

## **DPM ARCHITECT**

### **TOOL FOR EXTENSIONS**

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Eurofiling Online Conferences 2020

INFORMATION SYSTEMS DEPARTMENT

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# DPM ARCHITECT FOR XBRL: COMPUTER AIDED DESIGN OF FINANCIAL MODELS



*DPM Architect*



**XBRL**<sup>TM</sup>  
THE BUSINESS REPORTING STANDARD

```
3 <link:schemaRef xlink:type="simple" xlink:href="http://www.bde.es/es/fr/xbrl/fws/coren/cir-680-2014/2019-11-18/mod/solv_gusa.xsd" />
4 <xbrli:context id="ofin">
5   <xbrli:entity>
6     <xbrli:identifier scheme="http://www.ech.int/stats/money/mfi">ES0182
7   </xbrli:identifier>
8   <xbrli:segment>
9     <xbrli:explicitMember dimension="es-be-cm-dim:Agrupacion">
10      es-be-cm-dim:AgrupacionGrupoConsolidado
11    </xbrli:explicitMember>
12  </xbrli:segment>
13 </xbrli:entity>
<xbrli:period>
  <xbrli:instant>2020-03-31</xbrli:instant>
</xbrli:period>
```

# DPM ARCHITECT FOR XBRL: COMPUTER AIDED DESIGN OF FINANCIAL MODELS



DPM Architect para XBRL (CORPORATE\_MODE: WORK)

File Edit Views Reports Tools Settings Help

S11-1 x S11-1 x S11-2 x

Settings Z axes

	Vivienda habitual	Otras viviendas	Total viviendas
	1	2	3
Entregas de posesión (b)	0001 54 - \$a	0051 41 - \$a	0101 18 - \$a
1 Entregas voluntarias de la posesión (c)	0002 50 - \$a	0052 40 - \$a	0102 17 - \$a
1.1 Como resultado de daciones	0003 49 - \$a	0053 39 - \$a	0103 16 - \$a
1.2 Otras	0004 48 - \$a	0054 25 - \$a	0104 15 - \$a
2 Entregas de la posesión judiciales (e)	0005 47 - \$a	0055 24 - \$a	0105 14 - \$a
2.1 No ocupadas a la fecha de la	0006 46 - \$a	0056 23 - \$a	0106 13 - \$a
2.2 Ocupadas a la fecha de lanza	0007 45 - \$a	0057 22 - \$a	0107 53 - \$a
Del que: Intervención	0008 44 - \$a	0058 21 - \$a	0108 12 - \$a
Promemoria: Número total de hipotecas concedidas a los	0015 42 - \$a	0065 19 - \$a	0115 10 - \$a
Operaciones para las que no se ha tomado l	0016 43 - \$a	0066 20 - \$a	0116 11 - \$a

21/10/2020 13:38:39 DEBUG GetTableAxesTreeNodes, Params: {S11-1}  
 21/10/2020 13:38:39 DEBUG GetTableAxesTreeNodes, Params: {S11-1}  
 21/10/2020 13:38:39 DEBUG GetTableAxesTreeNodes, Params: {S11-2}  
 21/10/2020 13:38:39 DEBUG GetTableAxesTreeNodes, Params: {S11-2}  
 21/10/2020 13:38:39 DEBUG GetTableAxesTreeNodes, Params: {S11-1}

Language:es Role: bde - Filter [Managed by: (none), Version: All]

Data dictionary Frameworks

Table Assertions Assertion

**TAXONOMY: eses-be-vapd - Tax**

- or-1 : \$a >= 0
  - Affected tables
    - S11-1
    - S11-2
  - Filters
    - Metric = Numeric
  - Variables
    - \$a [0]
    - \$a >= 0
  - Preconditions
  - Documentation

Navigation

or-1

- Main properties
- Code
- Deprecated
- Forzar evaluación
- From date
- Mixes units

## DPM ARCHITECT: SOME FEATURES

### User oriented

- Hides XBRL technical details
- Extensibility made easy
- Solid modelling approach

### Table linkbase graphical editor

- Link between the model and the view
- Integrated instance editor
- Generation of sample instance documents

### Powerful validation rule editor

- Dual view of formulae: graphical view and data centric view
- Generation of descriptions, error messages and documentation
- Instance editor and test lab (plugins by vendors available)

