Integral Operations Between Windchill® PDMLink™ and Windchill® ProjectLink™
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Purpose

The purpose of this document is to provide detailed technical information regarding the Windchill integral capabilities. This document provides valuable information on how operations between Windchill PDMLink and Windchill ProjectLink are implemented; it also explains some constraints related to the current implementation.

Premise

The integral product data management (PDM) and collaborative project management capabilities enabled by Windchill are important because today's complex business environment requires companies to support business processes that span multiple business organizations. It also requires that a company execute on its set of business initiatives by effectively managing products and projects together.

The use of Windchill PDMLink with Windchill ProjectLink offers additional value to product development processes. Integrating the collaboration capabilities of Windchill ProjectLink with the control capabilities of Windchill PDMLink facilitates the following:

- Overall management of the new product introduction process.

- Tight interaction with partners to manage joint development of outsourced components.

- Management, investigation, and resolution of changes through a project without providing full access to the Windchill PDMLink data.

- Exploration of design options in an engineering sandbox.

An Integral architecture is defined as one that provides modular, standalone, and complete solutions that exhibit minimal redundancy, yet can be co-

installed as one user application where the combined solution is greater than the sum of the individual components. To support co-installed integral capabilities, several key changes have been made to the Windchill infrastructure. The Windchill integral environment is defined as one where Windchill PDMLink and Windchill ProjectLink are co-installed. At the highest level, the following areas are addressed:

Architecture: The Windchill architecture provides a single, shared database schema; a single set of business logic and process models; and a consistent and integral Web-based user interface complete with single login and common look-and-feel. Specifically, the Windchill Integral architecture includes:

- A "container" infrastructure that provides a consistent method of data partitioning and distributed administration.

- The use of common components. For example, the same CAD Workgroup Manager, user interfaces and search components are used in Windchill PDMLink and Windchill ProjectLink.

User Model: Numerous enhancements have been made to support an integral application and provide a streamlined user experience. Some examples include:

- A common navigation scheme that allows users to move easily between Windchill ProjectLink projects and Windchill PDMLink products and libraries.

- Clipboard and wizard interfaces to support operations across contexts.

- A common search interface and the ability to search across projects, products, and libraries.

Integral Operations: Several operations that enable solutions to exchange business objects have been developed to support the usage scenarios.

As an example, many types of PDM objects can be brought into a project where the team members can work collaboratively and independently, without visibility to the rest of the controlled PDM data. Objects that are checked out from the PDM system and undergoing modification within a project are contained in the project, visible only to the team members and subject to the project business rules. Additionally, business objects, checked out to a project from Windchill PDMLink can go through many iterations of change while in the project. New parts, documents, and CAD documents are also created in the project and go through iterations of change as well. Once the work is completed and the goals of the project are achieved, the parts, documents, and CAD documents that have been authored or updated in the project can be checked in to the PDM system, where they are then available to the rest of the enterprise.

In order to achieve the integral scenarios, Windchill PDMLink and Windchill ProjectLink must be co-installed on the same server, and use the same method server(s), as well as the same Oracle instance and Oracle user. Windchill does not support the operations described in this document when

Windchill PDMLink and Windchill ProjectLink are installed on separate servers or do not share the same Oracle user or instance.

Integral Operations

Windchill integral operations cover the ability to exchange objects between products or libraries and projects. Some business objects such as parts, document and CAD documents can be worked on in a project and then sent back to PDM contexts such as Windchill PDMLink products and libraries; other objects such as product configurations, product instances, and baselines can be sent to a project as well, but only as a reference (For example, as links that cannot be modified in the project). For the complete list of supported objects and operations, see Supported Objects.

A Windchill integral installation supports the following actions:

- Share

- Remove Share

- Update project

- PDM Check Out

- Undo PDM Check Out

- Convert To PDM Check Out

- Send to PDM

Windchill ProjectLink has also been enhanced to take advantage of some of these operations by allowing users to exchange parts, documents, and folders between projects. This project-to-project exchange of data is supported in standalone and integral Windchill ProjectLink environments, but is not supported for CAD documents, notes and dynamic documents.

Share Operation

The purpose of the share operation is to give project team members access to individual business objects located in the PDM system or in different projects. The share operation creates a link to the source object in the target location. Sharing an object requires the user to have **Read**, **Download**, and **Change** permission access to the object in the source object, such as a part, document, or CAD document, as well as **Read** access to the source context, such as a specific Windchill PDMLink product or library and **Modify** access in the destination folder. For the complete list of required permissions, see Integral Operations Authorization.

Sharing is done using the clipboard mechanism through the **Copy** and **Paste** action or the Windchill PDMLink **Add to Project** action.

Two main types of share operations exist; the type of share operation executed depends on the type of the shared object, as well as the source and target locations. Objects can be shared from a product or library (PDM system) to a project or between projects.

Share From A Project To A Project

Different rules apply when sharing objects between projects. During this operation, a link to the latest iteration of the object version, located in the source project, is created in the target project. The object will not be added to the project baseline.

Only object versions that have been created in the source project or checked out from the PDM system to the source project can be shared to another project. Only parts, documents, and folders may be shared between projects.

Access control for shared documents, parts, and folders can be extended to all team members (including guests) by using the standard ProjectLink access control policies. If the access control is extended to Modify, the user is able to check out, edit, and then check in the modified object to the project. A share is a link to the object located in the source project; therefore, modifying a shared object modifies the object in the source project. The modification (or new iteration) becomes available immediately in all projects where the object is shared.

When a folder is shared from a project to another project, all documents and parts located in the folder are shared as well. If accesses permissions are extended for the folder, those permissions are propagated to the documents and parts contained in that folder. After the folder has been shared, objects created in the source folder will automatically be shared to the target project while objects created in the shared folder in the target project, will be created in the source project and automatically shared to the target project.

Note: It is not possible to share a share. If an object has been shared from either the PDM system or a project to another project, the user is not able to select the shared object and share it to another project. The user will have to navigate from the share to the source object and then share the object to a different project.

CAD documents cannot be shared between two projects.

Because the workgroup managers and Pro/ENGINEER Wildfire operate within the context of the project baseline, if a part is shared from Project A to Project B, neither the workgroup managers nor Pro/ENGINEER Wildfire will be able to access it.

Share From A Product Or Library To A Project

This section describes the operations for sharing an object from a product or library to a project.

The Project Hidden Baseline and Configuration Specification

In order for the CAD integrations to interact with the shared CAD Documents and parts, Windchill maintains a *hidden baseline* for each project. The hidden baseline does not appear in the user interface and is not accessible by the user. This hidden baseline holds the specific iterations of shared objects such as parts, CAD documents, and Dynamic documents that will be used by the CAD application. It does not hold iterations of objects checked-out from the PDM system, and will also never hold document

iterations. For a complete list of objects for which the project baseline will hold iteration, see [Supported Objects](#).

The hidden baseline contains the preferred or current iteration that should be used for a given object for ongoing project work. In other words, it contains the set of shared object iterations that users can download to their workspaces. The two major ways for the hidden baseline to be populated are as follows:

1. Users share the object from Windchill PDMLink to the project.

2. Users update their projects to get later iterations of the share object.

When objects are unshared from a project, they are removed from the hidden baseline.

