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## **A Laymen's Explanation of Autodesk® Vault and Autodesk® Productstream™**

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**MA14-2** Learn the concepts behind Autodesk's Data Management Solution without having to be a data management expert. Get the information you need to make knowledgeable decisions about managing your data and files. This class will review the issues solved by Vault and Productstream as well as discuss the basic architecture behind each solution.

### **About the Speaker:**

Keith has been the senior application engineer for D3 Technical Services in Springfield, Missouri for the last 7 years. He holds a B.S. degree in Drafting and Design Technology from Southwest Missouri State, and has been an instructor at AU the past 2 years. He is both an Autodesk Inventor Certified Expert and an Autodesk Manufacturing Solutions Implementation Certified Expert. Keith's main focus at D3 is implementing Autodesk Inventor, Vault, and Productstream with new customers, as well as 2D/3D CAD automation/configurator development for existing customers. He also works as an engineering design consultant.

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# Introduction

## Document Scope

The purpose of this document is to give the reader a basic understanding of the principles behind Autodesk's Data Management Solution. It is not intended to be a sales document nor a technical how-to document, but rather a sort of primer for individuals unfamiliar with data management.

## The Autodesk Data Management Solution

The Autodesk Data Management Solution (ADMS) is currently provided by the Manufacturing Solutions Division (MSD) of Autodesk. It works with other MSD products such as Autodesk Inventor, AutoCAD Mechanical, AutoCAD Electrical, and regular AutoCAD.

The purpose of ADMS is to provide Engineers/Designers working with Autodesk design software the ability to manage their files and associated data easily. It also provides other personnel within the organization access to that information.

The ADMS is a combination of Autodesk Vault and Productstream. These are two separate products that work together to form the complete solution. Vault can be used without Productstream in certain scenarios; however, Productstream requires the presence of Vault. In general, Autodesk Vault serves the engineering department, while Productstream gives access and tools for sharing engineering data throughout the rest of a manufacturing company.

## Autodesk Vault

### *What is Autodesk Vault?*

The Vault is the portion of the ADMS that manages engineering files.

### *How do I get the Vault?*

The Vault is included with Autodesk Inventor, AutoCAD Mechanical, and AutoCAD Electrical. Basically, if you have a license of one of these products on your computer you have a license of the Vault. The Vault is also available to regular AutoCAD users within a manufacturing company that owns one of the previously mentioned products.

### *What is the architecture behind the Vault?*

The Vault is a client-server based software.

The server portion (Autodesk Data Management Server) runs on either a dedicated server machine or a user's workstation, which functions as a file storage machine. Clients communicate with the server via HTTP; therefore, the server acts as an internal web server using Microsoft Internet Information Server (IIS). Information within the Vault is stored in a SQL database and a filestore.

**Note:** Because the Vault uses a synchronized SQL database and filestore special considerations need to be made for backup procedures. Included with Vault is a backup utility, which will create a snapshot of a Vault and its associated filestore in a separate location for backup purposes.

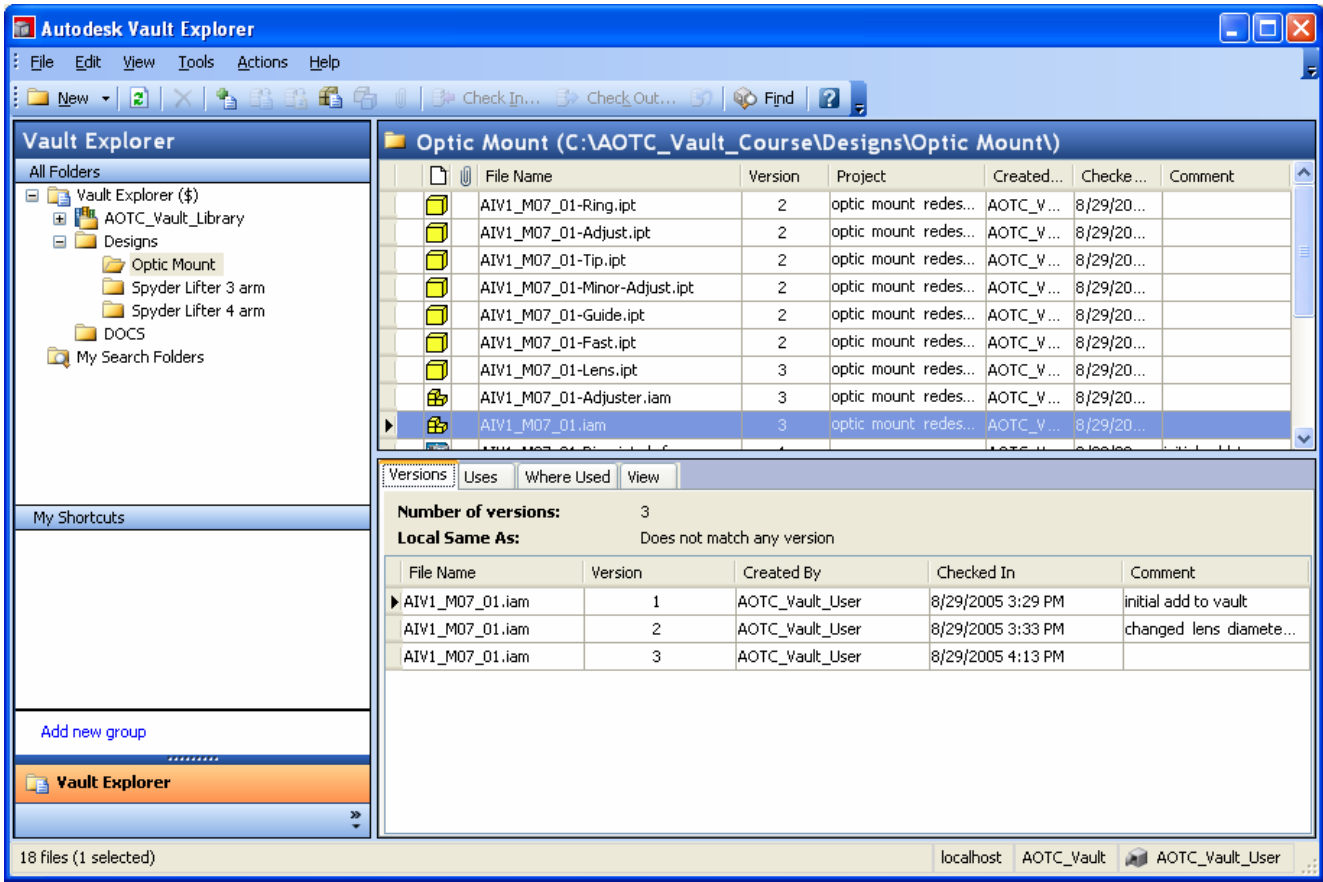
Vault clients include Vault Explorer, an Inventor Add-in, an AutoCAD Add-in, and a Microsoft Office Add-in.