# DPM ARCHITECT: CURRENT STATUS



## Successfully used in Bank of Spain:

- 50+ taxonomies already in Production
- Used by business users to author taxonomies

## Already in use by other institutions:

- Support agreement with the ECB
- EBA
- Review of EBA taxonomies by most NCAs
- New taxonomies and extensions by some NCAs
- Database taxonomy loading process by some NCAs

## Available for free on request (no support):

- Distribution list with 150+ users

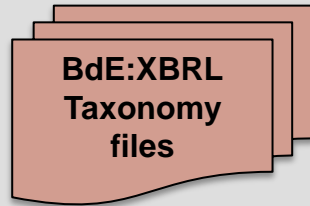
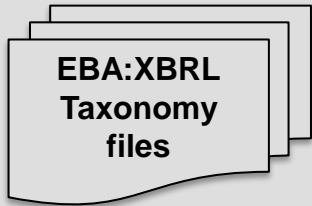
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**XBRL: Extensible Business Reporting Language**

# BDE: EXTENSIONS

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- Dictionary
- Taxonomies
- Modules
- Tables
- Validation rules

- Labels (es-ES)
- Modules
- Validation rules

The screenshot shows the XBRL Frameworks tool interface. The top bar has two tabs: "Data dictionary" and "Frameworks". The main area displays a tree view of taxonomies under the "Frameworks" tab. The tree structure is as follows:

- eba\_AE - Asset Encumbrance (en)
- eba\_COREP - Common Reporting (en)
- eba\_FINREP - Financial Reporting (en)
- eba\_FINREPCOVID19 - Financial Reporting of COVID19 (en)
- eba\_FP - Funding Plans (en) (expanded)
  - eba\_FP\_2.8 - Funding Plans 1.0.6 (DPM 2.8) (en) / 2018-03-31
  - eba\_FP\_2.10 - Funding Plans 2.0.0 (DPM 2.10) (en) / 2020-02-29
  - eba\_FP\_2.10.1 - Funding Plans 2.0.1 (DPM 2.10.1) (en) / 2020-06-30 (expanded)
    - Tables
    - Modules (expanded)
      - eba\_FP\_Con - Funding Plans, Consolidated (en)
      - eba\_FP\_Ind - Funding Plans, Individual (en)
      - es\_FP - Funding Plans (en) (selected)
    - Validations

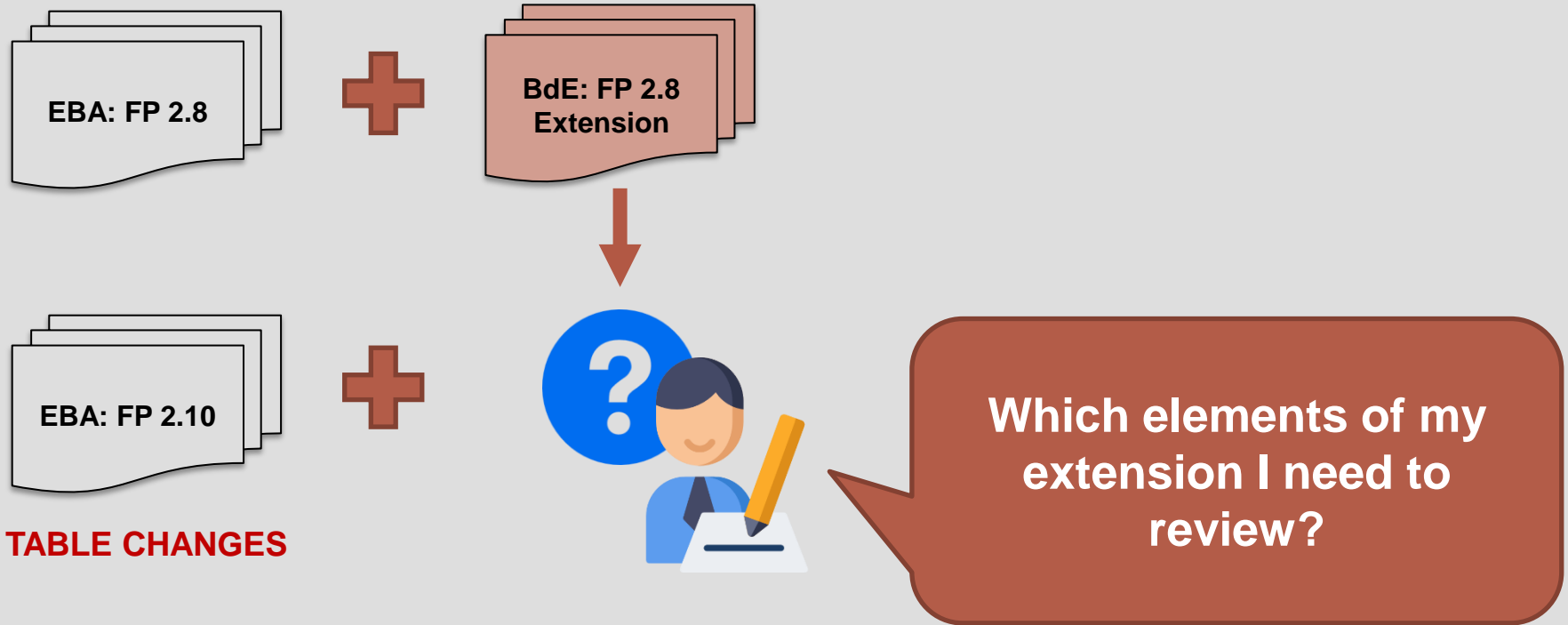
Below the tree view, there is a search bar with a checkmark icon and a "Find" button. The bottom panel shows the "Main properties" for the selected taxonomy "es\_FP - Funding Plans (en)":