Associated with the hidden baseline, there is a project configuration specification. The project configuration specification is implicitly set up to choose versions that are applicable only to the project. The project uses the hidden baseline to determine which iteration is the official iteration to consider when the system needs to traverse a structure for downloading to a workspace or for displaying in the product structure browser.

Note: The **Version** column of the Windchill ProjectLink folder browser displays the object iteration that is contained in the hidden baseline. In some specific cases, it is possible that an object shared from the PDM system to a project does not have an iteration in the hidden baseline. In this case the object cannot be used by the CAD integration, the latest iteration of the shared version is then displayed in the version column of the Windchill ProjectLink folder browser.

Only one iteration of an object can be contained in the hidden baseline; therefore, some object versions could be shared to the project without having an iteration contained in the hidden baseline. Only the iteration of the first version shared is added to the hidden baseline. When sharing a subsequent version of an object to a project, the iteration of the version does not replace the existing one in the hidden baseline. Therefore, when selecting the information page of that object version in the project, it always floats to the latest iteration of the share version in the PDM system. In order to replace the original iteration in the hidden baseline by the one of the subsequent version, the project needs to be updated.

Share Operation

Sharing an object from a product or library to a project creates a link in the project to the object version in PDM and provides read only access to the source object for reference purposes. The object can be seen but not modified within the project.

An object can be shared to multiple projects at the same time with no restriction on the number of projects. The object is identified in the PDM system as shared, and users are able to access the list of shared projects by selecting the **Share Status** submenu from **Collaboration** menu on the information page.

The projects displayed in the list will be those to which the user has been invited. Organization administrators will also be able to see the list of all projects belonging to their organization.

Note: If an object contained in a specific product has been shared to a project to which the product manager has not been invited, this project will not be displayed in the **Share Status** when invoked by the project manager.

When an object is shared from a product or library to a project, the entire version of the object is shared; however, for parts, CAD documents, dynamic documents and notes, a specific iteration of the object is added to the project hidden baseline. This specific iteration is either the iteration originally selected for sharing or the result of a configuration specification and dependency processing selection during the **Add to Project** operation.

When an object version is shared from a product or library to a project, **Read** access to the selected iteration (and all iterations of this object version) is granted to all non-restricted project team members (including project guests). Therefore, when a user selects the details page of a shared object in the project, the PDM details page corresponding to the iteration contained in the hidden baseline is displayed.

From the PDM information page, the user is then able to navigate to and access all iterations of this object version in the PDM system. If there is no iteration in the hidden baseline for this shared version, the PDM details page of the latest iteration of the shared version is displayed.

In the example below, version A.3 of a part was shared to the project, and the part has been subsequently iterated in Windchill PDMLink. If a member of the project who does not have access to the object in Windchill PDMLink views the iteration history of the object, he will see A.1, A.2, A.3, A.4 and A.5 listed in the report.

Because read only access is granted to a specific object version in the PDM system, from an object's details page, project members and guests will be able to access only the information accessible to them according to the access they are granted within the PDM system. For example, if a user has no access rights defined in the PDM system, only the subset of object information that is not subject to access control is displayed on the details page.

In the project, the access controls of a shared object cannot be extended to any of the project team members.

It is not possible to share multiple iterations of the same object version. Therefore, when an assembly is shared, the configuration specification and the dependency processing that occurs during the **Add to Project** operation may result in the identification of object versions that have already been shared to the project. In this case, the system notifies the user that the object versions have already been shared to the project and will be ignored and will not be shared again. Even if the iteration identified during this share operation is later than one that already exists in the hidden baseline, it is ignored, and the baseline remains populated with the iteration resulting from the first sharing operation. A newer iteration can only be brought into the hidden baseline by using the **Update Project** action.

It is possible to share multiple versions of a given object to the same project. The iteration resulting from the first share operation is added to the hidden baseline. During the subsequent share operations, the object versions are shared, but none of their iterations are added to the hidden baseline. Therefore, these versions are not accessible to any CAD integration and they cannot be converted to PDM Check Out.

> **Note:** It is not possible to share a specific iteration of an object and restrict access to only that iteration for any project team members. Therefore, users will always be able to navigate to, access, and view subsequent iterations of the shared version.

Share and Project Access Control

Sharing an object from a product or library to a project, grants read only access to the source object in PDM for all non-restricted team members belonging to any organization (this includes the project managers as well).

- Restricted members who have no access to the folder will not be granted any access to the shared object.

- Members who have update access to the folder will be granted read access to the shared object.

Shared objects will never be granted more than a read access to the source object for any of the project team member who have no or limited access to the source PDM context. If the access control on the folder is changed from None or Read to Update, access control on the shared object will be set to Read.

Sharing an object will have no impact on the existing access control provided to any users on the source object in the PDM context. These access controls remain the same. Also, no additional permission, other than a read access to the source object, is granted to project managers.

Access control for a shared object can be restricted to None for any of the project team members within the project by the project manager or by any user that has change permission access using the Windchill ProjectLink access control policies.

Moving a shared object in the project from a non-restricted to a restricted folder will follow the permission rules established by Windchill ProjectLink. The shared object will not inherit the permission for the target folder.

Remove Share

Once an object has been shared to a project it is possible to remove the share from the project. A project manager or the user who initially shared the object may perform this action provided the user also has modify access permission on the folder where the object is shared. If the object is shared from PDM to a project, the object will be removed from the hidden baseline as well. If the share is the result of a check-in action, the history of the object will always remain in the project in form of iterations called *terminal iterations* and will remain accessible from the object details page in PDM.

Removing a shared object from a specific project does not impact other projects. However, removing a shared object from a project may remove access to other objects that are required dependencies for this shared object. As a result, when a user attempts to open a parent object in the CAD authoring application, dependent objects may be missing.

It is possible to remove a shared object if the object is currently downloaded to a workspace in this case, an overridable conflict will be displayed to the user who is removing the shared object.

Note: It is not possible to remove the share of an individual object that is shared as part of a shared folder operation. The entire folder needs to be unshared.

Update Project

When an object is shared from the PDM system to a project, the iteration defined during the **Add to Project** action is added to the hidden baseline. A user is able to share a set of objects using a specific configuration and later share another set of objects using a different configuration.

Over time, objects shared to the project may get iterated in the PDM system; the iteration in the project may no longer be the latest, or it may no longer adhere to the configuration specification originally used for sharing the object to the project.

The **Update Project** action is invoked from the project page and applies to all objects contained in the hidden baseline. The **Update Project** action updates the hidden baseline with newer iterations of the shared objects from the PDM system. The new iterations are determined based on the configuration specification provided by user at the time of the update. The iterations that were previously in the hidden baseline and are currently downloaded to workspaces continue to be shared. However, those iterations will no longer be used in subsequent downloads to workspaces.

Only the project manager is able to invoke the **Update Project** action. The action presents an **Update** wizard that allows the project manager to select the configuration specification and dependency processing to be used in identifying the part, dynamic documents, and CAD document iterations in the hidden baseline that are not in conformance with the iterations in the PDM system. These iterations are displayed in a table. The project manager is able to exclude any of these objects from update. All iterations in the hidden baseline that are in concordance with the iteration in PDM will be filter out of the collection.

It is possible that the new iteration of an object may have a different set of dependents created in the PDM system at a later time. These dependents are automatically included in the **Update Project** list if the project manager has at least a Read authorization on these object in the source context, otherwise they will be ignored.

