

Library Synchronization Between PLM Systems and Allegro X Pulse

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To synchronize PLM part data with the Allegro X Pulse-managed library, users with the Administrator role in the *Pulse User Management* module use the *Library Synchronization* service to publish library data between the ECAD and PLM systems. Synchronization tasks can be executed on demand or per a schedule.

Library Synchronization PLM Prerequisites

In addition to a required minimum PLM version, there also some PLM-specific application configuration prerequisites.

Windchill PTC

For Windchill, you must have the *Partslink* module installed and configured and the *SOLR* indexing service running. Refer to the documentation provided by PTC Windchill for details.

The following table indicates the Windchill release minimum and the supported *Library Synchronization* features:

	Windchill 11.2 (Minimum)
Create Pulse parts based on PLM parts	Y
Update Pulse attribute values based on PLM attribute values	Y
Create PLM parts based on Pulse parts	Y
Update PLM attribute values based on Pulse attribute values	Y

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3DEXPERIENCE

The following table indicates feature support and the 3DEXPERIENCE releases that are currently supported by the Pulse-PLM *Library Synchronization* service:

	3DEXPERIENCE 21xFD06 (Minimum)	3DEXPERIENCE 22xFD04 (Minimum)
Create Pulse parts based on PLM parts	Y	Y
Update Pulse attribute values based on PLM attribute values	Y	Y
Create PLM parts based on Pulse parts	Y	Y
Update PLM attribute values based on Pulse attribute values	Y	Y
Publish STEP models with PLM-side conversion for 3D visualization	N	Y

For 3DEXPERIENCE, you must have the *Derived Format Converter*, a Dassault Systèmes product, installed and configured. This is needed for STEP file conversion on the 3DEXPERIENCE platform.

Refer to the 3DEXPERIENCE platform documentation for installation instructions.

STEP Conversion jobs are created in the 3DEXPERIENCE platform by the Pulse connector. The 3DEXPERIENCE platform then calls the *Derived Format Converter* to perform the conversion and update the 3D representation on the platform.

Configuring the Library Synchronization Service

To use the *Library Synchronization* service, users with the `Administrator` role in the *Pulse User Management* module must first configure the service through the *ECAD Administration Portal*, which is a web-based interface.

The following is a summary of the configuration tasks in this section:

- Creating a Managed External Connection
- Specifying the External Connection for Library Synchronization
- Defining Preferences
- Defining Attribute Mapping

Creating a Managed External Connection

When connected to the Pulse server, you can define a set of Managed Connections to enable communication between Pulse and instances of your PLM application. Once created, one of these connection definitions can be used by the *Library Synchronization* service to authenticate a specific PLM instance and enable Web Service data transfer.

Do the following to create a connection definition:

1. Type the URL of the Pulse primary node in a browser followed by `/epson` to access the *ECAD Administration Portal*.

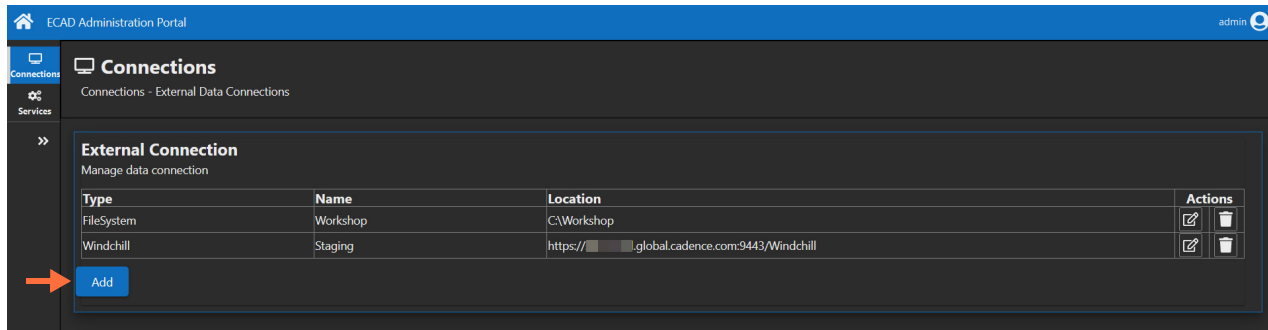
For example, `http://demoserver:7100/epson`. Ensure that there is no slash (/) at the end of the URL.

2. If prompted, enter the cluster administrator user credentials to authenticate to Pulse.

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This user account must include the `Administrator` role in the *Pulse User Management* module. The *Connections* page of the ECAD Administration Portal is displayed.



