Open Source XBRL Tools Study

Final Report

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Centro Nacional de Referencia de Aplicación de las TIC basadas en fuentes abiertas

April 2008

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Introduction

Background

CENATIC is the Spanish acronym for the National Reference Centre for the Application of Information and Communication Technologies based on open source initiatives. It is a public foundation created by the *Ministerio de Industria, Turismo y Comercio* and started operations on 20th November 2006, the date on which its Foundation Commission was constituted.

The CENATIC project is the strategic national project to promote the knowledge and best practice of open source software, created as an open collaborative effort involving public sector entities, private corporations, universities, R+D+i groups and the business users and developer communities of these technologies.

CENATIC's main objective is to become an centre of excellence and reference, leading the use and development of open source technologies in Spain and on an international level.

Inline with this objective, one of the CENATIC initiatives, in coordination with several activities launched by the public corporate entity Red.es, is to promote the use of XBRL (eXtensible Business Reporting Language) as the standard language for the financial information data exchange.

At present there is neither a single format for the companies to use when reporting their accounting information, nor an open source solution that facilitates the use of that format in a simple and straightforward way.

Therefore XBRL as an open and royalty free standard is an appropriate format to be part of this study into its application to and use within ICTs and local authorities. This is within CENATIC's goal to assist in the establishment of common standards and the implementation of open technologies to support these.

Background (cont.)

The *Dirección General de Coordinación Financiera con las Entidades Locales (DGCFEL),* has developed the LENLOC project to report electronic budget settlement from local administration entities to the central authority in order to maintain the principle of transparency within the context of budget control and financial stability.

The XBRL standard should allow DGCFEL to improve transparency in the budget information reporting chain for the public sector. As a result, DGCFEL is offering local governments the option to transmit their budget information in XBRL format according to the LENLOC taxonomy, as defined by the DGCFEL.

The *Intervención General de la Administración del Estado (IGAE)* has lead the development of the ICEL taxonomy, intended to give support to the electronic interchange of the General Account information of local government. The final aim is to report this information using XBRL to the controlling area of each government region.

Both ICEL and LENLOC taxonomies constitute the basis of the accounting principles for the public sector in Spain. They will converge in a taxonomy called CONTALOC, that will enable collecting reporting information from local government to the main external authorities through an automated system, making possible paper submission reduction and proprietary formats misuse.

This promotion of adopting XBRL in Public Sector in Spain has stimulated the interest of a number of software providers of accounting, managing and reporting tools commonly found in local government, that should be able to create their XBRL reports according to these taxonomies.

Against this background, the purpose of this study is to analyse the feasibility of promoting open source software for use with XBRL that can be effectively integrated into reporting tools used at local government level. Conducted under the auspices of a community called XBRL C³ [ce-cube] (aligned along three axes: the business users, the information receivers and the technology providers), created to facilitate the development of XBRL components, improve interoperability of XBRL solutions and support users.

This study is intended to cover any XBRL open source tool that can be identified, extended in the preliminary phase to include some software development that could benefit from an open source initiative at the local government level.

Open Source XBRL tools study - Guide diagram

0 Background

- Promote XBRL adoption in Public Sector
- Growing interest in ERP sw providers

Objectives

- Analyse viability of XBRL open source promotion of the software for ERP providers
- Identify current XBRL open source solutions

- XBRL open source solutions scarce at a first sight

XBRL C³ community creation

- Grouping users, receivers and technology providers
- CENATIC as initial promoter
- Initial start up: public sector ERPs
- LENLOC and CONTALOC Taxonomies

Initial research

1 Define selection criteria

- Clear, useful and transparent criteria
- General Features
  - High Level criteria ("integration level", f.e.)
  - Technical criteria
- XBRL functionality
  - Corresponds to specifications
  - Specific features

2 Identify libraries and tools to evaluate

- To consider both independent open source initiatives as well as private corporation promotion ones
- Special interest in success stories
- National and International initiatives
- Take into account National ERP software converter modules (to XBRL)

3 Preliminary Analysis

- Platform selection:
  - the most complete in functionality
  - the best implemented in technical terms
  - the best in maturity level, support and upgrades
  - the best in adjusting to open source patterns

XBRL open source library "Short list"

4 Final Analysis

Viability Study

- SWOT Matrix on weaknesses and strength
- Deeper evaluation of general features and XBRL functionalities
- Special Attention to:
  - XBRL standard level of commitment
  - Maturity level and support
  - Evolution capabilities
- Conclusions

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Preliminary Study

Selection criteria definition
General Features

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	Criteria	Weight
Commitment and level of platform support	Licence type	High
	Existence of promoters	High
	Availability of success stories	Medium
	Number of Developers in the community	Low
	Frequency of new software releases	Medium
	Year of last software version released	High
	Availability of Documentation	Medium
	Support channels (phone, email, forums, rss-feed, …)	Low
	Participation of the developer community in XBRL Spain or XBRL International working groups	Medium
Technical criteria and those related to integration	Source code available in multiple programming languages	Low
	Operating Systems / Platforms supported	High
	Ease of integration	High
	Other open source libraries/tools integration	High
	Availability of APIs	High
	IDE integration tools	Medium

Selection criteria definition
XBRL features

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	Criteria	Weight
XBRL specification conformance	XBRL 2.1 specification compliance	High
	XBRL 2.1 Conformance Suite Test compliance	Medium
	XDT 1.0 dimension specification compliance	High
	XDT 1.0 Conformance Suite Test compliance	Medium
	Formula specification (Candidate Recommendation) support	Medium
	Formula Conformance Suite Test support	Low
	Versioning specification support	Low
Specific XBRL features	Transformation formats implemented	Medium
	ETL mechanisms to enable XBRL generation	Low
	Availability of XBRL APIs	High
	XBRL processing methods to validate taxonomies	High
	XBRL processing methods to edit taxonomies	Low
	XBRL processing methods to validate instance documents	High
	XBRL processing methods to edit instance documents	Medium
	XBRL processing methods to read/navigate through instance documents	High
	XBRL processing methods to execute Formulae and Functions	Low
	XBRL processing methods for taxonomy versioning metadata	Low

Identify libraries and tools for evaluation in the initial research

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xBReeze Open Source Edition

- Promoter: UBMATRIX (USA)
- UBMatrix open source version of the commercial XBRL processor
- GPL Licence

XBRLAPI.org

- Promoter: Galexy Pty. Limited (Australia)
- Hosted on Sourceforge, under LGPL Licence

Batavia XBRL Java Library (BXJL)

- Promoter: Batavia Business Reporting (Netherlands)
- Batavia offer their XBRL library under a temporary evaluation licence (AGPL)

ABRA XBRL Processor

- Promoter: ABZ Reporting (Germany)
- XBRL processor based on the transformation language XSLT
- It is distributed under Apache 2.0 licence

XBRL Taxonomy Generator

- Promoter: Max Coletti (Italy) personal initiative, hosted on Sourceforge
- Under GPL Licence

SICALWIN XBRL Module

- Promoter: Aytos CPD (Spain)
- Proprietary module for XBRL generation according to LENLOC Taxonomy
- Included inside SICALWIN product

TAO-GEDAS XBRL Module

- Promoter: [illegible] (Spain)
- Without further information

Non Evaluated

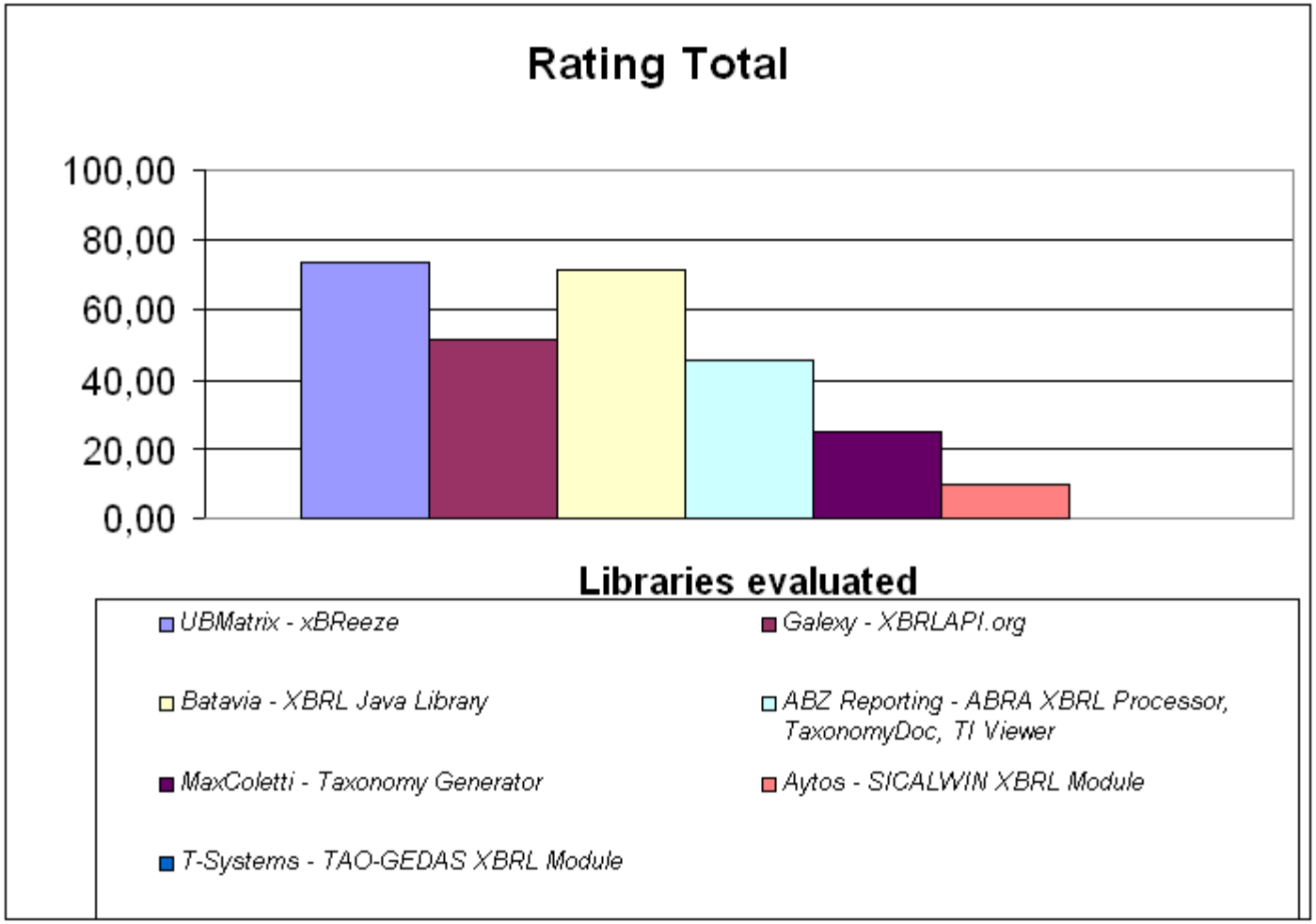
Decision matrix
Summary results

Criteria	Weight	max. value	XBReeze	XBRLAPI. org	BXJL	ABRA	Taxonomy Generator	Aytos	T-Systems
1. Commitment and level of support of the platform	*1*	*100*	55	52	49	40	29	22	0
2. Technical criteria and related to integration	*2*	*130*	100	94	96	66	48	16	0
3. XBRL specification adequacy	*4*	*280*	204	124	204	100	56	36	0
4. Specific XBRL features	*3*	*330*	258	162	252	180	78	9	0
Total		*840*	617	432	601	386	211	83	0
% to max. value			73,4 %	51,4 %	71,5 %	45,9 %	25,1 %	9,9%	0 %

