

Bill of Materials

A Part may be an assembly of other Parts keeping them in a Bill of Materials (BOM). A BOM is a list of components, parts, materials, other assemblies, and the quantities of each that are needed to put together this Part. A BOM is sometimes called a parts list, product structure, or associated list. In process industries, it is also known as a formula, recipe, or ingredients list.

A Part with a BOM is a Parent that has Parts as Children. In technical terms, it is a Part that has *Part BOM Relationships* to other Parts. A Child can be a single Part or another assembly (Parent) creating a multi-level BOM structure.

A Part may have Alternates. Alternates are Parts that can replace this Part globally in the scope of a company. For more details on this topic, refer to section [Alternates](#) . A Part can have Substitutes, which are Parts that can replace this Part in a specific BOM only. For more details on this topic, refer to section [Substitutes](#).

A Child Part can be used in a Parent multiple times. Each of the child instances may need to be identified individually to provide its specific X, Y and Z coordinates or Reference Designation information. Use the **Instances** tab of a BOM relationship to specify instance information.

The Goals of a Parent Part are automatically rolled up from all its Children. For more details on Goals, refer to section [Design Goals](#).

Part BOM Relationships

A Part BOM relationship is a relationship between a Parent Part and its Child Part defined in the **BOM** relationships accordion tab of the Parent Part.

To view a Part BOM relationship:

1. Open the Parent Part item.
2. Go to the **BOM** tab.
3. In the **BOM** grid, right-click a Child → **BOM** → **Open**. The view of the Part BOM relationship between the Parent and the Child appears.



6CF7C823ED3744A18C4D712AF16292FF ☆



Part BOM

Quantity
1

Part Number
[MP2954](#)

Reference Designator

Instances Substitutes Effectivity

Instances ☆



Seq... ↑ 1	Reference Designator ↑ 2	X	Y	Z	Angle	Side
------------	--------------------------	---	---	---	-------	------

4.

- **Quantity** – The number of Parts used in the assembly.
- **Part Number**– The part number.
- **Reference Designator** – Used primarily in electronic assemblies to list labels of each Instance.

The relationships accordion of the Part BOM contains three tabs:

- **Instances** – Refer to section Instances for details.
- **Substitutes** – Refer to section Substitutes for details.
- **Effectivity** – Refer to section Effectivity Management for details.

BOM Structures

A multi-level BOM is a structure of Parts and is often designed to be configurable. This approach enables you to have a single product structure for numerous product configurations.

Aras Innovator provides functionality to resolve a BOM structure using:



- Structure Resolution, which identifies Part versions depending on a Resolution Mode. Refer to section [Applying Structure Resolution Modes for details.](#)
- Effectivity, which identifies valid Parts to be used under different conditions. Refer to section [Effectivity Management for details.](#)

To view the BOM Structure for a Parent Part:

1. Open the Parent Part.
2. Go to the **BOM Structure** accordion tab of a Parent Part.

^

BOM

BOM Structure

Alternates

AML

Documents

CAD Documents

Goals

Changes

↺

↻

🔍

🔗

3

🔗

🔄

📄

Part Number	Revision	State	Sequence	Quantity	Claimed By	Name	Effectivity	Reference Designator
MP2942	A	Preliminary	1	1		Body		
MP2954	A	Preliminary	2	1		Extruder		

Important

The BOM Structure tab leverages a Tree Grid View to display the multi-level BOM structure for the Part. You can refer to the *Aras Innovator - Tree Grid View Administrator Guide* for information on the available toolbar options, along with instructions on configuring the items displayed in the BOM Structure.

Setting up a BOM

There are two ways to set up a BOM Relationship:

- Create all the necessary Children and then create a Parent and populate the **BOM** tab with its Children. This approach builds a new assembly using existing Parts and is outlined in section [Creating a BOM from Existing Parts.](#)
- Create a Parent and then create its Children using the BOM tab. This approach is convenient for populating nested BOMs or creating BOM structures quickly without getting into the details of each Child. However, it is still necessary to complete each Child later. This approach is outlined in section [Creating a BOM from the BOM tab.](#)

Important

Note: An Administrator can restrict Aras Innovator to one approach.



Creating a BOM from Existing Parts

This approach is used for building a new assembly using existing Parts. With this approach, all necessary Children are created prior to creating the Parent Part and populating the BOM tab of the Parent Part with Children. This section assumes that a Parent Part and all necessary Children exist.

To set up a BOM:

1. Open the Parent Part.
2. On the Parent toolbar, click **Edit**.
3. Go to the **BOM** accordion tab.
4. Click **Add Parts**. The Search dialog appears.
5. Search for and select the necessary Children to be added to the **BOM** table.
6. Enter relationship information, such as Quantity and Reference Designator, as needed. Double-click the **Quantity** cells of each Child and enter the required quantity.
7. Click **Save** or **Done**. The BOM is created.

Creating a BOM from the BOM tab

This approach is convenient for populating nested BOMs or creating BOM structures quickly without getting into the details of each Child. With this approach, all Children are created directly from within the BOM tab. Note that you still need to complete the details for each Child later. This section assumes that a Parent Part is created.

