Transforming Financial Information – Use of XBRL in Federal Financial Management

Financial Information Sharing (FIS) Subcommittee
Financial Management Committee
Collaboration and Transformation SIG

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The following White Paper addresses the current status toward adoption of the Extensible Business Reporting Language (XBRL) web services standard supporting financial reporting within the federal financial management community. It is accepted there are credible reasons to accelerate adoption of industry standards to ensure continued advancement of technology in the business community. Recent actions have begun that are designed to accomplish the objective of improving current business processes surrounding financial reporting, financial accounting, and financial management. These actions are occurring in legislative, regulatory, and within oversight bodies at the state and the federal levels. The need for real-time information exchange is fueling the drive towards adoption.

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1. Executive Summary

Business financial reporting is found in both the public and private sectors and is integral to financial management and performance. The purpose of this white paper is to examine the use of XBRL to support federal financial management and its potential to pervade the public and private sectors.

Each year, federal agencies utilize considerable resources to meet internal and external reporting obligations not related to their central mission. The cost of the reporting process is further compounded when the same, largely manual, effort has to be repeated to provide the same information to a subsequent interested party in a different format or through a different medium, often entailing the manual re-keying of information.

XBRL was designed to allow financial data to be part of an information supply chain and not just a single document exchanged with a single destination and purpose. At each step along an information supply chain, data needs to be viewed, analyzed, and manipulated for a diversity of uses, all without undermining its integrity or interpretation. XBRL was designed to capture the business logic of financial and regulatory information. Unlike XML, XBRL requires data elements to be 'normalized' so data can be easily stored and managed in a relational database or a spreadsheet.

The intention of having a standardized way of communicating information is to avoid the costs associated with gathering, manipulating, substantiating, correcting, misinterpreting, and reentering information.

The XBRL standard is governed by a not-for-profit international consortium (XBRL International) consisting of over 400 organizations worldwide, including: regulators, government agencies, news agencies and software vendors. The XBRL community is creating a growing number of shared, royalty-free taxonomies, each of which has thousands of data elements, covering many accounting standards in many languages.

The concept of an information supply chain emphasizes the notion that information can be 'reused' which is to say, it is not just gathered and provided once, but is passed along a chain of interested parties. A technology such as XBRL enables efficient reuse of information, not just through how a body of data can be automatically provided and consumed or electronically distributed, but also through how a body of data can be viewed and manipulated for analytical purposes while ensuring consistency of interpretation and without undermining the integrity of the data. Viewing financial reporting in the context of an information supply chain better allows for the identification of opportunities to improve efficiency and inject flexibility.

Traditionally, reporting is associated with a notion of static content with information laid out in a fixed format. The notion of a flexible format was only possible to the

degree data could be imported into another application (e.g. Microsoft Excel), but at the expense of the integrity of the data and its interpretation. However, XBRL uses metadata to define extensive information about the data of interest (such as presentation logic, calculation and business logic, format logic, and data element relationships) independently of the data but still systematically linked. Similar to how XBRL metadata functions to provide flexible presentation, so to does XBRL metadata provide enhanced data integrity. The result is information can be customized (viewed and manipulated) without accidentally undermining its integrity. XBRL uses the calculation, business, format, and data element relationship logic captured in a given XBRL taxonomy to validate the data that is captured in an XBRL document. It also allows information to be mapped to authoritative published business references and financial and accounting literature that give meaning to data elements. Finally, because this information about the data is available to the information provider while the data is being gathered, it allows the provider to validate the data before it is submitted.

Federal financial management is a complex, labor-intensive set of processes filled with manual steps and redundant data entry. These processes are further complicated by the breadth of participants, the diversity of information that needs to be shared, and the diversity of technologies and accounting systems used by agencies which store information in dissimilar formats and at varying levels of detail, and are annually becoming increasingly voluminous. In 2005, CFO Act Agencies sent Treasury 7,923 pages of PDF files as part of PAR reporting requirements.

There are a large number of potential opportunities for federal agencies to use XBRL in financial management, such as in budget formulation, financial review, budget execution, and performance management. Viewing this in terms of an information supply chain, OMB needs to integrate information from at least three major sources on a timely basis, as well as providing structured data to any potential user. XBRL taxonomies could play three roles in this system, as a: 1) Language in which requests are formulated, 2) Means for information providers to map and validate their data, and 3) Language in which data could be delivered to citizens for further analysis.

While on the surface this white paper is about the opportunity for a type of technology in the federal government, at its heart it is about exploring the benefits of a new way of doing business – instituting an information supply chain for federal financial information in place of the hundreds if not thousands of individual redundant and suboptimal reporting processes. There are many places to start the pursuit of XBRL, but the most effective with the richest opportunity for savings is with existing data collectors such as FMS and OMB. A pilot project would allow OMB and FMS to evaluate the character of an information supply chain, how it can satisfy the demand for information with responsiveness and efficiency, how it can enable the right information to be delivered to the right recipients, at the right time, and in a format recipients can digest to suit their own needs. A pilot would also create an initial taxonomy as the first step on the path to more extensive use.

Additionally, forming a common language for federal financial management through a taxonomy offers a potent means for dealing with breadth, complexity, and idiosyncrasies. A taxonomy of federal financial management is an investment in an asset of infinite reuse.

Taking a 'wait and see' approach to the future of managing financial data in today's environment of real-time information transfer is only imposing a greater cost tomorrow, especially with the ever increasing pressure to have more information available in an ever smaller amount of time. XBRL specifically is receiving strong international interest for its immediate practical value: an effective means of combating the labor intensive, time consuming, and error-prone nature of financial and regulatory reporting, while still allowing data to be captured in a standardized fashion. As such, XBRL represents the front edge of the next significant wave in information technology being practically applied in both public and private sector business systems.

2. Purpose

Business financial reporting is found in both the public and private sectors and is integral to financial management and performance. The purpose of this white paper is to examine the use of XBRL to support federal financial management. The paper explores the issues impacting financial accounting, business financial reporting, information technology, and the applications of a standards-based technology to solve these issues. The paper provides background on how business, both public and private, can benefit from the application of standards and the potential impact.

This white paper has been designed to facilitate knowledge transfer and aid in general discussion of the topic. As such extensive use of visualization has been made to make the material as intuitive as possible. Key points and concepts have been called out in framed text boxes to better highlight their significance.

3. Background on XBRL

3.1.   Why the Interest in XBRL?

Each year, federal agencies utilize considerable resources to meet internal and external reporting obligations not related to their central mission. Each report produced requires an agency to undergo an extensive effort to gather, validate, aggregate, consolidate, and reconcile information. More often than not, the information is maintained in disparate systems with incompatible technologies in use across the enterprise. Though a vigilant attempt at accuracy and clarity may be made, the size and complexity of the data along with the volatility of the rules and formats for reporting the data can result in an incorrect or misinterpreted report.

The cost of the reporting process is further compounded when the same, largely manual, effort has to be repeated to provide the same information to a subsequent interested party in a different format or through a different medium, often entailing the manual re-keying of information. The net result is that reporting within federal financial management is complex and expensive, placing a tremendous burden on the people, processes, and systems of each agency.

At the same time, there is an increasing awareness of the economics of information, the value it provides when readily available and the risks it imposes when it is not.

> Information has "*perfectly*" increasing returns; spend the money to learn something once, and that knowledge can be reused at zero additional cost forever; double the number of uses and the cost per use halves. [1]

To address these issues, XBRL (eXtensible Business Reporting Language) has emerged as an effective framework to contend with the labor-intensive, time consuming, and error-prone nature of financial and regulatory reporting. The growing popularity of XBRL internationally, with governments and commercial organizations has spawned interest in its potential use by the US Federal Government to reduce the cost and increase the speed of federal financial and regulatory information as it flows through the government.

3.2.   Overview of XBRL

3.2.1. What is XBRL?

XBRL is a flexible framework for standardizing and automating the flow of information. XBRL was designed to allow financial data to be part of an information supply chain and not just a single document exchanged with a single destination and purpose. At each step along an information supply chain, data needs to be viewed, analyzed, and manipulated for a diversity of uses, all without undermining its integrity or interpretation. XBRL was designed to capture the business logic of financial and regulatory information. Consequently, XBRL provides a more precise, yet flexible, method than other standards (or XML alone) for specifying the meaning and validity of the information to be shared.

The rich feature set of the XBRL framework is made possible by its three components:

> An **XBRL Taxonomy** acts like a dictionary, defining a common language, with descriptions and classifications for the contents of XBRL documents. Similar to a dictionary, it specifies the tags (words) to be used, their semantics (meaning), and how they are defined (types of data, structure, and relation to each other) and the rules and formulas they must adhere to, e.g. Assets = Liabilities + Equity).

> An **XBRL Document** is an XML document, conforming to the XBRL format and typically contains the information required in a single periodic financial report or statement. Each data element in an XBRL document is marked with an identifying tag, which is defined in an XBRL taxonomy. Thus each piece of information in an XBRL document has a definitive definition of what it is, what it means, and what rules it follows.

> **XBRL Tools** – XBRL itself is a complex syntax layered on top of XML and is not intended to be used without an XBRL tool or processor. XBRL tools fulfill multiple roles: *shielding* users from the complexity of its syntax and its taxonomies, *aiding* in the creation, viewing, and management of XBRL Documents, *facilitating* the interoperability of data in legacy systems, *enabling* automated collection, validation, extraction, and manipulation of XBRL Documents, and *easing* the management of change as the nature and content of information to be shared evolves.

Figure 3-1: Layered View of XBRL Components

Component	Role	Provider
XBRL Documents	Content	User Community
XBRL Taxonomies	Vocabulary	User Community
XBRL Tools	Infrastructure	Third Party Vendors
XBRL	Infrastructure	XBRL International
XML	Syntax	World Wide Web Consortium

(Dependency arrow pointing downward along the left side)

The above figure denotes how the value and functionality of XBRL is fulfilled through a layer of interdependent components from a diversity of sources such as a public and private sector user communities, vendors and standards organizations (including XBRL International and the World Wide Web Consortium). Starting from the top XBRL Documents provide the 'Content' or information being shared but are directly dependent upon the one or more XBRL Taxonomies. Taxonomies act like a dictionary, specifying the valid 'vocabulary' of a given user community or area of practice. In turn, the XBRL Taxonomies depend upon XBRL Tools to be enforced, given the complexity of the information and the rules specified in the taxonomies. XBRL Tools depend upon the XBRL standard, which works in concert with the XBRL Tools to form a 'framework' for structuring and managing XBRL documents and taxonomies. Finally, XBRL as a language is dependent on XML as the 'Syntax' in which it is written.

3.2.2. Why XBRL and Not Just XML?

Why XBRL and Not Just XML? The answer lies in a computer science term known as "metadata". Metadata is the term used for data that provides information about other data.[2] A common form of metadata is the information that defines the valid contents of a column in a database table, e.g. the social security column in an employee table is specified to be comprised of 8 numeric digits separated by dashes into three groups. XML supports metadata through a mechanism know as an XML Schema which allows some information about the data to be captured such as format of data, valid values, and relationships between data elements.

XBRL leverages this same mechanism, given it is based on XML, but augments it with an extensive metadata infrastructure for capturing a greater breadth and variety of information about the data XBRL can capture and represent, including information about:

- Relationships (hierarchical and nonhierarchical)
- Presentation Formats
- Calculations
- Rules
- Semantic Definitions

XBRL enables software to enforce relationships that XML alone, or other XML standards, could not. Unlike XML, XBRL requires data elements to be 'normalized' so data can be easily stored and managed in a relational database or a spreadsheet.

XBRL also provides a means of metadata extensibility without retooling or undermining the integrity of existing taxonomies. The richer the metadata for a given data, the more readily that data can be shared, manipulated, and transformed by computer. Systems which are metadata driven are easier to maintain, require less or no changes in programming when the data they support changes, and can support a greater diversity of uses.

3.2.3. What are the Benefits of XBRL?

The intention of having a standardized way of communicating information is to avoid the costs associated with gathering, manipulating, substantiating, correcting, misinterpreting, and reentering information. The seven fundamental benefits of XBRL are:

- **Accuracy**: The taxonomy specifies the meaning and rules of valid data, while automated tools can insure the compliance with the taxonomy.
- **Consistency**: The taxonomy acts as a dictionary, providing an explicit definition for each data element that can easily be shared to assure consistent interpretation. The taxonomy enables groups or communities to represent and share a common set of terminology, in an open, transparent and efficient manner.
- **Efficiency:** The combination of taxonomies, XML based documents, and automated tools enables the automated processing of business information and eliminates the manual processes of validation, re-entry, and comparison.
- **Reuse:** A form of efficiency, but worth noting separately when contrasting to the historical notion of reporting. By marrying an XML document with a taxonomy, XBRL is able to provide information in a format optimized for reuse, letting format, level of detail, and presentation be the choice of the end user rather than the information provider.

