Aras Manufacturing Process Planning 12.0R2

Administrator Guide

Document #: 12.0.2019050901

Last Modified: *7/2/2021*

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1 Overview of Manufacturing Process Planning

Aras Manufacturing Process Planning (MPP) application is an important component of Product Lifecycle Management (PLM) that enables global Manufacturing teams to author and manage Manufacturing data, such as Process Plans, Manufacturing Bill of Materials, Resources, Work Instructions etc. in a single source while interfacing with data from other parts of an organization such as Engineering, Quality etc.

The features available in Aras Manufacturing Process Planning are listed below:

- **Author Process Plans**: This feature enables users to author Process Plans that detail the Operations, Steps, Consumed Parts and Resources required to manufacture a Product or an Assembly.
- **Concurrent Work Instruction authoring**: The Process Plan and Work Instruction are created simultaneously as they are different views of the same underlying data.
- **Ability to create visually rich Work Instructions**: Users can create Work instructions with content such as images, tables, lists etc.
- **Ability to publish Work Instructions**: Work Instructions can be printed, and published to PDF and HTML formats.
- **Integrated Process Plan and Manufacturing Bill of Material creation**: This feature will enable users to create Process Plans and MBOMs simultaneously. The Process Plan and the MBOM are different views of the same underlying data.
- **Author Manufacturing Bill of Materials**: This feature enables users to restructure and derive the MBOM from the EBOM.
- **Workbench to easily author Process Plan and MBOM**: The workbench window will enable users to easily author the Process Plans and author/restructure MBOMs using drag and drop capability.
- **Reconcile Parts between EBOM and MBOM**: The user will be provided with automatic real-time indicators to show how Parts in the EBOM are accounted in the MBOM.
- **Create Location based Process Plans and MBOMs**: Users will be able to create Process Plans and MBOMs specific to different locations.
- **Conflict resolution while saving data**: MBOMs are multi-level BOM structures that can be edited concurrently by multiple users. Thus, there can be conflicts when saving data. This feature enables the user to resolve the data conflicts before saving.

1.1 Glossary

The following terms are used throughout this document and are important to understand to use Aras MPP:

Term	Definition
MPP	Manufacturing Process Planning
EBOM	Engineering Bill of Material
MBOM	Manufacturing Bill of Material

Term	Definition
WI	Work Instruction
Location	A Manufacturing factory where a product or assembly is manufactured. Locations are also referred to as Plants.
Sub-assembly	An assembly that has a higher level parent assembly
Process Plan	A Process Plan is an Item that details how a product or assembly will be manufactured. Process Plans are also referred to as routings.
Operation	An Item representing operations performed on the shop floor. An Operation can consist of detailed manufacturing Steps (mentioned below). Operations are usually performed at a WorkStation in the Manufacturing factory.
Step	The Step Item is the smallest work element of an Operation that is performed on an assembly.
WorkStation	A work area in a Manufacturing Factory where Operations are performed. Machines, Tools and Technicians come together at a WorkStation to assemble the Product (or work on an Assembly)
Resource	Assets, including Machines, Tools and Humans, necessary to perform an Operation.
Phantom Assembly/Phantom	A grouping of Parts that defines the results of an intermediate step in a manufacturing process. Phantoms are manufacturing-only Parts that do not appear in the EBOM. Like any other assembly, Phantoms are identified by a Part Number.
MBOM only Part	There are consumables that do not appear in the EBOM. Some examples of consumables are glue, paint etc.
Workbench (WB)	A window (in Aras MPP) that provides users access to content (Items) to author Process Plans and MBOMs

2 Overview of MPP Implementation

2.1 MPP Data Model

MPP is based on the new ItemType called **Process Plan** which includes a standard Innovator **Form** plus three **Views** that can be accessed through the Sidebar of a Tear-Off window. The three views are for the Process Plan, MBOM and EBOM.

