

Introduction

Autodesk Vault Manufacturing (previously called Autodesk Productstream) adds functionality for controlling revision levels and lifecycles for documents. This document explains how these two features interact with each other and the benefits that are gained.

Terms

Below are definitions of phrases used throughout this document.

Definitions	
Version	An iteration of a document and its meta-data that is created whenever a modification is committed to the system.
Revision	A collection of versions with a common label representing the work done to complete a desired change.
Lifecycle Definition	A defined set of lifecycle states and transition rules that may be assigned to a document.
Lifecycle State	A predefined stage describing the current status of the document.
Released	An attribute assigned to a version which gives priority status to that version.
Released Biased	To favor released data over non-released data.

Overview

When editing documents in a vault. The changes are saved as version history on the server. Using the default file settings. The history has little information that can be used to identify significant events.

The engineering industry has standards used for labeling significant changes to data. This is typically called the document revision. The revision is usually marked with a single character, and the document is given a new character for any significant changes that are done after the document has been released.

The Revision Management feature in Autodesk Vault Manufacturing gives the ability to mark a point in time as a significant change to a document and its related files. A revision level of a document may be retrieved along with the correct revision level of any related documents.

When used in combination with lifecycles, a revision level is created automatically during predefined events. The revision will also be marked as 'Released' when the document is placed into certain lifecycle states identified as released states. During open and download procedures, the user may choose to retrieve released or non-released revisions of the document and its related files.

DOCUMENT REVISION MANAGEMENT

What is a revision?

A revision is a collection of file versions rolled up into one object that is displayed to the user. After a revision is created, document edits are contained within that revision until a new revision is created. This means that as changes are made and committed to the system, the user sees no change to the revision label.

For example: a document is created and assigned the revision level “A”. As the user makes changes and those versions are committed, the revision label remains “A”. Only when the user performs a revision bumping action will a new revision be created. (e.g., using the Revise command to iterate the revision). This will cause a new revision of the document to be created with the label “B”. Any subsequent edits would then be collected within revision “B”.

Once the revision objects have been created, any revision may be downloaded or opened. When a revision is downloaded, only one version within that revision is used to represent the revision. If lifecycles are not used, then that version is always the latest version within that revision.

How are revision controlled documents related to each other?

When using documents that are related to each other, such as an Autodesk® Inventor® assembly and its referenced components, a relationship is created between the specific revisions of those documents.

This means that when an assembly is checked into a vault, the revision of each of its components is recorded for future use. When that revision of the document is recalled, each related document will be retrieved using the revision that was recorded.

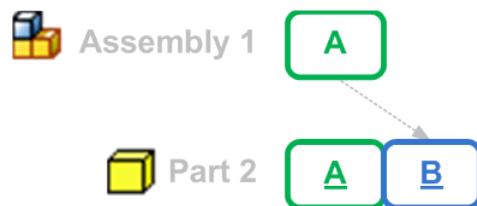


Figure 1

As stated earlier, a revision is represented by the latest version within that revision. This rule still applies when related documents are downloaded. Because of this, any out-of-context changes that are made to the revision of the related documents will be consumed by the referencing document.

For example: revision “A” of an assembly references revision “B” of a part. If edits are made to revision “B” of the part after the assembly has been checked in, the changes to revision “B” of the part will be shown in the assembly when revision “A” of the assembly is opened.

The opposite is also true. If a new revision of a referenced document is created and then the edits are made, those changes will not be shown when a specific revision of the referencing document is opened.

DOCUMENT REVISION MANAGEMENT

For example: revision “A” of the assembly references revision “B” of a part. A new revision of the part is created, named “C” and then edits are made to revision “C” of the part. When revision “A” of the assembly is opened, the changes to revision “C” of the part will not be shown in the assembly.



Figure 2

This gives a great deal of flexibility to the revision management system. It allows revision edits to be consumed by referencing documents without the need to modify the referencing documents. At the same time, it allows edits of components to not affect historical data.

How do lifecycles affect revision management?

A lifecycle is comprised of various states that can be assigned to a file. One or more of these states may be identified as a “released state”. When a document is in a released state, a new version is created that is marked internally as released.

