



## Recovery.gov and Extensible Business Reporting Language (XBRL)

*The approach and the benefits of using XBRL to provide full transparency under the Recovery Act of 2009*

### *Executive Summary*

This white paper is intended for business and technology architects responsible for the development of recover.gov. The goal of this paper is to describe how the use of XBRL can efficiently provide the transparency envisioned in the Recovery Act of 2009.

## *Introduction*

As stated in guidance provided by the Director of the OMB, "The Administration is committed to investing the Recovery Act dollars with an unprecedented level of transparency and accountability... Of particular note, the guidance addresses Federal agency requirements to provide spending and performance data to the "Recovery.gov" website. To deliver a website that allows citizens to hold the government accountable for every dollar spent, the law and guidance require Federal agencies to implement mechanisms to accurately track, monitor and report on taxpayer funds.<sup>1</sup>" As described in detail in the guidance document, these mechanisms involve the participation of many players and 8 different kinds of reports ranging from Major Communications to recipient reporting. Implementing these requirements involves a complex information supply chain with data flowing between recipients, federal agencies and recovery.gov. Ensuring data quality is critical to delivering the transparency as envisioned by the act. Developing an architecture using Extensible Business Reporting Language (XBRL) can take advantage of the unique capabilities of XBRL which can improve the efficiency and quality of the data flowing thru the Recovery Act information supply chain.

## *Recovery Act reporting requirements and challenges*

As described in the guidance document, all federal agencies, plus all prime recipients of Recovery Act funds are required meet extensive reporting requirements.

Section	Reporting Requirement	Period
2.2	Major communications	Immediate/Ongoing
2.3	Formula block grant allocation reports	Immediate/Ongoing
2.4	Initial weekly reports to help populate early phases of Recovery.gov	3/3/09 – 5/12/09
2.5	Monthly financial reports	Starting 5/8/09
2.6	Award-level reporting consistent with what is currently required for USAspending.gov	Starting 5/5/09
2.7	Agency-wide Recovery Act plans	NLT 5/1/09
2.8	Program-specific Recovery Act plans	NLT 5/1/09
2.9	Recipient reporting	Starting 7/10/09

The format and structure of these reporting requirements are laid out in the appendix of the guidance document. Instructions on transmitting the material for reports under sections 2.2 through 2.4 are also provided. However, note that

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<sup>1</sup> M-09-10 MEMORANDUM FOR THE HEADS OF DEPARTMENTS AND AGENCIES

instructions on the transmittal of reports under section 2.5 through 2.9 are yet to be provided.

The reporting requirements and the requirement to construct a website that allows citizen easily track spending create a number of challenges for the architects and developers implementing this system. Specific challenges include:

- 1) How to automate the collection of the reporting data from many different agencies and funding recipients while insuring data quality and completeness
- 2) How to architect a decentralized reporting environment with many participants that can adapt to the inevitable change in reporting requirements
- 3) How to create a web site that can aggregate the different levels of reported data from multiple agencies and funding recipients and present it in a way that preserves the semantics of the reported data.

XBRL was created to address these reporting challenges and has been tested and proven in a number of environments including the FFIEC/FDIC, the SEC, Banking Supervisors in Europe, Stock Exchanges and Financial Security Authorities across the globe.<sup>2</sup>

### *Key XBRL capabilities that address these challenges*

XBRL is an open standard that was developed specifically to improve the transparency and efficiency of reporting supply chains. Key to XBRL is the concept of a taxonomy, or metadata model. The taxonomy not only tags the data but also defines structure to the information being exchanged, business rules that operate on the information, and a framework for easily creating new taxonomies by extending existing ones. Taxonomies allow the transparent exchange of information by providing a rich set of metadata that ensures that the parties are in agreement about the information being exchanged. As more parties participate in the exchange of information, the Taxonomy provides even more value as the single flexible framework for information exchange.

### *Capturing semantics through XBRL taxonomies*

Each of the required reports listed by the guidance has a set of reporting elements defined through a flat structure / XML-like schema described in the appendix of the guidance document. These structures provide just a basic syntax and in some cases even duplicates the information reported (e.g. recipient state code and recipient state name). XBRL taxonomies provide a much richer way of tagging / describing the information reported. For example, XBRL taxonomies can define the relationship between various elements or concepts, such as hierarchical relationship, a mathematical relationship or a presentation relationship. XBRL also

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<sup>2</sup> <http://www.xbrlplanet.org/>

allows for creation of label and definition relationships that enable easy translation from bureaucratic language to plain English and eliminates the requirements for multiple reporting of the same data (see example above). The additional semantic information that is captured by XBRL taxonomies can easily be shared amongst the various participants. Changes or updates can also be easily shared.