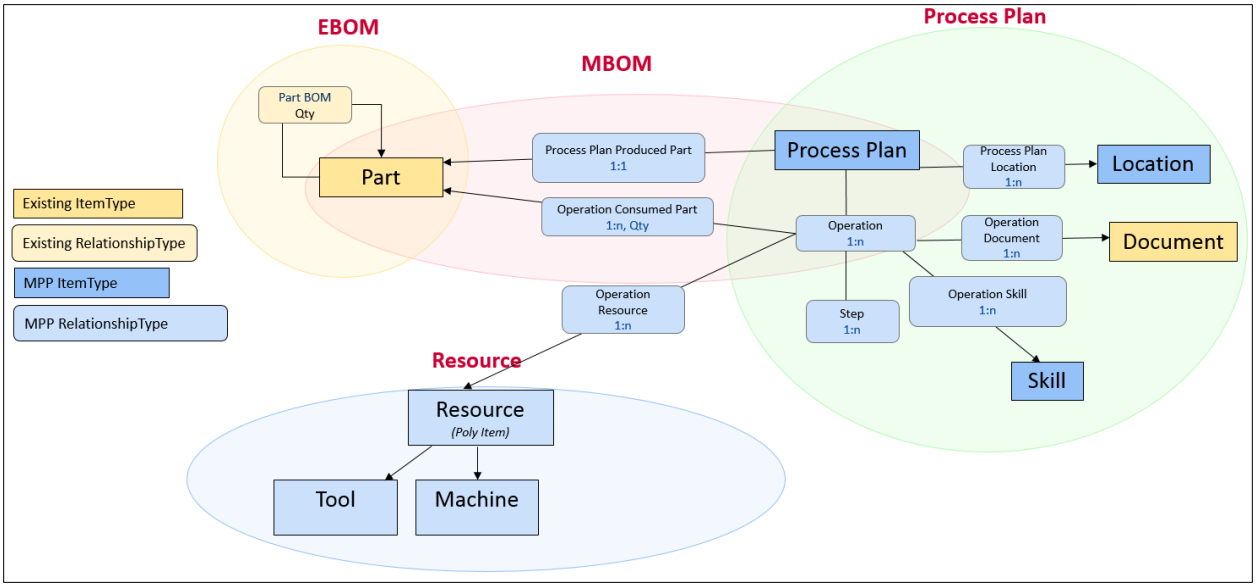

Figure 1.

2.2 Updates to Part Class Structure

Aras Manufacturing Process Planning adds two new classifications to the **Part** ItemType. These classifications are:

- **Phantom**
- **MBOM only Part**

These two classifications have a class specific icon and a Form called **mpp_Part_Phantom_MBOM_Only**.

2.3 Fly-Outs

When working with the Process Plan and MBOM, items are created and edited using Fly-Out dialogues. The display of these Fly-Outs is controlled by Form items. In all, there are four Fly-Outs shown here:

- **Operation** - mpp_OperationQuickEdit
- **Step** - mpp_StepQuickEdit
- **Phantom** - mpp_Part_Phantom_MBOM_Only
- **Change Quantity** - mpp_ConsumedPartChangeQuantity

Note: Fields can be added to the fly-outs fields as desired and other Form properties such as height, width etc. can be changed as well.

2.4 Process Plan Life Cycle

The “Process Plan” Lifecycle is associated with the Process Plan ItemType. To release a Process Plan the user must manually promote the Process Plan Item to Released state and then create the next revision of the Process Plan Item.

When the Process Plan Item is revised, the new revision of the Process Plan will point to the Parts (Produced & Consumed) and the other related Items (Tools, Machines, Documents, Skills) in the Origin Process Plan.

The user should manually replace the Produced Part to the new revision of the Produced Part and change the Consumed Parts if required.

The following diagram shows the Process Plan lifecycle:

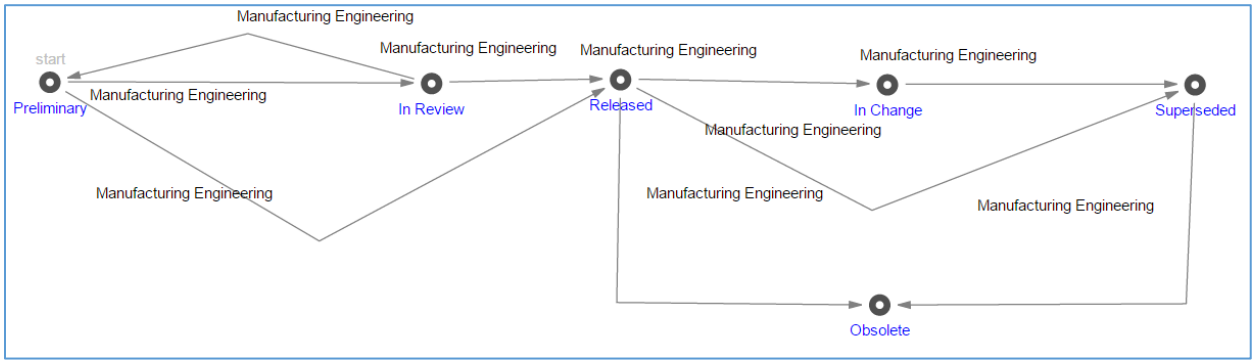

Figure 2.