- **Flexibility:** Unlike other XML standards, XBRL was architected for agility in many different contexts: A) letting end users determine how they wish to view and manipulate information, B) allowing information providers to extend taxonomies for new information exchanges without undermining existing taxonomies or compatibility with existing tools, or C) enabling taxonomy updates to be applied rapidly and without programmatic changes.
- **Traceability:** The fact that data is provided with a mapping to a taxonomy allows for greater traceability in determining both: A) From where it was derived and B) To what it relates. No longer does data have to be stripped of all supporting information and become just a number.
- **Visibility:** The ease with which information can be accessed and manipulated for analytical purposes defines the degree of visibility into any organization, issue, or subject of interest. Thus XBRL, through its layered component-based architecture, can dramatically enhance the visibility into financial matters such as an organization's performance or effectiveness.

> Adding XML tags, such as XBRL-GL [does] to data, frees up the data from the underlying applications and begins to permit businesses to construct traceable information trails that can be seen straight through from the business event to external reporting.[3]

The most prominent of these benefits is in the form of efficiency via the reuse of information. In any context that there is more than one recipient of a body of similar information, there is a high level of redundancy as illustrated below.

Figure 3-2: Information Exchange in Traditional Reporting without Reuse [4]
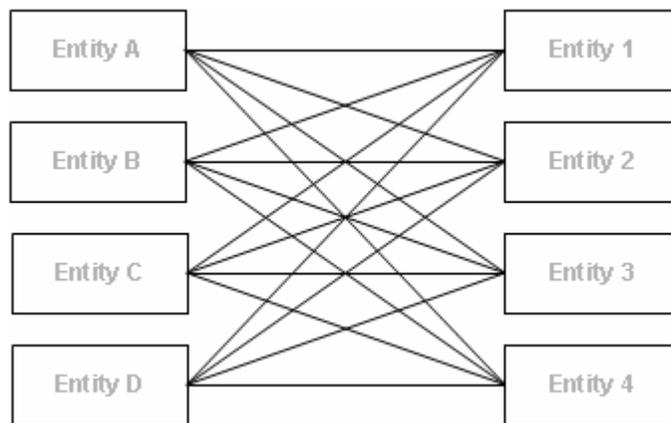
XBRL was designed from inception to provide any financial domain a means of resolving this redundancy, transforming a web of independent reporting connections to a single information exchange of precisely defined, universally understood, self validated data.[5]

Figure 3-3: Information Exchange via XBRL with Reuse [6]
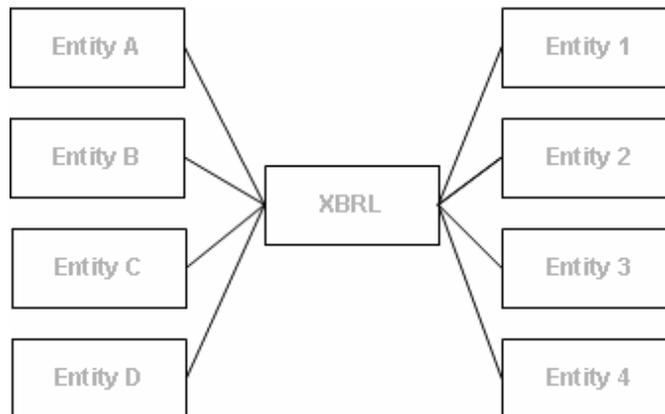
3.2.4. When to Use XBRL?

XBRL is suited for many basic business contexts where individuals or organizations must share information. XBRL can be used to represent the data found in business, operational, and accounting systems, and can then be moved between disparate systems. Typical utilizations are:

A. **Numerous organizations provide the same information to a single institution** - for example: public companies reporting financials to the Securities and Exchange Commission (SEC).

B. **Numerous organizations share the same information amongst themselves** – Often referred to as an 'information supply chain' when information is shared in a series. In this context many participants benefit by mapping their own internal reporting conventions into XBRL. For example: banks can submit information once to the Federal Financial Institutions Examination Council (FFIEC) XBRL system, which in turn shares it with FFIEC member agencies such as the Federal Deposit Insurance Corporation (FDIC), Federal Reserve System (FRS), and Office of the Comptroller of the Currency (OCC).

These two situations can often be found in tandem in a government reporting context, where public companies are required to provide information to a government agency and that agency in turn shares that information with several other agencies.

> The mantra often cited by XBRL advocates is 'provide the data once and use it many times'.

Because information in XBRL is designed for reuse, there are many more use cases than those mentioned above. For example, individuals can benefit from

drilling down within XBRL documents, enabling data analysis on the desktop (e.g., the Excel example from Edgar Online below). Also, end-users can benefit from getting dynamic documents on demand, instead of static documents on a schedule.

The mantra often sited by XBRL advocates is "*provide the data once and use it many times.*" In a government reporting context, numerous agencies require the same information about elements of financial performance, often in different formats. XBRL offers the potential to provide data sets once and enable its repurposing at different agencies in the way they need to receive it.

3.2.5. XBRL Case Studies

A few of the most prominent XBRL applications are listed below. A more extensive list is available on the web (http://www.xbrl.org/showcase).

Table 3-1: Prominent Applications of XBRL

Host	Application	Current and Anticipated Impact
US SEC	The US Securities and Exchange Commission (SEC) started a voluntary program for companies to use XBRL for the disclosure of financial performance information. SEC Chairman Christopher Cox is quoted as saying, "As the number of companies voluntarily submitting interactive data continues to grow, it's obviously becoming clear that making information available to investors in a more useful way is also cost effective."	The SEC's Interactive Data initiative will streamline the analysis capabilities of the investing public and of the SEC's own analysts, reducing the number of distinct forms and improving the timeliness and consistency of data. Edgar Online is now offering investors a value added service based on the SEC taxonomy to facilitate investor analysis to normalized performance data.
Dutch Tax Authority	Beginning in 2007, all financial reporting from the private sector to government, particularly corporate tax returns, will be done using taxonomies developed and maintained by a central government authority.	Consolidation of the standards for financial reporting is expected to save 400 million Euros per year. Given that the Dutch GNP is about 4% of US GNP and the Euro is about 1.25 USD, the equivalent benefit in the US would be $12.5B per annum.
FFIEC (FDIC, FRB, OCC)	The US Federal Financial Institutions Examination Council (FFIEC) launched the largest use of XBRL in the US in October 2005. The project entailed the FFIEC mandating that U.S. banks (over 8,000) use XBRL in submitting quarterly bank financial statements (Call Reports) to the FFIEC and do so over the Internet.	As a result of the project, the FFIEC has reported benefits to the extent of: • Increased data cleanliness (66% to 95%) • Increased data accuracy (70% to 100%) • Dramatic reduction in the time to process (from weeks to hours) • Rise in productivity (15%) The FFEIC is looking at a similar project for collecting the Summary of Deposits survey data within the next year, as well collecting other agency data via XBRL.
US Department of Housing & Urban Development, Federal Housing Administration (FHA)HUD	The Federal Housing Administration (FHA) replaced a data warehouse used to translate from a commercial chart of accounts into the federal chart of accounts (USSGL) for an asset servicing and accounting system. The data warehouse was expensive to manage and resulted in inefficiencies. The FHA was able to integrate a family of disparate financial systems using XBRL, including accounts receivable (loan servicing) and accounts payable (property accounting, contract management).	With the project fully implemented, the FHA is able to leave its legacy commercially-based accounting systems in place but receive daily input in accordance with USSGL requirements. The FHA is now using a single source for multiple reporting requirements, eliminating duplicate data entry, duplicate data processing, and extensive reconciliation processes. With daily data transmissions and reconciliation, the FHA has better controls over its cash and can close its books with less effort. A data warehouse has been removed, saving time, money and reducing complexity. Reporting is simplified through repurposed

		data, eliminating manual steps.

The business benefit to the FFIEC has been particularly well documented and quantified, and its key findings are summarized in the paper "Improved Business Process through XBRL: A Use Case for Business Reporting."[7]

3.2.6. Where Did XBRL Come From and Where Is It Going?

The XBRL standard is governed by a not-for-profit international consortium (XBRL International) that includes regulators, government agencies, news agencies and software vendors. XBRL International is supported by jurisdictions (generally organized by country) which act as independent bodies to encourage the adoption of XBRL and the development of taxonomies that define the information exchange requirements of a jurisdiction's particular domains.

The XBRL community is creating a growing number of shared, royalty-free taxonomies, each of which has thousands of data elements, covering many accounting standards in many languages. XBRL taxonomies have already been created for:

- GL (Global Ledger), modeling the contents of accounting ledgers, sub ledgers and other kinds of transaction journals;
- US GAAP (Generally Accepted Accounting Principles), encompassing US financial statements, notes and disclosures, and management discussion and analysis;
- IFRS (International Financial Reporting Standards), representing the core disclosures of IFRS which are then augmented on a country-by-country basis to meet local statutory requirements;
- COREP (Common Reporting), covering the requirements of 25 European banking supervisors' Basel II reporting;
- National GAAP taxonomies in Japan, Germany, Korea, and Sweden.

Work is currently underway to develop taxonomies for both vertical and horizontal industry groups. XBRL is being adopted by a wide range of regulators to replace both paper-based and legacy electronic data filing. It has already received wide adoption in Asian Pacific countries and is rapidly gaining acceptance in Europe.

> XBRL is not about sharing more information – it is about improving the way information is shared.[8]

4. Application of XBRL in Business

Undeniably, the reporting process of any given organization can vary widely in scope, timing, frequency, detail, jurisdiction, privacy, regulatory regime, and statutory limitations, yet they all follow a general model for reporting:

    (i)   Process Requests – receive and analyze information requirements from external parties

    (ii)   Issue Response – gather, summarize, format, and publish aggregated information that satisfies the requirements

    (iii)   Issue Requests - issue information requirements to external parties

    (iv)   Process Responses - receive, validate, reconcile and consolidate information from external parties

This general reporting model applies both to the outside faces of an organization (such as a federal agency responding to Financial Management Service (FMS) or Office of Management and Budget (OMB) reporting requirements, or an agency issuing information requirements to trading partners) as well as inside the organization (an agency's Office of the CFO issuing requirements to its divisions and consolidating the results).

4.1.   Request/Response Pattern of Financial Reporting

The general reporting model can more simply be viewed as a pattern of pairing requests and responses. In the context of the Federal Government, this pattern can be used to model the flow of financial reporting from the perspective of a typical agency, bureau, commission, or department (hereafter, referred to as "entity") to a diversity of stakeholders as illustrated below.

