TEAMCENTER

Weight and Balance Management — Deployment and Administration

Teamcenter 2412

SIEMENS

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Contents

1. Set up Weight and Balance Management

To create a high-quality product, managing the weight and balance of a product is very important. In the industries such as aerospace, automotive, and construction, weight and balance properties directly impact product efficiency, performance, stability, and movability.

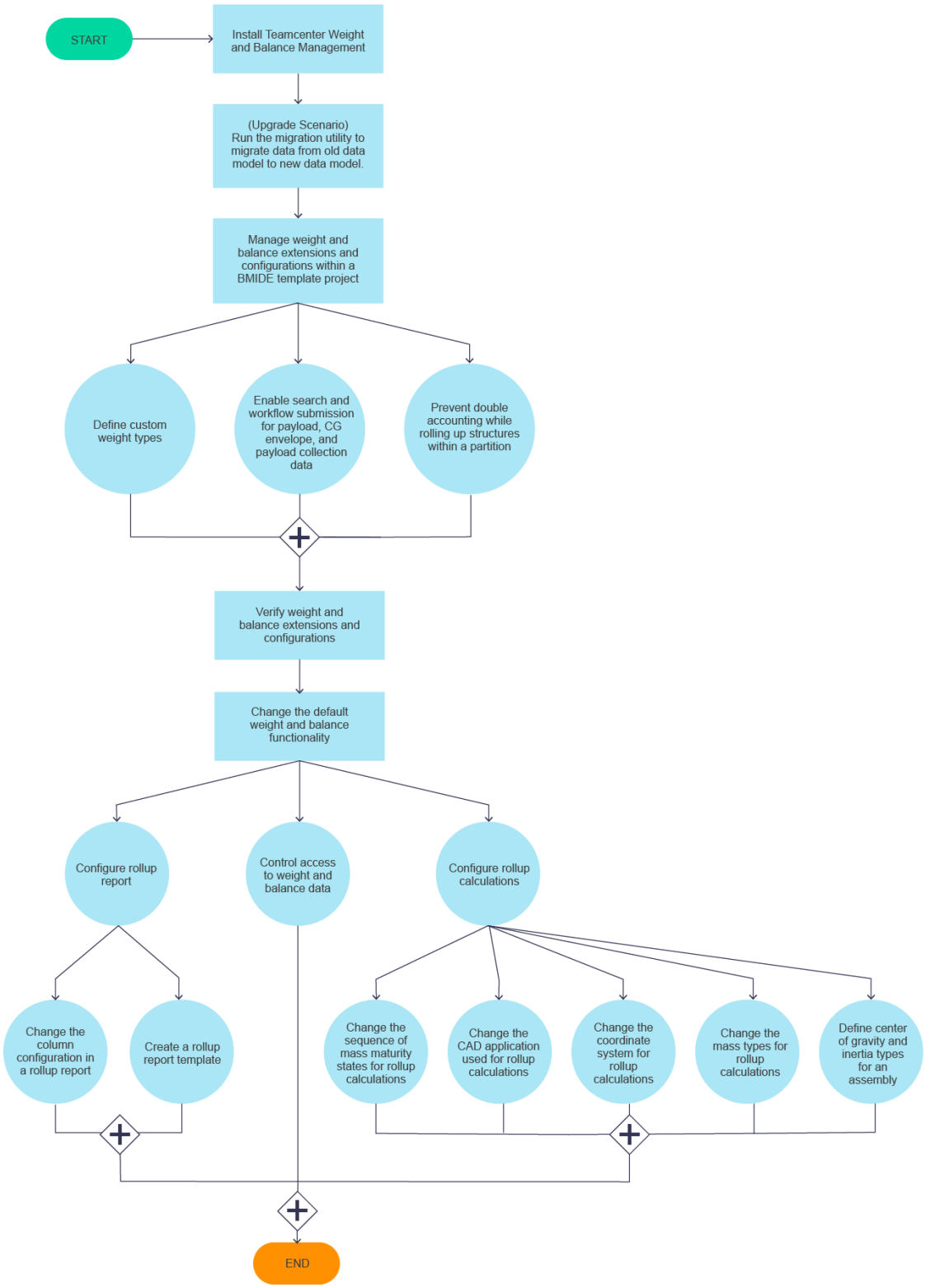
Using the Weight and Balance Management application in Teamcenter, companies can manage the weight and balance properties of their product right from the concept through the service phases. They can integrate weight and balance data into the overall product development process to ensure that products meet performance, safety, and regulatory requirements.

You, as an administrator, must set up Weight and Balance Management so that weight engineers can set their weight targets and generate rollup reports.

Where do I go from here?

 Business User	
How can I manage weight and balance rollup data?	See *Weight and Balance Management — Usage*.
 Administrator	
How can I install Weight and Balance Management?	See **Install Weight and Balance Management**.
How can I set up Weight and Balance Management?	See **Task flow to set up Weight and Balance Management**.
Where can I get a list of preferences that I need to set for Weight and Balance Management?	There are several sources from which you can retrieve a list of preferences. You can view the list in the Administration Data Documentation, Teamcenter rich client, Active Workspace, and raw XML file. The preferences that are specifically used for Weight and Balance Management start with the prefix **WNB**.

