



open source xbrl platform

# **XBRL Tutorial**

## **Arelle<sup>®</sup> Tool**

24 Nov 2014

# Topics

- Installation
- Validation (GUI, CmdLine, Webservice)
- Saving to files, import Excel to DTS
- Databases
- Plug-ins (existing, developing)
- Packages (and remappings)
- Performance & Profiling
- Integration (Java, C#, other)
- Testing

# Installation

- Application installers
  - Windows installer exe from website
  - Unix: Mac .dmg installer
  - Linux/Solaris zip
- Python sources
  - [gitHub.com/arelle](https://github.com/arelle)
  - Issues reports: [arelle.atlassian.net](https://arelle.atlassian.net)
  - Python 3.3+ packages: lxml, regex, isodate, gzip, zlib
    - Windows from: [www.lfd.uci.edu/~gohlke/pythonlibs/](http://www.lfd.uci.edu/~gohlke/pythonlibs/)
    - Others: easy\_install-3.3 {package}
  - Plugins: rdflib, pg8000, pymysql, sqlite3, pyodbc
  - Distribution: cx\_Freeze

# Validation, SEC/SBR

- Select disclosure system (SEC, SBR)
- Check (✓) Disclosure system checks if SEC, SBR
- File – open (📁)
  - A single file or a zip archive
- Validate (⚖️)

# Validation, Command Line

arelleCmdLine -f "file name" -v  
--disclosureSystem efm-pragmatic

- File name can be URL, local file, or path into a zip archive (e.g., ...foo.zip/bar.xml)
- Looks inside file to determine whether
  - Instance, inline XBRL
  - DTS file (schema, linkbase)
  - Testcase file, testcase index file

# Validation, Web Service

Start web service (bat or sh file)

<http://localhost:8080/help> (for details)

Simple validation:

[http://localhost:8080/rest/xbml/validation?  
file=c:/a/b/c.xbml](http://localhost:8080/rest/xbml/validation?file=c:/a/b/c.xbml)

# Validations, EBA/EIOPA

Supported Options		Validation Basis		Streaming	Formula
		DTS	DPM DB		
Arelle	GUI				
	Command Line				
	Web Service				
T4U	Native				
	with Arelle without DTS				
	with Arelle using DTS				





## Saving to csv, html, xml...

arelleCmdLine -f "file name"

--concepts filename.{csv, html, xml, ...}

--pre {f} --cal {f} --dim {f} --formulae {f}

--viewArcrole {arcrole} --viewFile {f}

--roleTypes {f} --arcroleTypes {f}

--logFile f.{xml, json, ...} --log{Level|Code}Filter

--internetConnectivity {online|offline}

# Excel Plug-in

- Create [extension] taxonomies from Excel
  - XBRL-US, IFRS, EDINET, bare taxonomy
- Plug-in:
  - Save XBRL DTS into Excel
  - Load/validate from Excel
  - Save from Excel into XBRL files

# Excel example

Link role

Concepts

Sheet 1: Taxonomy

Property Plant Equipment Extended Link												
科目分類	冗長ラベル(英語)	名前空間プレフィックス	要素名	type	substitutionGroup	periodType	balance	abstract	depth	calculation parent	calculation weight	
B	Property, Plant, and Equipment, Net, Movements [Abstract]	test	PPENetAbstract	xbrli:stringItemType	xbrli:item	instant		true	0			
B	Property, Plant, and Equipment, Net	test	PPENet	xbrli:monetaryItemType	xbrli:item	instant		false	1			
B	Land	test	Land	xbrli:monetaryItemType	xbrli:item	instant		false	2	test:PPENet		1
B	Buildings, Net	test	Bldg	xbrli:monetaryItemType	xbrli:item	instant	debit	false	2	test:PPENet		1
B	Furniture and Fixtures, Net	test	Furn	xbrli:monetaryItemType	xbrli:item	instant		false	2	test:PPENet		1
B	Computer Equipment, Net	test	CompEq	xbrli:monetaryItemType	xbrli:item	instant	debit	false	2	test:PPENet		1
B	Other Property, Plant, and Equipment, Net	test	OtherProp	xbrli:monetaryItemType	xbrli:item	instant	debit	false	2	test:PPENet		1

specification	file type	prefix (schema) type (linkbase) argument (other)	file, href or role definition	namespace URI
extension	schema	test	test.xsd	http://abc.com/test
extension	linkbase	presentation	test-pre.xml	
extension	linkbase	calculation	test-cal.xml	
extension	linkbase	label en	test-lab.xml	
extension	role		Property Plant Equipment Extended Link	http://abc.com/role/PPE