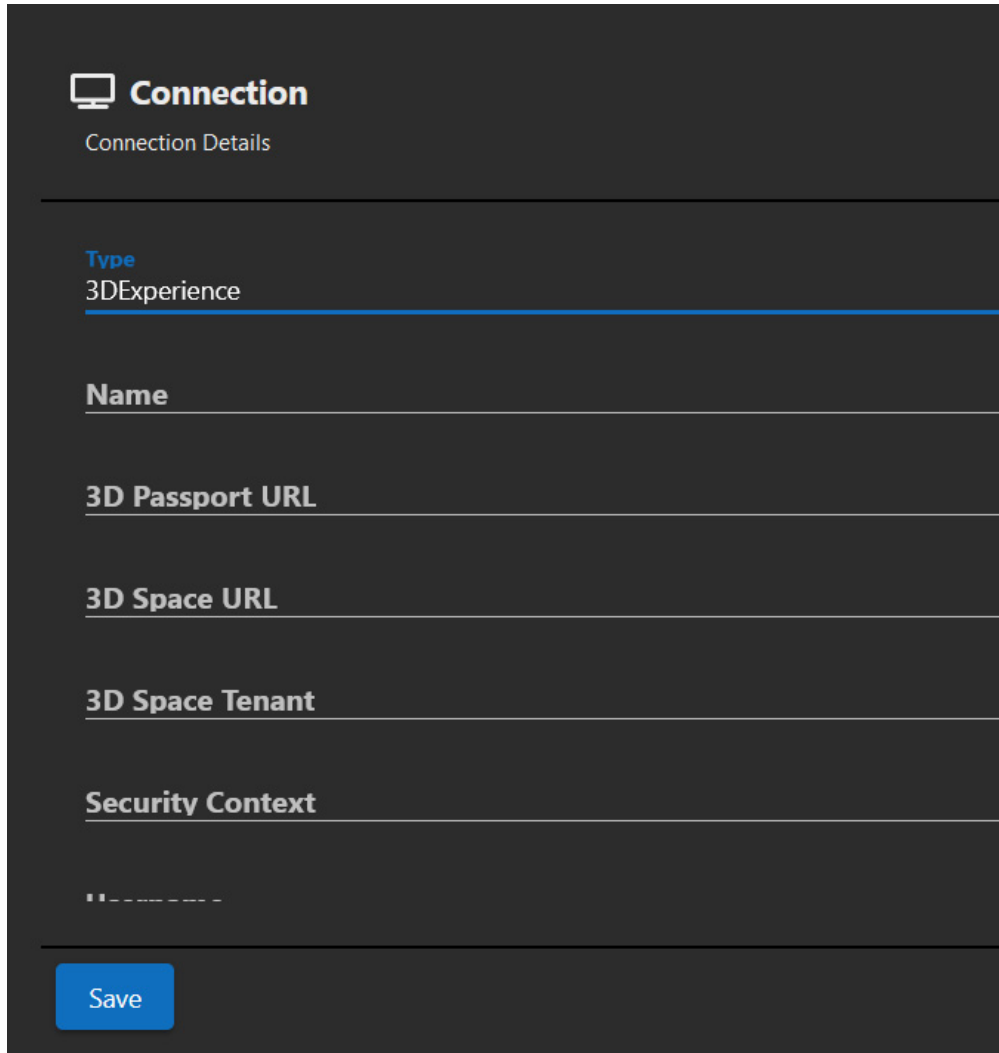
In a new Pulse installation, the table on this page does not contain connection definitions. If you already configured *Publish for Manufacturing*, existing definitions are available.

3. Click *Add* to create a connection for the PLM system.

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The *Connection* page is displayed.



The screenshot shows a dark-themed user interface for a 'Connection' page. At the top left, there is a monitor icon followed by the title 'Connection' and the subtitle 'Connection Details'. Below this, the form contains several fields, each with a label and a horizontal input line: 'Type' (with a blue label), '3DExperience', 'Name', '3D Passport URL', '3D Space URL', '3D Space Tenant', and 'Security Context'. At the bottom left of the form is a blue 'Save' button.

4. Click the *Type* field to view the list of supported PLM applications.

Depending on the connection you select, the form is refreshed to display additional fields.

5. If you select a 3DEXPERIENCE-managed connection, specify the following:

- a. A name to identify the managed connection
- b. The 3DEXPERIENCE 3D Passport URL. For example, `https://plm-server/3dpassport`.
- c. The 3DEXPERIENCE 3D Space URL. For example, `https://plm-server/3dspace`.

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- d. In *3D Space Tenant*, specify `OnPremise` if your 3DEXPERIENCE installation is installed within your network or on a hosted server.
- e. In *Security Context*, specify the collaboration space details to be used when this definition is used to authenticate to 3DEXPERIENCE.

