AUTODESK UNIVERSITY 2013

Choosing PLM 360: A Customer Perspective

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(co-Speakers-Mark Keilholz, Michael Pares)

PL2024 In this class we discuss one customer's journey in selecting Autodesk PLM 360 cloud-based software for its product lifecycle management solution. We discuss why Autodesk PLM 360 was considered as a potential solution, explain how to create a trial tenant, explore the main themes of how Autodesk PLM 360 works, and discuss possible Autodesk® Vault integrations.

Learning Objectives

At the end of this class, you will be able to:

- Access resources that are available for learning Autodesk PLM 360
- Describe the layout and function of key workspace concepts
- Create scripts and access the RESTful API
- Integrate with Autodesk Vault

About the Speaker

Orrin is the CAD Administrator at Greenpoint Technologies an aviation company in Kirkland, WA. He manages an install base of 80+ seats of Product Design Suite and Vault Professional. Currently he is part of his company's implementation team implementing PLM 360.

Previously, Orrin worked in industry as a design engineer and as an applications engineer for Autodesk resellers.

He draws from his deep knowledge of Autodesk mechanical design tools to provide practical solutions for engineering workflow requirements.

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Access resources that are available for learning Autodesk PLM 360

Autodesk PLM 360 does require a level of understanding needed to fully unlock its potential. A great way to learn PLM 360 is to use the online materials provided by Autodesk. I highly recommend that you invest the time and effort needed to learn these materials as it will have a direct correlation to your understanding and satisfaction with PLM 360.

Online Help System for PLM 360

http://help.autodesk.com/view/PLM/ENU/

This online help for PLM should be your first resource for learning the ins and outs of PLM 360. There is an excellent set of video tutorials that will guide you through the process of configuring your tenant.

PLM 360 Support Forum
http://forums.autodesk.com/t5/PLM-360-General/bd-p/705

This forum is an excellent place to connect directly with the development team for PLM 360. I have noticed that managers and support personnel from Autodesk routinely patrol the forum and quickly respond to posts – usually in 24hrs or less. I have used this forum many times to get help with scripting and to ask the odd question or two.

PLM 360 Idea Station
http://forums.autodesk.com/t5/PLM-360-IdeaStation/idb-p/3

While this is not a help or support system exactly it is non-the-less a resource you can use to offer improvement ideas to Autodesk. I have found the PLM 360 team to be very open to suggestions and enhancement requests.

PLM 360 Under The Hood
http://underthehood-autodesk.typepad.com/blog/

This is a blog run by Brian Schanen, a PLM 360 technical marketing manager. In his blog you'll find many helpful tips and insights into the inner workings of PLM 360. His ideas and suggestions are immediately useful and practical.

PLM 360 with Mike Watkins
http://mikewatkinsweb.blogspot.co.uk/

This is another blog that is run by Mike Watkins. On his blog I've found useful explanations of the "stock" PLM 360 workspaces that you can access from the APP store in PLM 360.

PLM 360 Technical Webinars
http://forums.autodesk.com/t5/PLM-360-General/PLM-Talk-technical-webinars/td-p/3580538

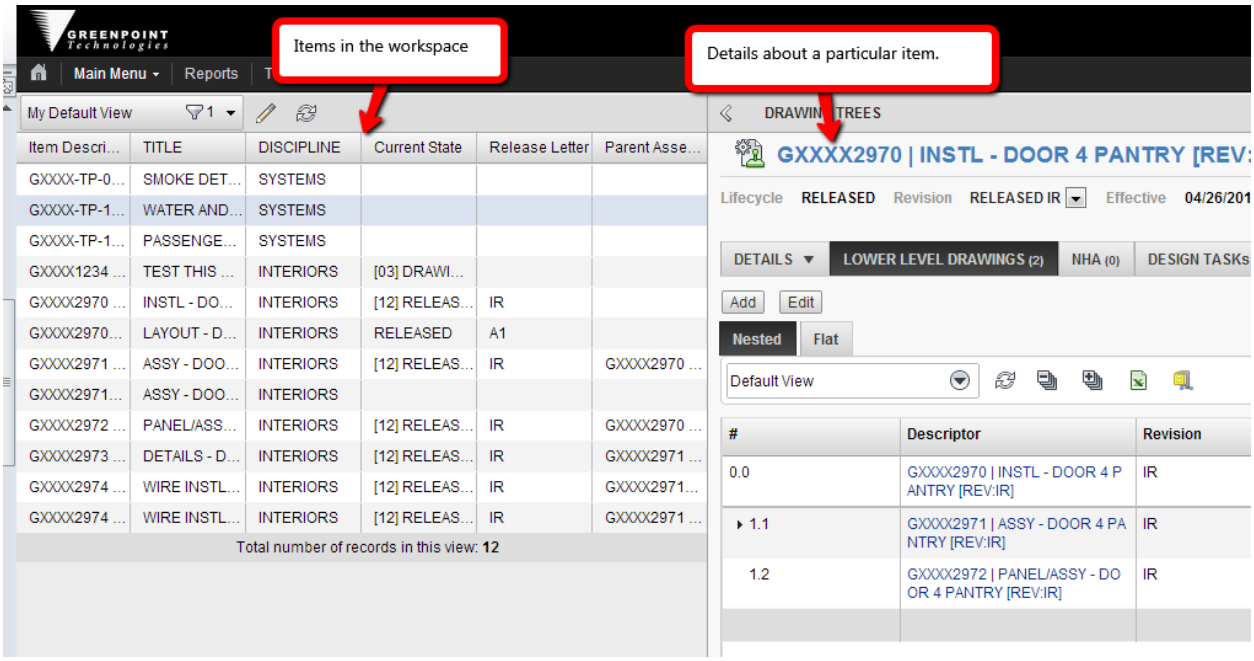
This link will take you a listing of technical webinars where you can review the schedule and sign up to attend. I've found these webinars to be very helpful.