2. Task flow to deploy and administer Weight and Balance Management



3. Install Weight and Balance Management using Teamcenter Environment Manager (TEM)

Add the **Weight and Balance Management** and **Active Workspace Weight and Balance Management** applications to you existing Teamcenter environment.

Adding applications is described in the Teamcenter server installation guides for Windows and Linux.

Prerequisites

- Verify that *Parameter Management* is installed. It is required only to set weight targets if you choose to migrate to the new data model. If you choose to retain the old data model, Parameter Management is required for setting both weight types and weight targets.

- If you want to run the rollup calculation in the background (asynchronously), you must install Teamcenter Dispatcher. For more information, see *Installing and Configuring Dispatcher*.

  You must also configure the **AsyncService** translator. For more information, see *Enable the AsyncService translator*.

Procedure

Update your Teamcenter setup to install the following applications through TEM:

- **Extensions** > **Weight and Balance Management**

- **Extensions** > **Active Workspace Weight and Balance Management**

- **Base Install** > **Active Workspace** > **Client** > **Active Workspace Weight and Balance Management**

4. Install Weight and Balance Management using Deployment Center (DC)

Add Weight and Balance Management to your existing Teamcenter environment through a series of tasks from selecting the application and entering configuration parameters to generating and running deployment scripts.

Prerequisites

Weight and Balance Management requires the Parameter Management capability to set different weight types.

If you want to run the rollup calculation in the background (asynchronously), you must install Teamcenter Dispatcher. For more information, see *Installing and Configuring Dispatcher*.

You must also configure the **AsyncService** translator. For more information, see *Enable the AsyncService translator*.

Procedure

1. Log on to Deployment Center and select the environment to which you want to add Weight and Balance Management.

2. Go to the **Applications** tab. Click **Add or Remove Selected Applications** .

3. In the **Available Applications** panel, use the web browser search to find the Weight and Balance Management application. Select the application, and then click **Update Selected Applications**.

   Deployment Center automatically selects any additional dependent applications.

4. Go to the **Components** tab.

5. In the **Selected Components** list, note any remaining components whose configuration status is not **100%**. Select each incomplete component, enter required parameters, and save component settings until all components in the environment show a configuration status of **100%**.

   When all components are fully configured, the **Deploy** tab is enabled.

6. Go to the **Deploy** tab. Click **Generate Install Scripts** to generate deployment scripts you will use to update affected machines.

   When script generation is complete, note any special instructions in the **Deploy Instructions** panel.

7. Locate deployment scripts, copy each script to its target machine, and then run each script on its target machine.

   For more information about running deployment scripts, see *Deployment Center — Usage*.

5. Migrate weight and balance data from the old data model to the new data model

A new data model is available that is independent of the CAD tool being used. The new data model is not dependent on parameters. Therefore, with the new data model, you do not need to install *Parameter Management* to set the weight types. You need it only to set the weight targets.

If you are doing a fresh installation of Weight and Balance Management, you are working with the new data model by default. However, if you have an existing installation of Weight and Balance Management and have data in the old data model, you need to run a migration utility so that the data is migrated to the new data model.

After the migration is successful and you are ready to switch to the new data model, you must set the value of the **WNB0_EnableCADBidirectionalExchange** preference to **True** so that you can work with the new data model. After that, a bidirectional exchange of data can proceed between the CAD application and Teamcenter.

Restrictions and limitations

This utility updates only the data that is local to a database. It does not update replicated data. Therefore, in the case of a multi-site scenario, you must update and then refresh the replicated data.

The information from the old data model is migrated to the new data model, but the new LOV is not updated. For example, if the information about the **External** weight type is present in the **Att0Source** LOV in the old data model, it is migrated to the new data model, but the **Wnb0MethodTypeValues** LOV is not updated with the **External** entry. Therefore, to display this information in the GUI, you must manually update the **Wnb0MethodTypeValues** LOV. Teamcenter checks if an LOV value in **Att0Source** is also available in **Wnb0MethodTypeValues**. If it is not available, a warning message is displayed in the utility report.

Procedure

1. Install Weight and Balance Management.

2. Run the following utility in the Teamcenter command prompt to migrate weight and balance data from the old data model to the new data model:

   wnb_migrate_parameter_data -u=*user_id* **{-p=***password***} -g=***group*
   -report=*absolute_path_to_fileName*

   > Tip:
   >
   > For more information about this utility, see its help:

```
wnb_migrate_parameter_data -h
```

Results

After the data is migrated, a migration report is populated in a file with the name that you specified in the **-report** argument of the **wnb_migrate_parameter_data** utility. If you did not specify a location in the **-report** argument, the report is available in the folder where you ran the **wnb_migrate_parameter_data** utility.

6. Set a BMIDE template project to configure Weight and Balance Management

You can manage the extensions and configurations for Weight and Balance Management within a Business Modeler IDE (BMIDE) template project.

Procedure

1. Create a new BMIDE template project.
2. Add the following Weight and Balance Management templates to this project:
   - **wnb0weightandbalance**
   - **wnb1weightandbalanceaw**
3. Within this template project, perform the required configurations, such as defining custom weight types and enabling search and workflow submission for payload, CG envelope, and payload collection data.
4. Deploy the template project.
5. **Verify if Weight and Balance Management is configured correctly**.

7. Define custom weight types

You can add custom weight types to the list of weight types displayed for structures. Some default weight types are used in rollup calculations, for example, **Actual**, **Asserted**, and **Estimated**. Based on your business requirements, you can add custom weight types for rollup calculations.