Figure 4-1: Flow of Federal Financial Information
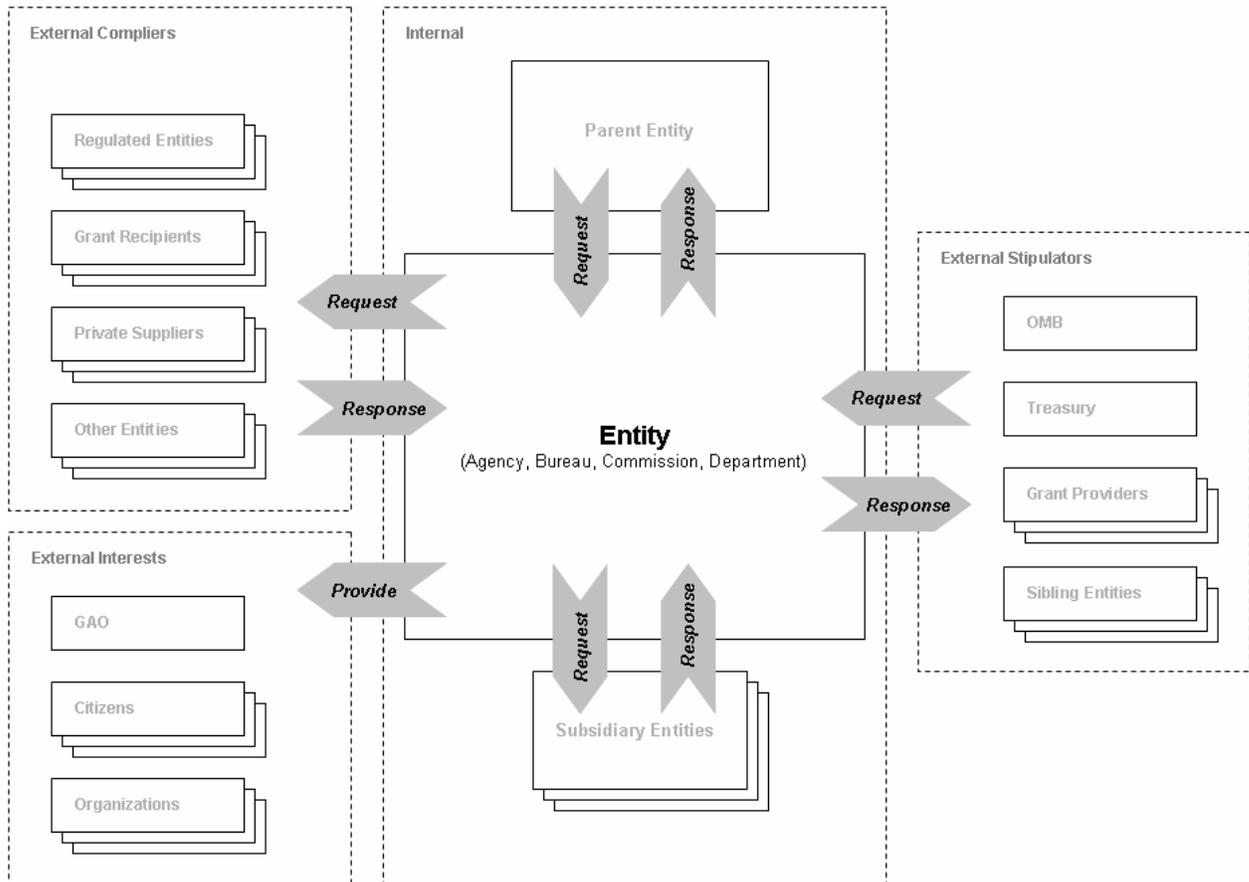
While the request/response pattern is simple in concept, it is useful in reviewing the challenges and costs of financial reporting. As illustrated above, entities within the federal government are replete with reporting requirements.

4.2. Challenges and Costs of Financial Reporting

Most current financial reporting requirements arose in isolation over time from the independent needs of diverse external and internal organizations. As a consequence of this schism in time and interest, numerous challenges arise resulting in either direct or indirect costs to all organizations involved in financial reporting. The most common challenges include:

1. **Gathering** – Resources expended or committed to the assembling of information
2. **Quality** – Accuracy of the information provided and the costs arising from inaccuracy
3. **Redundancy** - Many distinct response/request pairs for a single entity with little or no reuse among them
4. **Inconsistency** - Conflicting terminology or rules of classification and aggregation among different requests

5. **Comprehension** - Ambiguous terminology or rules of classification and aggregation among different requests
6. **Complexity** - Size and scope (complexity) of each request and response
7. **Reconciliation** - Work required to find and adjust for inconsistently applied rules or formats in responses to different requests at different times
8. **Volatility** – Consistent change in the rules and format that apply to individual requests, and flexibility of the mechanisms used to provide it
9. **Timing** – Small window in which to compile and submit a large amount of complex and dispersed information (e.g. 45 days from Fiscal Close for Federal Agencies)

These challenges are manifest in costs to requesters and responders. The costs are not merely single point costs: once to the requester (in digesting the information) and once to the responder (in providing financial information). Rather, the costs are numerous and dispersed over multiple points in time.

Figure 4-2: Points of Cost Creation in Reporting
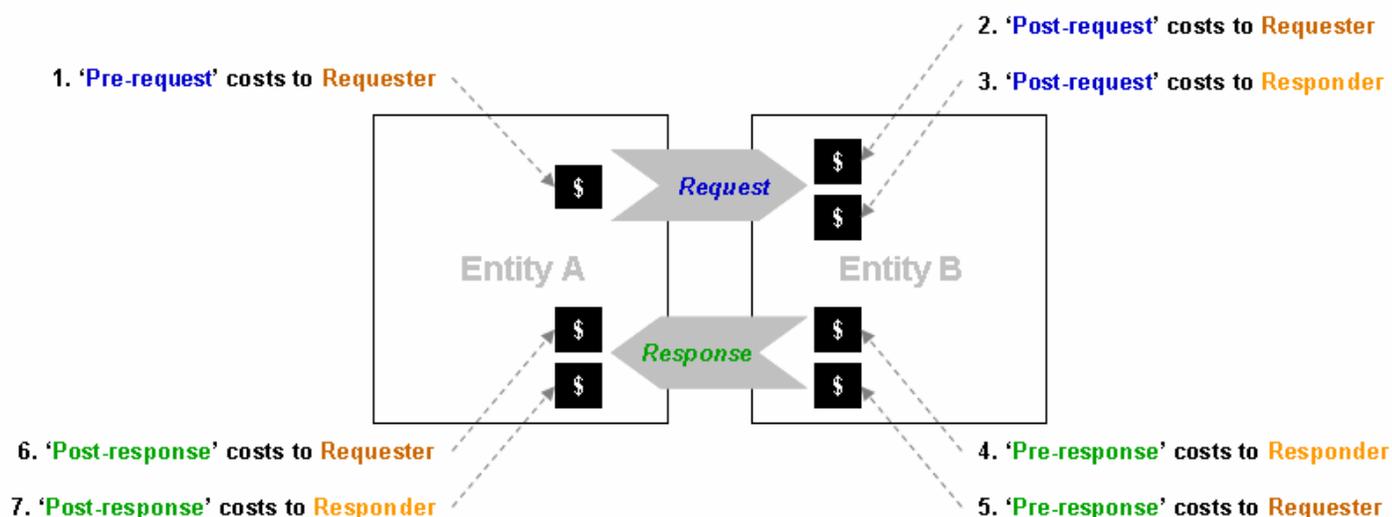
The figure above identifies seven typical cost points in reporting. For example, it is often assumed that when financial information is requested, the request is completely and accurately understood. While in practice, either:

A) An organization receiving the request needs clarification of the request, creating an additional cost point for the requester (cost points #2 and #3 above)

B) An organization receiving the request misinterprets the request and responds incorrectly, creating an additional cost for the requester and the responder in contending with the discrepancy (cost points #6 and #7 above).

The following table outlines the typical cost points and the types of costs associated with them.

Table 4-1: Role, Timing, and Nature of Reporting Costs

#	Role Bearing Cost	Timing of Cost	Traditional Reporting Cost
1	Requester	Pre-request	• Gathering Requirements • Documenting Requirements • Formatting Requirements • Transmitting Requirements
2	Requester	Post-request	• Answering questions, giving clarifications, making corrections to the request
3	Responder	Post-Request	• Interpreting Request
4	Responder	Pre-response	• Gathering - Disparate sources with diverse levels of granularity • Verifying • Reconciling • Summarizing • Formatting Request Interpretation
5	Requester	Pre-response	• Answering questions and giving clarifications (given actual responder may not have been recipient of request)
6	Requester	Post-response	• Interpreting Response • Verifying • Reconciling • Consolidating • Summarizing • Formatting
7	Responder	Post-response	• Answering questions and giving clarifications (given actual responder may not have been recipient of request) • Researching Inquiry • Making Corrections • Reconciling changes with original response

An important point in rationalizing the inefficiency of the traditional reporting model is to consider the burden upon an agency when the seven cost points are multiplied across all the reporting requirements of an agency as noted in Figure 4-1: Flow of Federal Financial Information.

> The traditional view of financial reporting as an isolated unique need between only two entities has imposed a considerable cost upon the federal government.

In other words, the sum total occurrence of all reporting challenges (gathering, quality, redundancy, inconsistency, comprehension, reconciliation, complexity, volatility, and timing) multiplied across all an agencies reporting requirements

results in the consumption of a significant amount of resources (human and financial) away from an agency's mission.

4.3.   A New Model for Reporting: The Information Supply Chain

Given the historical origin of financial reporting in a non-digital era, the concept has long been associated with a set of characteristics of paper-based business practices. Yet, these historical characteristics have lingered as assumptions with implementers and users, creating needless limitations and resource burdens in how reporting is applied, used, and managed.

Table 4-2: Characteristics of Traditional Reporting

Characteristic	Description
One to One	One request for information pertains to only one requester
Single Audience	A single report only has a single audience based on a narrow interest
Narrow Purpose	A single report has a narrow purpose. Should another purpose emerge another separate report is created. To reuse a report for more than one purpose is too complex and expensive and undermines the integrity of the content
Static in Composition	The definition of a report does not change once properly designed. Information is in a fixed format which can not be easily customized by recipients
Transient	Each report instance quickly becomes irrelevant not just because of time, but also due to the medium and format limiting its use for other purposes. It is easier and more economic to replace than reuse
Isolated Redundant Cost	Expensive, redundant, cost carried by single body for each isolated use

In contrast, in a digitally oriented and highly connected society, information often needs to be more flexible in how it is used, viewed, and shared.

> In a modern era, financial reporting is a fluid dynamic business function seeking to leverage technology, distribute costs, and employ common semantics - as a communal need of many organizations with a common interest.

Figure 4-3: Example of Information Supply Chain
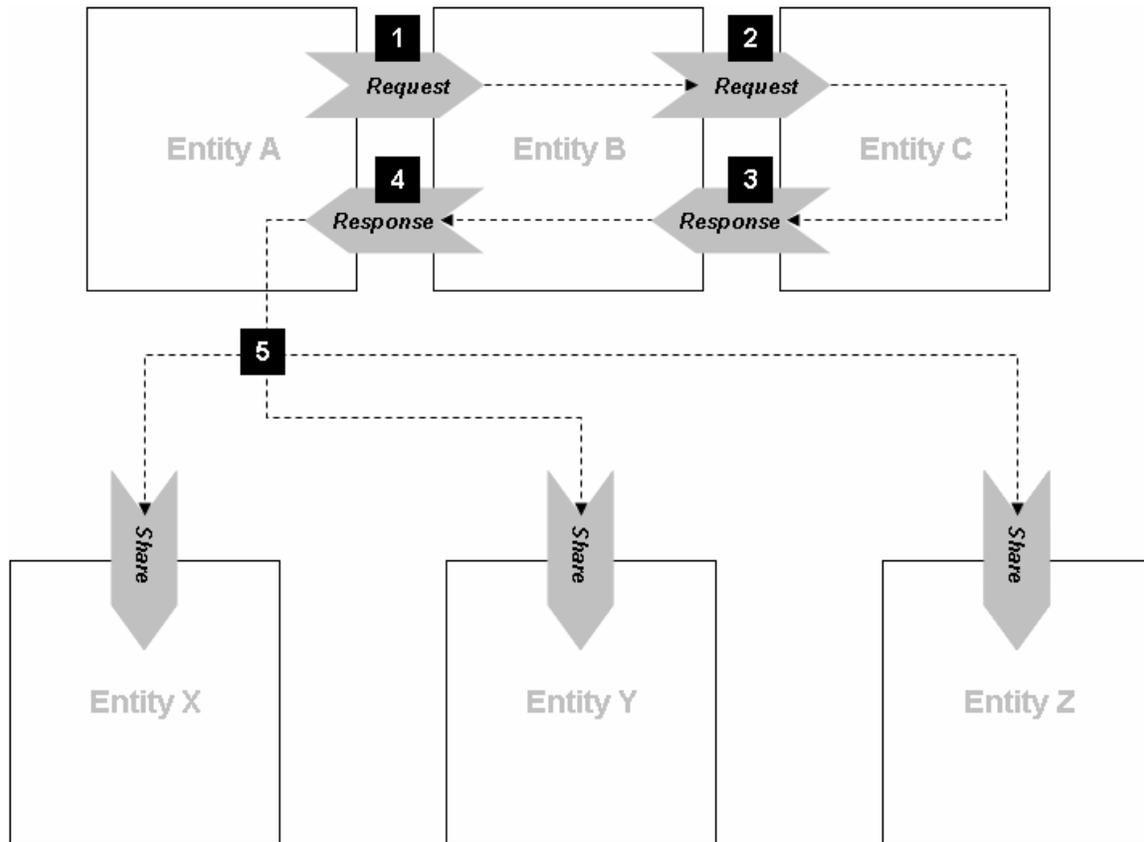
As illustrated above, information that is requested of one body (#1 above) may in turn become a request to another party (#2 above) with the response (#3 above) being passed, in part or in whole, back along to the original requestor (#4 above). Ultimately, the information may be shared out, in part or in whole, with other interested parties (#5 above). When the pairs of requests/responses are chained together they can be viewed as an *information supply chain*. The concept of an information supply chain emphasizes the notion that information can be 'reused' which is to say, it is not just gathered and provided once, but is passed along a chain of interested parties.

