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XBRL

EUROPE



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19<sup>th</sup> XBRL Europe day | Eurofiling 23<sup>rd</sup> workshop | Tutorials | Academic Track

# XBRL analytics with OIM

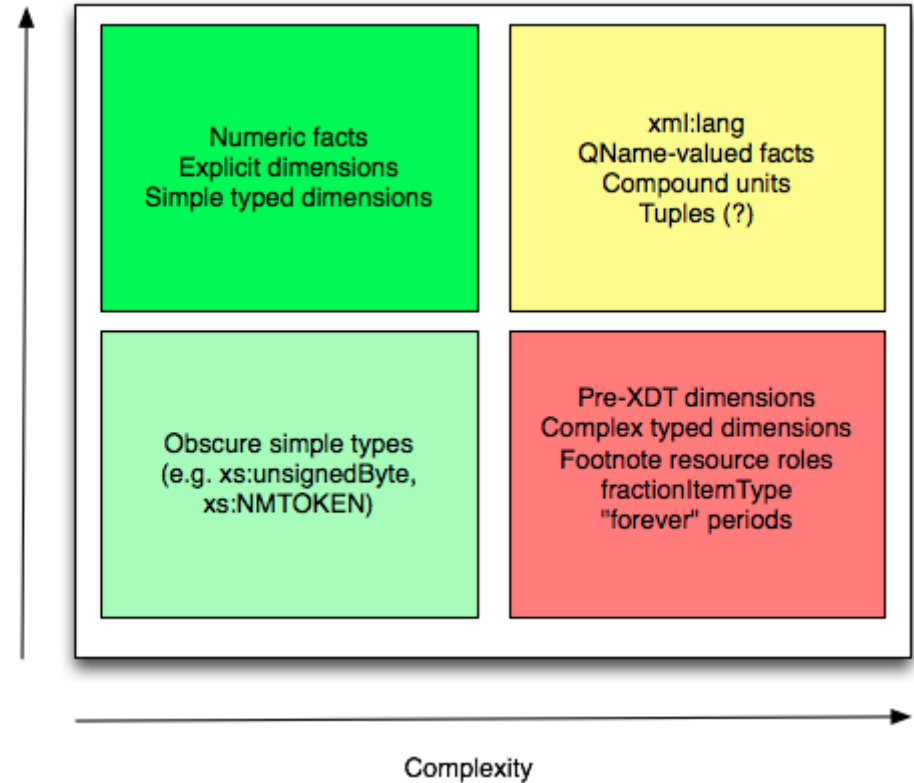
Mark  
Goodhand  
2017-06-08

# Why OIM?

- Many details of the original XML representation are not semantically significant
  - Context ids
  - Segment vs Scenario
  - Ordering of facts and dimensions
- XML is not always the most convenient syntax
  - JSON better for web; CSV better for bulk

# OIM simplifies

- XBRL is 14 years old
- Some features are more trouble than they're worth



# Unsupported features

- 2.1.1 Non-dimensional segment/scenario content
- 2.1.2 Mixing segment and scenario elements
- 2.1.3 Complex-typed dimensions
- 2.1.4/2.15 Unsupported data types (fraction, float, double)
- 2.1.6 non-standard footnote resource roles
- 2.1.7 Use of zero-precision numeric facts

See [\*OIM CR-2017-05-02 §2.1: Constraints\*](#)

# Unsupported features

- Custom attributes on facts (e.g. @find:filed)

```
<xs:element name="filingIndicator" id="find_filingIndicator"
  type="xbrli:stringItemType" substitutionGroup="xbrli:item"
  nillable="true" xbrli:periodType="instant"/>
<xs:attribute default="true" name="filed" type="xs:boolean"/>
```

- Eurofiling-2016-05-11/[www.eurofiling.info/eu/fr/xbrl/ext/filing-indicators.xsd](http://www.eurofiling.info/eu/fr/xbrl/ext/filing-indicators.xsd)
- Agreed yesterday to pursue new filing indicator representation, subject to EBA/EIOPA blessing  
See [OIM CR-2017-05-02 §2.2: Other unsupported features](#)

# Supported features

- Tuples (still)
  - xbrl:tupleParent
  - xbrl:tupleOrder
- Forever periods (NEW)
  - Campbell Pryde: “Just when you thought that no one uses forever we have a taxonomy where we need it all over the place.”