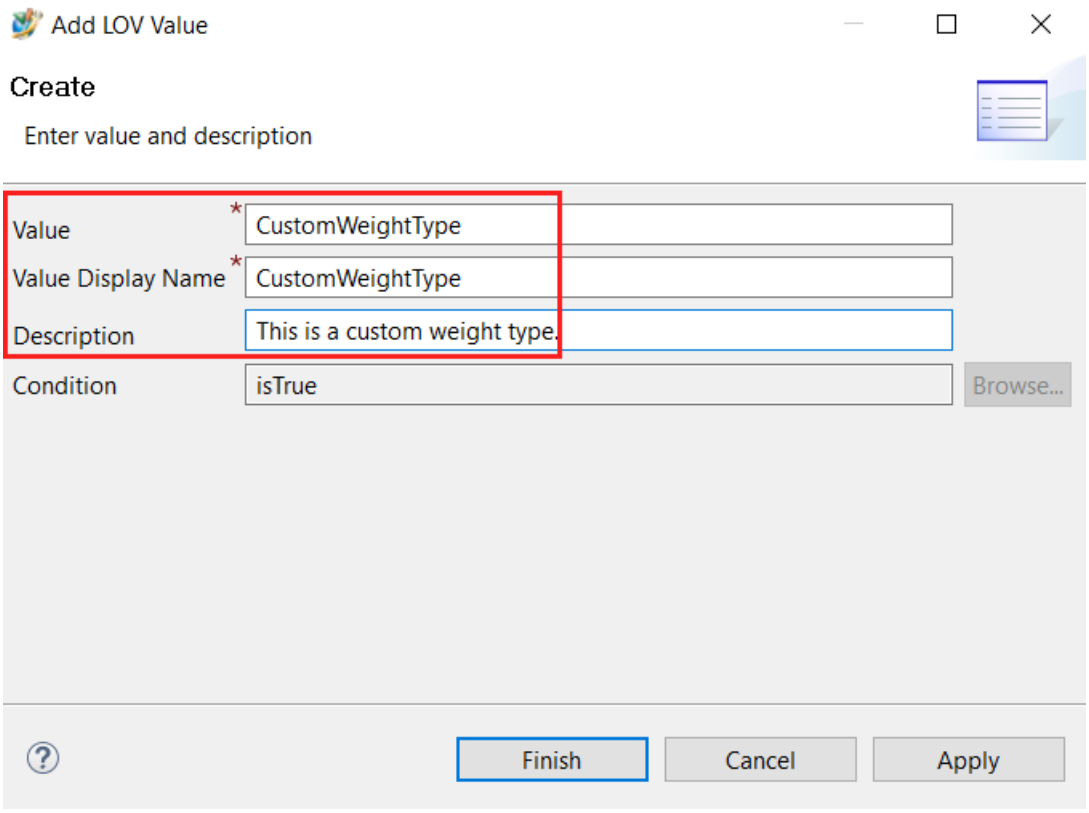
To add custom weight types:

1. In BMIDE, open the **required BMIDE template project**, for example, **OT45**.

2. Open the **Wnb0MethodTypeValues** LOV.

3. Click **Add**.

4. In the **Create** dialog box, enter a value and description for the custom weight type, and then click **Finish**.



5. Add the custom weight type to the **WNB0_MassMaturitySequence** preference for specifying the precedence.

   Any value that is not included in this preference is not considered for rollup.

The following image shows some sample values for the **WNB0_MassMaturitySequence** preference:

6. To display the custom weight type on the UI, modify the column configuration file:

   a. Open the column configuration XML file, *Wnb1ContentTableUiConfigCots.xml*, which is located at:

      ```
      TC_ROOT\install\wnb1weightandbalanceaw\data
      ```

   b. Copy the *Wnb1ContentTableUiConfigCots.xml* file to the *C:\Temp* directory and add the custom weight type to **ColumnDef objectType** in the file.

      The following example shows the format for the **Actual** weight type.

      ```
      <ColumnDef objectType="Awb0ConditionalElement"
      propertyName="wnb0_bl_Actual" width="100" hidden="true"/>
      ```

      Similarly, for the weight type **CustomWeightType**, add the property name as follows:

      ```
      propertyName="wnb0_bl_CustomWeightType"
      ```

      Here, **propertyName** is the internal name of your LOV value.

   c. Import the column configuration for the group and role as required.

      The following example shows the column configuration import command for the **Weight Analyst** role:

      ```
      import_uiconfig -u= -p= -g=dba -for_group=Engineering,
      -for_role=Weight_Analyst -file=c:\temp\rollup_column_config.xml
      ```

You can use Business Modeler IDE to set the display name for your custom objects and to override the display names of the out-of-the-box Teamcenter objects. For information about renaming the columns inside of the BOM view, see Set display names for properties.

> Caution:
>
> If you want to remove a weight type, you must delete it from BMIDE, from the the column configuration, and from the preferences in which the weight type is added.

8. Enable search and workflow submission for payload, CG envelope, and payload collection data

To generate excursion charts, Teamcenter uses the **Wnb0Payload**, **Wnb0CGEnvelope**, and **Wnb0PayloadCollection** business objects.

The data represented by the **Wnb0Payload** and **Wnb0CGEnvelope** business objects is not searchable, by default. Therefore, you need to make this data searchable.