To set up a BOM:

1. Open the Parent Part.
2. On the Parent toolbar, click **Edit**.
3. Go to the **BOM** accordion tab.
4. Click **New Part**. A new **row** appears in the **BOM** table.

^

BOM

BOM Structure

Alternates

AML

Documents

CAD Documents

Goals

Changes

Parts

Hidden

	Seq...	Part Number	Revision	Name	Type	Quantity	State	Unit	Reference Designator	Changes
	1	MP2942	A	Body	Assembly	1	Preliminary	EA		☐
	2	MP2954	A	Extruder	Assembly	1	Preliminary	EA		☐
	3					1		EA		☐



5. Click the **Part Number** cell and enter a unique part number for the Child.

Important

The Part Number must be unique. It is the only required Part property provided by the user.

6. Enter any additional data by clicking on the corresponding cell in the BOM table. Refer to section [Creating a Part](#) for a description of the Part fields.

7. Click **Save** or **Done**. The BOM and the Children are created.

Editing a BOM

You can update an existing BOM to add, replace, or remove Children from the BOM.

Adding New Children

To add new Children to an existing BOM, refer to section [Setting up a BOM](#).

Replacing Children

To replace Children in a BOM:

1. Open the Parent Part.
2. On the Parent toolbar, click **Edit**.
3. Go to the **BOM** accordion tab.
4. Right-click the Child to be replaced and then click **Replace**. The Search dialog appears.
5. Search for and select a replacement Part. The Child in the BOM is replaced with the Part selected. The BOM relationship data, such as Quantity and Reference Designator, is retained.
6. Click **Save** or **Done**. The Children are replaced.

Removing Children

To remove Children from a BOM:

1. Open the Parent Part.
2. Click **Edit** on the Parent toolbar.
3. Go to the **BOM** accordion tab.
4. Click on the Child or Children to be deleted and then click **Delete Part BOM**.
5. Click **Save** or **Done**. The selected Children are removed from the BOM.



Editing Parts within a BOM

To edit Children (related Parts) from the Parent BOM:

1. Open the Parent Part.
2. Click **Edit** on the Parent toolbar.
3. Go to the **BOM** accordion tab.
4. Right-click a Child and click **Edit**. The Child becomes claimed, and its row becomes editable. Enter any edits by clicking on the corresponding cell in the BOM table.
5. Right-clicking on the Child and clicking **Discard Changes** will discard any changes. The Child becomes unclaimed, its properties are rolled back, and its row becomes read-only.

Important

After you save the Child's Parent, the Child remains claimed with all new data saved. It is possible to continue editing the Child in its row, but it is not possible to discard this data.

6. Right-click the Child Part and then click **Done Editing**. The Child becomes unclaimed, **its row** becomes read-only, and its new property values are saved.
7. Click **Done** on the toolbar of Child's Parent to save your changes.

Important

To edit properties that are not present in the BOM table, right-click the Child Part and then click **Open**. The Child Part form appears allowing you to edit those properties.

8. Click **Save** or **Done** to save your changes.

Instances

A Parent Part can have multiple Instances of the same Child in its BOM. It may be necessary to identify information about each instance. For example, an assembly (Parent) can be fastened using several of the same bolt. It may be needed to specify the location of each instance.

The Part BOM form contains the **Instances** relationship tab. This relationship tab displays the properties of each Child Part Instance for its identification in a BOM:



- **Reference Designator** – This is a unique Instance label. The Reference Designator data is used primarily in electronic diagrams. For example, a circuit board consists of four Instances of the same resistor. Each Instance has its own Reference Designator to identify it unambiguously within the electrical schematic or on the printed circuit board.
- **X** – This is an X coordinate of Instance location in the assembly.
- **Y** – This is a Y coordinate of Instance location in the assembly.
- **Z** – This is a Z coordinate of Instance location in the assembly.
- **Angle** – This is an angle of Instance location in the assembly.
- **Side** – This is from where (Top or Bottom) the Instance location is measured.

Important

The coordinates and angle do not have a unit of measure. Their values must be entered in the same units.

Specifying Instances

To specify Instances of a Child Part in a BOM:

1. Claim the Parent Part.
2. Open the Part BOM relationship as described in [Part BOM Relationships](#).
3. Click **Edit** on the Part BOM toolbar.
4. Click **New BOM Instance** on the **Instances** relationship accordion toolbar. A new row appears in the Instances table.
5. Click on the corresponding cell in the row to enter the appropriate information.
6. If it is necessary to remove an Instance:
 1. Click the Instance to select it.
 2. Click **Delete BOM Instance** on the **Instances** relationship accordion toolbar.
 3. On the **Part BOM** toolbar, click **Save**. The **Instance** disappears.

Important

The **Instance** disappears immediately if you do not save the Part BOM after it was added.

7. On the Part BOM view, in the Reference Designator text box, enter a comma-separated list of Reference Designators for all the Instances.



$\wedge$

1

MP2954

Instance 1, Instance 2

- On the Part BOM toolbar, click **Done**.
- Go to the **Parent** Part form. The list of Instances is displayed in the corresponding Child's **row**.

	Seq... ↑ 1	Part Number ↑ 2	Revision	Name	Type	Quantity	State	Unit	Reference Designator	Changes
	1	MP2942	A	Body	Assembly	1	Preliminary	EA		☐
	2	MP2954	A	Extruder	Assembly	1	Preliminary	EA	Instance 1, Instance 2	☐

- ## 10. Unclaim the Parent Part.

