MFG500023

Synchronizing Change Orders between Vault and Fusion 360 Manage

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Learning Objectives

- Discover the advantages of synchronizing Fusion 360 Manage Change Orders with Vault ECOs
- Learn about the prerequisites to synchronize change information between Fusion 360 Manage and Vault
- Learn how to install and configure powerPLM to synchronize change information between Fusion 360 Manage and Vault
- Learn about the configuration and customization capabilities of powerPLM

Description

Both Vault Professional software and Fusion 360 Manage software enable you to delegate, track, and manage your data changes. While Vault Professional focuses on CAD-related changes, Fusion 360 Manage enables you to manage any data stored in the application. With powerPLM, COOLORANGE offers an easy-to-use and flexible tool to combine Fusion 360 Manage and Vault Professional processes. This class demonstrates how to use powerPLM to synchronize CAD design changes between Fusion 360 Manage and Vault Professional.

Speaker(s)

Christian Gessner is a co-founder and Technical Evangelist at COOLORANGE. In this role, he helps customers and resellers to use the right technology and tools to successfully design, implement and customize Autodesk PDM and PLM solutions. He has over 15 years of experience in software development with a focus on Autodesk data management products and Microsoft development technologies. Prior to COOLORANGE, Christian was member of the data management software engineering team at Autodesk.

Table of Contents

Basics

Connections

powerPLM uses *Autodesk Forge* to establish the communication between Vault and Fusion 360 Manage. More precisely, the authentication is based on the Autodesk Forge NuGet package:
https://www.nuget.org/packages/Autodesk.Forge/
Once a connection is established and a bearer token received from Forge, the Fusion 360 Manage REST API endpoints are used to exchange data.
The Vault SDK is used to communicate with Vault.

HTTP Requirements

Transport Layer Security (TLS) 1.2 must be activated on the Job Processor machine to establish a connection to Forge and Fusion 360 Manage. TLS 1.2 is enabled by default on the latest Microsoft operating systems such as Windows 10.
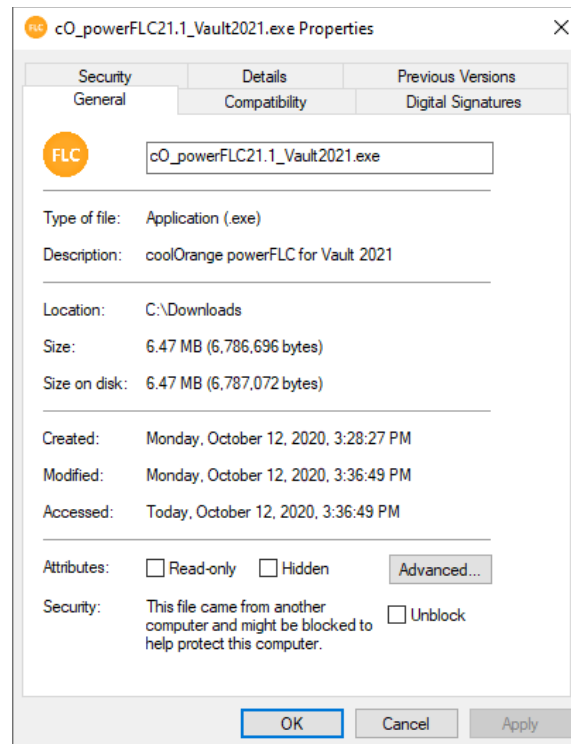
Download

The latest version of powerPLM can be downloaded from the COOLORANGE download portal:
https://download.coolorange.com/

Unblock

Depending on network and security policy settings, the downloaded file may be blocked by Windows. If this is the case, open the file properties of the downloaded installer package, enable the "Unblock" checkbox and apply the changes with "Apply" or "OK":

Note: The file can also be unblocked by using a PowerShell command:

*https://docs.microsoft.com/en-us/powershell/module/microsoft.powershell.utility/unblock-file?view=powershell-6*

