Productivity Tools

Cascaded Value Calculations

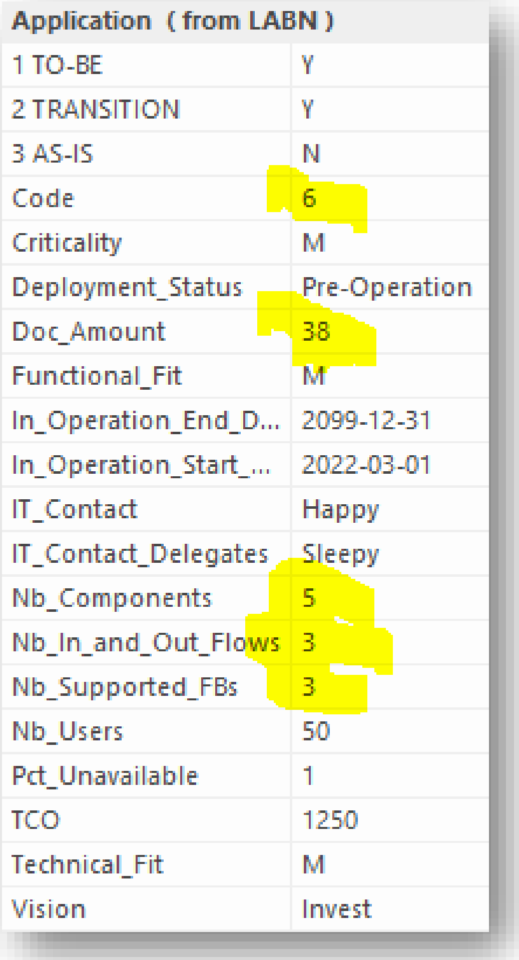
www.labnaf.one

Value Calculation

1. Overview
2. Defining the type of element needing calculation
3. Scenarios for creating new value controls
4. Selecting the collection of elements to be calculated
5. Defining the tagged values to calculated
6. Making calculated tagged values read only
7. Value calculation summary
8. Triggering periodical value calculations

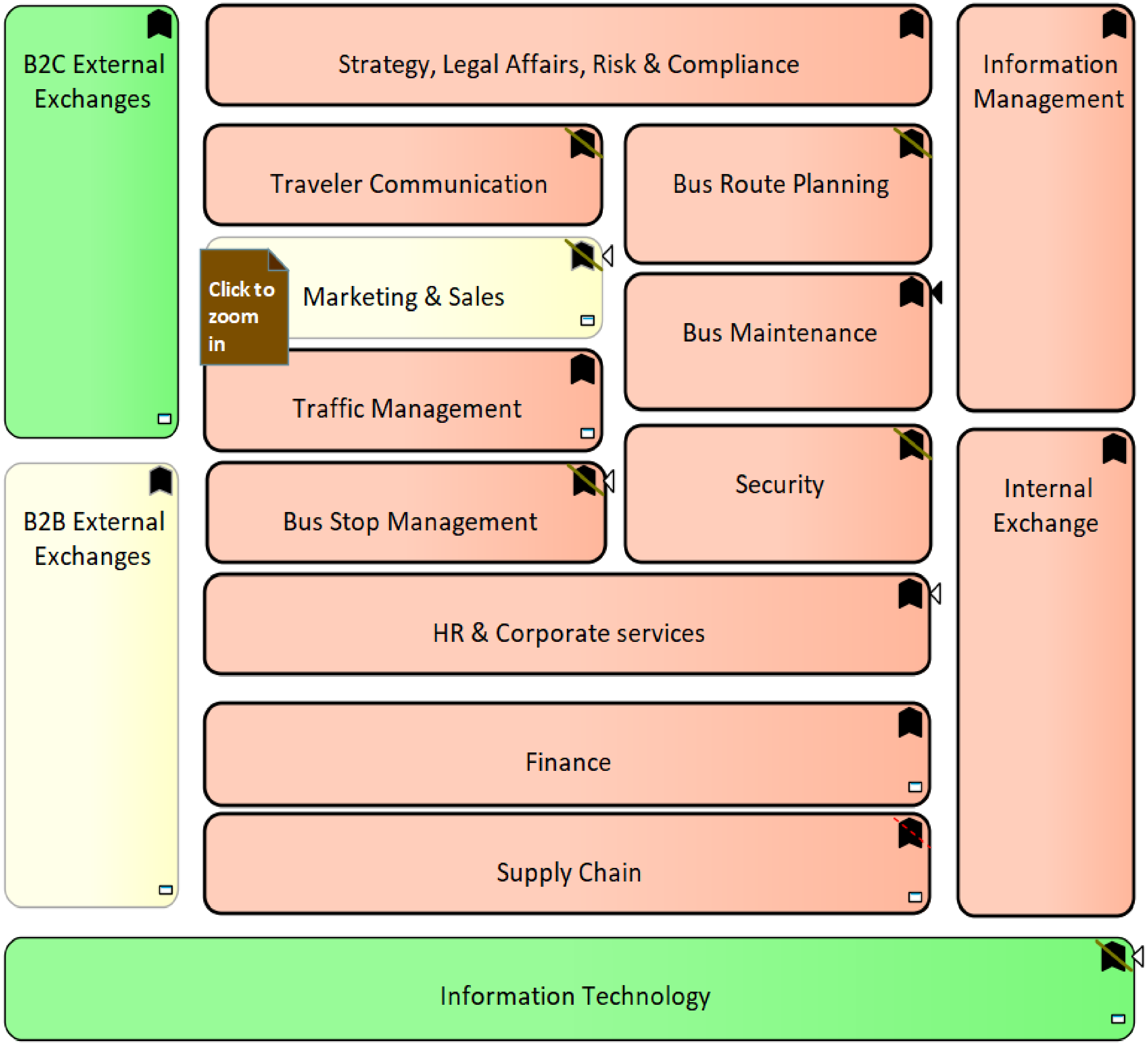
The purpose of value calculation

- Calculate element properties/tagged values
- Value can be in any format or any combination of formats (text, numeric, date, time series…)
- Calculations can be based on any propertys, any elements, any connectors, or any other information stored in the repository
- Calculations can be based on the result of other calculations
- If the calculate tagged value does not exist, then it is automatically added



Application (from LABN)	
1 TO-BE	Y
2 TRANSITION	Y
3 AS-IS	N
Code	6
Criticality	M
Deployment_Status	Pre-Operation
Doc_Amount	38
Functional_Fit	M
In_Operation_End_D...	2099-12-31
In_Operation_Start_...	2022-03-01
IT_Contact	Happy
IT_Contact_Delegates	Sleepy
Nb_Components	5
Nb_In_and_Out_Flows	3
Nb_Supported_FBs	3
Nb_Users	50
Pct_Unavailable	1
TCO	1250
Technical_Fit	M
Vision	Invest

Example: Heat map using cascaded calculations



B2C External Exchanges

Strategy, Legal Affairs, Risk & Compliance

Information Management

Traveler Communication

Bus Route Planning

Click to zoom in

Marketing & Sales

Bus Maintenance

Traffic Management

B2B External Exchanges

Bus Stop Management

Security

Internal Exchange

HR & Corporate services

Finance

Supply Chain

Information Technology

Legend for Enterprise Functions

Differentiator = ?	⋱
= Y	╲
= N	
Externalized = Y	◀ Entirely externalized
= P	◁ Partially externalized
= N	Not externalized (default)

Average Number of Supporting Applications

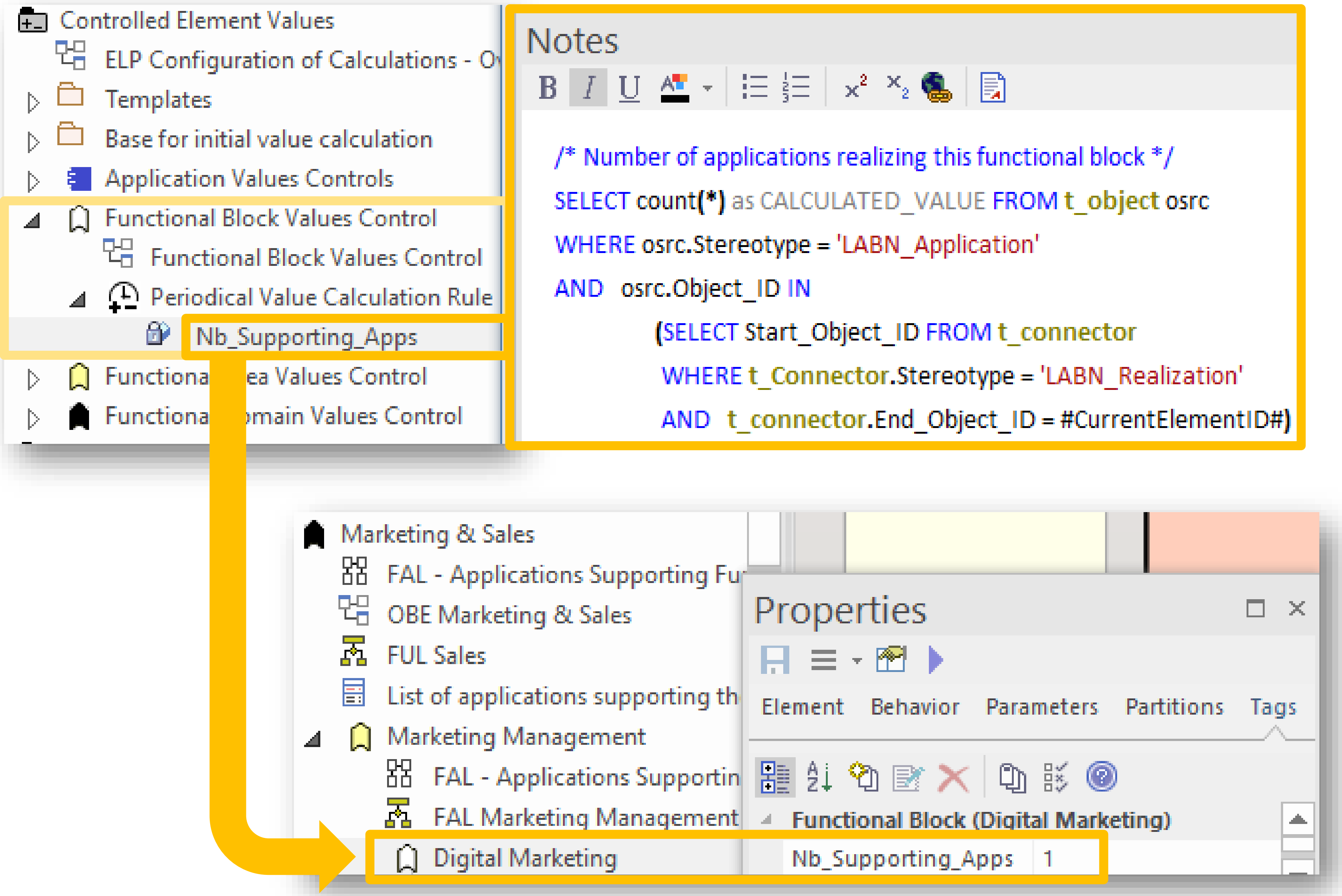
🟥	0 application/functional block on average
🟩	1 application/functional block on average
⬜	2 or more applications/functional block on average

This heat map **uses cascaded calculations**

1. Number of applications supporting a functional block
2. Average number of applications supporting a functional area
3. Average number of applications supporting a functional domain

This example on the Labnaf web site:
https://www.labnaf.one/guidance/index.html?guid=1375817A-B9CB-4d8c-ADDE-10487A0F3884

Example: Heat map using cascaded calculations (cont.)



Controlled Element Values
ELP Configuration of Calculations - O
Templates
Base for initial value calculation
Application Values Controls
Functional Block Values Control
Functional Block Values Control
Periodical Value Calculation Rule
Nb_Supporting_Apps
Functiona ea Values Control
Functiona main Values Control
Notes
B
I
U

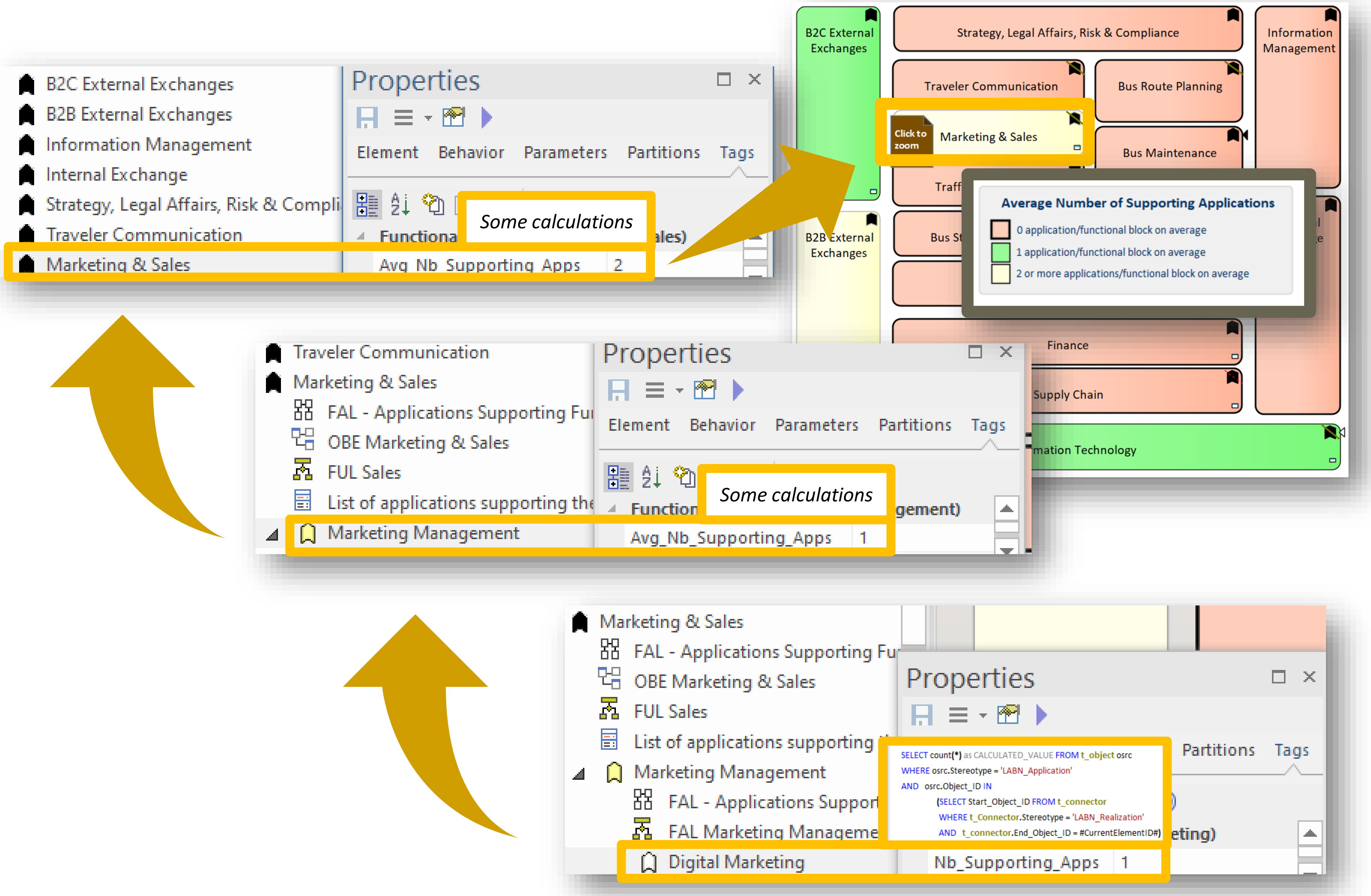
```
/* Number of applications realizing this functional block */
SELECT count(*) as CALCULATED_VALUE FROM t_object osrc
WHERE osrc.Stereotype = 'LABN_Application'
AND  osrc.Object_ID IN
          (SELECT Start_Object_ID FROM t_connector
           WHERE t_Connector.Stereotype = 'LABN_Realization'
           AND  t_connector.End_Object_ID = #CurrentElementID#)
```

Marketing & Sales
FAL - Applications Supporting Fu
OBE Marketing & Sales
FUL Sales
List of applications supporting th
Marketing Management
FAL - Applications Supportin
FAL Marketing Management
Digital Marketing
Properties
Element
Behavior
Parameters
Partitions
Tags

Functional Block (Digital Marketing)

Nb_Supporting_Apps	1

Example: Heat map using cascaded calculations (cont.)