Describe the layout and function of key workspace concepts

In the online help system for PLM 360 there are excellent explanations of key concepts and functions of the tenant. I will summarize the essential ideas and also provide some of my own observations of key – but not so obvious – concepts.

Workspaces and Items

The main functional area where users interact with the system is organized into workspaces and items. Workspaces are simply “templates for behavior” where items in the workspace will all function in exactly the same as other items in that workspace. Items are simply the “records” inside a workspace.



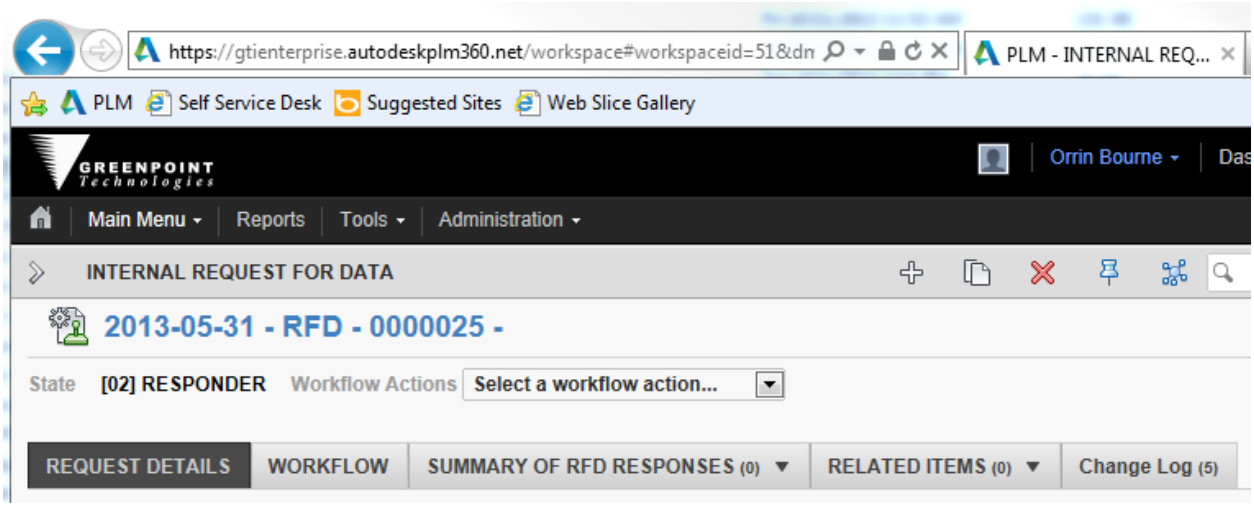
Each item in the workspace will contain tabs. These tabs have a predetermined functionality that is configured to meet your needs. When you click on a tab that functionality will be exposed and ready to use and interact with.

PLM 360 is a Website

While it may be obvious that PLM 360 is a website what may not be obvious is how this subtle distinction affords a surprisingly useful set of possibilities.