Note: In the case of CAD documents, only the required dependents will be included. No related objects are included by default.
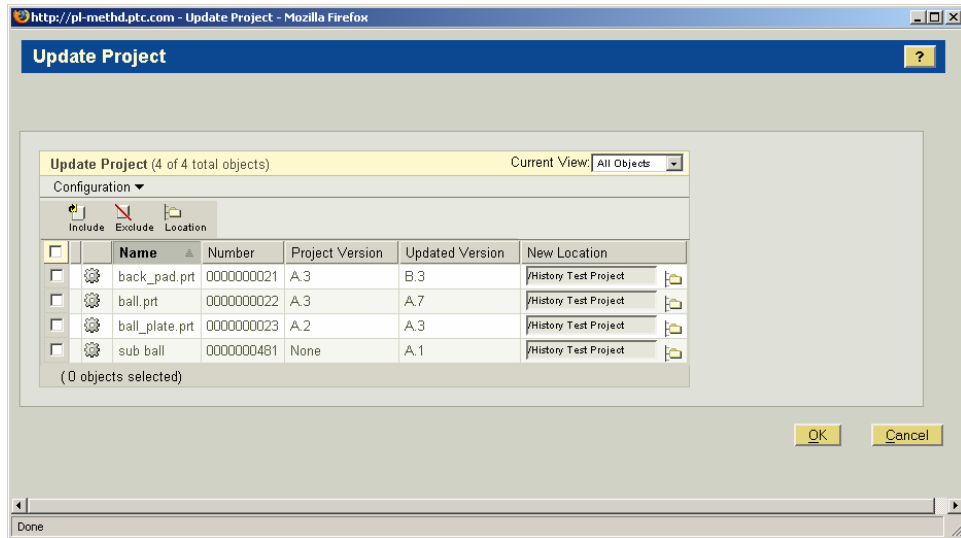
Because only parts, generic parts, dynamic documents, notes, and CAD documents are included in the hidden baseline, they are the only objects considered as candidates for Update. Regular documents and change objects are filtered out of the **Update Project** list.

The default project folder location for a new added object will be the one which contains its parent. If the object has more than one parent, the default location will be the root folder of the project. In this case after completing the operation, the user will be warned that <n> objects have been shared to the project root folder.

The user can specify the folder location for new objects added to the project during the Update operation.

The **Select Folder location** user interface is used to select the folder. Since only the project that is updated is a valid context, no context selection is available.

Note: For purposes of convenience and usability, it is possible during the Update operation to add an iteration to the hidden baseline in cases where versions were shared but the object is not represented in the baseline.

For example, version A of an object is shared to a project, the selected iteration A.1 is added to the hidden baseline. Later, version B of the same object is shared to the same project. Then version A is unshared from the project. Upon update the project manager will have the option to add the latest iteration of version B to the hidden baseline.

Note: Configuration specifications used for the Update Project action are currently limited to Baseline, Latest and effectivity; therefore, it is not possible to retrieve the latest iteration of a specific shared version. If a version has been shared to a project and later on the object has been revised in PDM, upon update, when the latest configuration specification is selected, the latest version will be shared to the project and the latest iteration will be added to the hidden baseline replacing the existing iteration, the original version of the object will remain shared to the project.

Update applies to the entire project. Currently, it is not possible to update a selected shared object.

Since the project does not remember which configuration was initially used to share an object, and there is no persistent configuration specification in the project, it is not possible to identify, in the folder browser, which object is out of date. Out-of-date objects are identified only during the Update operation which applies the configuration specified by the user at that time.

The configuration specification described in the following sections may be used during the **Update Project** operation.

Latest

Because the objects selected in the **Update Project** action are all object iterations that are in the hidden baseline at the time of update, the configuration specification also applies to these object.

The resulting objects displayed represent the latest iteration of the latest version at the specified life cycle state available in the PDM system and its latest dependents. Therefore, the version shared as a result of the update may not be the one that was shared originally. For example, if version A of an object is shared to a project, and revised in Windchill PDMLink afterwards, upon update of the project, version A will remain shared, version B will be shared and an iteration of version B will be added to the project hidden baseline.

Windchill Baselines

Three modes are specified by **Show baseline for** option.

Selected Iteration

The specific iteration of an object can be a member of several managed baselines.

The managed baselines listed are the baselines in which the shared object iterations that are in the hidden baseline are common members (there could be more than one). If no managed baselines exist, then none are displayed for selection.

The list of all appropriate baselines will be listed in the user interface. User cannot select more than one.

Selected Revision

The managed baselines listed are the baselines in which any iteration of the shared objects version are common members (there could be more than one). If no managed baselines exist, then none are displayed for selection.

The list of all appropriate baselines will be listed in the user interface. User cannot select more than one.

All Versions

The managed baselines listed are the baselines in which any iteration of the shared objects are common members (there could be more than one). If no managed baselines exist, then none are displayed for selection.

The list of all appropriate baselines will be listed in the user interface. User cannot select more than one.

As Stored Configuration

As Stored is not a valid configuration specification when used for project Update because of usability issues and the number of as-stored configurations available for each object (one as-stored configuration per object and per iteration).

Check Out to Project

The Check-out to Project action creates a one-off version of the object in the target project location. The object is locked in the PDM system, and PDM users cannot modify the source object. The access control granted to the one-off version in the project will follow the access control policies of the Project folder. By default, if no specific access control has been assigned to the folder; all project team members have **Update** access to the objects. The project manager or any user who has change permission authorization can change the access permissions to restrict the authorization to either **Read** or **None** for any of the team members.

While checked out to a project, the object can be used and referenced in the PDM system, but cannot not be modified. The object can be shared to other projects but not checked out to any other project. In order to modify an object in the PDM system or to check it out to another project, a project member would have to select: **Send to PDM**, **Undo PDM Check-out,** or **ProjectLink Delete**.

Any modifications done in the project to objects that have been checked-out from the PDM system are available to the project team members by selecting **History > Iteration**. The entire project history is accessible to PDM users who are also project team members. These users can view this information from the source object's details page by selecting **History > Version**.

If a project user opens the details page of an object checked out to the project, the project details page corresponding to the one-off version of the object is displayed.

When a one-off version (A-3.1) of an object is created in the project:

– **A** corresponds to the object version in the PDM system.

– **-3** corresponds to the number of times the object version has been checked-out to a project.

– **.1** corresponds to the object iteration within the project.

For example:

1. User checks out A-ASM B.3 from the PDM system to a project.

2. The system creates B-1.1 in the project and locks B.3 in the PDM system, preventing any modification to it.

3. The user iterates the object three times in the project, successively creating B-1.2, B-1.3, and B-1.4. These iterations are accessible to all project team members but not to PDM users who do not have access to the project.

4. User checks B-1.4 into the PDM system.

5. The system creates B.4 in the PDM system.

6. Now, if B.4 is checked out to a project, the system creates PDM B-2.1 in the project.

Any user who has **Read**, **Change permission**, **Modify**, and **Download** access to the object in the PDM system as well as **Create** permission for the object type and **Modify** access in the target project folder location is able to check out this object from the PDM system to a project. The operation uses the same clipboard mechanism that is used for sharing.

Note: It is not possible to check out multiple versions of the same object. Only one version of an object can be checked out at a time. Other versions can be shared.

