Structured Semantic Reporting

with the

Standard Business Reporting Model (SBRM)

Submitted by;

Cory Casanave	Model Driven Solutions	Cory-c@modeldriven.com
Claude Baudoin	cébé IT & Knowledge Management	cbaudoin@cebe-itkm.com
Pete Rivett	Federated Knowledge; Enterprise Knowledge Graph Foundation	pete.rivett@federatedknowledge.com
David Blaszkowsky	Financial Semantics Collaborative	blaszkowskyd@gmail.com

Value Proposition

Accurate business reporting supports trust and compliance among and between corporations, governments, and individuals. Errors, misstatements, or misunderstandings of those reports pose risks to the reporting institutions and to the public. Critical reports span from accounting to ESG (environmental, social, and governance) disclosures and many others in every industry and branch of government.

In particular, financial reporting for regulatory, supervisory submissions, and disclosure provide essential evidence of an institution's financial position and compliance with laws, policies, and agreements. This information provides regulators, business partners, and other stakeholders the means to evaluate an institution's compliance, risks, and opportunities.

Current methods to produce, validate, and evaluate these reports are error-prone, imprecise, time-consuming, and expensive. What the reports really mean is often unclear and the provenance of the information opaque. The recent U.S. Financial Data Transparency Act (FDTA) demonstrates that these problems are considered real and critical. Similar "Standard Business Reporting" type (SBR) initiatives are in progress within many countries. Both government agencies and the organizations that report to them must find a solution. Even within a single corporation with multiple units, compiling results in order to provide a corporate-level report can cause delays and errors.

The Object Management Group's (OMG) proposed Standard Business Report Model (SBRM) will provide standards and resulting capabilities as the basis for human and machine-readable disclosures and reports that will be clearly grounded in well-defined business meaning, i.e., ***semantics***. With SBRM, information will be structured based on policy and on consensus standards. The combination of well-defined reporting and disclosure structures based on formalized and contextualized business meaning assists both the producers and consumers of the information. *SBRM is not intended to provide the library of all such business concepts, but to enable linking reports to semantic models (ontologies) that define those concepts for multiple domains and jurisdictions.*

With an SBRM capability, institutions can better automate and govern the production of compliant reports based on information traceable from their internal authoritative sources – this reduces time and cost while reducing the risk of non-compliance. Because the reports are both machine-readable and grounded in business meaning, regulators and stakeholders will be able to leverage advanced analytics and machine learning to validate and act on this trusted information.

The SBRM standard will foster the emergence of report specification tools – software that will allow regulators and others to define what a specific kind of report (e.g., an SEC 10-K filing) means, including the relationships and constraints between the various pieces of information.