# OIM JSON

- Most effort in the working group has focused on the core model and the JSON representation
- Many syntax variations were considered



# OIM JSON - 2016-09-29

- Object for period

```
"xbrl:period": {  
  "start": "2015-01-01T00:00:00",  
  "end": "2016-01-01T00:00:00"  
}
```
- Object for taxonomy-defined aspects

```
"tax:RegionDimension": {  
  "value": "tax:Europe",  
  "baseType": "QName"  
}
```



# OIM JSON – desirable properties

- Uniform representation for aspects (QName key, string value)
- Space for inline type annotations (“augmentations”)
- Statically determinable datatype at a given JSON path
- “Simple”

# OIM JSON - CR-2017-05-02

```
{ "id": "f923",  
  "value": "1234",  
  "aspects": {  
    "xbrl:concept": "tax:NumericConcept",  
    "xbrl:entity": "cid:123456789",  
    "xbrl:periodStart": "2015-01-01T00:00:00",  
    "xbrl:periodEnd": "2016-01-01T00:00:00",  
    "xbrl:unit": "iso4217:GBP",  
    "tax:RegionDimension": "tax:Europe"  
  }  
}
```

# JSON defaults

- Current
  - Absent periodStart & periodEnd means *forever*
  - Absent accuracy means *INF*
- Proposed
  - Absent units means *xbrli:pure* [[bug 620](#)]
  - Absent entity means “nobody” [[bug 619](#)]

# OIM CSV

- First PWD published [2017-05-02](#)
- Significant reductions in file size

				measured in kB				
Number of facts	explicit	1 typed dim	2 typed dim	XBRL	CSV	metadata	total	reduction
6884	3	2942	3939	2722	176	12	188	14,5
87651	5	27446	60200	41621	1918	19	1937	21,5

- Well suited to production from backend databases

# OIM CSV

- Based on W3C's [Model for Tabular Data and Metadata on the Web](#)

W3C Recommendation



## Model for Tabular Data and Metadata on the Web

W3C Recommendation 17 December 2015

**This version:**

<http://www.w3.org/TR/2015/REC-tabular-data-model-20151217/>

**Latest published version:**

<http://www.w3.org/TR/tabular-data-model/>

# OIM RDF?

Semantic Web



XLink

# Why RDF?

- Syntax independent model
  - JSON LD
  - CSVW
- Highly expressive
- SPARQL
- OWL
- More widely supported than XLink
- Supports XML Schema data types



# OIM RDF?

Reification  
Ontologies

Blank nodes

N-Quads  
N-Triples

TriG

RDFa

IRIs

Turtle



# Why not RDF (yet)

- No demand for RDF from regulators or filers
- Desire to publish something simple ASAP
- Lack of RDF expertise within working group

# Reasons to revisit

- Taxonomy side of OIM not yet defined
- RDF can represent both instance and taxonomy
- JSON-LD helps to hide complexity
- Related technologies already mapped ([SDMX](#))
- Interest in Semantic Web increasing?

# OIM in production

- XBRL and iXBRL transformed into OIM JSON
- Augmented
- Indexed in Elasticsearch
- Initially built using 2016-01-03 PWD
- 7,541,969 UK filings
- 180,728 US filings

The screenshot displays the 'Full Beam' CoreFiling application. The top navigation bar includes the 'Full Beam' logo and a 'Log out' link. Below the navigation bar, there are tabs for 'UK Companies House Filings' and 'US Securities and Exchange Commission Filings'. A search bar is present with a dropdown menu showing 'Companies claiming dormant exemption with change in Book ...'. The main content area shows a search filter section with the text 'where all of the following are true:' and two criteria: 'Book Value (Delta) does not equal 0' and 'Company entitled to exemption under Section 480 Companies Act 2006 relating to dormant companies [UK GAAP 2009] is present'. Below the filter section, there are filters for 'Company Category' and 'Company Status'. The 'Company Category' filter shows 'Private Limited Company' with 9.1k results, 'PRI/LTD BY GUAR/NSC (Private, limited by guarantee, no share capital)' with 119 results, 'PRI/LBG/NSC (Private, Limited by guarantee, no share capital, use of 'Limited' exemption)' with 37 results, and 'Public Limited Company' with 2 results. The 'Company Status' filter shows 'Active' with 6.7k results, 'Dissolved' with 2.3k results, 'Active - Proposal to Strike off' with 271 results, and 'Liquidation' with 19 results. The search results section shows '9,280 filings for 7,810 companies (sorted by relevance)' and 'Searched 7,541,969 filings across 2,802,011 companies'. There are pagination controls showing '25 per page' and a list of results. The first result is for 'C H 1 INVESTMENTS LIMITED' with a matching filing on 31 Mar 2012 (published December 2012). The second result is for 'MILLTECH CONSULTANTS LIMITED' with a matching filing on 31 Mar 2012 (published December 2012).