### *Ensuring data quality through XBRL validation*

One of the largest challenges of the guidance is to automate the collection of data while insuring quality of the data. The traditional approach is to write code to perform checks on the data as it is transmitted. This is a difficult proposition with the widely distributed information supply chain envisioned. The challenge is further compounded when there are the inevitable changes in reporting requirements. Each agency and possibly each participant will have to review the changes to understand the impact on their applications. XBRL specifically addresses this challenge thru the use of validation. XBRL taxonomies not only provide schema and semantic information, they also provide a framework where business rules (also known as formulas) can be easily distributed to a wide audience. These validation rules can be developed as part of the taxonomies for each of the 8 reporting requirements. These rules can be then distributed to each of the agencies and funding recipients to allow them to pre-validate their reports before transmission improving data quality throughout the system.<sup>3</sup> Example simple checks include: "does the zip code match the state;" or "does the State code match the State name;" or "does Total Expenditures exceed Total Appropriation." This approach of providing data validation through XBRL business rules has been used effectively at the FFIEC/FDIC.<sup>4</sup>

### *Retaining key semantics through XBRL-enabled database*

The next challenge is how to store the reports once they are collected by the agencies or at recovery.gov. One approach is to shred the data and store in rows and columns in a standard SQL database. However, this approach does not preserve the semantics of the reports. Hence, if someone wanted to retrieve a given report, it would have to be reconstructed from the database. Using an XBRL-enabled database (built on top of a COTS database) allows both fact-based queries and taxonomy (or metadata) -based queries.<sup>5</sup> Fact-based queries can be accessed though standard BI tools / database views. Taxonomy-based queries can be accessed through a standard set of packages. This makes it much easier to build a wide ranging set of applications that access the reported information - from citizen portals to oversight applications.

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<sup>3</sup> [http://www.ubmatrix.com/downloads/UBmatrix\\_Validation\\_White\\_Paper.pdf](http://www.ubmatrix.com/downloads/UBmatrix_Validation_White_Paper.pdf)

<sup>4</sup> [http://www.ubmatrix.com/downloads/FFIEC\\_UBmatrix\\_business\\_brief.pdf](http://www.ubmatrix.com/downloads/FFIEC_UBmatrix_business_brief.pdf)

<sup>5</sup> <http://www.ubmatrix.com/downloads/XBRLDB.pdf>

### *Citizen access through semantic queries*

Creating citizen access becomes easier once the information is stored in an XBRL-enabled database. As described above, queries can be based on the taxonomies providing more complete access to the data. Developers can either use standard BI front ends or develop custom web services or applications to provide citizens the information they desire. Since the XBRL-enabled database is built on standard COTS database, developers can leverage the availability of supporting COTS software {portals, analysis tools, etc.} to develop the citizen portal. The SEC's 21<sup>st</sup> Century Disclosure Initiative provides an example vision on how citizen access to information should be rethought.<sup>6</sup>

### *OMB oversight through XBRL business rules*

XBRL Business rules not only provide the opportunity to ensure data quality (as described above) it also provides the ability for automated oversight. As has been done in the FFIEC/FDIC production environment, additional business rules can be written to review and automatically "red flag" reports based on predefined criteria. For example, the OMB may want to automatically review in cases where "Total Expenditures > 50% of Total Appropriations and no Major Completed Actions have been reported." And with information stored in an XBRL-enabled database, business rules can be written to assess changes over time. And, because these rules are part of the taxonomy and not the application, they can easily be updated without requiring recoding of the application. Having the information in the database also allows the ability to develop analysis capabilities pulling information from the stored XBRL-based reports and other sources.

### *Suggested approach*

We suggest an approach that would allow for a rapid deployment timeframe. The development of the XBRL taxonomies could happen in parallel with the staging of the IT infrastructure. With an XBRL-based approach, initial data collection could be rapidly put in place based on an initial taxonomy. Data quality checks could then be easily added by updating the taxonomies, not the data collection applications. Once the initial taxonomies are developed, the XBRL-enabled database could be staged. Accessed through web services, this database would serve both OMB internal requirement for oversight and a publicly available website that would provide full transparency to money spent under the Recovery Act of 2009.