Alternates

A Part may have an Alternate Part that can replace it globally. A Part is interchangeable with its Alternate regardless of where the Part is used in BOM structures.

The presence of an Alternate in a Part is for informational purposes only. To replace a Part with its Alternate in a BOM, you must follow the Child Part replacement procedure outlined in section [Replacing Children](#).

Assigning Alternates

To add an existing Part to another Part as an Alternate:

1. Open the Part where the Alternate will be added.
2. Click **Edit** on the **Part** toolbar.
3. Go to the Alternates relationship tab.
4. Click **Add Parts** on the Alternates accordion toolbar. The Search dialog appears.
5. Search for and select a Part to add as an Alternate for the current Part.
6. Click **Save** or **Done** on the Part toolbar.

Creating Alternates

To create a new Part and add it to another Part as an Alternate:

1. Open the Part where the Alternate will be added.
2. Click **Edit** on the **Part** toolbar.
3. Go to the Alternates relationship tab.
4. Click **New Part** on the Alternates accordion toolbar. A blank row appears in the Alternates grid.

Sequence	Part Number	Revision	Name	Type	State	Unit	Changes
1	Child Part A Alternate 2					EA	☐

5. Click the **Part Number** cell to specify a unique part number for the new Part.
6. If it is necessary to provide additional data, click the corresponding cell and enter the data.
7. Click **Save** or **Done** on the Part toolbar.

Replacing Alternates

To replace an Alternate in a Part:

1. Open the Part where the Alternate will be added.
2. Click **Edit** on the **Part** toolbar.
3. Go to the Alternates relationship tab.
4. Right-click the Alternate and then click **Replace**. The Search dialog appears.
5. Search for and select a replacement Alternate Part.
6. Click **Save** or **Done** on the **Part** toolbar.



Removing Alternates

To remove an Alternate from a Part:

1. Open the Part where the Alternate will be added.
2. Click **Edit** on the **Part** toolbar.
3. Go to the Alternates relationship tab.
4. Click the Alternate and then click **Delete Part Alternate** on the Alternates relationship tab toolbar.
5. Click **Save** or **Done** on the **Part** toolbar.

Substitutes

A Part may have a Substitute Part that can replace it only in specific BOM structures.

The presence of a Substitute in a BOM is for informational purposes only. To replace a Part with its Substitute in a BOM, you must follow the Child Part replacement procedure outlined in section Replacing Children.

Assigning Substitutes

To add a Substitute Part for a Child Part in a BOM:

1. Claim the Parent Part.
2. Open the Part BOM relationship as described in [Part BOM Relationships](#).
3. Click **Edit**.
4. In the Substitutes tab, click **Add Parts** on the accordion toolbar. The Search dialog appears.
5. Search for and select a Part to be added as a Substitute for the current Part.
6. Click **Done** on the **Part BOM** toolbar.
7. Unclaim the Parent.

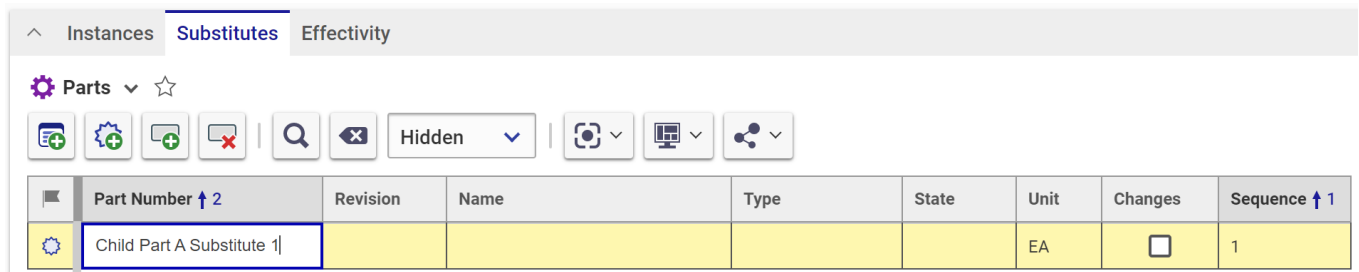
Creating Substitutes

To create a new Part and add it as a Substitute Part for a Child Part in a BOM:

1. Claim the Parent Part.
2. Open the Part BOM relationship as described in [Part BOM Relationships](#).
3. Click **Edit**.



4. In the Substitutes tab, click **New Part** on the Substitutes accordion toolbar. A blank row appears in the Substitutes grid.



5. Click the **Part Number** cell to specify a unique part number for the new Part.
6. If it is necessary to provide additional data, click the corresponding cell and enter the data.
7. Click **Save** or **Done** on the Part toolbar.

Replacing Substitutes

To replace a Substitute in a Part:

1. Claim the Parent Part.
2. Open the Part BOM relationship as described in 6.1 [Part BOM Relationships](#).
3. Click **Edit**.
4. In the Substitutes tab, right-click the Substitute and then click **Replace**. The Search dialog appears.
5. Search for and select a replacement Substitute Part.
6. Click **Done** on the **Part BOM** toolbar.
7. Unclaim the Parent.