Extension files

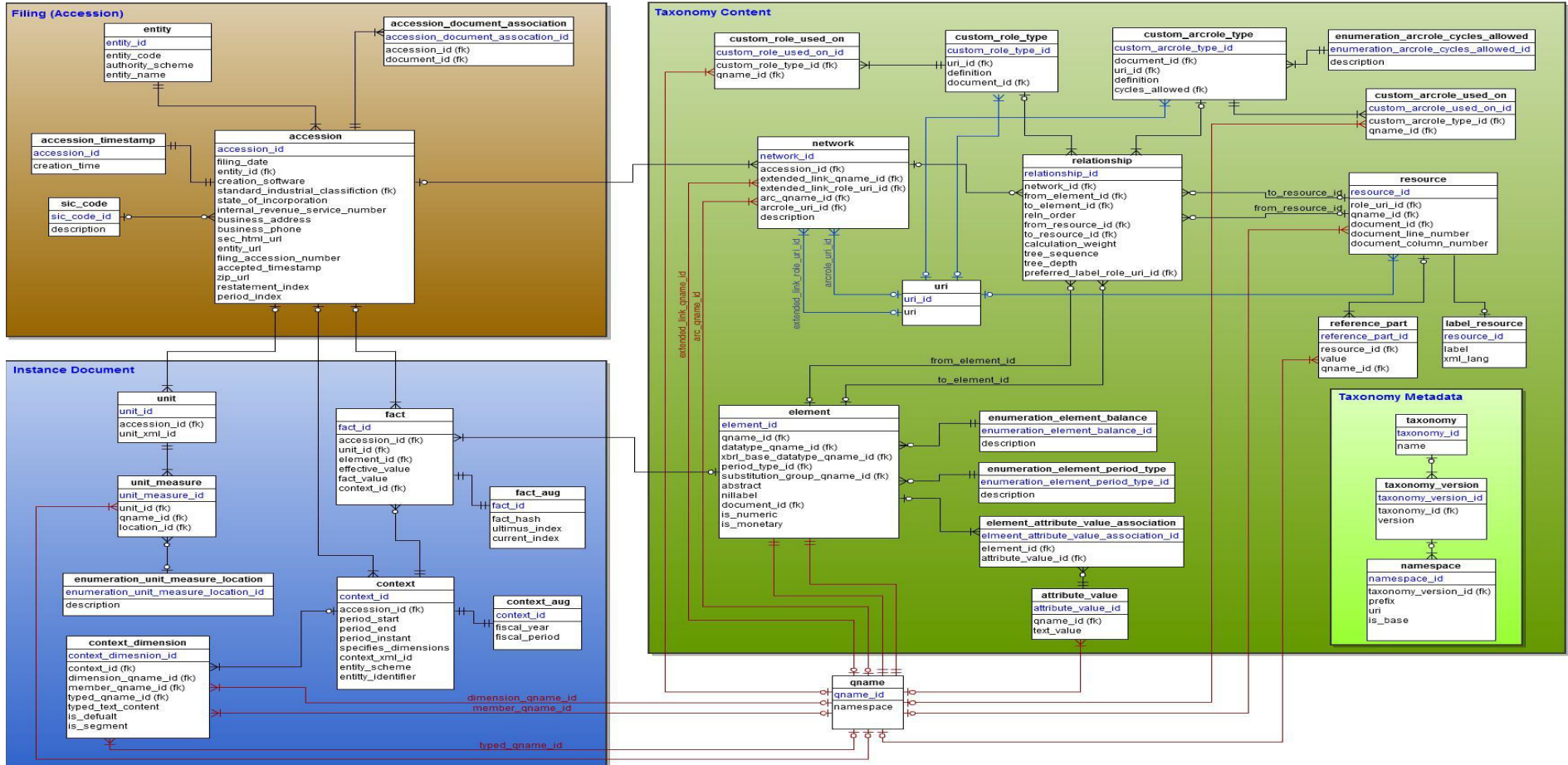
Extension link role

Sheet 2: Import and extension parameters

# Databases Support

- Bulk load & update database
  - From SEC RSS, UK & FSA websites
  - From GUI, files & scripts
- Database Schemas:
  - XBRL-US Public
    - Postgres only
  - XBRL Abstract Model
    - SQL (Postgres, SQLite, MySQL, MS SQL, Oracle)
    - Graph (Cassandra, RDF, JSON)
  - DPM Database (EIOPA T4U integrated)