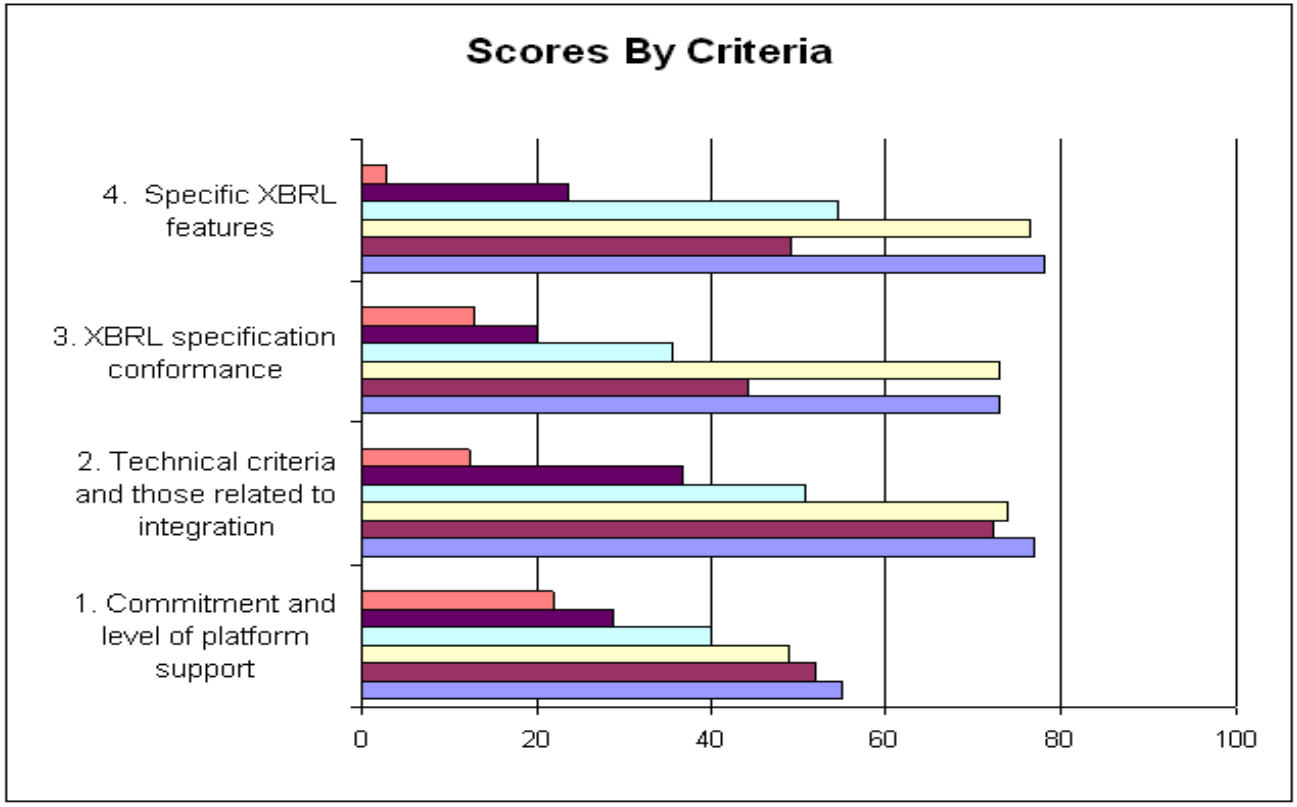
- XBReeze, BXJL y XBRLAPI.org are the three tools that pass the initial research and evaluation.
- XBReeze and BXJL stand out over the other solutions in all the criteria evaluated, as the most complete platforms, fulfilling the technical criteria, as well as their conformance to the XBRL specification and other specific XBRL features provided.
- BXJL does not score highly in the “Commitment and level of support of the platform” requirement, mainly due to its licence operation, which is not fully “open source“.
- ABRA does not pass the rest of the criteria but has an acceptable score in the "Specific XBRL features" evaluation.

Decision matrix
Summary results

Libraries to Evaluate	Total Score
UBMatrix - xBReeze	73,45
Galexy - XBRLAPI.org	51,43
Batavia - XBRL Java Library	71,55
ABZ Reporting - ABRA XBRL Processor, TaxonomyDoc, TI Viewer	45,95
MaxColetti - Taxonomy Generator	25,12
Aytos - SICALWIN XBRL Module	9,88
T-Systems - TAO-GEDAS XBRL Module	0,00



Decision matrix
Summary results



Libraries evaluated

- *UBMatrix - xBReeze*
- *Galexy - XBRLAPI.org*
- *Batavia - XBRL Java Library*
- *ABZ Reporting - ABRA XBRL Processor, TaxonomyDoc, TI Viewer*
- *MaxColetti - Taxonomy Generator*
- *Aytos - SICALWIN XBRL Module*
- *T-Systems - TAO-GEDAS XBRL Module*

Conclusions – Initital Research

- The XBRL open source initiatives are scarce in comparison to other consolidated open source communities.
- However, there are some solutions that could constitute a good starting position for a solid XBRL open source project. From the list of evaluated tools, the following are worth highlighting:
  - xBReeze Open Source Edition, from UBMATRIX.
  - Batavia XBRL Java Library (BXJL).
  - XBRLAPI.org, from Galexy.
- Of these three selected solutions, the most complete are xBReeze and BXJL according to technical criteria, and their conformance to the XBRL specification, in addition to the specific XBRL features provided.
- The xBReeze and BXJL projects are managed by two of the main XBRL tool providers, UBMATRIX and Batavia, respectively. Their open source solutions have a maturity level very similar to their corresponding version of their commercial products.
- XBRLAPI.org has been developed by Galexy, the corporate identity of Geoffrey Shuetrim, one of the mostt active consultants in the development of the XBRL specification. It does not have an associated commercial product, but the architecture and design of the solution is quite good. Nevertheless it has the weakness of a beta version, and a fully functional release is still pending.

Conclusions – Initital Research

- From solely the open source perspective, XBReeze and XBRLAPI.org are under the most favorable licence type, GPL y LGPL, respectively. The licence of BXJL is more restrictive, as it gives a temporary evaluation licence (AGPL).
- ABRA XBRL Processor was probably the first XBRL open source initiative. It presents very interesting technical features, as it uses other XML standards like XSLT as the transformation formats. The IASC has been using this processor during some phases of the IFRS project for building a taxonomy viewer. It has however some weakness in its integration capabilitites and its coverage of the XBRL specification. It seems that its development has been discontinued in favor of a commercial version of the product.
- XBRL Taxonomy Generator is a personal initiative, that has not been updated since its first creation. It has limited functionality, but it is under the open source GPL licence.
- The XBRL conversion module developed by some of the Spanish ERP software providers such as Aytos, is a set of custom development tools designed for their products and adjusted to a set of specific taxonomies. As a result they cannot be considered as a base for an XBRL open source project. This type of corporation initiative, should be taken into account when encouraging the collaboration on the creation and development of open source libraries. Their requirements and real experience would be valuable to the group and they would benefit from a way of integrating XBRL features in their products in a faster and more interoperable way.

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Final Analysis

xBReeze Open Source Edition Features

xBReeze Open Source Edition

- Promoter: UBMATRIX (USA).
- Open Source edition of the UBMatrix commercial XBRL processor (GPL Licence).
  - UBMATRIX is one of the pioneer companies in the field of XBRL tool development and has been involved since the XBRL standard conception.
  - They have solutions and services implanted among several regulatory and financial institutions, in USA, Europe and Asia such as Federal Deposit of Insurance Corporation (FDIC), National Bank of Belgium, Central Bank of France, Government of Singapore, and the Holland Finance and Justice Government Office.
  - It is worth noting the active collaboration of some of their members in the XBRL International standards development process, for example:
    - Herm Fischer, current Formula Working Group chairman, previously involved in other groups like Dimensions and XBRL-GL taxonomy development,
    - Charles Hoffman, initial promoter of the XBRL standard who has contributed in the editing and revision of several XBRL recommendations and documents, most significantly taxonomy and instance design best practices, FRTA and FRIS. He remains active with continuous effort towards XBRL standard adoption and development with initiatives like XBRLSimple document.
- Hosted on Sourceforge, under the GPL Licence.

xBReeze Open Source Edition SWOT Analysis

WEAKNESSES

- The API is not very intuitive.
- Complex package and classes architecture
- The performance is not remarkable

STRENGTHS

- Good documentation and examples.
- Fast start up and easy to integrate “black box”
- A Complete solution conforming to XBRL and XDT specifications
- Very stable and thoroughly tested.
- Additional conformance suite test and implementation tools available.

THREATS

- Extending functionality via a development community could be tough.
- The addition of features using the library, such as the development of an XBRL viewer, may not be quick to implement.

OPPORTUNITIES

- It offers a trusted and robust XBRL validation engine out of the box with zero cost of implementation.

xBReeze Open Source Edition
SWOT Analysis

WEAKNESSES

- The API is not very intuitive.
  - After a first look into the documentation and classes we find several factory patterns and interfaces that are aiming towards the software engineering of the architecture for reuse. As a result it doesn't expose clearly and intuitively the XBRL object model. On the other hand, they correspond more to an API of collections and interfaces with a general purpose, which specializes more and more as it gets into lower packages.
- Complex Package and Classes Architecture.
  - The package and class architecture is driven by a very complete and ambitious set of business objectives, this makes the resultant API very complex to keep maintained.
- The performance is not sufficient.
  - After the test execution of the processing engine for taxonomy processing with a sample containing a high number of schemas and dimensions in its DTS the resulting performance was inadequate. Therefore it is not very acceptable as an intensive validation service, for example.
  - It is worth noting the warning included in the documentation about this performance issue. The proposed solution is to upgrade to the commercial product version. It could be classified as a possible threat on a purely open source perspective in comparison to other XBRL open source solutions.

xBReeze Open Source Edition
SWOT Analysis

THREATS

- Extending functionality from a development community could be tough.
  - There is a long learning curve prior to a developer having a complete and clear vision of the API architecture. This high manpower cost, once overcome, allows the developer community, in theory, to be able to extend the solution and functionality in a very isolated and modular way.
- Fast additional feature, like the development of an XBRL viewer, could be not quick to implement.
  - Therefore, there is a high cost of building new functionalities from scratch, like developing an instance document viewer, for example. This could be a threat to the project estimation plans as the initial idea is to use available libraries to reduce the development time of the project based on the XBRL abstraction API that they provide.

xBReeze Open Source Edition
SWOT Analysis

STRENGTHS

- Good documentation and examples.
  - The documentation provided is very good and detailed with a number of examples that allow to focus on the principal features immediately.
- Fast start up as an integrable “black box”.
  - The samples and tools provided in the solution make it quick to set up and use the XBRL validation service. A rapid start up of the basic functionality is possible without requiring in depth knowledge of the source. The control on the internal execution is acquired later and slowly.
- A Complete solution conforming to XBRL and XDT specifications.
  - The solution includes a complete set of conformance tests and tools to execute them. The results indicate fully conformant to the XBRL and XBRL Dimension specifications. This allow users of the library to focus in their requirements with the complexity of the standard remaining stable in the background.
- Very stable and thoroughly tested.
  - It provides a large number of tracing, debugging and testing facilities for development.
- Additional conformance suite test and implementation tools available.
  - It easily allows the execution of the conformance tests and gives documentation on how to design and execute new ones.

xBReeze Open Source Edition
SWOT Analysis

OPPORTUNITIES

- It offers a trusted and robust XBRL validator out of the box with zero cost of implementation.
  - After evaluation was completed, the clearest opportunity we identified was the availability of a fully conformant XBRL processing and validating engine which does not require any difficult or lengthy development work to integrate into third party software solutions for simple tasks such as validating XBRL instance documents.