**Note:** Check Autodesk's website [www.autodesk.com](http://www.autodesk.com) for client and server hardware requirements.

### *How do I work with the Vault?*

In order to work with files in the Vault, users use the Vault Explorer and tools within their Autodesk product or Microsoft Office product.

Vault Explorer works much like Windows Explorer. It displays the directory structure of the Vault and provides tools for organizing and searching the files stored there.



When Vault is loaded tools are added to Inventor, AutoCAD, and Microsoft Office. These tools allow users to manage files in the Vault from within the current application.



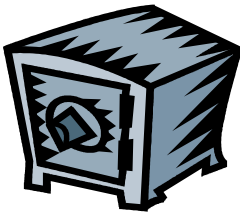
**Note:** Users who do not have the Vault installed on their computer are unable to see or work with files in the Vault.

## Vault Concepts

There are five major concepts behind how the Vault works that users must understand: Master Copy/Local Copy, Check In/Check Out, Versioning, Property Indexing, and Viewable File Creation.

### Master Copy/Local Copy

Files that have been placed into the Vault are called "vaulted" files. A vaulted file will have a Master Copy. This copy resides in the Vault, on the server, and is un-editable. In order for users to use or modify the file in any way they must have a copy of the file on their local workstation. This copy is referred to as the Local Copy (or sometimes Working Copy).



Master Copy

- Resides in Vault
- Un-editable



Local Copy

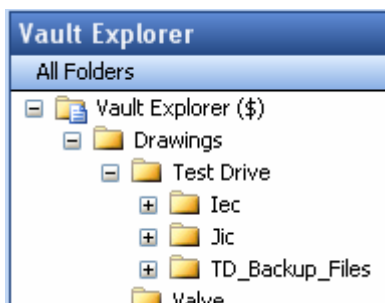
- Resides on Users Computer
- Copy of Master Copy

This setup has a number of advantages:

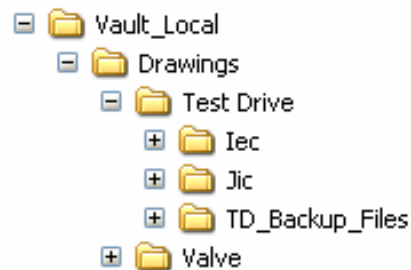
- The Master Copy is protected from accidental changes, corruption, etc.
- Network traffic is reduced because users are working off their local drives
- Performance is gained because users are working off their local drives
- Users can continue to work if the network or server becomes unavailable

In order to keep track of Local Copies and Master Copies, a special folder is setup on the user's computer. This folder is called the Working Folder and represents the top level or "root" of the Vault. The directory structure in the Working Folder basically mirrors the structure in the Vault. Local copies reside in the Working Folder and Master Copies reside in the Vault.