You also need to enable the submit to workflow command for the **Wnb0Payload**, **Wnb0CGEnvelope**, and **Wnb0PayloadCollection** business objects.

Procedure

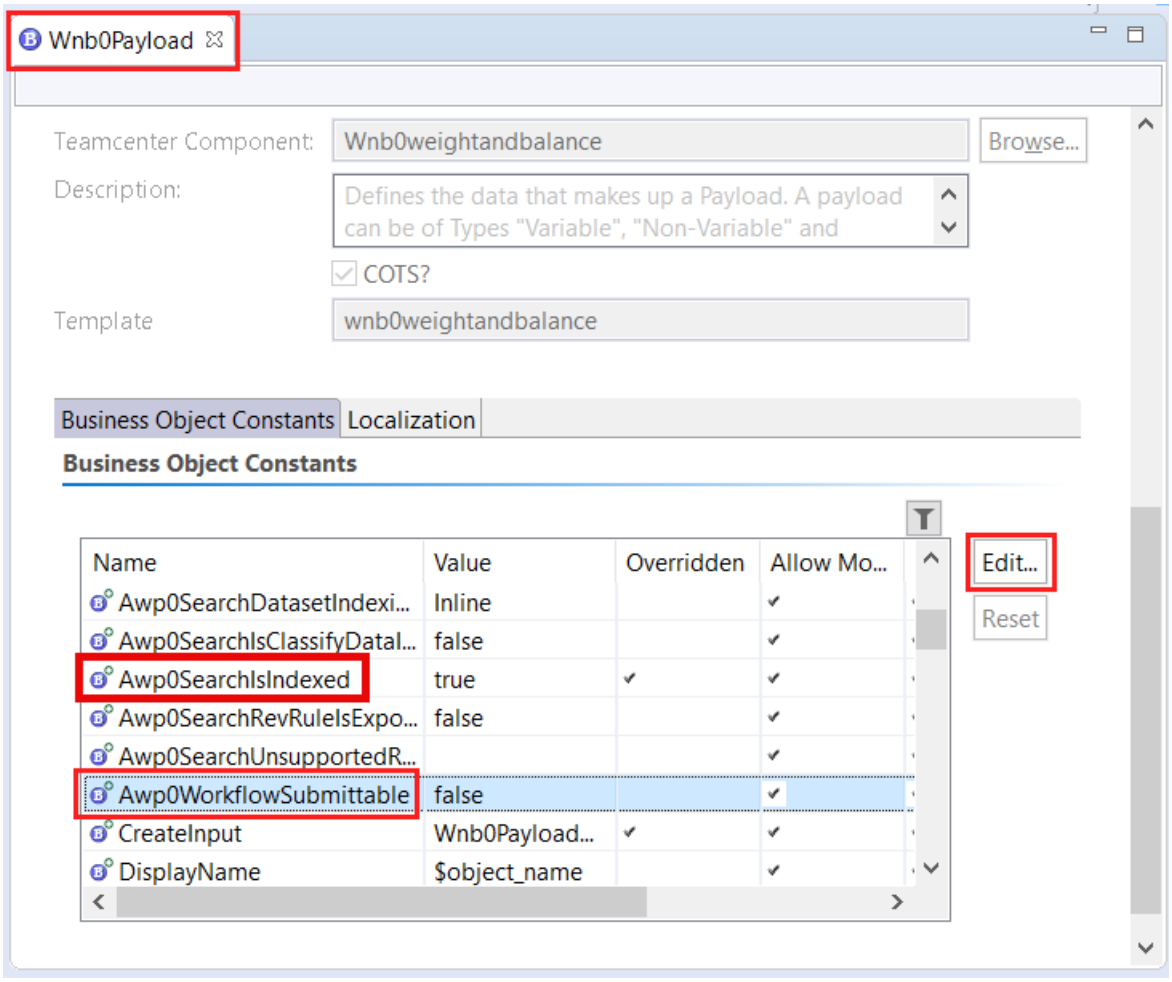
1. In BMIDE, open the **required BMIDE template project**, for example, **OT45**.