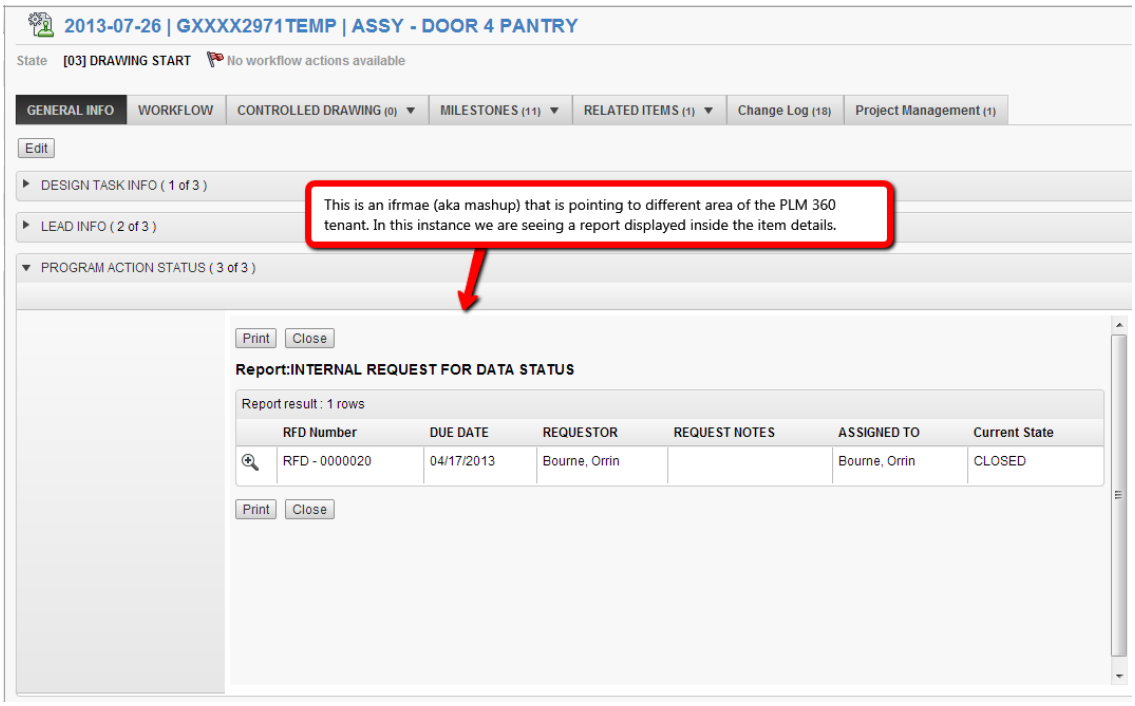
All items have URLs

This is very useful when trying to direct someone to a particular item. You can simply copy and paste the URL in an email. Following the link will take you directly to the item. In addition the individual tabs also have a URL so you can send some a link to a specific tab in an item as well.



You Can Create a Mash-up

Since your tenant is a website that runs in a web browser you can leverage iframes. There is a particular type of field in PLM 360 called a computed field. This computed field supports iframes that can leverage other properties in your item. What this means is you could have Google maps or something from Sharepoint or Salesforce "exposed" inside your item.