The security context affects which data is available to you in 3DEXPERIENCE and has the following format: `<role>.<organization>.<collaboration space>`. For example, "VPLMProjectLeader.Cadence.Common Space"

- f. Specify the username and password for the PLM system to validate the connection parameters.

These credentials are not stored and are only used to validate the connection parameters.

6. Click *Save* to validate and store the connection definition.

If the validation fails, an error is displayed and the connection definition is not saved.

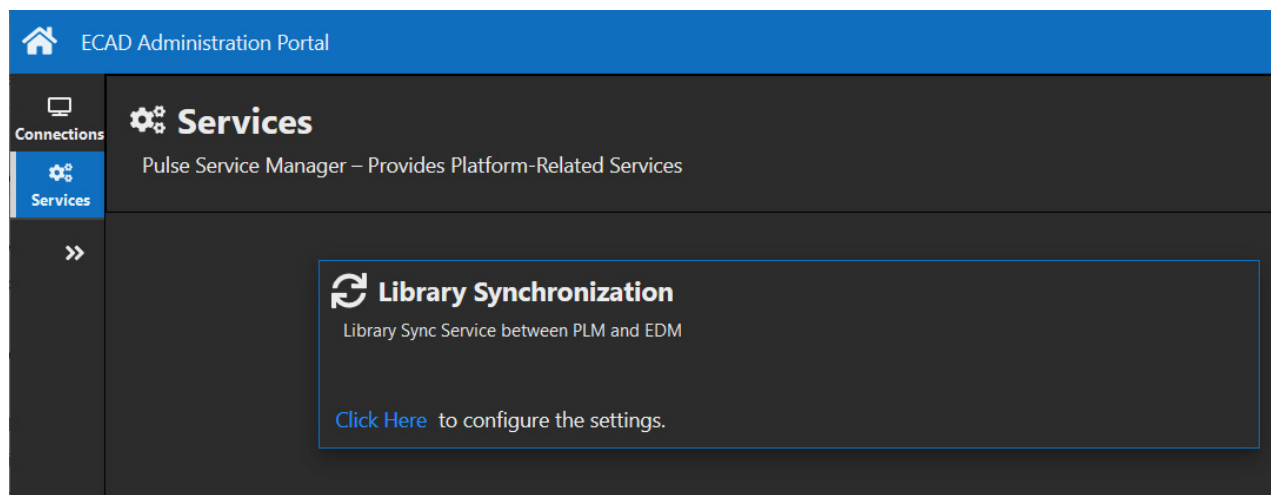
For 3DEXPERIENCE, each connection definition includes a specific security context. To specify a different security context for *Library Synchronization* versus Publish for Manufacturing, create a separate connection definition.

Specifying the External Connection for Library Synchronization

Only one managed connection at a time can be used for *Library Synchronization*.

To specify a managed connection, do the following:

1. Click the *Services* node on the left to display the *Services* tab.

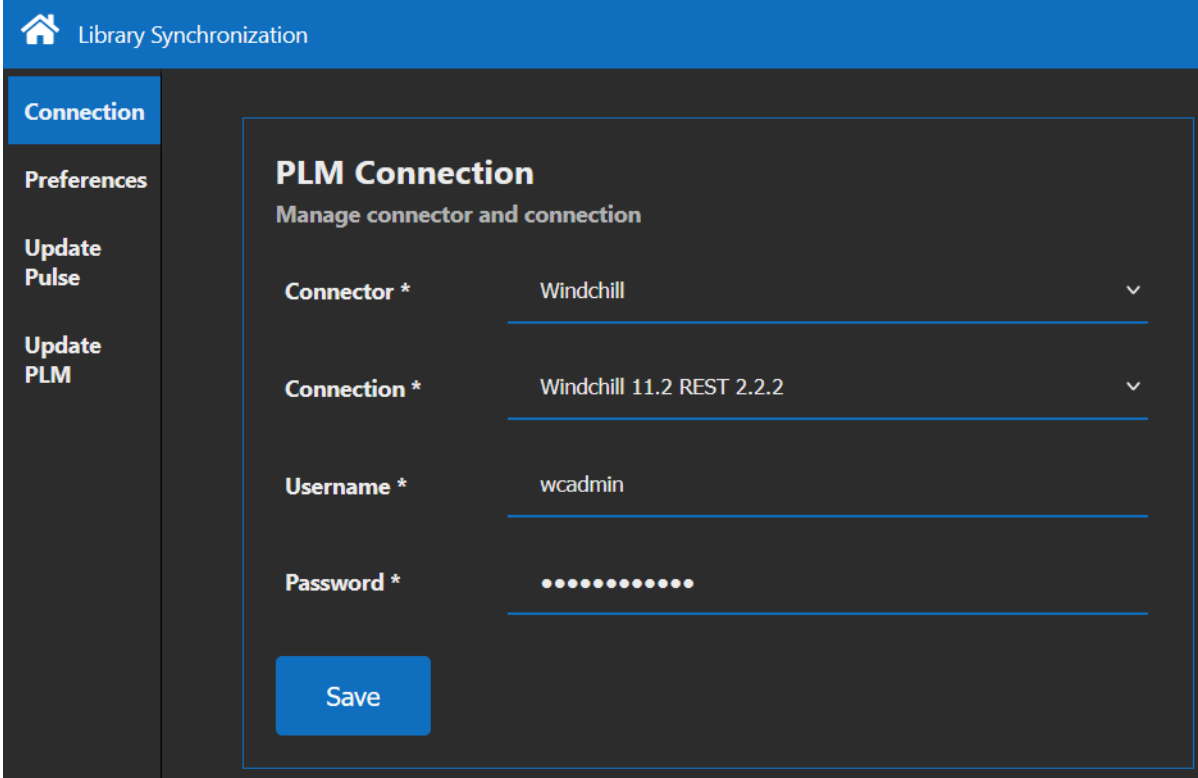


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2. Use the *Click Here* hyperlink in the *Services* tab to configure *Library Synchronization*.

The *Library Synchronization* page is displayed.



The screenshot shows the 'Library Synchronization' page. On the left is a sidebar with a home icon and the title 'Library Synchronization'. Below the title are four menu items: 'Connection' (highlighted in blue), 'Preferences', 'Update Pulse', and 'Update PLM'. The main content area is titled 'PLM Connection' with the subtitle 'Manage connector and connection'. It contains four form fields: 'Connector *' with a dropdown menu showing 'Windchill', 'Connection *' with a dropdown menu showing 'Windchill 11.2 REST 2.2.2', 'Username *' with a text input field containing 'wadmin', and 'Password *' with a masked password field (dots). A blue 'Save' button is located at the bottom left of the form area.

3. Specify the following in the PLM synchronization form:

- a. From a drop-down list, select the connector for the PLM tool you are using. Currently, *Library Synchronization* supports only 3DEXPERIENCE and Windchill.

- b. From a drop-down list, select the managed connection.

This list includes all the defined connections for the connector you selected.

- c. Specify the username and password for the PLM account that will be used to run the synchronization.

These credentials are encrypted and stored in the Pulse server and are used to authenticate to the PLM platform for all synchronization tasks.

- d. Click *Save* to store this connection selection.

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Defining Preferences

To define some global values for the synchronization tasks, use the *Settings* table in the *Preferences* tab. The *Preferences* page is enabled for the Windchill and 3DEXPERIENCE connectors.

1. Click the *Preferences* tab to view a page that includes both the *Settings* and *Mappings* tables.

Type	PLM Name	Pulse Name	Sync	Direction	Action
Attribute	Description	DESCRIPTION	True	Pulse to PLM	
Attribute	Current Ratir	IR	False	Pulse to PLM	
Classification	Part.Electron	CAD Compor	True	Pulse to PLM	
Attribute	VoltageRatin	VR	True	Pulse to PLM	

Preferences page for Windchill

Type	PLM Name	Pulse Name	Sync	Direction	Action
Attribute	partNumber	Part Number	True	Both	
Attribute	revision		False	PLM to Pulse	
Attribute	id	ENGG_ITEM_	True	PLM to Pulse	

Preferences page for 3DEXPERIENCE

2. Specify the following in the *Settings* table:

For Windchill

- a. Specify the *Classification Binding Attribute*. This should be the internal name of the Windchill attribute that holds the classification value.

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- b. Specify the *Default PLM Container* to indicate the Windchill folder into which new parts will be created.

This applies to *Update PLM* in *Library Synchronization* and the PLM new part request workflow for Windchill. This default can be overwritten by specifying a container in the *Update PLM* task.

- c. Use the *Default PLM Part Type* field to specify the internal name for the Windchill part type to be used when creating new parts with an *Update PLM* task.

This default can be overwritten by specifying a part type in the *Update PLM* task.

- d. Use *New Part Request with PLM* to enable the PLM workflow for Pulse new part requests.

For 3DEXPERIENCE

- a. If the PLM parts are not classified in the PLM system, use the *Default Part Classification* field to specify an initial Allegro X EDM classification for parts created by the synchronization.

This should be a top-level EDM classification and should contain all the attributes whose values will be synchronized from the PLM system to Pulse. The *Default Part Classification* is used when updating the Pulse-managed library with data from the PLM system.