2. Open the **Wnb0Payload** business object.

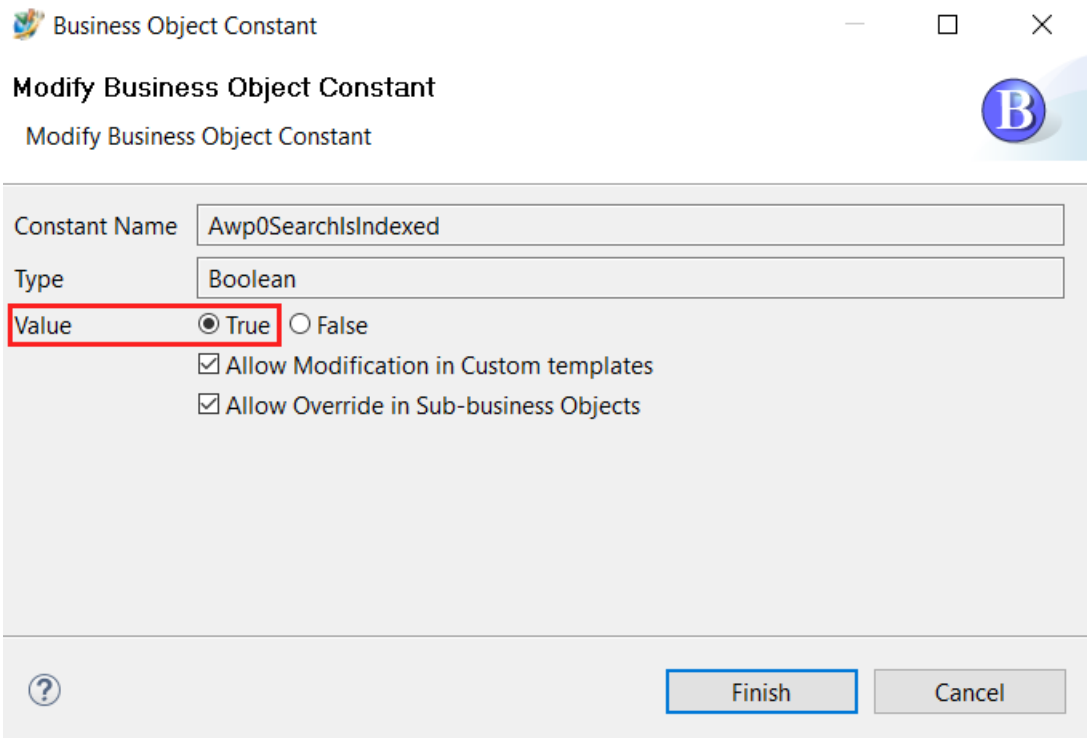
3. Do the following:

   - To make the data represented by the **Wnb0Payload** business object searchable, on the **Business Object Constants** tab, select **Awp0SearchIsIndexed** and then click **Edit**.

   - To enable the **Submit to Workflow** command for the **Wnb0Payload** business object, on the **Business Object Constants** tab, select **Awp0WorkflowSubmittable** and then click **Edit**.



4. In the **Modify Business Object Constant** dialog box, select **True** for **Awp0SearchIsIndexed** and then click **Finish**.



Similarly, for **Awp0WorkflowSubmittable**, select **True** and then click **Finish**.

5. Similarly, follow the steps 2 through 4 for the **Wnb0CGEnvelope** and **Wnb0PayloadCollection** business objects.

9. Prevent double accounting while rolling up structures with partitions

A structure element can belong to more than one partition within a partition scheme. In this case, when users try to perform mass rollup calculation, that element is considered more than one time. To prevent this double accounting, you, as an administrator, must set the value of the **Ptn0IsMultipleBomlineMembershipAllowedInScheme** business object constant to **false** in Business Modeler IDE (BMIDE). The default value of this business object constant is **True**. Setting the value of this business object constant to **False** ensures that an element is added only to a single partition within a scheme.

If a user has already added an element to more than one partition and then you set the value of the business object constant to **False**, the user must manually unassign the element from the other partitions, so that double accounting does not happen.

10. Verify if Weight and Balance Management is configured correctly

You can verify if Weight and Balance Management is configured correctly by performing certain steps, such as updating the column arrangement with mass and balance columns, adding or updating values for any editable weight types, and calculating mass rollup for a structure.

Procedure

1. Open a structure in Active Workspace. The weight and balance columns are hidden by default. To add the weight and balance columns:

   a. Click ⚙ to the right of the column headings to display the **Arrange** panel.

   b. Click **Column Arrangements** and then from the list, select **Mass and Balance**.

   c. Click **Arrange**.

2. Add or update the values for the **Budget**, **Estimated**, or any other editable weight types for the structure.

   If CAD data is available for the assembly, **From Design**, **Center of Mass**, and **Moments of Inertia** and **Products of Inertia** properties are auto-populated.

3. *(Optional)* If you want to display additional columns such as **Center of Mass**, **Moments of Inertia**, and **Products of Inertia**, add the attributes for their properties to the column configuration input file. The following examples show the format:

```
<ColumnDef columnName="wnb0_bl_Asserted_CoMX" filterable="true"
hidden="false" objectType="Awb0ConditionalElement"
propertyName="wnb0_bl_Asserted_CoMX" width="300"/>
<ColumnDef columnName="wnb0_bl_Asserted_CoMY" filterable="true"
hidden="false" objectType="Awb0ConditionalElement"
propertyName="wnb0_bl_Asserted_CoMY" width="300"/>
<ColumnDef columnName="wnb0_bl_Asserted_CoMZ" filterable="true"
hidden="false" objectType="Awb0ConditionalElement"
propertyName="wnb0_bl_Asserted_CoMZ" width="300"/>

<ColumnDef columnName="wnb0_bl_Asserted_PoIXY" filterable="true"
hidden="false" objectType="Awb0ConditionalElement"
propertyName="wnb0_bl_Asserted_PoIXY" width="300"/>
<ColumnDef columnName="wnb0_bl_Asserted_PoIXZ" filterable="true"
hidden="false" objectType="Awb0ConditionalElement"
propertyName="wnb0_bl_Asserted_PoIXZ" width="300"/>
<ColumnDef columnName="wnb0_bl_Asserted_PoIYZ" filterable="true"
```

```
hidden="false" objectType="Awb0ConditionalElement"
propertyName="wnb0_bl_Asserted_PoIYZ" width="300"/>
```

Verify if the additional columns that you have added are displayed on the user interface.