Note:

This is an option applied to the state itself and not the name of the state.


Newer non-released versions can be created by moving the document to a different state without creating a new revision.

For example: a document is in a released state and then moved to the state “Quick Change”, which is not a released state. A released version of the document will be created followed by a non-released version within the same revision.

Marking a version as released has several effects:

1. That version of the file can never be purged from the system.
2. The document may no longer be deleted (except by the administrator).
3. The released version now has priority over all versions within that revision, even if newer versions are created.

What is ‘Released Biased’?

In several of the areas and dialog boxes an option is shown called ‘Released Biased’ . This option allows the user to set a preference for released or non-released data. There are several reasons why a person would want one over the other. It mainly depends on if the person is planning to edit or consume the documents.

This option tells the system which revision to choose when a choice is available between new data and released data. If the ‘Released Biased’ option is ON, then the released data is chosen. If the option is OFF, then the newest data is chosen.

In the illustration below, Assembly1 is shown referencing Part2. The assembly has only one revision, A. The part has three revisions, and only revision B is released (denoted with the underline).

DOCUMENT REVISION MANAGEMENT

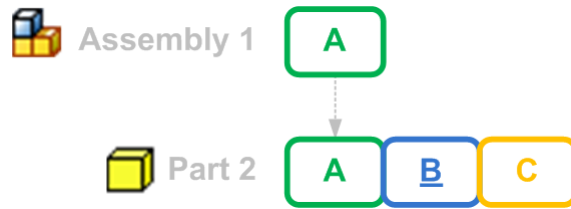


Figure 3

Scenario 1: The user chooses to open Assembly1 using the 'Latest' option with 'Released Biased' set to OFF. The Assembly will be opened referencing revision "C" of Part2.

Scenario 2: The user chooses to open Assembly1 using the 'Latest' option with 'Released Biased' set to ON. The Assembly will be opened referencing revision "B" of Part2.

The difference between scenarios 1 and 2 is that the released biased option is set to ON in scenario 2. By selecting the 'Latest' option, the system must now choose between the latest revision and the latest released revision. The 'Released Biased' option tells the system which to choose.

Scenario 3: The user chooses to open Assembly1 and specifically chooses revision "A" of the assembly (instead of Latest) with the 'Released Biased' option ON. The assembly will be opened referencing revision "A" of Part2.

The reason that scenario 3 uses revision "A" of the part even though it is not released is because there is no choice to be made; and therefore, the 'Released Biased' option has no effect. When a specific revision of a document is chosen, then the corresponding revisions of the related documents are always used.

Note:

The same logic that is applied to revisions is also applied to the versions within the revisions. If the revision has a released version and a newer version that is not released, then the 'Released Biased' option determines which version is given priority.

Details of Revisions

In the following section we will discuss some of the underlying details on how Revisions work.

A container of versions

A new version is created in the Vault whenever anything about a file is changed. These changes can range from; editing the file in the CAD application, editing properties, or simply moving files.

A Revision can be thought of as a container that holds multiple versions within it. Under most circumstances, the user will only see the revision container and not the versions inside. When a file is modified and new versions are created they are placed within the leading revision.

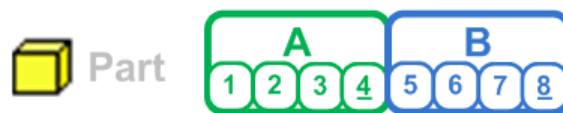


Figure 4

One of the versions is returned to represent the revision when the revision is opened or referenced by another document. This is often the leading version within the revision, but not always.

Released Versions

When using lifecycles, certain versions of the document may be marked a 'Released' (denoted with an underscore). It is also possible through different workflows (such as a quick change) to have versions within a revision which have been created after the released version

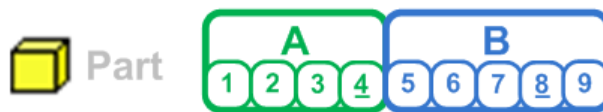


Figure 5

In Figure 5, revision B is shown having a released version which is not the leading version. It is possible to open or reference either of these versions. For example if Revision B is referenced by another document and the 'Released Biased' option is turned ON then the released version would be used. If the 'Released Biased' option is turned OFF then the leading version will be used.