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XBRLAPI.org

- Promoter: Galexy Pty. Limited (Australia).
  - Galexy is an Australian company providing a number of financial risk assessment services. Standing out in this instance is the high quality financial data service which is mainly oriented towards the active adoption of the XBRL standards.
  - Other services of note:
    - DataFactory, a web application for financial risk model development
    - Support for the open source XBRLApi.org project.
    - Creation and maintenance of an online system for documenting XBRL taxonomies.
  - Its principal member, Geoffrey Shuetrim, is an active member of XBRL International and he has collaborated in the editing and revision of several XBRL recommendations, including the XBRL 2.1 specification and XBRL Formula specification.
- Hosted in Sourceforge, under LGPL Licence.

XBRLAPI.org
SWOT Analysis

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WEAKNESSES

- There is no a fully functional version released.
- It doesn't provide a fully XBRL conformant processor, able to perform validation.
- The documentation is not extensive, and the number of examples is not sufficient, which makes implementation more difficult.

STRENGTHS

- Excellent support and level of response.
- Very good XML integration and Database connectivity.
- It offers cache level facilities for processing taxonomies.
- The API is very intuitive.

THREATS

- Being mainly a personal initiative, there is a risk that development may be discontinued.

OPPORTUNITIES

- It provides a very good base for the creation of new XBRL functionalities and services from scratch.

XBRLAPI.org
SWOT Analysis

WEAKNESSES

- There is no a fully functional version released.
  - There are parts of the beta implementation that are still incomplete.
  - The time taken to deploy is not as fast as it could be because of the configuration of the modules. As a result the solution is not easy to execute and integrate.
- It doesn't provide a fully XBRL conformant processor, able to perform validation.
  - The main library goal is to provide an object model to facilitate parsing and processing XBRL documents and taxonomies
  - As a result the initial design does not include a processor for validation nor XBRL consistency rule implementation. This maybe planned for future releases.
- The documentation is not extensive, and the number of examples is not sufficient, which makes implementation more difficult.
  - The documentation does not have complete coverage of the library, in particular the examples do not cover the full list of features to exploit the capabilities of the library. This makes more difficult for a developer community to contribute and use the library to its full potential.

THREATS

- Being mainly a personal initiative, there is a risk that development may be discontinued.
  - The main threats potentially resulting from the use of this library are the absence of known success stories, and an increased likelihood that the product is discontinued (as at present there is only one person responsible for support and backing) the potentially implanted solutions.
  - In the case that the library is adopted in an open source software development the risk could be mitigated with the support of a wider community of developers who could for example combine it with other libraries and continue development.

STRENGTHS

- Excellent support and level of response.
  - The evaluation found a more than acceptable support level and timeframe of response giving guidance on the deployment and the functionality of the library.
- Very good XML integration and Database connectivity.
  - One of the observed strengths of the library, not found in other solutions evaluated, is its design focused on parsing XBRL documents for a quickly and processing features from XML data stores.
- It offers cache level facilities for processing taxonomies.
  - Among its features, it provides several mechanisms for caching different XBRL models into memory. This is particularly appreciated in software solutions that process XBRL documents according to more than one taxonomy or based on a complex DTS (in other solutions the trend is to solve and simplify the model to an only one taxonomy, without using dimension features, for example.).
- The API is very intuitive.
  - The design of the classes and the API invocation is very clear and intuitive, making easy to learn and giving a firm base for building new XBRL functionality and services easily.

OPPORTUNITIES

- It provides a very good base for the creation of new XBRL functionalities and services from scratch.
  - While the documentation is poor the API is clear and intuitive and the support level is good. As a result it seems reasonable to count the easy of use of these classes as an opportunity for building new XBRL functionality and services.

Batavia XBRL Java Library (BXJL) Features

Batavia XBRL Java Library (BXJL)

- Promoter: Batavia Business Reporting (Netherlands).
  - Batavia develops XBRL software components with a high technical level and quality over a range of customer solutions. They supply their source code in their customized developments and adaptation of their libraries.
  - This library is in use in several solutions in the Netherlands. Batavia has also participated in the Netherlands government project.
  - One of the representatives of Batavia, Ron van Ardenne, participates actively in several XBRL International groups such as the XBRL 2.1 specification and maintenance group, searching for and creation errata, corrections and conformance tests, and the XBRL dimension group.
- Batavia provides its library under a temporary evaluation licence (AGPL).

Batavia XBRL Java Library (BXJL) SWOT Analysis

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Batavia XBRL

WEAKNESSES

- Steep learning curve.

STRENGTHS

- A complete solution conforming to XBRL and XDT specifications.
- Very clear and intuitive API
- Fast to deploy and integrate
- Very good performance
- It provides conformance suite testing tools and implementation.

THREATS

- It provides a temporary evaluation licence, not truly an open source initiative.

OPPORTUNITIES

- It provides a very good base for creation of new XBRL functionalities and services from scratch
- It offers a trusted and robust XBRL validator with a minimum cost.

Batavia XBRL Java Library (BXJL)
SWOT Analysis

Batavia XBRL

WEAKNESSES

- Steep learning curve.
  - The documentation is oriented towards a very skilled programmers with some experience in using the XBRL standard. This implies a target community of developers which is currently only small.
  - The design of the library is complex and the architecture is difficult to overcome. The potential community of developers working on current XBRL integration projects find it difficult to use and extend the XBRL functionality and services.

Batavia XBRL Java Library (BXJL)
SWOT Analysis

Batavia XBRL

THREATS

- It provides a temporary evaluation licence, not truly an open source initiative.
  - While at a first sight it seems to be an open source software development, this initiative is distributed under a temporary evaluation licence, without initial access to source code of the library.
  - In the case a community decided to use this library in an open source development a custom licence would need to be acquired from Batavia. This poses a risk in a wider development community, such as the C³ (ce-cube) proposed in this study, is the customised licence does not suit all purposes.

Batavia XBRL Java Library (BXJL) SWOT Analysis

Batavia XBRL

STRENGH

- A complete solution conforming to XBRL and XDT specifications.
  - The tests performed indicate that the library has been implemented with a full conformance to the XBRL and XBRL Dimension specifications. This allows the user to confidently rely on the API leaving without needing to directly worry about the standards focusing on the project requirements.
- Very clear and intuitive API.
  - The design of the classes and the API invocation is very clear and intuitive, making it easy to learn and giving a solid base for building new XBRL functionality and services.
- Fast to put in place and to integrate.
  - The provided examples allow a fast and easy initial deployment of the validation engine.
- Very good performance.
  - The validation engine and the processing of different XBRL instance documents and DTSs tested gave a remarkable result in performance, making this engine a serious candidate as an XBRL open source validator.
- It provides conformance suite testing tools and implementation.
  - It provides conformance suite testing tools for execution and gives documentation to enable easy design of new ones.

Batavia XBRL Java Library (BXJL)
SWOT Analysis

Batavia XBRL

OPPORTUNITIES

- It provides a very good base for the creation of new XBRL functionalities and services from scratch.
  - The design is clear and intuitive allowing for the easy building of new XBRL functionality and services of any type.
- It offers a trusted and robust XBRL validator with a minimum cost.
  - It offers a reliable, trusted and robust high performance XBRL validation engine which can be integrated into a software solution without high development costs.

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Conclusions

Conclusions

- XBRL open source initiatives are scarce.
- xBReeze, from UBMATRIX and Batavia XBRL Java Library (BXJL) are the most complete solutions, in terms of technical criteria, and their XBRL specification support and the XBRL specific features provided.
- The scope of the study does not include the edition and creation of taxonomies and instance documents. One important feature on processing XBRL is the validation engine, where both xBReeze and BXJL libraries includes. The BXJL remarks on XBRL validation, but their licence is not truly open source, dependent upon some type of agreement with Batavia.
- The development which is most focused on an open source community is the XBRLApi.org project, promoted by Galexy. Despite the lack of some XBRL components in the beta version it could be extended with new features and components.
- Although none of the tools evaluated provides all of documentation, ease of use, ease of set up, functionality and performance to the standard of other open source technologies, the combination of these libraries offers a sufficient base for the development of an XBRL service platform or suite for processing and interchange of XBRL documents.
- As the managing and accounting software providers could be interested in the use of any resulting work they should be invited to participate in the initiative to create and evolve these open source libraries.

Tool Integration Diagram applied to Local Administration Entities
Scenario: Budget Settlement using LENLOC taxonomy

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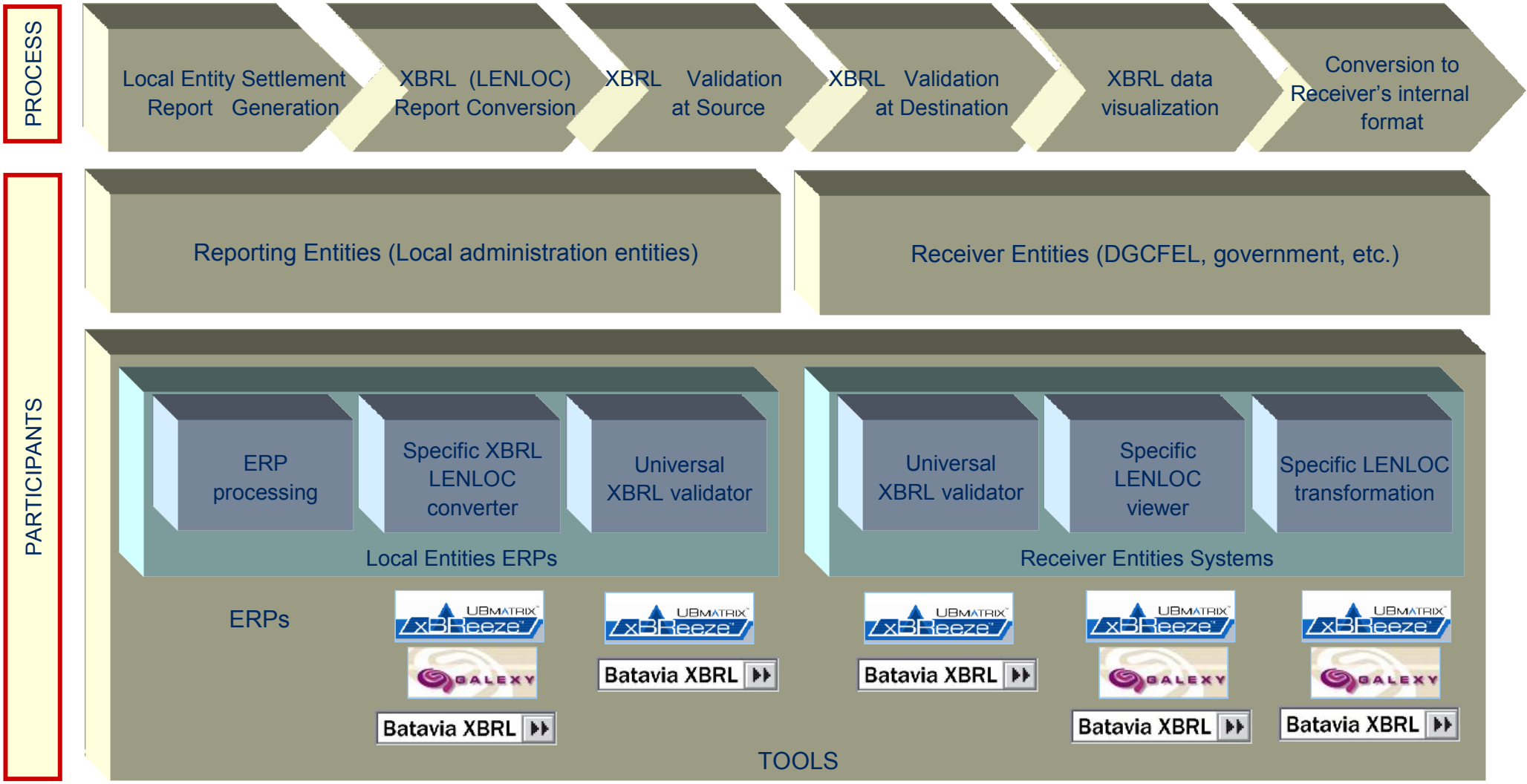