4. Calculate the mass rollup for the structure.

5. View the existing rollup reports.

6. Verify the rolled up values.

11. Configure the columns to be displayed and their arrangement in a rollup report

A business user can generate weight and balance rollup reports. As an administrator, you can configure what columns are displayed and the column arrangement in a rollup report. To do this, you use some preferences.

Certain columns are available in a rollup report, by default. You must not remove the properties for these columns from the preferences. However, you can include some additional columns by adding their properties as values in the preferences.

Use the following preferences to configure a rollup report:

Preference	Description
WNB0_MassPropsColConfiguration	Defines a configuration for the columns that appear in the report that is generated using the **Mass Properties** template.
WNB0_MassAndBalancePropsColConfiguration	Defines a configuration for the columns that appear in the report that is generated using the **Mass and Balance Properties** template.

While configuring a report, you must specify only the BOM line internal property names and not the names that are displayed on the user interface.

To get the list of BOM line internal property names:

1. In your BMIDE template project, search for and open the **BOMLine** business object.
2. Go to the **Properties** tab.

   All BOM line internal property names are displayed in the **Property Name** column.

12. Create a structure rollup report template

To define the standard content of structure rollup reports, you create templates in the rich client.

To create a template, you must be a member of an appropriate group. To create, edit, or delete a *Site* template, you must be a member of the **DBA** group. To create, edit, or delete a *Group* template, you must be a member of that same, specific group. You can create, edit, or delete your own user templates.

> Note:
>
> A member of the **DBA** group can create, edit, or delete group or user templates if bypass is turned on.

To create a structure rollup report template:

1. In the rich client, choose **Tools→Rollup Reports→Templates**.

2. In the **Roll Up Template Manager** dialog box, optionally select an existing template in the **Templates** list to use as the basis of the new template.

   You can select only from the templates that your group has permission to modify.

3. Enter the template name or change the name of the preloaded template. The template name must be unique within the group.

4. Enter a template description, which Teamcenter uses as the name of the rollup dataset, for example, *<Item_ID> <Rev_ID> <RT_name> <RT_date> <RT_Mass Total>*.

5. Check one of the **Scope** options to indicate which users have access to the template—**Site**, **Group**, or **User**.

6. Enter a delimiter character to use between data fields if this report is exported to a text file or to an Excel file.

   The default delimiter character is a tab, which works correctly in the case of a text file. However, in the case of an Excel file, you must change the delimiter character to a comma (,). If you do not do this, the data columns do not display correctly in Excel.

7. Add or delete **Summation**, **Center of Mass**, and **Moments/Products** calculations for any relevant structure line property.

8. Add or delete any other properties to include in the rollup report in the **Reference** box. Referenced properties are not included in rollup calculations.

9. Click **OK** or **Apply** to save the new template in the database.

Caution:

While creating a rollup report template, if you specify **Pack Count** (bl_pack_count) as a summation property, you get correct rollup results for the occurrences only with unpacked structure elements. Therefore, you must unpack the structure elements and then generate a rollup report to get the correct number of occurrences.

13. Provide access privileges to users for the weight and balance data

You can restrict access to weight and balance rollup data by configuring the Access Control List (ACL) for the **Wnb0MassMeasurableAttribute** and **Wnb0MassMeasureValue** classes.

For detailed information about setting ACLs, see Access Manager in the Teamcenter help.

1. In Access Manager, navigate to the ACL for the **Wnb0MassMeasurableAttribute** and **Wnb0MassMeasureValue** classes.

2. In the ACL, under **POM_object**, add the details of the class, attribute, and users as required.

The following examples illustrate how an ACL can be configured to grant access to various user groups for different weight types:

Example 1

- Grant the user group called **Weight Engineer** access to all weight types of the classes **Wnb0MassMeasurableAttribute** and **Wnb0MassMeasureValue**.

