Firms

Derive greater value from existing data assets

Meet increasing scope and complexity of regulatory mandates

- Improve capabilities to exploit analytical tools and techniques
- Extend better quality to clients, as well as new products and services
- Exploit better and broader data integration for better deeper insights and enhanced management

- Reduce burden in meeting existing and new requirements
- Find commercial benefits from investments in regulatory compliance
- Reduce perceived and actual risks

Semantic data standards enable data synergy for both purposes.
Semantic Data is Smart Data

- **Semantics**: The same concept that World Wide Web creator Tim Berners-Lee used to develop hyperlinks

- **Semantics** gives meaning to data
  - Structured, Semi-Structured and Unstructured data
  - “Metadata on steroids”

- **Semantic technologies** are used to map and attach (or tag) precise meaning onto each piece of data and its interrelationships
  - Built on *Dictionaries* and *Taxonomies*
  - *Ontologies* extend semantic meaning to describe the relationships between data elements

- **Semantics and semantic technologies** together enable transparent data analysis to create actionable, timely business insights

- Standards are required for the “meaning” to be held “in common” across institutions, processes and jurisdictions.

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Financial Industry Business Ontology – “FIBO” – for improving financial data through Semantics

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Getting to Industry Standards and Shared Meaning
Public/Private Collaboration among many key contributors

The information contained above is for illustrative purposes only.
### FIBO: Scope and Content

<table>
<thead>
<tr>
<th>FIBO Foundations: High level abstractions</th>
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</thead>
<tbody>
<tr>
<td>FIBO Business Entities</td>
</tr>
<tr>
<td>FIBO Financial Business and Commerce</td>
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<tr>
<td>FIBO Indices and Indicators</td>
</tr>
</tbody>
</table>

### FIBO Contract Ontologies

- Securities (Common, Equities)
- Derivatives
- Funds
- Securities (Debt)
- Loans, Mortgage Loans
- Rights and Warrants

### FIBO Pricing and Analytics (time-sensitive concepts)

- Pricing, Yields, Analytics per instrument class

### FIBO Process

- Corporate Actions, Securities Issuance and Securitization

### Future FIBO: Portfolios, Positions, etc.

- Concepts relating to individual institutions, reporting requirements, etc.

**Note:** Courtesy of Mike Bennett, Enterprise Data Management Council

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Standards as Governance: “FIBO”
A Swap In The “Financial Industry Business Ontology”

Note: Courtesy of David Newman, Wells Fargo Bank
State Street FIBO Proof of Concept

• Purpose: Demonstrate
  - The practicality of using FIBO to harmonize diverse derivative and entity data
  - The usefulness of FIBO for comprehensive reporting and analytics, both traditional and innovative

• PoC approach:
  - Apply FIBO to real unmodified operational data
  - Implement using a state-of-the-art semantics platform
    • Rapid implementation, no coding required

• Project Participants:

<table>
<thead>
<tr>
<th>State Street</th>
<th>Business requirements and operational data</th>
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<tbody>
<tr>
<td>EDM Council</td>
<td>FIBO model and recommended reports/analytics</td>
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<tr>
<td>Cambridge Semantics</td>
<td>Operational platform and implementation services</td>
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<tr>
<td>dun &amp; bradstreet</td>
<td>Business Entity and Corporate Hierarchy data</td>
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<tr>
<td>Wells Fargo</td>
<td>FIBO consultation</td>
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</table>
FIBO PoC Solution Architecture

Internal Data Sources
- Front Arena Data
- Derivatives Data

External Data Sources
- Dun & Bradstreet Data
- Entity & Corp. Hierarchy Data

Map & Load (QA)

Link & Query (Classification, inference, analytics)

Reports & Analytics

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Project Approach

1. Load & operationalize FIBO in Anzo
2. Map data sources onto FIBO
3. Load, harmonize, QA and classify data
4. Configure analytic dashboards
FIBO Proof of Concept Findings

• The FIBO model for Interest Rate Swaps appears fit for purpose and able to:
  • Map easily and readily to operational information
  • Harmonize with legacy data sources
  • Provision important and innovative analytics
  • Rapidly add new sources (internal or external) and analytics
• Some challenges had to be addressed
  • Not yet truly intuitive; usage requires learning and some coaching
  • Increased use will drive improvements
• The semantic technology platform, Anzo, worked well and delivered value
  • Open standards approach meant model (FIBO) and tool (Anzo) worked together seamlessly
  • No coding was required for mapping, harmonization, analyses and visualizations
  • Delays were due to traditional problems; availability of people, access to data and appropriate IT resources, some FIBO updating
  • FIBO facilitated construction of simplified operational ontologies
• Models and tools were standards based, but implementation did require some one-time adaptations and workarounds
• FIBO can contribute to a comprehensive data governance program
Trust as the Product of Cross-Financial System Collaboration on Semantic Standards

Potential benefits to all constituencies

- Products and services opportunities
- Path to improved efficiency and reliability
- Clients and public transparency
- More confidence by counterparties
- Less complex risk management
- Way to lower cost of compliance
- Improved information security

Financial Services Organizations

- Alignment with statutory missions
- Regulatory and supervisory/prudential surveillance improved
- Ability to detect and respond to systemic and internal risks
- Potentially lower costs and burdens

Product/Service Providers

- Revenue possibilities
- Opportunity for innovation and development
- Cost avoidance
- IP innovation with protection
- Lower risk investment

Regulators

- Confidence
- Growth
- Lower Risk
- Transparency
- Efficiency
- Effectiveness
- Simplicity
- Precision

Standards Organizations

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Perspectives on FIBO

“It is not sufficient to collect data on the same sector from different sources which have different formats, different levels of identification and definition. That will not lend itself to effective use of the data in building a picture of financial entities or their interlinkages.”

Gareth Murphy, Director of Markets Supervision, Central Bank of Ireland

“We will promote the identification and adoption of standards that improve the quality and utility of financial data.”

Richard Berner, Director, Office of Financial Research

“FIBO is the ‘Rosetta stone’ for the finance industry.”

Michael Atkin, Managing Director, EDM Council

“FIBO and Anzo use the same open W3C semantic standards, so they work together seamlessly, enabling agile operational data solutions to be implemented rapidly without coding.”

Marty Loughlin, VP Financial Service, Cambridge Semantics

“FIBO provides a unique opportunity for the financial industry to finally benefit from a unifying common language that aligns the meaning of financial data across reports, databases, message payloads and over the web”

David Newman, Strategic Planning Manager, Senior Vice President, Innovation Group, Wells Fargo Bank Chair, FIBO Program

“In conjunction with insight on entity identification and hierarchy, the adoption of FIBO as a common language will allow financial service firms to quickly and accurately aggregate risk exposures to grow their business while meeting regulations like BCBS-239.”

Monica Richter, Chief Content Officer, Dun & Bradstreet
Next Steps
What should you do next?

1. Implement data definition and discovery processes throughout your enterprise as part of a comprehensive data governance program.

2. Catalog and monitor your current and future regulatory requirements.

3. Develop a “heat map” of your existing IT solutions and fill gaps in your infrastructure.

4. Find and influence relevant semantic data standards in your business:
   – FIBO in Financial Services

Contacts for further information:

   – EDM Council / FIBO: Dennis Wisnosky  dwisnosky@edmcouncil.org
   – State Street: David Saul  dnsaul@statestreet.com
   – Cambridge Semantics: Marty Loughlin  marty@cambridgesemantics.com
   – dun & bradstreet: Michael Lubansky  LubanskyM@DNB.com

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Thank You

Q & A