> An Information Supply Chain emphasizes the notion that information can be 'reused' by numerous interested parties for more than one purpose and in diverse ways.

A technology such as XBRL enables efficient reuse of information, not just through how a body of data can be automatically provided and consumed or electronically distributed, but also through how a body of data can be viewed and manipulated for analytical purposes while ensuring consistency of interpretation and without

undermining the integrity of the data. For example, XBRL data can be imported and exported from Microsoft Excel but still have each data element tagged and affiliated with a specific taxonomy to ensure its integrity.

> The ease with which financial information can be accessed and manipulated for analytical purposes is directly tied to the degree of visibility into an entity's performance.

It is important to keep in mind that while reporting processes are clearly necessary, the process of reporting is in itself not the value. Rather, the value lays in a) the quality and nature of the content that result from the process and b) how and where the content can be used and reused. In other words, report creation processes themselves are *non-value adding* activities. It is the resulting body of information alone that is of value. Thus, in a scenario where a request of one entity becomes (in part or in whole) a request to another entity, there is both a chain of information being supplied and a chain of correlating and very likely redundant costs.

> If every entity has its own reporting processes there is an inherent level of redundancy and inefficiency when each link is established and maintained in isolation.

Viewing financial reporting in the context of an information supply chain better allows for the identification of opportunities to improve efficiency and inject flexibility.

Table 4-3: Characteristics of an Information Supply Chain

Characteristic	Description
Many to Many	Many related requests can be compiled into a single call for information and then shared with many interested parties
Broad Audience	A single body of information can have an expansive audience which receives all or part of the original pool of information as it moves down the supply chain
Broad Purpose	A single body of information can have a set of purposes. Should another purpose emerge the same body of information can be reused or mildly augmented. To reuse a body of information for more than one purpose is inexpensive, given it is easily reconstituted without undermining the integrity of the content.
Dynamic Composition	The definition of a body of information report is intended to change over time and is designed for requesters and responders to readily adopt to changes, and use and view as best suits each individual recipient.
Reusable	Each report instance only becomes irrelevant with the passage of time, given the medium and format do not limit the use of the information for other purposes.
Shared Minimal Cost	Shared cost distributed across all interested parties with a high opportunity for reuse of data, taxonomy, and tooling.

The value of a technology can often be found not only in its ability to automate business processes, but in its ability to help users understand the content of a given business domain. XBRL exploits commonalities, realizing value through a uniformity of semantics, automation, and flexibility.

> The fundamental value proposition of a technology that enables an 'information supply chain,' is that it maximizes efficiencies and shares costs.

4.4. Contrasting Costs: Traditional Reporting versus XBRL

When one entity's request becomes in whole or in part the request of another entity in a chain, the 7 cost points illustrated above in the "Points of Cost Creation" diagram are often needlessly reproduced at each link in the chain. Reducing the cost of reporting processes entails reducing redundancy and sharing the expense across the constituents of a supply chain.

The following table contrasts the typical reporting costs cited earlier with how XBRL contends with them.

Table 4-4: Role, Timing, and Nature of Reporting Costs - Contrasted with XBRL Benefits

#	Role Bearing Cost	Timing of Cost	Traditional Reporting Cost	XBRL Benefit
1	Requester	Pre-request	• Gathering Requirements • Documenting Requirements • Formatting Requirements • Transmitting Requirements	• Costs shared by a broader base of users and usages
2	Requester	Post-request	• Answering questions, giving clarifications, making corrections to the request	• Cost reduced by XBRL self documenting nature of Taxonomy
3	Responder	Post-Request	• Interpreting Request	• Cost reduced by XBRL self documenting nature of Taxonomy
4	Responder	Pre-response	• Gathering - Disparate sources with diverse levels of granularity • Verifying • Reconciling • Summating • Formatting Request Interpretation	• Cost reduced by automated tooling which supports automated gathering, verification, summation, and formatting. • Costs reduced by a broader base of usage
5	Requester	Pre-response	• Answering questions and giving clarifications (given actual responder may not have been recipient of request)	• Cost reduced by XBRL's self-documenting nature via a taxonomy
6	Requester	Post-response	• Interpreting Response • Verifying • Reconciling • Consolidating • Summating • Formatting	• Cost reduced by automated tooling which supports automated gathering, verification, summation, and formatting.
7	Responder	Post-response	• Answering questions and giving clarifications (given actual responder may not have been recipient of request) • Researching Inquiry • Making Corrections • Reconciling changes with original response	• Cost reduced by XBRL self documenting nature of Taxonomy • Cost reduced by automated tooling which supports automated gathering, verification, summation, and formatting. • Costs reduced by a broader base of usage

A standard mechanism for communicating information would also simplify the implementation of automating Response / Request interactions at an agency (specifically, to reduce programming and maintenance costs).

4.5.   New Possibilities

As noted earlier, XBRL was designed for flexibility and makes extensive use of metadata to do so. As a consequence, there are a number of possibilities unavailable to other non-semantic technologies.

> The spread of connectivity and common standards is redefining the information channels that link business with their customers, suppliers, and employees.[9]

4.5.1.   Extending the Richness Versus Reach Trade-off

In a *Harvard Business Review* article, Philip Evans and Thomas Wurster introduced the notion of information richness versus information reach. In a subsequently published book (*Blown to Bits*) they outlined in greater detail how business strategy is transformed by the new economics of information.

They assert that the extent to which information is embedded in a mode of delivery, the information is governed by a basic law of economics, resulting in a universal trade-off between the richness and the reach of that information.

> **Richness** refers to the quality of information, as defined by the user and reflected in characteristics of the information such as accuracy, timeliness, etc.

> **Reach** refers to the number of people who participate in the sharing of that information.

Consequently, the economics of information establishes that it is only possible to share extremely rich information with a few people and less rich information with a large number of people.

Richness is more complex than reach and is concerned with six aspects of information[10]:

> **Bandwidth** – the amount of information that can be moved from sender to receiver in a given time: stock quotes are narrowband; feature film is broadband.

> **Customization** – the degree to which the information can be customized to meet a specific end user's need: an advertisement on television cannot be tailored to each individual recipient, while a sales pitch at a car dealership can.

Interactivity – the bi-directionality of information and frequency with which it occurs: dialogue is possible with a small group, but to reach millions it must be a monologue.

Reliability – the degree to which information is correctly understood and utilized: information is reliable when exchanged among a small group of familiar individuals where context is appreciated, but is not when it is circulated among a large group of strangers with no common context.

Security – the level of confidence participants can have that information is protected: managers share highly sensitive business information only in closed-door meetings, but they will disseminate less sensitive information to a wider audience.

Timeliness – how current versus latent information is: in equity markets, seconds count - a few market makers have instantaneous quotes and a larger group of financial institutions receive quotes with a three to fifteen minute delay, while most retail investors receive quotes with a 15 minute delay.

Historically, sharing rich information has required proximity (people working close to one another) or dedicated channels (proprietary EDI networks, etc). The standardized electronic interchange of information provided by the internet dramatically extended the reach of information.

> By unbundling information from its physical carrier, a greater level of richness and reach can be concurrently achieved, raising the level of trade-off.

Figure 4-4: Richness versus Reach
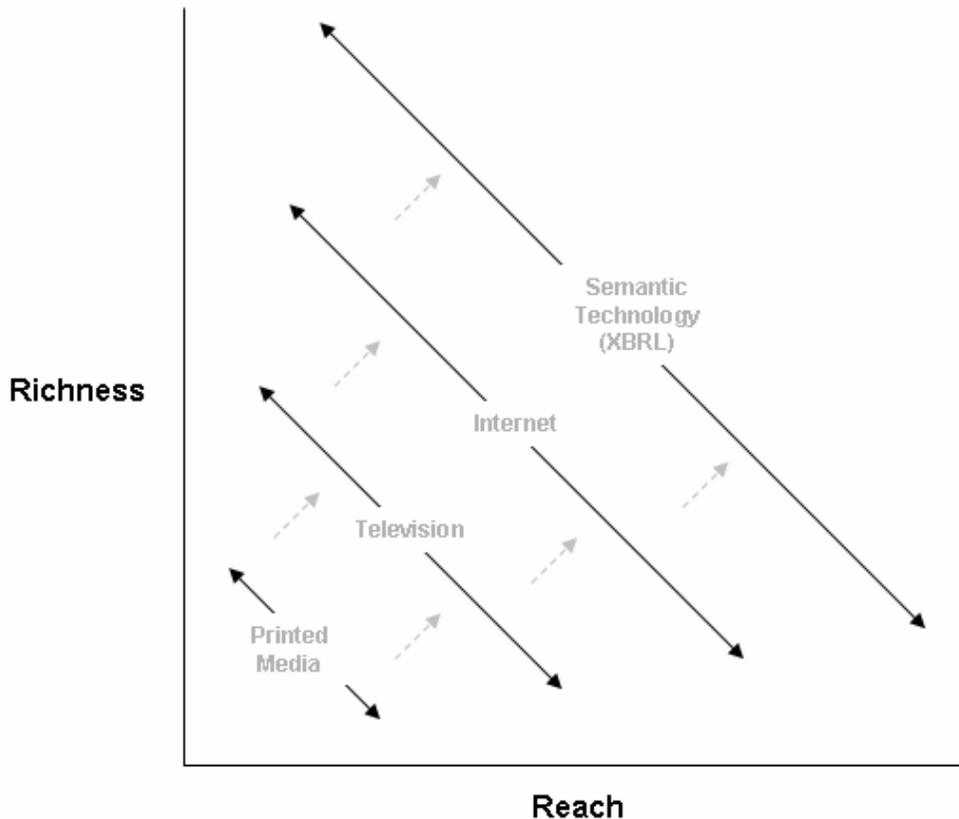
As illustrated, technological advancement has progressively pushed out the level at which the trade-off must be made. The economics of information forces the richness versus reach trade-off, but it is the maturity and sophistication of technology that sets the ultimate ceiling of the trade-off.

Semantic technologies such as XBRL offer a significant step forward in richness through directly addressing accuracy, timeliness, customization, relevance, and depth, while still maintaining a high level of reach with its pliability in the context of the Internet.[11]

4.5.2. Format as a Choice Rather Than a Limitation

Traditionally, reporting is associated with a notion of static content with information laid out in a fixed format. The notion of a flexible format was only possible to the degree data could be imported into another application (e.g. Microsoft Excel), but at the expense of the integrity of the data and its interpretation.

> Once pulled outside the application by a query or by a report writer, data is typically **stripped of all supporting information and becomes just a number**. Analysis of the how and why for a particular number on a subsequent financial report becomes an exercise of going back to the original software application and hoping that enough identifying information still exists inside the application. Accounting applications tend to keep supporting data in ways that are unique to each application, complicating both the business reporting process and subsequent internal control and audit routines.[12]

However, XBRL uses metadata to define extensive information about the data of interest (such as presentation logic, calculation and business logic, format logic, and data element relationships) independently of the data but still systematically linked. The result is information can be customized (viewed and manipulated) without accidentally undermining its integrity.

XBRL [and specifically the Global Ledger Taxonomy] can function as a generic tool to provide the following[13]:

- Drill-Down Details From Any Report
- A Bridge From Transaction Information To Reports
- Seamless Audit Trail
- A Standardized Data Consolidation, Migration And Archival Tool For Operational, Business, And Accounting Data
- Operational Reporting
- KPIs
- Dashboard Views
- Key Process Indicators (KPI)
- Feeding Dashboards
- 'Triple Bottom Line'
- Social Responsibility Reporting
- Multi-Dimensional Reporting (As In Basel Ii Compliance Processes)

With XBRL, it is common to send "master-detail" information in a single report, allowing the recipient to decide how he wishes to view it, in summation or in detail or both. This allows 'drill downs' to be at the discretion of those using the data.