### *Taxonomy development*

The first step would be to develop the taxonomies / metadata models that represent the 8 types of reports required. The initial taxonomies should be relatively easy to build give the work already done. Once these initial taxonomies are built and deployed, the taxonomies could then be extended with the creation

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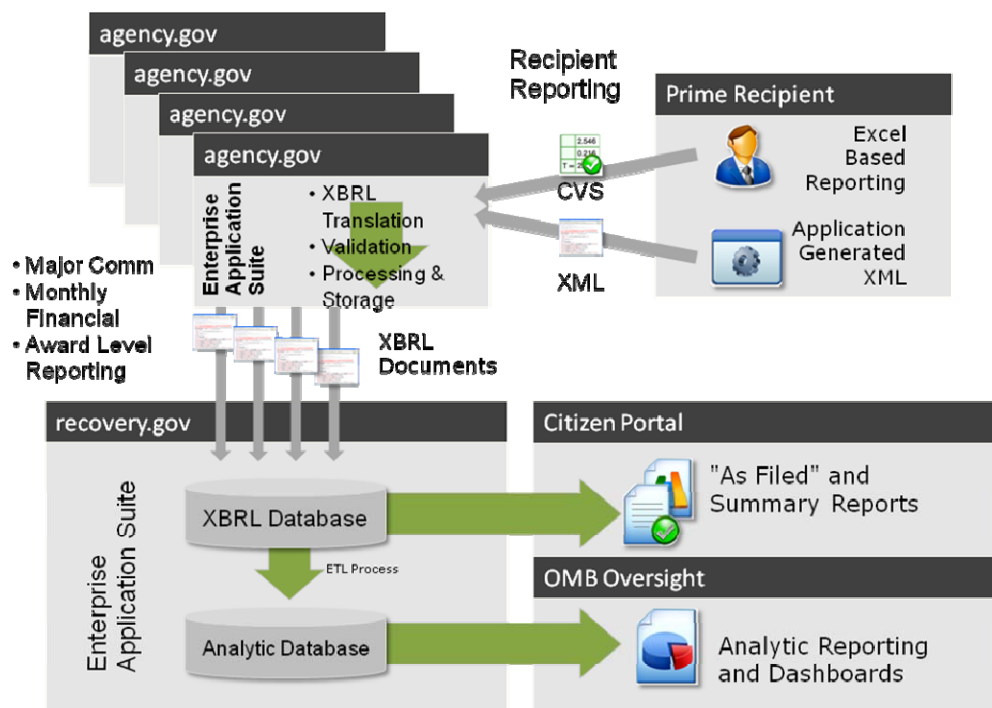
<sup>6</sup> Towards Greater Transparency <http://www.sec.gov/spotlight/disclosureinitiative/report.pdf>

of the validation rules which will provide the automated data quality check. Once the taxonomies are completed, they could be aggregated into a single "Recovery.gov" taxonomy that would create a single structured data schema for all recovery.gov projects. Over time, these taxonomies could be extended to deal with other reporting requirements such as USASpending.gov. This "Recovery.gov" taxonomy would also be the basis for the XBRL-enabled database allowing full transparency to all reporting required under the Recovery Act.

**Data collection**

At the recover.gov level - Initially, each agency is responsible for reporting major communications, agency plans, program plans, monthly financial reports, and award level transaction data. Once the taxonomies are developed, this information can be collected and converted to XBRL at the agency thru the use of Report Builder (a desktop-based) or transmitted to recovery.gov as CSV or XML, where Enterprise Application Suite (a server-based managed reporting system) could convert the data to XBRL. Enterprise Application Suite provides the workflow and processes to collect, validate and store received reports in an XBRL-based database. Each agency is also responsible for collecting and transmitting the recipient reports in XBRL to recovery.gov.

At the agency level - As envisioned in the guidance document, each agency is responsible for collecting reports from recipients of funds under the act. Recipients could deliver the information in the format of their choice {CSV, XML or XBRL}. Using Enterprise Application Suite, the agency can fully manage the process from notifying recipients of reporting requirements, providing a portal for accepting reports, converting them to XBRL (if necessary), validating them and storing them (if required) and transmitting the XBRL document to recovery.gov.