Average Number of Supporting Applications

- 🟥 0 application/functional block on average
- 🟩 1 application/functional block on average
- 🟨 2 or more applications/functional block on average

B2C External Exchanges
B2B External Exchanges
Information Management
Internal Exchange
Strategy, Legal Affairs, Risk & Compli
Traveler Communication
Marketing & Sales

Properties

Element Behavior Parameters Partitions Tags

Functiona ... ales)

Some calculations

Avg_Nb_Supporting_Apps 2

Traveler Communication
Marketing & Sales
FAL - Applications Supporting Fu
OBE Marketing & Sales
FUL Sales
List of applications supporting the
Marketing Management

Properties

Element Behavior Parameters Partitions Tags

Function ... gement)

Some calculations

Avg_Nb_Supporting_Apps 1

Marketing & Sales
FAL - Applications Supporting Fu
OBE Marketing & Sales
FUL Sales
List of applications supporting
Marketing Management
FAL - Applications Support
FAL Marketing Manageme
Digital Marketing

Properties

Partitions Tags

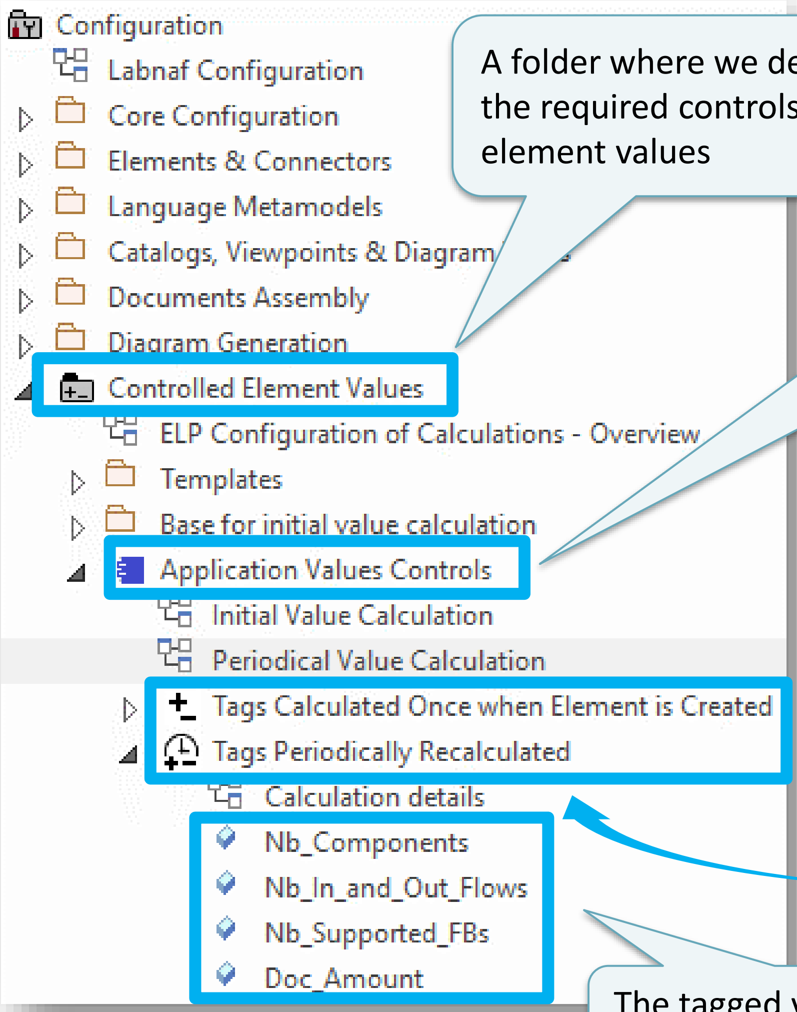
```
SELECT count(*) as CALCULATED_VALUE FROM t_object osrc
WHERE osrc.Stereotype = 'LABN_Application'
AND  osrc.Object_ID IN
          (SELECT Start_Object_ID FROM t_connector
           WHERE t_Connector.Stereotype = 'LABN_Realization'
           AND  t_connector.End_Object_ID = #CurrentElementID#)
```

...eting)

Nb_Supporting_Apps 1

Value Calculation - Overview

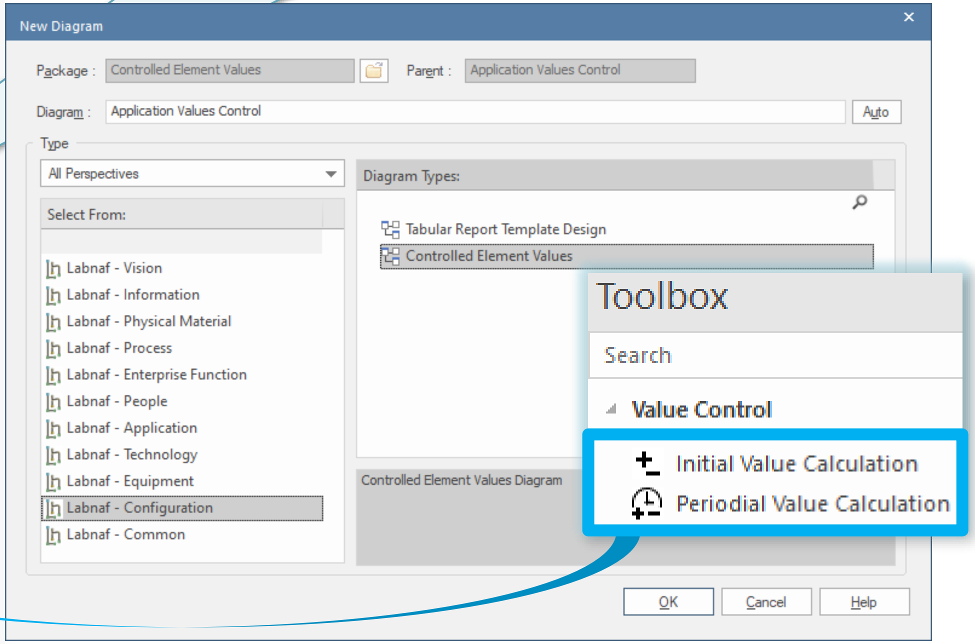
Structure in the repository



Configuration
- Labnaf Configuration
- Core Configuration
- Elements & Connectors
- Language Metamodels
- Catalogs, Viewpoints & Diagram...
- Documents Assembly
- Diagram Generation
- Controlled Element Values
  - ELP Configuration of Calculations - Overview
  - Templates
  - Base for initial value calculation
  - Application Values Controls
    - Initial Value Calculation
    - Periodical Value Calculation
    - Tags Calculated Once when Element is Created
    - Tags Periodically Recalculated
      - Calculation details
      - Nb_Components
      - Nb_In_and_Out_Flows
      - Nb_Supported_FBs
      - Doc_Amount

A folder where we define the required controls on element values

An element prototype for grouping all the required value controls.
So we can see that the embedded value control definitions (calculations…) are for elements of that specific type and stereotype.



New Diagram

Package : Controlled Element Values Parent : Application Values Control

Diagram : Application Values Control Auto

Type

All Perspectives

Select From:
- Labnaf - Vision
- Labnaf - Information
- Labnaf - Physical Material
- Labnaf - Process
- Labnaf - Enterprise Function
- Labnaf - People
- Labnaf - Application
- Labnaf - Technology
- Labnaf - Equipment
- Labnaf - Configuration
- Labnaf - Common

Diagram Types:
- Tabular Report Template Design
- Controlled Element Values

Controlled Element Values Diagram

Toolbox

Search

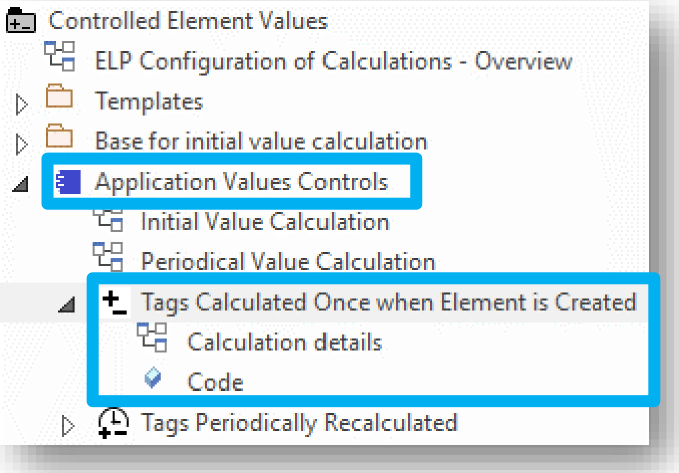
Value Control
- Initial Value Calculation
- Periodial Value Calculation

OK Cancel Help

The tagged values that must be calculated

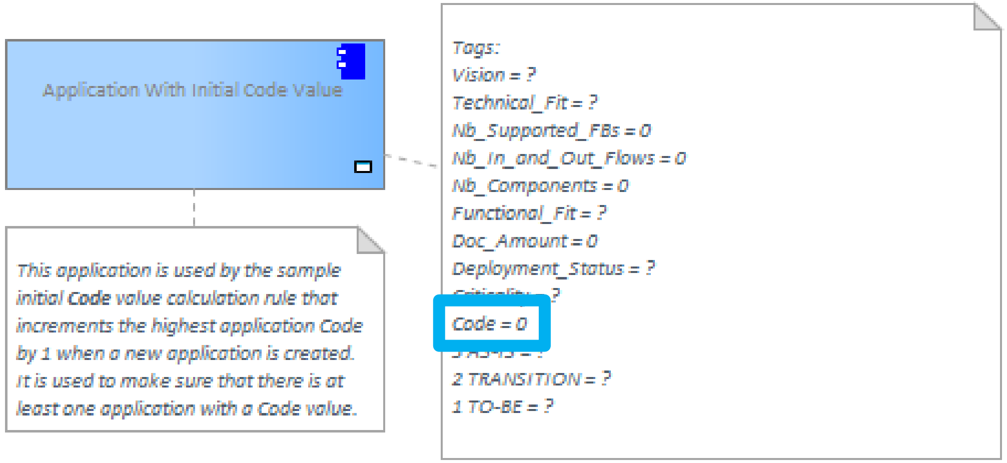
Initial Value Calculation Overview

1. Structure: What tagged values need to be calculated for which stereotype?



- Controlled Element Values
  - ELP Configuration of Calculations - Overview
  - Templates
  - Base for initial value calculation
  - Application Values Controls
    - Initial Value Calculation
    - Periodical Value Calculation
    - Tags Calculated Once when Element is Created
      - Calculation details
      - Code
    - Tags Periodically Recalculated

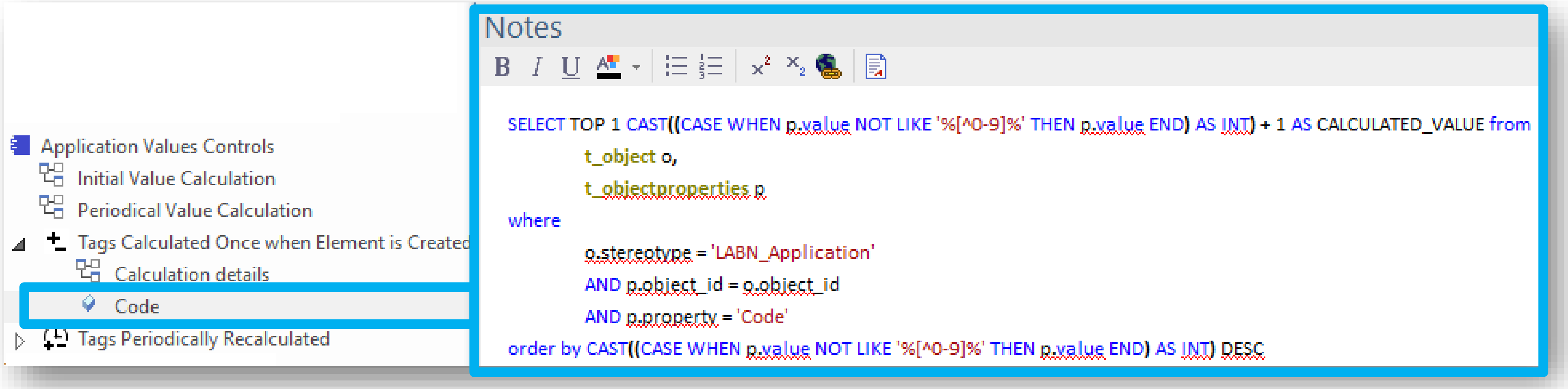
2. Base: What is the referenced base element in case there is no other element with an initial value to be incremented?



This application is used by the sample initial Code value calculation rule that increments the highest application Code by 1 when a new application is created. It is used to make sure that there is at least one application with a Code value.

Tags:
Vision = ?
Technical_Fit = ?
Nb_Supported_FBs = 0
Nb_In_and_Out_Flows = 0
Nb_Components = 0
Functional_Fit = ?
Doc_Amount = 0
Deployment_Status = ?
Criticality = ?
Code = 0
3 AS-IS = ?
2 TRANSITION = ?
1 TO-BE = ?

3. Calculation: How shall we calculate the value?



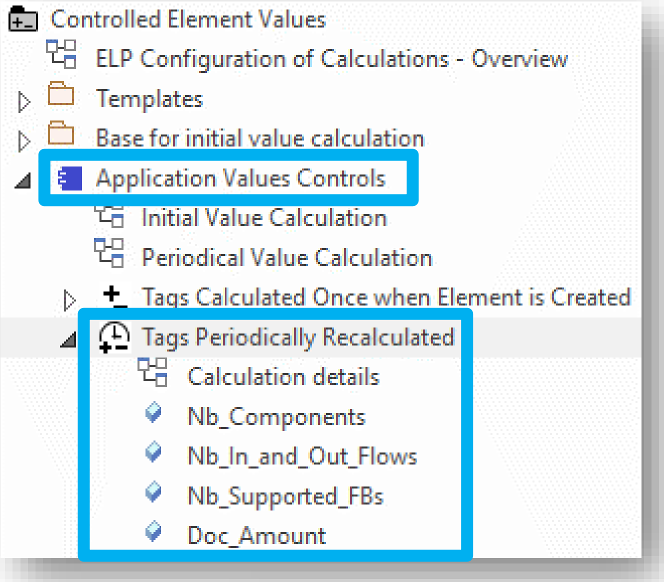
- Application Values Controls
  - Initial Value Calculation
  - Periodical Value Calculation
  - Tags Calculated Once when Element is Created
    - Calculation details
    - Code
  - Tags Periodically Recalculated

Notes

```
SELECT TOP 1 CAST((CASE WHEN p.value NOT LIKE '%[^0-9]%' THEN p.value END) AS INT) + 1 AS CALCULATED_VALUE from
        t_object o,
        t_objectproperties p
where
        o.stereotype = 'LABN_Application'
        AND p.object_id = o.object_id
        AND p.property = 'Code'
order by CAST((CASE WHEN p.value NOT LIKE '%[^0-9]%' THEN p.value END) AS INT) DESC
```

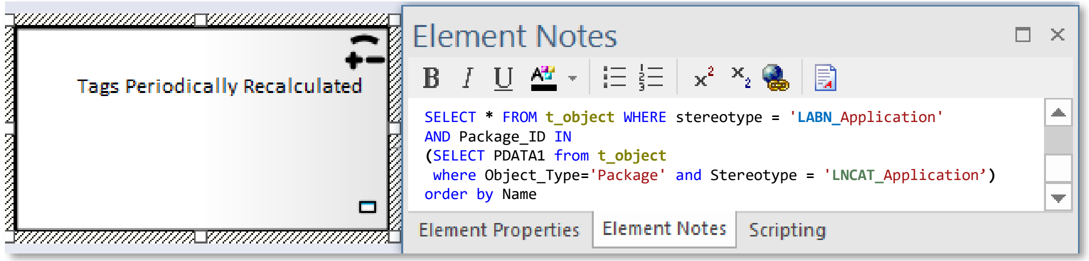
Periodical Value Calculation - Overview

1. Structure: What tagged values need to be calculated for which stereotype?



- Controlled Element Values
  - ELP Configuration of Calculations - Overview
  - Templates
  - Base for initial value calculation
  - Application Values Controls
    - Initial Value Calculation
    - Periodical Value Calculation
    - Tags Calculated Once when Element is Created
    - Tags Periodically Recalculated
      - Calculation details
      - Nb_Components
      - Nb_In_and_Out_Flows
      - Nb_Supported_FBs
      - Doc_Amount

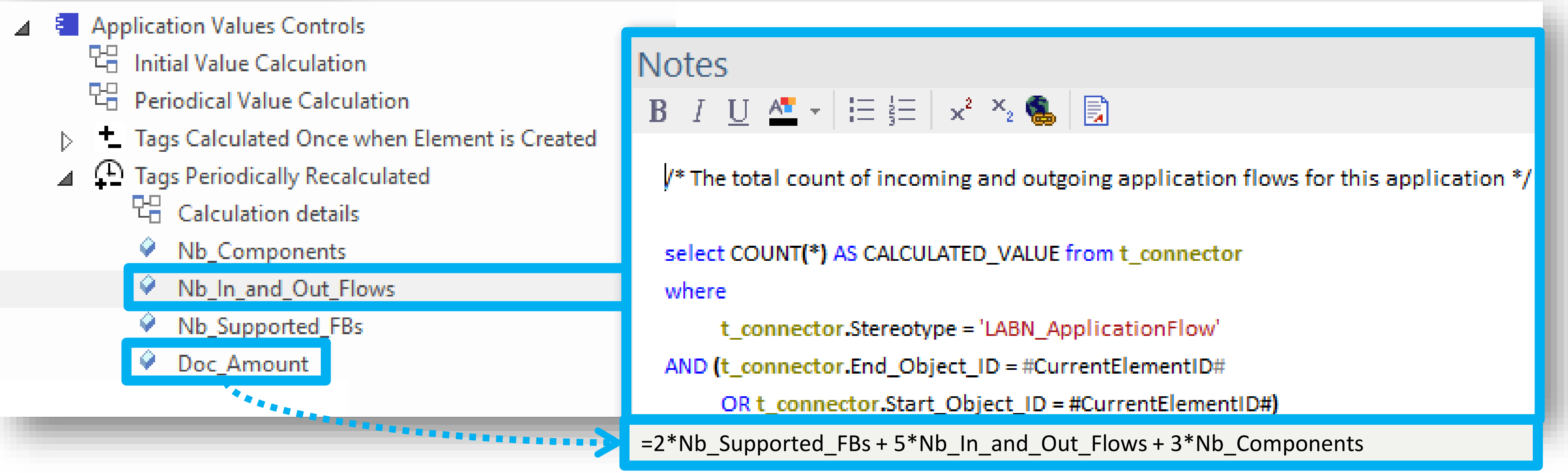
2. Scope (optional): Which elements need to be updated?



```
SELECT * FROM t_object WHERE stereotype = 'LABN_Application'
AND Package_ID IN
(SELECT PDATA1 from t_object
 where Object_Type='Package' and Stereotype = 'LNCAT_Application')
order by Name
```

By default, **all elements** with the same stereotype "LABN_xxx" as the element prototype are selected from the related catalog packages with stereotype "LNCAT_xxx".