### Vault



### Working Folder

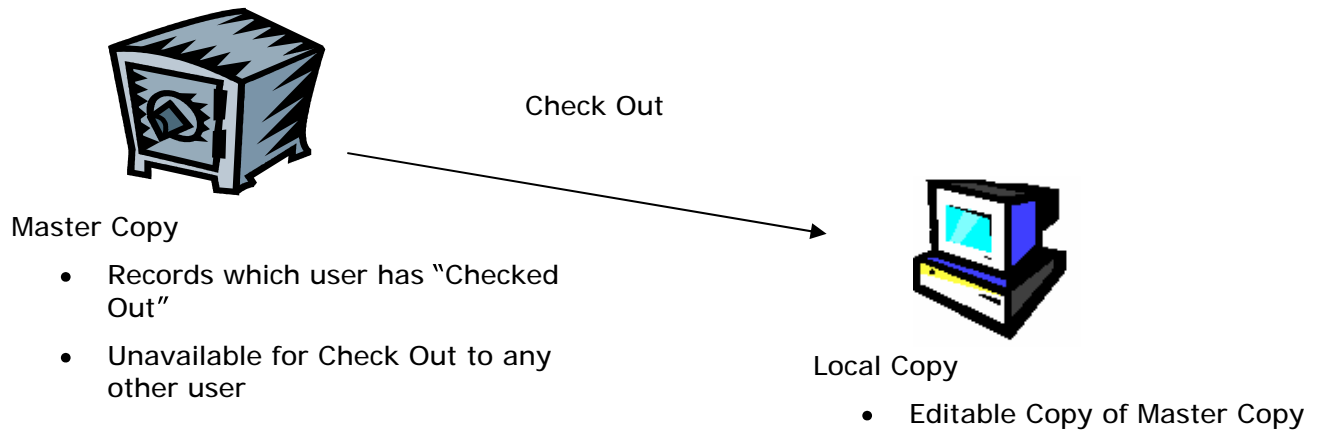


**Note:** While it is technically possible to place a working folder on a shared network location it is highly discouraged. The Vault was designed around a local Working Folder setup; not using it in this fashion can cause unexplained results. A network Working Folder scenario also negates many of the advantages of the Master Copy/Local Copy concept.

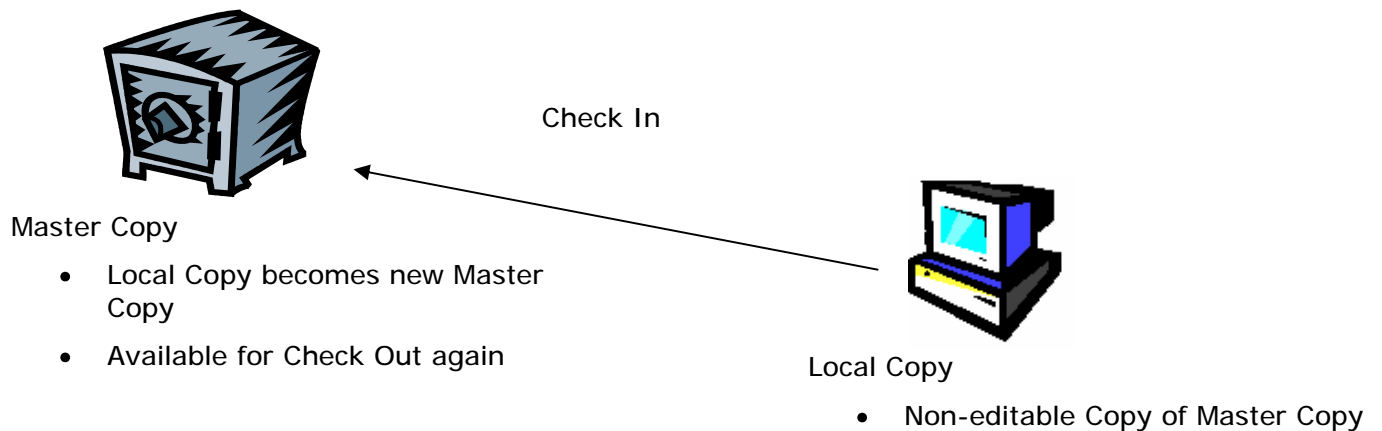
### Check In/Check Out

Since multiple users can have Local Copies of the same file it is important that only one user be able to modify the file at any given time. To manage this, the Vault uses a Check In/Check Out process.

When a user wishes to change a file they perform Check Out. The Vault records which user checked it out and when. The user's Local Copy is now editable and all other users will be unable to check the file out.



