Intelligent Digital Financial Reporting

Intelligent financial reporting using XBRL-based structured digital financial reports

by

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and

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A resource for professional accountants who want to understand and otherwise work with XBRL-based digital financial reports including external financial reporting managers, internal auditors, external auditors, financial analysts, regulators, and other business professionals. A resource for software engineers who want to implement useful software which will be used by professional accountants.

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About the authors:

Charles Hoffman, CPA, is credited as being the *Father of XBRL*. He started his public accounting career as an auditor with the international firm then called Price Waterhouse, served various roles in industry and public accounting for over 25 years, and has worked with XBRL since its introduction by the AICPA in 1998. In 2006, he received the AICPA Special Recognition Award for his pioneering role in developing XBRL. He has authored numerous publications including *XBRL for Dummies*, a number of *Journal of Accountancy* articles, writes a blog relating to XBRL, and contributed to a number of XBRL related technical specification and best practices documents. Currently, Charlie works as a consultant to CPAs and software vendors who want to better understand the subtle details of this new digital medium.

Charlie was co-editor of the first ever US GAAP XBRL taxonomy, contributor to the *XBRL 2.1 Specification* and the *XBRL Dimensions* specification, editor of the *Financial Reporting Taxonomy Architecture* and *Financial Reporting Instance Standards*, co-author of the *US GAAP Taxonomy Architecture*, part of the project team which created the *US GAAP Taxonomy*, and a major contributor to the IFRS XBRL taxonomy for a five year period, and consultant to numerous other XBRL taxonomy projects.

Raynier van Egmond is an IT professional with more than 25 years of ICT development and design expertise in financial and manufacturing industries and research. He has been involved in the XBRL community since its inception in 1999, and he's been an active participant in development of the XBRL standard. Raynier contributed to and coauthored several parts of the XBRL specification and best-practices definitions. He managed development and deployment of XBRL solutions worldwide for the private, public, and nonprofit sector and national governments. He was the architect of the final version of the Dutch government Netherlands 2008 taxonomy and consulted as technical manager for the project responsible for quality assurance and its deployment. Most recently he has defined the Medical Protocol Markup Language using XBRL to support a proof of concept application of XBRL in the Healthcare industry. Raynier is currently the CEO of XBRL Consulting Partners LLC.

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1. Introduction

> "The difficulty lies not so much in developing new ideas as in escaping from old ones." (John Maynard Keynes)

The future of financial reporting is digital financial reporting.

The general purpose financial statement (or financial report) has existed for over two millennium. Formats for general purpose financial statements have included clay, paper, word processor documents such as Microsoft Word, PDF, and HTML. The common thread that all these reports have is that a machine cannot read these reports because the reports are unstructured.

The institution of accountancy needs to create a digital, or structured, version of the general purpose financial statement which is readable by both humans but is also machine-readable.

The general purpose financial report is getting a face lift, being updated for the 21st century[1]. It is hard to say exactly when this process began. In the early 1900's financial disclosures became more standardized with the creation of what became US GAAP. In the 1970's efforts began to create a set of international financial reporting standards, IFRS. In the last part of the 20th century the XBRL technical specification was created, establishing a global standard technical syntax usable for business and financial reporting. In the early 21st century the US Securities and Exchange Commission funded the creation of the US GAAP XBRL Taxonomy and mandated that public companies report to the SEC using the XBRL technical syntax.

But public companies who report to the SEC amount to only about 10,000 entities that are regulated by the SEC. There are still approximately:

- 18,500 private companies with 500 employees or more employees in the US
- 27.5 million private companies in the US
- 800,000 employee benefit plans that create financial reports in the US
- 90,000 state and local governmental entities in the US
- 360,000 not-for-profit entities in the US

Similar numbers of state and local governmental entities, not-for-profits, and private companies likewise exist in other parts of the world.

All these companies could benefit from the digital financial report. What exactly are the benefits of a digital financial report as contrast to current paper-based or electronic financial reports?

Think about something. Today, how much does the tool that you are using to create your financial reports understand those reports that you are creating? Generally, those software applications know nothing about what a financial report is. Two primary tools are used to create most financial reports: Microsoft Excel and Word. What do those applications understand about financial reports or the process of financial reporting? They understand nothing. But what if software *did understand* the financial reports with which they are interacting?

[1] Web 3.0 Manifesto, http://project10x.com/bio_downloads/web3_manifesto_2009.pdf

You can understand what I mean about a software application understanding the information that it is working with if you think about another type of document that has already made the transition from human-readable only unstructured documents to human-readable and machine-readable structured digital information. Think of the blueprint.

