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Course Title: **Lost In Space: Demystifying Projects In Autodesk Inventor®**

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Course Outline:

- What are Project Files?
- When Should Project Files be Used?
- How do Project Files Work in Inventor?
- How Does Inventor Resolve Files
- Subfolder Paths in File Resolution
- Project File Structure
- Library and Non-Library Folders
- Relative Path Option
- Included Path File
- File Resolution Dialogue
- Conclusion

What Are Projects?

Much has been written and discussed in regard to projects in Inventor. Debates have raged about how they should be created and used from the very beginning. Many users have suffered the frustration of lost files and inconsistent performance problems and been discouraged from exploring the subject altogether.

On the other hand, some users have, through trial and error, mastered the use of projects in their own unique environment. This course is intended to both enlighten and encourage all users of Inventor in the design and usage of projects.

The Project File

A Project File is a “container” for describing how a particular project will be managed. The .IPJ file is a simple text file (editable with Notepad or the Project File Editor) that specifies subfolders and proxies that contain the parts, assemblies, presentation and drawing manager files, along with proxies and library paths that assure proper location and usage of the contents of the project. The project file breaks the dependency between the file location and the Inventor assembly file dataset.

When Should Project Files Be Used?

- Always! (You are in a project whenever you are using Inventor anyways)
- When starting any new Inventor project
- When moving files to a new location
- When reviewing design iterations When setting up collaborative design environments
- When reviewing designs which you may not have created

File Management for Productivity

Proper design and layout of Project path components is important to assembly performance and process structure, and may be a good opportunity to review how file management occurs within your design environment. Most organizations have evolved their current file structure according to accepted practices at the time of creation. Many such organizations are battling areas such as naming conventions, libraries, and file locations, having evolved from paper drawings to 2D CAD on single user stations, to networking and finally collaboration on large assembly design. Clearly, what has worked in the past may not be the most efficient way to work today.

This may be your best opportunity to “retool” your design department for the future.

How do Project Files Work in Inventor?

Project files are used by Inventor to resolve individual file locations on load. The project file contains the ONLY explicit locations to be searched for file resolution on assembly load

Sub-directories of named locations are not searched unless subfolder path information exists within the assembly

Parts not found within the Project Space will cause the file resolution dialog to appear, requiring the user to manually resolve the path.

How Does Inventor Resolve Files?

Named paths from active Project File are loaded and stored in memory, while the relative subfolder paths for each part or subassembly are stored in the assembly file being opened. When a file name is searched, the subfolder path is appended to the named path to provide the last known location of the file.

Example1 (Absolute directory location in project file):

C:\Model (Named Path) + **Assy\Parts** (subfolder path) = **C:\Model\Assy\Parts\part.ipt**

Example2 (Relative directory location in project file – .IPJ placed in C:\Model\):

. (Relative Path) + **Assy\Parts** (subfolder path) = **Assy\Parts\part.ipt**

When each file is loaded, each valid path is passed to Windows, which searches entire list of files located in each path until it finds the file. A very specific search order is followed (see Resolution Chart), libraries first, then the workspace, then workgroups in a top-down order.

Some things to consider that affect load performance:

- Search function can be slowed by having many (750+/-) files in one path folder.
- The speed of this operation is disk access and network speed dependent
- Speed could be hindered by over abundance of path names

Project File Structure

Keep things simple when designing a project file. Add as few search locations as possible, since an overabundance of folders and search paths will have a detrimental effect on performance and load times.

Never add sub-directories of named path locations. Example:

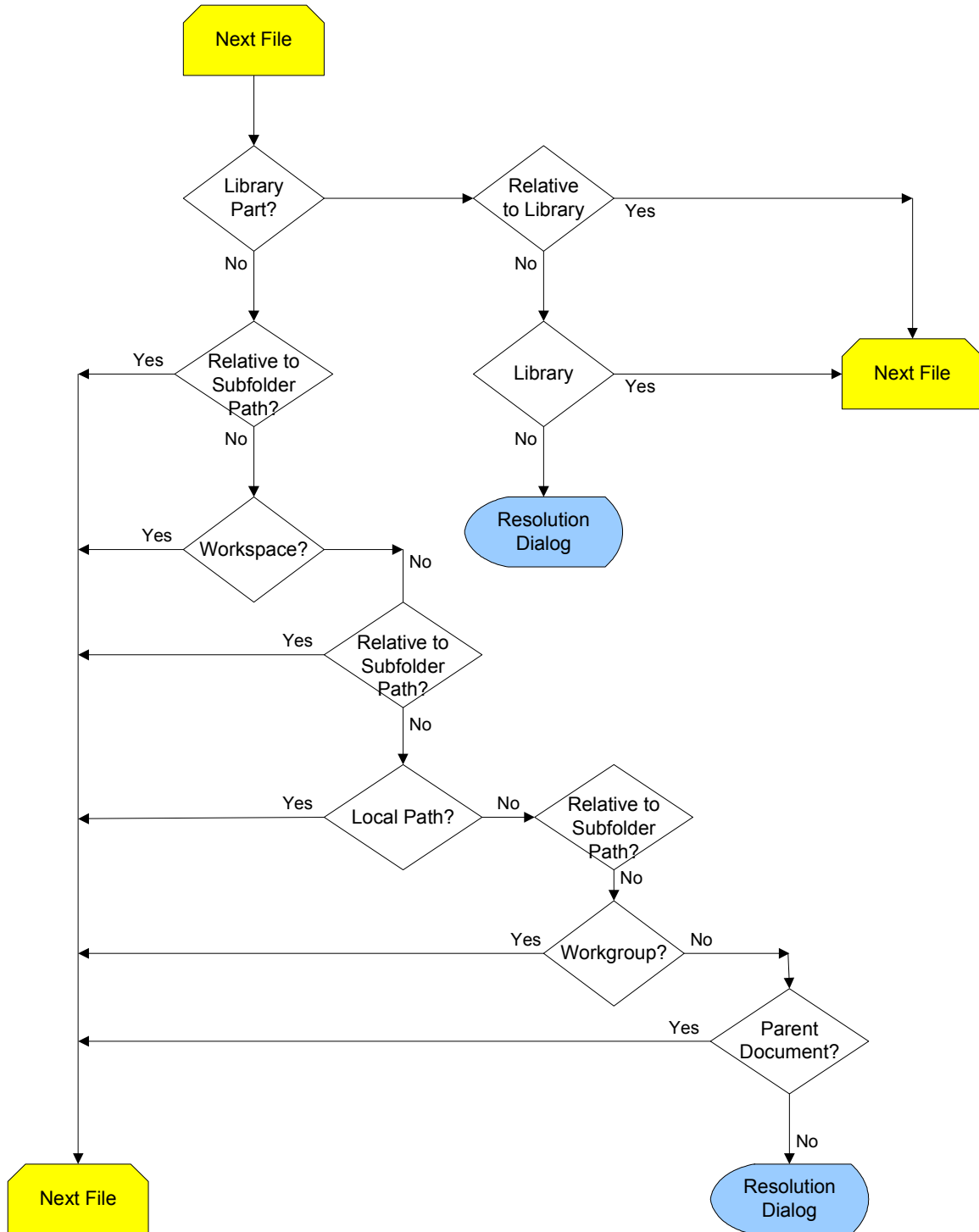
Named Path Location: .\Machine21\
Redundant Path: .\Machine21\Assemblies\
Redundant Path: .\Machine21\Assemblies\Upper\

In this example, the workgroup is .\Machine21. The project ipj is stored in this folder. When parts or subassemblies are added to an assembly file (iam) located in \Assemblies, then the subfolder path (\Upper...) is added to the assembly file. Adding this path as a workgroup will result in nested paths.



Subfolder Path Resolution

What are subfolder paths with regards to file resolution? The path location of a part, placed into an assembly, with respect to any named path specified in the active project file will normally be resolved without issue. Parts located in folders outside the project path will not be resolved, but rather, launch the resolution dialog box every time the assembly is opened. This is illustrated in the chart below:



Inventor File Resolution Protocol

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Subfolder Path Storage In An Assembly File

First, strip off file name

Second, strip off matching folder paths

What's left over is the "Subfolder Path"

Step One

•referencing file path: **C:\inventor\projects\acme\main\main.iam**

•referenced part file path **C:\inventor\projects\acme\main\supportleg\bracket.ipt**

Step Two

•**C:\inventor\projects\acme\main**

•**C:\inventor\projects\acme\main\supportleg**

Step Three

supportleg is the Subfolder path stored in the assembly file. When the assembly file is resolved, it will look for bracket.ipt in the subfolder **supportleg**

Subfolder Path Key Points

- Paths are stored in the assembly files (.iam), and can be viewed using the Design Manager
- Created only on component insertion or file resolution when subfolder path information is available
- Subfolder paths allow placement of parts from subdirectories of named project locations
- Can greatly improve the speed of file resolution during assembly load
- **CAN** allow similar part names.