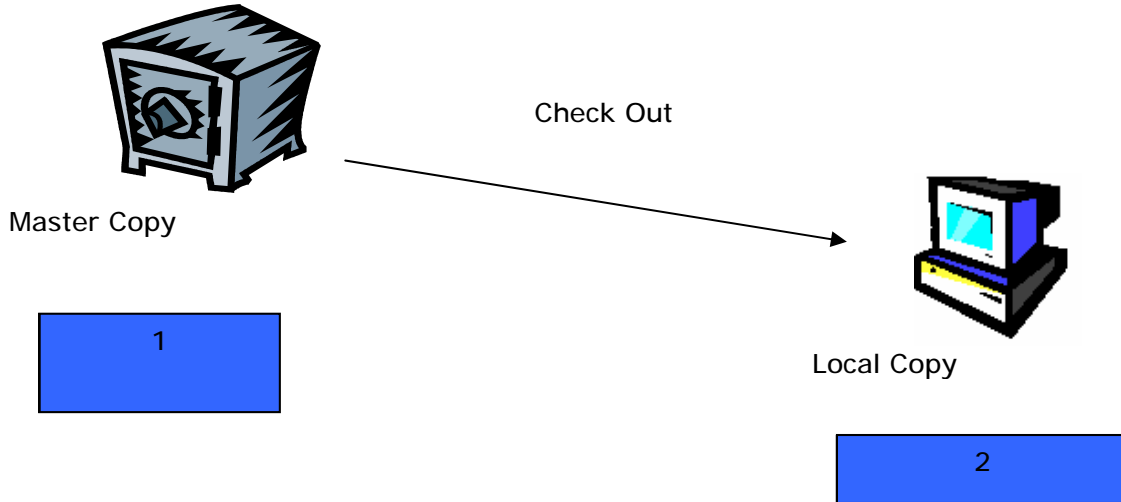
When the user is done editing the file they simply Check it In. Upon Check In the Master Copy is updated and another user is free to Check it Out for their editing purposes. Also upon Check In the Local Copy is either deleted or becomes non-editable.



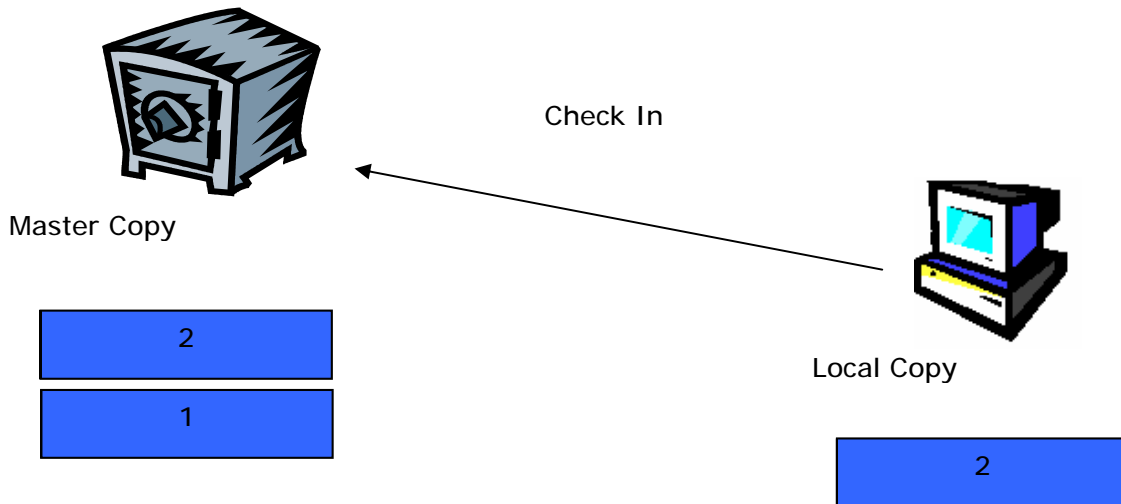
## Versions

When a Local Copy is Checked In the existing Master Copy is not over-written. Instead a new Version of it is created inside the Vault. The Vault keeps a version of every Master Copy.

When a file is added to the Vault the Master Copy is assigned the version number 1. The next time the file is Checked Out it becomes version 2.



If it is edited and Checked In a new Master Copy is added to the Vault with the version number 2.



Users only see the latest version of the file in the directory structure of the Vault. However, older versions are maintained and accessible through tools within Vault Explorer.

**Note:** Older Versions can be Purged from the Vault to save file space.

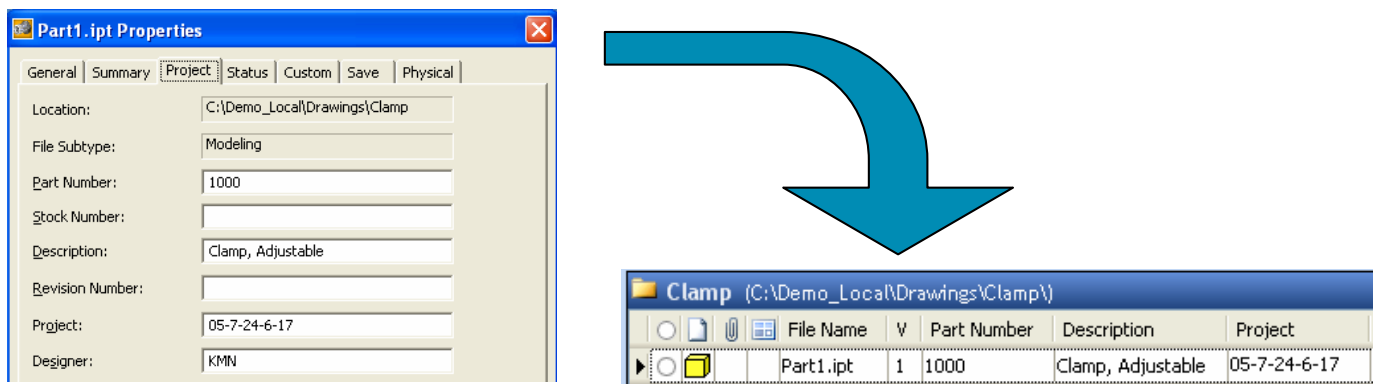
The advantages of Versions are as follows:

- Each version of a Master Copy is truly un-editable and therefore protected from accidental change or corruption
- Users are free to try “what-if” design scenarios without fear of losing good work

**Note:** File Versions within the Vault should not be confused with Revisions. Revisions will be discussed later in the Productstream section.