4.5.3. Data Is Self Validated - Before It Is Sent

Similar to how XBRL metadata functions to provide flexible presentation, so to does XBRL metadata provide enhanced data integrity. XBRL uses the calculation, business, and data element relationship logic captured in a given XBRL taxonomy to validate the data that is captured in an XBRL document. Because this information about the data is available to the information provider while the data is being gathered, it allows the provider to validate the data before it is submitted.

> Just as XBRL promises to bring additional openness and some degree of standardization to the financial reporting process, it can also inject some degree of control into the often haphazard state of business process reporting . . . spreadsheets and programs won't need to have their data and formulas [or] macros built-in, But available instead from centralized and more auditable and controllable sources.[14]

In cases of validation failure, the validation logic is complemented by another facet of the metadata: descriptive labels, definitions, and links to authoritative and practical references and guidance on each data element.

> It is a standardized, generic and holistic way to represent the business facts that flow from transactions and business events . . . providing a single framework for representing data as it flows from system to system. [15]

4.5.4. Flexible Automated Exchange of Information

One particular XBRL taxonomy exemplifies the power of flexible automation devised with XBRL. The XBRL GL taxonomy is intended to enable the efficient collection and optional communication of information required by US and European accounting standards. According to XBRL International, the XBRL GL taxonomy allows the representation of any data that is found in a chart of accounts, journal entries or historical transactions, financial and non-financial, without requiring a standardized chart of accounts to gather information. It can be used to tie legacy charts of accounts and accounting detail to a standardized chart of accounts to improve communications within a business. The use of the XBRL GL Taxonomy does not require that a business change the way it represents data internally.

According to the XBRL International's GL working group, XBRL GL is "based on the model of a sophisticated accounting system's General Ledger journal history file, into which all of the detail from all of the sub-ledgers may flow." XBRL GL is a generic representation of the documents, parties, resources, events, and other details that start at the transaction level and flow in full detail or government agency.

> "It is not just about accounting and tax, but also about operational and business information . . . [such as] business processes and metrics."[16]

XBRL offers one medium in which an entire audit trail can be communicated while meeting diverse reporting needs including financial, tax, statutory, statistical, and management. As one enthusiast put it, "It is not just about accounting and tax, but also about operational and business information . . . business processes and metrics."[17]

4.5.5. Contending with Change without Writing Code

The author of XBRL, Charles Hoffman, points out the efficiencies and effectiveness achieved with XBRL's separation of business rules, presentation, and format logic from data. XBRL taxonomies and tools allow business users to update business rules and presentation preferences rather than programmers' having to update or write code. The key enabler is again metadata. By isolating the core concepts into a computer-readable format, are easily based between systems and additionally are not "hard coded" and more readily handled by non technical staff with the aid of tools.

4.5.6. A Selection of Standard Commercial off-the-Shelf Tools

Integration is an expensive process. According to the Gartner Group, for every dollar spent on a software license, between five and ten dollars are spent on consulting and integration services.[18] This high cost is suggestive of the significant cost to change those integrations. By using an increasingly popular metadata based standard such as XBRL there is a pool of commercial products to support its use and a growing pool of knowledgeable human resources to aid in its application. It is a new paradigm to have integration (often synonymous with "customized") become "standardized". Consequently, it is supported by a competitive market of products, rather than just specialized esoteric tools and a few specialized resources.

5. Application of XBRL in Federal Financial Management

Federal financial management is a complex, labor-intensive set of processes filled with manual steps and redundant data entry. These processes are further complicated by the breadth of participants, the diversity of information that needs to be shared, and the diversity of technologies and accounting systems used by agencies which store information in dissimilar formats and at varying levels of detail.

5.1. Background on Federal Financial Management

At the core of federal financial management is the federal budget process partitioned among three primary parties of interest: Individual Agencies, Executive Office, and Legislative Branch.

Figure 5-1: Information Exchanges in Financial Management
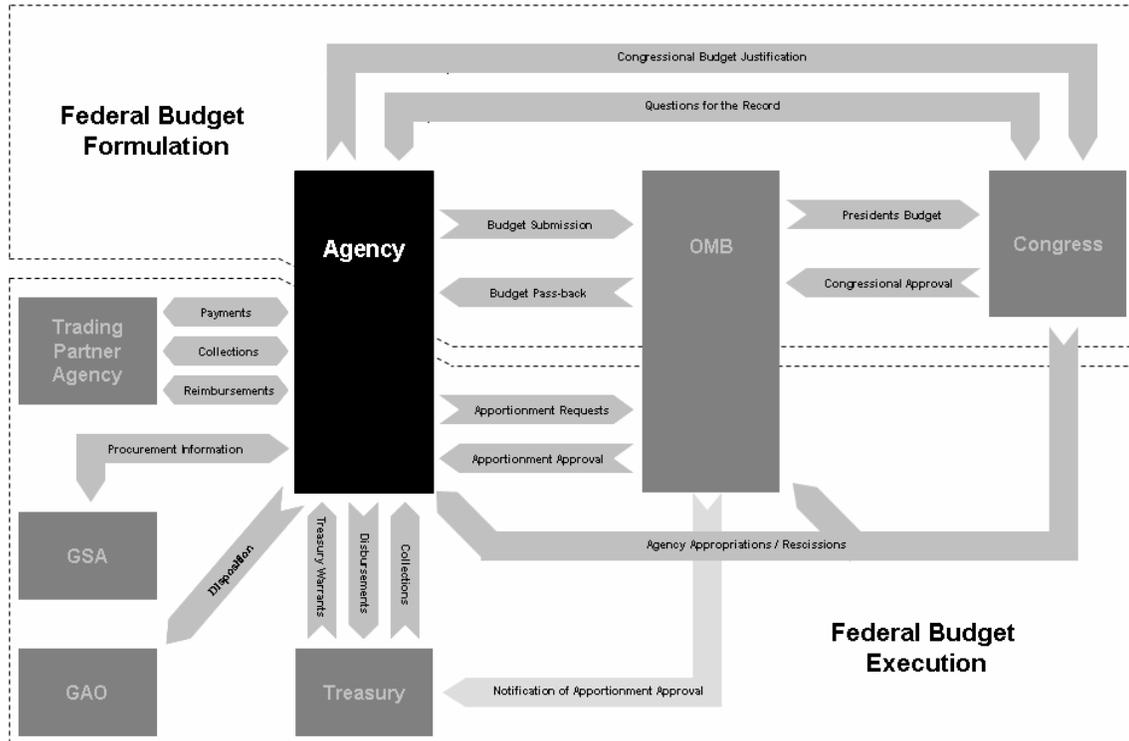
The illustration above shows the prominent federal financial information exchanges from the perspective of a single agency, suggestive of the fact that a great deal of the information being shared between these federal entities overlaps and interrelates.

5.1.1. Federal Financial Management Life Cycle

Federal financial management process goes through 4 stages: Budget Formulation, Budget Approval, Execution, and Financial Review. The four stages can be viewed abstractly as a succession of information exchanges across several

key federal entities. At the heart of federal financial management is the federal budget process. As noted below performance assessment is not a separate stage but at the center of the life cycle, being integrated throughout all stages of federal financial management.

Figure 5-2: Federal Financial Management Life Cycle

Each stage within the life cycle entails an abundance of individual financial information gathering and sharing processes.

5.1.1.1. Budget Formulation - Executive Branch
On the Executive Branch side the process begins with budget formulation, initially within each agency, leading to agency budget submissions to the Office of Management and Budget (OMB) in August / September every year. The process continues with OMB review September through mid November, pass-back of approved budget request levels from OMB to agencies in late November, and submission of agency spending history and plans in various budget schedules to OMB through December to build the President's Budget. The process finishes with an announcement of the President's new budget initiatives in the State of the Union address late January, along with the submission of the President's Budget to Congress, supported by more detailed budget justifications from each agency submitted to Congress in early February each year.

5.1.1.2. Budget Approval – Congressional Branch
On the Legislative Branch side Budget approval starts when Congress receives the President's Budget. Congress considers the President's Budget proposals with more detailed review by separate House and Senate committees and subcommittees who are responsible for various aspects of discreet federal program

activities and their corresponding budgets. After hearing testimony from federal agency heads defending their annual budget requests, Congress submits questions for the record to each Federal agency, examines responses and debates program activity funding levels for discretionary spending in thirteen separate appropriations bills over the spring and summer each year.   After much consultation and negotiation, Congress passes an overall revenue and spending plan called a "budget resolution," which reflects its decisions on how much money will go to each federal discretionary program and enacts appropriations and rescissions that fund agencies for the upcoming fiscal year starting October 1. Congress may enact other laws that control spending and receipts which are then managed and enforced through OMB. Congress can also grant an agency borrowing or contract authority, or give the agency the authority to collect fees from the public or reimbursements from other agencies.

5.1.1.3. Budget Execution – Individual Agencies

Federal financial management then continues with budget execution which is comprised of two parts:

1) Apportionment / Obligation
2) Reporting / Outlay

Apportionment / obligation pertains to funds appropriated for that fiscal year and to balances of appropriations made in prior years that remain available for obligation. At the beginning of the fiscal year, and at such other times as necessary, OMB grants budget authority, i.e., the authority to spend funds, to each executive-branch agency for use by time period, program, project, or activity as specified in apportionments requested and approved via the SF 132. Throughout the year, agencies hire people, purchase goods and services, enter into contracts, enter into grant agreements, etc., obligating budget authority in order to carry out their programs, projects, and activities. These actions use up the available funds by obligating the Federal Government to make outlays, immediately or in the future.

Reporting / outlay lasts until funds are cancelled (single-year and multiple-year funds are canceled at the end of the fifth year after the funds expire for new obligations) or until funds are totally disbursed (for no-year funds). Agencies are required to report on all financial activity, including monthly, quarterly and annual reporting to various federal entities including Treasury/FMS, OMB, Federal Procurement Data System (FPDS), and others.

5.1.1.4. Financial Review

FMS gathers and publishes Government-wide financial information that is used by the public and private sectors to monitor the Government's financial status and establish fiscal and monetary policies. These publications include:

- Daily Treasury Statement; the Monthly Treasury Statement
- Treasury Bulletin; the Combined Statement
- Financial Report of the US Government, which is the Federal

Government's set of audited financial statements, a requirement of the Government Management and Reform Act of 1994.

5.1.1.5. Performance Assessment

As noted earlier, Performance Assessment permeates all stages of the Federal Financial Management Life Cycle. The Government Performance and Results Act (GPRA), of 1993 emphasizes managing for results by examining what a program accomplishes, how well the accomplishments match with the program's purpose and objectives, and the integration of budget decisions into program performance management. This is exemplified by Agencies now submitting their budgets titled as "Performance Budgets" to Congress, connecting dollars to performance levels in OMB requests and in Program Assessment Rating Tool (PART) assessments is also increasing in importance it requires agencies to prepare strategic plans, annual performance plans, and annual performance reports.[19] The current administration has emphasized the importance of GPRA and has established initiatives including:

- Presidents Management Agenda (PMA) with an initiative on Budget and Performance Integration (BPI)
- Establishment of PART to carry out GPRA goals.

Performance and Accountability Reports (PAR) include agency financial statements along with performance metrics and results. The PAR fulfills the requirement for annual performance reporting and simultaneously fulfills the requirement for annual financial reporting.