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Appendix I: Preliminary Study Details

Decision matrix
General parameters of the study

General Parameters Diagram

Open Source Library under Evaluation
UBMatrix - xBReeze
Galexy - XBRLAPI.org
Batavia - XBRL Java Library
ABZ Reporting - ABRA XBRL Processor, TaxonomyDoc, TI Viewer
MaxColetti - Taxonomy Generator
Aytos - SICALWIN XBRL Module
T-Systems - TAO-GEDAS XBRL Module

Weight	
100%	4
75%	3
50%	2
25%	1

Rating	
Excellent	5
Very Good	4
Good	3
Medium	2
Poor	1
Non evaluated	0

Criteria	Weight	chapters
1. Commitment and level of platform support	1	9
2. Technical criteria and those related to integration+E	2	6
3. XBRL specification conformance	4	7
4. Specific XBRL features	3	11

An individual score, weighted from 0 to 5, is assigned to each criterion.

Additional to this, each criteria group has an specific weight over the total score.

Criteria: Definition of the preliminary selection and measure scale

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Evaluation Information Detail: Criteria definition and Measure

Objective:	*OpenSource XBRL library evaluation*	
Criteria	**Definition**	**Weight**
1. Commitment and level of platform support		***1***
1.1 Licence type	There is an influence in the software integration depending on the licence type of the library. As there is a variety of types that range from Freeware, Open Source, Public Domain, Apache Software Licence, GNU General Public Licence (GPL), GNU LesserGPL to closed proprietary development.	3
1.2 Existence of promoters	Based on the number of private entities and associations promoting the development of the library, this criteria gives the idea of level of backup to the development. Being important for the use and promotion of the solution that includes this library.	3
1.3 Availability of success stories	Cases in which the library has been integrated in solutions for reporting systems.	2
1.4 Number of Developers in the community	Measure the number of developers that contribute to coding, fixing buds, releasing improvements, documentation and translations. In online communities such as sourceforge some development groups are set by country.	2
1.5 Frequency of new software releases	Evaluate the level of commitment to the last XBRL specification updates using the frequency of new releases and updates of the libraries. This frequency could range from nightly builds to weekly, monthly or anually bases.	2
1.6 Year of last software version released	To be able to identify when an open source initiative has become obsolete or discontinued we use the year of the last release. This value gives an idea of the progress of the development and the conformance to the standard.	3
1.7 Availability of Documentation	When a developer come accross the library the documentation helps in allowing him to make a new contribution in less time. The documents and the formats available are evaluated. The translations to several languages and the documentation update in each library realease including new features is also important.	2
1.8 Support channels (phone, email, forums, rss-feed, ...)	Evaluate the available channels to communicate bugs and solving software issues inside the development and user community.	1
1.9 Participation of the developer community in XBRL Spain or XBRL International working groups	Indicates the degree of participation of some developers in the XBRL standard through observation and discussion follow up on XBRL working groups or similar initiatives.	2

Criteria: Definition of the preliminary selection and measure scale

2. Technical criteria and those related to integration		**2**
2.1 Source code available in multiple programming languages	Indicates the flexibility to integrate the library. The more programming languages the source code is available in, the better the flexibility grade for integration into solutions..	1
2.2 Operating Systems / Platforms supported	Under evaluation is the number of different platforms and operating systems that the library is available in.	3
2.3 Ease of integration	Ease of design and deployment of the library. To be evaluated positevely it should match the following: modularity of the package, the documentation of the architecture, based on design patterns, clearly interfaces and services exposition.	3
2.4 Other open source libraries/tools integration	The majority of open source development libraries are built upon other complementary open source libraries. In this study it could be the case of libraries that implements features such as XML processing, XML Schema validation, XLink processing, XSLT transformations, etc..)	1
2.5 Availability of APIs	This criteria evaluates if the open source library offers a programming interface to extend and deploy the functionality.	3
2.6 IDE integration tools	It is also evaluated if the library has an Integrated Development Environment Tool or integrates in existing ones to combine the common tasks of coding, debugging, deploying and testing such as Eclipse, SharpDevelop, JBuilder2007, SoftwareStudio or VisualStudio2005ExpressEdition, i.e.	2
3. XBRL specification conformance		**4**
3.1 XBRL 2.1 specification compliance	Enable the development of solutions requiring the compliance to XBRL2.1 specification including the last recommended errata correction up to date.	3
3.2 XBRL 2.1 Conformance Suite Test compliance	A fully XBRL coformant processor has to be able to execute a set of conformance test published by XBRL International, which makes possible the interoperable of XBRL processing results. This point evaluates the level of conformance of the processor to the standard XBRL 2.1	2
3.3 XDT 1.0 dimension specification compliance	Enable the development of solutions requiring the compliance to XBRL Dimensionas 1.0 specification including the last recommended errata correction up to date.	3
3.4 XDT 1.0 Conformance Suite Test compliance	Level of conformance of the processor to the standard XBRL Dimensions (XDT) 1.0	2
3.5 Formula specification (Candidate Recommendation) support	Level of support in the libraries to the XBRL Formula and Functions specifications	2
3.6 Formula Conformance Suite Test support	Level of conformance of the processor to the XBRL Formula and Functions specification	1
3.7 Versioning specification support	Level of support in the libraries to the XBRL Versioning specification	1

Criteria: Definition of the preliminary selection and measure scale

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4. Specific XBRL features		3
4.1 Transformation formats implemented	XML document Transformation supported (i.e. XSLT v1.0 or v2.0)	1
4.2 ETL mechanisms to enable XBRL generation	If there are classes, methods or XML artifacts to facilitate data extraction to generate XBRL instance documents.	1
4.3 Availability of XBRL APIs	It will be evaluated if the library offers a clear and encapsulated programming interface for each XBRL functionality.	3
4.4 XBRL processing methods to validate taxonomies	It indicates the availability of classes and methods implementing an XBRL 2.1 validating processor (it would be an extra if it validates additional specifications such as dimensions XDT or FRTA rules).	3
4.5 XBRL processing methods to read/navigate taxonomies	It indicates the availability of classes and methods implementing read and navigate through XBRL 2.1 taxonomies (it would be an extra if it supports hypercubes and dimension domain definitions).	3
4.6 XBRL processing methods to edit taxonomies	It indicates the availability of classes and methods implementing the creation and update of XBRL 2.1 taxonomies (it would be an extra if it supports hypercubes and dimension domain definitions).	1
4.7 XBRL processing methods to validate instance documents	It indicates the availability of classes and methods implementing a validating processor for XBRL 2.1 instance documents (it would be an extra if it supports additional specifiactions such as XDT and FRIS).	3
4.8 XBRL processing methods to edit instance documents	It indicates the availability of classes and methods implementing read and navigate through XBRL 2.1 instance documents (it would be an extra if it supports additional rules such as dimensions, footnote links and tuple management).	3
4.9 XBRL processing methods to read/navigate through instance documents	It indicates the availability of classes and methods implementing the creation of XBRL 2.1 instance documents from an API object model (it would be an extra if it supports additional features such as dimensions, footnote links and tuple management).	2
4.10 XBRL processing methods to execute Formulae and Functions	It indicates the availability of classes and methods implementing the execution of XBRL formulae defined using generic linkbases documents (it would be an extra if it supports function implementation).	1
4.11 XBRL processing methods for taxonomy versioning metadata	It indicates the availability of classes and methods implementing the highlight of different taxonomy versions according to the versioning specification and XBRL Infoset (it would be an extra if it creates diff reports between taxonomy versions).	1

Libraries Technical Information
xBReeze Open Source Edition

xBReeze Open Source Edition

- Promoter: UBMATRIX (USA)
- Open source edition of the commercial XBRL product (GPL Licence)

General Features	
Number of developers in the community	3
promoter existence	yes
Real cases existence	yes
Licence Type	GPL
API Interface	yes
Programming Languages available for the source code	Java,XSL (XSLT/XPath/XSL-FO)
IDE Integration	yes
Number of software releases per year	1
Last Release year date	2007
Other open source library integration	XPath,Xerces, Xalan-j, relaxNG, Log4j
Integration degree (1 hard, 5 very easy)	3
Operating Systems / Platforms supported	32-bit MS Windows (NT/2000/XP), All POSIX
Documentation available	yes
Support	
phone	yes
email	yes
forum	yes
rss feed	yes
Collaboration in XBRL International working groups	
XBRL-dev	no
XBRL-spec	yes
XBRL-formula	yes
XBRL-Versioning	no
XBRL-Rendering	no

Libraries Technical Information
xBReeze Open Source Edition

xBReeze Open Source Edition

- Promoter: UBMATRIX (USA)
- Open source edition of the commercial XBRL product (GPL Licence)

XBRL Features	
XBRL 2.1 Specification conformance	5
passes XBR 2.1 Conformance Suite Test 1.0	5
XBRL Dimensions XDT 1.0 conformance	4
passes the XDT Conformance Suite Test	-
Formula and Funtcion support	-
passes the Formula Conformance Suite Test	-
Versioning spec support	-
ETL support for XBRL transformation	yes
Input Format types supported	Excel CSV, TXT, XML
XBRL API Interface:	yes
XBRL Processing Classes, Methods and Services to validate taxonomies	yes
XBRL Processing Classes, Methods and Services to edit taxonomies	yes
XBRL Processing Classes, Methods and Services to read taxonomies	yes
XBRL Processing Classes, Methods and Services to validate instance documents	yes
XBRL Processing Classes, Methods and Services to edit instance documents	yes
XBRL Processing Classes, Methods and Services to read instance documents	yes
XBRL Processing Classes, Methods and Services to execute formulae and functions	no
XBRL Processing Classes, Methods and Services to create taxonomy versioning reports	no

Libraries Technical Information
XBRLAPI.org

XBRLAPI.org

- Promoter: Galexy Pty. Limited (Australia)
- Hosted in Sourceforge, under LGPL licence

General Features	
Number of developers in the community	1
promoter existence	yes
Real cases existence	no
Licence Type	LGPL
API Interface	yes
Programming Languages available for the source code	Java
IDE Integration	no
Number of software releases per year	>1
Last Release year date	2008
Other open source library integration	XLink, XMLBase, XPointer
Integration degree (1 hard, 5 very easy)	3
Operating Systems / Platforms supported	32-bit MS Windows (NT/2000/XP), All POSIX (Linux/BSD/UNIX-like
Documentation available	yes
Support	
phone	no
email	yes
forum	yes
rss feed	yes
Collaboration in XBRL International working groups	
XBRL-dev	yes
XBRL-spec	yes
XBRL-formula	yes
XBRL-Versioning	yes
XBRL-Rendering	no