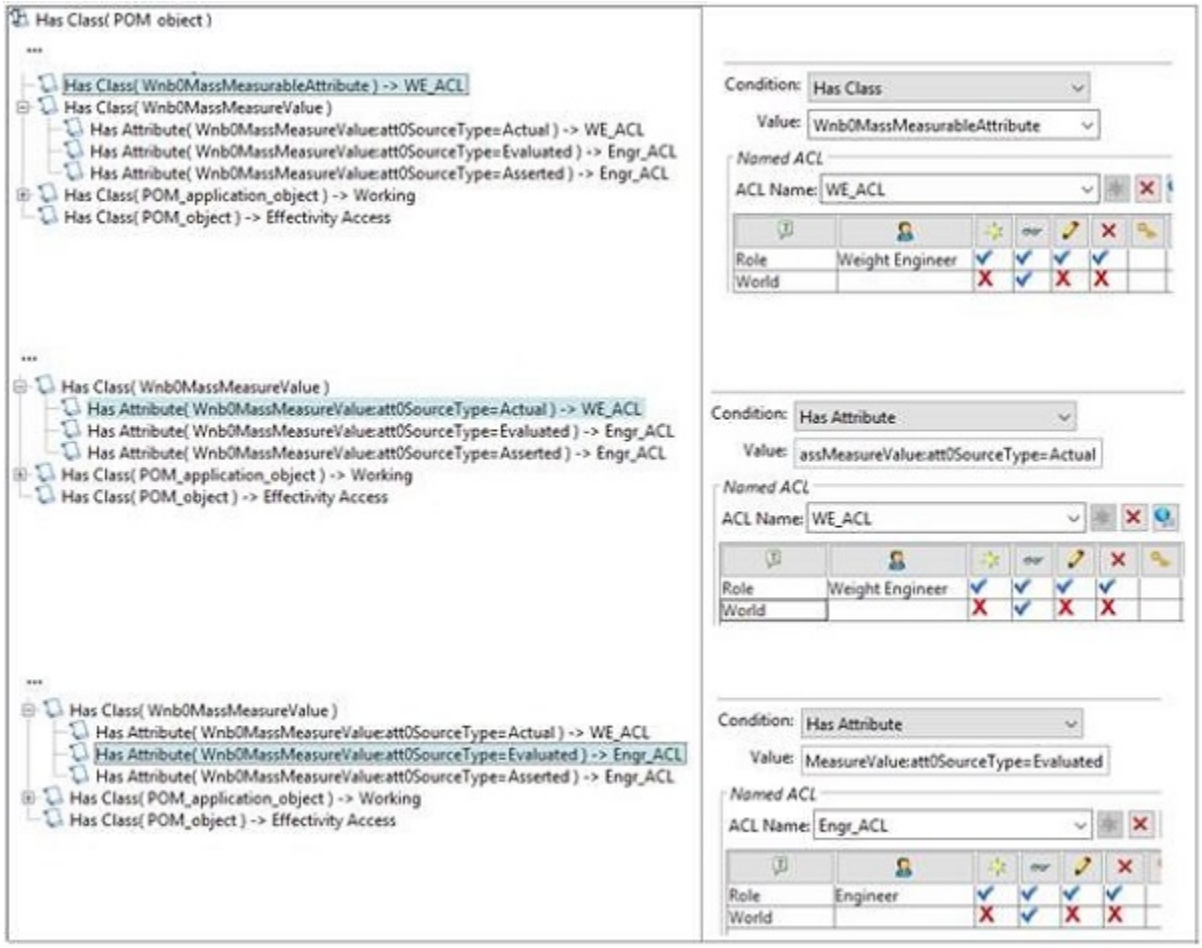
- Restrict the user group **Designer** to access only the **Asserted** weight type.

Class or attribute	Role	Read	Write	Create
Has Class(Wnb0MassMeasurableAttribute)	Designer	Y	X	X
	Weight Engineer	Y	Y	Y
	World	Y	X	X
Has Class(Wnb0MassMeasureValue)				
Has Attribute(Wnb0MassMeasureValue:att0SourceType=Asserted)				
	Designer	Y	Y	Y
	Weight Engineer	Y	Y	Y
	World	Y	X	X
Has Attribute(Wnb0MassMeasureValue:att0SourceType=Asserted)				
	Designer	Y	X	X
	Weight Engineer	Y	Y	Y
	World	Y	X	X

The configuration shown in the table does the following:

- The Weight Engineer can create, read, or modify values for all weight types in the **Wnb0MassMeasurableAttribute** and **Wnb0MassMeasureValue** classes, for example, **Budgeted**, **Asserted**, and **Evaluated**.
- Designers can view or update the **Asserted** weight type but can only view the other weight types: **Budgeted** and **Evaluated**.
- **World** (any other user) can only view the values.

Example 2



The configuration shown in the table does the following:

- The Weight Engineer can create, read, or modify values for all weight types in the **Wnb0MassMeasurableAttribute** and **Wnb0MassMeasureValue** classes, for example, **Actual**, **Asserted**, and **Evaluated**.

- Engineers can view or update the **Evaluated** weight type but can only view the other weight types: **Asserted** and **Actual**.

- **World** (any other user) can only view the values.

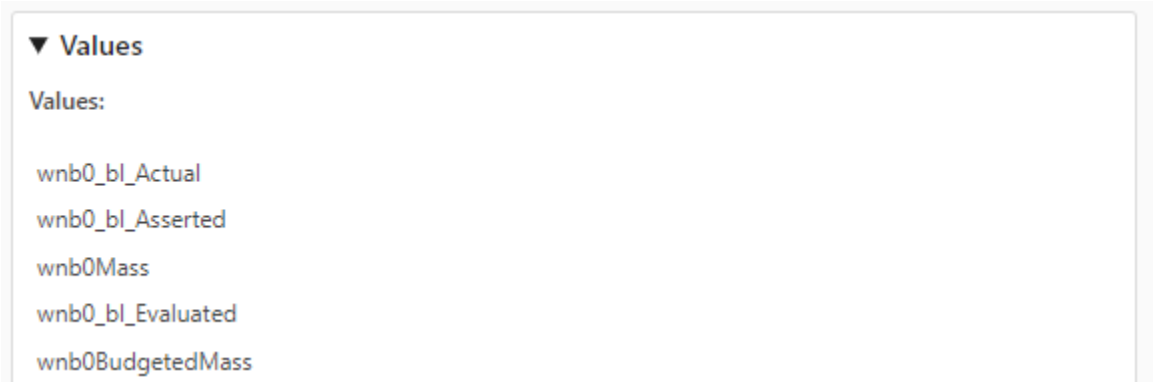
14. Change the sequence of mass maturity states for rollup calculations

A rollup calculation selects the mass value based on the maturity assigned to the weight type. For each BOM line, the mass value from the weight type with the highest maturity is used for mass rollup calculations.