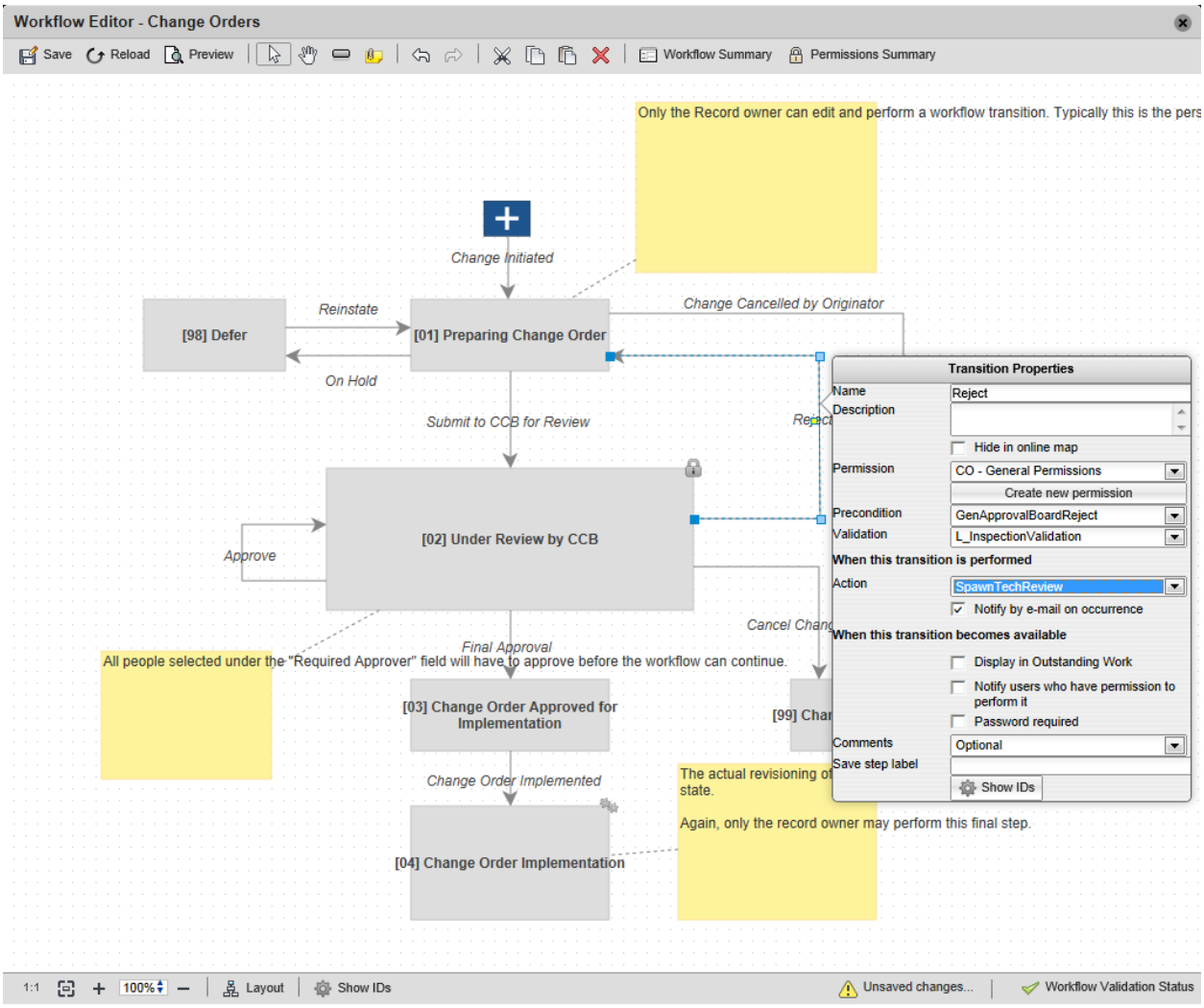
Workflow and Milestones

PLM 360 uses workflows as the mechanism for managing and tracking process flows. Millstones can be associated with workflows to provide a means of determining and tracking

schedules. PLM 360 is very interesting in how it allows you to create a workflow through a UI driven workflow editor.

Workflow

The workflow editor can be found by selecting Administration>Workspace Manager. Expand the desired workspace and choose Workflow Editor.

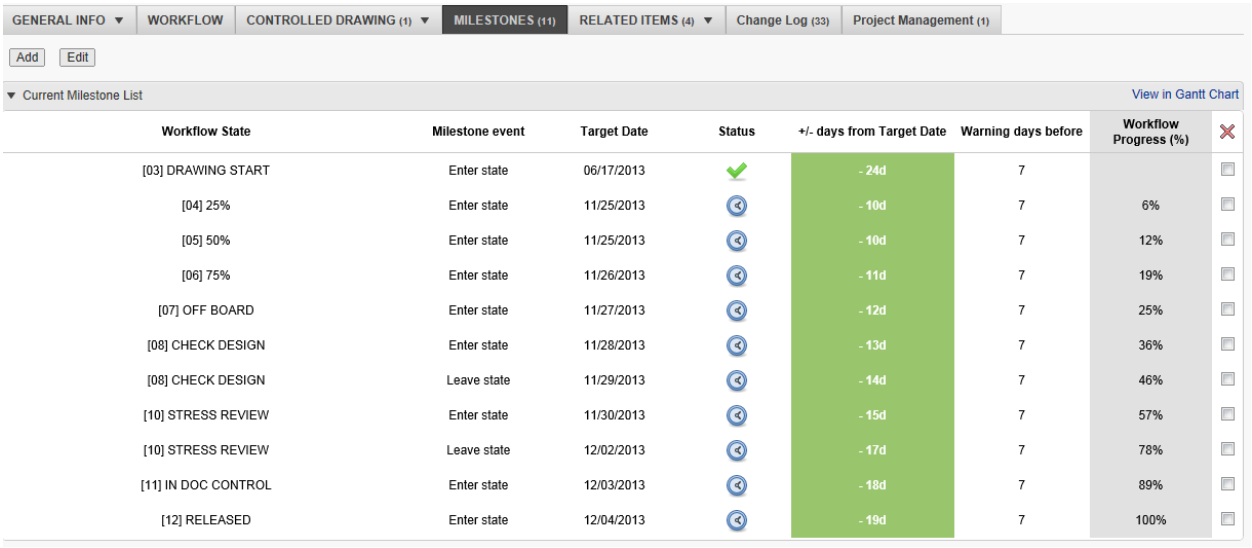


You'll be presented with a workflow "map" like the image above. This is much, much more than a mere graphic of workflow. This ***"IS"*** the workflow. By that I mean that as you layout the graphical representation in the editor you are actually configuring the workflow logic that will be applied to your workspace items. The transition arrows shown above indicate the "direction" that the item can flow as users update the system with their status. If there is no arrow connecting to a particular state (represented by the rectangles) to another then it is not possible to flow between those states. The converse is also true: if a transition arrow is connecting two states then a flow can happen between the two in the direction the arrow is pointing.