Digital financial reporting can be understood by contrasting that process to the process of creating blueprints using Computer-aided Design/Computer-aided Manufacturing (CAD/CAM) software[2]. Just as CAD/CAM software is knowledgeable of blueprints; properly created digital financial reporting software is knowledgeable of financial reports. CAD/CAM software understands what a door is, what a window is, what a wall is, and that a window goes into a wall. Similarly, digital financial reporting software understands what a balance sheet is, what an income statement is, what a disclosure is, that assets goes into the balance sheet and that assets equals liabilities and equity, per the accounting equation[3]. CAD/CAM software is used to increase the productivity of the designer, improve the quality of design, improve communications through documentation, and to create a database for manufacturing. CAD/CAM output is often in the form of machine-readable information which can be printed; provide instructions for machining directly to a numerically controlled machine, or used in other ways for other manufacturing operations. Similarly, a digital financial report will travel through the entire supply chain which is connected via the Internet and information never needs to be rekeyed and different business systems will have the same understanding of the reported financial facts and the relations between the reported facts.

This resource will give you all the information that you need to understand XBRL-based digital financial reports. Basically, a digital financial report creation tool is an expert system for creating financial reports. It uses artificial intelligence technology such as intelligent software agents to help the professional accountant using the software to create the financial report.

1.1. Impact on professional accountants

To remain relevant, CPAs and professional accountants need to adjust their thinking about how to appropriately modify financial reporting to keep up with the digital revolution. These and other business professionals need to figure out the best ways to employ this new digital medium, where, and they must understand the ramifications of any change.

Even with good tools, a tool in the hands of someone with inadequate knowledge can produce substandard results. Poor tools can make this situation even worse. But give a knowledgeable, skilled craftsman the right tools and they can produce high-quality and even beautiful and elegant results.

This resource is for professionals who choose to be masters at their craft. It will help CPAs, external financial reporting managers, other accountants, financial analysts, regulators, and other business professionals understand the moving pieces of the new digital financial reporting paradigm and create high-quality digital financial reports.

[2] Computer-aided Design, https://en.wikipedia.org/wiki/Computer-aided_manufacturing

[3] Accounting equation, https://en.wikipedia.org/wiki/Accounting_equation

1.2. About this document

It takes hard work to create a framework, master a model, or create a theory. A creator of a theory or model is attempting to discover the seemingly invisible principles that hide behind appearances. Theories don't simplify. Theories describe the principles by which the world operates. A theory or model is characterized by its intent: the discovery of essence.

Frameworks, theories, and models make things easier to understand. Frameworks, theories, and models articulate rules that anyone can then follow.

Rene van Egmond and I have been collaborating, trying to figure out how to properly employ XBRL for financial reporting since the very first XBRL International meeting in 1999. Rene has a strong technical background; I have a strong financial reporting background. We both know people all around the world who know bits and pieces about XBRL. We have both looked at this information attentively. We have both looked at it closely. We have both looked at it over, and over, and over. I was funded by UBmatrix to do nothing else but understand XBRL for over 12 years and took full advantage of that opportunity. I worked with world class professional accountants on creating both the IFRS and US GAAP XBRL taxonomies. I was very lucky.

The U.S. Securities and Exchange Commission (SEC) mandated XBRL-based digital financial reporting beginning in about 2009. I participated in the team to create the initial US GAAP XBRL Taxonomy. Since that time thousands and thousands of XBRL-based digital financial reports have been publically available. Poking and prodding[4] those XBRL-based digital financial reports helps one understand digital financial reporting. I have published most of my analysis on my blog[5].

Rene and I have taken what we have learned and condensed, organized and synthesized it into this resource. As Henry David Thoreau says: "Simplify, Simplify".

This resource helps accounting professionals and other business professionals cut through all the noise and misunderstandings which surrounds this new technology, XBRL. This resource allows business to focus on what is truly important and not be distracted by the underlying technology which there is no need for business professionals to ever deal with.

This resource also helps information technology professionals and software developers to understand what business professionals truly need from software applications in support of XBRL-based digital financial reporting.

While this resource uses XBRL to explain digital financial reporting, XBRL is really only one of many technical tools which will be employed for digital financial reporting. While XBRL is a widely employed technical tool, it is not the only tool and there is more to digital financial reporting than the XBRL technical tools. XBRL is simply one of many enabling technologies.

Information in this document was accumulated over a period of about fifteen years. It represents, arguably, the best resource available today to understanding XBRL-based digital financial reporting. The information and knowledge has been

[4] Understanding that XBRL-based Digital Financial Reports are made up of Distinct Identifiable Pieces, http://xbrl.squarespace.com/journal/2015/5/3/understanding-that-xbrl-based-digital-financial-reports-are.html

[5] See, http://xbrl.squarespace.com/blog-archive/

accumulated, synthesized, organized, and explained as best as possible given the current point in time of the evolution of XBRL, digital financial reporting, software available to business professionals, etc.