The project information page of the PDM checked-out object indicates in the top panel the PDM check-out status as follows:

```
PDM Checkout Status: Checked Out from <Product/Library>
<context_name> by <user>
Checked Out PDM Version: <version>
```

Note: The context name is a hyperlink to the source Product or Library. Checked Out PDM Version is a hyperlink to PDM object info page. The Hyperlink on user follows the attribute rendering standards for principals.

The PDM information page of the PDM checked-out object has a specific 3rd level navigation option called **PDM Checkout Status** under the **Collaboration** menu containing the following information in a table. For example:

```
Checked out PDM Version: A.1
            PDM Context: GOLF_CART
   PDM Context Location: /GOLF_CART/folder1
     PDM Checked out by: admin
   Date PDM Checked out: 2007-03-19 10:35 AM CDT
```

Note: A.1 is hyperlinked to the PDM version info page. PDM Context is hyperlinked to the source Product or Library. PDM Context Location is hyperlinked to the PDM folder location. Hyperlink on user follows attribute rendering standards for principals.

Also note this does not affect the original PDM Version.

Convert to PDM Check-out

When an object version is shared to a project, it can be converted to a PDM check-out. In this case, the shared object is removed from the hidden baseline but remains in the project. However, the shared object is hidden in the project folder browser user interface while the one-off version exists. A one-off version of the object is added to the project, the object is locked in the PDM system, and **Modify** permission is granted to all project team guests and members according to the access control assignment from the folder.

Conversion to PDM check-out is a single object operation, and no dependency processing is done during the operation. Therefore, in order to maintain the structural integrity and ensure that all dependents are correctly added to the project, conversion to PDM check-out cannot be performed on an object version if the hidden baseline does not contain its latest iteration. (This includes the case in which no iteration of the object version is contained in the baseline.) During the operation, an error message will be displayed

asking the user to Update the project before proceeding with the conversion to PDM check-out.

Note: This does not apply to objects such as documents that don't get iterations added to the hidden baseline upon share.

Any user who has **Read, Change permission, Modify, and Download** access to the source object in the PDM system as well **Create** permission for the object type and **Modify** permission to the project folder location is able to convert an object (CAD document, document, or part) to PDM check-out.

Note: Only the latest iteration of the version shared to the project can be converted to PDM check-out. If the iteration that exists in the hidden baseline is not the latest, the conversion to PDM check-out will fail, user will be asked to Update the project first in order to replace the exiting iteration by the latest one in the hidden baseline and then to convert it to PDM Check Out.

When multiple versions of the same object are shared to a project, and the first shared version is removed from the project, the remaining shared versions will not have any of their iterations in the hidden baseline. Therefore, the project must be updated first, using the latest configuration in order to add the latest iteration of the object version to the hidden baseline.

Because the shared object remains in the project after **Convert to PDM Check Out**, two glyphs (share and a check-out), will be shown on the object icon in PDM. If the object has been directly checked-out from PDM only the check-out glyph will be displayed for this object in PDM.

Undo PDM Check-out

An object that was checked-out to a project can be converted to a shared object by using the **Undo PDM Check Out** action. The user who originally checked out the object, the project manager, and any user having administrative permission in the project, are able to perform this operation.

Undo PDM Check Out removes all iterations of the one-off object version created in the project and replace those iterations with a share. The latest iteration of the version that was originally checked-out is added to the hidden baseline. In the case of an object converted to PDM check-out, the version shared that was originally in the project will be kept and the latest iteration added back to the hidden baseline.

Note: It is not possible to perform the **Undo PDM Check Out** action on an object (part or document) that it currently checked out of the project by another user. The object must be undone checked-out first.

It is not possible to perform the **Undo PDM Check Out** action on an object that is currently checked out or downloaded to a workspace. However it is possible for a project manager to undo the check-out of any object checked-out to any Workspace. An overridable conflict will then occur when undoing the PDM check-out of this object.

Send to PDM

The **Send to PDM** action allows users to bring parts, documents, and CAD documents from the project to the appropriate PDM contexts. For an entire list of supported objects, see <u>Supported Objects</u>.

The objects that are eligible to be sent to the PDM system are either objects that have been checked out from the PDM system to a project or objects that have been created in the project.

During the **Send to PDM** action, the system performs a dependency analysis and presents to the user a list of dependent objects that need to be checked into the PDM system at the same time. The list includes objects checked-out from the PDM system and modified dependents, as well as dependents newly created in the project. Checked-out and unmodified dependents appear as Excluded in the object list in the **Send to PDM** user interface, but can be re-included by selection of the **PDM Check-in** action. In order to maintain the integrity of the product structure, new dependents, as well as PDM checked-out and modified dependents, cannot be removed from the list.

Note: The initially selected objects will always appear as included by default regardless of their status (modified or unmodified). Unmodified initially selected objects can be excluded from the list. Modified initially selected objects however cannot be excluded from the list.

In order to preserve the integrity of the product structure in PDM, the user will not be able to exclude from the **Send to PDM** list the following objects:

- Objects newly created in the project and explicitly selected to be sent to PDM

- Objects newly created in the project and an instance of a family table

- Objects that are newly created in the project and are required dependents of a component being sent to the PDM system

- Objects checked-out and modified in the project

Note: As the Send to PDM operation does not apply to shared objects, all shared objects will be automatically excluded by the system. By default, they will not be displayed to the user, and they will not be able to be re-included by the user.

For convenience, an additional table view will be provided and will allow the user to display all items in the table.

After the user selects the **Send to PDM** action, a two steps wizard appears which displays a list of objects that should be sent to the PDM system.

In the first step, the user will be able to exclude objects from the list. During this step, for new and existing objects, user will be able to select the **Keep check-out** action. When selected, this action will allow the user to automatically check the object back to the project creating a new one-off version.

The second step will only appear when object newly created in the project are sent to PDM. In this step the user must specify the following PDM information for new objects:

**Number**: The field will be editable if the numbering scheme is set to manual entry.

Name: The field will always be editable.

File Name (for CAD documents only): This field will always be editable.

Context: Only product and library contexts for which the user is a member of will be available for selection. No projects contexts will be listed.

Location within the context: Only the folder for which the user has at least creation authorization for the specific object type will be listed. It is assumed that different folders and contexts can be selected.

View (for parts only)
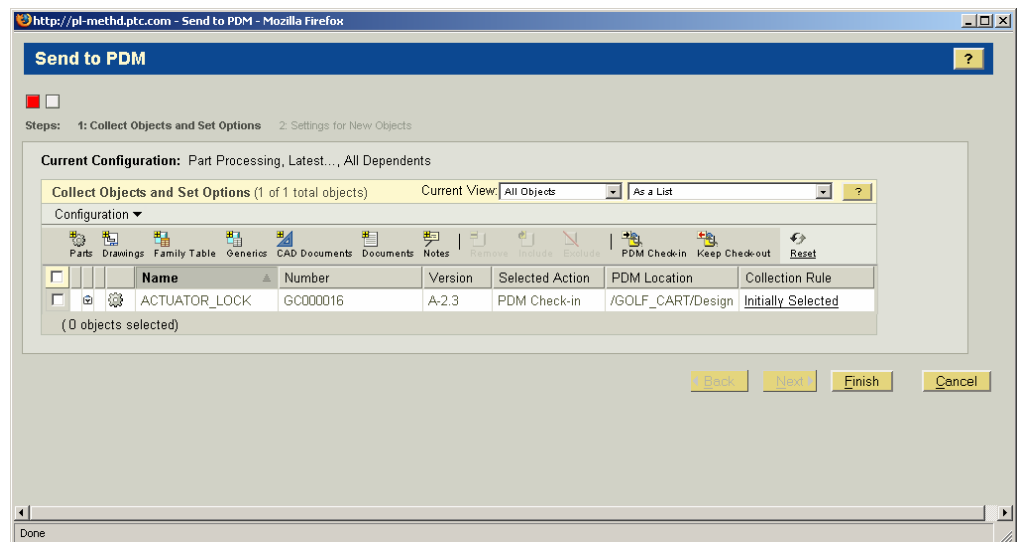
Once all of the required information is provided, the system proceeds with the following actions:

If the part, document or CAD document being sent is a one-off version created from a previous checkout to the project, the system does the following:

▪ Unlocks the original object in the PDM context.

