

xAudit: Auditing Representation in XBRL Based Documents

Allison Ramon Araújo de Santana¹, Paulo Caetano da Silva¹, Márcio A. Pereira da Silva², Maurício Codesso³
 PPGCOMP – Universidade Salvador (UNIFACS)¹, Center for Informatics, Federal University of Pernambuco²,
 Universidade Federal de Santa Catarina³, Brazil

E-mail: paulo.caetano@unifacs.com, allison-valente@hotmail.com, marcio.alexandre83@gmail.com, mmcodesso@gmail.com

Abstract — Most financial documents are presented to governments and governors in computer language (e.g., XBRL). Information acquired from said reports should be free from faults, omissions and fraud, making it trustworthy to the point of supporting strategic decisions by the organizations that receive them. Although XBRL technologies present financial data and its accounting semantics, the auditing techniques used (which make this data even more trustworthy) are not stored or listed in the XBRL taxonomies. This fact makes it difficult to perform the auditing of these files, given that it's up to the auditor to apply the concepts of auditing manually, without the assistance of the automated auditing process. With the continuous auditing it's more and more possible to avoid the recidivism of fraud or even to identify it more quickly. Despite many auditing operations being performed under the XBRL perspective, it has not yet been defined a standard for the auditing of XBRL files. This paper proposes the establishment of a link database (*Linkbase*, in XLINK language), based on the XBRL specifications, which has been named xAudit, for the listing and storing of auditing techniques in XBRL taxonomies. To do so, a solution has been created, based on the XBRL definitions and auditing-specific regulations. Using xAudit, people try to solve the shortage for a standard for XBRL auditing. Some important points of the auditing process are raised in the present article. Using xAudit, it's expected that organizations can achieve improved results, real-time verification and accurate data analysis.

Keywords-Continuous Auditing; Auditing Standards; XBRL; xAudit.

I. INTRODUCTION

Financial reports are meant to provide useful information for the interested sides involved in an organization or its processes. All information acquired from these reports should be free from mistakes, omissions and fraud, making it trustworthy to the point of supporting strategic decisions by the organizations that receive them [1].

Auditing is a systematic process, documented and independent for the acquirement of evidence (registers, fact submission or other information) that aim to verify the satisfactory meeting of the defined criteria (set of policies, procedures or requirements) [2].

Standardizing is one of the factors that contribute for a suitable auditing, given that, with non-standardized data, it's up to the auditor to manually "clean" the data so the automated auditing process can take place [1].

XBRL technology has been increasingly utilized by national and international financial systems, such as SICONFI system, of the National Treasury Secretariat of Brazil [13]. In 2009, the American Securities and Exchange Commission (SEC), started demanding for companies of local or foreign capital, with operations in the country, to disclose their financial reports in XBRL format [3]. In

March of 2017, an update on their internal systems enabled public companies to use the XBRL format for the emission of financial statements, as well [4]. The Organisation for Economic Cooperation and Development (OECD) recommends that tax administrators take into consideration data formatting that allows for the use of automated auditing, in order to minimize potential costs for the interested sides. To that effect, the Organisation acknowledges in particular the use of open financial data standards, such as XBRL and XBRL GL [5].

Many auditing operations have been built on the XBRL perspective, such as the Forensic LMDQL [6]. In February 4th, 2015, the XBRL International [7] organized a meeting to take a standing regarding the drafting of a proposal to be sent to members of the international normalization committee [8] to establish an International Standard (ISO) for auditing data with commercial and governmental usage, for both internal and external auditing. Several relevant decrees and regulations of international, national and regional levels were presented, but the project wasn't approved nonetheless, given the proposal hadn't taken into consideration several standards known to the committee, e.g., OECD Standard Audit File – Tax, United Nations auditing regulations [14], Swedish SIE [15], Dutch Auditfile Financieel [16], Object Management Group's GL Facility and Open Application Group's (OAGIS). Some aspects were pointed out to guide the improvement of the standardizing proposal, such as a more accurate definition of terms deemed vague and/or indeterminate [5], and so a new evaluation of the project is awaited anytime soon.

Based on this scenario, as there is no agreement on which standard to be used or even a regulation as basis for the execution of the auditing process, it is understood that there's a need for a generic standard for the representation of different auditing techniques, contributing to the implementation of auditing on XBRL reports. Therefore, an extension of the XBRL 2.1 is proposed, named xAudit, to assist in this process. Said extension is based on XBRL standards, such as Generic Links [17], so that it is a solution consistent with the syntactic and semantic structure of XBRL. xAudit can be a new and useful tool to aid and automate the auditing process in XBRL-formatted files.