Full Beam CoreFiling

Search

Log out

UK Companies House Filings US Securities and Exchange Commission Filings Companies claiming dormant exemption with change in Book ...

where all of the following are true:

- Book Value (Delta) does not equal 0
- Company entitled to exemption under Section 480 Companies Act 2006 relating to dormant companies [UK GAAP 2009] is present

+ field + all ... + any ... + none ...

Search

Company Category

- Private Limited Company 9.1k
- PRI/LTD BY GUAR/NSC (Private, limited by guarantee, no share capital) 119
- PRI/LBG/NSC (Private, Limited by guarantee, no share capital, use of 'Limited' exemption) 37
- Public Limited Company 2

Company Status

- Active 6.7k
- Dissolved 2.3k
- Active - Proposal to Strike off 271
- Liquidation 19

9,280 filings for 7,810 companies (sorted by relevance)

Searched 7,541,969 filings across 2,802,011 companies

25 per page

« < 1 2 3 4 ... > »

Query as JSON

C H 1 INVESTMENTS LIMITED

Number	07238510	Matching filing	31 Mar 2012 (published December 2012)	Download
Status	Dissolved			
Category	Private Limited Company			
Accounts	DORMANT			

MILLTECH CONSULTANTS LIMITED

Number	03820373	Matching filing	31 Mar 2012 (published December 2012)	Download
Status	Dissolved			
Category	Private Limited Company			
Accounts	DORMANT			

# OIM potential: lightweight, open BI

- Taxonomies are standard, open meta-models
  - Reuse data cubes rather than redefining
- OIM datasets are semantic and easily queryable
  - NoSQL databases cope with size and dimensionality
  - REST APIs support querying by aspects
- Web components for visualisation

# Horizontal scaling and wide columns

Google BigTable	Apache Cassandra	Apache HBase
“sparsely populated NoSQL database which can scale to billions of rows, thousands of columns, and petabytes of data”	“Some of the largest production deployments include Apple's, with over 75,000 nodes storing over 10 PB of data, Netflix (2,500 nodes, 420 TB, over 1 trillion requests per day”	“This project's goal is the hosting of very large tables -- billions of rows X millions of columns -- atop clusters of commodity hardware”
+ BigQuery	+ Spark SQL	+ Phoenix / Hive / Impala

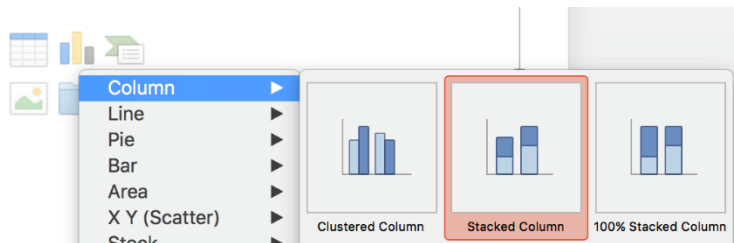
# OIM queries

- OIM-based queries insulate users from database representation

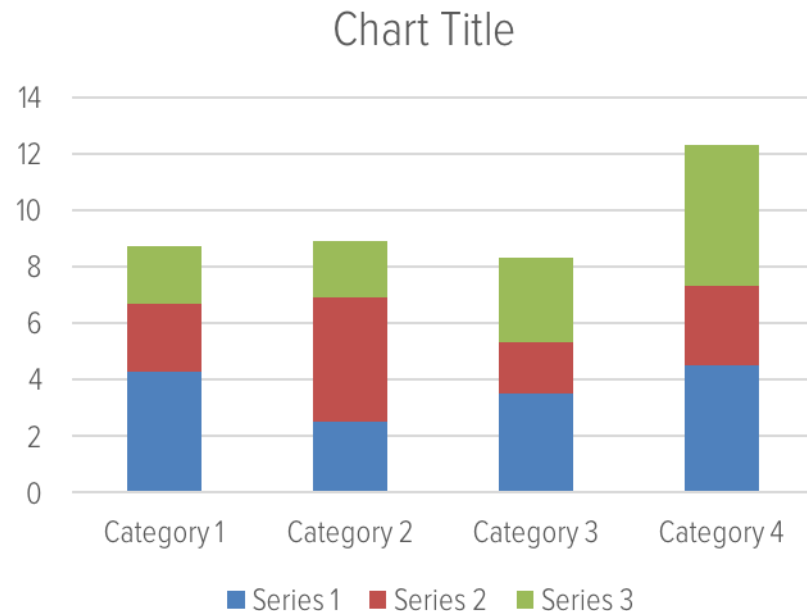
```
{
  "prefixes": {
    "my": "http://taxonomies.corefiling.com/mrg/samples/mgmt-reports"
  },
  "aspects": {
    "xbrl:concept": "my:Revenue",
    "xbrl:periodStart": "2015-01-01T00:00:00",
    "xbrl:periodEnd": "2015-12-31T00:00:00"
  }
}
```