Note: The behavior for all the states in the Process Plan lifecycle must be set to **fixed**.

2.5 Mapping Custom ItemTypes for Process Plans

Aras Manufacturing Process Planning offers an option to map custom ItemTypes to Process Plans. This section explains the requirements for these ItemTypes and the mapping process.

2.5.1 Requirements for Custom ItemTypes in Process Plans

Before mapping a custom ItemType to use in Process Plans, you must confirm that it meets the data structure requirements and includes the necessary classifications and properties.

The required data structure needs to match the following structure used by the Aras OOTB Part ItemType:

```
<Item type="Part">
    <Relationships>
        <Item type="Part BOM">
            <related_id>
                <Item type="Part" />
            </related_id>
            <Relationships>
                <Item type="BOM Substitute">
                    <related_id>
                        <Item type="Part" />
                    </related_id>
                </Item>
            </Relationships>
        </Item>
        <Item type="Part Alternate">
            <Relationships>
                <Item type="Part" />
            </Relationships>
        </Item>
    </Relationships>
</Item>
```

Note: Although the names in the custom structure may be different than the ones shown above, the highlighted names must all match. For example, if the name of the top-level item is myPart, that should be the name in all highlighted areas.

The custom ItemType specified at the top-level of the structure above must have a classification structure that includes two classifications for specific use by the MPP application. These classifications are:

- `Phantom`
- `MBOM Only Part`

The custom structure also needs to have specific properties used by the MPP application. These properties include the following:

ItemType	Required Property
Top-level item *Example: Part*	name; type=String
Top-level item *Example: Part*	item_number; type=String; must be unique
Top-level item	make_buy; type=List;

ItemType	Required Property
Example: Part	Data Source must be the OOTB **Make Buy** List in Aras Innvoator database (id = F7553D600D57489BB81309E32835AFEC)
First Relationship on top-level itemtype *Example: Part BOM*	quantity; type=Float

2.5.2 Mapping custom ItemTypes to Use with Process Plans

Once the requirements for setting up custom ItemTypes have been met, use the following procedure to set up this structure for use with Process Plans:

1. Log into Aras Innovator as an administrator.
2. Go to **Administration\Preferences** in the TOC and open the **World** Preference for editing.
3. Click on the **MPP Custom Part Mapping** tab and set the following properties:

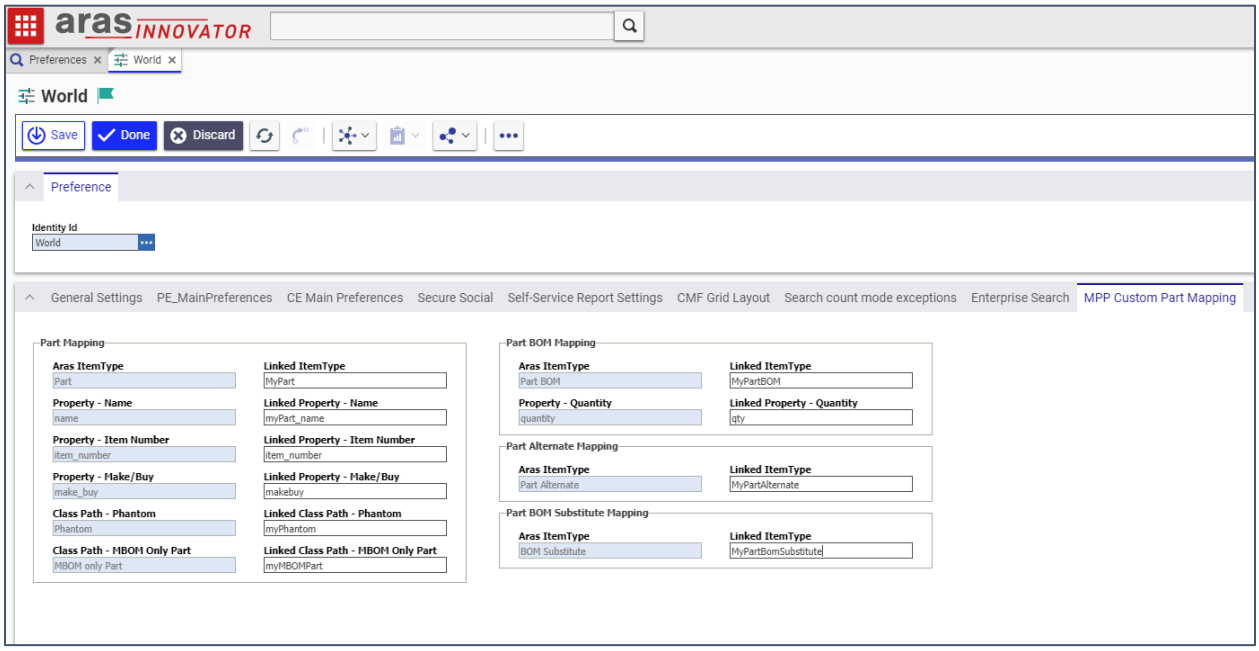

Figure 3.