This work is divided in five sessions, in the session I The Introduction, in the session II Theoretical Foundation, in the session III Correlated Works, in the session VI xAudit Specification end session V Conclusion, Limitations and Future Works.

II. THEORETICAL FOUNDATION

This session presents the concepts of *XBRL* and *Continuous Audit*.

A. XBRL

XBRL, is an open international standard, based on XML (Extensible Markup Language), meant for the exchange of business information. XBRL has its specifications defined by the XBRL International Consortium [18], being based on the technological standards of W3C [19]. XBRL is already present in many countries, including The United States, Japan, Korea, United Kingdom, Australia, Denmark, Argentina, France, China, India, Ireland, Italy, New Zealand and Brazil [9].

The XBRL 2.1 specification is formed by two main elements: taxonomy and instance document. In taxonomy, the terms representing financial concepts are described, i.e., the vocabulary that will be used in the instance document, as well as the relations between said terms, the description and classification of the business. The semantics and syntax of the financial information is described in the taxonomy. On the other hand, the instance document contains the financial data and the description of its textual elements. An instance document may be connected to more than one taxonomy at once, as long as it uses elements described in them. The set of these two elements, instance document and taxonomy, is what composes XBRL documents [10].

An XBRL document can be generated from data acquired from many sources, including, but not restricted to: XML documents, manual inputs and databases. The distribution of an XBRL document can be executed in a way that integrates it in several different formats (HTML, PDF, Word RTF) or even in a database [10]. Receiving documents in various formats, converting them into an auditable format (XBRL) favors the process of acquiring evidence generated in all organizational levels, in order to increase even further the amount for analysis or the range of the auditing. In addition, distributing the information in different formats allow even more integration between different software platforms.

With a standardized representation, the XBRL facilitates the acquisition of trustworthy and accurate data, providing a better analysis of the risk of the transaction, control mitigation and operational efficiency [10].

Financial information of the kind distributed through XBRL reports must be trustworthy, given that it is essential for the daily routine of organizations, as decisions about investments and credit, or even strategic organizational planning, are made based on it [1].

B. Continuous Auditing

In the auditing process, the evidence is acquired and presented in conclusive reports, in a way that points out aspects that require improvements, as well as stresses unconformities, aiming to solve their original cause, thus avoiding recurrence.

In traditional auditing, the process tends to be slow, especially because of aggravating effects such as the sample limitation or even the manual procedures. Generally, the market acts dynamically and, if the rhythm of the auditing is

slower, the decision-making, most of the time, tends to be delayed, inducing a loss of competitive edge, increased costs and decreased productivity [10].

In the paradigm of traditional auditing, the data is periodically verified and, as an outcome, faults, fraud or omissions can last long periods without being detected by an auditing or because of it [1].

Continuous auditing takes place more frequently or even continuously. In this process, the monitoring of controls and operations in a shorter time lapse allow for the auditor to detect the deviations faster and more efficiently, contributing for a timely, adequate response [1].

The continuous auditing process becomes even more efficient with the use of technology and automation. Improved methods make significant increases in efficiency of an auditing process more likely to happen, as it allow for more frequent audits, making the information more reliable and readily available [1].

The monitoring and continuous auditing processes integrated with XBRL technology allow for data, in the operational level, to be defined in a single way, being then read, interpreted and analyzed in real time. A standardized representation favors a more trustworthy and efficient data collection, to achieve a higher capacity of data analysis, being able to account for negotiation risks, efficiency and operational control, meeting of determinations and demand verification in a shorter time [10].

For the present work, auditing techniques have been applied to enable the identification and responsabilization of the auditor, definition of context of the auditing to be executed, type and method of the auditing, conformity, action management, activities and processes scheduling, among others. Said techniques are available for reference in Section IV (xAudit Specification).

III. CORRELATED WORKS

The number of articles produced in Brazil about XBRL is not high. The main focuses of research, discussion and propagation of XBRL in Brazil are the TECSI-USP (Laboratory of Technology and Information Systems) coordinated by Dr. Edson Luiz Riccio, and the Group of Research in Software Engineering and Applications (GESA) [20] [21], laboratory of the master's in Systems and Computing from UNIFACS (Salvador University), coordinated by professor Dr. Paulo Caetano da Silva (Farias, 2014). The former, TECSI, operates exclusively in the area of business, while the latter, GESA, develops works based on XBRL technology, both in the areas of business and Information Technology.

Regulations and standards are defined in order to adapt, from the existing taxonomies, the needs of each country and region [5]. A few studies were pointed, regarding topics like the benefits and challenges of XBRL in Brazil; data models for federal organizations; continuous auditing, however not necessarily about XBRL; implications of XBRL in the process of continuous auditing.

It is noticed the existence of standards that enable data extraction from accountability systems, for example the standards developed by American Institute of Certified

Public Accountants (AICPA), with the goal of generating files that are fit for auditing [11].