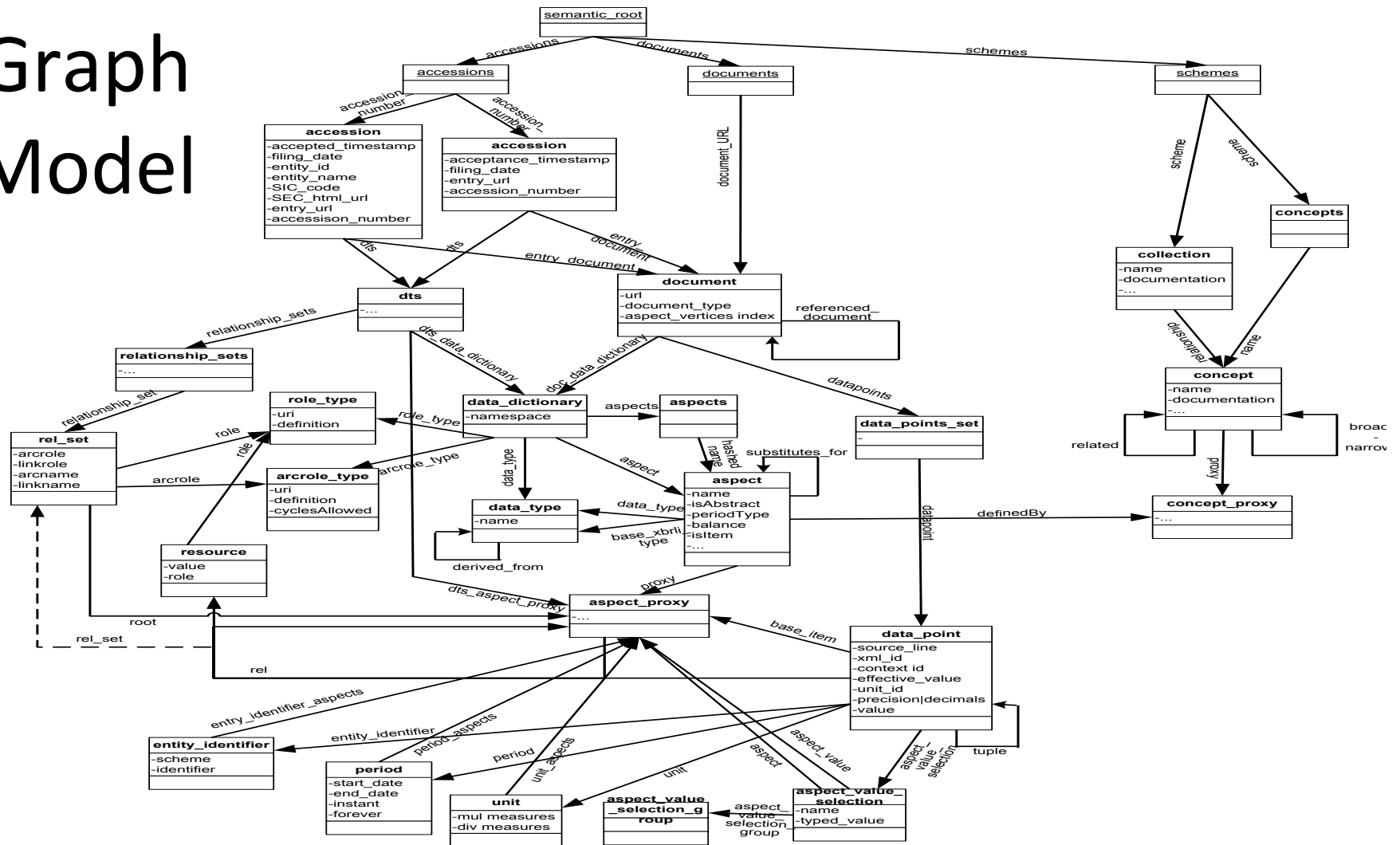
# XBRL-US Public schema



# Installing XBRL-US Postgres DB

- Install Postgres
  - Create database, user, password, load DDL
- Install Arelle & xbrlDB plugin
- Run *RSS feeds* or cmd scripts
  - `arelleCmdLine -f c:\temp\test.rss -v --disclosureSystem efm-pragmatic-all-years --store-to-XBRL-DB "host, port, user, pwd, database, 90, postgres"`

# Graph Model



# Graph Databases

- Social networking technology (Facebook)
  - Rexter interface, Titan data store
  - Multiple backends (Cassandra, HBase)
  - Gremlin / Groovy query (tinkerpop)
- Run *RSS feeds* or cmd scripts
  - `arelleCmdLine -f c:\temp\test.rss -v -- disclosureSystem efm-pragmatic-all-years -- store-to-XBRL-DB "host, port, user, pwd, database, 90, rexter"`



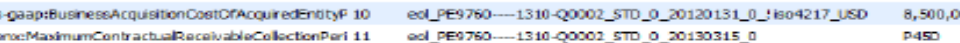


## Gremlin graph query

```
['rows':g.v(132005).out('entry_document')
.out('data_points').out('data_point')
.order(it.a.source_line <=> it.b.source_line)
.as('data').as('id').select{it.id}{
[it.name,
it.source_line,
it.context?:'',
it.unit?:'',
it.effective_value?:it.value?:'']}]
```