3. Calculation: How shall we calculate the values?



- Application Values Controls
  - Initial Value Calculation
  - Periodical Value Calculation
  - Tags Calculated Once when Element is Created
  - Tags Periodically Recalculated
    - Calculation details
    - Nb_Components
    - Nb_In_and_Out_Flows
    - Nb_Supported_FBs
    - Doc_Amount

```
/* The total count of incoming and outgoing application flows for this application */

select COUNT(*) AS CALCULATED_VALUE from t_connector
where
      t_connector.Stereotype = 'LABN_ApplicationFlow'
AND (t_connector.End_Object_ID = #CurrentElementID#
      OR t_connector.Start_Object_ID = #CurrentElementID#)
```

```
=2*Nb_Supported_FBs + 5*Nb_In_and_Out_Flows + 3*Nb_Components
```

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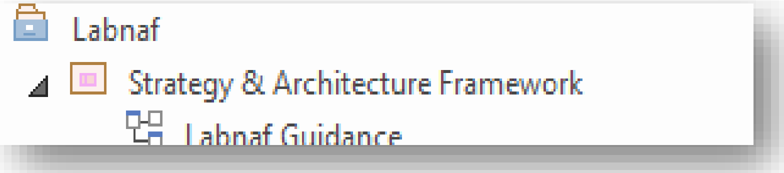
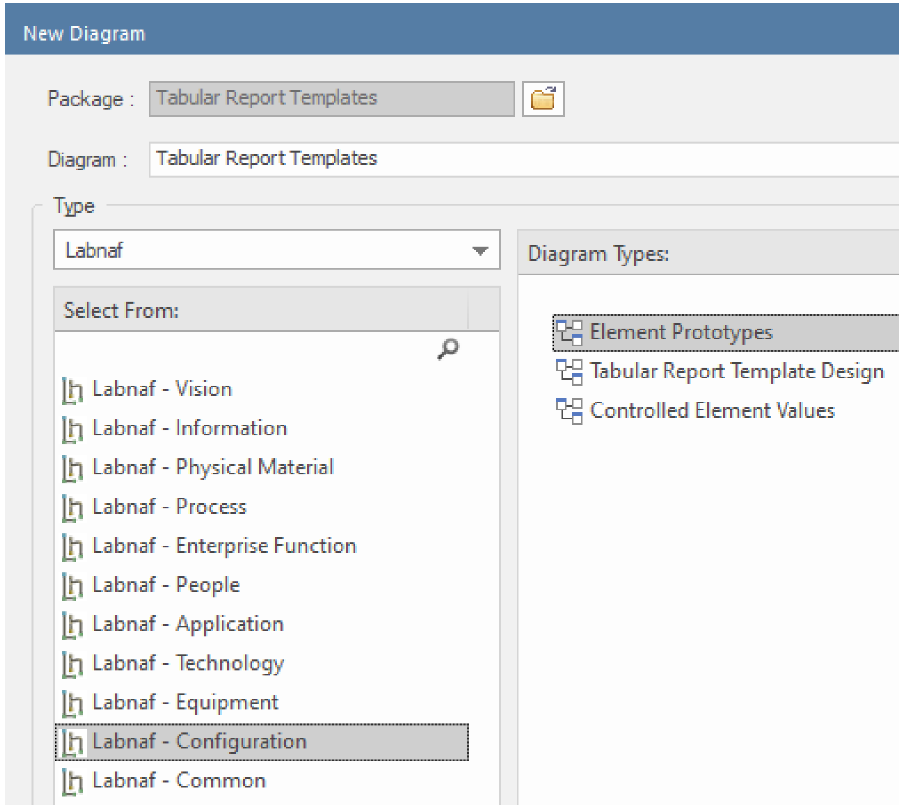
Define the type of element needing calculation…

- If it does not exist yet, create a diagram of type “Element Prototypes” or any diagram type containing the elements you need in the toolbox.
- Name it, for example, “ELP Configuration of Calculations”



Labnaf
- Strategy & Architecture Framework
  - Labnaf Guidance

:



New Diagram

Package : Tabular Report Templates

Diagram : Tabular Report Templates

Type

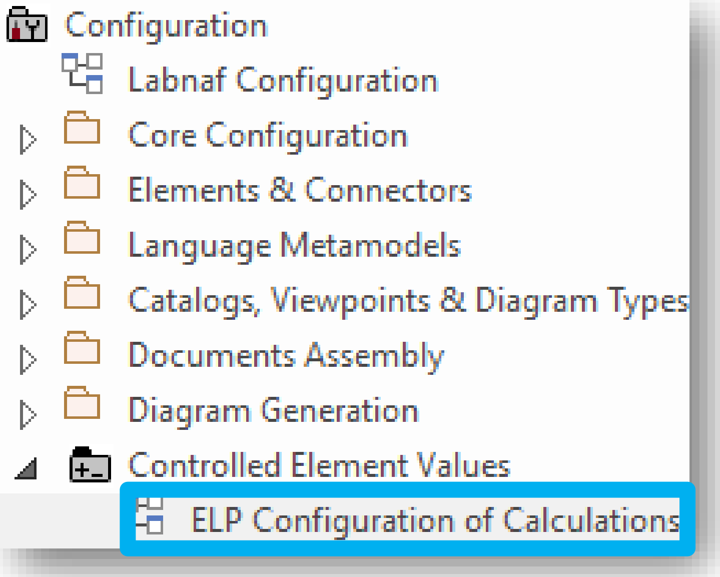
Labnaf

Select From:

- Labnaf - Vision
- Labnaf - Information
- Labnaf - Physical Material
- Labnaf - Process
- Labnaf - Enterprise Function
- Labnaf - People
- Labnaf - Application
- Labnaf - Technology
- Labnaf - Equipment
- Labnaf - Configuration
- Labnaf - Common

Diagram Types:

- Element Prototypes
- Tabular Report Template Design
- Controlled Element Values



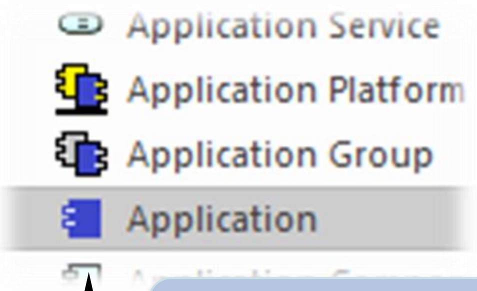
Configuration
- Labnaf Configuration
- Core Configuration
- Elements & Connectors
- Language Metamodels
- Catalogs, Viewpoints & Diagram Types
- Documents Assembly
- Diagram Generation
- Controlled Element Values
  - ELP Configuration of Calculations

… using an element prototype

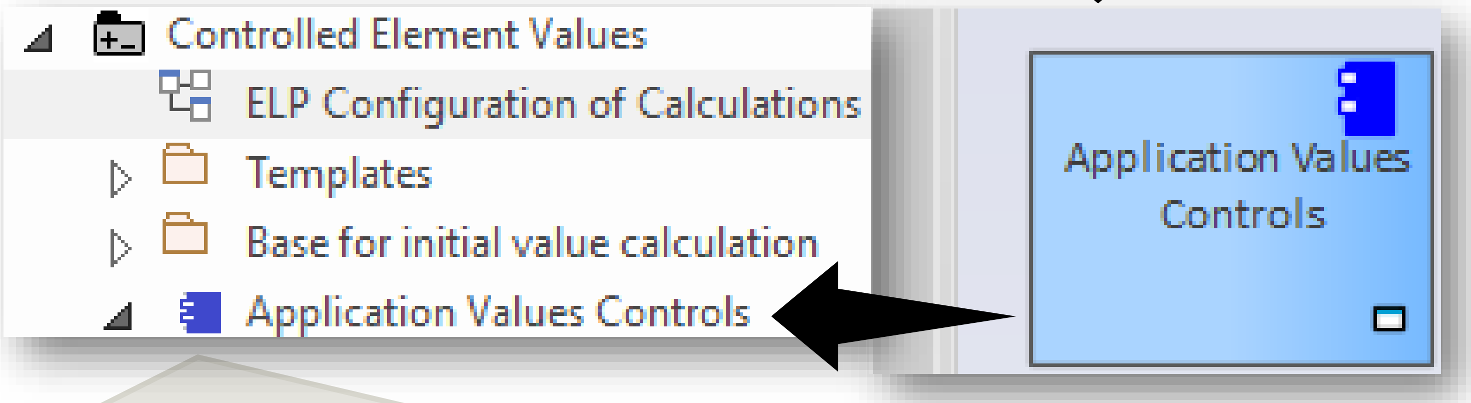
- Select an element in the toolbox

  You need only one element prototype of each type. But you can have more, for example, to further classify your calculations.

- Name the element prototype for example “Application Values Controls”



Type of element needing calculations


Controlled Element Values
ELP Configuration of Calculations
Templates
Base for initial value calculation
Application Values Controls
Application Values Controls

This is an **element protype** that will group all the **<u>application</u> calculations** (periodical or initial value).

By default, the Labnaf PowerShell periodically calculates values for all element prototypes contained in the “Controlled Element Values” folder. But you can be selective as well.

Value Calculation

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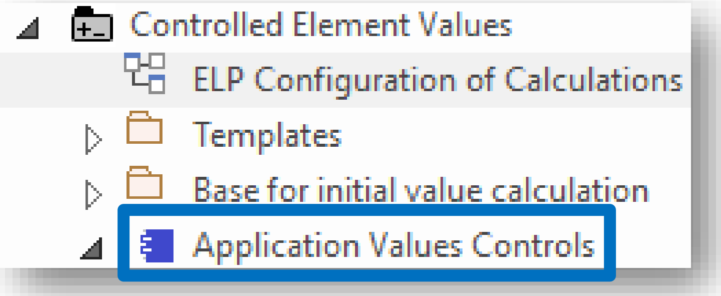
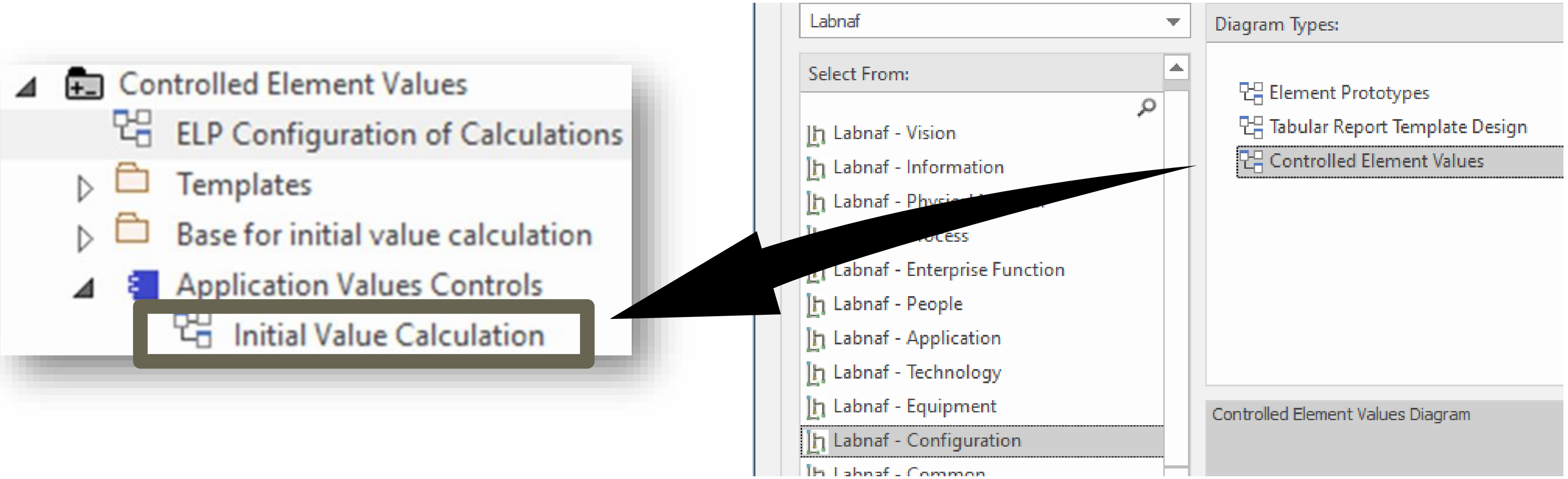
Add a diagram for creating your Value Controls (Value calculation elements)



- Controlled Element Values
  - ELP Configuration of Calculations
  - Templates
  - Base for initial value calculation
  - Application Values Controls

Right click on the element prototype and select “**Add Diagram**”

Under “Labnaf Configuration”, select “**Controlled Element Values**”



- Controlled Element Values
  - ELP Configuration of Calculations
  - Templates
  - Base for initial value calculation
  - Application Values Controls
    - Initial Value Calculation

Labnaf

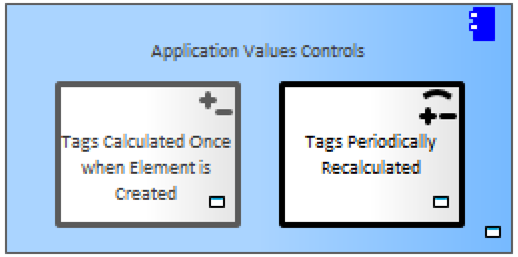
Select From:

- Labnaf - Vision
- Labnaf - Information
- Labnaf - Physi
- ocess
- Labnaf - Enterprise Function
- Labnaf - People
- Labnaf - Application
- Labnaf - Technology
- Labnaf - Equipment
- Labnaf - Configuration
- Labnaf - Common

Diagram Types:

- Element Prototypes
- Tabular Report Template Design
- Controlled Element Values

Controlled Element Values Diagram


Application Values Controls
Tags Calculated Once when Element is Created
Tags Periodically Recalculated

2 possible scenarios for **Creating a New Value Control**

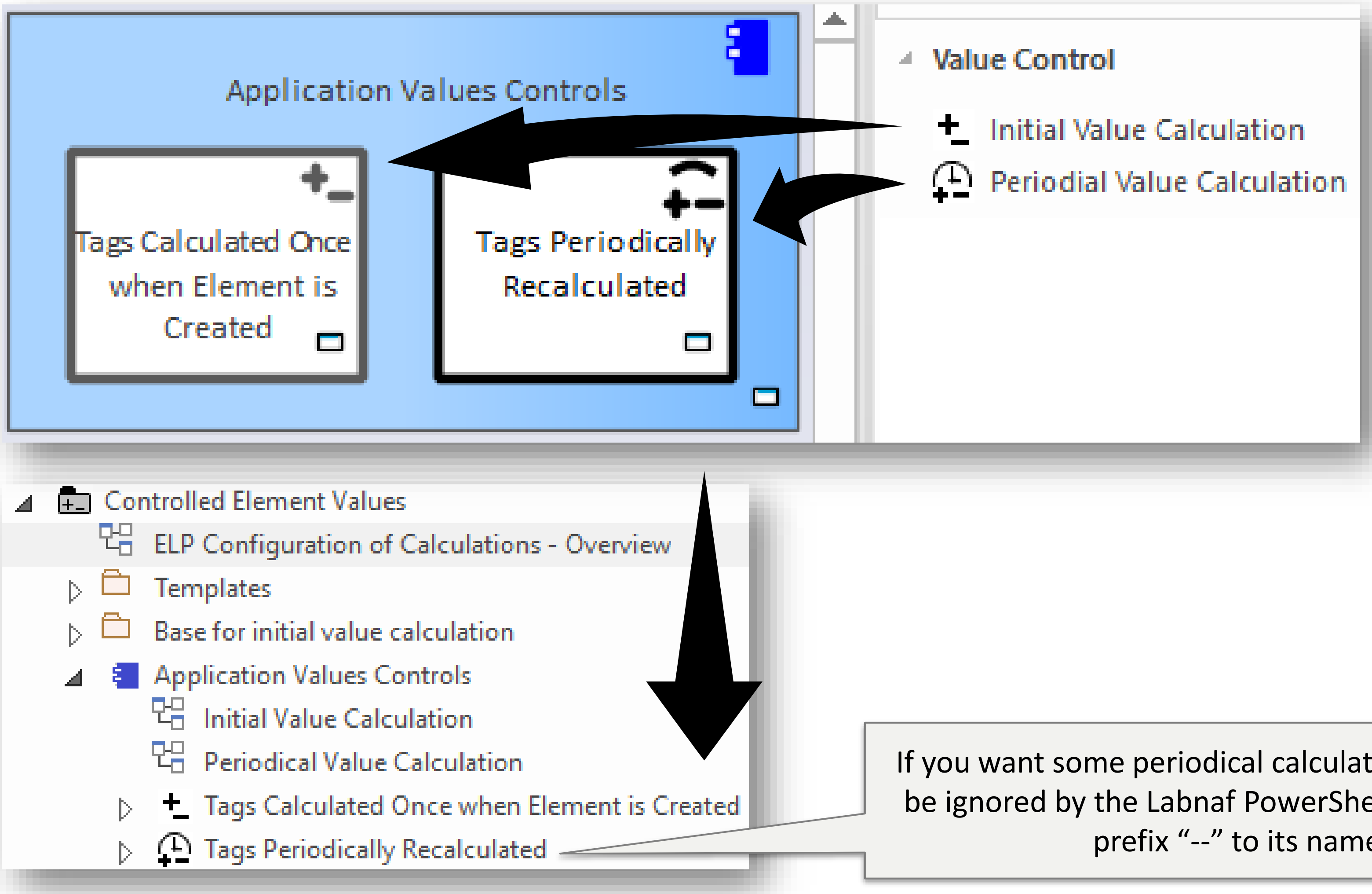
From Scratch Add a value control from the toolbox