Removing Substitutes

To remove a Substitute from a Part:

1. Claim the Parent Part.
2. Open the Part BOM relationship as described in [Part BOM Relationships](#).
3. Click **Edit**.
4. In the Substitutes tab, click the Substitute and then click **Delete BOM Substitute** on the Substitutes accordion toolbar.
5. Click **Save** or **Done** on the Part toolbar.
6. Unclaim the Parent.



Applying Structure Resolution Modes

The following Structure Resolution Modes are available to dynamically resolve a multi-level Part BOM structure using item versions as specified in the Resolution Mode:

- **Default**– The version of the related Part as stored on the Part BOM Relationship is used. This is the standard resolution.
- **Latest**– The latest version of the related Part is used in the resolution.
- **Latest Released**– The latest Released version of the related Part is used in the resolution.
- **Latest Released or Latest**– The latest Released version of the related Part is used in the resolution. If there are no Released versions of the related Part, then the latest version is used.

To apply a Structure Resolution Mode to a BOM structure:

1. Open the Part.
2. In the BOM Structure accordion tab, click Parameters null .
3. Select the desired Structure Resolution Mode in the Value drop-down list of the StructureResolutionMode row of the Parameters dialog.

Parameters ✕

✓ ✗

Property	Value
StructureResolutionMode	Default ▼ Default Latest Latest Released Latest Released Or Latest

4. Click **Apply**. The BOM is resolved to a Part structure according to the selected Mode.

To explain how different Resolution Modes work, this section uses a set of Parts that have multiple versions as follows:

- **Child A:** A – Released; B – Preliminary
 - **Child A.1:** A – Preliminary



- **Child A.2:** A, B, C – Released
- **Child A.3:** A, B – Released; C – Preliminary
- **Child B:** A, B – Released
 - **Child B.1:** A – Released
 - **Child B.2:** A, B, C – Released; D – Preliminary
- **Child C:** A – Preliminary
 - **Child C.1:** A – Preliminary
 - **Child C.2:** A, B – Released

From these Parts, a simple BOM structure example is created as described in the following table. A simple BOM example

BOM Level	BOM Level	BOM Level	Part	Revision	State
0			Parent	A	Preliminary
	1		Child A	B	Preliminary
		2	Child A.1	A	Preliminary
		2	Child A.2	C	Released
		2	Child A.3	C	Preliminary
	1		Child B	B	Released
		2	Child B.1	A	Released
		2	Child B.2	B	Released
	1		Child C	A	Preliminary
		2	Child C.1	A	Preliminary
		2	Child C.2	B	Released

Default Resolution Mode

The Default Resolution Mode uses the versions of related child Parts as stored on the BOM Relationships. This is the standard resolution in Aras Innovator. The following image shows the resolved structure when the Default resolution mode is selected:



Part Number	Revision	State
☐ ⚙ Child A	B	Preliminary
☐ ⚙ Child A.1	A	Preliminary
☐ ⚙ Child A.2	C	Released
☐ ⚙ Child A.3	C	Preliminary
☐ ⚙ Child B	B	Released
☐ ⚙ Child B.1	A	Released
☐ ⚙ Child B.2	B	Released
☐ ⚙ Child C	A	Preliminary
☐ ⚙ Child C.1	A	Preliminary
☐ ⚙ Child C.2	B	Released

Latest Resolution Mode

When the Latest resolution mode is selected, the structure is resolved starting from the top using the latest versions of child items. When a child item is resolved to its latest version, then its child items are resolved using this resolution mode. This is done recursively. The Latest resolution mode does not consider the release state of the child Parts. The following image shows the resolved structure when Latest resolution mode is selected:



Part Number	Revision	State
☐ Child A	B	Preliminary
☐ Child A.1	A	Preliminary
☐ Child A.2	C	Released
☐ Child A.3	C	Preliminary
☐ Child B	B	Released
☐ Child B.1	A	Released
☐ Child B.2	D	Preliminary
☐ Child C	A	Preliminary
☐ Child C.1	A	Preliminary
☐ Child C.2	B	Released

The latest revision D of Child B.2 is shown where this Part version is in the Preliminary state.

Latest Released Resolution Mode

When the Latest Released resolution mode is selected, the structure is resolved starting from the top using the latest versions of child items that are in Released state. When the child item is resolved to its latest Released version, then its child items are resolved using this resolution mode. This is done recursively. If the related child item has no versions that are in Released state, then a blank row is displayed for that item. There is no further processing on that item. The following image shows the resolved structure when Latest Released resolution mode is selected:



Part Number	Revision	State
☐ Child A	A	Released
Child A.2	C	Released
Child A.3	B	Released
☐ Child B	B	Released
Child B.1	A	Released
Child B.2	C	Released

The latest Released versions of child Parts are resolved. A blank row is displayed for Child C because it has no version that is in the Released state.