### Json result

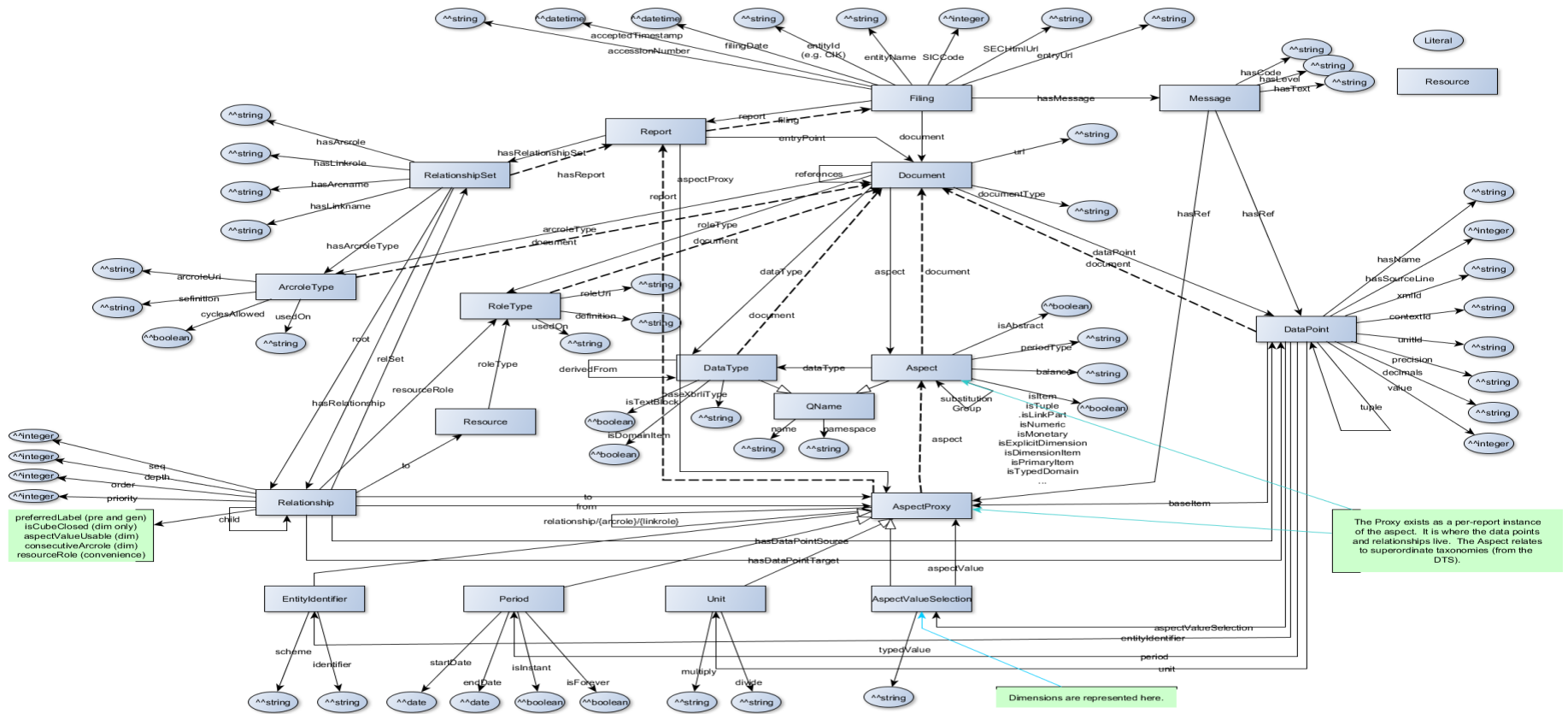
```
{
  "rows": [
    {
      "id": "134195",
      "data": [
        {
          "dei": "EntityCommonStockSharesOutstanding",
          "9",
          "eol_PE9760---1310-Q0002_STD_0_20130402_0",
          "shares",
          "12,418,428"
        }
      ]
    },
    {
      "id": "134197",
      "data": [
        {
          "us-gaap": "BusinessAcquisitionCostOfAcquired...",
          "10",
          "eol_PE9760---1310-Q0002_STD_0_20120131...",
          "iso4217_USD",
          "8,500,000"
        }
      ]
    }
  ]
}
```



The screenshot shows the Arelle XBRL viewer interface. The 'Fact List' table is displayed with the following data:

Name	Line	ContextRef	Unit	Value
dei:EntityCommonStockSharesOutstanding	9	eol_PE9760----1310-Q0002_STD_0_20130402_0	shares	12,418,428
us-gaap:BusinessAcquisitionCostOfAcquiredEntityP	10	eol_PE9760----1310-Q0002_STD_0_20120131_0	iso4217_USD	8,500,000
peroc:MaximumContractualReceivableCollectionPeri	11	eol_PE9760----1310-Q0002_STD_0_20130315_0	P4SD	
peroc:ContractualLitigationSettlementReceivableNe	12	eol_PE9760----1310-Q0002_STD_0_20130315_0	iso4217_USD	2,100,000