Figure 6

If Revision B is then released a second time, this newly released version will be the version that is returned when referencing the revision.

DOCUMENT REVISION MANAGEMENT

What does it all mean?

All of this means that the document revision management system in Autodesk Vault Manufacturing is very flexible. The user can choose to use revisions without using lifecycles, or use them both in conjunction with each other.

A given revision of a component may be edited and released out of context of any referencing assemblies, and the released changes will be used when the assembly is opened.

A user may choose to set the 'Released Biased' option to ON or OFF depending on their needs at any given time.

As a best practice, set the 'Released Biased' option to ON for the most control. This will help to ensure that new, non-released revisions of parts are not consumed unintentionally. Once a new revision of a part has been consumed purposefully, the referencing document will continue to use it even if it is not released yet.

Revision Management Example

The remainder of this document will present a typical workflow, which takes advantage of the Revision Management tools.

In this example “John A. Designer” will create an assembly and use revision management workflows to assist in controlling his data.

Creating a new assembly

John will start out by creating a new assembly named A1001.iam along with a sub assembly named S002.iam. John then creates a new part called N003.ipt and places it into the sub assembly.

Figure 7 shows the data structure of the assembly.

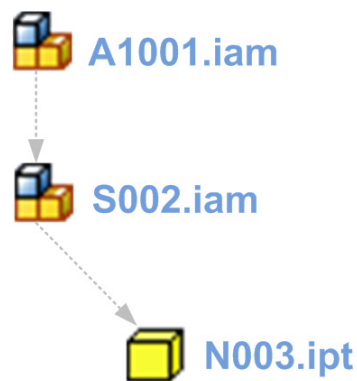


Figure 7

John then checks in the new data, into his Vault Manufacturing server. The configuration is setup to auto-assign revision schemes and lifecycles. This sets all of the new data to a revision letter and places them into the “Work in Progress” state.

DOCUMENT REVISION MANAGEMENT

Figure 8 shows a diagram of the data model with the new revisions and the relationships to each other.

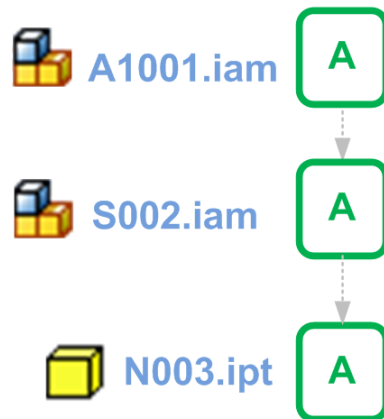


Figure 8

Using an existing Part

John would like to use an existing part; X004.ipt, in the assembly. John would like to insert the latest released revision of the component. To do this he will use the 'Latest' option in the 'Revision Selection' control for the Place Component command with the Released Biased option turn on.

As shown in Figure 9, the part has several revisions in its history. Revisions A and B have been released while revision C has not been released. When the 'Latest' option is selected with Release Biased turned on revision B will be used.



Figure 9

DOCUMENT REVISION MANAGEMENT

When the component X004.ipt is placed in the assembly a relationship is built between the revision A of the assembly and revision B of the component (as shown in Figure 10).

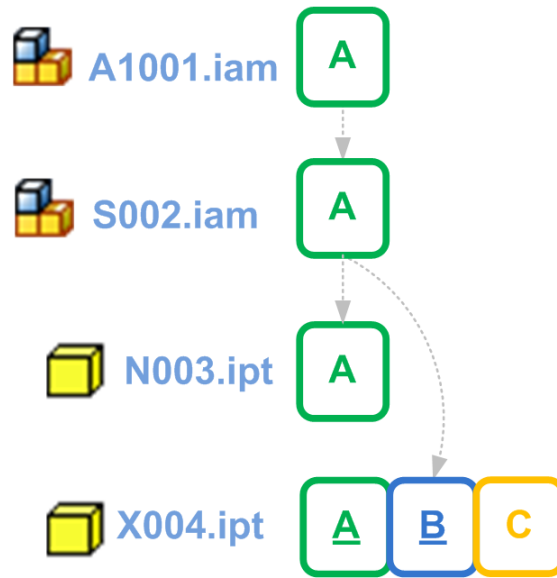


Figure 10

Opening the Assembly

After closing the assembly to work on some other designs. John wants to reopen the Assembly. Given the simple example shown in Figure 10. There are two different results that John could get when opening the assembly depending on the options he chooses.