# Charts the old fashioned way



A6				
	A	B	C	D
1		Series 1	Series 2	Series 3
2	Category 1	4.3	2.4	2
3	Category 2	2.5	4.4	2
4	Category 3	3.5	1.8	3
5	Category 4	4.5	2.8	5
6				
7				



# Charts on the web

## Google Charts

```
google.charts.load('current', {packages: ['corechart', 'bar']});
google.charts.setOnLoadCallback(drawMultSeries);

function drawMultSeries() {
  var data = google.visualization.arrayToDataTable([
    ['City', '2010 Population', '2000 Population'],
    ['New York City, NY', 8175000, 8008000],
    ['Los Angeles, CA', 3792000, 3694000],
    ['Chicago, IL', 2695000, 2896000],
    ['Houston, TX', 2099000, 1953000],
    ['Philadelphia, PA', 1526000, 1517000]
  ]);

  var options = {
    title: 'Population of Largest U.S. Cities',
    chartArea: {width: '50%'},
    hAxis: {
      title: 'Total Population',
      minValue: 0
    },
    vAxis: {
      title: 'City'
    }
  };

  var chart = new
  google.visualization.BarChart(document.getElementById('chart_div'));
  chart.draw(data, options);
}
```

## C3

```
chart = c3.generate({
  bindto: '#chart',
  data: {
    columns: [
      ['data1', 30, 200, 100, 400, 150, 250],
      ['data2', 50, 20, 10, 40, 15, 25]
    ],
    axes: {
      data2: 'y2'
    }
  },
  axis: {
    y: {
      label: { // ADD
        text: 'Y Label',
        position: 'outer-middle'
      }
    },
    y2: {
      show: true,
      label: { // ADD
        text: 'Y2 Label',
        position: 'outer-middle'
      }
    }
  }
});
```

## Chart.js

```
var ctx = document.getElementById('myChart').getContext('2d');
var chart = new Chart(ctx, {
  // The type of chart we want to create
  type: 'line',

  // The data for our dataset
  data: {
    labels: ["January", "February", "March", "April", "May"],
    datasets: [{
      label: "My First dataset",
      backgroundColor: 'rgb(255, 99, 132)',
      borderColor: 'rgb(255, 99, 132)',
      data: [0, 10, 5, 2, 20, 30, 45],
    }]
  },

  // Configuration options go here
  options: {}
});
```

# Charts as components

[vue-chartjs](#)



[google-chart](#)

```
<google-chart
  type='pie'
  options='{ "title": "Distribution of days in 2001Q1" }'
  cols='[{"label": "Month", "type": "string"}, {"label": "Days", "type": "number"}]'
  rows='[["Jan", 31], ["Feb", 28], ["Mar", 31]]'>
</google-chart>
```

```
ReactDOM.render(
  <BarChart
    title= {title}
    data= {generalChartData}
    width= {width}
    height= {height}
    chartSeries = {chartSeries}
    x= {x}
    xLabel= {xLabel}
    xScale= {xScale}
    yTicks= {yTicks}
    yLabel = {yLabel}
  />
, document.getElementById('data_bar')
)
```

[react-d3](#)

# OIM charts

- Labels drawn from taxonomy
- Values and dimensions from OIM JSON
- No need to bend data into shape
- Can be used with individual documents or datasets
- Embeddable in Markdown and HTML

# OIM charts

```
<oim-chart
  type='pie'
  title='Revenue by country, 2015'
  dataset='https://oim.corefiling.com/mrg/samples/mgmt-reports'
  filter='{ "aspects": { "xbrl:concept": "my:Revenue",
                        "xbrl:periodStart": "2015-01-01T00:00:00",
                        "xbrl:periodEnd": "2015-12-01T00:00:00"} }'
  group='my:Region'>
</oim-chart>
```

# The future is soon

- We'll be opening up OIM JSON APIs in the next few weeks
- Expect a growing set of free tools for exploring the power of OIM
- Get in touch:
  - [mrg@corefiling.com](mailto:mrg@corefiling.com)
  - @MarkGoodhand