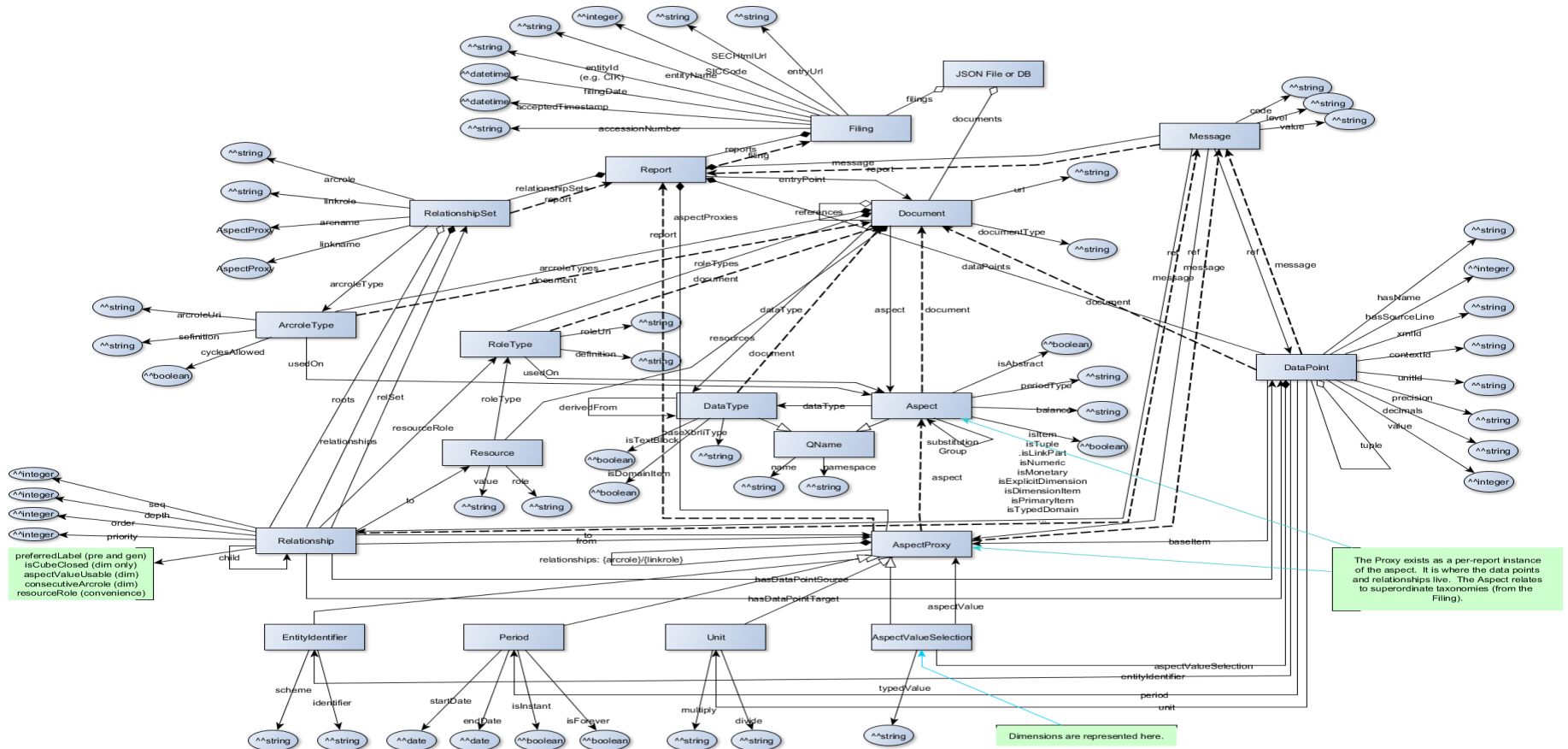
# RDF Model



# Storing into to RDF

- RDF stores
  - Files (turtle, XML)
  - Database NanoSparqlServer
- Run *RSS feeds* or cmd scripts
  - `arelleCmdLine -f c:\temp\test.rss -v - disclosureSystem efm-pragmatic-all-years -- store-to-XBRL-DB rdfFile,,,, c:\abc \test.turtle,600,rdfDB"`