1.3. Assumptions about reader

We make the following assumptions about the reader of this resource:

- We assume that you are not the average professional accountant or business professional but rather talented and somewhat of an early adopter or someone who will be helping the average accounting professional understand digital financial reports. As software improves, the complexity of digital financial reports will be absorbed by software. However, at this stage of the evolution of digital financial reports we have not reached the ease of use required for the average accountant to make use of digital financial reports.
- We assume that you understand the basics of the XBRL technical syntax. If this is not the case we would encourage the reader to become familiar with the XBRL technical syntax to get the most from this document. A good resource for the understanding of the XBRL technical syntax which the reader needs is chapter 4 An XBRL Primer in the book *XBRL for Dummies*[6].
- We assume that you understand financial reporting and will not explain fundamental financial reporting concepts and terminology.
- We assume that you will dig into the details of examples provided using good software. This will help you grasp important details. This is not a resource for understanding how to use any specific software application for the purpose of digital financial reporting.
- We assume that you are a hard worker. While we have accumulated a great deal of information, this resource is not perfect. Understanding digital financial reporting will take work.
- We are not saying that we have all of the answers. We do have a lot of very good questions, we have many interesting and enlightening observations, and we have figured some things out. We are working toward a world-class global standard solution for XBRL-based digital financial reporting.

1.4. Organization of this document

We have organized this resource into parts and sections. Each part and section serves a specific purpose and fulfills a specific need for any business professional or information technology professional endeavoring to understand XBRL-based digital financial reporting.

In order to understand XBRL-based digital financial reporting appropriately, we need to fill a few gaps in your current training most likely. We do that in ***PART 1: Foundation for Understanding, Framework, Theory, Principles*** is provide business professionals with important background and foundational information that they did not get in their accounting information systems or other computer science classes that they may have taken in college. This sets the foundation to be able to effectively build upon in the next sections. We start off with a **Conceptual Overview of Structured, XBRL-based Digital Financial Reporting**. Next, we

[6] *XBRL for Dummies*, http://xbrl.squarespace.com/xbrl-for-dummies/

take the information in this resource and condense it down to 15 principles, **XBRL-based Digital Financial Reporting General Principles**. Those 15 general principles frame the big picture. In the chapter, **Introduction to Knowledge Engineering Basics for Professional Accountants,** we start filling in some gaps about your knowledge about how computer work and how to get computers to do the things you want. None if this is technical. The reason you need this information is because it helps you understand how things actually work.

Comprehensive Introduction to Business Rules summarizes the important role that business rules play in making XBRL-based digital financial reports actually work. **Comprehensive Introduction to Problem Solving Logic** helps you understand how computers solve problems. **Comprehensive Introduction to Expert Systems** helps you understand the sorts of work computers can perform for you. **Comprehensive Introduction to Intelligent Software Agents** drills into the details even more.

Digitizing Financial Reports provides an overview of how we get from paper-based financial reports to digital financial reports. It also provides necessary background for understanding the differences between paper-based or electronic financial reports and digital financial reports. Understanding these differences is important because how you interact with digital financial reports will be different. The bottom line is that the workflow of professional accountants will change.

Overview of Accountants Perspective helps bring into focus things accountants should be thinking about as they endeavor to understand digital financial reporting. This section helps you understand the interests, perspective, position, and risks of professional accountants.

We finish off the first part with **Understanding Other Moving Parts of Digital** which summarizes other odds and ends you should be aware of.

In ***PART 2: Conceptual Model***, we outline the conceptual model of XBRL-based digital financial reports. In the first section, Introduction to the **Conceptual Model of an XBRL-based Digital Financial Report**, we provide a high-level overview of the conceptual model. **Understanding Mechanics of an SEC-type XBRL-based Digital Financial Report** drills into the specifics of public company financial reports which are submitted to the SEC. Then, **Reference of Financial Report Conceptual Model Elements**, we provide details of the conceptual model. **Reference for Financial Report Conceptual Model Domain Semantics** focuses on accounting and reporting aspects of the model. **Digging into Slots, Blocks and the Mechanics of a Business Report** focuses on the deals of slots and blocks. **Understanding Fundamental Accounting Concepts and Report Styles** focuses on key accounting relationships. **Understanding Concept Arrangement Patterns, Member Arrangement Patterns, and Report Fragment Arrangement Patterns** digs into the details of concept and member patterns. **Introducing a Few Advanced Aspects of the Digital Financial Reporting Conceptual Model** makes you aware of a few important advanced topics. Additional Resources for Getting Started finishes of the second part.