▪ Copies the latest iteration of the one-off version to the PDM context as the latest iteration of the original object version. The object resides in the same folder and is assigned the same team template and life cycle template as the original.

▪ Flags the one-off version in the project as checked into the PDM system, which will create a termination iteration. The

termination iterations are accessible only by selecting the Version link on the object's PDM details page.

- Removes the ad hoc access control, which gave all members of the project team Update permission.

- Shares the PDM object version to the project and add the latest iteration to the hidden baseline.

- Gives all non-restricted members of the project team Read access to the original object version in the PDM context.

When a part, document, or CAD document is created in a project and is sent to the PDM system for the first time, the system does the following:

- Moves the master of the object from the project into the PDM context specified by the user at the time of the action.

- If the number scheme for the destination PDM context is set to manual entry, the object master is renumbered using the user-specified number. If the numbering scheme is set to auto generate, the rules engine sets the number. If the number generator is the same in both the source project and the destination context, the object will not be re-numbered.

- Copies the latest iteration of the one-off version to the PDM context as the first and only iteration of an initial version for the master. The revision scheme of the object is set based on the scheme set up for the destination PDM context.

- In the case of a part, assigns the view specified by the user.

- Puts the initial version of the PDM object into the folder specified by the user.

- Assigns the team and life cycle specified by the user according to that defined for the folder.

- Labels the version in the project to be a one-off version: A-0.1.

- Removes the ad hoc access control, which gave all members of the project team **Update** permission.

- Flags the one-off version in the project as Checked into PDM, which creates termination iterations. The termination iterations are accessible only by selection of the **Version** link on the object's PDM details page.

- Shares the PDM object version to the project and add the latest iteration to the hidden baseline.

- Gives all non-restricted members of the project team **Read** access to the original object version in the PDM context.

When Keep check-out is selected, instead of sharing the PDM object version back to the project, the system does the following:

- Flags the one-off version in the project as Checked into PDM, which creates termination iterations. The termination iterations

> are accessible only by selection of the **Version** link on the object's PDM details page.
>
> ▪ Create a new one-off version in the project as checked out from the PDM system.
>
> ▪ Grant the ad hoc access control to the one-off version to the project team member according to the access control policies defined in the project folder.

The permissions required to send an object to PDM can be found in [Integral Operations Authorization](#) of this document.

Note: Certain libraries do not accept every type of object. If the user tries to perform the Send to PDM action on an object that does not fulfill the library criteria, a generic authorization error message is displayed to the user.

Numbering Rules Upon Send to PDM

When an object, newly created in a project, is sent to PDM, its number will be assigned according to the object initialization rules set for the target context.

If the number scheme for the destination PDM context is set to manual entry, the object master is renumbered using the user-specified number.

If the numbering scheme is set to auto generate, the rules engine sets the number.

In the case the number generator is the same in both the source project and destination PDM context the object will keep the number that has been assigned in the project. Otherwise, the object will be renumbered according to the object initialization rules defined in the target context.

In some cases for parts and CAD Documents, when auto-number is turned on for a specific project, it is still possible for the user to override the number that has been assigned to the object. In this case upon send to PDM it is not possible to guarantee that the number of the object will adhere to the initialization rules refined in the PDM context. It is then possible that an object of the same type and number already exists in the PDM system, in this case upon **Send to PDM** the object will be renumbered and will take the next number available in the sequence.

Delete from PDM

With the introduction of the delete functionality and the conflict resolution, it is possible to delete an object that has been checked-in from a project to PDM. An overridable conflict will be displayed to the user. Terminal iterations located in the project and corresponding to the version being deleted in PDM will be deleted from the project as well. As a result, the iteration history in the project for this specific version will not be available any longer.

Delete, Suspend and Cancel a Project

When a project that contains objects being shared or checked-out from PDM needs to be either cancelled, suspended or deleted the following behavior will occur:

- If there are workspaces associated to this project, the user will be able to suspend and cancel the project. But the project will not be able to be deleted until all workspaces, empty or not, have been deleted.

- If there are objects shared to this project, the user will be able to suspend, cancel and delete the project. The object, in PDM, will still appeared as shared to this project.

- If there are objects checked-out to this project, the user will be able to suspend and cancel the project. The objects will remain check-out to this project. But the user will not be able to delete the project until all objects have been undone PDM check-out.

It is still possible to restart a project that has been either cancelled or suspended, but once a project has been deleted it is not possible to recover it.

User Interface Changes

The following sections describe the user interface available in the integral Windchill system.

Add to Project User Interface

The clipboard mechanism is used to share and check out objects from the PDM system to a project. The user can either copy the object (to the clipboard) in the PDM system and then paste it in the appropriate project folder, or select the **Add to Project** action from the action menu of the selected object or from the product structure browser.

After the user is prompted for the destination project and folder, the **Add to Project** window opens.

- If the clipboard mechanism is used, the target location (project and folder) for all collected objects will be by default the one in which the objects have been pasted. The user will be able to change the folder location for each of the individual objects or for a set of selected object, however the destination project can not be changed.

- If the **Add to Project** action has been used, the target location (project and folder) for all collected objects will be by default the one selected in the previous step, the user will be able to change the folder location for each individual objects or for a set of selected object, however the destination project can not be changed.

The "Select Folder Dialog" can be used to select an alternate destination folder.

Only folders for which the user has at least creation authorization for the specific object type will be listed. Different folders can be selected but only one destination project can be selected for the entire set of objects.

In the **Add to Project** window, the user is able to build the list of objects that will be sent to the project and to specify whether each object will be checked out, shared or copied to the project. By default all objects listed will be set to be shared.

The following toolbar action will be available for group selection: "Share", "PDM check-out" "Copy". When an object or a set of objects is selected in the table only the action valid for at least one selected object will be available for selection. All other actions will be grayed out.

PDM check-out will not be a valid choice in the following situations:

- The object is currently checked-out in PDM.

- The object is currently check-out to another project.

- The user does not have Modify access on the source object in the PDM container.

- The user does not have Modify access on the target folder in the Project container.

- The object type is not eligible for PDM Check-out. For the list of eligible objects, see <u>Supported Objects</u>.