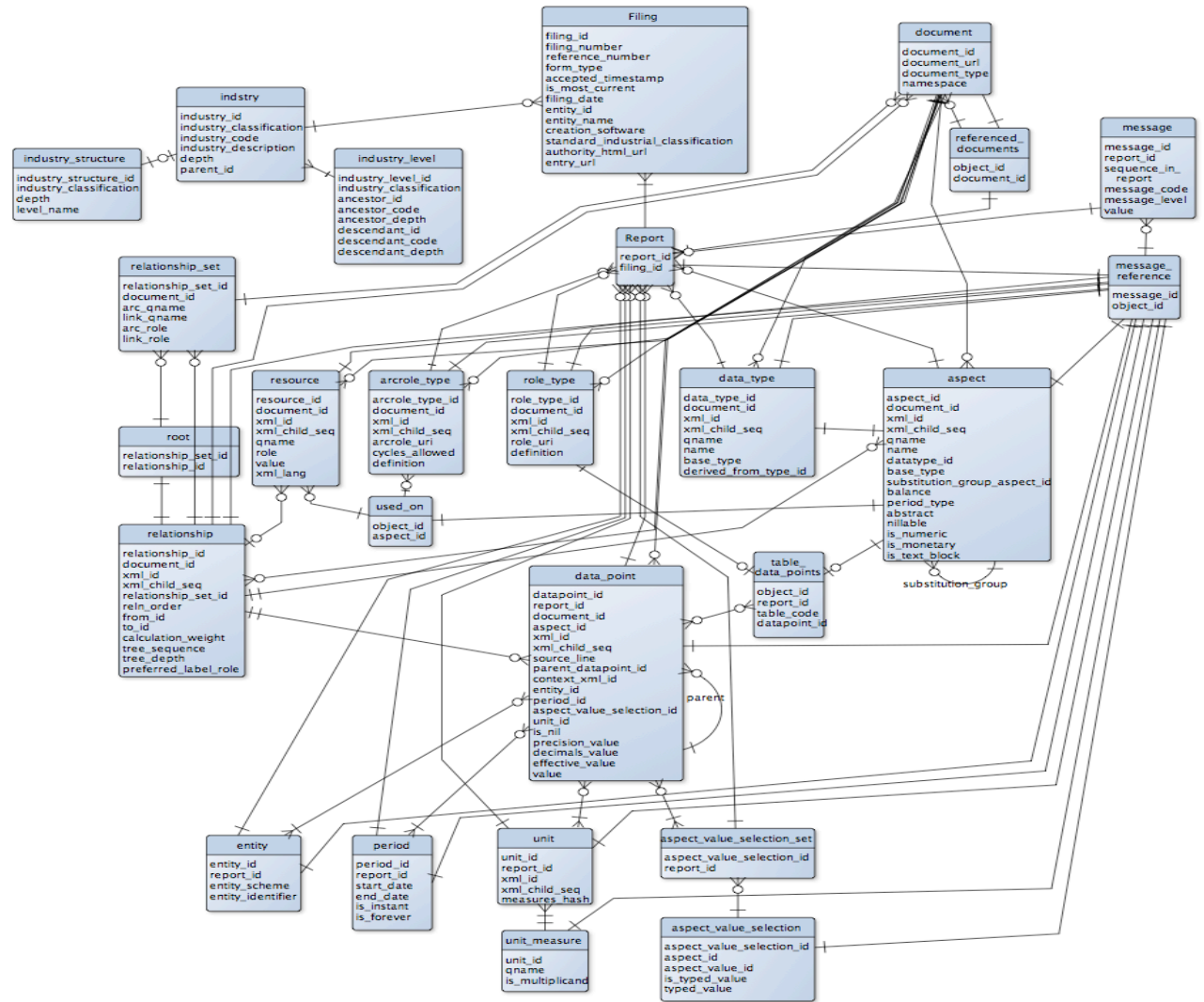
# JSON Model



# Storing into JSON Database

- JSON file syntax
  - MongoDB interesting, size issues
- Run *RSS feeds* or cmd scripts
  - `arelleCmdLine -f c:\temp\test.rss -v -disclosureSystem efm-pragmatic-all-years --store-to-XBRL-DB jsonFile,,,, c:\abc\test.json,600,json"`