## Property Indexing

Each time a file is added to the Vault for the first time or Checked In the Vault tries to get as much information out of the file as possible. It places this information in its database to help users organize and search for files easier. This process is known as Property Indexing. The information the Vault is able to gather is limited to File Properties and Block Attributes within AutoCAD drawings.



**Note:** In order to take full advantage of this, users should standardize property information in their files as much as possible.

## Viewable File Creation

When Inventor or AutoCAD files are Checked In or Added to the Vault a Viewable File is created and added to the Vault as well. The Viewable File is a .dwf file with the same name as the file it was created from (e.g., Clamp.ipt.dwf) and resides in the same folder. The existence of this file allows users to view the file from inside Vault Explorer without having to open it.

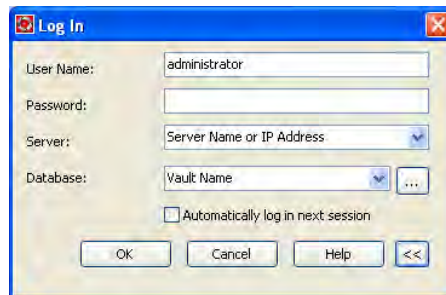
**Note:** In order for Viewable Files to be created the Enable DWF Attachments option must be set. Also, to create Viewable Files of AutoCAD drawings a page setup must be initialized within the drawing.

## Vault Procedures

There are several standard procedures used when working with the Vault. Depending on the application used (e.g., Vault Explorer, Inventor Add-In, etc.), the steps to perform these procedures differ.

### *Log In*

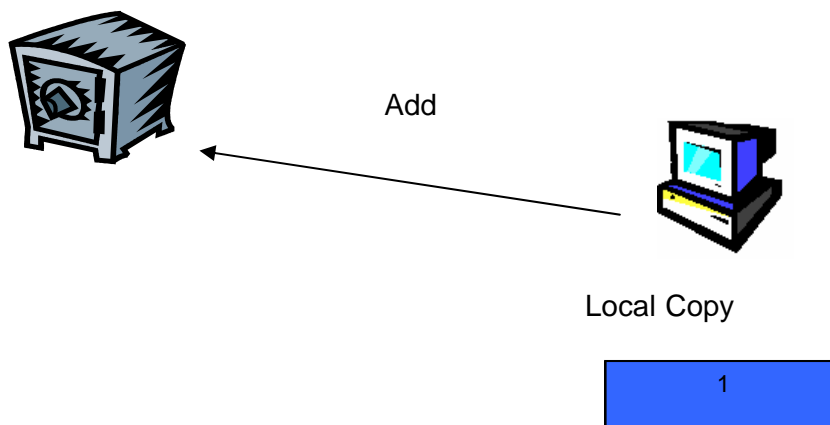
In order for the Vault to track a user's actions within the Vault, every application that accesses the Vault requires the user to Log In to Vault. An option is available on the Log In dialog for automatic log in next session.



**Note:** Currently, the Vault uses its own user security system. A Vault Administrator must create each user and give them permissions within the Vault.

### *Add File*

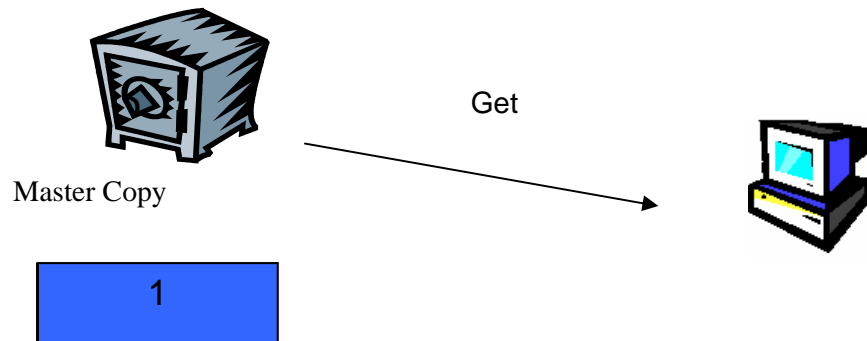
When a file resides in the Working Folder but not in the Vault it must be Added to the Vault to create a Master Copy.



**Note:** Add is not available in AutoCAD or Microsoft Office applications. In these applications Check In performs the same task.