Latest Released Or Latest Resolution Mode

When the Latest Released or Latest resolution mode is selected, the structure is resolved starting from the top using the latest versions of child items that are in Released state. If there are no versions that are in Released state, then the latest version is used. When the child item is resolved to a version, then its child items are resolved using this resolution mode. This is done recursively. The following image shows the resolved structure when Latest Released or Latest resolution mode is selected:



Part Number	Revision	State
☐ Child A	A	Released
☐ Child A.2	C	Released
☐ Child A.3	B	Released
☐ Child B	B	Released
☐ Child B.1	A	Released
☐ Child B.2	C	Released
☐ Child C	A	Preliminary
☐ Child C.1	A	Preliminary
☐ Child C.2	B	Released

The latest Released versions of child Parts are resolved. Child C does not have any version that is in the Released state. Therefore, its latest Preliminary version is resolved.

Effectivity Management

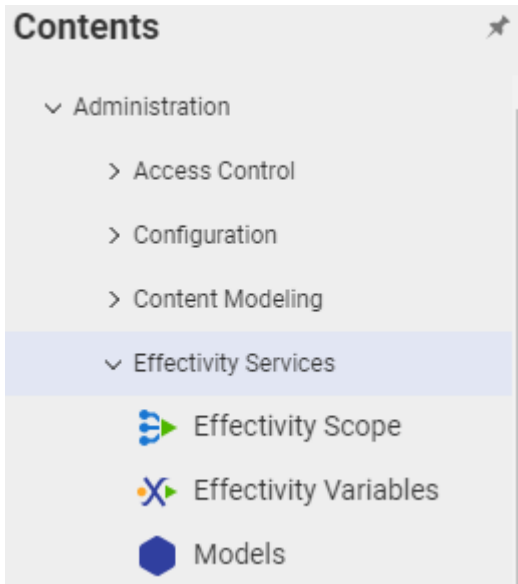
Effectivity Management is incorporated into Part BOM Structures. Using effectivity, conditions for which to include or exclude items in specific configurations can be expressed. The PE application provides commonly used effectivity variables out-of-the-box along with the ability to easily add additional effectivity variables. Effectivity scopes organize lists of relevant effectivity variables. For example, if one product uses Model and Unit effectivity and another uses Model, Lot, and Date effectivity, two different effectivity scopes can be created. The PE application provides an Aras Part BOM Scope with Model, Unit and Date variables. Additional effectivity scopes and variables can be created by an Administrator. The following table defines terms, acronyms, and abbreviations used for Effectivity in the PE application. Effectivity Terminology

Term	Definition
Effectivity	Identification of valid uses of an item in a structure if this item's use is conditional.
Effectivity Variable	A variable that influences effectivity decisions, such as a date, model, unit, batch, lot, plant, etc.
Effectivity Scope	A built-in ItemType that represents a list of relevant Effectivity Variables. For example, the Scope may contain a Model, Unit, and Date Effectivity Variables.



Effectivity Expression	A representation of an effectivity condition in the Boolean Expression Language. For example: Model = "Model X" and (Unit >= 10 and Unit <=20)
Effectivity Criteria	The criteria to resolve a structure by effectivity. Effectivity conditions set on relationships are evaluated against the input criteria to determine the inclusion or exclusion of conditional items in the resolved structure. For example: resolve the structure for criteria: (Model = "Model X" and Unit = 15).

To access the Effectivity Services, go to **Contents** → **Administration** → **Effectivity Services**.



Viewing Effectivity on BOM Structure tab

Effectivity, which is set on Part BOM relationships, can be viewed from the **BOM Structure** tab. To view an Effectivity on a multi-level BOM:

1. Open the **BOM Structure** tab of the Part.
2. BOM Effectivities are displayed in the Effectivity column.

BOM BOM Structure Alternates AML Documents CAD Documents Goals Changes							
Part Number	Revision	State	Sequence	Quantity	Locked By	Name	Effectivity
MP2942	B	Preliminary	5	1		Body	
MP2954	B	Preliminary	10	1		Extruder	
MP2961	A	Released	15	1		Shipping	
MP2956	A	Released	20	1		Gantry	
MP2968	A	Released	25	1		XY Stage	
MP2943	B	Preliminary	30	1		Build Platform	
MP2952	B	Preliminary	35	1		Electronics	
MP2967	A	Released	40	1		Wiring	
MP2938	B	Preliminary	45	1		Additional Parts	
MP2935	A	Released	5	2		Filament Spool Holder	Model = Replicator OR (Model = [Replicator 2] AND Unit <= 99)
MP2361	A	Preliminary	6	1		Filament Heavy Duty Spool Holder	Model = [Replicator 2] AND Unit >= 100
MP2962	B	Released	10	8		Side Clip Short	
MP2937	A	Released	15	2		Acrylic Side Cover	
MP4000	A	Preliminary	16	1		Filament	Date >= [12/19/2018]

3. To view full details, right-click a BOM row → **View Effectivity**. The Manage Effectivity Expressions split pane appears on the right side of the **BOM Structure** tab with a list of effectivities set on the selected BOM.

BOM
BOM Structure
Alternates
AML
Documents
CAD Documents
Goals
Changes

Part Number	Re...	State	Sequen...	Quantity	Claimed By	Name
MP2942	A	Preliminary	1	1		Body
MP2954	A	Preliminary	2	1		

Open
Grow
Trim
View Effectivity

BOM Effectivity: MP2942 Body

Effectivity Scope	Effectivity Expression
Aras Part BOM...	Model = Replicator OR (Model = [Replicator 2] AND Unit <= 99)

Managing Effectivity on a BOM

Setting Effectivity on a BOM

Multiple Effectivities can be set on a single Part BOM Relationship. These Effectivities can use the same or a different Effectivity Scope depending on how your business uses multiple Effectivities. To set Effectivity on a BOM using the Part Item view:

1. In the Manage Effectivity Expressions split pane, click Create effectivity null . The Effectivity Expression dialog appears.