Copy will be a valid choice only if the selected object is a document.
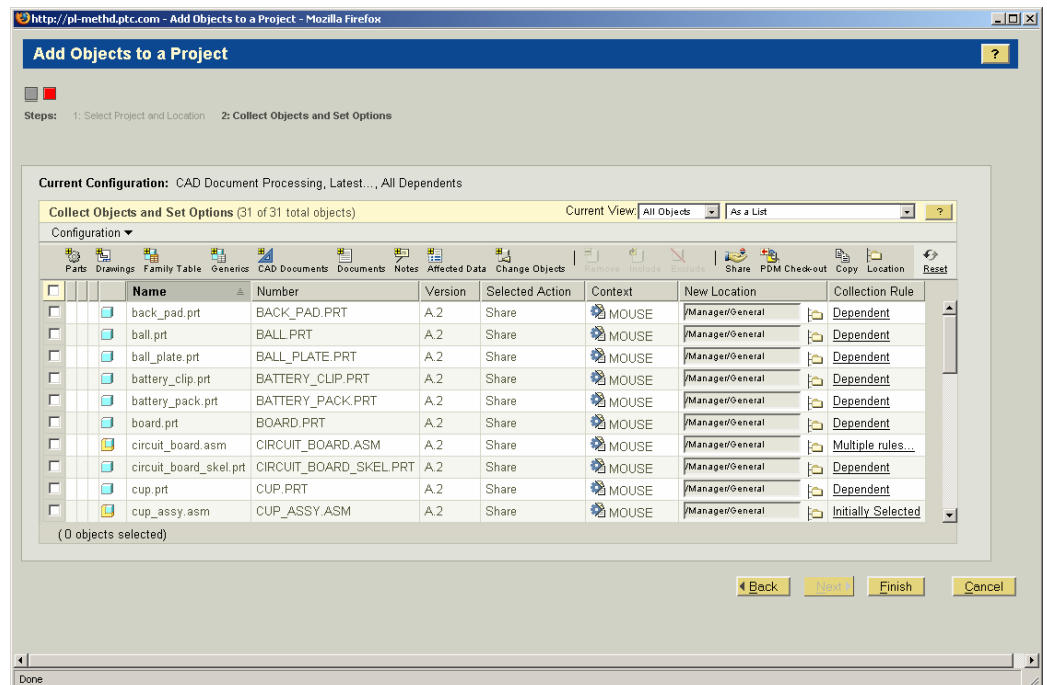
The user is also able to set a specific configuration specification as well as dependency processing criteria in order to include the appropriate versions and iterations of the objects.

The configuration specifications described in the following sections are available in the **Add to Project** window.

Latest

In some cases the configuration specification will not apply to the initially selected object but to its dependents.

In this case, when "Latest" configuration specification is selected, the dependent latest version/iteration of the initially selected object version/iteration object is retrieved.

For example, two objects exist in PDM:

Object1 at version/iteration A.1, A.2, A.3
Object2 at version/iteration B.1, B.2
Object1 A.1 has no dependents
Object1 A.2 has Object2 B.1 as dependent
Object1 A.3 has no dependents
Then Object2 B.1 is iterated to B.2

{Graphic here}

If a user selects Object1 A.2 and selects the latest configuration specification, Object1 A.2 and Object2 B.2 will be listed.

In order to have Object1 A.3 listed, it must be the originally selected version/iteration, or select the option "Apply configuration specification to the initially selected object" in the "Latest configuration" dialog. In this case, when "latest" configuration specification is selected, the latest version/iteration of the selected items and will be returned and the when a specific lifecycle is specified, the dependents that adhere to this configuration specification will be returned.

In the case of the example above, if Object1 A.2 is selected by the user and "latest" configuration is selected, Object A.3 only will be listed.

When a specific lifecycle is specified, the dependents that adhere to this configuration specification will be returned.

The interface to select latest configuration specification will use a set of pull down menus to select processing type, view and object states in addition a checkbox for specifying the user of work in progress.

As Stored Configuration

The as-stored configuration can have owners and members. A specific CAD document iteration can be the owner of one as-stored configuration but can be a member of more than one. An as-stored configuration can be owned by more than one CAD document iteration; specifically, the configuration is owned by all of the CAD document iterations that were checked in together. In order to simplify the user interface, not all as-stored configurations of the selected object are listed; instead, the **Add to Project** window displays only the **As Stored** option in the **Configuration Specification** drop-down list.

When a single object and the **As Stored** option are selected, the as-stored configuration used to filter the list of objects will be the configuration owned by the selected object iteration.

When multiple objects and the **As Stored** option are selected, the as-stored configuration used to filter the list of objects will be the configuration for which all selected object iterations are the common owner (It can be only one).

If no as-stored configuration exists, then the as-stored label will not be displayed.

In order to share an as-stored configuration of a specific object iteration, the object iteration must be explicitly selected for sharing.

Managed Baselines

Three modes will be possible and will be specified by the **Show baseline for** option:

Selected iteration

The specific iteration of an object can be a member of several managed baselines, and there is no notion of managed baseline owner.

When a single object is selected, the list of managed baselines listed for selection will be the ones in which the selected object iteration is a member. There could be more than one.

When multiple objects are selected, the managed baselines listed are the baselines in which the selected object iterations are common members (there could be more than one). If no managed baselines exist, then none are displayed for selection.

The list of all appropriate baselines will be listed in the user interface. User cannot select more than one.

Selected Revision

When a single object is selected, the list of managed baselines listed for selection will be the ones in which any iteration of the selected object version is a member. There could be more than one.

When multiple objects are selected, the managed baselines listed are the baselines in which any iteration of the selected object version are common members (there could be more than one). If no managed baselines exist, then none are displayed for selection.

The list of all appropriate baselines will be listed in the user interface. User cannot select more than one.

All Version

When a single object is selected, the list of managed baselines listed for selection will be the ones in which any iteration of the selected object is a member. There could be more than one.

When multiple objects are selected, the managed baselines listed are the baselines in which any iteration of the selected object are common members (there could be more than one). If no managed baselines exist, then none are displayed for selection.

The list of all appropriate baselines will be listed in the user interface. User cannot select more than one.

For example:

The user selects the following items A.prt - C.3 and B.asm - B.4

In the Show Baselines For option, user selects:

- Selected iteration: The set of baselines returned must contain A.prt - C.3 and B.asm - B.4

- Selected Versions: The set of baselines returned must contain any version of A.prt - C and B.asm - B

- All versions: The set of baselines returned must any iteration of A.prt and B.asm

Note: Because of performance impact, the baseline option will always be displayed, even if no qualifying baseline exists, when selected, the choose baseline dialog will be displayed but the list of baselines will be empty.

Effectivity (parts only)

Effectivity Configuration Specifications are only valid for Parts and therefore this menu only appears when the dependency processing type is set to part structure.

This interface will allow the user to specify Effective Date or Effectivity Context and Serial Number for the Configuration Specification.

Effectivity Context:

• Default is set to < blank >

• The picker constrains the search to looking for parts that are currently being used as a context of effectivities of the user specified effectivity mode.

The following attributes will be used:

Item Picker Criteria Attributes			
Required	**Labels**	**Form Elements**	**Additional/Special Considerations**
No	Number	Input Field	The unique internal identifier for the item.
No	Name	Input Field	The name of the item

Item Picker Results Attributes (Default View)			
Required	**Labels**	**Form Elements**	**Additional/Special Considerations**
Yes	Type	Display Field	The type of item.
Yes	Number	Display Field	The unique internal identifier for the organization. The number field will render a link which will allow the user to reference the information page associated with the item.
Yes	Name	Display Field	The name of the item

Effectivity Form

Valid values are:

- Date (default)

- Serial Number

- Lot Number

- MSN

- Block

View

Valid values based on view network. The default is set to <blank>.