5.1.2. Agency Reporting Requirements

Throughout each fiscal year agencies are required to submit a series of reports to OMB, FMS, FPDS, and exchange information with other agencies, which ultimately ends up being consolidated into the Financial Report of the United States Government (FR). The primary reports of this process are highlighted below, but are only a sampling of all the financial information exchanges:

Table 5-1: Fundamental Reports of the Federal Budget Life Cycle

Report	Full Name	Timing	Contents	Medium	Recipient
FACTS I	Federal Agencies Centralized Trial Balance System I	Year End	Pre-closing agency trial balances summarized by fund group, SGL account and account attributes.	Fixed width text file	FMS
FACTS II	Federal Agencies Centralized Trial Balance System II	Quarterly	Primarily budgetary data summarized by Treasury Symbol, SGL account and predefined account attributes	Fixed width text file	FMS
PAR	Performance and Accountability Report	Year End	Comprised of 3 parts: a. Management Discussion and Analysis (MDA) – Provides an overview of the agencies financial and performance data b. Basic Statement and Related Notes – Provides the financial statements including Balance Sheet, Statement of Net Cost, Statement of Changes in Net Position, Statement of Budgetary Resources, Statement of Financing and Statement of Custodial Activity c. Required Supplementary Information (RSI) – Complements the information presented in the MD&A and related statements.	PDF	OMB
Agency Consolidated Financial Statements	Agency Consolidated Financial Statements	Quarterly	Includes the following financial reports: 1. Balance Sheet 2. Statement of Net Cost 3. Statement of Changes in Net Position 4. Statement of Budgetary Resources 5. Statement of Financing 6. Statement of Custodial Activity	Various	FMS
GFRS	Government wide Financial Report System	Year End	This is the reporting tool utilized by FMS to record reclassified financial statement information from each agency. Primarily records the same information as the Consolidated Financial Statements however the amounts are reclassified and aggregated differently then the individual agency reports.	On-line data entry	FMS
"F" Data File Submission	"F" Data File Submission – Intra-governmental Reporting	Quarterly	This report identifies general ledger balances that result from business events conducted between two government agencies and associated balances to the appropriate trading partner	Fixed width text file	FMS
SF – 224/ SF – 1220	Statement of Transactions	Monthly	Provides an allocation of disbursement and collection activity by Treasury Symbol and accomplished date.	Fixed width text file	FMS
SF – 132	Apportionment Request	Varies	The SF-132 is the report issued to request the apportionment of budget authority.	PDF	OMB
PARTweb	Program Assessment Reporting Tool	Varies	Reports on agency performance data	On-line data entry	OMB
MAX	MAX	Varies	MAX reporting is made up of a series of 17 schedules – The MAX schedules collect and process the information necessary to create the budget. The schedules include actuals and estimates for the upcoming budget year, prior year, and several budget out years.	Various	OMB

5.2. Nature of the Problem in Federal Financial Reporting

Federal financial reporting processes are generally viewed as support activities with no visible impact to the efficiency or performance of the organization. However, the General Accounting Office has found a direct correlation between effective internal controls, financial management, financial information systems, and workflow processes. According to David Walker, the Comptroller General of the United States, the three major impediments to an opinion on the consolidated financial statements continue to be:

1. Inability to adequately account for and reconcile intra-governmental activity and balances between federal agencies
2. Ineffective process for preparing the consolidated financial statements
3. Serious financial management problems at the Department of Defense [20]

The reports identified in Table 6 above are intended to provide a complete picture of an agency, summarizing its financial position, performance objectives and achievements. Each of the 10 reports listed represents a different set of reporting processes which each agency has to contend with, generating points of cost creation as a non core or non value adding function to each agency. Yet this listing is only a sampling of the total financial reporting requirements of a given agency.

> **"There are so many reports involved, pulling data through such a wide set of systems, that no one person really understands it in totality."** - Anonymous Federal Employee

Technology, standards, processes, procedures and people are intertwined and tightly dependent upon one another. Any approach or strategy that seeks to bypass any one of these areas introduces risk and substandard measures of quality into the financial supply chain. The result is that performance breaks down and quality degrades to a point where information becomes unreliable. Technology alone cannot solve the problem. However, technology can be used as a tool along with effective oversight, accountability, and other control measures to improve and in some cases eliminate poor data quality.

> **""Growing complexity in an enterprise's systems can fossilize operations"[21]**

Each report arose in a similar fashion typical of traditional reporting: a need isolated in time and purpose to a narrow set of entities. Yet when the prominent federal financial reports are viewed collectively there is a high level of overlap from a content perspective (illustrated below).

Figure 5-3: Overlap of Federal Financial Reports
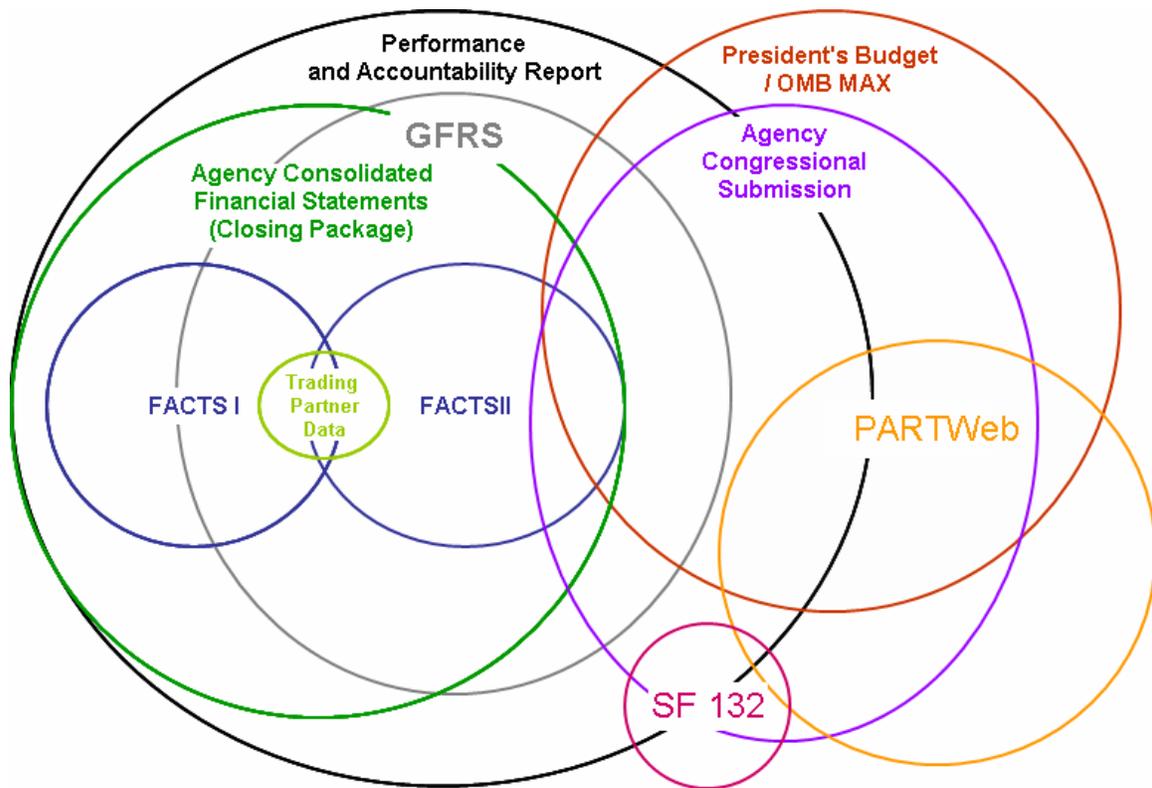
For example, the Performance and Accountability Report (PAR) consolidates a signification portion of the content of 5 other reports into a single statement. However, in this particular case, the information is transmitted in PDF which while highly human readable, is not readily reusable by machine or at all flexible for computer-based analysis. As a result, additional response request pairs are needed to actually report on the data that could have been reused from the PAR.

In the end, the magnitude of cost created through redundant reporting provides limited value, since the information is reported in a wide variety of formats using a copious number of reports, technologies, and systems, making it costly to obtain a complete picture of a single agency and difficult to appreciate the federal government as a whole.

> The enormity of the cost to the federal government as a whole is further magnified when the challenges of reporting are common to all government agencies, yet independently and uniquely resolved.

From its first implementation of XBRL (noted earlier), the FFIEC has predicted a savings of $26 million over 10 years. The FFIEC went from manually collecting data in a proprietary file format to an automated solution using an open standard in the form of XBRL submitted over the web.

> In the first year of production, the FFIEC solution dramatically reduced bank reporting errors (math related: from 30% to 0% and content related: from 34% to 5%), while increasing analyst productivity (by as much as 33%), and reducing processing time from weeks to days.[22]

The FFIEC experience gives enticing prospects to the opportunity in Federal Financial Management.

5.3.   Opportunities for XBRL in Federal Financial Management

There are a large number of potential opportunities for federal agencies. A pilot in any of these areas would offer a chance to assess the nature and magnitude of the benefits XBRL can provide federal financial management. The actual benefit of applying XBRL in each opportunity area is similar but to a differing degree.

5.3.1. Opportunity: Budget Formulation

Agencies are required to submit schedules detailing past, current and future available budget resources and spending, in accordance with the conventions governing the formulation of the President's Budget. Usually, this information is submitted to OMB as part of the President's Budget formulation process.

XBRL would allow agencies to automate the extraction and transmission of their budgetary information from agency core financial and budget formulation systems to the OMB MAX A-11 system. The automate extraction and transmission capability via XBRL could be reused to meet other information sharing requirements. XBRL would also allow standardized collection of budget information from agency systems across the federal government that could eventually actually replace the OMB MAX system.

5.3.2. Opportunity: Financial Review

FMS has already taken steps to reduce the redundancy of certain data calls; for example, agencies are no longer required to submit the Report on Budget Execution and Budgetary Resources (SF-133). FMS acknowledged that the information submitted via FACTS II can be used by FMS to automatically generate the SF-133 for each agency. Consequently, there are numerous benefits to both the responding agencies and FMS: reduced effort for each agency, greater consistency between the data reported for FACTS II and the SF-133, and reduced time for reconciliation of reports by FMS.

The experience with SF-133 exemplifies the greater opportunity of using a technology such as XBRL in creating a "single window" for information sharing: consolidating many similar requests into a single request with the response (or responses) distributed to different requestors all while reducing inconsistencies. Gathering similar information on behalf of multiple agencies at once slashes the overall reporting cost by reducing the number of request/response pairs. Additionally, XBRL would allow recipients to receive a greater depth of information for analysis without the loss of a summarized perspective.

5.3.2.1. Single Window

Currently agencies submit the PAR in PDF format to OMB and submit the Agency Consolidated Financial Statements (Closing Package) to FMS, and then manually re-enter the information into the GFRS system to facilitate the consolidation of the agency reports into the FR. Utilizing XBRL as the reporting language for the information contained in the PAR and Closing Package would allow reports to be consolidated into a single submission that could be used by both OMB and FMS to meet the differing needs of each agency. Additionally, since XBRL can capture data in a hierarchical manner, it is conceivable that the FACTS I and II trial balances used to support the PAR and Closing Package could be included within a single XBRL submission. Moreover, providing the reporting in XBRL format would allow the information to be uploaded into the GFRS automatically, eliminating the manual reclassification of each element of agency information.

> In 2005, CFO Act Agencies sent Treasury **7,923 pages of PDF files**
>
> as part of PAR reporting requirements.

5.3.2.2. Consistency

Having a single XBRL based window for the transfer of information would also eliminate a number of reconciliation points, since budget request submissions and reports would be created from the same underlying data with no manual intervention. XBRL would ensure consistency across all agency financial review reports and reduce the reconciliation burden of the recipients such as FMS, OMB, GAO, and Congress. The transition of the closing package data from PDF or Excel to XBRL would also address cost issues imposed on FMS by receiving reports from agencies that use inconsistent terminology and rules of classification. XBRL would allow all agency recipient entities to utilize a standard vocabulary for all closing package reports.

5.3.2.3. Flexibility

XBRL provides enough flexibility to allow each agency to adhere to the standard vocabulary, while continuing to generate meaningful agency level reports targeted to address the agency's specific objectives. XBRL provides a means to contend with non-quantitative information such as occurs in section I of the PAR, which contains primarily descriptive text summarizing the agency's performance

measures, system controls and compliance with laws and regulations. Furthermore, XBRL supports capturing footnotes as presented currently in section II of the PAR.

5.3.3. Opportunity: Execution

As part of pursuing its operational plan, an agency generates numerous accounting entries from the inflow and outflow of funds. As relates to financial reporting, these transactions can be categorized into three sub-areas of opportunity within Execution:

- Trading Partner Balances
- Apportionment Requests
- Reimbursement Activity

5.3.3.1. Trading Partner Balances

When federal agencies do business with one another, they must reconcile payables and receivables, and expense and revenue balances in order to generate the proper elimination entries for their financial statements. These interagency elimination entries are then incorporated into the federal government's consolidated financial statements.

At present, the processes are complex, time consuming, and prone to error. Each agency is responsible for a number of aspects of accounting for intra-governmental transactions, which ultimately result in numerous information exchanges between partnering agencies, Treasury, and GAO as required by the Federal intra-governmental Transactions Accounting Policies Guide. In addition to properly recording and controlling intra-governmental transaction in their accounting system, the agency is required to perform quarterly reconciliation of trading partner data as part of the quarterly financial statement submission process. To properly reconcile data with trading partners prior to submission of financial data to FMS, the agency must communicate with their trading partners to ensure the intra-governmental transactions are recorded on each agency's financial statements appropriately. The manner in which this is done can vary, but is often accomplished via email, shared reports, or telephone conversations.