The open command has a 'Revision Selection' control that will allow John to choose revision A or Latest. John may also turn the Released Biased option on or off. Because most of the components have only one revision the only component that will be affected by these options is X004.ipt. The following is a list of the options and the revision of X004.ipt that would be used.

- **Latest with Released Biased**
This would return revision B of X004.ipt. This is because revision B is the latest released revision (revision C is not released).
- **Latest without Released Biased**
This would return revision C of X004.ipt.
- **Revision A**
If Revision A of the assembly is chosen specifically then revision B of X004.ipt will be returned. In this specific case the Released Biased option makes no difference.

Managing the Revisions

Continuing on with the example; John releases all of his new components (as shown in Figure 11).

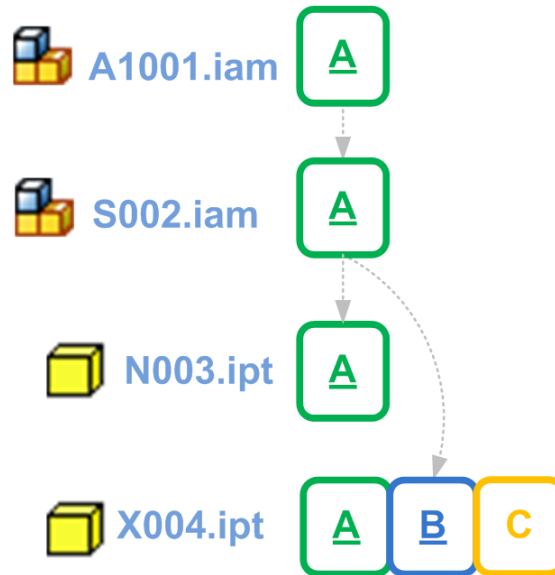


Figure 11

After releasing his components, it is discovered that a change is needed in the part N003.ipt. John changes the state of the component to 'Work in Progress'. This causes a new revision of the part to be created automatically.

John opens the file N003.ipt and makes the changes required. He then releases revision B of the part.

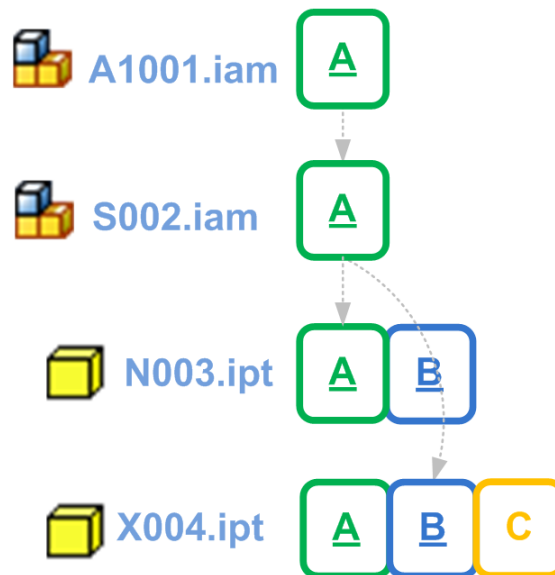


Figure 12

DOCUMENT REVISION MANAGEMENT

John wants to change the sub-assembly S002.iam to use the new revision of N003.ipt. He changes S002.iam to “Work in Progress” causing a new revision to be created. He then updates S002.iam to use revision B of N003.ipt (as shown in Figure 13).