Command:
```
Get-Item "C:\cO_powerFLC22.0_Vault2022.exe" | Unblock-File
```

Pre-requisites

powerPLM workflows that are based on *powerJobs Processor* which is using the *Autodesk Vault Job Processor* as a host to exchange data between Vault and Fusion 360 Manage. The option "Enable Job Server" must be checked in the Vault settings to enable the Vault Job Processor functionality:
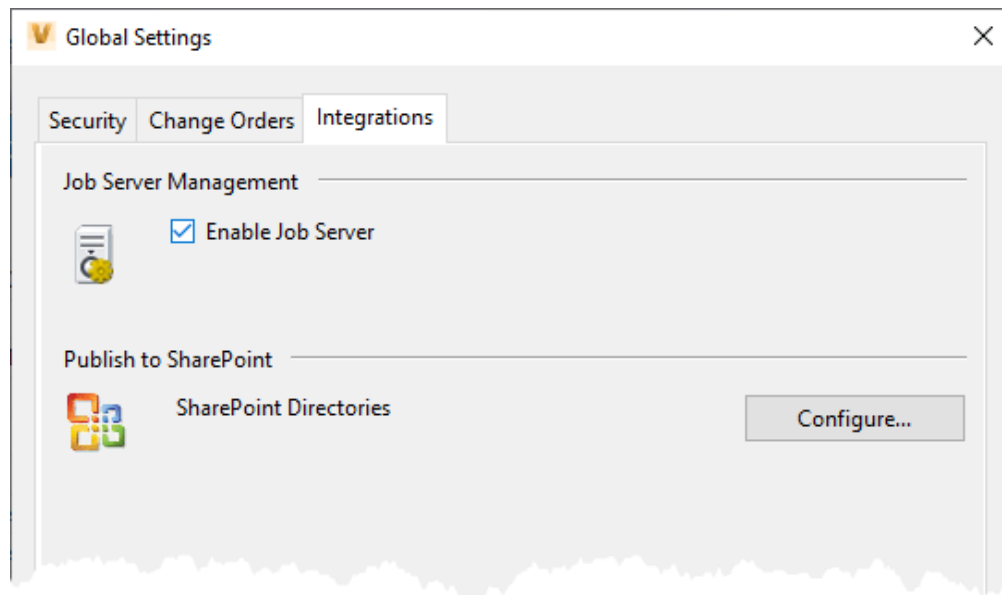
VAULT GLOBAL SETTINGS: "ENABLE JOB SERVER"

More detailed information about the concept of the Vault Job Processor can be obtained from:

https://knowledge.autodesk.com/support/vault-products/learn-explore/caas/CloudHelp/cloudhelp/2015/ENU/Vault/files/GUID-DAE28A42-45C3-4501-9BF2-78EE2F42808D-htm.html

powerPLM is hosted by powerJobs Processor. For that reason, powerJobs Processor must be installed prior to the powerPLM installation.

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powerJobs Processor Installation
The setup can be started by executing the downloaded installer package exe-file.
All settings are pre-configured, an installation wizard guides through a very straight forward installation process:

1. License Agreement page: Agree the license terms and conditions and click "Install"
2. User Account Control Dialog: click "Yes"
3. Setup Progress page: Wait for the installer
4. Confirmation page: click "Close"
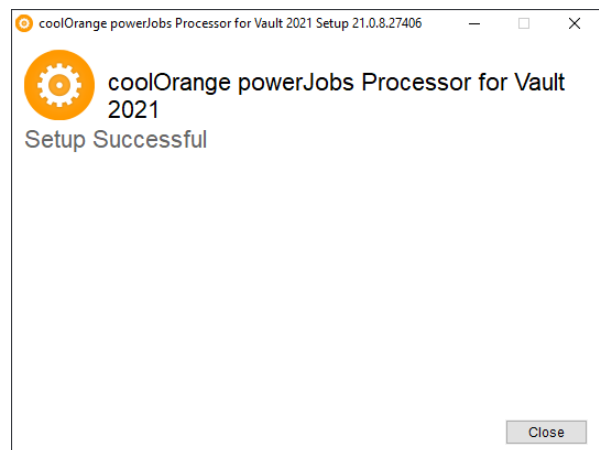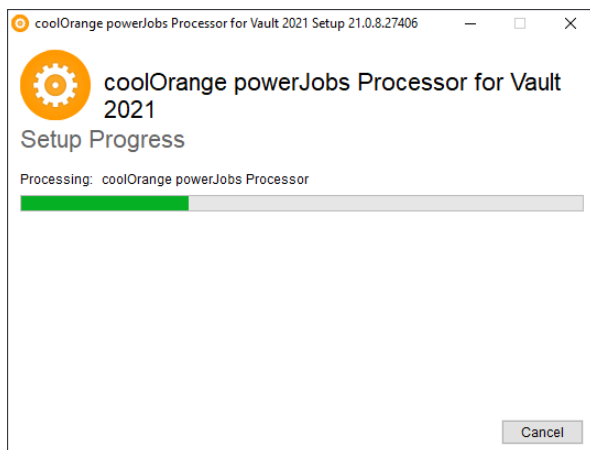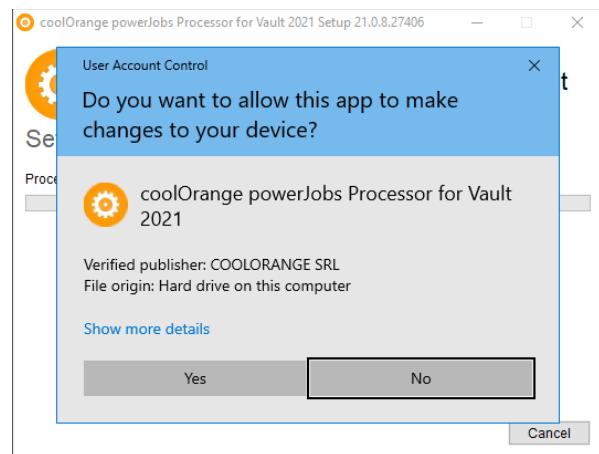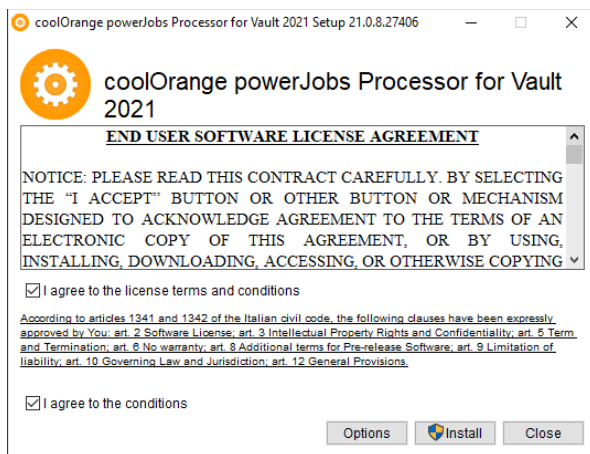
powerPLM Installation

The setup can be started by executing the downloaded installer package exe-file (e.g., cO_powerFLC22.0_Vault2022.exe).

All settings are pre-configured, an installation wizard guides through a very straight forward installation process:

5. License Agreement page: Agree the license terms and conditions and click "Install"
6. User Account Control Dialog: click "Yes"
7. Setup Progress page: Wait for the installer
8. Confirmation page: click "Close"
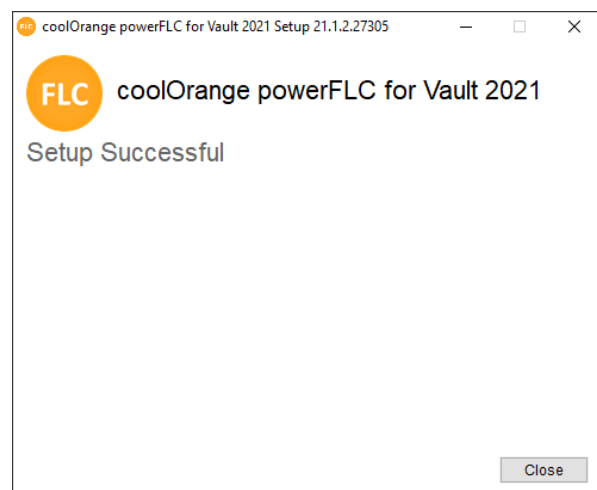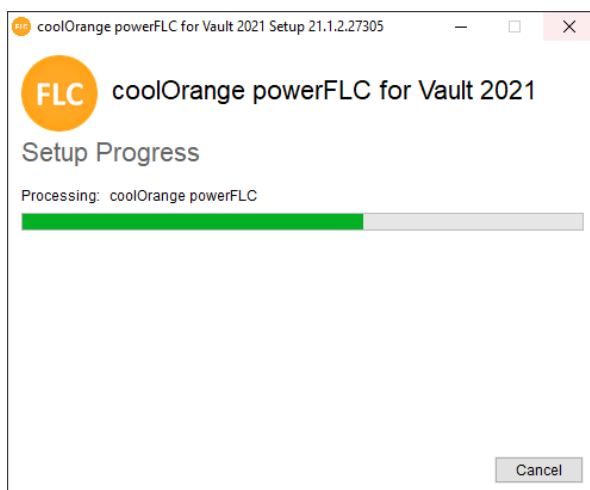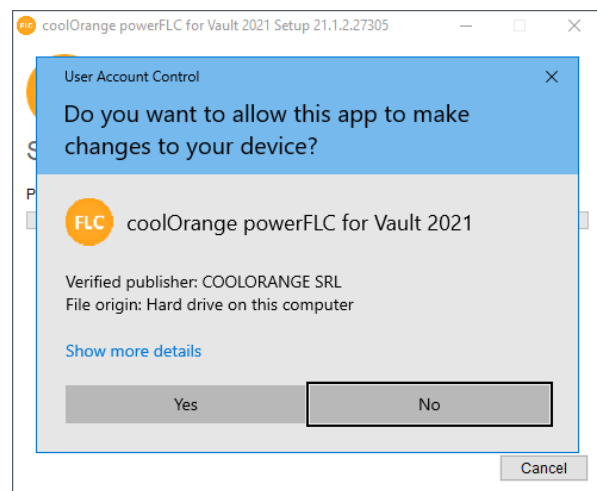
Once installed, the menu button "*powerFLC Configuration Manager…*" can be found in the Vault Explorer tools menu:
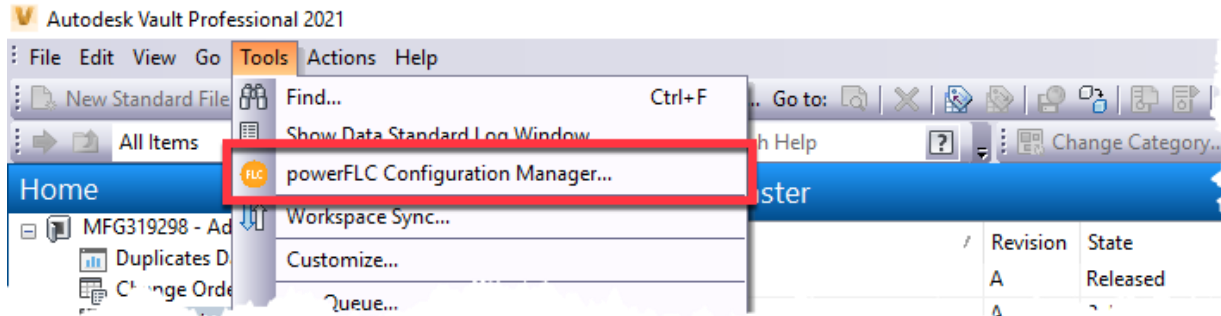
Licensing and Activation

To activate powerPLM, a serial number needs to be provided. To enter the serial number, the License activation utility must be started from the start menu:

or by executing the exe file located at:

C:\Program Files\coolOrange\Modules\powerFLC\License.exe

Once started, the serial number must be entered and submitted with "Register License":

LICENSE REGISTRATION UTILITY

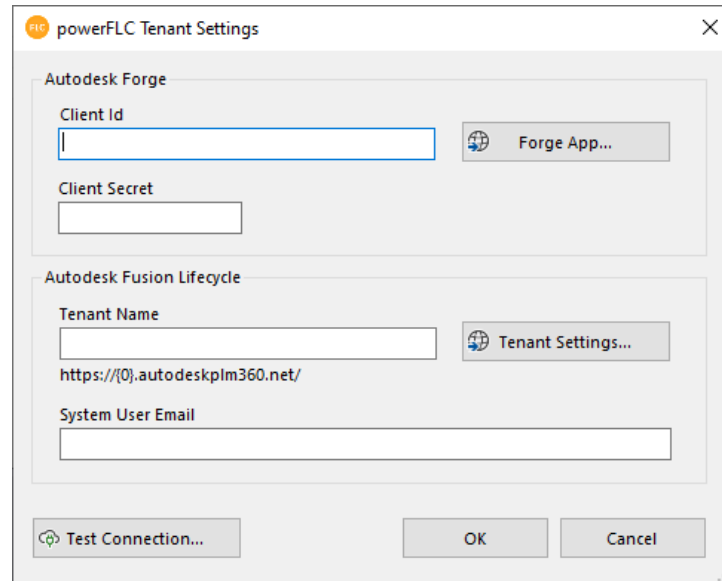*To request a trial license or to purchase powerPLM or any other product from COOLORANGE, please contact sales@coolorange.com*
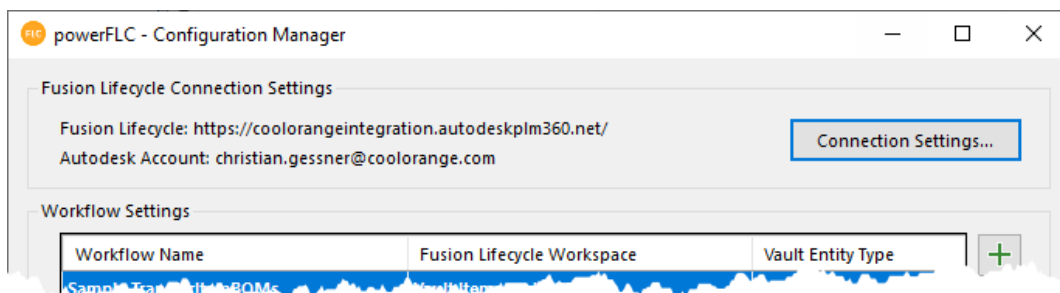
When launched the first time, a dialog appears to gather the information needed to connect to Fusion 360 Manage:

TENANT SETTINGS IN THE CONFIGURATION MANAGER

This dialog can also be exposed using the "Connection Settings…"-button in the *Configuration Manager* dialog:

Forge App

For powerPLM to communicate with Fusion 360 Manage, a common platform is necessary that can be used by powerPLM and that is trusted by Fusion 360 Manage. This common platform is Autodesk Forge's *Authentication (OAuth) API*.

To get access to the Auth API a Forge app must be created:
https://forge.autodesk.com/en/docs/oauth/v2/tutorials/create-app/

When creating a new app in Forge, the following information must be provided:

Name	Description
APIs	At least one API must be chosen. None of the selected APIs will be used by powerPLM but only the Authentication API that is always available, independent of the selection
Name	Any name can be chosen
Description	Any description can be chosen
Callback URL	A valid URL must be provided. E.g., https://localhost. This URL won't be used by powerPLM since this is only needed for 3-legged authentication

Once created, it provides a **Client ID** and a **Client Secret**.

Fusion 360 Manage Whitelist

powerPLM uses Forge's 2-legged authentication to communicate with Fusion 360 Manage.

For Fusion 360 Manage to allow 2-legged authentication, the Forge Apps Client ID needs to be added to the whitelist in Fusion 360 Manage.

The whitelist can be modified in the *Security Settings*:
Administration -> System Configuration -> General Settings
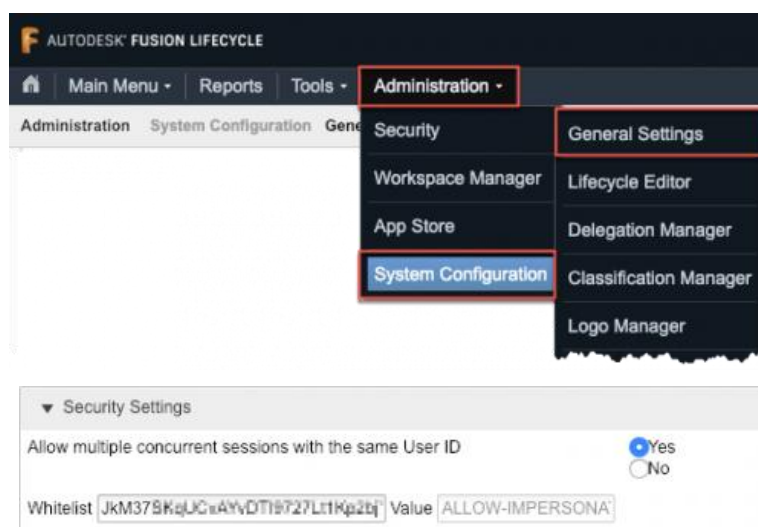
SECURITY SETTINGS - WHITELIST

Out-of-the-box Capabilities

powerPLM is a highly configurable and customizable solution that connects Autodesk Vault with Autodesk Fusion 360 Manage. It is completely based on PowerShell commands (Cmdlets) and ships with a configurable sample workflow.