- b. Specify the *STEP Folder locations* for the 3DEXPERIENCE connector.

The value is a comma-separated list of file system folders containing STEP files to be considered when updating the PLM system components.

This folder location must be accessible by the Pulse primary server.

3. Click *Save* to store these settings.

Defining Attribute Mapping

Use the *Mappings* table to map the PLM attribute names with Allegro X EDM classification property names. Include all attributes that should be passed between platforms as part of the synchronization tasks.

Note: In the current release, the mappings table is supported and used for 3DEXPERIENCE and Windchill synchronization.

To add an attribute mapping, do the following:

1. Click the plus (+) icon below the table to add a row.

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2. Specify the *Type* of mapping.

For 3DEXPERIENCE synchronization, use `Attribute`.

3. Specify the *PLM Name* for the attribute you want to synchronize.

Work with your PLM administrator to get this value because it might not match the display name you see in the PLM system web applications.

For Windchill, this would be the internal attribute name. If the attribute is a Partslink attribute, the internal name should be prefixed with `ClassificationAttribute::`. For example, `ClassificationAttribute::VoltageRating`.

4. Specify the *Pulse Name* for the property you want to synchronize.

This should match the property name you are using in the EDM classification.

Note: Currently, all searchable properties are supported in both synchronization directions. However, only two injected properties are supported when updating PLM system components.

a. Specify *FOOTPRINT* for footprint relation.

b. Specify *ALT_FOOTPRINT* for the Alternate Footprint relation.

5. Specify a *Sync* value of `True` if you want this mapping to be considered during the synchronization tasks, or `False` to maintain the mapping but disable the publishing of the attribute value.

6. Specify the *Direction* for the use of this attribute mapping.

☐ Use *PLM to Pulse* if this mapping is to be used to push PLM attribute values to Pulse.

☐ Use *Pulse to PLM* if this mapping is to be used to push Pulse-Allegro X EDM attribute values to the PLM.

☐ The *Direction* of the Part Number attribute mapping should be `Both` because this mapping is used for the *Update Pulse* and *Update PLM* tasks.

This mapping is part of the out-of-the-box configuration but you might need to update the PLM name based on your PLM configuration. The out-of-the-box configuration specifies `partNumber` for the PLM Name, which is the 3DEXPERIENCE API name for the Enterprise Item Number.

For Windchill, the part number mapping is not configurable.

7. Use the trash bin icon in the *Action* column to delete any existing attribute mapping.

8. Click *Save* to store these mappings.

Data Exchange Configuration

When updating the Pulse-managed EDM library, the connector extracts the requested data from the PLM system and creates an input XML file for the Allegro X EDM Data Exchange program. The connector then launches the Allegro X EDM Data Exchange application on the Pulse server to update the Pulse-managed EDM library.

Allegro X EDM Data Exchange supports an advanced rule engine that controls library updates. For details, see *Allegro X EDM Data Exchange Reference Guide*.

Some non-ASCII characters are unsupported by the Data Exchange program. To enable Unicode support while importing the input XML file using Data Exchange, run the following command from the Allegro X EDM system console while the Pulse server is running:

```
adwschema -enable extension0004
```

For details on this command and the *adwschema* utility, refer to *Allegro X EDM Utilities Guide*.

As part of the *Update Pulse* configuration, a Sync Folder is specified. This folder is within the `<Pulse server home>/exchange/sync` folder and controls the EDM library updates made by EDM Data Exchange when called by the Library Synchronization service.

An out-of-the-box folder, `ds_3dx`, is available in `<Pulse server home>/exchange/sync` for 3DEXPERIENCE library synchronization.

For PTC Windchill, it is recommended that you make a copy of the `ptc_wc` folder supplied with the installation to update the out-of-the-box *Sync* folder.

You can use this folder or copy it to create a site-specific version of the sync folder. Typical updates for this configuration include maintaining the Allegro X EDM classification for existing parts.

Maintaining EDM Classifications for Existing Parts

In the `/configuration/sync.xml` file, set `action` to `ignore` for the `TargetTypeExist` condition within the `RelationRules` section.