Note: The shaded, disabled fields show the defaults. The enabled "Linked" fields are used to override the default values.

a. **Part Mapping: Linked ItemType** The name of the ItemType that should be used in place of Part.

b. **Part Mapping: Linked Property – Name** The property on the custom ItemType that should be used as the name.

c. **Part Mapping: Linked Property – Item Number** The property on the custom ItemType that should be used as the item_number.

d. **Part Mapping: Linked Property – Make/Buy** The property on the custom ItemType that should be used as the make_buy.

e. **Part Mapping: Linked Class Path – Phantom** The class path on the custom ItemType that leads to the node to be used for Phantom in the Process Plan.

f. **Part Mapping: Linked Class Path – MBOM Only Part** The class path on the custom ItemType that leads to the node to be used for MBOM Only Part in the Process Plan.

g. **Part BOM Mapping: Linked ItemType** The name of the Relationship that should be used in place of Part BOM.

h. **Part BOM Mapping: Linked Property – Quantity** The property on the custom Relationship that should be used as the quantity.

i. **Part Alternate Mapping: Linked ItemType** The name of the Relationship that should be used in place of Part Alternate.

j. **Part BOM Substitute Mapping: Linked ItemType** The name of the Relationship that should be used in place of Part BOM Substitute

4. Save, Unlock, and Close the **World** Preference item.

3 Publishing Process Plans

3.1 Required Components

In order to publish Process Plans, the following needs to be installed:

- Aras Conversion Server (See *Aras Innovator 12.0 - Conversion Server Setup Guide*)
- Aras Agent Service (See Section 5.13 of the *Aras Innovator 12.0 – Installation Guide*)
- Aras Publishing Service (See *Aras Innovator 12.0 – Publishing Service Setup Guide*)
- Aras HTML to PDF Converter (See *Aras Innovator 12.0 – HTML to PDF Converter Setup Guide*)

Publishing Technical Documents requires two Feature Licenses – Aras.PublishingService and Aras.HTMLtoPDFConverter.

3.2 Installing MPP Publishing

Installing MPP Publishing involves making updates to the Aras Conversion Server code tree. You will need to have administrative privileges on the Server machine where the Conversion Server is installed.

1. Get a copy of the Aras Manufacturing Process Planning CD Image on the Conversion Server machine.
2. Copy the 'ConversionServer' folder to the root directory where the Conversion Server was installed, overwriting the existing 'ConversionServer' folder and its contents.

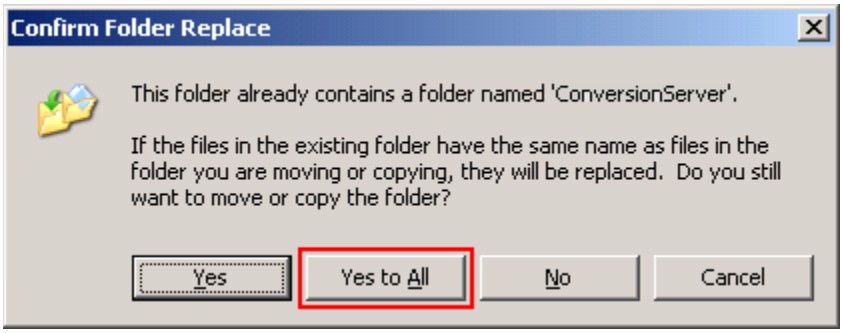

Figure 4.