Fast Track Copy and adapt an existing value control

From Scratch

Add a value control from the toolbox

Add value controls following your needs and with some meaningful name(s)



Application Values Controls
Tags Calculated Once when Element is Created
Tags Periodically Recalculated
Value Control
Initial Value Calculation
Periodial Value Calculation

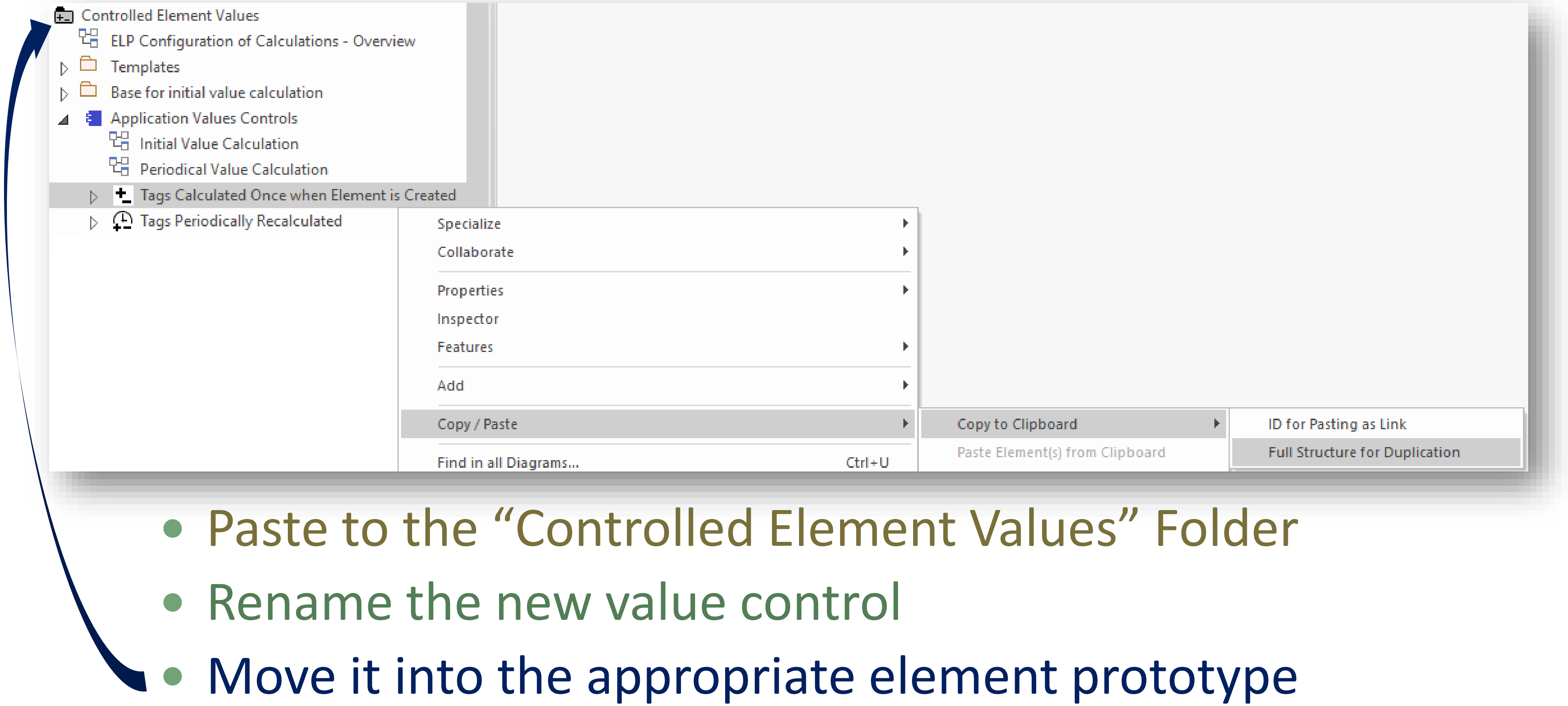
- Controlled Element Values
  - ELP Configuration of Calculations - Overview
  - Templates
  - Base for initial value calculation
  - Application Values Controls
    - Initial Value Calculation
    - Periodical Value Calculation
    - Tags Calculated Once when Element is Created
    - Tags Periodically Recalculated

If you want some periodical calculation template to be ignored by the Labnaf PowerShell, then add the prefix “--” to its name.

Fast Track

Copy and adapt an existing value control

- Copy an existing value control


Controlled Element Values
ELP Configuration of Calculations - Overview
Templates
Base for initial value calculation
Application Values Controls
Initial Value Calculation
Periodical Value Calculation
Tags Calculated Once when Element is Created
Tags Periodically Recalculated
Specialize
Collaborate
Properties
Inspector
Features
Add
Copy / Paste
Find in all Diagrams... Ctrl+U
Copy to Clipboard
Paste Element(s) from Clipboard
ID for Pasting as Link
Full Structure for Duplication

- Paste to the “Controlled Element Values” Folder
- Rename the new value control
- Move it into the appropriate element prototype
- Add/remove the content you need. See following slides…

Completing/Adapting the New Value Control…

Value Calculation

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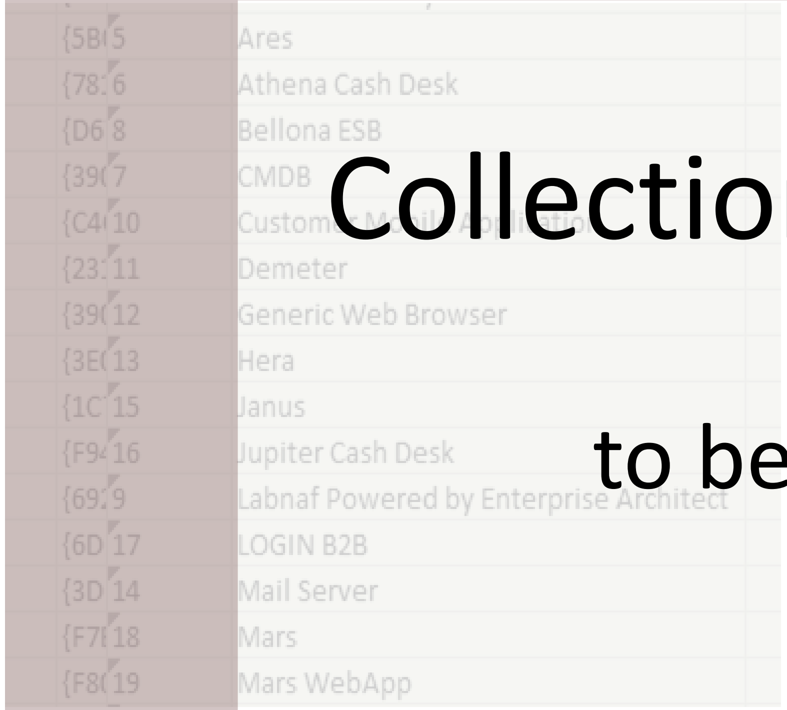
6. Making calculated tagged values read only
7. Value calculation summary
8. Triggering periodical value calculations

For PERIODICAL Value Calculations ONLY

Selecting the

Collection of Elements

to be Calculated



{5B(	5	Ares
{78:	6	Athena Cash Desk
{D6	8	Bellona ESB
{39(	7	CMDB
{C4(	10	Customer Mobile Application
{23:	11	Demeter
{39(	12	Generic Web Browser
{3E(	13	Hera
{1C	15	Janus
{F9	16	Jupiter Cash Desk
{69:	9	Labnaf Powered by Enterprise Architect
{6D	17	LOGIN B2B
{3D	14	Mail Server
{F7(	18	Mars
{F8(	19	Mars WebApp

Defining a selection of elements (scope) requiring calculations

Options that can be defined in the template

1. Elements and packages present in a “scope” diagram that belongs to the template
2. Elements selected by some SQL select defined in the template
3. All elements in the catalog (default)

If multiple scopes have been defined, then the above sequence corresponds to priorities

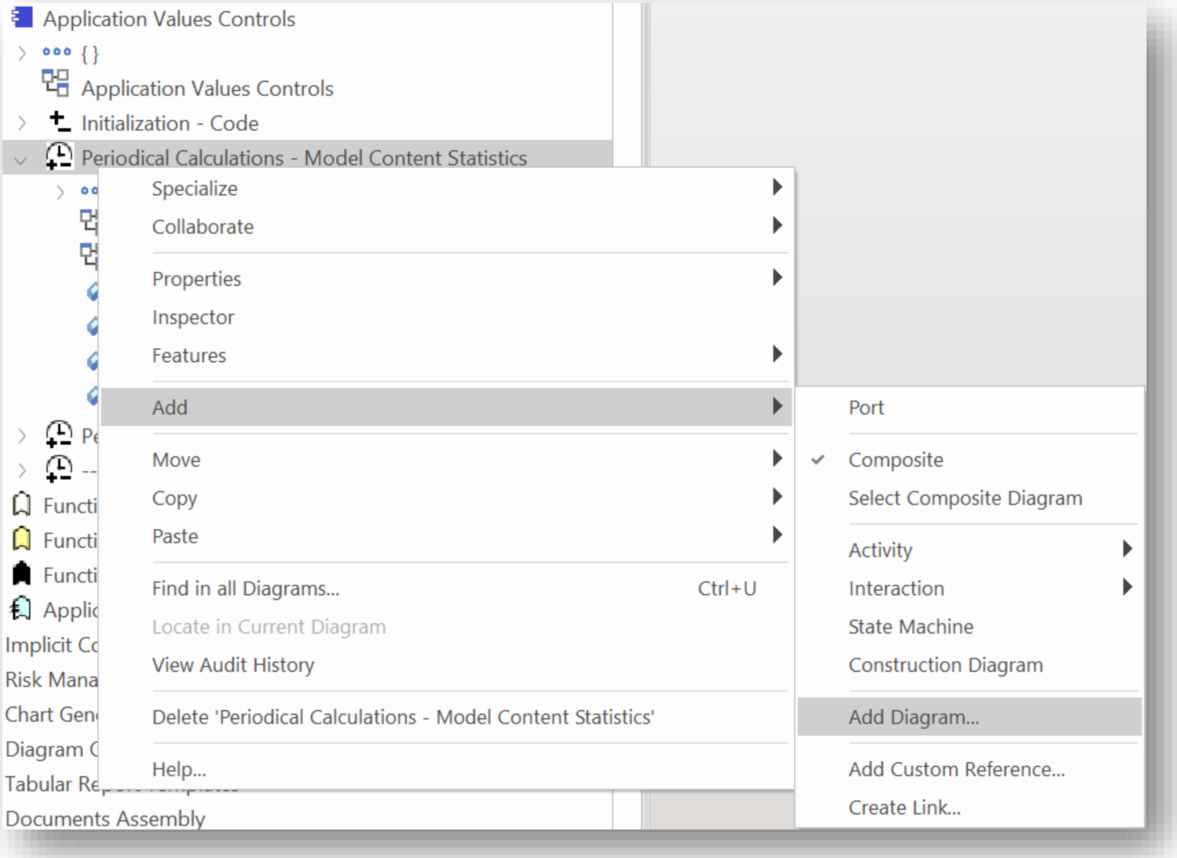
Additional option when the calculation is started from the user interface

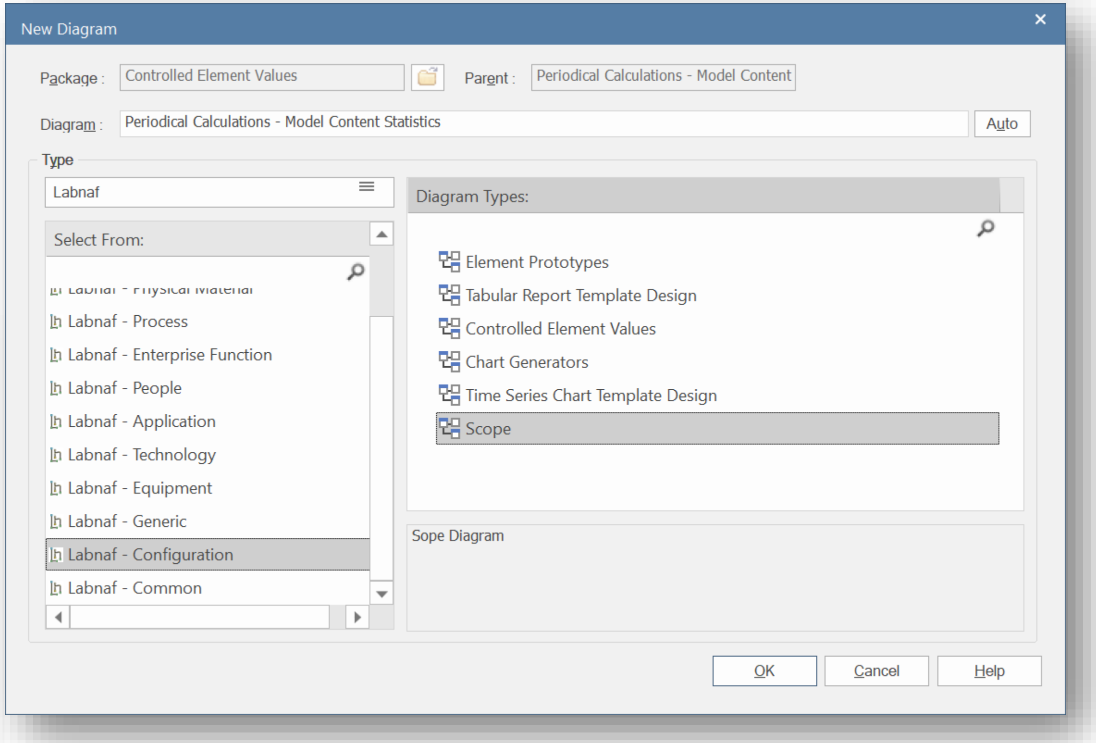
- Apply all calculations applicable to the element selected in the project browser or in the active diagram (typically used for calculation development and test purpose)

1. Scope Diagram

Creating a “scope” diagram defining the collection of element to be reported

- Select a periodical value calculation template element and add a « Scope » diagram





Package : Controlled Element Values

Parent : Periodical Calculations - Model Content

Diagram : Periodical Calculations - Model Content Statistics

Labnaf

Sope Diagram

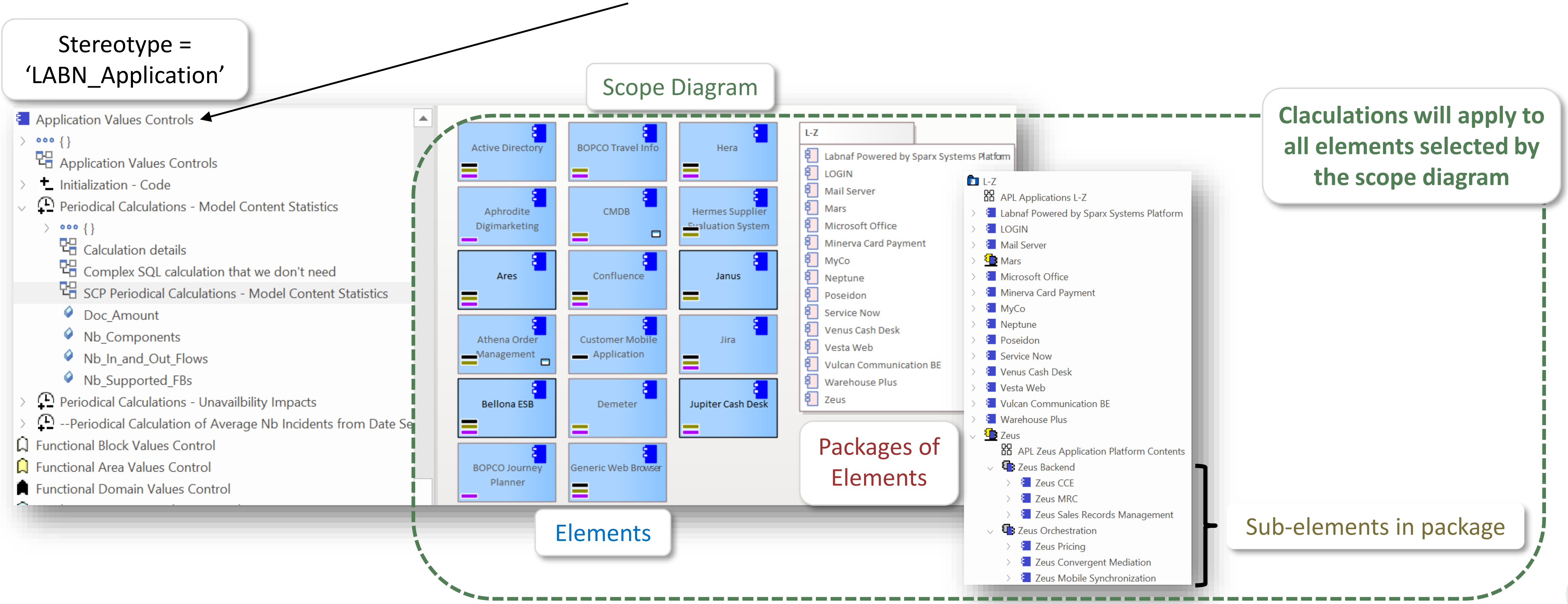
1. Scope Diagram

Populate the Scope diagram

- Add to the scope diagram the elements and packages of elements for which calculations are required