By default, a certain sequence of mass maturity states is set for rollup calculations. However, if you want to change this sequence, set the maturity for different weight types in the **WNB0_MassMaturitySequence** preference.

In the preference, list the weight types in descending order of maturity you want to assign. The one at the top of the list is assigned the highest maturity.

In the following example, the highest maturity is assigned to the **Actual** mass, and the lowest maturity is assigned to the **Budgeted** mass.



The following table shows some parts with different mass values. The maturity is assigned as described in the **WNB0_MassMaturitySequence** preference example. Based on the maturity assigned to the weight types, the mass values marked with (✓) are considered for calculating the rollup.

Part	Actual (maturity 1)	Asserted (maturity 2)	Evaluated (maturity 3)	Budgeted (maturity 4)
Engine	221 ✓	225	229	223
Chassis	-	421 ✓	429	423
Wheel Assembly	-	-	29 ✓	29

15. Change the CAD application used for rollup calculations

Teamcenter supports NX and CATIA as the CAD applications for rollup calculations. You can use the **WNB0_TC_CAD_APPLICATION** preference to configure the CAD application for your site.

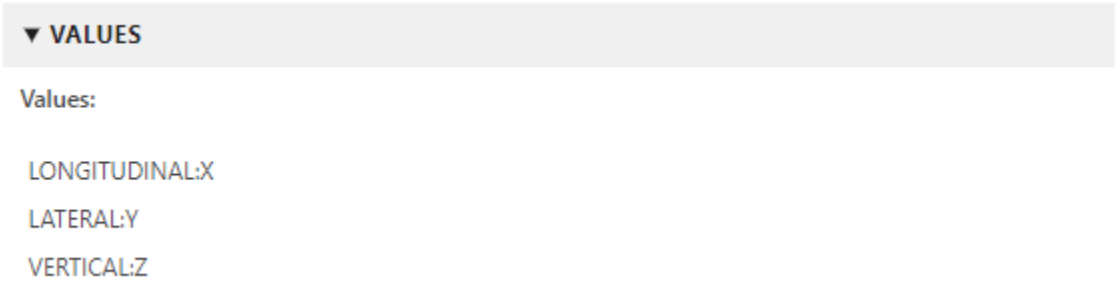
> Note:
>
> If no CAD tool is added to the preference, NX is set as the default CAD tool.

16. Change the default coordinate system

While creating a payload, a business user must define a value for the Center of Mass (CoM). This value can be **CoMx**, **CoMy**, or **CoMz** based on the specified longitudinal axis.

You can set the longitudinal axis for an excursion diagram by using the **WNB0_CoordinateSystem** preference. You can use this preference to define the mapping between the coordinate axes (x,y,z) and the longitudinal, lateral, and vertical axes. The value for the longitudinal axis in the preference is used in the column header. The default value is **X**.

The following image shows some sample values specified in the **WNB0_CoordinateSystem** preference.

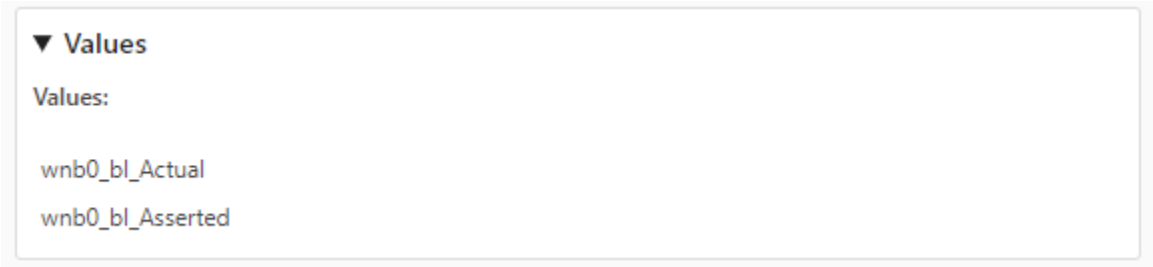


17. Change the mass types for rollup calculations

By default, the **Actual** and **Asserted** mass types are considered for rollup calculations. However, if you want Teamcenter to consider other mass types for rollup calculations, add those mass types to the **WNB0_AssemblyMaturedMassTypes** preference.

This preference marks the specified mass types as *matured*. Once the mass types are added, Teamcenter considers only the mass type of the parent and ignores the sum of the masses of the children for rollup calculations.

In the following example, the preference defines **Actual** and **Asserted** as *matured* mass types. This means that if **Actual** or **Asserted** mass is available for any parent part in the assembly, its child parts will be ignored for the rollup calculations.



18. Define center of gravity and inertia types for an assembly

As an administrator, you can create custom balance properties. The **WNB0_CG_INERTIA_Source** preference controls the custom properties. These custom properties must be a subset of **Wnb0MethodTypeValues**. The precedence for these properties is controlled by the **WNB0_MassMaturitySequence** preference, which also controls the precedence for mass properties.

This preference defines the Center of Gravity (CG) and inertia types for an assembly. BOM line properties for Center of Mass (CoM), Moment of Inertia (MoI), and Product of Inertia (PoI) are added based on these preference values.

If the values for the CAD-driven properties in the **WNB0_CG_INERTIA_Source** preference are changed, these changes are not reflected in the template. The template shows the **Asserted** column with its internal name and no data. For such cases, either you or the user must create (or update) an Excel export template with the required properties.