### *Get File*

If a file resides in the Vault and not in a user's Working Folder a Get will create a read-only Local Copy. The user has the option to Get either the latest version or any previous versions that have not been purged.



### *Check Out*

A file Check Out performs a Get, only the Local Copy is not read-only. Check Out also locks the Master Copy, which prevents any other user from performing a Check Out.

### *Check In*

Checking a file In creates a new Version of the Master Copy based on the Local Copy. The Local Copy is then either deleted or becomes read-only.

**Note:** A comment field is available in the Check In dialog box. Comments are displayed for each version of a file in the Vault. Version comments are generally very helpful, especially when a previous version needs to be retrieved from the Vault.

### *Undo Check Out*

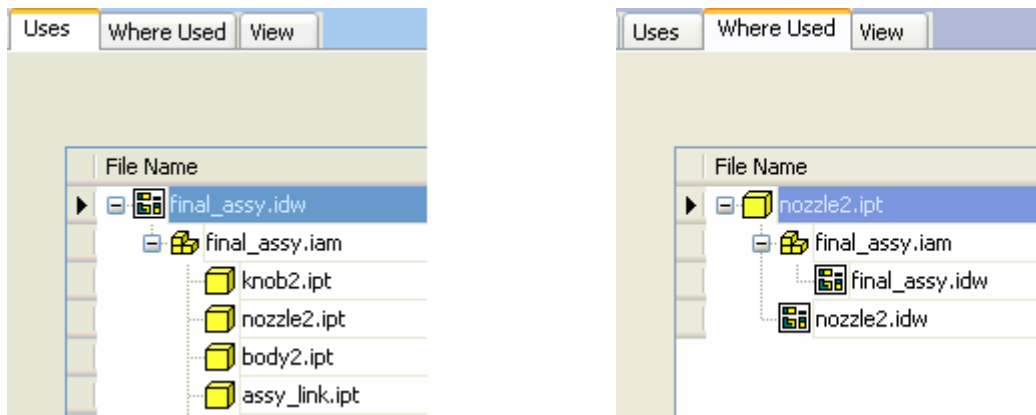
Undo Check Out allows a user who has modified a Checked Out file to revert back to the previous version. The file becomes available for Check Out again and the user has the option to remove the modified Local Copy.

## File References and the Vault

Both Autodesk Inventor and AutoCAD use functionality that links one file to another. This is known as file referencing. In Inventor, assembly files reference part files, drawing files reference assembly files, etc. While AutoCAD is less dependent on file referencing, many companies use the external reference (xref) functionality quite frequently. One of the major advantages of using the Vault is tracking these file references.

**Note:** Vault does not fix file references. Files with broken references cannot be Added or Checked In to the Vault through Inventor or AutoCAD.

When Inventor or AutoCAD files with references are added to the Vault all referenced files are added as well. Vault Explorer can then provide a Uses report, allowing users to see what references a file has, as well as a Where Used report, which displays any files that reference a particular file.



**Note:** Files with references must be Added or Checked In through Inventor or AutoCAD in order for Vault to recognize the references.

When a Get or Check Out is performed on a file with references, Local Copies of all referenced files are created as well.

**Note:** Vault does not manage reference file search locations within the parent file. While a Local Copy of the reference file will be created, it is up to Inventor or AutoCAD to determine where that file exists.

### *Single Project Method*

Inventor uses Project Files (.ipj) to determine search paths for file references. In working with the Vault, the best method is to have one Project File per Vault. This single project file tells Inventor to search for referenced files in the top level folder and all its subfolders. This method gives user's more freedom to organize their files without breaking file references.

**Note:** In order for the Single Project Method to work correctly all Inventor files must have unique names. An option can be set in the Vault to enforce unique filenames.

# Autodesk Productstream

## *What is Productstream?*

Autodesk Productstream is a package that extends the functionality of the Vault. It provides non-CAD access to Vaulted files as well as extra tools for managing and distributing engineering data throughout the rest of the company.

## *How do I get Productstream?*

Autodesk Productstream can be purchased from a certified Autodesk Reseller. Licenses are user-based (i.e., the software can be loaded on an unlimited number of computers but only licensed users can log in and use it). There are 3 different license types which will be discussed in the next section.

## *What is the architecture behind Productstream?*

Productstream uses the same architecture as the Vault. The server portion, Autodesk Data Management Server, includes both Vault and Productstream. One SQL database is used for both products.

There are 3 different clients for Productstream.

### **Productstream Creator**

Creator is the most powerful Productstream Client. It contains all the functionality of Vault Explorer plus has access to the Item Master and ECOs.

### **Productstream Reviewer**

Reviewer is actually the same client as Creator. However, users with a Reviewer license have limited permissions with regard to Items.

### **Productstream Explorer**

Explorer is a thin Web-Client that accesses the Autodesk Data Management Server through Internet Explorer. Software does not need to be loaded on the client workstation because it is a thin client.

Explorer provides users access to released items and their associated Viewable Files.

**Note:** With the exception of Productstream Explorer, Productstream clients access the server in the same manner as Vault Explorer.