Note:
More information about Microsoft PowerShell Cmdlets can be found here:
https://docs.microsoft.com/en-us/powershell/scripting/developer/cmdlet/cmdlet-overview?view=powershell-7

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powerPLM PowerShell Cmdlets
The foundation of powerPLM is a set of PowerShell Cmdlets that provides functionality to connect to Fusion 360 Manage, read, write, and update item details, BOM or Grid information from and to Fusion 360 Manage as well as upload attachments to FLC items.

Detailed information about the powerPLM Cmdlets can be obtained from:
https://doc.coolorange.com/doku.php?id=powerflc:code_reference:commandlets

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The Cmdlets can be executed from any application that is able to execute PowerShell (e.g., Microsoft Windows PowerShell ISE or Visual Studio Code). To execute the commands in the context of Vault, COOLORANGE powerJobs Processor must be used. Each powerPLM license contains a powerJobs Processor license.

Configuration Manager
To allow administrators to adjust the workflows that are executed in a PowerShell environment, a Configuration Manager is available that allows to change settings and mappings in a graphical user interface rather than in a PowerShell script file.
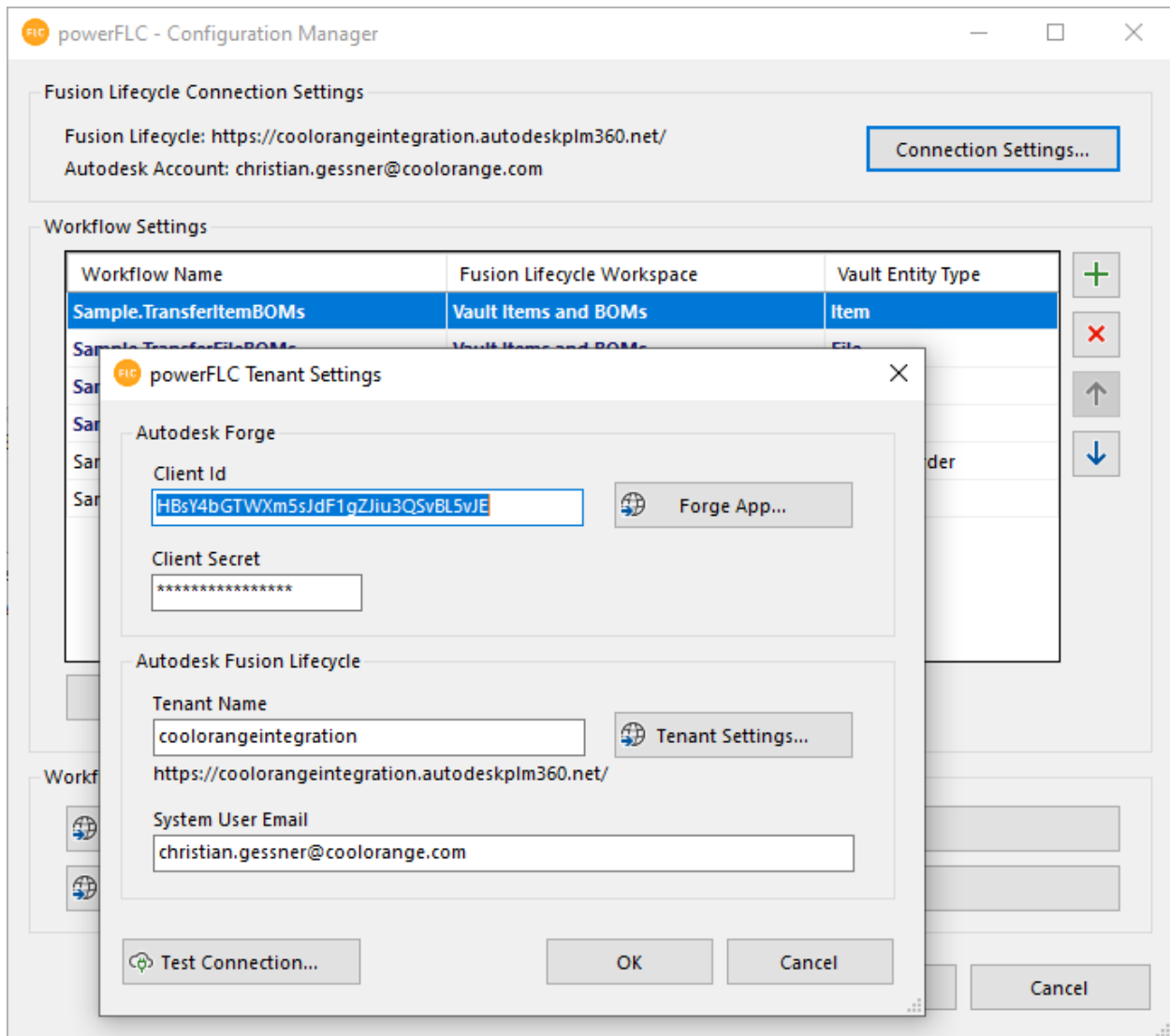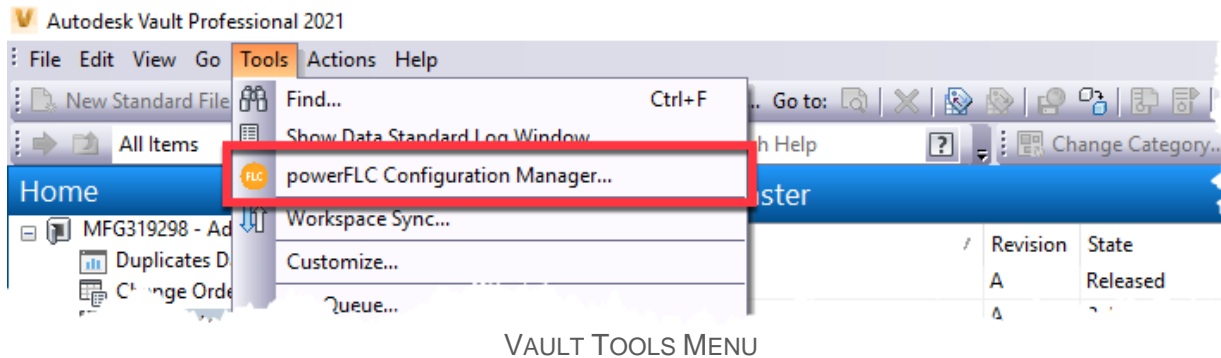