Automated code and other settings can be associated with each transition. These are called Transition Properties. You can have code that checks to see if you are allowed to transition between states (precondition). There is a validation code that can check to see that you can transition between states at that particular instance in time. You can also have code to will perform an action upon successfully transitioning between states as well.

Milestones

Milestones can be associated with workflow transitions allowing for real-time updating when tracking workflow progress.



GENERAL INFO | WORKFLOW | CONTROLLED DRAWING (1) | MILESTONES (11) | RELATED ITEMS (4) | Change Log (33) | Project Management (1)

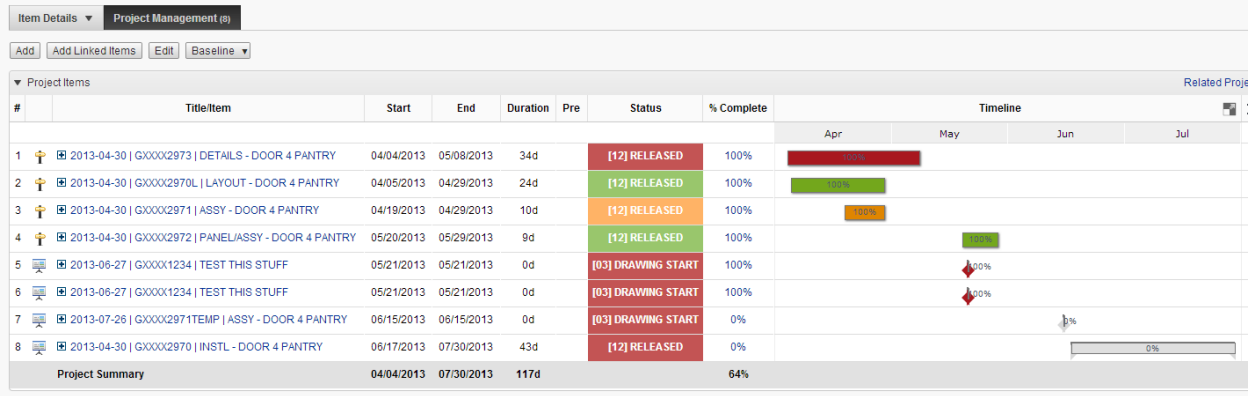
Add | Edit

Current Milestone List — View in Gantt Chart

Workflow State	Milestone event	Target Date	Status	+/- days from Target Date	Warning days before	Workflow Progress (%)
[03] DRAWING START	Enter state	06/17/2013	✔	- 24d	7	
[04] 25%	Enter state	11/25/2013		- 10d	7	6%
[05] 50%	Enter state	11/25/2013		- 10d	7	12%
[06] 75%	Enter state	11/26/2013		- 11d	7	19%
[07] OFF BOARD	Enter state	11/27/2013		- 12d	7	25%
[08] CHECK DESIGN	Enter state	11/28/2013		- 13d	7	36%
[08] CHECK DESIGN	Leave state	11/29/2013		- 14d	7	46%
[10] STRESS REVIEW	Enter state	11/30/2013		- 15d	7	57%
[10] STRESS REVIEW	Leave state	12/02/2013		- 17d	7	78%
[11] IN DOC CONTROL	Enter state	12/03/2013		- 18d	7	89%
[12] RELEASED	Enter state	12/04/2013		- 19d	7	100%