Remove the additional conditions and ensure that the `RelationRules` section is as follows:

```
<RelationRules id="relation_id">
    <Condition name="ObjectIgnored" action="ignore"/>
    <Condition name="Default" action="create">
```

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```
<Condition name="TargetTypeNotExist" action="create"/>

<Condition name="TargetTypeExist" action="ignore"/>

</Condition>

</RelationRules>
```

Defining and Running Synchronization Tasks

Pulse includes support for bidirectional synchronization through the following synchronization tasks:

- *Update PLM* pushes library data from the Pulse-managed EDM library to the PLM system for the 3DEXPERIENCE and Windchill connectors.
- *Update Pulse* pushes library data from the PLM system to the Pulse-managed EDM library for both the 3DEXPERIENCE and Windchill connectors.

Update PLM Synchronization tasks

The following use cases are supported as part of *Update PLM* synchronization for the 3DEXPERIENCE and Windchill connectors:

- Creation of new PLM components
- Update of existing PLM components with EDM property values
- Publishing of STEP files for part-related footprints with creation of a STEP conversion job to be run by 3DEXPERIENCE.

For Windchill, only the classification of new PLM components is supported.

To create an *Update PLM* task, do the following:

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1. From the *Library Synchronization* configuration web page, click the *Update PLM* tab to display the form for *New Task* creation and to view the *Task History* of existing task runs.

Library Synchronization

Connection

Preferences

Update Pulse

Update PLM

New Task

Create and schedule tasks for Library Synchronization

Name *

Type

Recurring

Scope

Attribute Sync

Part Creation*

Disable

Part type *

Cron Expression *

Incremental Sync

Disable

Classifications to Sync

Search Filter

Save

Task History

Manage library synchronization tasks

No task found.

Library Synchronization

Connection

Preferences

Update Pulse

Update PLM

New Task

Create and schedule tasks for Library Synchronization

Name *

Type

Recurring

Scope

Attribute Sync

Part Creation *

Disable

Part type *

#PTC.ProdMgmt.ElectricalPart

Container *

Library - Cadence ECAD Library

Default PLM Part Classification

Cron Expression *

Incremental Sync

Disable

Classifications to Sync

Search Filter

Save

Task History

Manage library synchronization tasks

Name	Type	State	Result	Summary	Action
Sync CDN-DIO-0001	One-time	Completed	Failed		

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2. Specify a *Name* for the task.

This should be descriptive to identify the task within the *Task History* table. This task name is also referenced in the log files.

3. Specify the *Type* of task.

Options include:

- ☐ **Recurring** - Runs repeatedly on a schedule defined in the task. This type of task can be suspended or resumed from the *Task History* table.
- ☐ **One-time** - Runs one time and starts when you save the task definition. This type of task can be run again from the *Task History* table.
- ☐ **Mock Run** - Creates a list of EDM parts to be updated in the PLM system but does not make any updates.

4. Specify the *Scope* of the task:

- ☐ **Attribute Sync** updates attribute values in the PLM system.
- ☐ **STEP Sync** publishes STEP Files to 3DEXPERIENCE.
- ☐ **Attribute and STEP sync** run both operations, which are attribute update and STEP publishing for 3DEXPERIENCE.
- ☐ **Attribute and Classification Sync** run both operations, which are attribute update and classification updates for PTC Windchill.

5. In *Part Creation*, **Disable** or **Enable** the creation of PLM parts based on Allegro X EDM parts.

You would typically disable PLM part creation if parts are created in the PLM system.

6. If *Part Creation* is set to **Enable**, specify a PLM part type.

The PLM part type is used to create a part of this type in the PLM.

7. If your task *Type* is **Recurring**, set the Cron Expression which defines the schedule for the task run.

Click in the field text box to view sample values.

The increment, for example, 10 minutes, 30 minutes, also dictates when the task is initially run.