Note:
The Configuration Manager is not necessarily needed, since all settings can also be hardcoded to the PowerShell script file. However, the sample workflows are using this functionality to make the configuration seamless and easy.

The powerPLM Configuration Manager can be launched from the *Tools* menu in Vault:

VAULT TOOLS MENU

CONFIGURATION MANAGER

Workflows

All sample workflows that are shipped with powerPLM are not only meant to be samples but can also be used out-of-the-box. Several workflow options and mappings are available to adjust the workflows to the customer's needs. In addition, the business logic is implemented using PowerShell scripts and therefore highly customizable.

Item centric BOM transfer

Vault item BOM is populated to Autodesk Fusion 360 Manage, where items are automatically created, and attachments uploaded. The BOM workflow supports all the Vault features, such as raw material, purchase parts, BOM row related properties, multiple item instances, etcetera. A simple property mapping allows to define which information from Vault shall be shared with Autodesk Fusion 360 Manage and miscellaneous settings are available to control the detailed behavior of the workflow.

Change Management synchronization

The Change Management synchronization workflow can be used to outsource a Fusion 360 Manage Change Order state to Vault.

Once a Change Order in Fusion 360 Manage reaches a configurable state, powerPLM creates a new representation of this Change Order as an Engineering Change Order (ECO) in Vault. All affected items (Linked Items or Managed Items) that are available in Vault are automatically assigned to the ECO as records. In addition, documents attached to the Change Order in Fusion 360 Manage are automatically downloaded, stored in Vault, and attached to the ECO.

When the ECO in Vault is closed, powerPLM automatically updates the Change Order in Fusion 360 Manage by executing a configurable workflow action.

Note:
All workflows have been developed in collaboration with product managers from Autodesk. They use the latest Vault and Fusion 360 Manage functionality and are Autodesk's recommended way to synchronize data between Vault and Fusion 360 Manage.