3. Restart IIS.
4. Open the ConversionServerConfig.xml file for editing.

   Typically, this file is located at the root of Aras Innovator code tree (Sample: `C:\Program Files (x86)\Aras\Innovator\ConversionServerConfig.xml`)
5. In the `<sectionGroup name="ConverterSettings">` section add:

```
<section name="HtmlPublishingConfiguration"
type="Aras.MPP.Publishing.HtmlPublishingConfiguration,
Aras.MPP.Publishing" />
```

6. In the `<Converters>` section add:

```
<Converter name="mpp_HtmlPublishingConverter"
type="Aras.MPP.Publishing.HtmlPublishingConverter,
Aras.MPP.Publishing"/>
```

7. In the `<ConverterSettings>` section add:

```
<HtmlPublishingConfiguration>
            <BaseResourceUrls>
                  <add
url="http://localhost/InnovatorServer/Client/images" />
            </BaseResourceUrls>
            <ConvertionTool path="C:\Program Files
(x86)\Aras\Innovator\ConversionServer\Prince\bin\prince.exe" />
      </HtmlPublishingConfiguration>
```

Note: You will need to specify the appropriate Aras Innovator URL and Path to the ConversionServer folder.

The resulting file should look similar to the code shown here:

```
<?xml version="1.0" encoding="utf-8"?>
<configuration>
       <configSections>
              <!-- Common converter service configuration -->
              <section name="ConversionServer"
type="Aras.ConversionFramework.ConversionServer.Configuration.ConversionServerConfigurationSectio
n"/>
              <sectionGroup name="ConverterSettings">
                    <!-- Place here class configuration section definitions for converters -->
      <section name="HtmlPublishingConfiguration"
type="Aras.MPP.Publishing.HtmlPublishingConfiguration, Aras.MPP.Publishing" />
              </sectionGroup>
       </configSections>
       <ConversionServer>
              <InnovatorServer
url="http://localhost/InnovatorServer/Server/InnovatorServer.aspx"/>
              <Converters>
         <Converter name="mpp_HtmlPublishingConverter"
type="Aras.MPP.Publishing.HtmlPublishingConverter, Aras.MPP.Publishing"/>
              </Converters>
       </ConversionServer>
       <ConverterSettings>
              <!-- Place here configuration sections for converters -->
       <HtmlPublishingConfiguration>
                  <BaseResourceUrls>
                        <add url="http://localhost/InnovatorServer/Client/images" />
                  </BaseResourceUrls>
                  <ConvertionTool path="C:\Program Files
(x86)\Aras\Innovator\ConversionServer\Prince\bin\prince.exe" />
           </HtmlPublishingConfiguration>
       </ConverterSettings>
</configuration>
```

8. Save ConversionServerConfig.xml file.
9. Log into Aras Innovator as an administrator.
10. Add **mpp_HtmlPublishingConverter** to Conversion rules.

a. Navigate to **Administration\File Handling\Conversion Servers** in TOC.
b. Find the Conversion Server item you use and open it for editing.
c. Add the **mpp_HtmlPublishingConverter** Conversion Type.

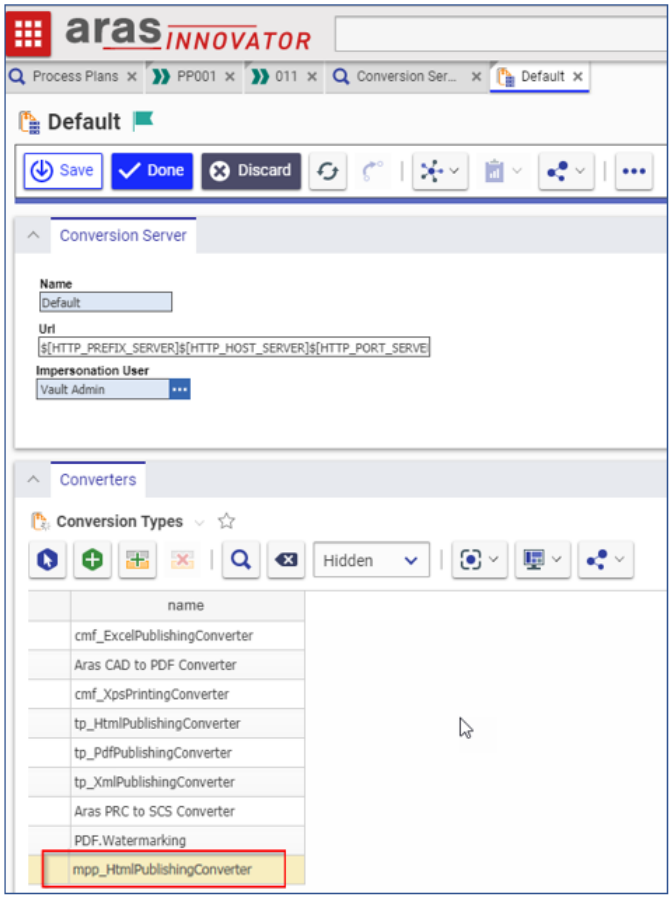

Figure 5.

11. Click Save, Done, and close.