## *How do I work with Productstream?*

In order to work with Productstream you must be a licensed user and have either Creator or Reviewer installed or a link to Explorer.

When Productstream is implemented so is the Vault. CAD users will continue to access files through Vault Explorer, Inventor and AutoCAD unless they need access to Item or ECO information. If this is the case they will need a Productstream client. All non-CAD users will need to use a Productstream client in order to access Vaulted files and/or Item or ECO information.

## Productstream Concepts

There are five major concepts users must understand when working with Productstream: Items, Lifecycle States, Revisions, Bill of Materials, and ECOs.

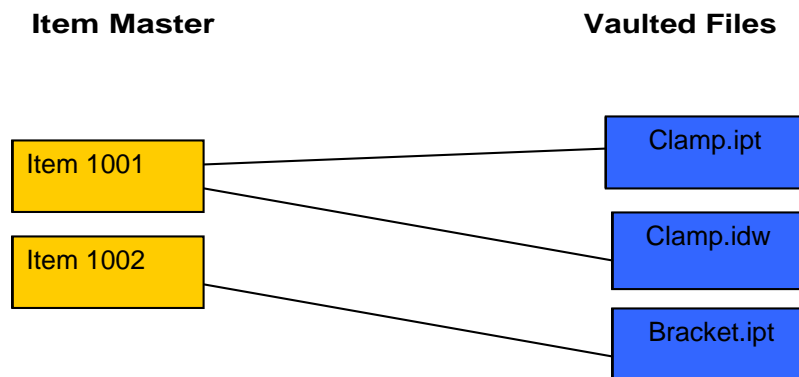
### Items

Items, as defined by Productstream, are entities used to represent unique objects within a manufacturing company. These objects could be purchased parts, fabricated parts, assemblies, replacement parts, etc.

Productstream stores textual information, known as Properties, for each Item in its database. One of these Properties is the Item Number, which is a unique number used to identify the Item. The database of Items is referred to as the Item Master.

Item Master								
	Number	Rev...	Lifecycle State	Title	Item Description	Item Type	Units	
	1000	-	Released	Valve Linkage	Valve Link	Part	Each	
	1003	-	Released	Valve Actuator	Valve Knob	Part	Each	
	1002	-	Released	Valve Nozzle	Valve Nozzle	Part	Each	
	1001	-	Released	Final Valve Assembly	Valve Assembly	Assembly	Each	
	1004	-	Released	Valve Body	Valve Body	Part	Each	

Items can be linked to files within the Vault (i.e., Item 1001 can be linked to Clamp.ipt and Clamp.idw)



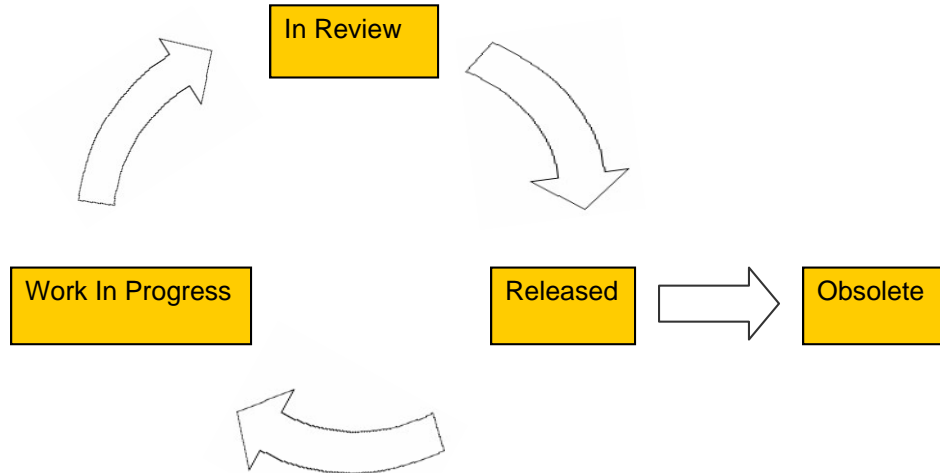
Items can be created from Inventor or AutoCAD Mechanical files. During this process Productstream copies property information from the file to the Item and links the two automatically.

**Note:** Regular AutoCAD files cannot be used to create Items. In this case, Items must be created manually and then linked to the AutoCAD file.

## Lifecycle States

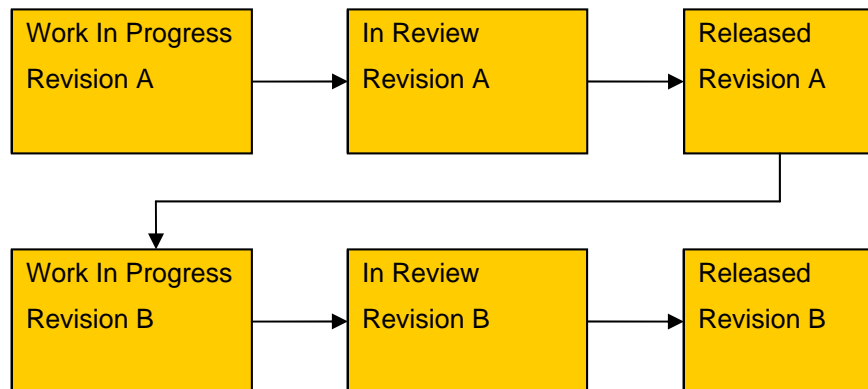
Items have a special property known as the Lifecycle State. There are four possible values for this property: Work in Progress, In Review, Released, and Obsolete.