Main properties	
Code	FP
Name (en)	Funding Plans
Name (es)	
Official Uri	<a href="http://www.bde.es/es/fr/xbnl/fws/ebacrr_fp/gl-2019-05">http://www.bde.es/es/fr/xbnl/fws/ebacrr_fp/gl-2019-05</a>
Owned by	Banco de España



# EXTENSION PROCESS

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## DPM ARCHITECT: TOOLS



- **Comparison taxonomy report**
- **Massive copy of own validation rules**
- **Validation Rule predictions based on template structure changes**



Comparison in 3 ways:

- Tables comparison
  - New and deleted tables
- Dimensional comparison
  - New and deleted DPs
  - DPs “moved”
- Validation rules comparison

# COMPARATION TAXONOMY REPORT: FP 2.8 ← → FP 2.10



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## Tables comparison

Tablas no existentes en FP_2.8	
Código	Descripción
P_04.01	Estado de resultados
P_04.02	Estado de resultados para entidades de crédito pequeñas y no complejas
P_05.00	Valores representativos de deuda: emisiones y amortizaciones

Tablas no existentes en FP_2.10	
Código	Descripción
P_03.00	Perímetro de consolidación



## Dimensional comparison

DPs no existentes en FP_2.8			
Código de tabla	Fila	Columna	Datapoint
P_01.01	R010	C010	XBRL:MET(EBA:mi53)EBA:APL(x12)EBA:BAS(x6)EBA:MCB(x824)EBA:MCY(x996)EBA:REF(x5)
P_01.01	R010	C030	XBRL:MET(EBA:mi53)EBA:APL(x12)EBA:BAS(x6)EBA:CSC(x6)EBA:MCB(x824)EBA:MCY(x996)EBA:REF(x12)
P_01.01	R010	C040	XBRL:MET(EBA:mi53)EBA:APL(x12)EBA:BAS(x6)EBA:CSC(x6)EBA:MCB(x824)EBA:MCY(x996)EBA:REF(x13)
P_01.01	R010	C050	XBRL:MET(EBA:mi53)EBA:APL(x12)EBA:BAS(x6)EBA:CSC(x6)EBA:MCB(x824)EBA:MCY(x996)EBA:REF(x16)
P_01.01	R020	C010	XBRL:MET(EBA:mi53)EBA:APL(x73)EBA:BAS(x6)EBA:MCB(x828)EBA:MCY(x469)EBA:REF(x5)
P_01.01	R020	C030	XBRL:MET(EBA:mi53)EBA:APL(x73)EBA:BAS(x6)EBA:CSC(x6)EBA:MCB(x828)EBA:MCY(x469)EBA:REF(x12)