As an example, if the schedule is set for every 10 minutes and the task was saved at 1:05 p.m., the first run of the task is at 1:10 p.m. then continues every 10 minutes until it is deleted or suspended.

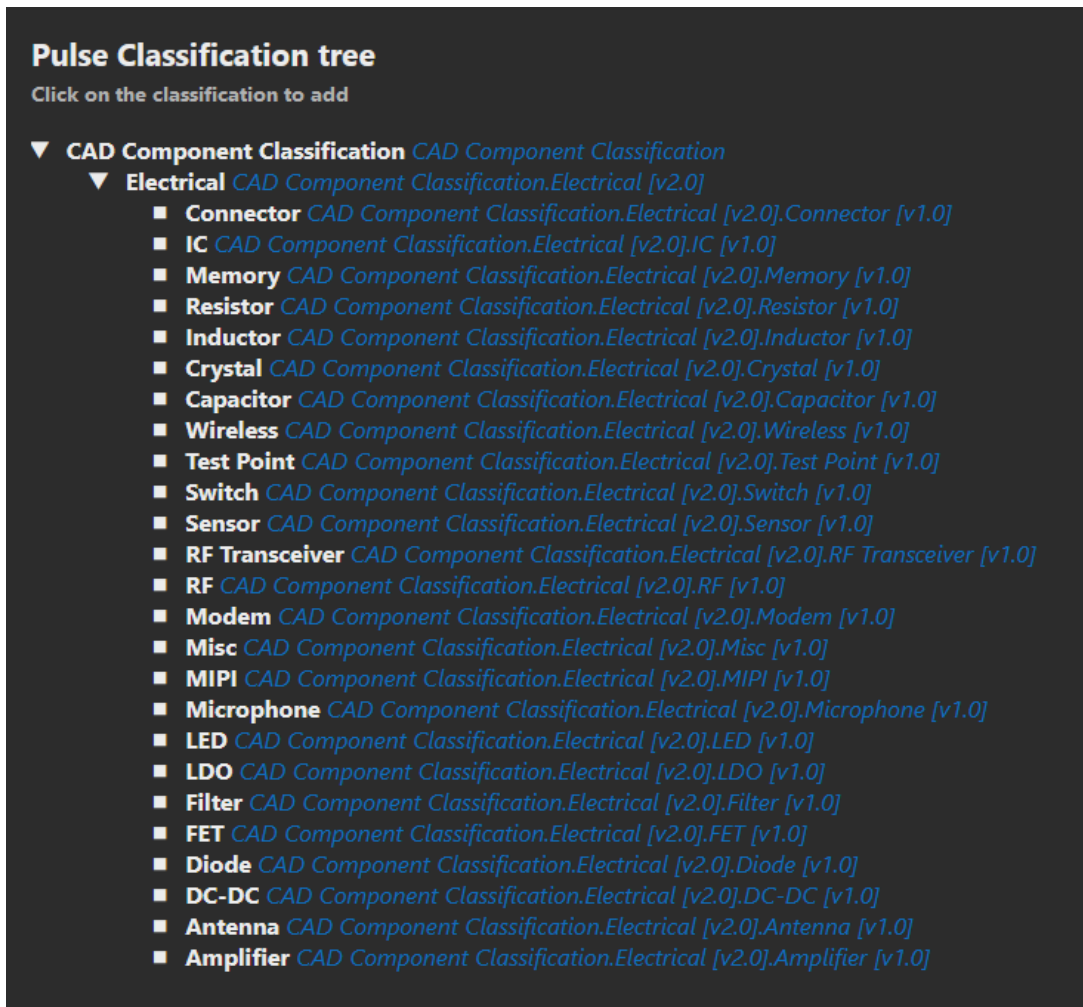
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The *Incremental Sync* is relevant only for `Recurring` task types. The incremental sync can be enabled or disabled. For an *Update PLM* task, the connector looks to the modification date of the EDM part and only processes parts modified since the last sync.

8. To reduce the scope of the synchronization task, you can specify a set of *Classifications to Sync*. Click the plus icon (+).

The *Pulse Classification tree* is displayed.



In this display, the classification nodes can be expanded or collapsed.

If you choose a parent classification, such as *Electrical*, all child classification below that parent are also considered for syncing. If no classification is specified, all EDM parts are considered.

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In *Classifications to Sync*, you can highlight a classification you have added and click the minus (–) icon to remove the selected classification from the list.

For Windchill, the classification structure in Publish for Manufacturing is managed by the Windchill PTC Partslink module.

9. You can also use *Search Filter* to reduce the scope of the EDM parts that are considered for synchronization.

Click in the field text box to view some examples.

10. Click *Save* to store the task.

If you selected *One-time* as the *Type* of task, the synchronization is initiated as soon as you click *Save*. If it is a *Recurring* task, the first run is based on the defined Cron expression.




Use the *Task History* table to track the progress of your saved tasks. The table includes:

- ❑ The name of your saved task
- ❑ The type, which can be *Recurring*, *One-time*, *Mock Run*, of your saved task
- ❑ The current state of your task. The value can be *Running* or *Completed*.
- ❑ The result of your task execution. This will be *Passed* if the task was successfully run, and *Failed* if an error occurred during the run, or blank if the task is still running.

11. Click the *Summary* icon to display a summary report of your task run.

For successful tasks, the report indicates the part created and or updated in the PLM system and the STEP publish operations. If the task failed, an error message is displayed. More details about the error are available in the `<Pulse Server HOME>/server/log/protium/protium.log` file.

In the *Action* column, you can do the following:

Task History					
Manage library synchronization tasks					
Name	Type	State	Result	Summary	Action
DemoTask	One-time	Completed	Passed		 

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- ☐ Restart a `One-time` or `Mock Run` task using the refresh button. You can also suspend or resume a `Recurring` task using the same button.
- ☐ Delete a task using the trash can button.

Update Pulse Synchronization tasks

The following use cases are supported for *Update Pulse* synchronization:

- Creation of new EDM parts
- Update of existing EDM parts with PLM system attribute values

To create an *Update PLM* task, do the following:

1. In the *Library Synchronization* configuration web page, click the *Update Pulse* tab to display the form to create a New Task and to view the Task History of existing task runs.
2. Specify a *Name* for the task.

This should be descriptive to identify the task within the *Task History* table.

3. Specify the Type of task you want to define, such as `Recurring`, `One-time`, or `Mock Run`.

- ☐ You will usually select `Recurring` if you want the task to run per a specified schedule.
- ☐ `One-time` is for when you want to sync the data just once.
- ☐ If you want data to be extracted from the PLM system and processed but do not want the Pulse-managed library to be updated, select `Mock Run`.

4. Specify a path to the *Workbench environment file*.

This path needs to be accessible from the Pulse primary server. This file sets up the Allegro X EDM environment to run Data Exchange, which updates the Pulse-managed library.

Manually create this file based on your Pulse installation. The format of the file is as follows:

```
ADW_CONF_ROOT=<path to EDM conf root>
```

```
ADW_INST_DIR=<path to the Cadence installation directory>
```

```
ATDM_COMPANY=<EDM Company Name>
```

```
ATDM_LIB=<path to Pulse HOME>
```

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```
PCBDW_LIB=<path to Pulse HOME>
ATDM_MASTER_COMPANY=<EDM Company Name>
ATDM_MASTER_SITE=<EDM Company Name>
ATDM_PROJECT_DIR=<EDM Library Project Folder>
ATDM_RELEASE=<Release Number>
ATDM_SITE=<EDM SITE Name>
CDN_METADATA=ON
```

Here are the contents of a sample file:

```
ADW_CONF_ROOT=D:\Cadence\Pulse\edm_conf_root
ADW_INST_DIR=D:\Cadence\SPB_23.1
ATDM_COMPANY=Cadence
ATDM_LIB=D:\Cadence\Pulse\vista_pulse
PCBDW_LIB=D:\Cadence\Pulse\vista_pulse
ATDM_MASTER_COMPANY=Cadence
ATDM_MASTER_SITE=Workshop
ATDM_PROJECT_DIR=D:/PROJECTS/library_project
ATDM_RELEASE=23.1-S001
ATDM_SITE=Workshop
CDN_METADATA=ON
```

5. Specify a *Sync Folder*, which includes the configuration and rules to guide the EDM Library update by the Data Exchange program.
6. If your task Type is *Recurring*, set the *Cron Expression*, which defines the schedule for the task run.

Click in the field entry area to display sample values.

The increment, such as 10 or 30 minutes, also dictates when the task is initially run.

Synchronizing Part Data in PLM Systems with Pulse-Managed Libraries

Library Synchronization Between PLM Systems and Allegro X Pulse

For example, if the schedule is set every 10 minutes and the task is saved at 1:05 p.m., the first run of the task is at 1:10 p.m., then continues every 10 minutes until it is deleted or suspended.

7. Enable or disable the *Incremental Sync* only if you select *Recurring* as the task type.

For an *Update Pulse* task, the connector looks to the modification date of the 3DEXPERIENCE or Windchill component to determine the data set for updates to Pulse. Only components modified since the last sync date or time are considered.

8. You can narrow down the PLM data set considered for synchronization using the *Search Filter*.

This value supports the same 3DEXPERIENCE search string that is entered in 3DDashboard. You can enter a string such as a part number. For example, CDS-CAP-0200 or an attribute name/value pair.

```
modified >01/18/2023
```

```
label=CDN-CAP-0200
```

```
CDN-*
```

The following endpoint can be added to your 3DEXPERIENCE URL to list all attribute names that can be used in search strings:

```
http://<plm-server>:19000/mashup-ui/page/index
```

9. Click *Save* to store the task.

If this is a *One-time* type task, the synchronization is initiated as soon as you click *Save*. If it is a *Recurring* task, the first run is based on the Cron expression.

10. Click the *Summary* icon to display a summary report of your task run.




For successful tasks, the report indicates the part created and or updated in the PLM system and the STEP publish operations. If the task failed, an error message is displayed. More details about the error are available in the *<Pulse Server HOME>/server/log/protium/protium.log* file.

Library Synchronization Between PLM Systems and Allegro X Pulse

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In the *Action* column, you have two icons offering the following functionality:

Task History
Manage library synchronization tasks

Name	Type	State	Result	Summary	Action
DemoTask	One-time	Completed	Passed		 

- ❑ Using the refresh icon, you can restart a `One-time` or `Mock Run` task. You can also suspend or resume a `Recurring` task using the same icon.
- ❑ Use the trash can icon to delete a task.