In ***PART 3: Working with Digital Financial Reports***, we help you get your hands dirty and introduce you to digital financial reports. We start off this section with **Viewing XBRL-based Digital Financial Reports** which provides a good hands-on introduction to digital financial reports. After viewing, **Validating the Model Structure and Fundamental Accounting Concept Relations** shows you some basics of validating a digital financial report so that you know it is created correctly.

One highly desirable result of expressing financial reports digitally is so the information can be more easily used by analysts. The section **Query and Analysis of Digital Financial Reports** covers important aspects of using digital financial reports. **Creation of Digital Financial Reports** will put you in the driver's seat and helps you create your own intelligent digital financial reports. We finish of the hands on part with **Summary of Common Sense Digital Financial Report Creation Principles** summarizes information that will help you become a digital financial report master craftsman.

In ***PART 4: Examples and Samples***, we give you lots of examples and samples to play with, explore, and learn from. We start with a **Hello World** basic example, then cover **Concept Arrangement Pattern Examples**, **Member Arrangement Pattern Examples**, **Business Use Case Examples**, **Comprehensive Example**, **Financial Disclosure Template Examples**, and **Reference Implementation of an XBRL-based SEC Financial Filing** sections provide a rich set of detailed examples you can use to further your understand this material. (Note that an IFRS reference implementation will eventually be provided).

In ***PART 5: Important Technical and Other Details***, we provide information that is probably not useful to most professional accountants, but it is very useful to software developers building software for business professionals. **Special or Specific Modeling Considerations** dives into a little more specific examples related to digital financial reports. **Reconciliation of Models** reconciles various models to each other which is helpful to software developers. **Financial Report Semantic Object Properties** summarizes information needed to implement the conceptual model in software applications. **Report Element Properties** provides additional implementation details. **Analysis of 6,751 XBRL-based Public Company 10-Ks Submitted to SEC** helps you see how the conceptual model was reverse-engineered from the empirical evidence of XBRL-based public company financial reports submitted to the SEC. **Top XBRL Technical Syntax Related Modeling Tips** provides information that did not really fit anywhere else, but is important. **Notion of Profiles, General Application Profile, and NOLAP** explains those ideas.

1.5. Additional resources

Throughout this document sample files, examples, and other information is referenced. Each section will refer you to this additional information which is useful. All of this information is also summarized in one location which you can find here:

http://xbrl.squarespace.com/digital-financial-reporting/

We will also provide additional information, updated information, and otherwise provide additional resources you might need at this blog.

The following is other resources which you will likely find helpful:

- *XBRL for Dummies* (http://xbrl.squarespace.com/xbrl-for-dummies) by Charles Hoffman and Liv Watson helps understand what XBRL is, what it is not, and provides good chapter, An XBRL Primer, which helps you understand the XBRL technical syntax should you want to delve into that. It also helps you understand how others are making use of XBRL and helps business readers understand the notion of a supply chain.

- *Arelle (http://arelle.org)* is a high quality, free, open source XBRL processor. For those who are more technical, this is a great resource. Business professionals, don't bother. Trying to make use of this will drive you nuts.

1.6. Where next

Digital financial reporting is just getting started. Many new opportunities will be created for professional accountants who learn to harness these new tools. Older tools will become less relevant.

1.7. Acknowledgements

While I did physically create the information in this resource, I could have not done so without the gracious help of a number of people, directly and indirectly, over the years. I see myself as merely a custodian of this important information, nurturing it along for the benefit of all, condensing countless discussions into something hopefully useful for the common good.

I would like to specifically thank these contributors: Walter Hamscher, PhD, Geoff Shuetrim, PhD; David vun Kannon; Rene van Egmond; Thomas Egan, CPA; Josef Macdonald, CA; Jim Richards; Roger Debreceny; Jeff Naumann, CPA; David Prather, Alan Teixeira, CA; Hugh Wallis; Allyson Ugarte; Colm O hAonghusa; Giancarlo Pellizzari; Yossef Newman, CPA; Rob Blake; Mark Creemers; Marc van Hilvoorde; Herman Fischer; Ignacio Hernandez-Ros; Dean Ritz; Timothy Randle; Cliff Binstock; David Scott Stokes; Masatomo Goto; Paul Warren; Mark Goodhand; Campbell Pryde, CPA; Michele Romanelli; Maciej Piechocki, PhD; Victor Morilla; Mike Rowling; Joe Ryba, CPA; Matthias Brantner; Dennis Knochenwefel; Ghislain Fourny, PhD; Daniel Taylor, Chris Taylor, CPA, Thomas McKinney, CPA; Eric Cohen, CPA; Mike Willis, CPA; Louis Matherne, CPA.

There are others which I probably left off and for this I apologize. I acknowledge and appreciate the thinking others contributed to this endeavor.

1.8. Feedback

Please send any feedback to Charles.Hoffman@me.com. We will use feedback to improve this resource.