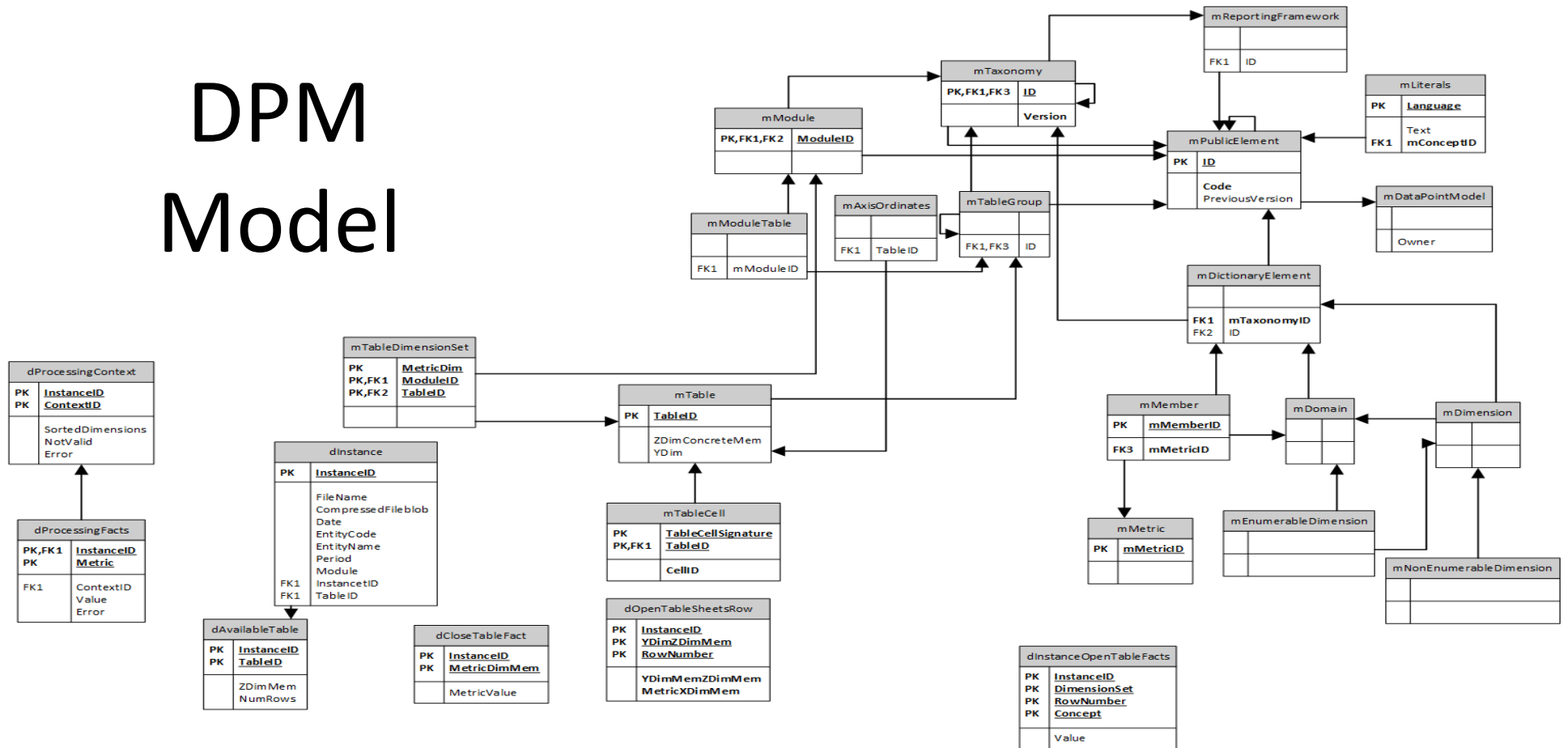
# SQL Abstract Model



# Storing into SQL

- **Postgres, SQLite, MySQL, MSSQL & Oracle**
  - `arelleCmdLine -f c:\temp\test.rss -v - disclosureSystem efm-pragmatic-all-years -- store-to-XBRL-DB host,port,user,pwd,database600,pgSemantic`
    - `pgSemantic` - Postgres
    - `mysqlSemantic` - MySql & Cloud SQL (GAE)
    - `mssqlSemantic` - MS SQL Server (2011)
    - `orclSemantic` - Oracle 11g
    - `sqliteSemantic` - SQLite

# DPM Model

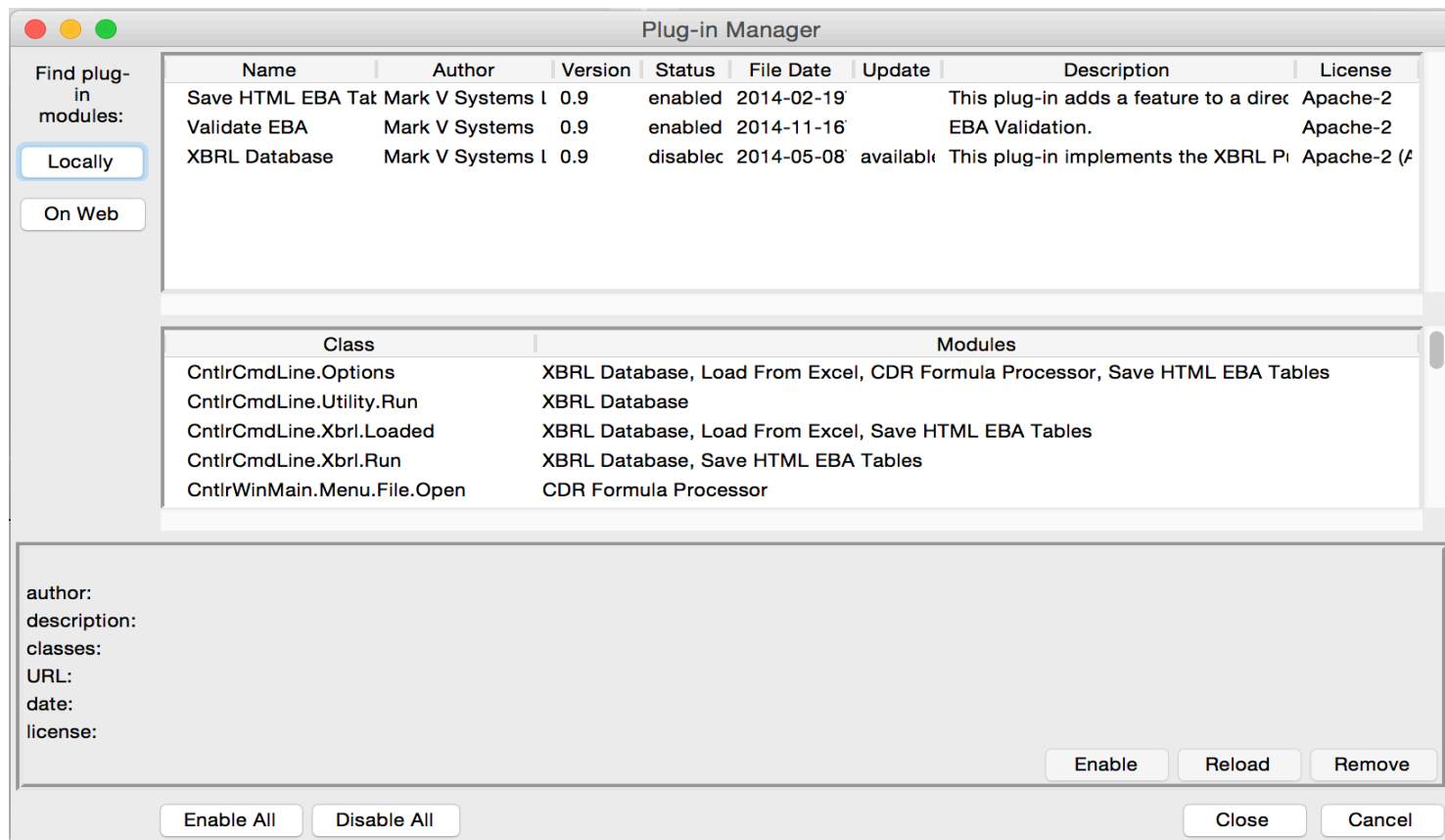




# Plug-ins

- GUI
- Command line
- Standard plug-ins
- Developing custom plug-ins

# Plug-in Manager



# Command Line Plug-in Use

- --plugins=PLUGINS
- Modify plug-in configuration.
  - Re-save unless 'temp' is in the module list.
  - 'show' to show current plug-in configuration.
  - '|' separator (multiple plugins and commands)
  - +url to add plug-in by its url or filename, (relative to installation plugin directory)
  - ~name to reload a plug-in by its name,
  - -name to remove a plug-in by its name
  - name for temporary plug-in (not saved)