Effectivity Expression



Effectivity Scope



Effectivity Expression

Apply

Cancel

2. Set the Effectivity Scope field by either typing or using the ellipsis to search for an Effectivity Scope.
3. Enter your Effectivity Expression in the Effectivity Expression text field.

Important

Aras Innovator supports both simple and complex Effectivity Expressions using the free-form Boolean expression language. Effectivity Expressions can be created using Boolean operators, like `equal` , `greater than` and `equal` , `less than`



and equal , not , and , and or . The Effectivity Expression editor provides guided editing user interface as an Effectivity Expression is entered.

4. Click **Apply**.

Updating Effectivity on a BOM

To update Effectivity on a BOM:

1. In the Manage Effectivity Expressions split pane, right-click on an Effectivity → **Edit Effectivity**.
2. Update the Effectivity Expression as required.
3. Click **Apply**. The updated Effectivity Expression appears in the Manage Effectivity Expressions split pane. The updated Effectivity Expression is set on the BOM.

Removing Effectivity from a BOM

To remove an Effectivity from a BOM with the help of a Part Item view:

1. In the Manage Effectivity Expressions split pane, click on the Effectivity to be deleted.
2. Click Delete effectivity null .
3. In the confirmation dialog, click **OK** to delete the effectivity.

Resolving a BOM Structure by Effectivity

When no Effectivity Criteria is yet specified, the unfiltered BOM structure is displayed. The unfiltered BOM structure can contain extra Parts. In the example below, Parts for two different models are both included.

	MP2954	B	Preliminary	10	1	Extruder	
	MP1705	B	Released	5	2	MK7 Thermal Core	
	MP2607	D	Released	10	2	Cartridge Heater 40W 24V Right Angle Exit	
	MP2966	C	Released	20	1	Wire-Filament Extruder Guide	
	MP2959	C	Released	25	1	Nylon Spacer with Flange	
	MP2506	B	Released	30	2	MK8 Nozzle 0.4mm	Model = [Replicator 2]
	MP2505	A	Preliminary	30	1	Nozzle 0.3mm	Model = Replicator
	MP1708	B	Released	35	2	MK7 Heatsink	
	MP2685	C	Released	40	4	Spacer Black 16.5mm length 3.2mm ID 7...	
	MP2675	A	Released	45	2	Tube Fitting .45in Tube	
	MP2350	C	Released	50	2	Fan 24V 40x40x10 Hi Performance	
	MP2953	D	Released	55	1	Extruder Hardware	
	MP2589	A	Preliminary	60	1	Bar Mount	Model = Replicator
	MP2590	A	Released	60	1	MK8 Bar Mount	Model = [Replicator 2]
	MP1872	C	Released	65	2	Stepper Motor NEMA17	

To resolve a BOM by Effectivity:

1. On the **BOM Structure** toolbar, click **Set Effectivity Criteria**. The Effectivity Criteria Filter dialog appears.
2. Click the ellipsis in the Scope field.
3. Search for and select a proper Effectivity Scope. The selected Effectivity Scope populates the Scope field and Effectivity Variables of this Scope appear as editable rows.

Effectivity Criteria Filter



Scope **Aras Part BOM Scope** ...

Variable	Value
Unit	
Date	
Model	

4. Provide the Effectivity Criteria you need to resolve the BOM structure in the Value cells of the Effectivity Variables.

Important

It is possible to resolve a structure either fully or partially. To fully-resolve a structure, a value must be entered for every effectivity variable on the **Effectivity Criteria Filter** dialog for the selected scope. To resolve a structure partially, one or more effectivity variable values can be left blank. When left blank, those effectivity variables are ignored while evaluating if the Part BOM relationship is effective.

5. Click **Apply**.

Important

If the effectivities set within the BOM structure use more than one effectivity scope, then during structure resolution, the effectivities are evaluated for the scope selected on the Effectivity Criteria Filter dialog. If there are multiple effectivities set on a single Part BOM relationship, they are evaluated using OR logic during structure resolution. This means that if at least one of the effectivities set on the relationship meet the effectivity criteria, the child item is evaluated as effective for the Parent and displayed in the resolved structure. IF your business requires evaluating such cases using AND logic, an administrator can change the configuration.

To return to the unfiltered structure, remove the Effectivity Criteria:

1. On the **BOM Structure** toolbar, click **Set Effectivity Criteria**.
2. Click **Clear**.



3. Click **Apply**.

Design Goals

Adding a Design Goal

You can add design goals to a Part item using the Goals tab in the relationship accordion. A design goal is either defined by cost or weight. The supplied values for each Child Part can then be used in a part structure to calculate the cost of a Parent Part. To add a design goal for a Part:

1. Open the Part.
2. Click **Edit**.
3. Go to the **Goals** tab.
4. Click **New Part Goal** on the Goals relationships toolbar. A new row appears in the Goals table.