Each agency is then required to submit trading partner balances to the Intra-governmental Reporting Analysis System (IRAS) system. FMS will compare data submitted through the IRAS system to the information submitted through the GFRS modules and quarterly financial statements and issue an agency several reports related to Intra-governmental activity at closing.

The IRAS System is used for an "F" data file submission which includes the following elements:

- Department Code
- Bureau Code
- Fund Group
- USSGL Account
- Federal Non-Federal Attribute
- Federal Trading Partner
- Dollar Amount
- Exchange/Non Exchange Attribute
- Duplicate Partner Code Identifier

The "F" data file submission should match the information submitted for the FACTS I report and must match the related information submitted by the corresponding trading partner. Currently this data submission is not automated but rather is sent via email to FMS in either a text file or Excel format. FMS is then responsible for uploading the information and synthesizing the data and issuing reconciliation reports to the agency for which discrepancies exist. The agency must then respond to the intra-governmental Closing Package Material Differences/Status of Disposition Certification Report. To properly respond the agency must work with all trading partners to ensure discrepancies are appropriately resolved and adjusted in the financial statements.

> At present, the processes are complex, time consuming, and prone to error - result in numerous information exchanges between partnering agencies, Treasury, and GAO, and often are accomplished via email, shared reports, or telephone conversations.

The ability to share this data as XBRL would greatly facilitate the reconciliation process. Potentially, the "F" data submission could be done via XBRL providing a consistent format and terminology. XBRL could augment the level of detail being provided and thus ease reconciliation. The more detailed information could include:

- Agreement Number - when the transactions are related to reimbursable agreements
- IPAC Number - to provide a link between information recorded through the treasury IPAC system
- Deposit and Collection Number - for balances created as a result of TDO or CASHLINK activity.
- Additional Identifiers - to indicate if the balance is a result of quarterly accruals (accruals are the most common candidate of discrepancies between agencies)

XBRL would provide this process a single common vocabulary for sharing this information and a standardized means of automating the gathering, validation, and distribution of the information. Having the "F" data submission based on an XBRL taxonomy would facilitate:

- Sharing additional transaction information related to the balance represented on the "F" data file submission
- Provide a better basis for reconciliation
- Provide a better basis for accurate balances
- Materially represent the transactions conducted between federal agencies.[23]

The XBRL "F" data file submission could also be shared between other systems within FMS to ensure consistency between the closing package data, FACTS I data and trading partner submissions. As noted earlier, discrepancies in the reconciliation of these transactions are a significant concern and one of three major impediments to an opinion on consolidated financial statements.

As a subset of trading partner activity is reimbursable activity. When federal agencies delegate to other agencies to perform business on their behalf, the costs incurred by the executing agency must be reimbursed by the delegating agency. The use of XBRL would enable agencies to more effectively monitor and reimburse activity related to these agreements. This creates the ability for credit-based transactions to occur.

As noted in the section above, "F" data file submission could be used to address and include the more detailed information, such as transaction level data, like agreement numbers, etc. This would allow agencies to better monitor transactional activity that relates to them.

5.3.3.2. Apportionment Requests

Once Congress appropriates funds for agencies the funds are then at the control of OMB for more detailed oversight of spending activity. Apportionment means OMB has made specific amounts available for obligation by the agency and for distribution by Treasury. Apportionments are made by appropriation or fund account into amounts available for specified time periods, program, activities, projects, objects, or any combinations of these.[24] The logical process is fairly simple with an agency making apportionment requests to OMB, and OMB authorizing them and notifying the agency as well as Treasury.

But in execution the literal process is complicated with an assortment of information from different sources being exchanged bi-directionally between the aforementioned parties.

> OMB sends program reporting categories from approved apportionment attachments to the Department of the Treasury's Financial Management Service (FMS), which operates the FACTS II system that agencies use to report their SF 133 budget execution information. When reporting their obligations, FACTS II provides agencies with the list of program reporting categories to report upon; these are the same categories that OMB provides from the apportionment attachments. For those TAFSs that use Category B projects but do not use program reporting categories, OMB sends FMS the list of Category B projects for use in FACTS II reporting. [25]

The above quote explaining the apportionment and reapportionment schedule (SF 132) implies the current inherent complexity of similar information being used in multiple different contexts for different purposes. It also highlights the challenge imposed as that information ultimately comes together in different venues. XBRL would not only enable a common infrastructure for automating the round trip processing of apportionment requests but illuminate the challenge of multiple non-aligned terminologies

5.3.4. Opportunity: Performance Assessment

FMS has already taken steps to integrate the financial reporting systems with budget formulation systems by transmitting FACTS II data into the OMB-MAX system. FMS could utilize the XBRL to further enhance this effort. For example, the performance measure data outlined in the MD&A section of the PAR could be transmitted to the performance management sections of PARTweb and OMB-MAX, potentially reducing the number of data calls in that arena.

While the financial reporting information provided in the PAR will never replace the information in the budget formulation process, it will provide the ability to make the information more consistent in all phases of the budget life cycle, allowing the federal government to make better decisions regarding resource allocation.

5.3.5. Opportunity: Federal Funding Accountability and Transparency Act

Under the recently enacted Federal Funding Accountability and Transparency Act (S.2590), OMB has the responsibility to create a free, publicly accessible web site that allows users to search all federal contracts and grants and download the results. The search would gather information from existing databases such as the Federal Procurement Data System, Federal Assistance Award Data System and Grants.gov. It would provide access to data on all payments of more than $25,000, with exceptions for classified information and federal assistance payments made to individuals. Note that the requirement to provide access to data on all *payments*,

not just *entitlements* or net amounts, means that this application will also require journal-level detail.

Figure 5-4: Flow of Information for Accountability and Transparency
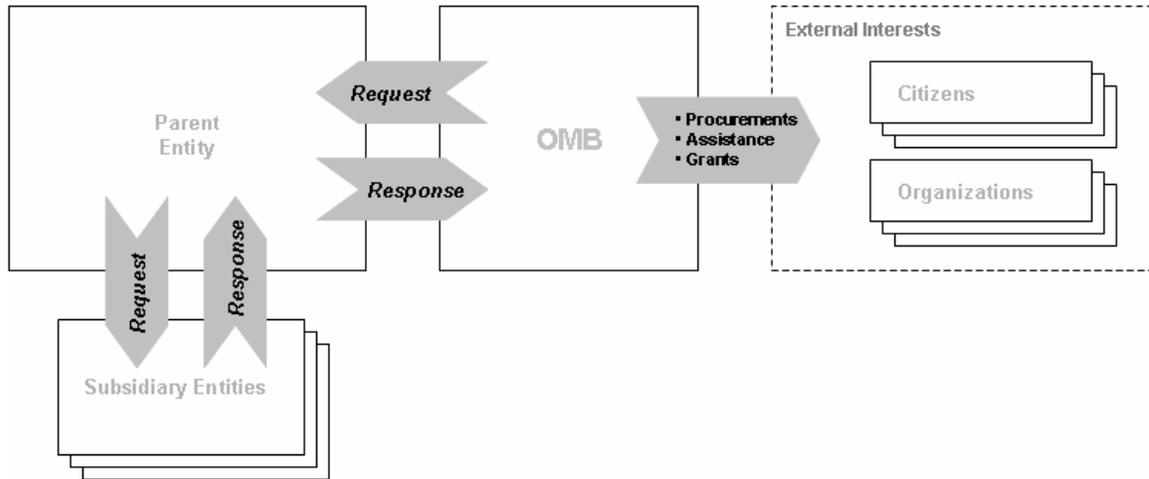
Viewing this in terms of an information supply chain, OMB needs to integrate information from at least three major sources on a timely basis, as well as providing structured data to any potential user. XBRL taxonomies could play three roles in this system, just as it does in an analogous model at the FFIEC, as a:

1. Language in which requests are formulated
2. Means for information providers to map and validate their data
3. Language in which data could be delivered to citizens for further analysis

6. Recommendations

While on the surface this white paper is about the opportunity for a type of technology in the federal government, at its heart it is about exploring the benefits of a new way of doing business – instituting an information supply chain for federal financial information in place of the hundreds if not thousands of individual redundant and suboptimal reporting processes. And while it can be and is being pursued by individual agencies for more specific uses, the real opportunity is for it to be used in core common function of federal financial management.

> Data is the heart of any business. Without good data turned into information, management can't make the proper decisions.[26]

6.1.   Find a Champion for XBRL among Existing Data Collectors

There are many places to start the pursuit of XBRL, but the most effective with the richest opportunity for savings is with existing data collectors such as FMS and OMB. Since the collecting agencies define the medium for Federal Financial Management data submission, they alone are in a prime position to propagate the benefits of XBRL to other agencies. Of course, processes and procedures already exist for FMS and OMB, and it will take a concerted commitment to transition existing reporting to an XBRL-based solution. But the pay-off would be significant to all parties by allowing a flexible technology such as XBRL to be the medium for all inter- and intra-government financial data sharing – many reporting obligations could be consolidated and fulfilled with a single report and all financial reporting could leverage a single technology. Reporting would be decreasingly a unique customized effort for each agency.

Conversely, it is impractical to expect the benefits of a common approach to emerge when the management constructs of the federal government discourages anything outside the narrow scope of a given program. The only hope of realizing such benefits is for a single empowered organization to champion a common solution.

6.2. Pilot the Benefits of an Information Supply Chain

As noted earlier, there are a large number of potential opportunities for federal agencies. Given this, a prudent approach is to pilot XBRL in federal financial management to assess the nature and magnitude of the benefits it can offer in that environment.

> OMB is in the unique position to encourage industry participation in agency/industry pilots - particularly in the advancing the federal government closer to the establishment of a financial information supply chain with the use of semantic technology such as XBRL.

A pilot would allow OMB and FMS to evaluate the character of an information supply chain, how it can satisfy the demand for information with responsiveness and efficiency, and how it can enable the right information to be delivered to the right recipients, at the right time, and in a format recipients can digest to suit their own needs. A pilot would also create an initial taxonomy as the first step on the path to more extensive use.

6.3. Develop a Common Vocabulary Independent of Any System or Platform

As noted earlier, the value of a technology can often be found not only in its ability to automate business processes, but in its ability to help users understand the content of a given business domain - exploiting commonalities. Consider that an annual report triggers many information requests within an agency; normalizing the vocabulary (such as the requirement to adhere to the US SGL) helps individual business units from the standpoint of predictability and consistency. Conversely, the exchange of transaction information such as inter-agency grants is known to incur significant costs because of the lack of standards at a detailed level.

Content in an XBRL Taxonomy is multi-dimensional, organized somewhat like what is known in information technology as a star schema: the core content definition at the hub and individual domains of knowledge are nodes projecting from the hub. There can be an unlimited number of projections from the hub which offers tremendous extensibility but in a prescribed and controllable fashion. Though XBRL Taxonomies may seem complicated to humans in their native form, they are not intended to be viewed as such. XBRL tools ease the creation, comprehension, navigation, and general utilization of taxonomies. But the primary user of taxonomies is computers in processing XBRL content.[27]