⇒ Collected elements =

  - Elements and packages of elements (including sub-elements) in the scope diagram
  - that have the same stereotype as the parent element prototype



Stereotype = 'LABN_Application'

Scope Diagram

Claculations will apply to all elements selected by the scope diagram

Elements

Packages of Elements

Sub-elements in package

Application Values Controls
{ }
Application Values Controls
Initialization - Code
Periodical Calculations - Model Content Statistics
{ }
Calculation details
Complex SQL calculation that we don't need
SCP Periodical Calculations - Model Content Statistics
Doc_Amount
Nb_Components
Nb_In_and_Out_Flows
Nb_Supported_FBs
Periodical Calculations - Unavailbility Impacts
--Periodical Calculation of Average Nb Incidents from Date Se
Functional Block Values Control
Functional Area Values Control
Functional Domain Values Control

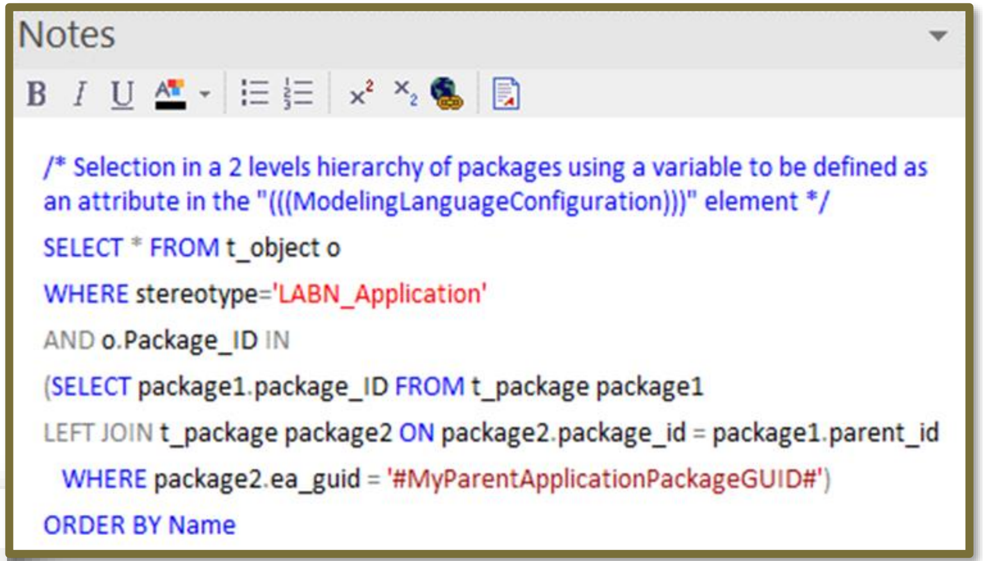
L-Z
Labnaf Powered by Sparx Systems Platform
LOGIN
Mail Server
Mars
Microsoft Office
Minerva Card Payment
MyCo
Neptune
Poseidon
Service Now
Venus Cash Desk
Vesta Web
Vulcan Communication BE
Warehouse Plus
Zeus

L-Z
APL Applications L-Z
Labnaf Powered by Sparx Systems Platform
LOGIN
Mail Server
Mars
Microsoft Office
Minerva Card Payment
MyCo
Neptune
Poseidon
Service Now
Venus Cash Desk
Vesta Web
Vulcan Communication BE
Warehouse Plus
Zeus
APL Zeus Application Platform Contents
Zeus Backend
Zeus CCE
Zeus MRC
Zeus Sales Records Management
Zeus Orchestration
Zeus Pricing
Zeus Convergent Mediation
Zeus Mobile Synchronization

2. Scope As SQL Select

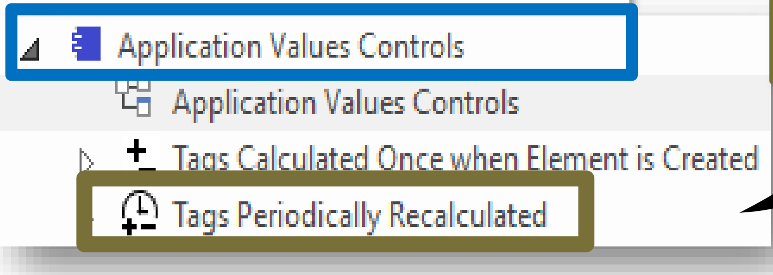
Custom **SQL** for selecting the **collection of elements** requiring calculations.

The "**Notes**" property of the value control element contains some SQL SELECT statement.
That SQL statements selects the elements that have values to be calculated.



```
/* Selection in a 2 levels hierarchy of packages using a variable to be defined as
an attribute in the "(((ModelingLanguageConfiguration)))" element */
SELECT * FROM t_object o
WHERE stereotype='LABN_Application'
AND o.Package_ID IN
(SELECT package1.package_ID FROM t_package package1
LEFT JOIN t_package package2 ON package2.package_id = package1.parent_id
  WHERE package2.ea_guid = '#MyParentApplicationPackageGUID#')
ORDER BY Name
```

By default, all elements with the same stereotype as the element prototype are selected.


Application Values Controls
Application Values Controls
Tags Calculated Once when Element is Created
Tags Periodically Recalculated

With professional database engines, that SELECT statement can reach a level of sophistication that goes way beyond users' requirements.

File-based databases, on the other hand, have some limitations, but it is still usually sufficient to implement most use cases. File-based databases are anyway not designed for running on professional database servers.

Sample SQL Statements

```
/* Selection in a 2 levels hierarchy of packages */
SELECT * FROM t_object o
WHERE stereotype='LABN_Application'
AND o.Package_ID IN
(SELECT package1.package_ID FROM t_package package1
LEFT JOIN t_package package2 ON package2.package_id = package1.parent_id
  WHERE package2.ea_guid = ‘#uMyVariableContainingAPackageGUID#')
ORDER BY Name

/* selection in a set of packages
SELECT * FROM t_object WHERE stereotype ='LABN_Application' AND package_ID=550
UNION
SELECT * FROM t_object WHERE stereotype ='LABN_Application' AND package_ID=1126
*/

/* Ordered selection in a set of packages (Access only)
SELECT * FROM (
SELECT * FROM t_object WHERE stereotype ='LABN_Application' AND package_ID=550
UNION
SELECT * FROM t_object WHERE stereotype ='LABN_Application' AND package_ID=1126
)
ORDER BY NAME
*/
```

Statement can include comments

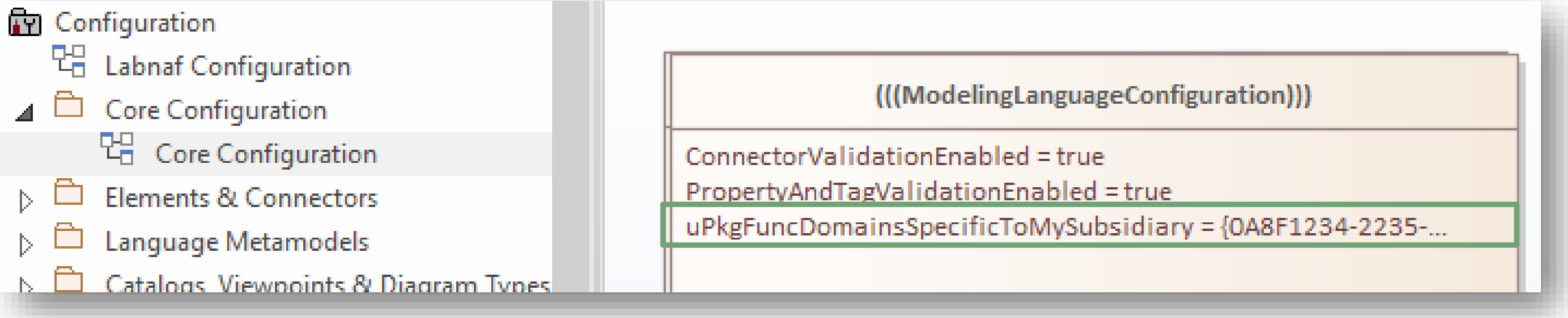
/* my comment */

These SQL statements can include variables

Variables defined in the core configuration can be used in SQL statements. You can add your own variables.

User-define variable must start with the letter **‘u’**

Example: A user-defined variable containing the GUID of a package:



ConnectorValidationEnabled = true
PropertyAndTagValidationEnabled = true
uPkgFuncDomainsSpecificToMySubsidiary = {0A8F1234-2235-...

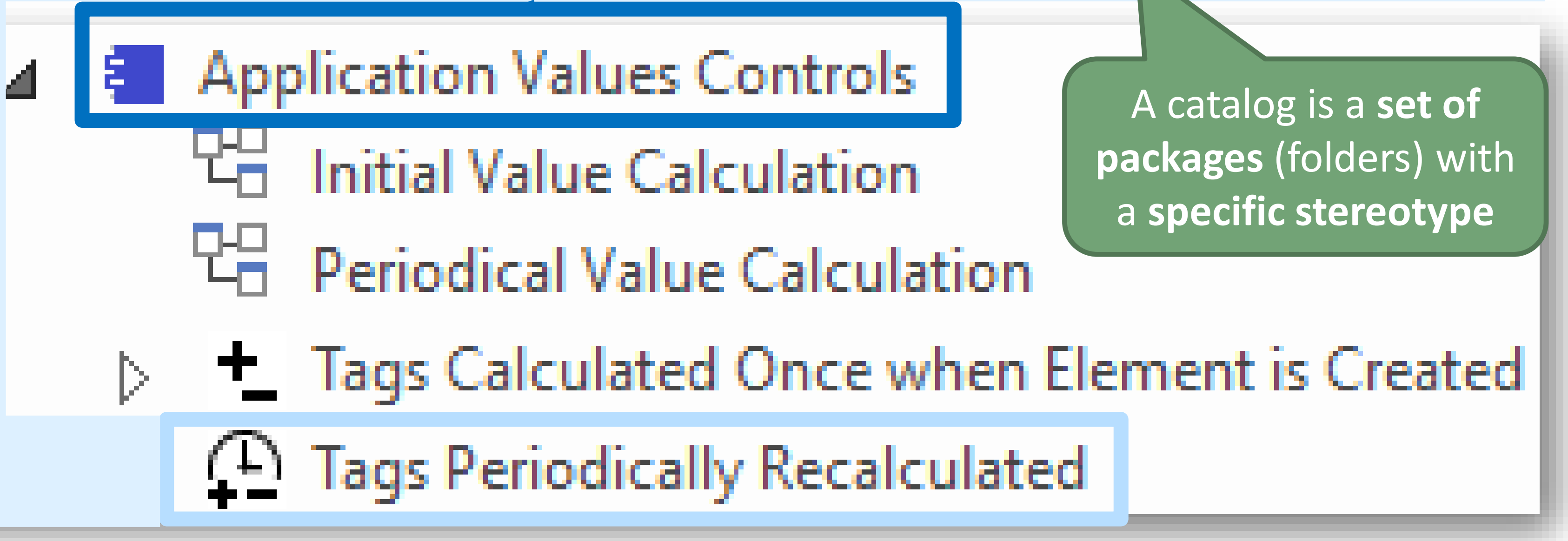
Usage of the user-defined variable in a SQL statement:

```
select * from t_object o inner
join t_package p on o.package_id = p.package_id
  where o.ParentID = 0 and o.stereotype like 'LABN_%’
  and p.ea_guid = ‘#uPkgFuncDomainsSpecificToMySubsidiary#'
ORDER BY o.Name
```

Default Scope = All elements in the catalog

By default, all elements with the same stereotype as the element prototype are selected from the related catalog

```
SELECT * FROM t_object WHERE stereotype = 'LABN_Application'
AND Package_ID IN
(SELECT PDATA1 from t_object
 where Object_Type='Package' and Stereotype = 'LNCAT_Application’)
order by Name
```



Application Values Controls
Initial Value Calculation
Periodical Value Calculation
Tags Calculated Once when Element is Created
Tags Periodically Recalculated

A catalog is a **set of packages** (folders) with a **specific stereotype**

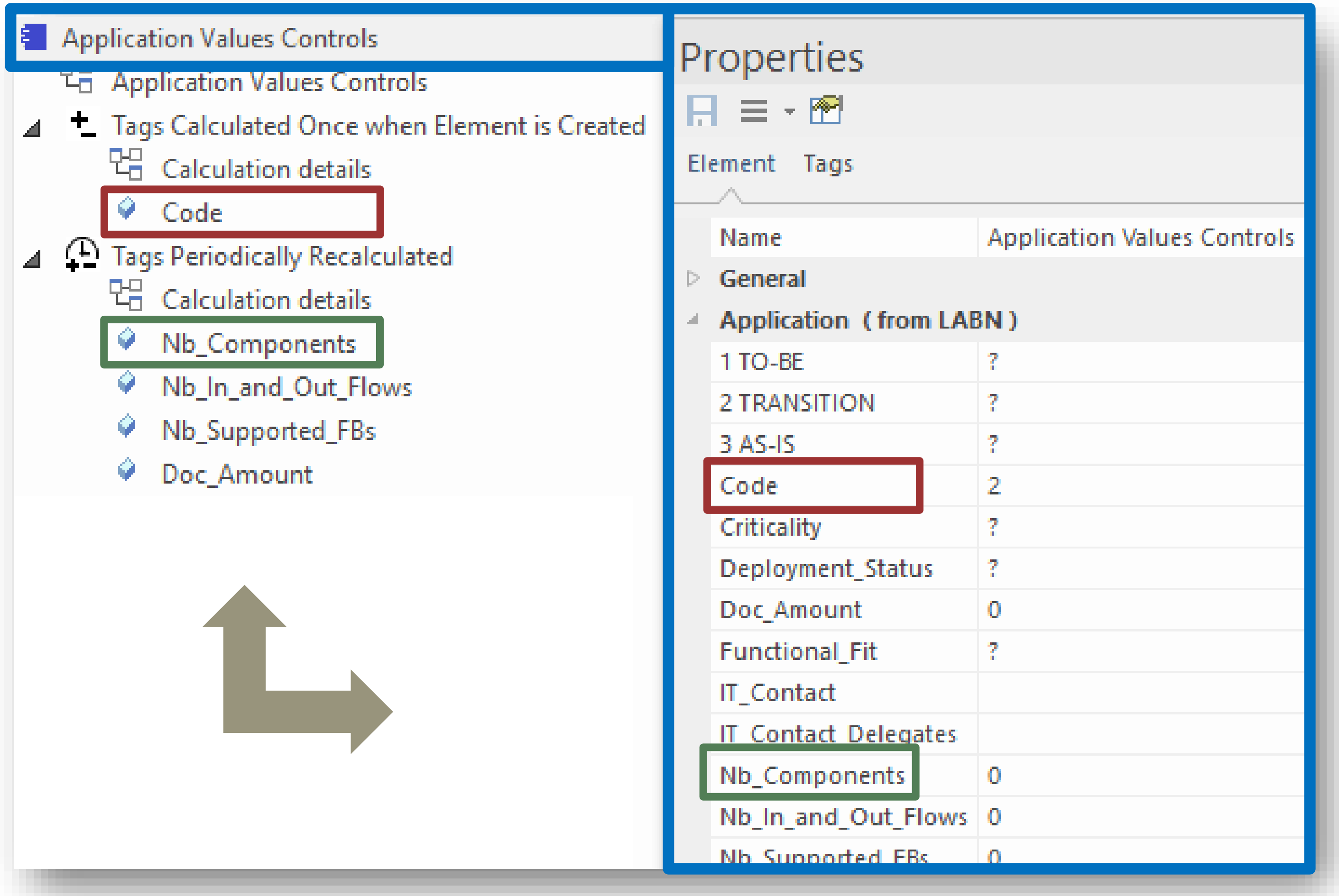
Value Calculation

1. Overview
2. Defining the type of element needing calculation
3. Scenarios for creating new value controls
4. Selecting the collection of elements to be calculated
5. Defining the tagged values to calculated
6. Making calculated tagged values read only
7. Value calculation summary
8. Triggering periodical value calculations

Tagged values to be calculated

'**Initial value calculation**' and '**periodical value calculation**' elements contain attributes.

The name of the **attributes** correspond to the **tagged values** to be calculated.