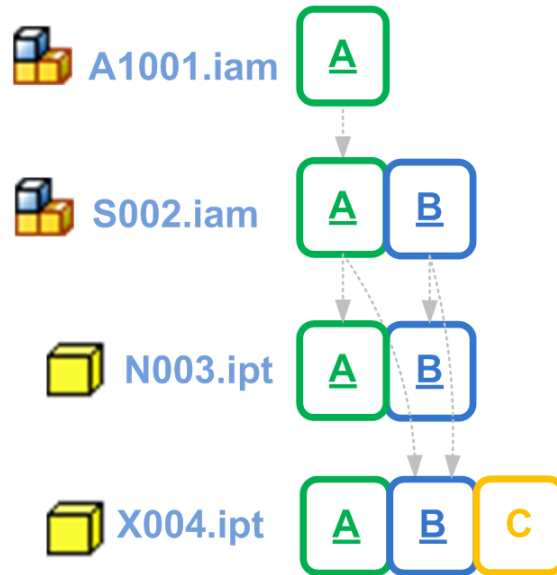


Figure 13

Quick Change

After creating revision B of the sub-assembly S002.ipt, John decides that the main assembly should consume this change without creating a new revision. To do this he changes the state of the assembly to “Quick Change” which allows him to edit the part without creating a new revision letter. This creates a secondary revision A, allowing access to the Released and Quick Change versions (as shown in Figure 14). If this assembly were being referenced by another file the released biased option would cause either the Released or Quick Change version to be returned.

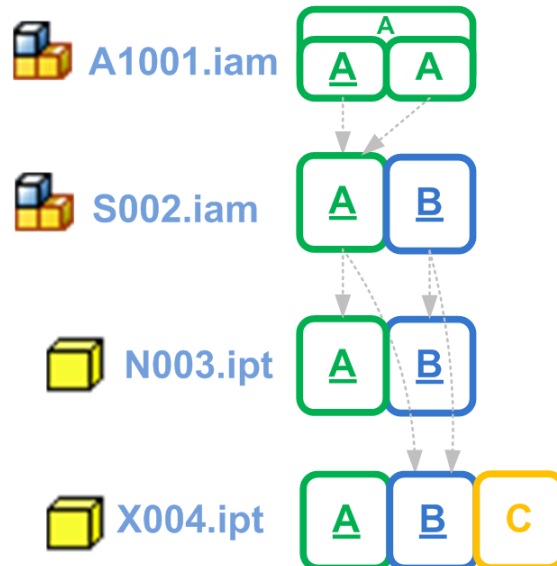


Figure 14

DOCUMENT REVISION MANAGEMENT

John then edits revision A of A1001.iam to use revision B of S002.iam and changes the state of A1001.iam to Released. This means that revision A has been released twice. This will cause the new released version of revision A to replace the old released revision A. The history of the file will continue to show two released versions of revision A.

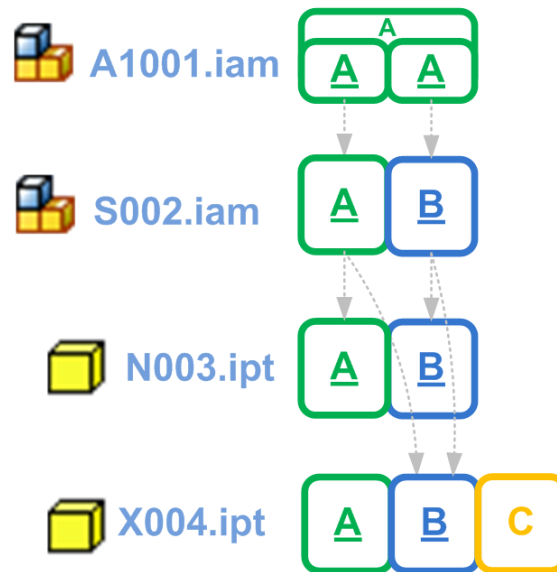


Figure 15

Summary

In conclusion this document has shown a few benefits of using the Revision Management and Lifecycle tools offered in Autodesk Vault Manufacturing. These concepts outline only a few of the possible tasks these new flexible tools are capable of doing.

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