Due to the difficulty in finding national and international researches about auditing in XBRL files, it is hoped that xAudit fills this gap, in order to instigate the topic in the academic community and create a generic representation for auditing techniques in XBRL-formatted data, thus allowing for the automation of auditing processes in XBRL documents, and its use in public and private institutions.

IV. XAUDIT SPECIFICATION

Taking into account the existence of auditing regulations, such as NBR ISO 19011 (Guidelines for the auditing of quality and/or environmental management systems) [2], and the Data Standard for Auditing, proposed by American Institute of Certified Public Accountants (AICPA) [3], it was sought, in this work, to analyze these documents in order to identify essential terminology and concepts for an auditing process that, put together and adjusted, could create a standard to be used jointly with XBRL technology for Continuous Auditing, in this case, the xAudit.

In Figure 1, it is represented the set of documents used as basis for the theoretical foundation of xAudit, as well as its relationship with XBRL technology.



Figure 1. xAudit.

To enable the execution of continuous auditing in XBRL files, a set of terms to be annexed to the xAudit taxonomy has been defined, which in turn represents part of the auditing process.

In order for an auditing to take place, it is required that a range, criteria, reference regulations and evidence to be analyzed are defined. Aiming to meet the organizational schedule in what regards the period and scope of the audited processes, it is proposed the representation of an auditing plan, containing information, such as frequency, kind of auditing and responsible parts [2].

This way, XBRL instances for certain processes may be analyzed based on the established criteria. The conformity analysis may also be executed, and log files generated, which will be basis for the composition of the recommendation report of the auditing. Taking into account the improvements pointed out, action plans can be laid out for monitoring the steps taken as a result of the auditing.

In Figure 2, an UML representation of xAudit can be seen. Following that, its elements are described.

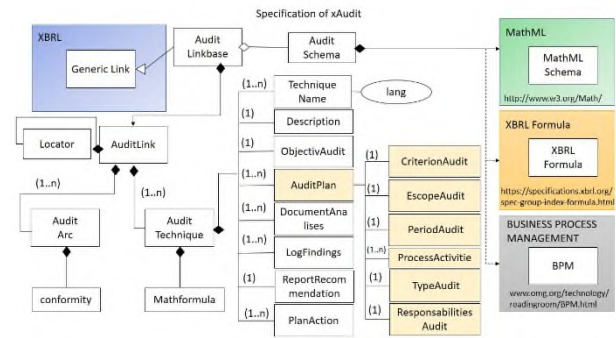


Figure 2. UML representation of xAudit.

Given that business auditing techniques can be mathematically represented, this work also proposes the interconnection between xAudit and XBRL technologies, such as XBRL Formula and MathML, which represent documents of business regulations and mathematical calculations, respectively. It's also presented in this work an XBRL Linkbase, as an xAudit element, to establish the connection between the technologies, as illustrated by Figure 3.

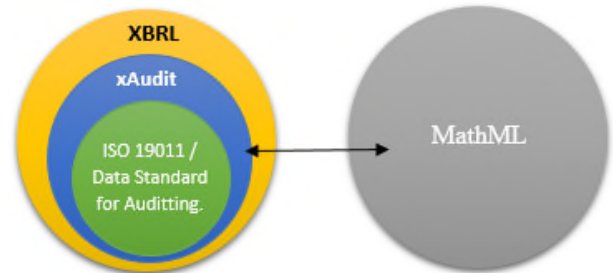


Figure 3. Connection Between The Technologies.

The specific elements for the composition of xAudit are described below.

A. Audit Schema

The xAudit schema file defines the elements that can be part of the semantic representation of the auditing technique. These elements are based on XBRL taxonomy.

B. Audit Linkbase

The file <Audit Linkbase> is a document that stores the representation of the auditing technique and its connections with the business elements. This file is an specialization of the Generic Link specification (XBRL Inc., 2009), which has been devised to extend XBRL to new semantics.

In this file (Audit Linkbase), the taxonomist expresses the elements that represent the auditing technique. This representation is based on the elements contained in the xAudit schema file, which is explained below:

1) Audit Link

The element <AuditLink> represents a set of interconnected elements. The subelements of <AuditLink> are (i) Locator [12], which locates elements in the XBRL taxonomy (ii) Resource [12], specified to represent a

resource to be used by the taxonomist and (iii) Arc [12], which establishes a connection arc between the previous elements. AuditLink may contain several Locators, Resources and Arcs.

1.1) Audit Technique

The element <AuditTechnique> represents the auditing technique. Ten children elements have been specified for its formal representation:

1.1.1) TechniqueName

The element <TechniqueName> describes the name of the applied auditing technique.