Application Values Controls

- Application Values Controls
- Tags Calculated Once when Element is Created
  - Calculation details
  - Code
- Tags Periodically Recalculated
  - Calculation details
  - Nb_Components
  - Nb_In_and_Out_Flows
  - Nb_Supported_FBs
  - Doc_Amount

Properties

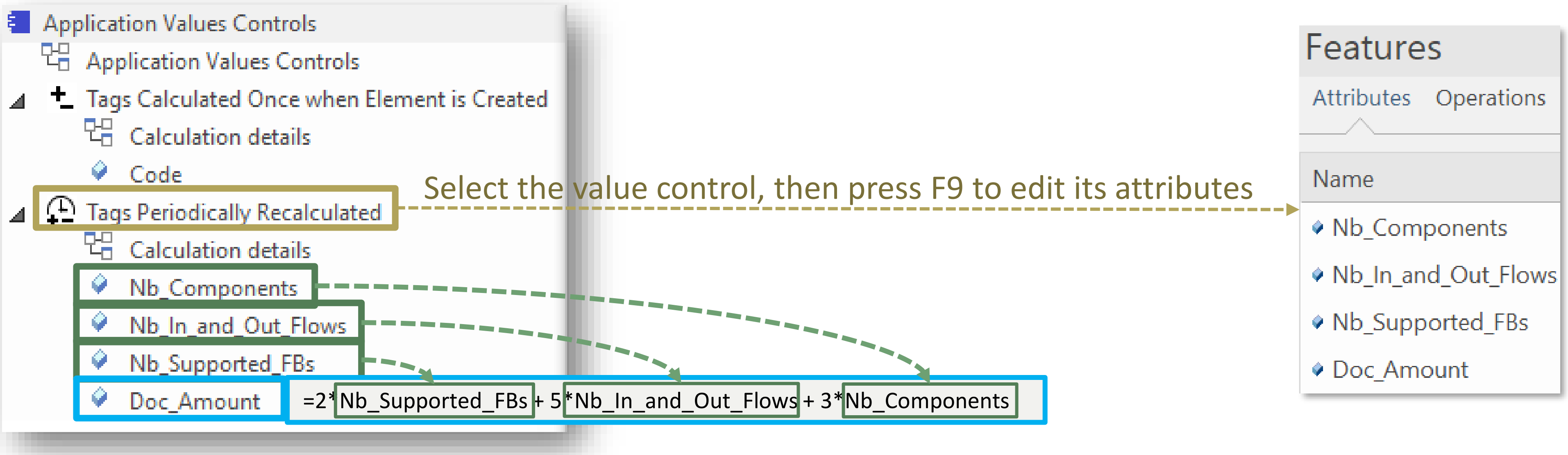
Element Tags

Name	Application Values Controls
General	
Application (from LABN)	
1 TO-BE	?
2 TRANSITION	?
3 AS-IS	?
Code	2
Criticality	?
Deployment_Status	?
Doc_Amount	0
Functional_Fit	?
IT_Contact	
IT_Contact_Delegates	
Nb_Components	0
Nb_In_and_Out_Flows	0
Nb_Supported_FBs	0

The Sequence of (Cascaded) Calculations

The sequence of calculation follows the order of elements and attributes in the project browser

Use the **Ctrl-Up and Ctrl-Down keys** to change the order of elements and attributes



Application Values Controls
- Application Values Controls
- Tags Calculated Once when Element is Created
  - Calculation details
  - Code
- Tags Periodically Recalculated
  - Calculation details
  - Nb_Components
  - Nb_In_and_Out_Flows
  - Nb_Supported_FBs
  - Doc_Amount

Doc_Amount =2*Nb_Supported_FBs + 5*Nb_In_and_Out_Flows + 3*Nb_Components

Select the value control, then press F9 to edit its attributes

Features

Name
Nb_Components
Nb_In_and_Out_Flows
Nb_Supported_FBs
Doc_Amount

Cascaded calculations

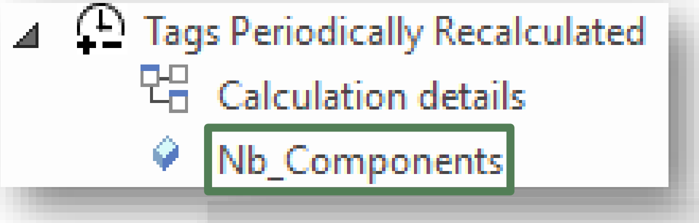
Calculation Expressions

Calculations expressions are stored in the attribute’s **Notes** property, e.g. **NB_Components.Notes**

The calculation can be expressed in three different formats, depending on your needs.

Formats =>	**SQL SELECT statement**	**Date Series Consolidation Function + SQL SELECT statement**	**Mathematical expression**
Syntax	**SQL SELECT statement** that returns **one single row** and a **single column called** '**CALCULATED_VALUE**'.	A **function name** followed by a **SQL SELECT statement** that returns **multiple rows** and a **single column called** '**CALCULATED_VALUE**’. Function is either **SumValuesInMatchingDateSeries** or **AverageValuesInMatchingDateSeries**	={math expression}
Example	Nb_Components.Notes SELECT COUNT**(*)** AS **CALCULATED_VALUE** from **t_object** oChild where oChild**.**ParentID **=** **(**SELECT Object_ID from **t_object** oParent where oChild**.**Stereotype in **(**'LABN_DataStore'**,**'LABN_ApplicationComponent’**)** AND oParent**.**ea_guid **=** **'#CurrentElementGUID#')**	MTBF.Notes **AverageValuesInMatchingDateSeries** SELECT oApp.Name as AppName, prop.value AS **CALCULATED_VALUE** FROM t_object oApp LEFT JOIN t_objectproperties prop ON oApp.object_id = prop.object_id WHERE oApp.Stereotype = 'LABN_Application' AND oApp.Object_ID IN (SELECT Start_Object_ID FROM t_connector WHERE t_Connector.Stereotype = 'LABN_Realization’ AND t_connector.End_Object_ID = **#CurrentElementID#)** AND prop.Property='MTBF'	Doc_Amount.Notes =2*Nb_Supported_FBs + 5*Nb_In_and_Out_Flows + 3*Nb_Components
Input data	Any combination of repository content including catalogs, elements, connectors, diagrams, properties/tagged values, authors…	Any combination of repository content including catalogs, elements, connectors, diagrams, properties/tagged values, authors…	Properties/tagged values that belong to a same element

SQL SELECT Statements

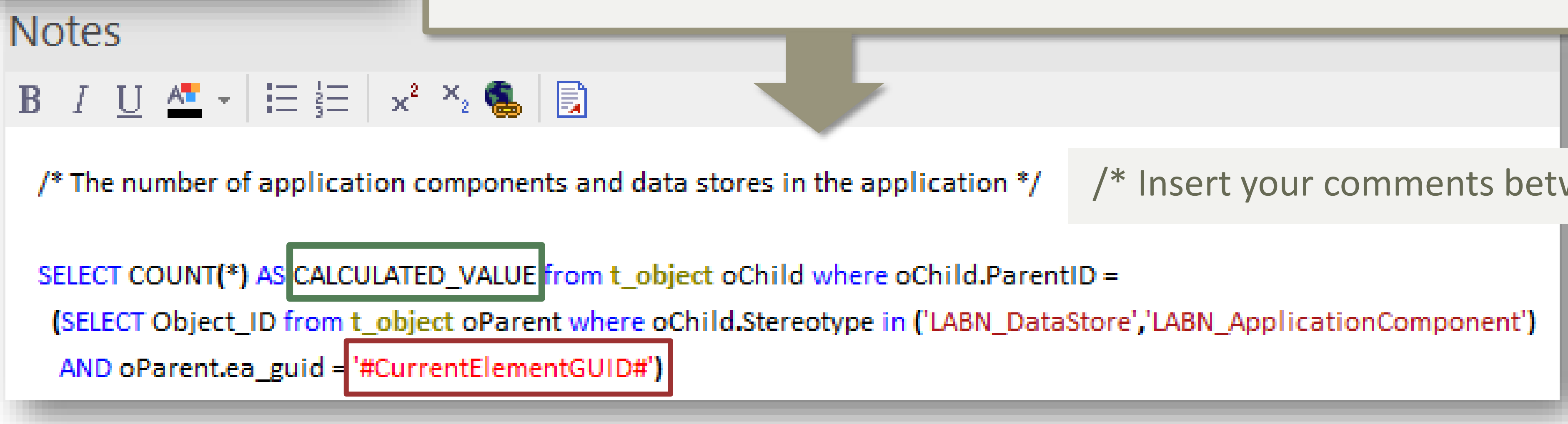


Tags Periodically Recalculated

Calculation details

Nb_Components

SQL SELECT statement that returns **one single row** and a **single column called** '**CALCULATED_VALUE**'.



Notes

```
/* The number of application components and data stores in the application */

SELECT COUNT(*) AS CALCULATED_VALUE from t_object oChild where oChild.ParentID =
 (SELECT Object_ID from t_object oParent where oChild.Stereotype in ('LABN_DataStore','LABN_ApplicationComponent')
  AND oParent.ea_guid = '#CurrentElementGUID#')
```

/* Insert your comments between delimiters */

Contextual variables can be used in the SQL calculation statements:

#CurrentElementGUID#

#CurrentElementID#

SQL SELECT Statements

Database Engine: Use SQL Server

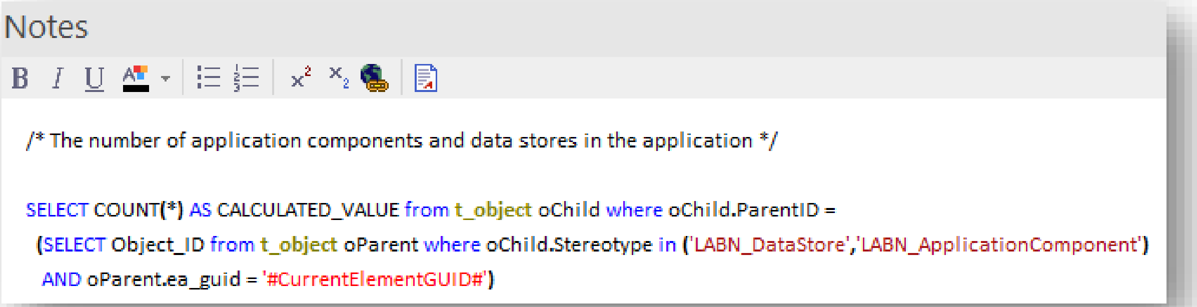
- SQL syntax is different across database engines

- **SQL Server is very powerful including for queries**

  Because the calculation language is SQL, the possibilities and combinations are almost infinite.

- **File-based databases** (SQLite, Access) are **limited**

  Trying to make SQL-based value calculations in Access databases is mostly a waste of time

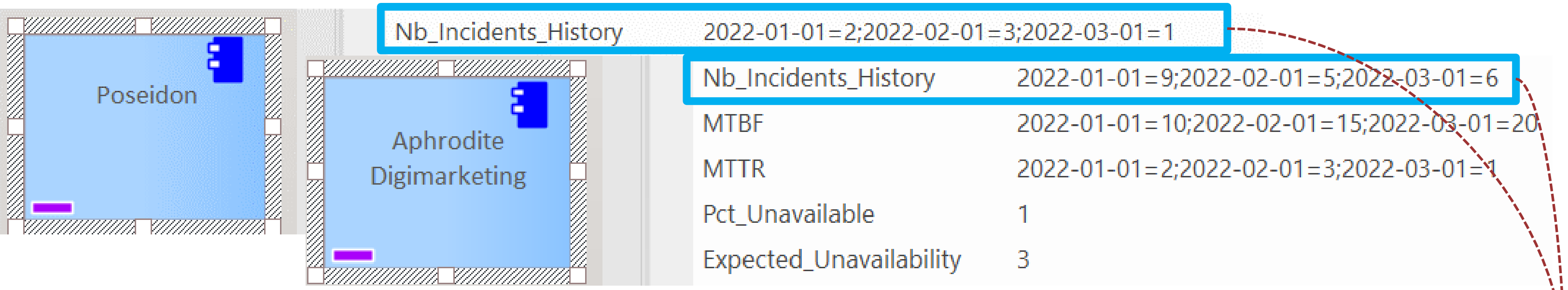


```
/* The number of application components and data stores in the application */

SELECT COUNT(*) AS CALCULATED_VALUE from t_object oChild where oChild.ParentID =
 (SELECT Object_ID from t_object oParent where oChild.Stereotype in ('LABN_DataStore','LABN_ApplicationComponent')
  AND oParent.ea_guid = '#CurrentElementGUID#')
```

Date Series Consolidation Functions

- **Definition**: A date series is a series of values of a quantity obtained at successive dates.
- **Format:** Labnaf Date Series tagged value format is: “YYYY-MM-DD=NumericValue; YYYY-MM-DD=NumericValue; …”
- **Sample Application Date Series:**

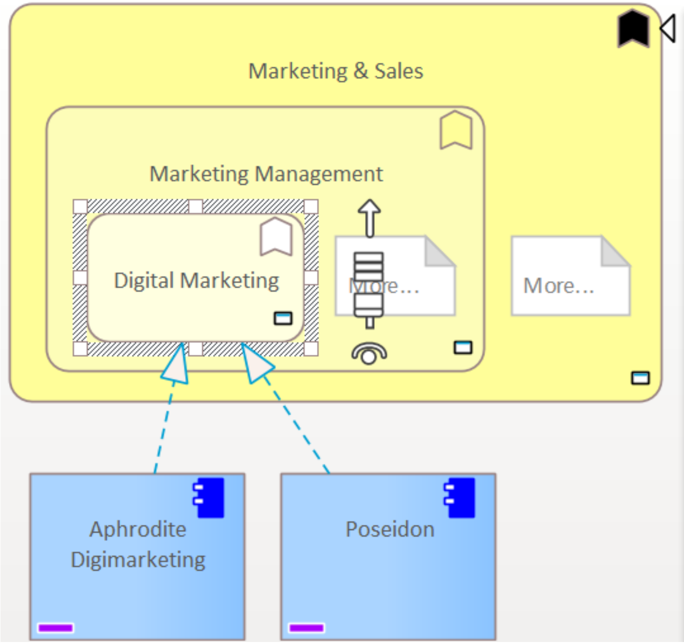


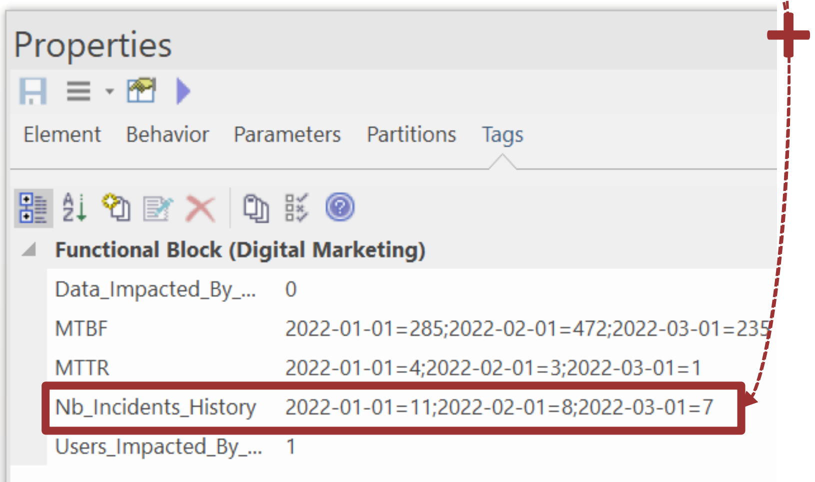
Nb_Incidents_History	2022-01-01=2;2022-02-01=3;2022-03-01=1

Nb_Incidents_History	2022-01-01=9;2022-02-01=5;2022-03-01=6
MTBF	2022-01-01=10;2022-02-01=15;2022-03-01=20
MTTR	2022-01-01=2;2022-02-01=3;2022-03-01=1
Pct_Unavailable	1
Expected_Unavailability	3

- **Multiple date series can be consolidated.**

For example, the property **Nb_Incidents_History** from multiple applications realizing a same functional block can be consolidated into a single **Nb_Incidents_History** for that functional block.





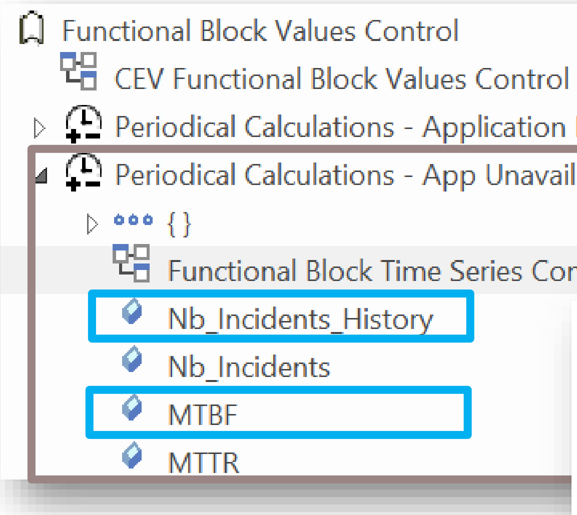
Functional Block (Digital Marketing)

Data_Impacted_By_...	0
MTBF	2022-01-01=285;2022-02-01=472;2022-03-01=235
MTTR	2022-01-01=4;2022-02-01=3;2022-03-01=1
Nb_Incidents_History	2022-01-01=11;2022-02-01=8;2022-03-01=7
Users_Impacted_By_...	1

Values of matching dates are either **summed**, or their **average** value is calculated.