## *Current examples of XBRL production systems*

As noted in a previous section there are a wide range of XBRL systems in production today. Some specific examples that could be of interest to the Recovery.gov team include:

### *US Securities and Exchange Commission*

The SEC adopted a ruling making XBRL filings mandatory for public company beginning with the top 500 companies filing in June. Before that, the SEC ran an extensive voluntary filing program for 3 years. It has as recently published a series of rulings also requiring Mutual Funds and NRSROs to submit XBRL documents.

### *FFIEC / FDIC*

8,000 banks submit call reports of over 3,000 facts each quarter to the FDIC using XBRL. This program has been in production since 2005. The FDIC uses XBRL business rules to both ensure the quality of the data coming in from the banks and for automating the surveillance process.

### *Committee of European Bank Supervisors*

European banks submitting reports (COREP/FINREP) are using XBRL to meet Basel II reporting requirements to their country's banking supervisor. Jurisdictions include France, Belgium, Spain, Luxembourg and Norway. As an example, Banque de France is currently live with a system for its 630+ submitting banks.

### *The Government of the Netherlands*

In order to reduce the administrative burden of business filing, the Netherlands Taxonomy Project facilitates the filing of tax declarations, annual reports and economic statistics using XBRL with a goal of saving businesses 350 million Euros a year. The project also expects transparency to be one of the benefits of the XBRL approach. To quote:

*“The introduction of standardised reports (XBRL and Dutch Taxonomy) can make reports more reliable, easier to analyse and compare. This increase in efficiency, transparency and comparability can hopefully contribute to the recovery of the necessary trust in financial reporting.”<sup>7</sup>*

### *Microfinance Information Exchange*

As a supplier of information to the 25 billion dollar microfinance industry, MIX has put in place a reporting system using XBRL to promote greater transparency for 1,000+ microfinance institutions and organizations that invest in them. By developing an XBRL taxonomy that met the reporting needs of all parties in the microfinance industry, they were able to significantly improve the efficiency and transparency of a “many-to-many” reporting ecosystem.

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<sup>7</sup> Reducing administrative burdens through standardization  
<http://www.xbrl-ntp.nl/english/Overviewntp10.pdf>

## *Appendix: Introduction to eXtensible Business Reporting Language (XBRL)*

XBRL is a global standard method for the electronic exchange of business information (replacing 100s of proprietary methods). XBRL is also a method of expressing meta-data and semantics, which is how the business information can be exchanged. Basically, this is what the XBRL Specification provides.

XBRL represents a global agreement of the semantics of financial reporting concepts and business rules. These concepts and rules, the semantics, have already been created for IFRS and US GAAP. These two taxonomies provide agreed upon semantics against the respective set of accounting standards. So, rather than each company defining its own financial reporting terms and business rules, standard taxonomies of concepts and rules have been created which enhances comparability across companies.

XBRL is also an organization, comprised of 500+ members from around the world which stands behind and maintains XBRL. The non-profit organization XBRL International provides this. XBRL will cause a fundamental change in infrastructure relating to the creation and consumption of business information as the cost/benefit model for creating and using such information has fundamentally changed.

XBRL provides an XML-based framework that the global business information supply chain can use to create, exchange, and analyze financial reporting information including, but not limited to, regulatory filings such as annual and quarterly financial statements, general ledger information, and audit schedules. XBRL is freely licensed and facilitates the automatic exchange and reliable extraction of financial information among various software applications anywhere in the world.

XBRL extends XML to improve the efficiency, accuracy and transparency of reporting and information exchange. The key to the power of XBRL is the concept of a taxonomy, or metadata model. The taxonomy not only tags the data but also defines structure to the information being exchanged, business rules that operate on the information, and a framework for easily creating new taxonomies by extending existing ones. Taxonomies exist today for a wide range of business applications including US GAAP, IFRS (International Financial Reporting Standard), CRAS (Credit Risk Assessment Services), XBRL-GL and the COREP/FINREP (under Basel II Accord).

### *About UBmatrix*

UBmatrix, Inc. is the leading provider of XBRL-based information exchange solutions for global organizations and enterprises allowing them to more efficiently and effectively address the challenges of business and financial information management, exchange and reporting. XBRL is fast becoming the standard for financial information exchange and reporting demonstrated by the XBRL programs being driven by the SEC, FDIC and the European Central Bank Supervisors. UBmatrix XBRL solutions increase operational efficiency and financial transparency, and ensure reporting accuracy and regulatory compliance. UBmatrix is based in Silicon Valley with development centers in Bellevue, WA, and New Delhi, India. For further information, visit [www.ubmatrix.com](http://www.ubmatrix.com)

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