Effectivity Date

Enabled only if the Effectivity Mode is set to "Date". To specify the effectivity date the user will be able to use a date picker.

The default is set to the current date.

Effectivity Unit

Enabled only if:

The Effectivity Mode is not set to "Date"

A value has been provided for Effectivity Context

- The value entered by the user is validated against the unit number format associated with the part specified as the Effectivity Context. The default is set to <blank>.

In addition, the following behavior will occur:

If Context is set to:

- <blank>

  The valid value for Form is 'Date'

- A part whose default trace code is 'Not Traced'

  The valid value for Form is 'Date'

- A part whose default trace code is 'Serial Number'

  The valid values for Form are: 'Serial Number' (default), 'MSN' and 'Date'

- A part whose default trace code is 'Lot Number'

  The valid values for Form are: 'Lot Number' (default), 'Block' and 'Date'

- A part whose default trace code is 'Lot/Serial Number'

  The valid values for Form are: 'Lot Number' (default), 'Block' and 'Date'

If the Form is set to:

- 'Date'

  User must set a value in the Date field

  User cannot set a value in the Unit field
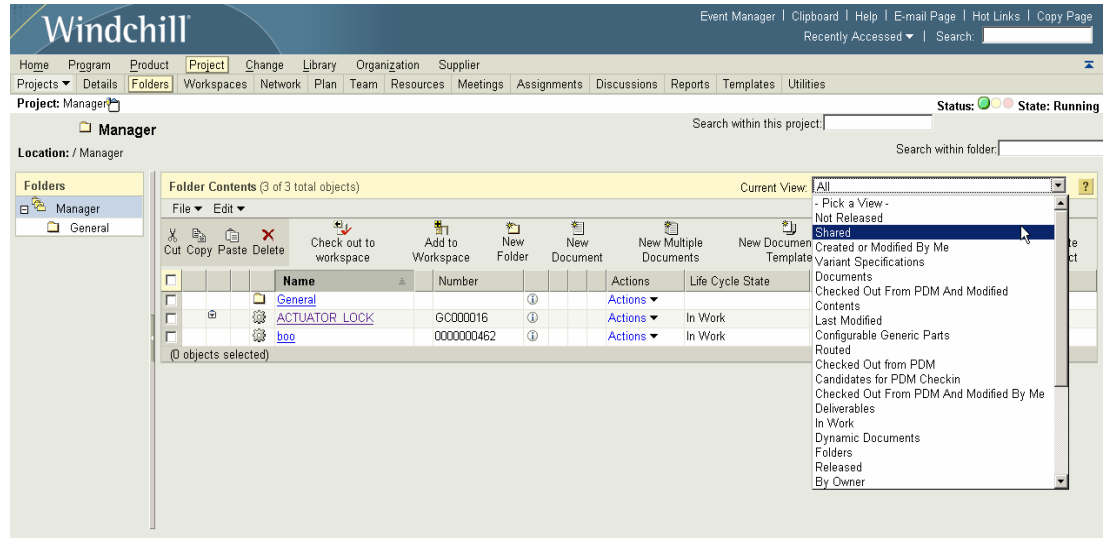
- 'Serial Number', 'MSN', 'Lot', 'Block'

  User must set a value in the Unit field

  User cannot set a value in the Date field

Windchill ProjectLink Table Views

Within a project, a user can filter the information displayed by using the view mechanism. The user can select a folder to view, or, if the user selects the root folder, all objects of that view within the project are displayed.

The following views specific to the integral operations are available in a project; no actions will be specific to any table views.

- **Shared**: Only displays objects that have been shared to the project.

- **Created in project**: Only displays objects that have been newly created in the project and have not yet been sent to PDM.

- **Check-out from PDM**: Only displays objects that have been checked-out from PDM.

- **Check-out from PDM and modified**: Only displays the objects that have been checked-out from PDM and have been iterated by any user within the project, since the last PDM check-out

- **Candidate for PDM Check-in**: Displays all object that have been newly created in the project and all objects that are PDM Checked-out (includes both modified and non modified objects)

Note: These views are only available for selection when working with an integral environment (i.e. bundle Windchill PDMLink or Windchill PDM and Windchill ProjectLink installation).

Delete From Project

In order to enhance usability and reduce the number of action icons displayed in the table, the Delete action icon behaves differently, depending on the status of the object. No overridable conflicts will be displayed to the user.

- If the object is currently shared to the project, it is unshared from the project.

- If the object is currently checked-out to the project, the PDM checkout is undone; the object is not re-shared to the project. If the object was originally converted to PDM check-out, the remaining share is unshared from the project as well.

- If the object was created in the project, it is deleted from the project.

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Objects that were shared or checked-out to the project will not be deleted from the PDM system as part of the deletion from the project.

Interoperability and CAD Integration

Workspaces

Pro/ENGINEER Wildfire and all workgroup managers are linked to a workspace. When created, a workspace is associated to an active context (for example, a project, product, or library, or Windchill PDM).

When a workspace is linked to a product or library in the case of Windchill PDMLink, or linked to Windchill PDM, the user is able to search, download, check out, and check in objects that are contained in any of these contexts.

When a workspace is linked to a specific project, the user is able to search, download, check-out and check-in only those objects contained in this specific project. Users cannot perform these actions on objects contained in other projects, products, or libraries.

All CAD integrations operate by using the hidden baseline and project configuration specification. The baseline identifies the set of shared parts and CAD document iterations that are considered whenever users download items or Update their workspaces. In addition to this baseline, the project configuration specification automatically includes the latest iteration of any non-terminal one-off version in the project context (i.e., the latest iteration of the working one-off version is automatically included as a floating "latest" reference).

The workspaces could point to iterations/versions of parts and CAD documents that are not specified by the hidden baseline – a situation that might occur after a project Update operation. The users can later update their workspaces to the hidden baseline.

The following example illustrates how a project can control when it brings in new iterations of shared PDM objects, and users can control when they bring in new iterations to their workspaces:

1. The user shares Iteration 1 of a PDM object to the project. A share link to the PDM object is created in the project folder, and Iteration 1 is added to the hidden baseline.

2. Users download Iteration 1 from the project to their workspaces.

3. Meanwhile, PDM users create a new iteration of the object. However, the hidden baseline and the various workspaces continue to point to iteration 1.

4. At a later time, the project is updated in order to pick up new iterations of objects that have been shared. In this case, Iteration 2 would replace Iteration 1 in the hidden baseline. All subsequent downloads of this object to a workspace would be for Iteration 2 rather than Iteration 1.

5. Workspaces that downloaded the object before the Project action continue to reference Iteration 1. When users are ready to move up to

the iteration identified in the hidden baseline, they select the **Update** action in the workspace browser.

Configuration Processing in the Collector

As the workspace always uses the project configuration specification, the following options will not be available when setting the latest configuration specification in the collector.

–   Specify life cycle state.

–   Use latest configuration for unresolved dependents.

In the case of a shared object, the latest configuration will always be the iteration that is in the hidden baseline.

Pro/ENGINEER Wildfire

When the workspace registered in Pro/ENGINEER Wildfire has an active project (as selected by using the **File > Open** feature), Pro/ENGINEER Wildfire allows the user to browse across all products and libraries to which that user has access. When an object is selected and opened, it is automatically shared from the PDM system to the project root folder, and then downloaded to the workspace.