Libraries Technical Information
XBRLAPI.org

XBRLAPI.org

- Promoter: Galexy Pty. Limited (Australia)
- Hosted in Sourceforge, under LGPL licence

XBRL Features	
XBRL 2.1 Specification conformance	5
passes XBR 2.1 Conformance Suite Test 1.0	1
XBRL Dimensions XDT 1.0 conformance	3
passes the XDT Conformance Suite Test	-
Formula and Funtcion support	-
passes the Formula Conformance Suite Test	-
Versioning spec support	-
ETL support for XBRL transformation	yes
Input Format types supported	XML DB (Berkeley, eXist, xIndice)
XBRL API Interface:	yes
XBRL Processing Classes, Methods and Services to validate taxonomies	no
XBRL Processing Classes, Methods and Services to edit taxonomies	no
XBRL Processing Classes, Methods and Services to read taxonomies	yes
XBRL Processing Classes, Methods and Services to validate instance documents	no
XBRL Processing Classes, Methods and Services to edit instance documents	no
XBRL Processing Classes, Methods and Services to read instance documents	yes
XBRL Processing Classes, Methods and Services to execute formulae and functions	no
XBRL Processing Classes, Methods and Services to create taxonomy versioning reports	no

Libraries Technical Information
Batavia XBRL Java Library (BXJL)

Batavia XBRL

Batavia XBRL Java Library (BXJL)

- Promoter: Batavia Business Reporting (The Netherlands)
- Batavia offers its XBRL library under an temporary evaluation licence (AGPL)

General Features	
Number of developers in the community	4
promoter existence	yes
Real cases existence	yes
Licence Type	AGPL
API Interface	yes
Programming Languages available for the source code	Java
IDE Integration	yes
Number of software releases per year	1
Last Release year date	2007
Other open source library integration	Commons, JDOM, Sun xsdlib, relaxNG
Integration degree (1 hard, 5 very easy)	4
Operating Systems / Platforms supported	32-bit MS Windows (NT/2000/XP), All POSIX
Documentation available	yes
Support	
phone	yes
email	yes
forum	yes
rss feed	yes
Collaboration in XBRL International working groups	
XBRL-dev	yes
XBRL-spec	yes
XBRL-formula	no
XBRL-Versioning	no
XBRL-Rendering	no

Libraries Technical Information
Batavia XBRL Java Library (BXJL)

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Batavia XBRL

Batavia XBRL Java Library (BXJL)

- Promoter: Batavia Business Reporting (The Netherlands)
- Batavia offers its XBRL library under an temporary evaluation licence (AGPL)

XBRL Features	
XBRL 2.1 Specification conformance	5
passes XBR 2.1 Conformance Suite Test 1.0	5
XBRL Dimensions XDT 1.0 conformance	5
passes the XDT Conformance Suite Test	-
Formula and Funtcion support	-
passes the Formula Conformance Suite Test	-
Versioning spec support	-
ETL support for XBRL transformation	yes
Input Format types supported	CSV, XML
XBRL API Interface:	yes
XBRL Processing Classes, Methods and Services to validate taxonomies	yes
XBRL Processing Classes, Methods and Services to edit taxonomies	yes
XBRL Processing Classes, Methods and Services to read taxonomies	yes
XBRL Processing Classes, Methods and Services to validate instance documents	yes
XBRL Processing Classes, Methods and Services to edit instance documents	yes
XBRL Processing Classes, Methods and Services to read instance documents	yes
XBRL Processing Classes, Methods and Services to execute formulae and functions	no
XBRL Processing Classes, Methods and Services to create taxonomy versioning reports	no

Libraries Technical Information
ABRA XBRL Processor

ABRA XBRL Processor

- Promoter: ABZ Reporting (Germany)
- XBRL processor based on XSLT transformation language
- It is distributed under Apache licence model 2.0

General Features	
Number of developers in the community	2
promoter existence	yes
Real cases existence	yes
Licence Type	Apache 2.0 license
API Interface	yes
Programming Languages available for the source code	(XSLT/XPath/XSL-FO)
IDE Integration	no
Number of software releases per year	<1
Last Release year date	2007
Other open source library integration	saxon, XMLUnit
Integration degree (1 hard, 5 very easy)	2
Operating Systems / Platforms supported	Windows,MAC,Unix
Documentation available	yes
Support	
phone	no
email	yes
forum	yes
rss feed	yes
Collaboration in XBRL International working groups	
XBRL-dev	no
XBRL-spec	no
XBRL-formula	no
XBRL-Versioning	no
XBRL-Rendering	no

Libraries Technical Information
ABRA XBRL Processor

ABRA XBRL Processor

- Promoter: ABZ Reporting (Germany)
- XBRL processor based on XSLT transformation language
- It is distributed under Apache licence model 2.0

XBRL Features	
XBRL 2.1 Specification conformance	5
passes XBR 2.1 Conformance Suite Test 1.0	1
XBRL Dimensions XDT 1.0 conformance	3
passes the XDT Conformance Suite Test	-
Formula and Funtcion support	
passes the Formula Conformance Suite Test	
Versioning spec support	-
ETL support for XBRL transformation	no
Input Format types supported	XML
XBRL API Interface:	yes
XBRL Processing Classes, Methods and Services to validate taxonomies	yes
XBRL Processing Classes, Methods and Services to edit taxonomies	no
XBRL Processing Classes, Methods and Services to read taxonomies	yes
XBRL Processing Classes, Methods and Services to validate instance documents	yes
XBRL Processing Classes, Methods and Services to edit instance documents	no
XBRL Processing Classes, Methods and Services to read instance documents	yes
XBRL Processing Classes, Methods and Services to execute formulae and functions	no
XBRL Processing Classes, Methods and Services to create taxonomy versioning reports	no

Libraries Technical Information
XBRL Taxonomy Generator

SOURCEFORGE.NET

XBRL Taxonomy Generator

- Promoter: Max Coletti (Italia) individual initiative, stored in Sourceforge
- Under GPL Licence

General Features	
Number of developers in the community	2
promoter existence	no
Real cases existence	no
Licence Type	GPL
API Interface	yes
Programming Languages available for the source code	Java
IDE Integration	no
Number of software releases per year	
Last Release year date	2005
Other open source library integration	Saxon 8, Tcl 8.4
Integration degree (1 hard, 5 very easy)	1
Operating Systems / Platforms supported	WindowsXP
Documentation available	no
Support	
phone	no
email	yes
forum	yes
rss feed	yes
Collaboration in XBRL International working groups	
XBRL-dev	no
XBRL-spec	no
XBRL-formula	no
XBRL-Versioning	no
XBRL-Rendering	no

Libraries Technical Information
XBRL Taxonomy Generator

SOURCEFORGE.NET

XBRL Taxonomy Generator

- Promoter: Max Coletti (Italia) individual initiative, stored in Sourceforge
- Under GPL Licence

XBRL Features	
XBRL 2.1 Specification conformance	3
passes XBR 2.1 Conformance Suite Test 1.0	-
XBRL Dimensions XDT 1.0 conformance	2
passes the XDT Conformance Suite Test	-
Formula and Funtcion support	
passes the Formula Conformance Suite Test	
Versioning spec support	
ETL support for XBRL transformation	yes
Input Format types supported	RDBMS (ODBC)
XBRL API Interface:	no
XBRL Processing Classes, Methods and Services to validate taxonomies	no
XBRL Processing Classes, Methods and Services to edit taxonomies	no
XBRL Processing Classes, Methods and Services to read taxonomies	no
XBRL Processing Classes, Methods and Services to validate instance documents	no
XBRL Processing Classes, Methods and Services to edit instance documents	no
XBRL Processing Classes, Methods and Services to read instance documents	no
XBRL Processing Classes, Methods and Services to execute formulae and functions	no
XBRL Processing Classes, Methods and Services to create taxonomy versioning reports	no

Libraries Technical Information
AYTOS

SICALWIN XBRL Module

- Promoter: Aytos CPD (Spain)
- Private Module for XBRL generation of LENLOC taxonomy, embedded in SICALWIN software package.

General Features	
Number of developers in the community	2
promoter existence	yes
Real cases existence	yes
Licence Type	Comercial
API Interface	-
Programming Languages available for the source code	Visual Basic
IDE Integration	yes
Number of software releases per year	
Last Release year date	
Other open source library integration	NS/ND
Integration degree (1 hard, 5 very easy)	-
Operating Systems / Platforms supported	Windows
Documentation available	yes
Support	yes
phone	yes
email	yes
forum	no
rss feed	no
Collaboration in XBRL International working groups	
XBRL-dev	no
XBRL-spec	no
XBRL-formula	no
XBRL-Versioning	no
XBRL-Rendering	no

Libraries Technical Information
AYTOS

SICALWIN XBRL Module

- Promoter: Aytos CPD (Spain)
- Private Module for XBRL generation of LENLOC taxonomy, embedded in SICALWIN software package.

XBRL Features	
XBRL 2.1 Specification conformance	1
passes XBR 2.1 Conformance Suite Test 1.0	-
XBRL Dimensions XDT 1.0 conformance	-
passes the XDT Conformance Suite Test	-
Formula and Funtcion support	-
passes the Formula Conformance Suite Test	-
Versioning spec support	-
ETL support for XBRL transformation	yes
Input Format types supported	RDBMS (ODBC)
XBRL API Interface:	no
XBRL Processing Classes, Methods and Services to validate taxonomies	no
XBRL Processing Classes, Methods and Services to edit taxonomies	no
XBRL Processing Classes, Methods and Services to read taxonomies	no
XBRL Processing Classes, Methods and Services to validate instance documents	no
XBRL Processing Classes, Methods and Services to edit instance documents	no
XBRL Processing Classes, Methods and Services to read instance documents	no
XBRL Processing Classes, Methods and Services to execute formulae and functions	no
XBRL Processing Classes, Methods and Services to create taxonomy versioning reports	no

Preliminary evaluation Decision Matrix
Commitment and platform support level results

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Criteria	Weight	Score	XBReeze	XBRLAPI.org	BXJL	ABRA	Taxonomy Generator	Aytos	T-Systems
1. Commitment and platform support level	*1*	*100*	55	52	49	40	29	22	0
			24	*22*	*22*	*17*	*12*	*9*	*0*
1.1 Licence type	3	15	4	4	2	3	4	1	0
1.2 Existence of promoters	3	15	3	2	3	2	1	3	0
1.3 Availability of success stories	2	10	2	1	2	2	1	2	0
1.4 Number of Developers in the community	2	10	2	1	2	2	1	2	0
1.5 Frequency of new software releases	2	10	1	2	1	1	1	0	0
1.6 Year of last software version released	3	15	3	4	3	3	1	0	0
1.7 Availability of Documentation	2	10	4	2	3	1	1	0	0
1.8 Support type (phone, email, forums, rss-feed, …)	1	5	3	2	3	2	1	0	0
1.9 Participation of the developer community in XBRL Spain or XBRL International working groups	2	10	2	4	3	1	1	1	0

Legend: 5 – Excellent 4 – Very Good 3 – Average 2 – Fair 1 – Poor 0 – Not evaluated

Preliminary evaluation Decision Matrix
Technical criteria and those related to integration results