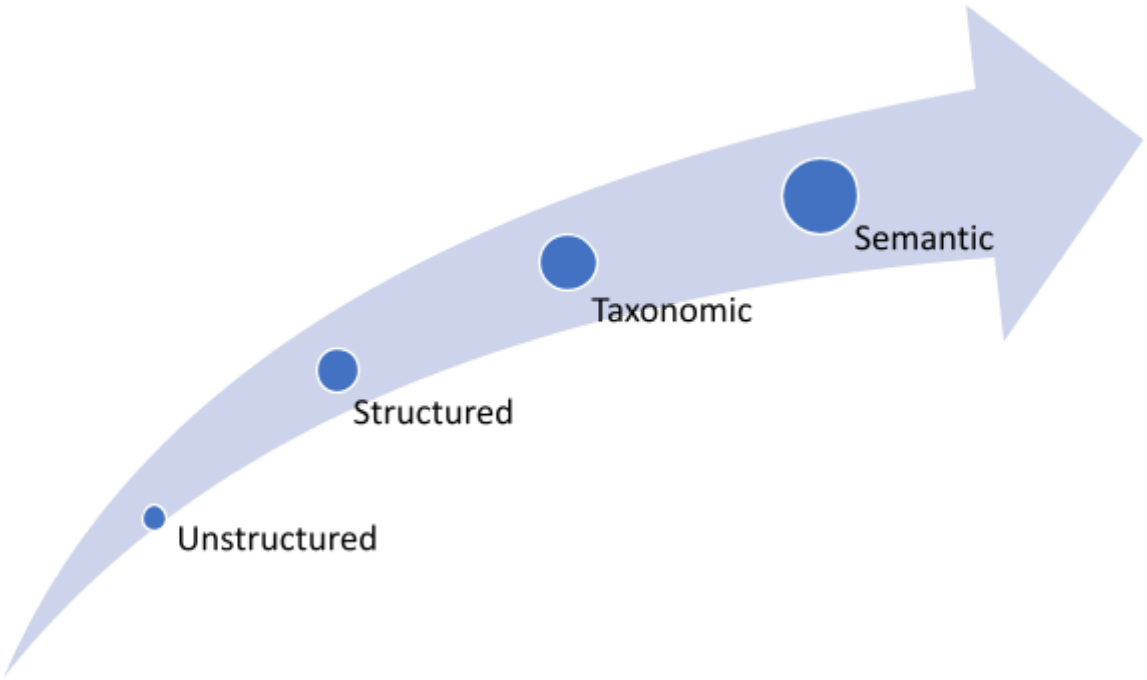
Current State

The degree to which current reporting is both structured and grounded in semantics varies widely and utilizes a variety of formal and informal standards as well as *ad hoc* requirements.

At one end of the spectrum, disclosures are made in textual “notes,” with no control over the structure or vocabulary. Beyond this, there are multiple standards and methods for providing information structure, such as schema (e.g., XML or JSON Schema) and/or information models (e.g., entity-relationship or UML models). Beyond pure structure, some such schemas have been extended to include more reporting specifics including “checks” and links to report taxonomies – XBRL is widely recognized as the leader in this “enhanced report schema” space, especially for financial regulatory reporting. SBRM will complement XBRL with semantic capabilities.

On the semantics side, there are substantial standards and best practices for capturing meaning. These include languages such as the Web Ontology Language (OWL), SHACL, SBVR (Semantics of Business Vocabularies and Rules) and Common Logic; all are international standards. There are also industry standards for specific domains, such as the Financial Industry Business Ontology (FIBO); these help formalize business meaning and vocabulary in a machine-processable form but may need extensions, for example, to cover more accounting terminology, to be fit for this purpose.

To make reported information interoperable and understandable, both a well-defined structure and semantics are required. However, the link between data as needed in the context of a report and its underlying semantics is not standardized and there is not yet an established best practice. The SBRM initiative is intended to close that gap, to allow for flexibility and evolution in how both the structure and semantics are represented.



SBRM enables financial reporting to achieve a new level by introducing semantic meaning

Reporting and disclosure have progressed from unstructured text to structured data, and most notably XBRL taxonomies for financial reports. The next step is to integrate business semantics to define the meaning of taxonomies. This next step will provide enhanced capabilities and interoperability, and reduce risk.

The essential “shift in thinking”

There has already been progress from informal reporting to providing more structure and, in the case of XBRL, providing mechanisms for validations and definitions for report elements. These schema-based approaches provide value but can become very complex, and even so, often fail to communicate the relationships between different reports or related information. The basic problem is that these schemas are *about the report*, not *about the business*. Even XBRL taxonomies are taxonomies of report elements, not business concepts.

The needed shift in thinking is to define business meaning - the semantics - and then apply that business meaning to define, produce, validate and analyze information as it is communicated in reports. Reports carry the information and structure, while semantics define the meaning of the information to support understanding and analysis.

An essential criterion for any architecture is the separation of concerns. Separating, but connecting, business concerns from reporting concerns provides a result that is understandable in business language yet able to support and relate information exchanged in any number of report formats. Trying to couple business concerns with a specific report becomes complex and fails to integrate information from multiple sources and timeframes.