DPs no existentes en FP_2.10			
Código de tabla	Fila	Columna	Datapoint
P_01.01	R010	C010	XBRL:MET(EBA:mi53)EBA:APL(x12)EBA:BAS(x6)EBA:MCY(x46)EBA:REF(x5)EBA:SCO(x8)
P_01.01	R010	C020	XBRL:MET(EBA:mi53)EBA:APL(x12)EBA:BAS(x6)EBA:CSC(x6)EBA:MCY(x46)EBA:REF(x11)EBA:SCO(x8)
P_01.01	R010	C030	XBRL:MET(EBA:mi53)EBA:APL(x12)EBA:BAS(x6)EBA:CSC(x6)EBA:MCY(x46)EBA:REF(x12)EBA:SCO(x8)
P_01.01	R010	C040	XBRL:MET(EBA:mi53)EBA:APL(x12)EBA:BAS(x6)EBA:CSC(x6)EBA:MCY(x46)EBA:REF(x13)EBA:SCO(x8)
P_01.01	R010	C050	XBRL:MET(EBA:mi53)EBA:APL(x12)EBA:BAS(x6)EBA:CSC(x6)EBA:MCY(x46)EBA:REF(x16)EBA:SCO(x8)
P_01.01	R020	C010	XBRL:MET(EBA:mi53)EBA:APL(x73)EBA:BAS(x6)EBA:MCY(x231)EBA:REF(x5)EBA:SCO(x8)
P_01.01	R020	C020	XBRL:MET(EBA:mi53)EBA:APL(x73)EBA:BAS(x6)EBA:CSC(x6)EBA:MCY(x231)EBA:REF(x11)EBA:SCO(x8)
P_01.01	R020	C030	XBRL:MET(EBA:mi53)EBA:APL(x73)EBA:BAS(x6)EBA:CSC(x6)EBA:MCY(x231)EBA:REF(x12)EBA:SCO(x8)

# COMPARATION TAXONOMY REPORT: FP 2.8 $\leftrightarrow$ FP 2.10



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## Dimensional comparison: DPs “moved”

Cambios estructurales FP_2.8 $\leftrightarrow$ FP_2.10			
Código de tabla	Datapoint	Fila columna origen	Fila columna destino

# COMPARATION TAXONOMY REPORT: FP 2.8 $\leftrightarrow$ FP 2.10

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## Validation rules comparison