1.1.2) Description

The element <Description> represents the theoretical concept of the technique represented in the file. This description has to be in natural language, as expressed in the *Lang* attribute.

1.1.3) Mathformula

The element <Mathformula> represents a mathematical formula that formalizes the respective auditing technique, based on the elements defined in the xAudit schema file.

1.1.4) ObjectiveAudit

The element <ObjectiveAudit> determines the objective of the auditing that will be executed. Three different objectives were defined, divided by level:

- Level 1: <Routine Check> (Detect routine transaction irregularities that stand out);
- Level 2: <Conformity Check> (Aims to compare the set criteria with collected evidence);
- Level 3: <Reanalysis check> (Redo the auditing process in order to verify the consistency of the collected data).

1.1.5) Audit Plan

The element <AuditPlan> defines details that facilitate the understanding between the involved parts, in such a way that reflects the complexity of the auditing, just as much as it enables the process. Composed by the elements: <CriterionAudit>, <EscapeAudit>, <PeriodAudit>, <ProcesseActivitie>, <TypeAudit> e <ResponsibilitiesAudit>, described below:

1.1.5.1) CriterionAudit

The element <CriterionAudit> is used as reference for ascertaining of conformity. It describes the regulations and regulatory items to be used as criteria. (EX: 1: NBC TA 230_ – AUDITING DOCUMENT - CFC, items 10 and 11, 2: NBC TA 530 – AUDITING SAMPLING, items 5 and 6);

1.1.5.2) EscapeAudit

The element <EscapeAudit> describes the scope and limits of the auditing that will be executed, in a way that defines what hierarchical or documental levels will be audited.

1.1.5.3) PeriodAudit

<PeriodAudit> defines the period in which the audit will take place, as well as the schedule for its execution.

1.1.5.4) ProcessActivitie

<ProcessActivitie> defines the processes or activities that will go through documental analysis.

1.1.5.5) TypeAudit

<TypeAudit> determines if the auditing process will be carried out by an internal or external (independent) team, about the audited organization.

1.1.5.6) ResponsibilitiesAudit

The element <ResponsibilitiesAudit> delegates the responsible individuals, that will legally answer during the auditing, as well as the auditor responsible for the <ReportRecommendation>.

1.1.6) DocumentAnalises

The element <DocumentAnalises> is responsible for containing instances of the documents to be critically analyzed. It must be taken into consideration the size, complexity and nature of the organization, as well as the <ObjectivAudit> and the <EscapeAudit>. Only verifiable data may be selected for analysis.

1.1.7) LogFindings

<LogFindings> stores the log of the findings of the process, being able to point out the conformity or nonconformity of <DocumentAnalises> in respect to <CriterionAudit>.

1.1.8) ReportRecommendation

The element <ReportRecommendation> is sent after the analysis of the element <LogFindings> and based on the nonconformities that were evidenced a report containing a description of them, as well as the element <CriterionAudit> regarding the nonconformities found and their degree is written.

The degrees are divided in two, namely:

- Simple Degree: Simple fault that does not compromise the integrity of the financial report, but requires improvements in order to avoid making its usage impossible;
- High Degree: Major fault that compromises the integrity of the financial report, rendering it unusable.

1.1.9) PlanAction

The element <PlanAction> is set to solve possible faults pointed out, by attributing actions and their respective responsible parts that will have to monitor their completion.

1.1.10) AuditArc

The element <AuditArc> establishes a connection arc between the <Locator> and the <AuditTechnique>.

1.1.10.1) Conformity

<Conformity> is a subelement of <AuditArc>, which expresses the conformity level established by the connection between <Locator> and <AuditTechnique>.

V. CONCLUSION, LIMITATIONS AND FUTURE WORKS

The xAudit specification proposal has, as an objective, solve the shortage of auditing standards for XBRL data, thus contributing positively for the consolidation of the XBRL standard and its utilization. Important aspects in an auditing process can be represented in xAudit: the responsabilization of the auditor, definition of context, type and method of auditing, conformity, action management, among others. Continuous auditing is one of the keys to improve and audit business processes. The use of adequate technology directly influences the achievement of better

results, real-time verification and accurate data analysis, in this case, a use of xAudit will be of great value in this task. xAudit creates a layer of software for representation of auditing processes, and with that, it is expected that auditing software administration can execute its processes in a standardized fashion.

This work is currently still in the concept definition stage, the following stages will consist of the specification definition, creation of a taxonomy based in auditing regulations and xAudit, the development of an application that opens the doors for the executing of auditing based on a real case study and verifying the performance of said auditing.

xAudit is a proposal for the improvement of current auditing processes, to be of use as a tool for the auditing process in XBRL-formatted files.

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