If a shared object that is opened in a Pro/ENGINEER Wildfire session is being modified, the conflict dialog box appears, requesting the user to check out the object from the project. If the user has the appropriate authorization, the object is automatically checked out from the PDM system to the project. When the user checks in this object from Pro/ENGINEER Wildfire, the object is automatically checked in to the project but is not sent to the PDM system.

Note: Pro/ENGINEER Wildfire will not notify the user that they are sharing the object to the project.

Family Tables

The integral operations allow users to work with family tables within a project. Users are able to send generic and instances to the project for modification (check-out) or to be used as reference (share).

Users are able to share the generic as well as the instances. In order to allow users to collaborate on instances only, instances can be shared to a project without sharing the generic. In this case, users will be able to view the instance (if a visual representation exists) but will not be able to open the instance in the CAD application. If the generic has been shared with the instances, removing the share of the generic from the project does not remove the share for any of the instances. Additionally, removing the share of an instance does not remove the share of any other member of the family (other instances and the generic).

If a generic and some of the instances have been checked out to a project, undo check-out of the generic undoes the check-out of the instances modified

within the project and removes from the project all instances that have been newly created within the project. All other instances remain checked-out to the project.

When the user sends any of the instances or the generic to the PDM system, all checked-out and new instances, as well as the generic, are sent to the PDM system as well.

Note: Windchill ProjectLink only requires the user to send to PDM new instances and checked-out instances that were modified in the project. However, because dependency tracing does not distinguish between modified and non-modified instances, the **Send To PDM** UI lists all checked-out instances.

Interoperability Actions

The following tables summarize the list of object types supported for each operation as well as the permission required to proceed with these operations.

Supported Objects

The following table identifies the list objects supported by the interoperability operations:

Business Object Type	Source/Destination Context	Share	Access control extendable (project to project only)	Object added to the hidden baseline (PDM to Project only)	PDM Check Out	Send to PDM
Part	Project/project	Yes	Yes			
Part	PDM/Project	Yes		Yes	Yes	Yes
Generic Parts	Project/Project	No				
Generic Parts	PDM/Project	Yes		Yes	No	No
Variant Spec	Project/Project	No				
Variant Spec	PDM/Project	Yes		No	Yes	Yes
CADDocument	Project/Project	No				
CADDocument	PDM/Project	Yes		Yes	Yes	Yes
Dynamic document	Project/Project	No				
Dynamic document	PDM/Project	Yes		Yes	Yes	Yes
Document (includes type, subtypes and subclasses)	Project	Yes	Yes			
Document (includes type, subtypes and subclasses)	PDM/Project	Yes		No	Yes	Yes
Notes (includes type, subtypes and subclasses)	Project/Project	No				
Notes (includes type, subtypes and subclasses)	PDM/Project	Yes		Yes	Yes	Yes

Business Object Type	Source/Destination Context	Share	Access control extendable (project to project only)	Object added to the hidden baseline (PDM to Project only)	PDM Check Out	Send to PDM
Problem Reports ECRs ECNs Change investigations Change proposals Change activities Analysis activities Variances (includes type, subtype and subclasses)	PDM/Project	Yes		No		
Product Configurations Product Instances	PDM/Project	No				
Managed Baselines	PDM/Project	No			No	No
Folders	Project/Project	Yes	Yes			
Folders	PDM/Project	No			No	No

Integral Operations Authorization

The following table identifies the authorization criteria required for a user to perform the interoperability operations:

Interoperability Operation	Permissions required to perform the action.
Check Out to Project	**PDM Context** User must have Read, Change Permission and Modify permission to the source PDM object, and if the object is a content holder user must have Download permission. **Project Context**: User must have Create permission for the one-off version and Modify permission on the target project folder. **Add to Project action is available for**: Any user who has Read, Change Permission and Modify permission on the source PDM object, and Read permission on source PDM container.
Send to PDM (First-time)	**Project Context** User must have Modify permission on the source project folder. **PDM Context** User must have Create permission for the given object type, and a Modify permission on the target PDM folder. Note: will not check anything when sharing back the object to the project **Send to PDM action is available for**: Any user who has Modify permission on the project folder.

Interoperability Operation	Permissions required to perform the action.
Send to PDM (After a check out)	**Project Context** User must have Modify permission on the source project folder. **PDM Context** User must have Modify permission to the original PDM object.
Share	**PDM Context** User must have Change Permission and Read permission to the PDM object, and if the object is a content holder user must have Download permission. User must also have Read permission on the source PDM context **Project Context** User must have Modify permission on the target folder. and Create permission on the SharedContainerMap, (all confirmed team members will be granted this CREATE permission by policy).
Remove Share	User must have Modify permission on the project folder where the share is. And User must have Delete permission on the SharedContainerMap. PDM manager, Project manager and the user who shared the object will be granted Delete permission to the SharedContainerMap by default. **Remove share action is available for**: Any user who has Delete permission on the SharedContainerMap (by default, PDM and Project managers, and user who did the share has this permission).
Convert PDM Check Out	**PDM Context** User must have Read, Change Permission and Modify permission to the source PDM object, and if the object is a content holder user must have Download permission. **Project Context** User must have Create permission for the given object type in project context (the one-off version), and Modify permission on the target project folder. **Convert to PDM Check Out action is available for**: Any user who had Modify permission on the project folder, and Read, Change Permission and Modify permission on the source PDM object.
Undo PDM Check Out	User must satisfy one of the 2 conditions: 1) User is the person who locked the original copy in PDM 2) User must have Administrative permission to the PDM (locked original) copy of the object (if the user cannot unlock the object) *(different from x-05)* **Undo PDM Check Out action is available for**: user who locked the pdm copy or one with Administrative permission on the source PDM object.

Interoperability Operation	Permissions required to perform the action.
Update Project	**Project Context** User must be a Project Manager. **PDM Context** User must have Read permission to the PDM object and the PDM context. **Update project action is available for**: Any project manager. Note: To update an already shared object by a later iteration of the shared version the project manager don't need to have read permission to the source container as the system is not sharing a new version but just replacing the iteration of the same version in the hidden baseline. The project manager needs to have Read permission to the source container in the case he is: - Sharing a new object (new added dependent) - Sharing a new version of an already shared object. In the case the project manager does not have access to the source container, these objects will not be listed in the update user interface.

Permissions in the Manage Security User Interface

The following table illustrates the permissions set by default in the project depending on the status of the object, and specifies what permissions can be updated where:

x = Ad-hoc permission set by default during the operation

Permissions that are grayed out in the user interface cannot be modified in the manage security user interface.

Permissions that are highlighted in green can be set for the object, modifiable in the manager security user interface.

Participant	Permission	Shared object (from project)	Share object (from PDM)	PDM Checked-out	Shared folder
Member	Full control				
	Read	x	x	x	x
	Download	x	x	x	x
	Modify			x	
	Modify content			x	
	Change prem.				
Project Manager	Full control				
	Read	x	x	x	x
	Download	x	x	x	x
	Modify			x	
	Modify content			x	
	Change prem.				
Collaboration Manager	Full control				
	Read	x	x	x	x
	Download	x	x	x	x
	Modify			x	
	Modify content			x	
	Change prem.				
Guest	Full control				
	Read	x	x	x	x
	Download	x	x	x	x
	Modify			x	
	Modify content			x	
	Change prem.				