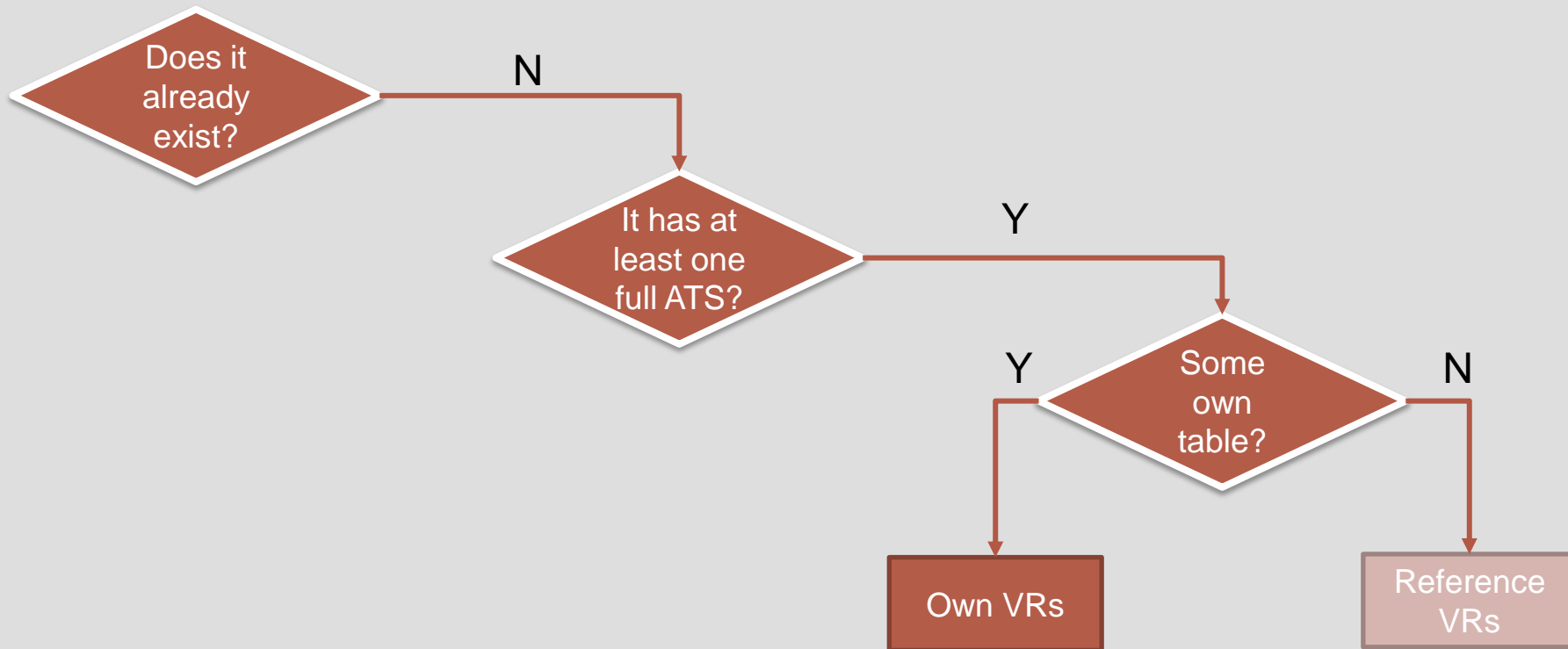
Cambios en cuadros FP_2.8 <> FP_2.10						
Código de cuadro	Código de taxonomía origen	Código de taxonomía destino	Conjunto de tablas	Conjunto de tablas afectadas	Test origen	Test destino
b1657_m	FP_2.8	FP_2.10	{P_02.04}{P_02.05}		iaf:numeric-less-equal-than(\$a, 0.06)	
v08800_m	FP_2.8	FP_2.10		{P_01.01}		iaf:numeric-equal(\$a, 0.06)
v4105_m	FP_2.8	FP_2.10	{P_01.01}	{P_01.01}	iaf:numeric-equal(\$a, iaf:sum((\$b, \$c, \$d, \$e) iaf:numeric-equal(\$a, 0.06)	
v4112_m	FP_2.8	FP_2.10	{P_01.02}	{P_01.02}	iaf:numeric-equal(\$a, iaf:sum((\$b, \$c, \$d, \$e) iaf:numeric-equal(\$a, 0.06)	
Legend						
	(1) En las columnas de taxonomías: El cuadro existe en la taxonomía.(2) En la columna de tablas afectadas: Igualdad(3) En la columna de tests: Igualdad					
	(1) En las columnas de taxonomías: El cuadro no existe en la taxonomía.(2) En la columna de tablas afectadas: Diferencia(3) En la columna de tests: Diferencia					

# DPM ARCHITECT FOR EXTENSIONS: VRS COPY PROCESS



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Massive copying of BdE elements from one version of taxonomy to another.







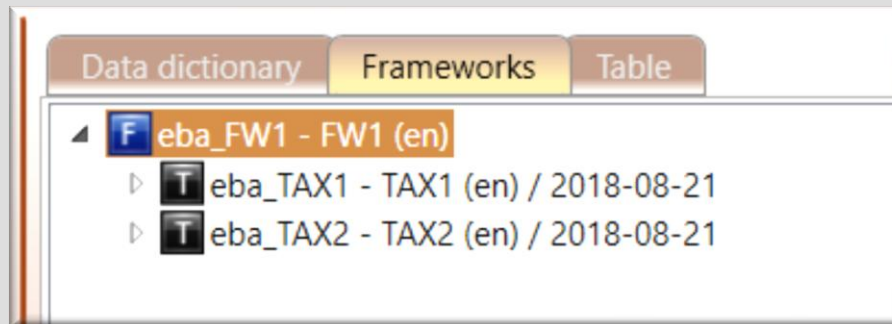
## Final report:

- Validation rules copied as “references”
- Validation rules copied as “own” – pending to review
- Validation rules not copied: reasons

# DPM ARCHITECT FOR EXTENSIONS: VALIDATION RULE PREDICTIONS BASED ON TEMPLATE STRUCTURE CHANGES

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- Mechanism for automatic validation rule predictions based on template structure changes
- For clarity purposes, an illustrative XBRL model has been designed with DPM Architect (VRProposalModel):
  - Using EBA dictionary
  - One framework with two different versions of a taxonomy



# VALIDATION RULES PROPOSALS – STARTING POINT



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- TAX1: Taxonomy first version content detail

## Templates

## Validation Rules

```

Taxonomy Assertions eba_TAX1
├─ TAX1_T1
│   └─ v1 : sum($a) = $b
├─ TAX1_T2
│   └─ v2 : $a > $b
└─ TAX1_T3
    └─ v3 : $a = $b + $c
    
```