The value of the Lifecycle State property determines the edit ability of the Item (e.g., if an Item is Released the description property can not be changed).



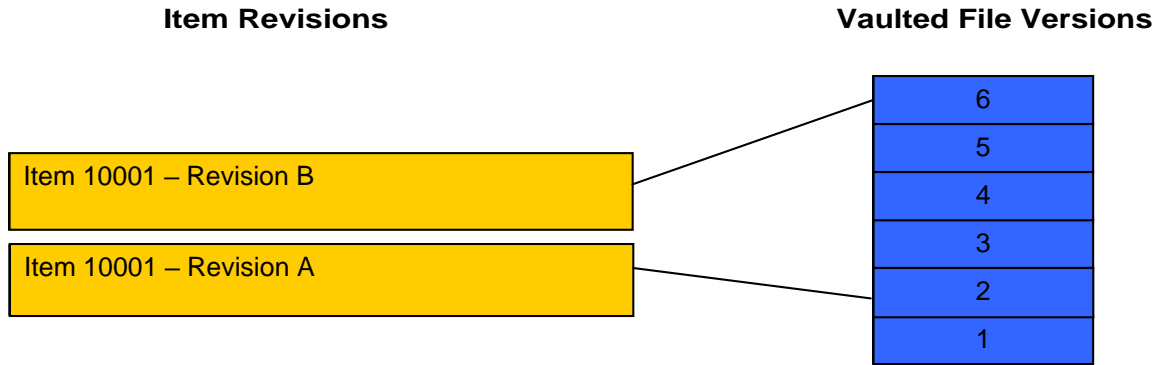
## Revisions

Productstream tracks the history of Items through the use of Revisions. Every time an Item moves from Released to Work in Progress a new Revision is created.



**Note:** The Revision sequence can be modified to fit many different scenarios.

Different Revisions of an Item can be linked to different Versions of a Vaulted file.



**Note:** When an Item is in a Released state, any files linked to it are Locked (i.e., unable to be Checked Out) in the Vault.

### *Bill of Materials (BOM)*

Every Item has a Bill of Materials. The Bill of Materials is used to specify other Items as child components (e.g., an assembly represented by Item 10001 can be specified as a subassembly of another assembly represented by Item 20000).

**Note:** When Items are created from Inventor or AutoCAD Mechanical files, Productstream tries to reproduce any BOM information found in those files.

### *ECOs (Engineering Change Orders)*

Productstream also contains another database of objects known as Engineering Change Orders (ECOs). An ECO is used to manage the Lifecycle State of an Item or group of Items. Each ECO has a Routing, which is a list of users who must accept the ECO before it can be closed. When an ECO is closed the Items it is linked to are Released.

## Possible Implementation Scenarios

There are 3 major implementation scenarios for the Autodesk Data Management Solution; Vault Only, Vault with Productstream Reviewers, and Full Productstream.

### *Vault Only*

In this scenario CAD users use Vault for managing Work In Progress (WIP) files. When non-CAD users need to view the files they are either printed or a copy of the Viewable File (.dwf) is placed outside the Vault.

A manual process can be defined where CAD users copy the Viewable File to a shared network location upon Release of the document. Non-CAD users then use the DWF Viewer to access these files

#### **Benefits**

- CAD Users gain the benefits of using Vault for WIP files
- Productstream does not have to be purchased
- Non-CAD users have access to Released electronic documents

#### **Concerns**

- CAD users are responsible for maintaining an up-to-date shared network location
- Release process is not managed
- Shared network location is not managed (i.e., files could be moved, renamed, deleted, etc.)

### *Vault with Productstream Reviewer*

In this scenario CAD users again use Vault for managing Work In Progress (WIP) files. Non-CAD users use a Productstream Reviewer Client to access files within the Vault.

#### **Benefits**

- CAD Users gain the benefits of using Vault for WIP files
- Limited Productstream licenses have to be purchased
- Non-CAD users have access to all vaulted documents

#### **Concerns**

- Non-CAD users have access to all vaulted documents regardless of their release state
- Release process is not managed

## *Full Productstream*

This ultimate scenario gives users the full power of Autodesk's Data Management Solution. CAD users use either the Vault or a Productstream client depending on their needs. Non-CAD users use the level of Productstream necessary to access engineering data and files important to them.

### **Benefits**

- CAD Users gain the benefits of using Vault for WIP files
- Release process is managed
- Certain Non-CAD users only have access to Released documents

### **Concerns**

- Productstream must be purchased for each user dealing with Engineering data
- Full implementation is required

### **Contact Information:**

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