SumValuesInMatchingDateSeries and AverageValuesInMatchingDateSeries

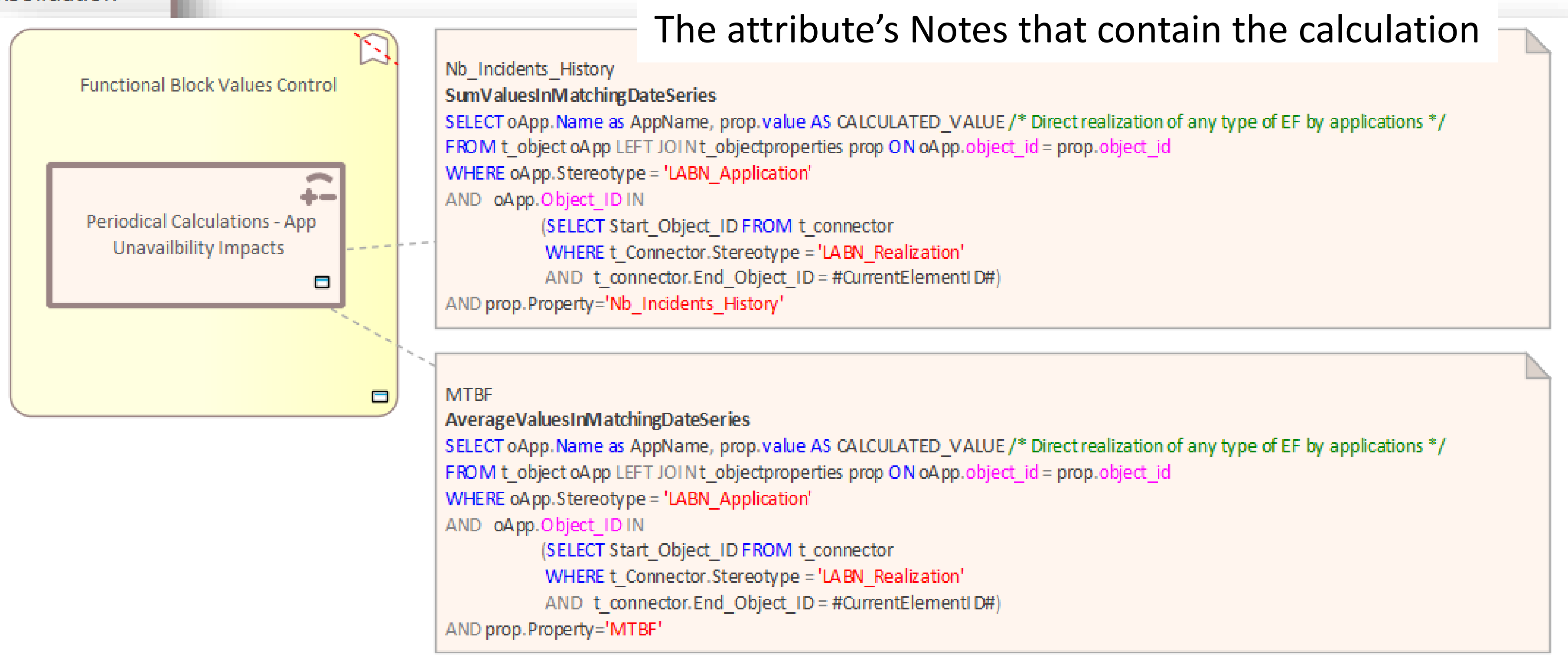
Sample Date Series consolidation for the properties **Nb_Incident_History** and **MTBF**



- Functional Block Values Control
  - CEV Functional Block Values Control
  - Periodical Calculations - Application Portfolio
  - Periodical Calculations - App Unavailbility Impacts
    - { }
    - Functional Block Time Series Consolidation
    - Nb_Incidents_History
    - Nb_Incidents
    - MTBF
    - MTTR

Each select statement selects multiple application date series properties to be consolidated..

For **NB_Incidents_History**, values are summed for the matching dates.
For **MTBF**, the average values are calculated for the matching dates.



Functional Block Values Control
Periodical Calculations - App Unavailbility Impacts

The attribute’s Notes that contain the calculation

```
Nb_Incidents_History
SumValuesInMatchingDateSeries
SELECT oApp.Name as AppName, prop.value AS CALCULATED_VALUE /* Direct realization of any type of EF by applications */
FROM t_object oApp LEFT JOIN t_objectproperties prop ON oApp.object_id = prop.object_id
WHERE oApp.Stereotype = 'LABN_Application'
AND  oApp.Object_ID IN
            (SELECT Start_Object_ID FROM t_connector
             WHERE t_Connector.Stereotype = 'LABN_Realization'
             AND  t_connector.End_Object_ID = #CurrentElementID#)
AND prop.Property='Nb_Incidents_History'
```

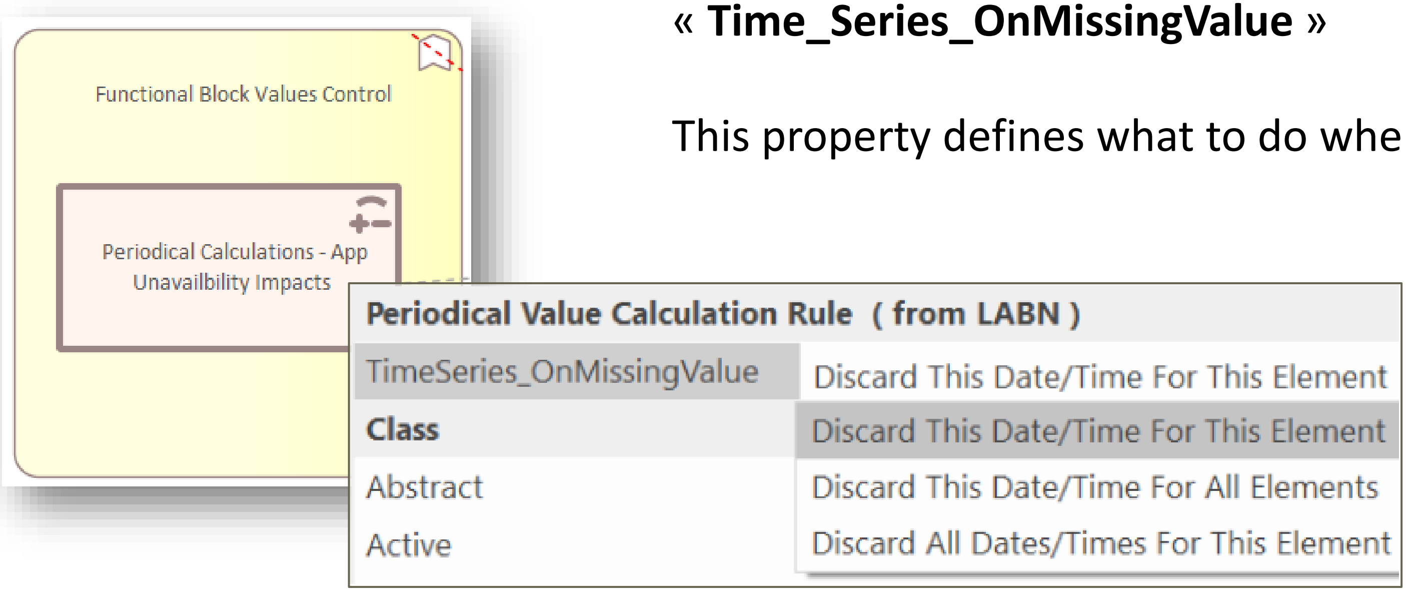
```
MTBF
AverageValuesInMatchingDateSeries
SELECT oApp.Name as AppName, prop.value AS CALCULATED_VALUE /* Direct realization of any type of EF by applications */
FROM t_object oApp LEFT JOIN t_objectproperties prop ON oApp.object_id = prop.object_id
WHERE oApp.Stereotype = 'LABN_Application'
AND  oApp.Object_ID IN
            (SELECT Start_Object_ID FROM t_connector
             WHERE t_Connector.Stereotype = 'LABN_Realization'
             AND  t_connector.End_Object_ID = #CurrentElementID#)
AND prop.Property='MTBF'
```

SumValuesInMatchingDateSeries and **AverageValuesInMatchingDateSeries**

Consolidating Inconsistent Sets of Date Series

Periodical Value Calculation Rule elements contain a property called « **Time_Series_OnMissingValue** »

This property defines what to do when a date/value is missing in a time series.


Functional Block Values Control
Periodical Calculations - App Unavailbility Impacts

Periodical Value Calculation Rule (from LABN)

TimeSeries_OnMissingValue — Discard This Date/Time For This Element

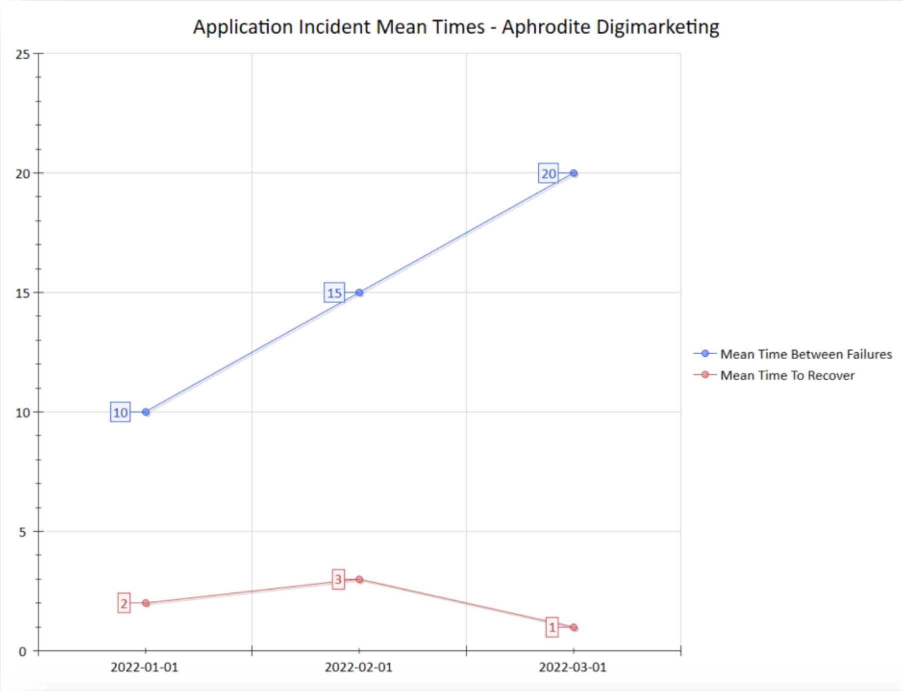
Class

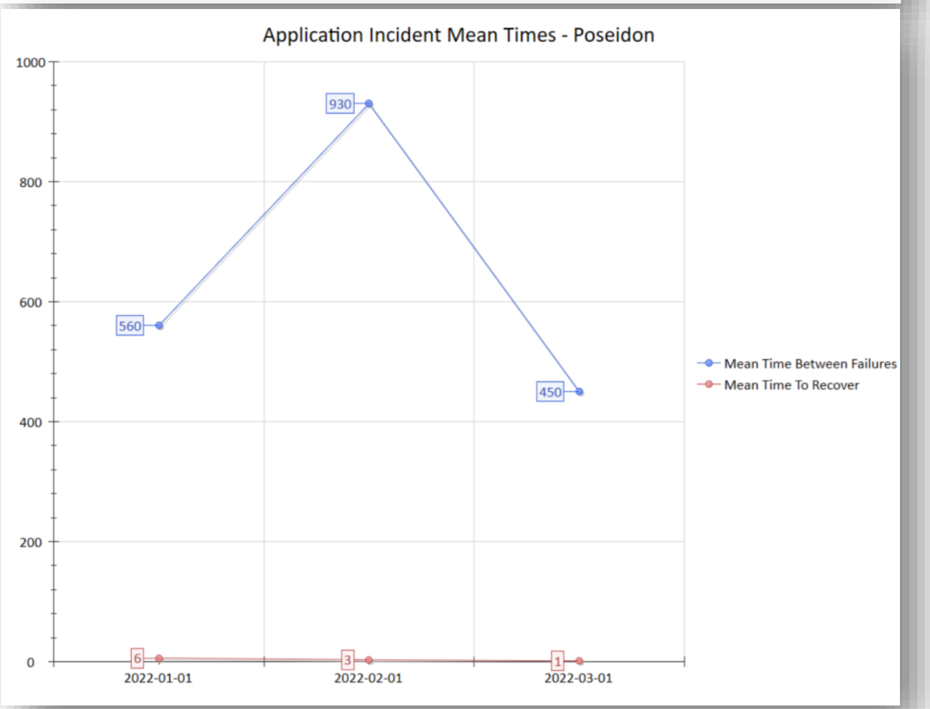
Abstract

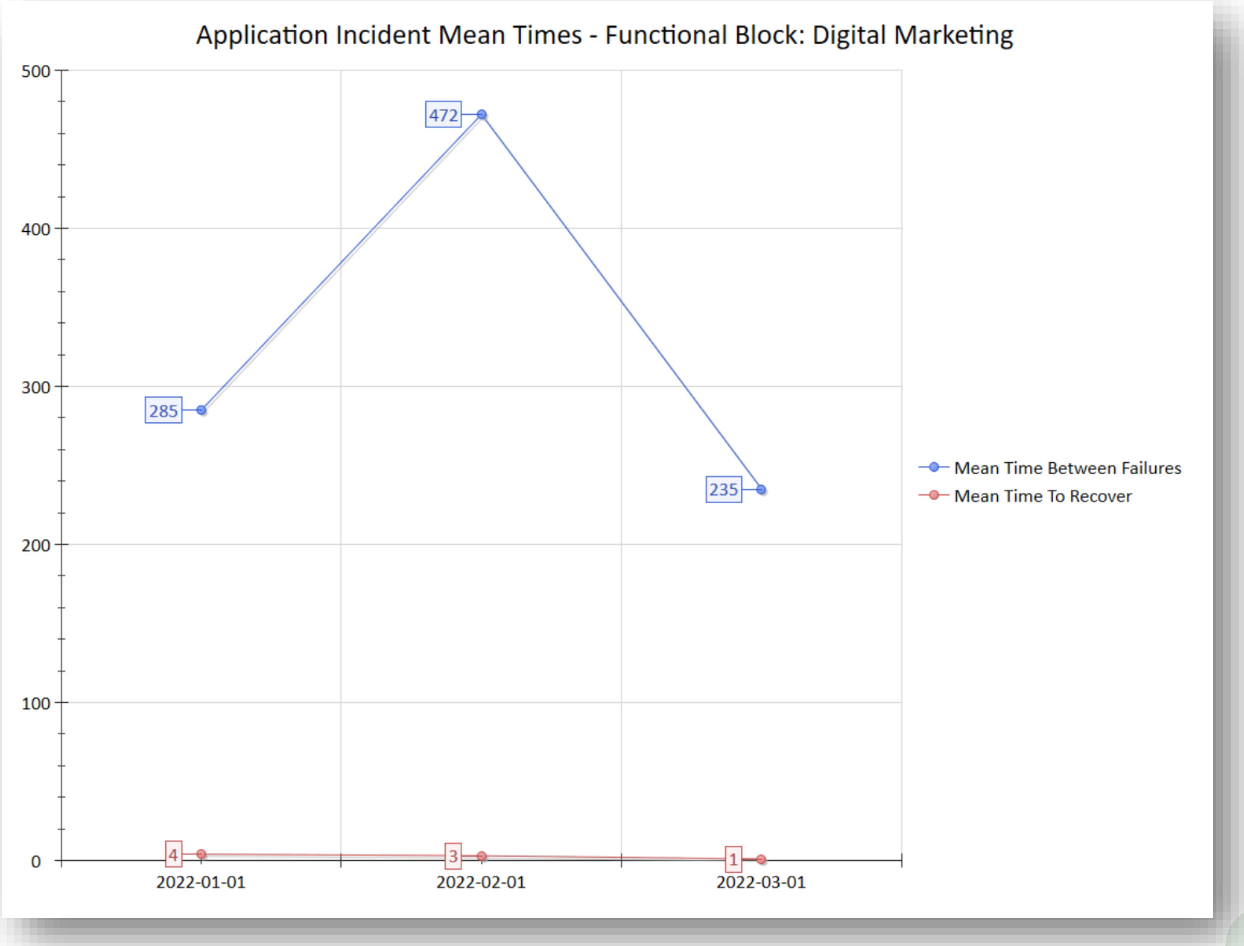
Active

Discard This Date/Time For This Element
Discard This Date/Time For All Elements
Discard All Dates/Times For This Element

Typical usage is consolidated time series chart generation







Mathematical Expressions

The attribute's **Notes** field contains the expression as follows:

"= {Calculation Expression}"

where {Calculation Expression} can include any of the items on the right =>

- **Property/Tagged Value names** that exist in the current element
- **Operators**:

  *

  /

  +

  -

  Power: x^y

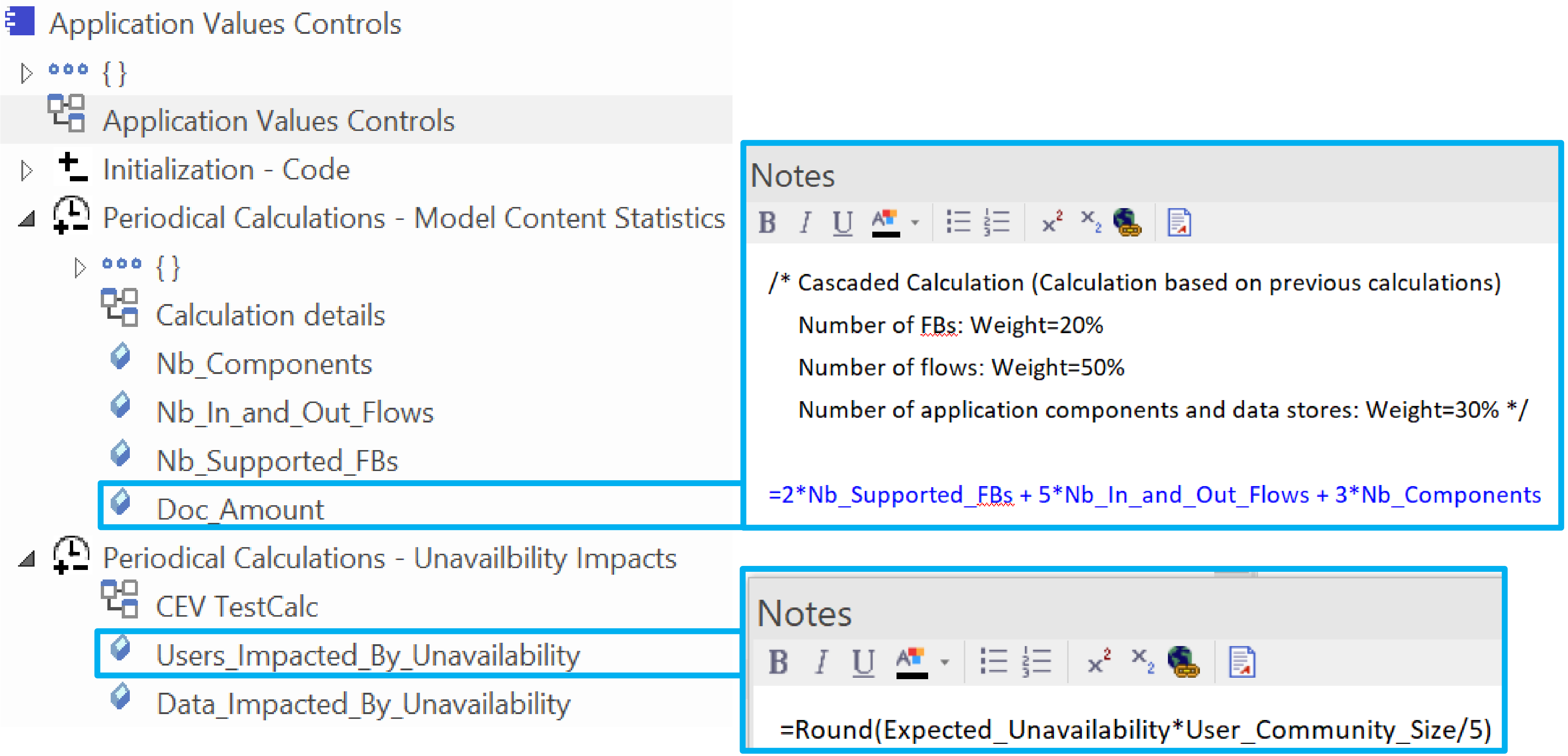
  Modulo: x%y

  Factorial: x!

- **Functions**: Round(x), RoundDown(x), Abs(x), Sqrt(x)
- **Parenthesis**, which can be embedded: (())

Mathematical Expressions

Examples


Application Values Controls
{ }
Application Values Controls
Initialization - Code
Periodical Calculations - Model Content Statistics
{ }
Calculation details
Nb_Components
Nb_In_and_Out_Flows
Nb_Supported_FBs
Doc_Amount
Periodical Calculations - Unavailbility Impacts
CEV TestCalc
Users_Impacted_By_Unavailability
Data_Impacted_By_Unavailability
Notes
B I U
Notes
B I U

```
/* Cascaded Calculation (Calculation based on previous calculations)
   Number of FBs: Weight=20%
   Number of flows: Weight=50%
   Number of application components and data stores: Weight=30% */

=2*Nb_Supported_FBs + 5*Nb_In_and_Out_Flows + 3*Nb_Components
```

```
=Round(Expected_Unavailability*User_Community_Size/5)
```

Value Calculation

1. Overview
2. Defining the type of element needing calculation
3. Scenarios for creating new value controls
4. Selecting the collection of elements to be calculated
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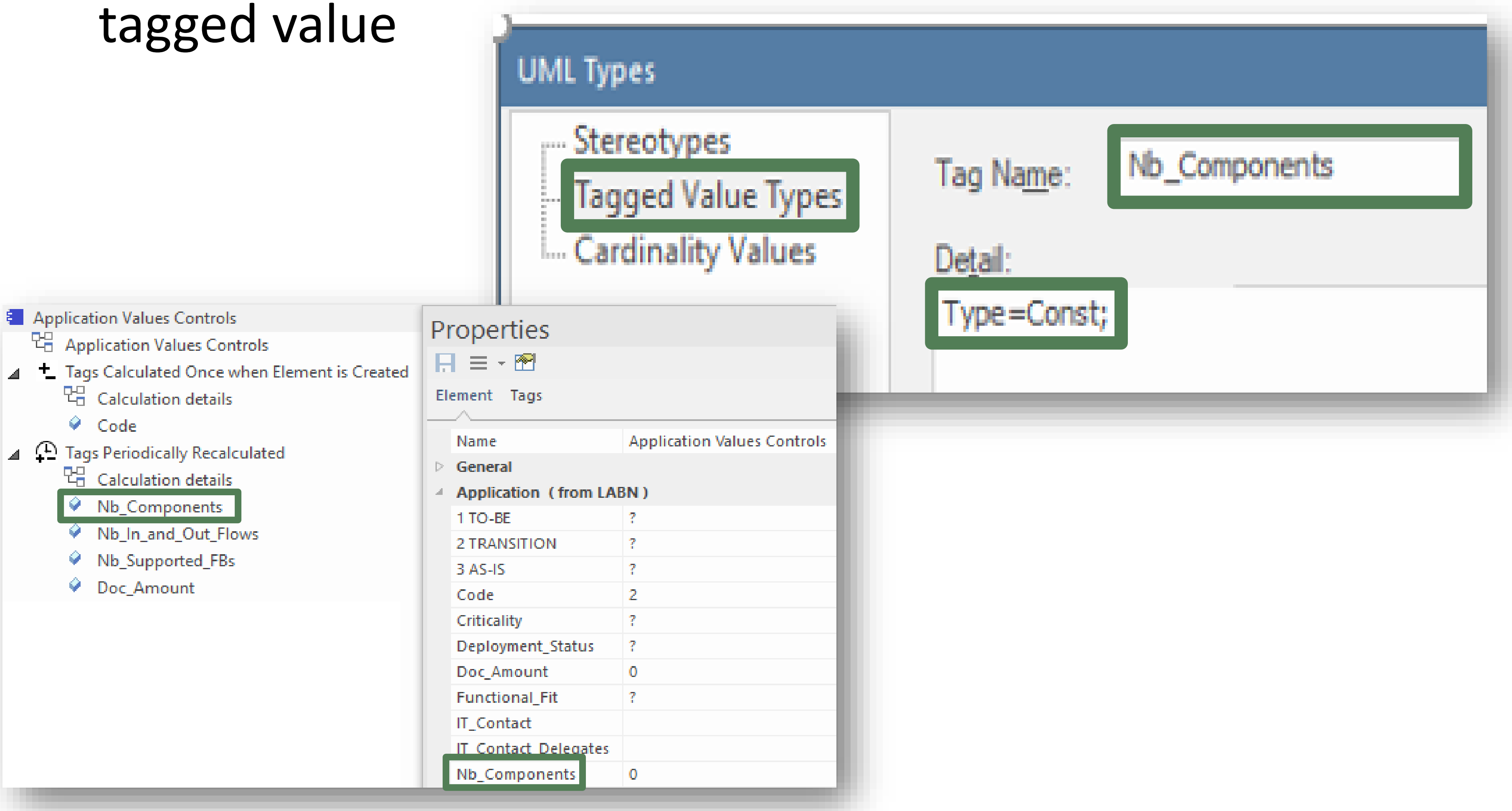
Making calculated values Read Only

- '**Configure** (Ribbon) > **UML Types** > **Tagged Value Types**
- Add a new tag name that correspond to the name of your tagged value



Tag Name: Nb_Components

Detail:
Type=Const;

Name	Application Values Controls
General	
Application (from LABN)	
1 TO-BE	?
2 TRANSITION	?
3 AS-IS	?
Code	2
Criticality	?
Deployment_Status	?
Doc_Amount	0
Functional_Fit	?
IT_Contact	
IT_Contact_Delegates	
Nb_Components	0

Value Calculation

1. Overview
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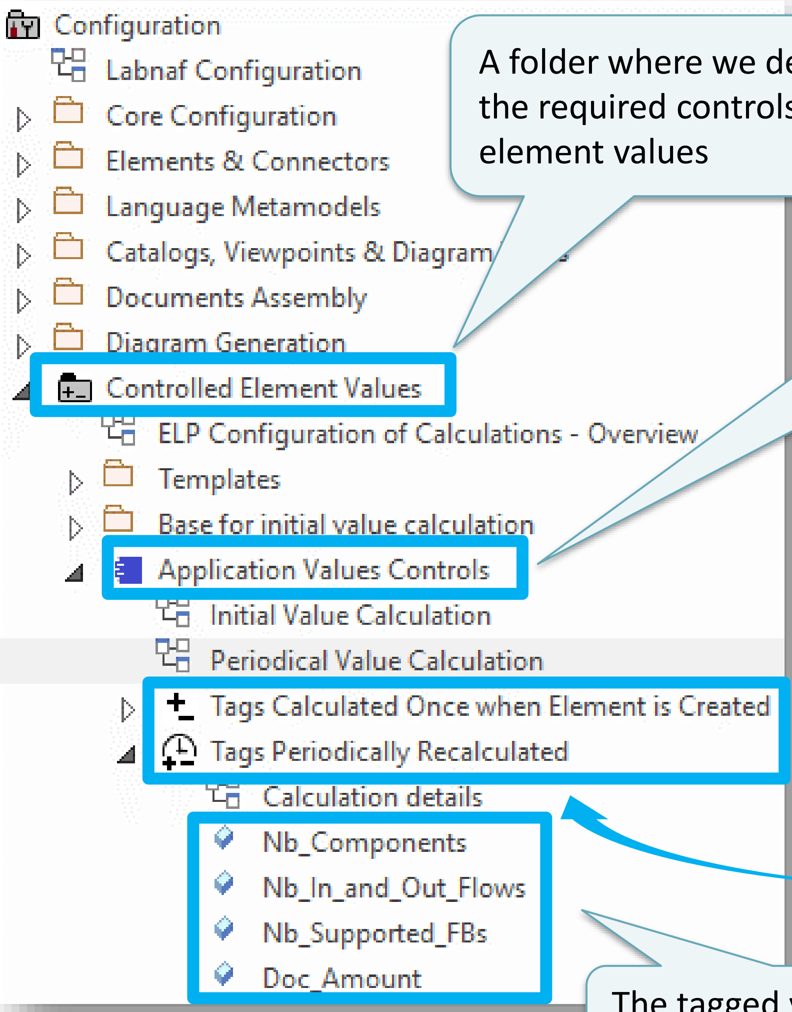
Value Calculation - Overview

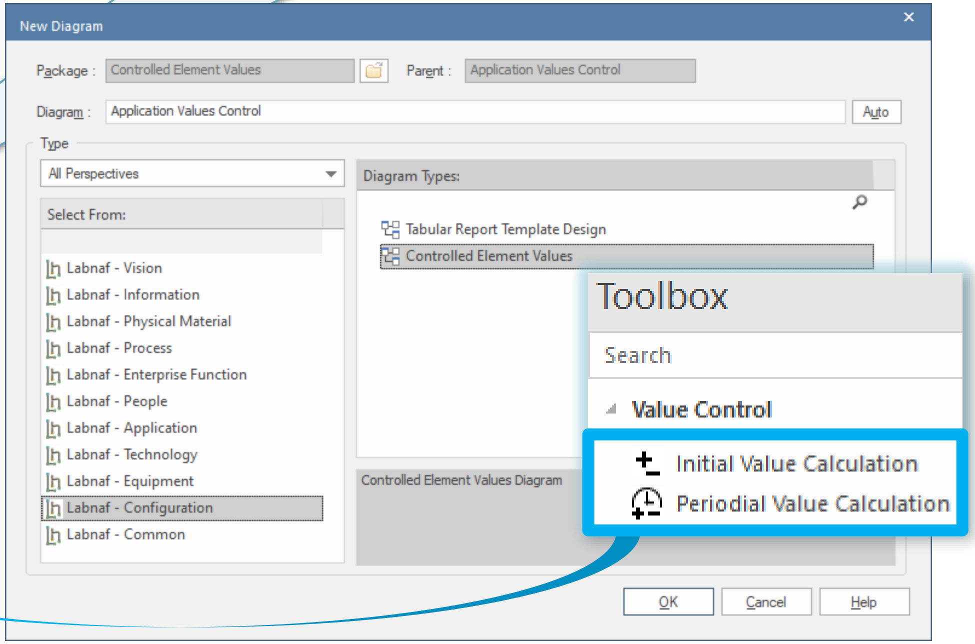
Structure in the repository



- Configuration
  - Labnaf Configuration
  - Core Configuration
  - Elements & Connectors
  - Language Metamodels
  - Catalogs, Viewpoints & Diagram
  - Documents Assembly
  - Diagram Generation
  - Controlled Element Values
    - ELP Configuration of Calculations - Overview
    - Templates
    - Base for initial value calculation
    - Application Values Controls
      - Initial Value Calculation
      - Periodical Value Calculation
      - Tags Calculated Once when Element is Created
      - Tags Periodically Recalculated
        - Calculation details
        - Nb_Components
        - Nb_In_and_Out_Flows
        - Nb_Supported_FBs
        - Doc_Amount

A folder where we define the required controls on element values

An element prototype for grouping all the required value controls.
So we can see that the embedded value control definitions (calculations…) are for elements of that specific type and stereotype.



New Diagram

Package : Controlled Element Values
Parent : Application Values Control
Diagram : Application Values Control
Type: All Perspectives

Select From:
- Labnaf - Vision
- Labnaf - Information
- Labnaf - Physical Material
- Labnaf - Process
- Labnaf - Enterprise Function
- Labnaf - People
- Labnaf - Application
- Labnaf - Technology
- Labnaf - Equipment
- Labnaf - Configuration
- Labnaf - Common

Diagram Types:
- Tabular Report Template Design
- Controlled Element Values

Controlled Element Values Diagram

Toolbox

Value Control
- Initial Value Calculation
- Periodial Value Calculation

The tagged values that must be calculated

Value Calculation

1. Overview
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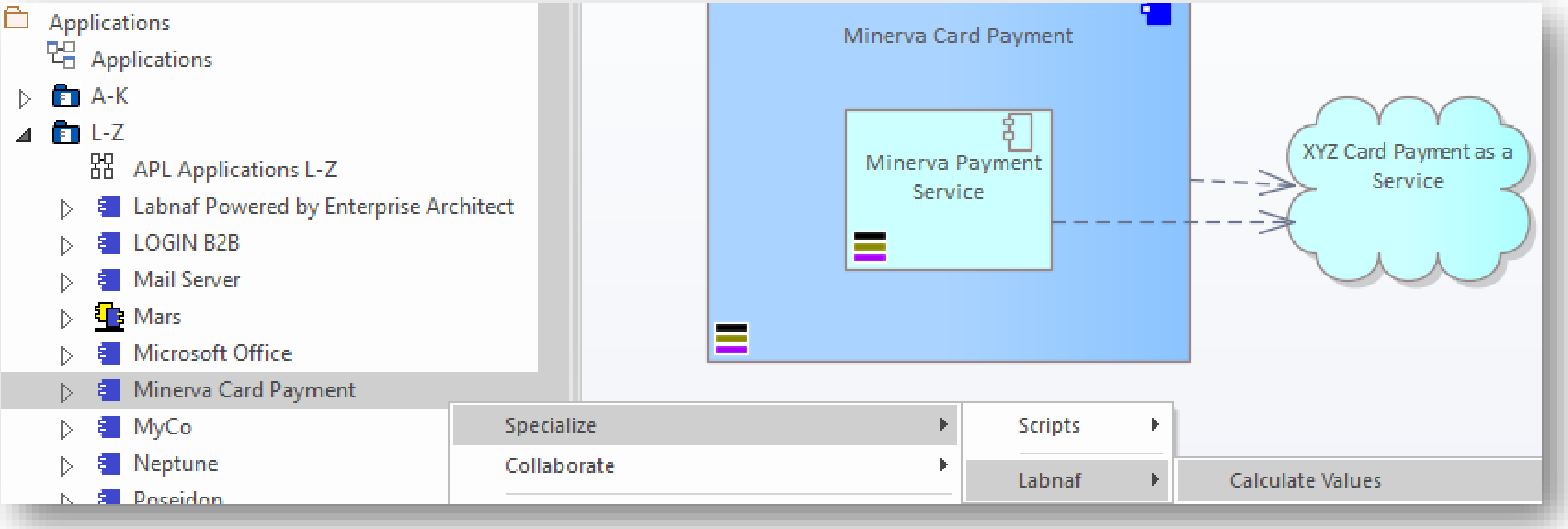
Testing your Periodical Value Calculation

- Right-click on any element that has a periodical value calculation associated to its type (either in the browser window or in a diagram)
- Select **Specialize > Labnaf > Calculate Values**



Scheduling Periodical Value Calculation

See the

Labnaf PowerShell

documentation