### TAX1\_T1

	C1	C2	C3
R1	r1c1	r1c2	r1c3

V1:  $\text{sum}(\$a) = \$b$

### TAX1\_T1

	C1	C2	C3
R1	r1c1 \$a	r1c2 \$a	r1c3 \$b

### TAX1\_T2

	C1
R1	r1c1
R2	r2c1

V2:  $\$a > \$b$

### TAX1\_T2

	C1
R1	r1c1 \$a
R2	r2c1 \$b

### TAX1\_3

	C1	C2	C3
R1	r1c1	r1c2	r1c3

V3:  $\$a = \$b + \$c$

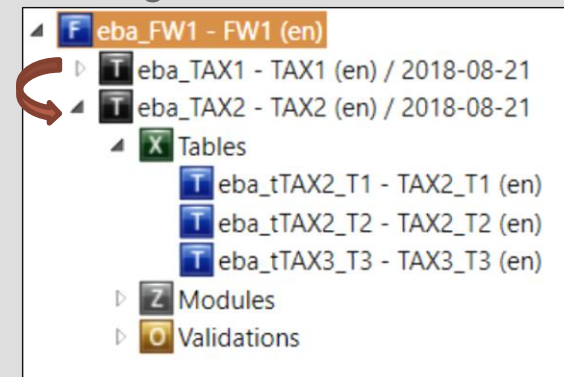
### TAX1\_3

	C1	C2	C3
R1	r1c1 \$a	r1c2 \$b	r1c3 \$c

# VALIDATION RULES PROPOSALS – TAXONOMY EXTENSIÓN – TEMPLATE STRUCTURE CHANGE



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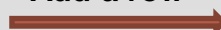
- **New Taxonomy Revision: TAX2.**  
Template Structure Changes for TAX2

## TAX1 Templates

### TAX1\_T1

	C1	C2	C3
R1	r1c1	r1c2	r1c3

Add a row



## TAX2 Templates

### TAX2\_T1

	C1	C2	C3
R1	r1c1	r1c2	r1c3
<b>NEW ROW</b>	r2c1	r2c2	r2c3

### TAX1\_T2

	C1
R1	r1c1
R2	r2c1

Add a column



### TAX2\_T2

	C1	<b>NEW COLUMN</b>
R1	r1c1	r1c2
R2	r2c1	r2c2

### TAX1\_T3

	C1	C2	C3
R1	r1c1	r1c2	r1c3

Remove a column



### TAX2\_T3

	C1	C3
R1	r1c1	r1c3

# VALIDATION RULES IN NEW TAXONOMY REVISION

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- Validation Rules status per taxonomy

## TAX1: Does not change

### TAX1: Initial Taxonomy

#### TAX1\_T1

	C1	C2	C3
R1	r1c1 \$a	r1c2 \$a	r1c3 \$b

V1:  $\text{sum}(\$a) = \$b$

#### TAX1\_T2

	C1
R1	r1c1 \$a
R2	r2c1 \$b

V2:  $\$a > \$b$

#### TAX1\_T3

	C1	C2	C3
R1	r1c1 \$a	r1c2 \$b	r1c3 \$c

V3:  $\$a = \$b + \$c$

## TAX2: Requires expert assesment

### TAX2: New Revision

#### TAX2\_T1

	C1	C2	C3
R1	r1c1 \$a	r1c2 \$a	r1c3 \$b
<b>NEWROW</b>	r2c1	r2c2	r2c3

#### TAX2\_T2

	C1	<b>NEWCOLUMN</b>
R1	r1c1 \$a	r1c2
R2	r2c1 \$b	r2c2

#### TAX2\_T3

	C1	C3
R1	r1c1 \$a	r1c3 \$c



**But....**

**Would it be possible to improve the assertions in TAX2 automatically?**





- **New feature in DPM Architect:**

- Automatic validation rule modification proposals based on template structure changes

- Steps:

*1) New Report of Validation Rules, potential candidates for automated improvement analysis. Identification based on template structural changes*

*2) Validation Rule modification proposal for expert assesment*

- **Step 1: New report of Validation Rules, potential candidates for automated improvement analysis, including:**