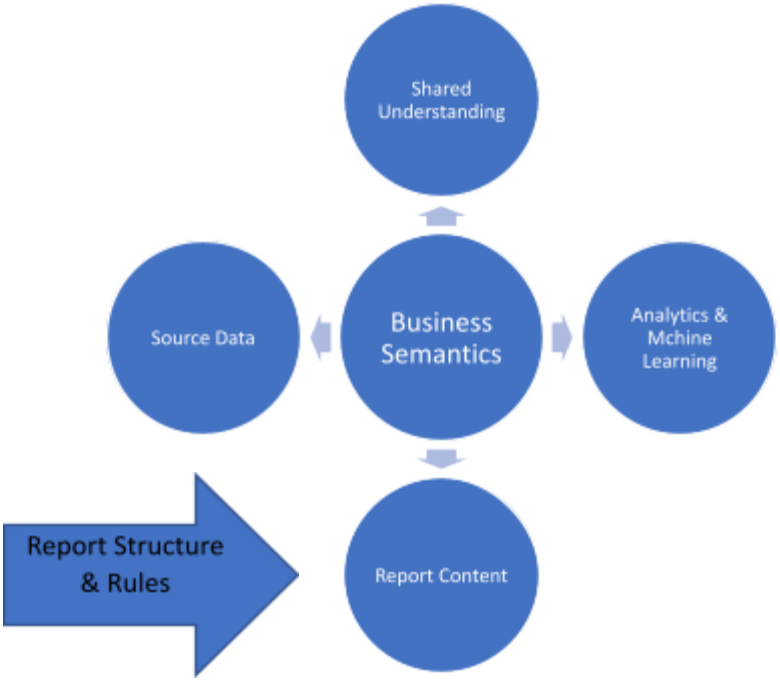


Figure 2. Future State: Focused on the business.

Focusing on business semantics, what things mean in terms of the business provides for clarity of understanding as well as supporting:

- A foundation to relate business semantics to source data, thus establishing the provenance and lineage of the reported information
- Analytics that combine the result of multiple information sources, from multiple reports, and from multiple organizations across multiple timeframes.
- Automating report-based calculations and rules based on business semantics related to the source of the report and how the information will be used.
- Utilizing the same business semantics across multiple report and data formats

Example: The Meaning of "Total Assets"

Let's say an entity is required to state its total assets in a report. What this may mean is that "Total Assets" in a report is the sum of the value of the portion of assets owned by the subject entity at the time specified in the report based on the valuation rules of the reporting jurisdiction as may be expressed by FASB or IFRS. To be "understood" by both machines and people, the meaning of each qualification, term, and context needs to be explicit. Making the implicit explicit requires relating the report element of "Total Assets" to the specific concepts that define it. With those relationships, both man and machine can validate and act on the reported facts. The explicit relationships can power automation, analytics, and machine learning to infer valid and important information.

Without "Total Assets" being well grounded in meaning it is easy to make errors or even to defraud. Well-defined meaning reduces effort, cost, and risk.

It is not intended that SBRM contain all of these business concepts but that it provides the framework to connect report structures to the semantic models that define these business concepts. These

connections, or mappings, are often complex and often combine multiple types of mapping relationships SBRM will make this simpler.

Connecting the dots

To achieve structured semantic reporting requires vision and effort, but it does not require starting from scratch. There are already ways to define structure and validations in XBRL, and these can be leveraged and enhanced by relationships to semantic models. Likewise, there is an important body of semantic definitions of business concepts that can be leveraged and extended.

Our challenge is to bring together the right stakeholders in government and industry to provide the connective tissue between structure and semantics that is practical, understandable, and able to meet the needs of reporting and disclosure across multiple domains.

There is a current standard definition activity in the Object Management Group (OMG) that can be the basis for connecting the dots. This is the “Standard Business Reporting Model” (SBRM) standards activity. We invite interested stakeholders to engage in this and related efforts.

Individuals, organizations, regulating authorities, reporting organizations (such as companies and financial institutions), and organizations are encouraged to provide input and engage in the process of creating these specifications. Please review the Request for Proposals (RFP) and provide recommendations, critiques, use cases, or new information to help specification submitters and OMG members evaluate submissions.

For organizations interested in proposing a specification, the deadline to submit a Letter of Intent is June 23, 2023, Collaborative teams are now forming and welcome new participants.

SBRM link: https://www.omg.org/intro/SBRM.pdf