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Additional Materials

Workflow samples
In addition to the samples that are installed by the powerPLM installer, there are other samples available online: https://github.com/coolOrangeLabs/powerflc-samples

Product documentation
https://www.coolorange.com/wiki/doku.php?id=powerflc
https://www.coolorange.com/wiki/doku.php?id=powerjobs_processor

Vault UI Extension
To interact with Fusion 360 Manage from within Vault a Vault Explorer Extension is available that extends the Vault Item and BOM workflow by introducing a context menu to the Vault items with commands to Navigate to the corresponding Fusion 360 Manage item and to publish the Vault item to Fusion 360 Manage:
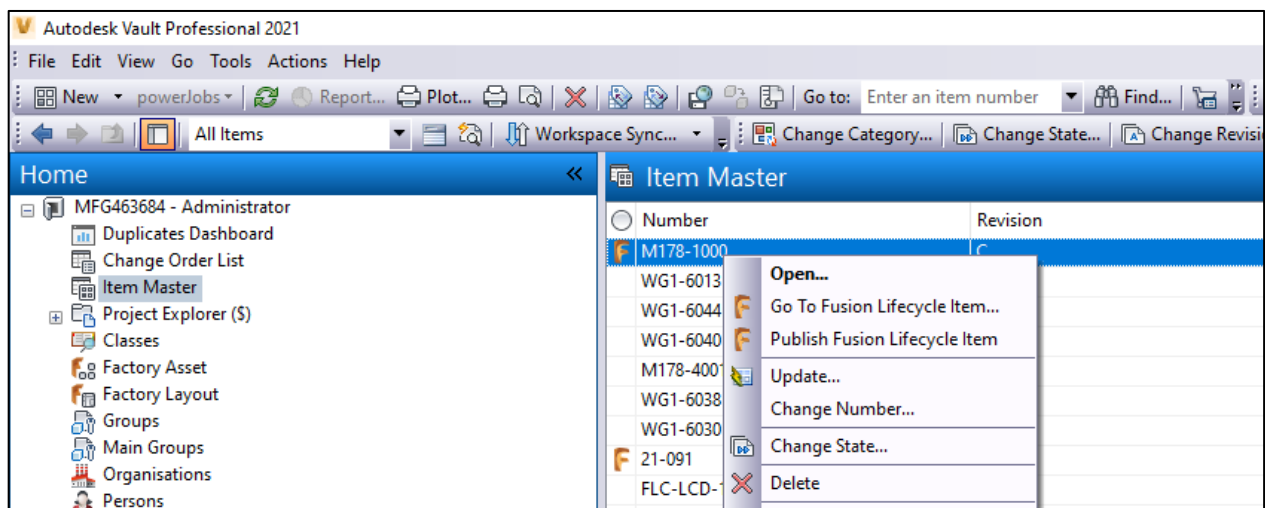
VAULT UI EXTENSION

The sources can be downloaded from GitHub:
https://github.com/coolOrangeLabs/powerflc-explorer-extension

There are also compiled version available as MSI installers for different Vault versions:
https://github.com/coolOrangeLabs/powerflc-explorer-extension/releases

Joint Effort: Vault and Fusion Lifecycle As the New Dream Couple
Author
Christian Gessner

Description
When used together, Vault Professional software and Fusion Lifecycle software provide a combined solution that is the best of all worlds for product data management (PDM) and product lifecycle management (PLM). While Vault runs on-prem to keep your CAD data safe behind your firewall, Fusion Lifecycle is cloud-based for flexibility and ease of deployment. With powerFLC (Vault Fusion Lifecycle connector), coolOrange offers an easy-to-use and flexible tool to combine Fusion Lifecycle and Vault processes. Previous versions of powerFLC included predefined workflows, and with the latest version of powerFLC, it is even possible to create custom workflows to synchronize any data between Vault and Fusion Lifecycle. This class will demonstrate the advantages of using both products together and show some of the endless possibilities of this integration.

Link
https://www.autodesk.com/autodesk-university/class/Joint-Effort-Vault-and-Fusion-Lifecycle-New-Dream-Couple-2020

PDM and PLM United: Vault Fusion Lifecycle Connector – a Zero-Code Connector
Author
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Description
When used together, Vault Professional software and Fusion Lifecycle software provide a combined solution that is the best of all worlds for product data management (PDM) and product lifecycle management (PLM). While Vault runs on-premises to keep your CAD data safe behind your firewall, Fusion Lifecycle is cloud based for flexibility and ease of deployment. Sadly, this has made a seamless integration between the two difficult—until now. This class describes the benefits of the Vault Fusion Lifecycle Connector, including installation, configuration, and extensibility, so you can create a best-of-all-worlds solution.

Link
https://www.autodesk.com/autodesk-university/class/PDM-and-PLM-United-Vault-Fusion-Lifecycle-Connector-Zero-Code-Connector-2019