Goal ▲	Target	Estimated	Calculated	Actual	Comments
Cost Weight					

5. Enter the appropriate values for each cell of the new row:
 - **Goal** – (Required) Cost or Weight.
 - **Target** – The design target value for the cost or weight.
 - **Estimate** – The estimated value for the cost or weight.
 - **Calculated** – The roll-up calculated value for the cost or weight based on the child component values in the BOM. This value is not editable.
 - **Actual** – The actual value for the cost or weight. For cost, this may be the value that was negotiated with the vendor. For weight, this may be the value resulting from a measurement.
 - **Comments** – Remarks about the design goal.

Important

Goals and their calculations do not have a unit of measure. Their values must be entered in the same units.

5. Click **Save** to save your changes.



Important

A Part can have at most one Cost and one Weight Goal row. If there are several rows for Goals of the same type, you will receive an error upon saving the Part. Delete the extra row to resolve the error.

Rolling Up Costs

Costs are entered as either Target, Estimate, Calculated, or Actual. Based on the values supplied in the design goal, a calculated cost/weight rollup will occur automatically for a BOM. To initiate a roll up, you must specify at least a Target on the parent. The calculated value is determined using the values supplied in the design goal based on the following hierarchy from lowest to highest accuracy: Target, Estimated, Calculated, Actual. In other words:

- If the Target and Estimated values are supplied, then the Estimated value is used.
- If the Target, Estimated and Calculated values are supplied, the Calculated value of the part is used.
- If Actual value is specified, it overrides any of the other values defined.

Specifying only Target values on the child parts will prevent a roll-up calculation. As long as the children cost goal values are Target, they do not alter the parent's goal value. The Target goal for the Parent will remain as long as there is at least one child part that has only a Target value for its cost goal. However, as soon as all children have an Estimated or Actual goal value, the parent's value changes to Calculated. The parent's Goal value is automatically re-calculated whenever any Child has a Goal changed. In the following example, Parent Part contains two immediate children: Child A and Child B.



Part Number

Parent

Revision

A

State

Preliminary

Name

Parent Part

Type

Assembly

...

Unit

EA

▼

Make / Buy

Make

▼

Cost (Calculated)

31.0000

Part Number ↑ 2	Revision	Name	Quantity	Cost
Child A	A	Child A	1	17.0000
Child B	A	Child B	1	14.0000

Goal ↑	Target	Estimated	Calculated	Actual
Cost	10.0000	15.0000		17.0000

Goal ↑	Target	Estimated	Calculated	Actual
Cost		14.0000		

Child A has a Target cost goal of 10.00, and an Estimated goal of 15.00, but the Actual cost is 17.00. Actual cost is used for the rollup calculation. Child B has an Estimated cost goal of 14.00 so that is used for the rollup calculation. If a user supplies an Actual cost goal to Child B, then this value will be used for the rollup calculation. To initiate a roll up, you must specify at least a Target on the parent. A user then assigns a cost goal on Parent Part with an Estimated goal of 30.00. Now the calculated cost of Parent Part appears automatically and is 31.00.

Important

Goals and their calculations are unitless. Their values must be entered in the same units. Ensure that you enter Cost in the same currency and Weight in the same unit of mass.



BOM Reports

To present complex multi-level BOMs in a well-organized layout, Aras Innovator provides four standard types of Reports:

- **Multilevel BOM Report** – Shows all Parts of a BOM with their position in the hierarchy and their quantity.
- **BOM Quantity Rollup Report** – Shows total quantities of all Parts of a BOM.
- **BOM Costing Report** – Calculates the cost of a Parent from Actual or Estimated Costs of its Children.
- **Part Circular Reference Report** – Detects Circular References in a BOM.

To access these standard Reports, either:

- Go to **Contents** → **Parts** → **Search Parts**, right-click on a Part → **Reports**.
- Open a Part, and on the Part toolbar, click Reports null , and then select the Report you need.

To print a Report, use the Print button null available in the top left corner of each Report tab. The print button uses standard browser print function. Depending on the browser and your specific configuration, various print choices, such as printing to a printer or saving to PDF, are available.

Multilevel BOM Report

The Multilevel BOM Report shows a BOM hierarchy where you can see the properties for each Part: BOM level, Quantity, AML Status, Manufacturer, and Manufacturer Part.



Bill of Materials Report

Generated on: 2/25/2019, 4:43:53 PM

BOM Level	Part Number	Name	Quantity	AML Status	Manufacturer	Manufacturer Part
0	MP0101	Makerbot Replicator	1			
1	MP2942	Body	1			
2	MP2667	Spacer Black 5-16 in length .14in ID .25in OD	1			
2	MP2322	RGB LED Strip Common Anode	1			
2	MP2660	Spacer Black 1-2 in length .14in ID .25in OD	2			
2	MP2939	Body Fan Assembly	1			
3	MP2347	Fan 24V 40x40x10 1m leads	1			
3	MP2685	Spacer Black 16.5mm length 3.2mm ID 7mm OD	2			
2	MP2940	Body Hardware	1			
3	MP2295	M3 Square Nut	44			
3	MP0370-004	M3x16 Socket Cap Bolt	38	Approved	McMaster-Carr Supply Company	91290A120
3	MP0370-006	M3x25 Socket Cap Bolt	4	Approved	McMaster-Carr Supply Company	91290A125
3	MP2728	Support Blind Hole Mount	5			
3	MP0370-008	M3x35 Socket Cap Bolt	2	Approved	McMaster-Carr Supply Company	91290A135

BOM Quantity Rollup Report

The BOM Quantity Rollup Report displays a list of BOM Parts where for each Part displays the total quantity required for this BOM.