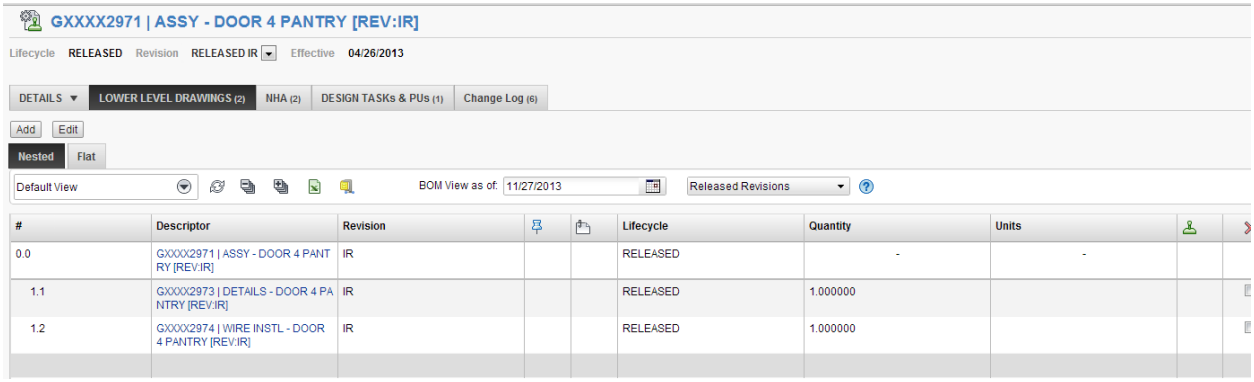
Project Management

There is a capacity for project management oversight that leverages milestones in the items. As milestones are reached the project management GANTT chart is updated in real-time. Also, since the item being tracked all have URLs navigation to an item directly from the project management tab is simple.



Revision Control and Bill of Materials

PLM 360 has a workspace functionality that allows revision control and BOM management. Revision control is linked to transition in the workflow of a revision controlling item. As the revision controlling item (i.e. a change order item) transition to a “released” state the transition will cause a revision to “lock in” in the revision controlled item. Also, a Bill of Material can be associated will item via the BOM tab.



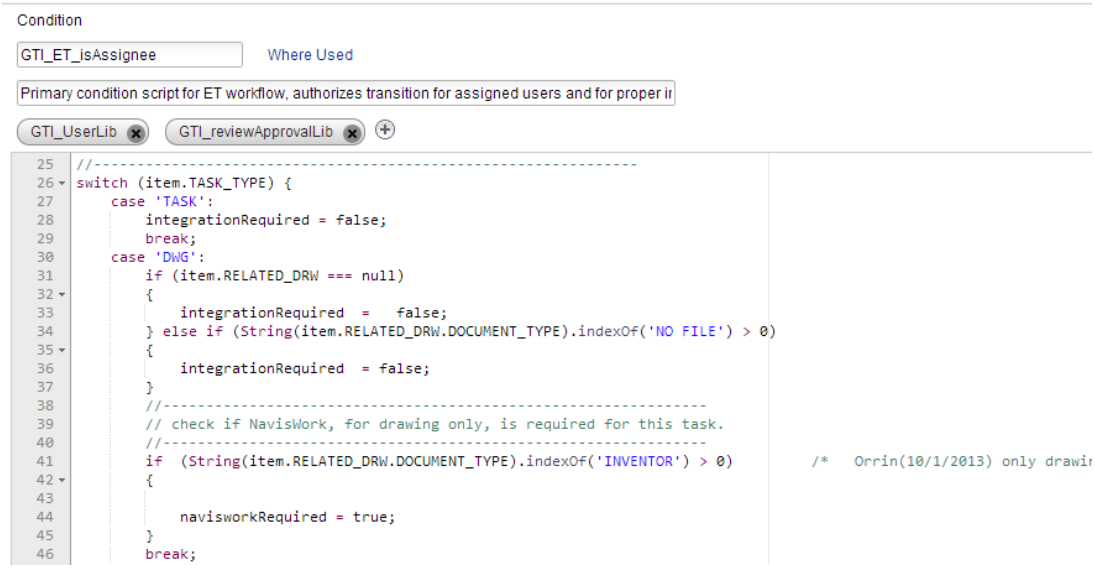
Create Scripts and Access the RESTful API

A very powerful and necessary part of PLM 360 is the ability to automate workspaces via scripts. Scripting in PLM 360 is done with JavaScript, a common web based scripting language. In PLM 360, JavaScript runs server side. PLM 360 provides a programming environment that allows you create and test your scripts.

It is these scripts that the workspaces use when executing workflow state changes i.e. pre-condition, validation and action scripts.

It is beyond the scope of this paper to go into details about JavaScripting in PLM 360 however the learning resources listed in this paper will direct you to very good information on the topic.

The scripting environment itself can be found by navigating to Administration>System Configuration>Scripting.



Another equally powerful method of automating PLM 360 is leveraging the RESTful API. The RESTful API allows you to access PLM 360 functions that normally are accessed via clicks and picks. In other words, if you can do something by clicking and picking then you probably can access that function with the API. The RESTful API has the distinction of being accessible via any .NET programming language meaning that you can have external code that interacts with PLM 360 in the cloud. This is a mechanism that allows integrations with other software applications. You can find the objects in the RESTful API by locating the WADL (Web Application Definition Language) at https://yourTenantName.autodeskplm360.net/api/rest/application.wadl.

The WADL will list the URLs available in the API and what functions they can perform.