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Criteria	Weight	Score	XBReeze	XBRLAPI.org	BXJL	ABRA	Taxonomy Generator	Aytos	T-Systems
2. Technical criteria and those related to integration	*2*	*130*	100	94	96	66	48	16	0
			22	*21*	*22*	*15*	*11*	*4*	*0*
2.1 Source code available in multiple programming languages	1	5	3	3	3	2	2	2	0
2.2 Operating Systems / Platforms supported	3	15	4	4	4	3	1	2	0
2.3 Ease of integration	3	15	3	3	4	2	1	0	0
2.4 Other open source libraries/tools integration	1	5	3	4	4	3	2	0	0
2.5 Availability of APIs	3	15	5	5	3	3	4	0	0
2.6 IDE integration tools	2	10	4	2	4	1	1	0	0

Legend: 5 – Excellent 4 – Very Good 3 – Average 2 – Fair 1 – Poor 0 – Not evaluated

Preliminary evaluation Decision Matrix
XBRL specification conformance results

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Criteria	Weight	Score	XBReeze	XBRLAPI.org	BXJL	ABRA	Taxonomy Generator	Aytos	T-Systems
3. XBRL specification conformance	*4*	*280*	204	124	204	100	56	36	0
			21	*12*	*21*	*10*	*6*	*4*	*0*
3.1 XBRL 2.1 specification compliance	3	15	5	5	5	3	1	1	0
3.2 XBRL 2.1 Conformance Suite Test compliance	2	10	5	1	5	1	0	0	0
3.3 XDT 1.0 dimension specification compliance	3	15	5	3	5	3	2	1	0
3.4 XDT 1.0 Conformance Suite Test compliance	2	10	4	1	4	1	1	0	0
3.5 Formula specification (Candidate Recommendation) support	2	10	1	1	1	1	1	1	0
3.6 Formula Conformance Suite Test support	1	5	0	0	0	0	0	0	0
3.7 Versioning specification support	1	5	1	1	1	1	1	1	0

Legend: 5 – Excellent 4 – Very Good 3 – Average 2 – Fair 1 – Poor 0 – Not evaluated

Preliminary evaluation Decision Matrix
Specific XBRL feature criteria results

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Criteria	Weight	Score	XBReeze	XBRLAPI.org	BXJL	ABRA	Taxonomy Generator	Aytos	T-Systems
4. Specific XBRL features	*3*	*330*	258	162	252	180	78	9	0
			36	*23*	*36*	*23*	*13*	*3*	*0*
4.1 Transformation formats implemented	1	5	2	4	3	1	2	2	0
4.2 ETL mechanisms to enable XBRL generation	1	5	3	2	3	1	1	1	0
4.3 Availability of XBRL APIs	3	15	5	3	3	4	3	1	0
4.4 XBRL processing methods to validate taxonomies	3	15	4	1	5	3	1	0	0
4.5 XBRL processing methods to read/navigate taxonomies	3	15	5	5	5	4	2	0	0
4.6 XBRL processing methods to edit taxonomies	1	5	4	1	4	1	3	0	0
4.7 XBRL processing methods to validate instance documents	3	15	5	1	4	3	1	0	0
4.8 XBRL processing methods to edit instance documents	3	15	4	5	4	4	1	0	0
4.9 XBRL processing methods to read/navigate through instance documents	2	10	4	1	4	3	1	0	0
4.10 XBRL processing methods to execute Formulae and Functions	1	5	0	0	0	0	0	0	0
4.11 XBRL processing methods for taxonomy versioning metadata	0	0	0	0	0	0	0	0	0

Legend: 5 – Excellent 4 – Very Good 3 – Average 2 – Fair 1 – Poor 0 – Not evaluated

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Appendix II: SWOT Analysis Details

Description of the tests performed

From the initial research a short list has been collated including the most appropriate tools and libraries identified within the scope of the study for the development of XBRL functionality.

A series of technical tests have been performed on them in order to evaluate technical criteria and put into practice in a simple way the response, development and deployment of the tools using some of the XBRL taxonomies in the area of the study, specifically, the integration features that are expected in a set of APIs to process XBRL documents.

A set of test cases has been created to evaluate this functionality using the Spanish gaap taxonomy PGC-2007, in the public first draft release status, and the taxonomy LENLOC (Budget settlement for local government). Both are modular taxonomies that use dimensional information.

Each of the libraries have been tested using the same platform, Windows Operating system, Eclipse IDE environment and Java programming language. For the tests a project has been created with a main class performing several calls to the library to provide the execution methods to:

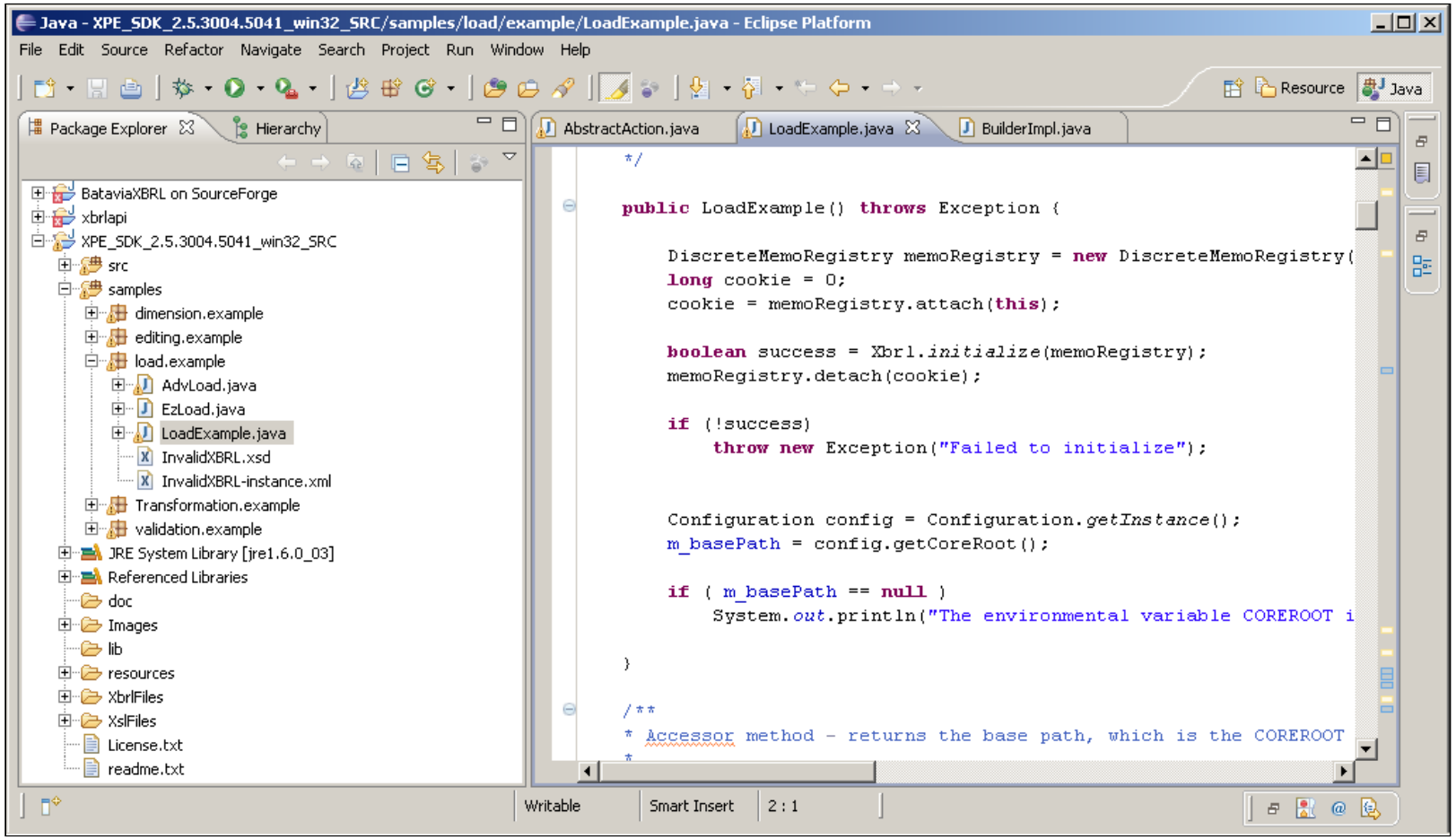
- Validate an XBRL instance document according to the taxonomy, tracing the results and measuring the processing time.
- Read a DTS given an XBRL instance document, listing the contexts and units identified using the methods and objects provided by the library.

Performing these simple tests using those two taxonomies, we have evaluated the ease of use capabilities, the documentation and example quality when available, and the individual features of each library with respect to object model complexity, function extensibility and in the case where direct execution was not available or the ability to solve errors in debug mode when the execution fails, evaluating the traceability level and library support.

Description of the tests performed

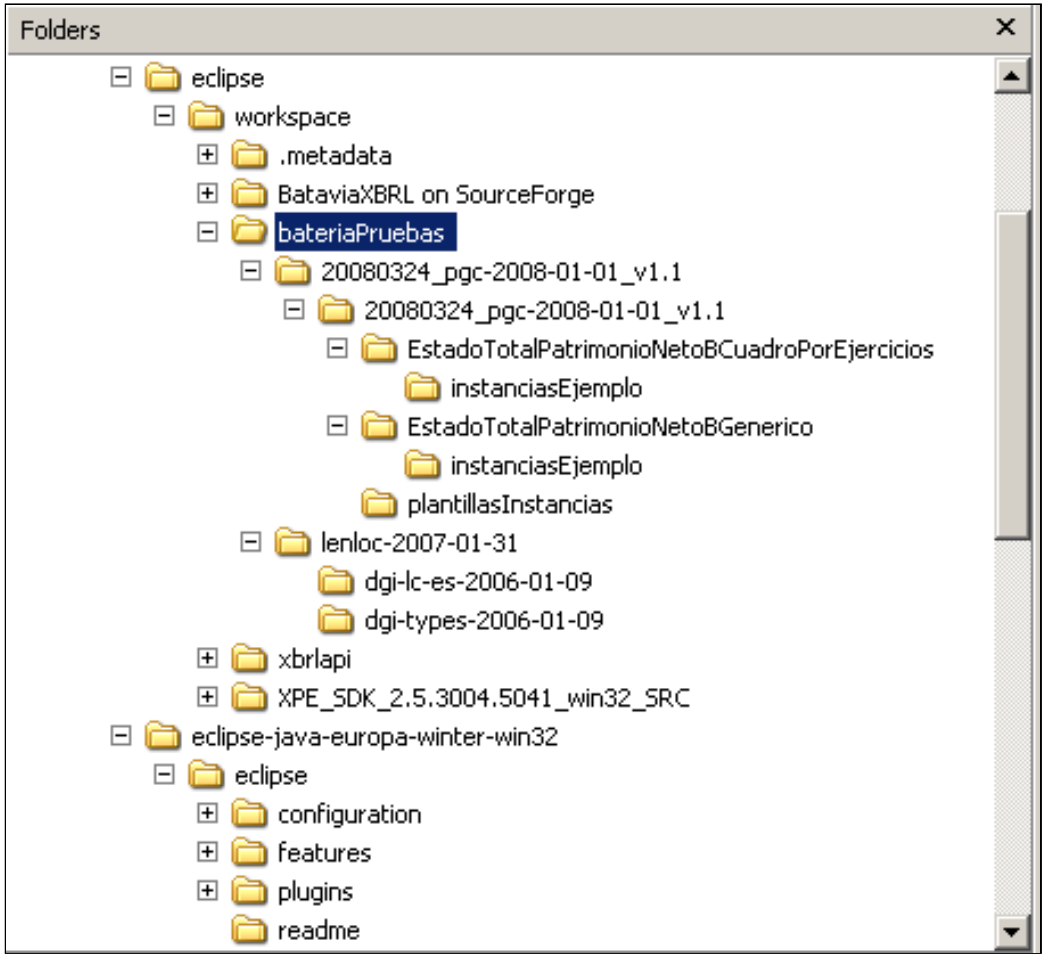
Following is the description of the tests performed, grouped in 5 tests for the PGC2007 taxonomy and 4 for the LENLOC taxonomy.