## A) Expanded assertions (i.e. new row, new column)

Val. Rule	Current description	New description
v1	TAX2_T1, r1 : $\text{sum}(\{c[1, 2]\}) = \{c3\}$	<b>r*</b> , TAX2_T1 : $\text{sum}(\{c[1, 2]\}) = \{c3\}$
v2	TAX2_T2, c1 : $\{r1\} > \{r2\}$	<b>c*</b> , TAX2_T2 : $\{r1\} > \{r2\}$

## B) Incomplete assertions (i.e. deleted row, deleted column)

Val. Rule	Current description
v3	TAX2_T3, r1 : $\{c1\} = 0 + \{c2\}$



# PREDICTING VALIDATION RULES

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- **Step 2: Validation Rule modification proposal for expert assesment**
  - **v1:  $\text{sum}(\$a) = \$b$**

DPM Architect para XBRL (C:\Taxonomias\AccuracyValidations)

File Edit Views Reports Tools Settings Help

TAX2\_T1 x

Settings Z axes

	C1	C2	C3	
	1	2	3	
R1	r1c1 2 - \$a	r1c2 2 - \$a	r1c3 2 - \$b	
NEWROW	r2c1 3 - \$a	r2c2 3 - \$a	r2c3 3 - \$b	

21/08/2018 16:15:45 DEBUG Configure, Params: {Bde.Aps.Six.ModelEditor.ViewModels.TableElements.Cell}  
21/08/2018 16:15:46 DEBUG Configure, Params: {Bde.Aps.Six.ModelEditor.ViewModels.TableElements.Cell}

Language:en Role: eba - Filter [Managed by: (none), Version: Current]

Data dictionary Frameworks Assertions Assertion

- ▲ v1 : sum(\$a) = \$b
  - ▲ Affected tables
    - ▶ TAX2\_T1
  - ▲ Filters
    - ▶ eba\_AGG - Aggregation level = eba\_x3 - Non-controlling interests
  - ▲ Variables
    - ▶ \$a [0]
    - ▶ \$b [0]
    - ▶ sum(\$a) = \$b
    - Preconditions
    - Documentation

Navigation

eba_ALM - Use of allocation mechan	eba_x0 - Boolean Tool residual category - Total/NA
eba_ALO - Type of allowance	eba_x0 - Not applicable/ Total exposures
eba_VPO - Valuation positions	eba_x0 - Not applicable/All positions

A new complete evaluation is shown and the user can choose to add it or not

- **Step 2: Validation Rule modification proposal for expert assesment**
  - **V2: \$a > \$b**

DPM Architect para XBRL (C:\Taxonomias\AccuracyValidations)

File Edit Views Reports Tools Settings Help

TAX2\_T1 TAX2\_T2

Settings Z axes

	C1	NEWCOLUMN	
	1	2	
R1	r1c1 2 - \$a	r1c2 1 - \$a	
R2	r2c1 2 - \$b	r2c2 1 - \$b	

21/08/2018 16:19:08 DEBUG Get tableAxes freeNodes, Params: (TAX2\_T2)  
21/08/2018 16:19:08 DEBUG GetTableAxesTreeNodes, Params: (TAX2\_T2)

Language:en Role: eba - Filter [Managed by: (none), Version: Current]

Data dictionary Frameworks Assertions Assertion

- ▲ v2: \$a > \$b
  - ▲ Affected tables
    - ▶ TAX2\_T2
  - ▲ Filters
    - ▶ Metric = eba\_bi146 - Institution or equivalent
  - ▲ Variables
    - ▶ \$a [0]
    - ▶ \$b [0]
    - ▶ \$a > \$b
    - Preconditions
    - Documentation

Navigation

To date (Empty)

Visible True

Documentation

**A new complete evaluation is shown and the user can choose to add it or not**

- **Step 2: Validation Rule modification proposal for expert assesment**
  - **V3: \$a = \$b + \$c**

The screenshot shows the DPM Architect interface for XBRL. The main window displays a table with columns C1 and C3, and rows 1 and 2. The cell containing 'r1c1 3 - \$a' is highlighted in red. A red arrow points from this cell to the 'Assertion' panel on the right, which shows the rule 'v3 : \$a = \$b + \$c' and its variables. The bottom status bar shows 'Role: eba - Filter [Managed by: (none), Version: Current]'.

The tool shows in red a single incomplete evaluation since the variable \$b has disappeared. An expert assesment would identify the need for this VR in this new taxonomy version



# Thank you for your attention.

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