Experiment Using the API in Chrome (Courtesy of Razorleaf)

Download and install Advanced REST Client

1. Open Chrome
2. Download and install Advanced REST Client.
   https://chrome.google.com/webstore/detail/advanced-rest-client/hgmloofddffdnphfgcellkdfbfbjeloo?hl=en-US
   NOTE: These instructions were developed against version 3.1.5. I haven't tested version 3.1.6. Also, version V1 of the REST API is used.

Configure a bookmark to retrieve cookie from a browser

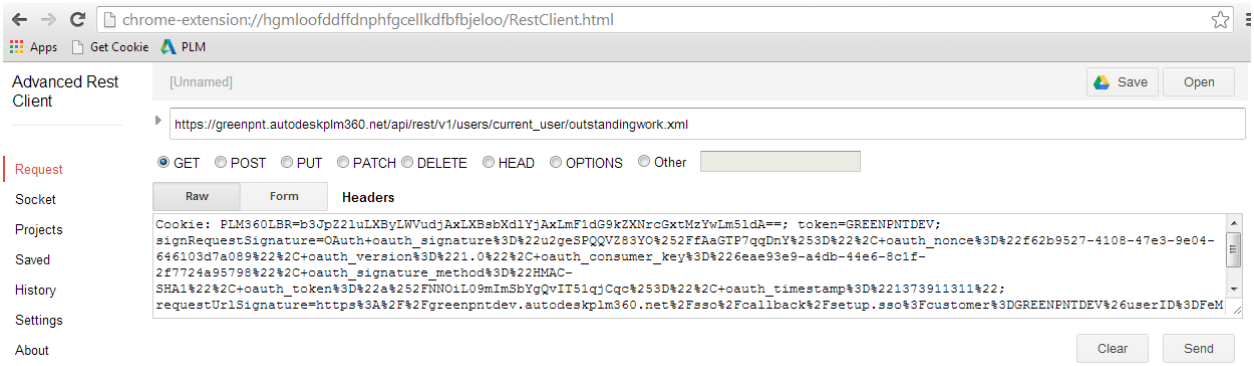
An authentication cookie will be used to identify you to PLM 360. There are various ways to obtain a cookie while authenticated to PLM360. This exercise demonstrates an easy method that uses a bookmark to retrieve the cookie of any page being currently displayed in the browser.

1. Open Chrome
2. Create a bookmark, naming it **Get Cookie**
3. Edit the bookmark and use the following URL:
    a. javascript:void(document.cookie=prompt(document.cookie,document.cookie));
4. Use this bookmark on any PLM360 page while authenticated to retrieve the authentication cookie.

Retrieve a listing of workspaces

This exercise demonstrates how to use a REST endpoint as a source for retrieving data. In this case, a listing of workspaces will be retrieved.

1. Open the Advanced REST client
2. In another tab, browse to a PLM360 page to retrieve the authentication cookie.
3. In the REST client, use the following URL:
    a. https://**[tenantname]**.autodeskplm360.net/api/rest/v1/workspaces.xml
4. Click the **Form** tab, add a header named **Cookie** and paste the authentication cookie
5. Ensure the verb is GET
6. Click Send



Integrate with Autodesk Vault

It is possible to have an integration with Autodesk Vault Professional either using an iframe or a direct integration via the Vault and PLM 360 API and scripts.

To use an iframe to leverage Vault you need to create a computed field. The iframe in PLM 360 will point to the Vault Professional web client and pass to its search URL a string. The search will return a list files. By tuning the string passed by PLM 360 - and the Vault “slop factor” - you can focus your search results to a specific file.

Experimenting with a Vault Integration via an iframe

You can try this:

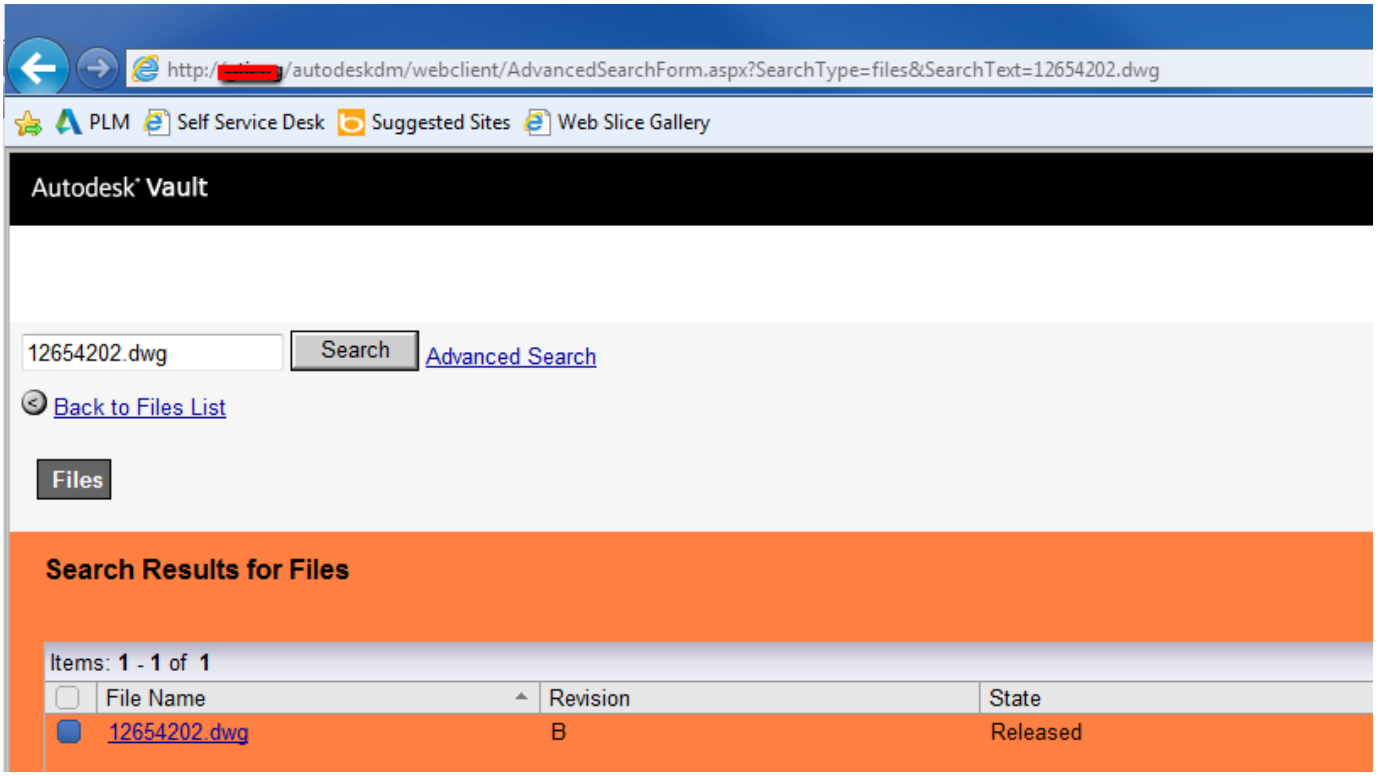
In your workspace create a field called "file name" (or whatever).

Create another field as single line text and make it a computed field. In your iframe use:

http://<server name>/autodeskdm/webclient/AdvancedSearchForm.aspx ?SearchType=files&SearchText= "file name"

When this runs inside the item you will be prompted to log into Vault. If it's in Chrome it should be pretty easy. If using IE9 then you will need to log in and go back to PLM 360 (it's kind of a pain). In that case (of using IE9) I would suggest turning on SSL for vault: http://wikihelp.autodesk.com/Vault/enu/Help/Help/0376-Advanced376. Instructions for setting that up are in the document at the link. Be sure to change your computed field URL to https://

What you'll see is search results (see below image). Just click on the link to get more file info. This will be exposed as an iframe in your PLM 360 item. The formatting can be a bit of a challenge. I found it easier to format in Chrome.



Since these are actually search results you may get too many hits. If you get too many results tune the vault slop factor. This will allow you to "focus" your search but keep in mind that it will affect the entire vault.:

http://wikihelp.autodesk.com/Vault/enu/Help/Help/0170-Administ170/0205-Client_A205/0265-Fine-Tun265

If you want to try using attachments/check-in/out you'll need a license of Vault office. Speak to your VAR as they can arrange to get you a trial license which can be appended to your existing Vault .lic file.

Using this method I found that Chrome seemed to be the easiest to setup and configure. IE9 works but it was very hard to change the size of the iframe and logging in was/is verbose.

Vault Integration using PLM 360 Connect

It is beyond the scope of this paper to detail how to integrate with Vault via PLM 360 Connect. But what I can do is give you an idea of what this type of Vault integration looks like.

In the graphic on page 12 you'll see a diagram of the configuration for a Vault integration using PLM 360 Connect (aka Jitterbit). With PLM 360 in the cloud your scripts can trigger an integration "orchestration" to occur. What happens is PLM 360 with pass data to an HTTP end point that you create that is exposed outside the firewall. Jitterbit sees that traffic on this end point and pulls in the data passed to it by PLM 360. Jitterbit then processes this data in the DMZ and determines the action to occur on the Vault. It then accesses the Vault API (which is a

SOAP API) and instructs Vault to execute actions. Vault can then communicate back to PLM 360 that the action is complete.