All of them were executed in a Java Project using the Eclipse IDE.



Description of the tests performed

The resource structure of the test battery passed:



Description of the tests performed: PGC-2007 Taxonomy

- PGC01: Validate *pgc-07-n-m1-balance-2008-01-01.xsd*

  Selected the Normal Balance module on the draft of the Spanish gaap taxonomy PGC-2007, *pgc-07-n-m1-balance-2008-01-01.xsd,* load and validating the XBRL taxonomy module (non dimensional). The test consist of loading from the main class of the program the taxonomy schema and validate it, writing the result in the console.

- PGC02: Validate *pgc07n-etpn-2008-01-01.xsd*

  This test consist of loading a dimensional taxonomy module from the Spanish gaap taxonomy PGC-2007 and validating the XBRL taxonomy. The test performed, similar to the previous one, has been developed from a Main class calling to the methods exposed by the API executing the calls to load the taxonomy, validate and writing the result to the console.

- PGC03: Read an Instance *2007-01-08-instancesampledim2_patnetB_normal.xml*, write context and unit list

  In this test using a Java program, from a main class, an instance XBRL document is loaded, based on the PGC-2007 taxonomy, specifically for the normal dimensional module. After loading it, the program used the required methods and classes available in the library to validate the instance document and to navigate through the library object model listing all the contexts and units of the XBRL instance document, writing the result to the console.

Description of the tests performed: PGC-2007 Taxonomy

- PGC04: Validate instance document *DatosSAGE_14.2_Normal_Balance.xbrl*

  This test consists of loading an instance document of a non dimensional module, such as the Normal Balance, from the Spanish gaap taxonomy PGC-2007. After loading it, the program use the required methods and classes available in the library to validate the instance document and to navigate through the library object model listing all the contexts and units from the XBRL instance document, writing the result to the console.

- PGC05: Validate instance document *PlantillaInstanciaPGC2007_Normal.xbrl*

  This test consists of loading an instance document according to the Spanish gaap taxonomy PGC-2007. Similar to the previous tests, the program is calling the required methods and classes available in the library to validate the instance document and to navigate through the library object model listing all the contexts and units from the XBRL instance document, writing the result to the console.

Description of the tests performed: PGC-2007 Taxonomy xBReeze Open Source Edition

Test	result	result log
PGC01	validation OK	N/A
PGC02	Validation OK	N/A
PGC03	Navigate through context and unit writing the information	******** CONTEXTOS ********** ..... <xbrli:context id="Y2008_SaldoAjustadoInicioEjercicioActualOperacionesSociosOperacionesPropietariosOtrasOperacionesSociosOperacionesPropietarios" xmlns:xbrli="http://www.xbrl.org/2003/instance"> <xbrli:entity> <xbrli:identifier scheme="http://www.acme.es">Acme, S.A.</xbrli:identifier> </xbrli:entity> <xbrli:period> <xbrli:instant>2008-12-31</xbrli:instant> </xbrli:period> <xbrli:scenario> <xbrldi:explicitMember dimension="pgc07cbs-dvs:SaldoDimension" xmlns:xbrldi="http://xbrl.org/2006/xbrldi">pgc07cbs-dvs:SaldoAjustadoInicioEjercicioActualOperacionesSociosOperacionesPropietariosOtrasOperacionesSociosOperacionesPropietarios</xbrldi:explicitMember> </xbrli:scenario> </xbrli:context> ..... ******** UNIDADES ********** <xbrli:unit id="euro" xmlns:xbrli="http://www.xbrl.org/2003/instance"> <xbrli:measure>iso4217:EUR</xbrli:measure> </xbrli:unit>
PGC04	Validation ERROR	..... '-452638.50' is not facet-valid with respect to minInclusive '0.0' for type 'null'. ... ' must have no element [children], and the value must be valid...
PGC05	Validation OK	N/A

Description of the tests performed: PGC-2007 Taxonomy Batavia XBRL Java Library (BXJL)

Batavia XBRL

Test	result	result log
PGC01	Validation ERROR	..... Concept Item 'pgc-07-c-na:ActivoCorrienteActivosNoCorrientesMantenidosParaVenta' has a balance attibute thus MUST have a type attribute value of monetaryItemType. ...
PGC02	Validation ERROR	..... pgc07cbs-dvs:SaldoAjustadoInicioEjercicioActualOperacionesSociosOperacionesPropietariosAumentosCapital' has a balance attibute thus MUST have a type attribute value of monetaryItemType. .....
PGC03	Navigate through context and unit writing the information	****** Errores de validación ******* ..... pgc07cbs-dvs:SaldoAjustadoInicioEjercicioActualOperacionesSociosOperacionesPropietariosDistribucionDividendos' has a balance attibute thus MUST have a type attribute value of monetaryItemType. ..... ******** UNIDADES ********** <xbrli:unit xmlns:xbrli="http://www.xbrl.org/2003/instance" id="euro"> <xbrli:measure>iso4217:EUR</xbrli:measure> </xbrli:unit> ******** CONTEXTOS ********** <xbrli:context xmlns:xbrli="http://www.xbrl.org/2003/instance" id="Y2006_SaldoFinalEjercicioAnterior"> <xbrli:entity> <xbrli:identifier scheme="http://www.acme.es">Acme, s.a</xbrli:identifier> </xbrli:entity> <xbrli:period> <xbrli:instant>2006-12-31</xbrli:instant> </xbrli:period> ...
PGC04	Validation ERROR	..... may NOT have children 'pgc-07-n:ActivoNoCorrienteInversionesLargoPlazoEmpresasGrupoEmpresasAsociadasOtrosActivosFinancieros' (sche_XmlSchemaError). ....
PGC05	Validation ERROR	..... Concept Item 'pgc-07-n-fe:EstadoFlujosEfectivoActividadesExplotacionAjustesResultadoAmortizacionInmovilizado' has a balance attibute thus MUST have a type attribute value of monetaryItemType. ....

Description of the tests performed: PGC-2007 Taxonomy XBRLAPI.org

Test	result	result log
PGC01	N/A	N/A
PGC02	N/A	N/A
PGC03	Navigate through context and unit writing the information	********** CONTEXTOS ********** ..... Contexto: ID=Y2008_SaldoAjustadoInicioEjercicioActualOperacionesSociosOperacionesPropietariosDistribucionDividendos Contexto: ID=Y2008_SaldoAjustadoInicioEjercicioActualOperacionesSociosOperacionesPropietariosOperacionesAccionesParticipacionesPropias Contexto: ID=Y2008_SaldoAjustadoInicioEjercicioActualOperacionesSociosOperacionesPropietariosIncrementoReduccionPatrimonioNetoResultanteCombinacionNegocios Contexto: ID=Y2008_SaldoAjustadoInicioEjercicioActualOperacionesSociosOperacionesPropietariosOtrasOperacionesSociosOperacionesPropietarios ********** UNIDADES ********** UNIDAD ID= euro...
PGC04	N/A	N/A
PGC05	N/A	N/A

Description of the tests performed: LENLOC Taxonomy

- LEN01: Validate *lenloc-ord-2007-01-31.xsd*

  From the LENLOC taxonomy, selecting the ordinary reporting module, execute a Java program to load the XBRL taxonomy and validate it. Making use of the main class to the required API library classes and methods, writing the result to the console.

- LEN02: Validate *lenloc-sim-2007-01-31.xsd*

  Similar to the previous test, validate the simplified taxonomy schema of LENLOC from a Java program., executing the required calls to the API library methods and writing the result to the console.

- LEN03: Load, Validate, Navigate instance document *mod_ord_1.xbrl*, listing contexts and units

  In this test we developed a Java program to load an XBRL instance document of LENLOC, (for the ordinary reporting module). After loading it, using the required library methods it is validated and then we navigate through the information object model listing all the contexts and units included in the instance, writing them to the console.

- LEN04: Load, Validate, Navigate instance document *mod_sim_1.xbrl*, listing contexts and units

  Similar to the previous test, an XBRL instance document is processed (in this case according to the simplified module of LENLOC). After loading it, using the required library methods it is validated and then we navigate through the information object model listing all the contexts and units included in the instance, writing them to the console.

Description of the tests performed: LENLOC Taxonomy xBReeze Open Source Edition

LEN01	Validation ERROR	..... e-props-correct.4: The {type definition} of element 'capitulo' is not validly derived from the {type definition} of the substitutionHead 'link:part', or the {substitution group exclusions} property of 'link:part' does not allow this derivation. ...
LEN02	Validation ERROR	..... cvc-complex-type.2.4.a: Invalid content was found starting with element 'lenloc-ref:articulo'. One of '{"http://www.xbrl.org/2003/linkbase":part}' is expected. .....
LEN03	Navigate through context and unit writing the information	******** CONTEXTOS ********** ..... <xbrli:context id="CTXT_0001_Q0300549C" xmlns:xbrli="http://www.xbrl.org/2003/instance"> <xbrli:entity> <xbrli:identifier scheme="www.00001.com">00001</xbrli:identifier> </xbrli:entity> <xbrli:period> <xbrli:instant>2006-12-31</xbrli:instant> </xbrli:period> <xbrli:scenario> <xbrldi:typedMember dimension="lenloc-ord:CIFDimension" xmlns:xbrldi="http://xbrl.org/2006/xbrldi"> <lenloc-ord:CIF xmlns:lenloc-ord="http://www.meh.es/es/fr/gaap/8-9-1999/lenloc-ord/2007-01-31">Q0300549C</lenloc-ord:CIF> </xbrldi:typedMember> </xbrli:scenario> </xbrli:context> ..... ******** UNIDADES ********** <xbrli:unit id="euro" xmlns:xbrli="http://www.xbrl.org/2003/instance"> <xbrli:measure>iso4217:EUR</xbrli:measure> </xbrli:unit>

Description of the tests performed: LENLOC Taxonomy xBReeze Open Source Edition

LEN04	Navigate through context and unit writing the information	******** CONTEXTOS ******** ..... <xbrli:context id="CTXT_03032AA000_PrestamosRecibidos" xmlns:xbrli="http://www.xbrl.org/2003/instance"> <xbrli:entity> <xbrli:identifier scheme="www.03032AA000.com">03032AA000</xbrli:identifier> </xbrli:entity> <xbrli:period> <xbrli:startDate>2006-01-01</xbrli:startDate> <xbrli:endDate>2006-12-31</xbrli:endDate> </xbrli:period> </xbrli:context> ..... ******** UNIDADES ******** <xbrli:unit id="euro" xmlns:xbrli="http://www.xbrl.org/2003/instance"> <xbrli:measure>iso4217:EUR</xbrli:measure> </xbrli:unit>..