# Writing a Plug In

- Production code in .../plugin
- Examples in ...examples/plugin
- Structure:
  - Methods for plugin
  - CmdLine & GUI interfaces
  - \_\_pluginInfo\_\_ : plug-in class methods
- Plugin is always distributed in source

# Packages

- Zip manifests (Oasis Catalog, XII Package)
  - (currently only first oasis catalog is found)
- Entry points named in Package manifest
- URL redirection catalog entries
  - Eliminate copying into cache
  - Support multiple packaged versions

# Package Manager

Find taxonomy packages:

Locally

On Web

Manifest

Name	Version	Status	File Date	Update	Description
XBRL.org files	1.0.0.0	enabled	2014-09-18T16:53:28 UTC		Files related to XBRL specifications :
W3C files	2001	enabled	2014-09-18T16:53:28 UTC		Files related to XML specifications.
Asset Encumbrance	1.0.0.0	enabled	2014-09-18T17:26:45 UTC		Asset Encumbrance 2014-03 (1.0.0).
Eurofiling	Unknown	enabled	2014-09-18T16:53:28 UTC		
Solvency II Dictionary	solvency2/2014-07-23-v1.5.2	enabled	2014-09-18T17:26:45 UTC		

Prefix	Remapping
http://eiopa.europa.eu/eu/xbrl/s2c/dict/	/Users/hermf/Documents/mvsl/projects/EIOPA/xbrt/6. Windows T4U/SolvencyII.UI/SolvencyII
http://eiopa.europa.eu/eu/xbrl/s2hd/dict/m	/Users/hermf/Documents/mvsl/projects/EIOPA/xbrt/6. Windows T4U/SolvencyII.UI/SolvencyII
http://eiopa.europa.eu/eu/xbrl/s2md/dict/r	/Users/hermf/Documents/mvsl/projects/EIOPA/xbrt/6. Windows T4U/SolvencyII.UI/SolvencyII
http://eiopa.europa.eu/eu/xbrl/s2md/fws/	/Users/hermf/Documents/mvsl/projects/EIOPA/xbrt/6. Windows T4U/SolvencyII.UI/SolvencyII
http://www.eba.europa.eu/eu/fr/xbrl/crr/dic	/Users/hermf/Documents/mvsl/projects/EIOPA/xbrt/6. Windows T4U/SolvencyII.UI/SolvencyII

**Solvency II Dictionary, Solvency II**

version: solvency2/2014-07-23-v1.5.2

description:

prefixes: http://eiopa.europa.eu/eu/xbrl/s2hd/dict/met/, http://eiopa.europa.eu/eu/xbrl/s2c/dict/, http://eiopa.europa.eu/eu/xbrl/s2md/dict/met/, http://eiopa.europa.eu/eu/xbrl/s2md/fws/

URL: /Users/hermf/Documents/mvsl/projects/EIOPA/xbrt/6. Windows T4U/SolvencyII.UI/SolvencyII.GUI/bin/Debug/ Arelle/Taxonomies/sol2.zip

date: 2014-09-18T17:26:45 UTC

Disable

Move Up

Move Down

Reload

Remove

Enable All

Disable All

Close

Cancel

# Command Line Package Use

- `--packages=PACKAGES`
- Modify package configuration.
  - Re-save unless 'temp' is in the module list.
  - 'show' to show current package configuration.
  - '|' separator (multiple packages and commands)
  - +url to add package by its url or filename, (url is full path)
  - ~name to reload a package by its name,
  - -name to remove a package by its name
  - name for temporary package (not saved)

# Other mapping redirection

- Config/mappings.xml
  - Maps URL or File to file, directory or into a zip



# Performance & Profiling

--collectProfileStats - collect profile statistics  
(time and memory by processing phase)

GUI tools log menu: collect/log profile stats

--plugins=profileCmdLine.py  
--saveProfilerReport=filename

Plugin profileFormula.py  
validation menu: Profile formula validation

# Integration Topics

- C# interface
- Java interface
- Error messages options
  - Parameterized XML and JSON available
- Status bar updates
- Database Integration
- Table linkbase error locating

# Interface “wrapper”

- Prepare parameters
- Prepare cache if offline, or Package file(s)
- Initiate in background as appropriate
  - runtime.exec or Process.start
  - If run from GUI, named pipe to display status info
- Process resulting log file (txt, .xml or .json)
  - Integrate error results to source files/tables/etc
    - href's for each log entry with tooltip info in .xhtml/.json

# Regression Testing

- Supports XBRL validation suites
- Run either by:
  - Command file .bat/.sh scripts
  - GUI: Open a test index or test suite
  - pyTest
    - Control file config/arelle\_test.ini – tests & parameters
    - junitxml output for test integration
    - Test wrapper example arelle\_test.py