Figure 6-1: Abstraction of a Federal Financial Management Taxonomy
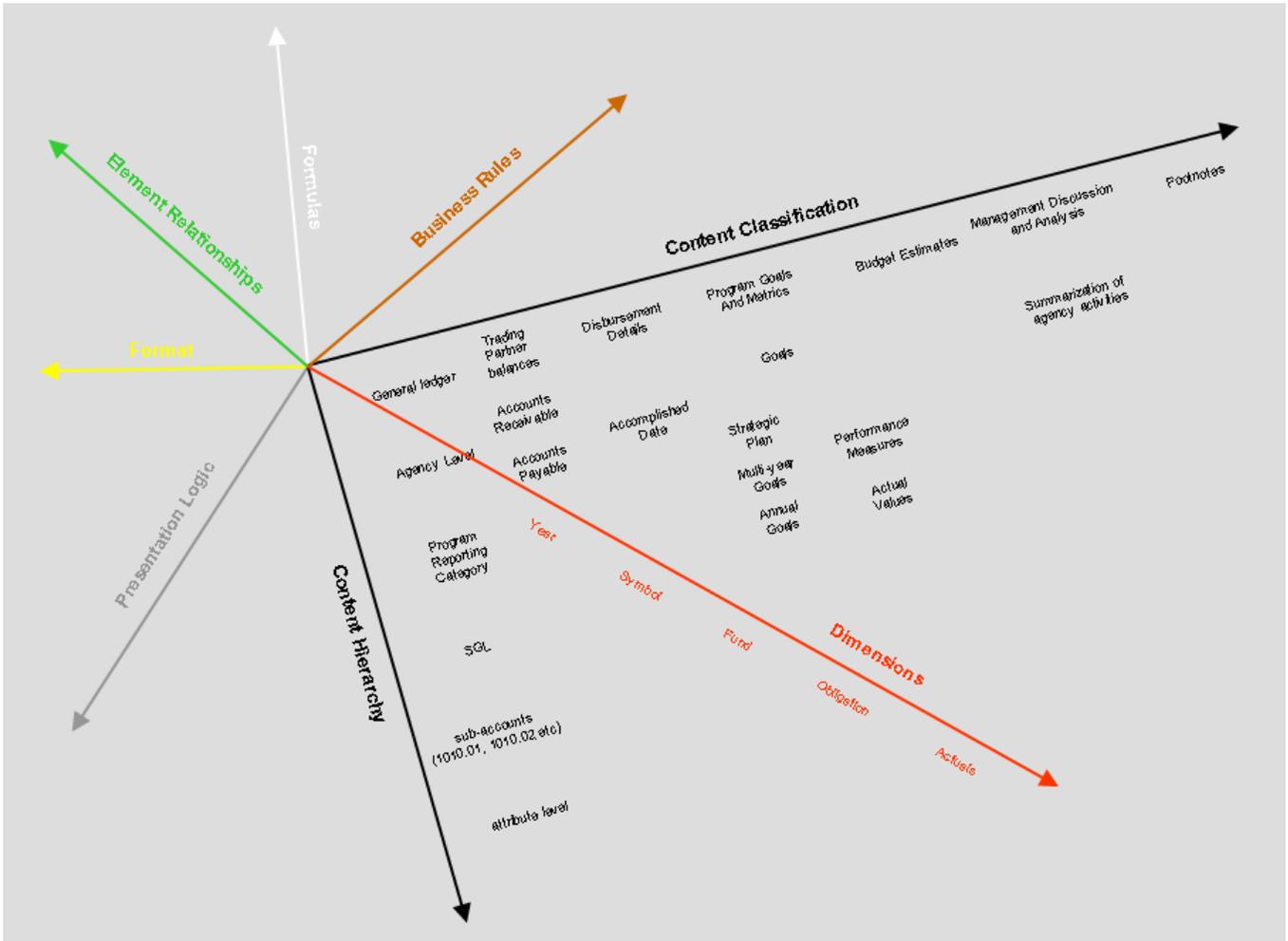
Forming a common language for federal financial management through an XBRL taxonomy offers a potent means for dealing with breadth, complexity, and idiosyncrasies.

> A taxonomy can be thought of as a body of knowledge, representing the expertise and insights of those professionals who have a rich and deep experience in a domain of interest.

A fair portion of the cost of reporting comes from the complexity of the domain being reported upon as is typified by GL Attributes (such as is used in the FACTS I & II reports). A taxonomy aids in managing this complexity without creating barriers to its use.

A Federal Financial Management Taxonomy would start as the synthesis of existing reporting concepts such as those found in reports cited earlier, like:

- Vocabulary of individual information such as GL Attributes and their classifications
- Explanation of the meaning or purpose of individual GL Attributes
- References to legislative or administrative regulations and policies that relate to the GL Attribute
- Constraints on when and how many of each GL Attribute is required, forbidden, or optional, in relation to other information GL Attributes
- Mathematical or logical consistency relationships among GL Attributes
- Technically valid data types (text, numeric, monetary, etc) for GL Attributes
- Relationships of GL Attributes originating from different contexts

This knowledge can be reused in many contexts for numerous purposes, used in part or in whole, and extended as needed.

> An XBRL taxonomy of federal financial management is an investment
>
> in an asset of potentially infinite reuse.

A Federal Financial Management Taxonomy offers non-technical benefits, it would:

- Provide a common vocabulary and understanding - given the complexity of jargon and confusion circling this field of the government
- Establish basic 'conceptual tools' for discussing, analyzing, and finding a path to broad utilization of an information supply chain

As noted earlier, the power of the digital age is to separate data from any given proprietary medium. There is already an effort under way to establish a common vocabulary for federal financial management titled the Federal Financial Management Common Government-wide Accounting Classification Structure (CGAC) by the Financial Systems Integration Office (FISIO). The CGAC effort offers an opportunity to establish a common vocabulary, but the true potential of this effort will not be realized unless the vocabulary is provided in an open technical standard such as XBRL, and thus portable and independent of any proprietary software or format.

> The key to realizing a technology's potential is the degree to which it
>
> is openly defined and widely supported in the commercial world,
>
> allowing it to be quickly digested into the fabric of a business – the
>
> value of a taxonomy as a common vocabulary is no exception.

XBRL offers the federal government the ability to craft a solution suited to its own needs and idiosyncrasies, while still staying compliant with a widely accepted standard technology with growing commercial vendor support.

6.4.   Benefit from Common Infrastructure and Common Automation

Charles Hoffman, the "Father of XBRL", points out that organizations who innovate on top of open standards have an advantage over those which do not. Innovating on top of open standards allows resources to be freed up for higher-value work, rather than building basic infrastructure.

> XBRL offers the Federal Government numerous benefits ranging from increased efficiency to enhanced comprehension, **but it can also be an effective mechanism for business process improvement** – providing a path to a qualified opinion on the consolidated financial statement of the federal government.

XBRL as a solution for an information supply chain is akin to infrastructural solutions in other domains. And as an infrastructure it has the prospect of augmenting the potential and agility of federal financial management. How agile, efficient, or effective would the United States economy be without its highway, telephone or air transport infrastructure? All organizations who desire to exchange business information have the same issue. If a standards organization provides a solution for the exchange of information, fewer resources are needed to build a complete solution, the software will cost less, and context specific features can still be layered on top.[28]

XBRL could be and has been used as a project specific technology, but in the context of federal financial management it is a question of reporting infrastructure or foundation. In a recently published book by the Harvard Business Press on enterprise architectural strategy, the authors point out the importance of foundation in execution. Their research found that companies with a solid foundation had higher profitability, faster time to market, and lower IT costs.

> Implementing standardized, digitized processes carries costs, particularly those associated with organizational change, but the benefits are simpler technology environments, lower-cost operations, and greater agility.[29]

The authors go on to highlight emerging risks found in organizations as they have tried to incrementally manage change over time, resulting in growing complexity - complexity that adds no value on its own but fossilizes operations, creating an inability to change. They also emphasize that companies "need to construct a solid foundation for business execution – an IT infrastructure and digitized business processes that automate [a] company's core capabilities."[30] XBRL is a foundation stone that other commercial and governmental organizations are looking to for establishing sound and efficient financial reporting.

7. Looking Forward

There is currently a significant wave of adoption of XML-based standards in the pursuit of improved business results. XBRL as a method of automation, enhanced data integrity, business process flexibility, and improved human understanding is seeing traction commercially and in governmental agencies internationally. US government programs have an opportunity to become more efficient as interpretation of data becomes more reliable and less error prone. Human intervention will become less of a requirement. Information technology will come closer to the goal of achieving inter-operability. All of this will result in better decision-making on the part of executives with greater accountability and more transparency in business operations. XBRL is not a panacea. It is in fact a new, better, more effective tool for running a business environment and is beneficial across the entire business domain. As such, XBRL offers a great opportunity for federal agencies and the pool of public and private organizations that interact with them.

7.1.   Doing Nothing Collectively – Limited By Disjointed Adoption

Doing nothing is always a valid option with any new technology. It could be argued that there is no reason for a pilot project to examine the collective benefits of XBRL, since agencies will eventually each adopt this technology as it gains wider popularity in both the public and private sector. As noted earlier, a number of financially-oriented agencies are already investigating XBRL and have their own internal projects.

A downside to 'collectively' doing nothing is that each agency will repeat many of the costs which could be experienced only once in developing a common approach. More importantly, the areas of greatest opportunity with a large number of potential benefactors will be the last to reap the rewards of a standard, given the lack of a champion and the challenge of group consensus.

> The train, the automobile, and then the telephone were all compelling new technologies in their day, but it was not until they each had a common consistent infrastructure that their true potential to enhance the US economy was realized.

Since each agency would essentially work independently of others, they are likely to experience only limited benefits and develop divergent taxonomies and guidelines for the use of XBRL. This would not contribute to interagency collaboration, nor would it lend itself to a common approach for the long-term use of XBRL by federal agencies.

Given the diversity of ways XBRL can provide value, federal agencies should be encouraged and supported in their efforts to experiment with XBRL in finding ways to make it useful to their businesses. It is not a question of 'either or' – but rather of 'both' exploring individual and collective benefits. Taking a 'wait and see' approach in today's environment of real-time information transfer is only imposing a greater cost tomorrow, especially with the ever increasing pressure to have more information available in an ever shorter period of time (for example: there currently is a movement to reduce the corporate financial reporting cycle from quarterly to monthly.[31])

7.2.   Flexibility for the Future

XBRL was designed to be easily customized and extended for new information exchanges without extensive effort. This is an important attribute for any financial reporting language, as existing requirements can be modified, new requirements can be added, or outdated requirements can be eliminated. This is evidenced in both the private and public sectors as both have a large stakeholder base to which they are accountable. A recent example in the federal arena was the change in FACTS II to include the new Program Reporting Category which provided Treasury with more meaningful data about how agencies were actually using government funds. While this was an important change, it can definitely not be considered the last. Over the course of the last few years FMS has made strides in standardizing reporting processes and data, and in order to continue in this effort it is important to consider a reporting language that can efficiently change with the evolving requirements of federal reporting.

7.3.   Progression to Semantic Technologies

XBRL is in a field referred to collectively as Semantic Technology, all of which seek to contend with 'meaning' in a context of a computer. Today, the majority of computer based information places much of the burden of meaning upon the user, requiring them to be predisposed as to the meaning of what they encounter - rarely is any context or point of reference provided. Semantic Technology seeks to:

1) Instill meaning with data such that its significance, implications, or consequences are less subject to misinterpretation
2) Allow a computer to process the information based on its meaning

Semantic Technologies is a multi-faceted field with progressive layers of technology and complexity. The World Wide Web Consortium developed a set of semantic standards established at the turn of the century (most significant of which are the Resource Description Framework (RDF) and the Web Ontology Language (OWL)). This field is rich with possibilities and stands as the next logical step in the natural progression of information technology to seek a higher value proposition.

With the maturation of the information technology industry and the Internet in particular, the application of Semantic Technologies is receiving growing interest. The question is not 'if' but 'when' and in 'what' specific form these technologies will emerge for broad and general utilization.

XBRL specifically is receiving strong international interest for its immediate practical value: an effective means of combating the labor-intensive, time-consuming, and error-prone nature of financial and regulatory reporting, while still allowing data to be captured in a standardized fashion. Gartner Group's 2006 Hype Cycle of Emerging Technologies places XBRL as about to enter the 'Slope of Enlightenment,' reaching broad productivity in 2 to 5 years with benefits widely demonstrated and accepted. The progression beyond the benefits of syntactical and structural standards inevitably leads to semantic technology. As such XBRL represents the front edge of the next significant wave in information technology's being practically applied in business.

7.4.   A Shared Interest

XBRL represents a global agreement on a technology and a set of semantics for financial reporting concepts and business rules. These concepts and rules have already been created for IFRS and GAAP accounting. The associated taxonomies illustrate how a common shared interest can benefit many organizations, distributing the cost of developing the taxonomy, making a market for tools and expertise to facilitate its use, and establishing a de facto standard for the semantics of accounting in these domains.

A Federal XBRL Community of Practice does exist. This group began in 2006 and seeks to promote the understanding and adoption of XBRL within the federal government. This group is considering how best to promote XBRL in government, including creating pilot projects of the sort recommended in this paper.

There is also a US jurisdiction arm of XBRL International known as XBRL-US, a non-profit membership organization run by a permanent staff. XBRL-US offers organizational, academic, and individual memberships. XBRL-US primarily focuses on:

- Promoting the adoption of XBRL within the United States
- Developing promotional and educational materials and events
- Developing United States specific taxonomies
- Developing other technical materials in support of XBRL use in the United States

Federal agencies should be encouraged to participate in industry consortia, such as XBRL US, to contribute to and benefit from the collective intelligence of such groups as these standards develop and morph.

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