Description of the tests performed: LENLOC Taxonomy Batavia XBRL Java Library (BXJL)

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Batavia XBRL

LEN01	Validation ERROR	..... arcs. This is not valid for the node with id 'DeudoresPagosPendientesAplicacion' in network with role 'http://www.meh.es/es/fr/gaap/8-9-1999/lenloc-ord/2007-01-31/role/DeudoresYPagosOperacionesNoPresupuestarias' because it 'undirected to SaldoRectificaciones'. ...
LEN02	Validation ERROR	..... arcs. This is not valid for the node with id 'DeudoresPagosPendientesAplicacion' in network with role 'http://www.meh.es/es/fr/gaap/8-9-1999/lenloc-sim/2007-01-31/role/DeudoresYPagosOperacionesNoPresupuestarias' because it 'undirected to SaldoRectificaciones'. .....
LEN03	Navigate through context and unit writing the information	..... ******** UNIDADES ********** <xbrli:unit xmlns:xbrli="http://www.xbrl.org/2003/instance" id="euro"> <xbrli:measure>iso4217:EUR</xbrli:measure> </xbrli:unit> ******** CONTEXTOS ********** <xbrli:context xmlns:xbrli="http://www.xbrl.org/2003/instance" id="CTXT_00001_GastosPersonal"> <xbrli:entity> <xbrli:identifier scheme="www.00001.com">00001</xbrli:identifier> </xbrli:entity> <xbrli:period> <xbrli:instant>2006-12-31</xbrli:instant> </xbrli:period> <xbrli:scenario> <xbrldi:explicitMember xmlns:xbrldi="http://xbrl.org/2006/xbrldi" dimension="lenloc-ord:CuentasGastosDimension">lenloc-cta:GastosPersonal</xbrldi:explicitMember> </xbrli:scenario> </xbrli:context>...

Description of the tests performed: LENLOC Taxonomy Batavia XBRL Java Library (BXJL)

Batavia XBRL

LEN04	Navigate through context and unit writing the information	..... ******** UNIDADES ********** <xbrli:unit xmlns:xbrli="http://www.xbrl.org/2003/instance" id="euro"> <xbrli:measure>iso4217:EUR</xbrli:measure> </xbrli:unit> ******** CONTEXTOS ********** <xbrli:context xmlns:xbrli="http://www.xbrl.org/2003/instance" id="CTXT_03032AA000_ImpuestosDirectosA"> <xbrli:entity> <xbrli:identifier scheme="www.03032AA000.com">03032AA000</xbrli:identifier> </xbrli:entity> <xbrli:period> <xbrli:instant>2006-12-31</xbrli:instant> </xbrli:period> <xbrli:scenario> <xbrldi:explicitMember xmlns:xbrldi="http://xbrl.org/2006/xbrldi" dimension="lenloc-ord:CuentasIngresosDimension">lenloc-cta:ImpuestosDirectos</xbrldi:explicitMember> </xbrli:scenario> </xbrli:context>...

Description of the tests performed: LENLOC Taxonomy XBRLAPI.org

LEN01	N/A	N/A
LEN02	N/A	N/A
LEN03	Navigate through context and unit writing the information	********** CONTEXTOS ********** ..... Contexto: ID=CTXT_03032AA000_IngresosTransferenciasCapital Contexto: ID=CTXT_03032AA000_IngresosActivosFinancieros Contexto: ID=CTXT_03032AA000_IngresosPasivosFinancieros Contexto: ID=CTXT_03032AA000_TotalIngresos Contexto: ID=CTXT_03032AA000_AnexoOperacionesNoPresupuestarias_2 Contexto: ID=CTXT_03032AA000_PrestamosRecibidos ********** UNIDADES ********** UNIDAD ID= euro ...
LEN04	Navigate through context and unit writing the information	********** CONTEXTOS ********** ..... Contexto: ID=CTXT_03032AA000_IngresosActivosFinancieros Contexto: ID=CTXT_03032AA000_IngresosPasivosFinancieros Contexto: ID=CTXT_03032AA000_TotalIngresos Contexto: ID=CTXT_03032AA000_AnexoOperacionesNoPresupuestarias_2 Contexto: ID=CTXT_03032AA000_PrestamosRecibidos ********** UNIDADES ********** UNIDAD ID= euro

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Appendix III: List of Terms

List of Terms

- API: Acronym of *Application Programming Interface,* is a set of software components communication specifications. In concrete the set of system calls giving the software processes access to the services of the system. It implements a method to achieve programming abstraction, in general (but not always the case), between lower software layers and the upper ones. One of the main goals of the API is to expose a set of general purpose functions, for example, to draw windows or icons on the screen. Thus, programmers would benefit from API making use of this functionality, saving programming time to develop everything from scratch. APIs are usually abstract in terms of definition while their API software implementation is used in libraries and solutions.
- Cache: In IT terms, a cache is a data set copied from another source, usually costly to access, in comparison to the copied cache (faster in access time). The first time a data is accessed, a copy is placed in the cache; the subsequent accesses are resolved to this copy, reducing the average time.
- Conformance suite: A set of test cases used to verify that the software solutions implementing an standard give the same results to the same inputs. It is widely used to then certify the conformance of software to a technical specification.
- CSV: CSV files (acronym of *comma-separated values*) are a simple document type to represent tabular data, in which columns are separated by commas (or semicolons in those cases where the comma is the decimal separator: i.e: Spain, France, Italy...) and the rows are identified by carriage return. The fields that need to report a comma or a carriage return as a value should be enclosed in double quotation marks.
- SWOT: The SWOT analysis is a methodology to study the competitive situation of an enterprise or solution respect to its market and internal features, in order to inspect their Strengths, Weaknesses, Opportunities and Threats.

List of Terms

- DTS: Is the acronym for *Discoverable Taxonomy Set*, referring to the set of taxonomies that are discovered starting from an XBRL instance document. The DTS concept is important in realizing the XBRL processing of a report. The processors use the DTS to identify the set of rules to validate the documents received.
- ERP: *Enterprise Resource Planning* is a type of management information system that integrates and operates best practice in the production and distribution processes of a company, usually the production of goods or services.
- FRIS: *Financial Reporting Instance Standards* are a set of rules created to help in the comparing and analyzing financial XBRL instance documents.
- FRTA: *Financial Reporting Taxonomy Architecture*, is a document that defines a set of rules created to validate financial taxonomy design best practices.
- IASC: Acronym of the *International Accounting Standards Committee*
- IDE: *Integrated Development Environment*, is a set of programming tools mainly for coding, debugging and testing. They exist for a single programming language or for several. They usually have a set of features including graphical interfaces, code assistants and debugging tools.
- IFRS: *International Financial Reporting Standard*, are the set of recommendations that constitute the international standards for economic activity development. There is an XBRL taxonomy for the IFRS.
- JDOM: Is an open source library for XML data manipulation, optimized for Java.
- Apache 2.0 Licence: Is an open source software licence created by the *Apache Software Foundation* (ASF), that requires *copyright* and *disclaimer* propagation along with the solution that implements and uses this licence, allowing the open source distribution on free and proprietary software.
- AGPL Licence: The *Affero General Public License* is a GPL licence variation that includes a clause that forces the redistribution of the source code to the network users. This means that if someone updates the code of a web application using AGPL they will have to distribute their source code updates to the network of users.

List of Terms

- GPL Licence: The General Public Licence (GNU GPL) is one of the licence types of open source software more widely used. The author reserves the *copyright* and allows the distribution and modification of the code under a predefined terms to guarantee that all the modified software versions preserve the GNU GPL terms. This issue makes it impossible to create a commercial product using GPL components. The whole set of components must be under GPL. In other words, the GNU GPL licence enable the modification and redistribution of software under the same licence.
- LGPL Licence: The *GNU Lesser General Public License is a software licence created by the Free Software Foundation*. The main difference to GPL is that it allows the combination of the software with other non GPL solutions, such as free or commercial software.
- ODBC: *Open Database Connectivity* is an standard to access Databases. The goal is to enable access from any application to any data store, independent of *DataBase Management System (DBMS)* which is being used.
- Open source: Is the term used to name the software developed and freely distributed. The open source applications enable to the user the flexibility to improve them and distribute their updates.
- RDBMS: *Relational DataBase Management System.*
- RSS: Is a data format used to communicate information to the user upon subscription to a web site. The format allow to distribute the content without the need to use a browser, using a software designed to read those RSS messages. The last versions of the common used browsers can read RSS without additional software.
- Saxon: It is a library package to process XML, XSLT and XQuery, written by Michael Kay. It distributes a basic open source edition in Java and and also several commercial licences in Java and .NET
- Sourceforge: Sourceforge.net is a community development website that manages a wide range of open source projects and operates as a tool and repository of open source programs.
- Tcl: *Tool Command Language*, is an script language mainly used for rapid prototyping, graphical interfaces and testing.

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- TIC: Is the Spanish acronym for the *Information and Communication Technologies*, related to the study, development, implementation, storage and distribution using hardware and software as the communication channel.
- Tuple: Element type of an XBRL taxonomy consisting of a data structure that groups simple item elements together that would not be meaningful if they were independently reported.
- Xalan: XSLT Proccessing application, developed as part of the *Apache Software Foundation* community of XML projects.
- XBRL Simple: XBRL dialect, 100 % conformant to XBRL specification, that defines some usage patterns of XBRL components, oriented towards improving the standard usability in the business users.
- XDT: *XBRL Dimensional Taxonomies*, is the specification that describes how to define and represent multi dimensional information using XBRL Taxonomies.
- Xerces: XML processor, member of the *Apache Software Foundation* XML project family
- XLink: XLink or XML Linking language is a *World Wide Web Consortium* (W3C) recommendation that allow to create XML elements describing relationships between document, images and other files in Internet or another networks. Thus, XLink allows the creation of connections between several documents to aggregate information about a concept (metadata) or to create and describe documents for a concept in multiple locations.
- XML: *eXtensible Markup Language* is an extensible metalanguage developed by the *World Wide Web Consortium* (W3C) based on tags or markups. It is a simplification and adaptation of SGML (as HTML is) and allows the definition of specific language grammars. Thus XML is not a particular language, but a mechanism to define languages that fits several needs. To name a few languages that uses XML in their definition: XHTML, SVG, MathML, etc.

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- XML Schema: Is a schema language used to describe the structure and type restrictions of XML documents more strictly than the base specification allowing the definition and validation of XML languages. It was developed by the *World Wide Web Consortium* (W3C) and became a recommendation in May 2001.
- XPath: XPath (*XML Path Language*) is a language using a syntax that allows the selection of a subset of information from an XML document. It is similar to regular expression languages that select text characters (*plain text*). XPath allows the searching and selection of data across the hierarchical structure of XML model. It also contains a full set of processing functions.
- XPointer: Is a W3C standard used to uniquely identify XML document fragments creating useable links to them. The XPointer specification offers a mechanism to locate XML documents according to their internal structure, enabling the analysis of the hierarchical structure while selecting the components such as elements, attribute values, character data and relative position.
- XSL-FO: An XSL-FO document is an XML document in which it is specified the formatting of data for representation on a screen, in a paper or other media. The meaning of XSL-FO is *eXtensible Stylesheet Language Formatting Objects*. It is worth noting that an XSL-FO document includes both the data and the format to be applied.
- XSLT: XSLT or *XSL Transformations* is a W3C standard that defines a mechanism for the transformation of XML documents into other XML Documents or into other formats. The XSLT stylesheet documents (this term is not used exclusively for the transformation process of XSLT) transform a given input document using several template rules: These template rules added to the input document, are processed by an XSLT engine, which executes the indicated transformations to the input placing the result in an output file or, in the case of a web page, displayed in the presentation device, such as the browser.

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