Quantity Rollup Report for MP0101

Generated on: 2/25/2019, 4:46:58 PM

Part Number	Name	Calculated Quantity
MP2942	Body	1
MP2954	Extruder	1
MP2961	Shipping	1
MP2956	Gantry	1
MP2968	XY Stage	1
MP2943	Build Platform	1
MP2952	Electronics	1
MP2967	Wiring	1
MP2938	Additional Parts	1
MP1705	MK7 Thermal Core	2
MP2667	Spacer Black 5-16 in length .14in ID .25in OD	1
MP2935	Filament Spool Holder	2
MP2459	M3 Thumb Nuts	4
MP1531	ABS Black 1kg Spool 1.75mm	1
MP2295	M3 Square Nut	84
MP2584	PTFE Tubing 14in OD 18in ID	2
MP2753	Shaft 8mm x 424mm	2
MP2827	Nylon 440 screw	6

BOM Costing Report

The BOM Costing Report shows the Cost Goal Rollup for a given BOM where each Part displays its level in the BOM and its properties at that level: Quantity, Cost value, and Cost Basis.

Bill of Materials Costing Report

Generated on: 2/25/2019, 4:50:03 PM

BOM Level	Part Number	Name	Quantity	Cost	Cost Basis
0	MP0101	Makerbot Replicator	1	4760.7859	Calculated
1	MP2942	Body	1	443.5369	Calculated
2	MP2667	Spacer Black 5-16 in length .14in ID .25in OD	1	0.0600	Actual
2	MP2322	RGB LED Strip Common Anode	1	3.8000	Actual
2	MP2660	Spacer Black 1-2 in length .14in ID .25in OD	2	0.6500	Actual
2	MP2939	Body Fan Assembly	1	9.9000	Calculated
3	MP2347	Fan 24V 40x40x10 1m leads	1	9.0000	Actual
3	MP2685	Spacer Black 16.5mm length 3.2mm ID 7mm OD	2	0.4500	Actual
2	MP2940	Body Hardware	1	5.6800	Calculated

Circular Reference Report

A circular reference occurs in a series of parts or assemblies where a Child Part adds its Parent Part to its own BOM, causing an “infinite” series of references. For example, a circular reference would occur if there is a Parent Part that has two Children A and B and a user were to edit Child A to add



the Parent Part to its BOM. The BOM Relationship from Child A to the Parent Part creates a Circular Reference in this case. When the Circular Reference Report is run, it detects these cases in a BOM structure, indicating where the circular references occur.

List of circular dependencies between Parts

Generated on: 2/25/2019, 5:07:55 PM

Loop #	Source Part	Referenced Part
1	Child Part B.2 gen.5 (1AADE136F54B4D74A78F71B06EA71E52)	Parent Part gen.14 (73678DA3F16042E4A77729723FB71E2A)
	Parent Part gen.14 (73678DA3F16042E4A77729723FB71E2A)	Child Part B gen.14 (C120442B993344A89B7C8654AD73C84E)
	Child Part B gen.14 (C120442B993344A89B7C8654AD73C84E)	Child Part B.2 gen.5 (1AADE136F54B4D74A78F71B06EA71E52)

If there are no Circular References in a BOM, the Circular Reference Report displays an appropriate message.

List of circular dependencies between Parts

Generated on: 2/25/2019, 5:09:45 PM

No circular dependencies between Parts are found.

Comparing BOMs

To compare complex multi-level BOMs side-by-side, Aras Innovator provides the Structure Browser. Refer to section [Comparing Items](#) for information about comparing BOMs. All examples in that section are applicable to BOMs and Parts.

Finding Where a Part is Used

Aras Innovator offers the Where Used feature to determine where an Item is used by other Items. Refer to section [Finding Where an Item is Used](#) for information about how to find out where a Part is used. All examples in that section are applicable to BOMs and Parts.

Sorting BOM Structures

Columns in the **BOM Structure** accordion tab can be sorted in ascending or descending order by clicking on the column headers. Sorting is applied to each BOM level recursively. When a level of Parts is sorted, then children of each Part are sorted within this Part.



Part Number	Sequence	Revision	State 
 Child A	1	B	Preliminary
Child A.1	1	A	Preliminary
Child A.3	3	C	Preliminary
Child A.2	2	C	Released
 Child B	2	B	Released
Child B.2	2	D	Preliminary
Child B.1	1	A	Released

To sort across multiple columns, press and hold the **Ctrl** key while clicking on the column headers.

Part Number	Sequence	Revi...  2	State  1
 Child A	1	B	Preliminary
Child A.3	3	C	Preliminary
Child A.1	1	A	Preliminary
Child A.2	2	C	Released
 Child B	2	B	Released
Child B.2	2	B	Released
Child B.1	1	A	Released