Libraries

Definition of a Library

Typically a collection of related "Read Only" data files representing standard parts or parts not intended to be easily modified. Library names are based on logical names such as fasteners, fittings, etc. Library files are resolved first within a project, enhancing performance on large quantities of parts. Libraries may be shared across many different projects or servers. Libraries help ensure name conflict resolution where duplicate file names exist.

Three Common Types of Libraries:

- Parts or Standard Components
- iParts
- Design reuse

Editing Library Parts

Before contemplating the editing of library parts, the CAD Administrator should determine the effect of editing any commonly used part in context of all assemblies in all projects where the part

may be used. Is the part a revision that can be interchanged wherever the part is used, or is the edit going to create a unique part for a specific use? If the latter, the part should be opened and resaved under a different part name, to avoid damaging other designs. While the Design Assistant can be used to move, then edit, and return, the approach outlined here helps ensure control of standard part libraries. The DA process is not recommended for use with editing libraries.

Steps required to Edit a Library Part:

- Create a Unique Project file
- Add a Workgroup or Local Search path
- Point to the Folder containing the Library files
- Open and Edit as Required
- Is Part a Revision or Unique Part?
- Only edit if Revision
- Save Copy As (unique name) if Unique

Non Library Folders

One Workgroup folder is almost always enough! Usage of many workgroup definitions is usually the result of a file resolution issue. By restructuring the usage of subfolder paths, resolution can be accomplished without a loss of performance.

How assemblies are resolved:

The path reference is stored in the form: **subfolder path + filename**

File resolution is performed to bottom for multiple entries. If a particular subfolder path and file name is not found, then resolution is performed in "loops" until the entire project subfolder path(s) are searched.

File resolution concatenates the workgroup subfolder **c:\inventor\projects\acme\workgroup** with the **subfolder path supportleg** and **filename bracket.ipt**. The resolution process queries the file location at

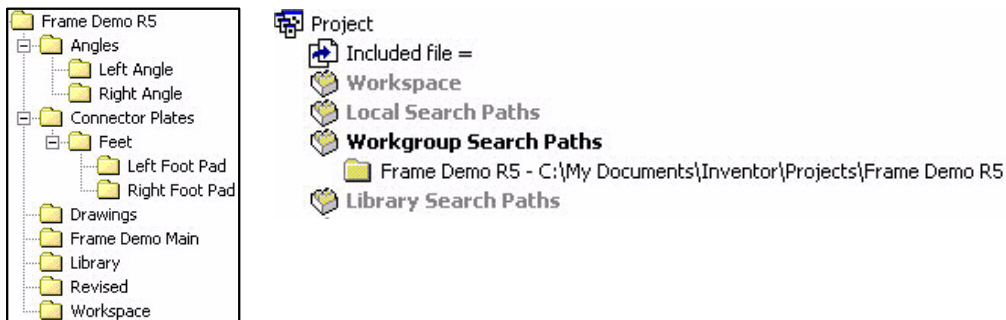
c:\inventor\projects\acme\workgroup\support\bracket.ipt, opening the file if found. If not found, the subfolder path is dropped, and Inventor queries the workgroup folder **c:\inventor\projects\acme\workgroup\bracket.ipt**. If that fails, the Resolve Link dialog is launched.

Why Have Multiple Non Library Folders?

- No Space on drive where first workgroup folder exists, So workgroups may be located across drives
- Well delineated design responsibilities among a team
- Team is networked together
- Users can see/share all local drives
- Separate workgroup for each team member
- Users store files they are responsible for modifying

- Customers are unsure about *subfolder paths* (better approach is to properly design data structure)
- Concerned they interfere with ability to re-organize files into subfolders

Project Directory and IPJ Structure Example 1



Benefits:

- Quickest load times with large file counts (750+ unique parts)
- Very simple to understand and manage project file

Concerns:

- Can not re-order or re-name any paths, in project space, using Windows Explorer
- Must use Workspace to review design iterations or add new Local/Workgroup paths
- Must browse to open any file in the project space
- Will allow similar part names

Relative Paths

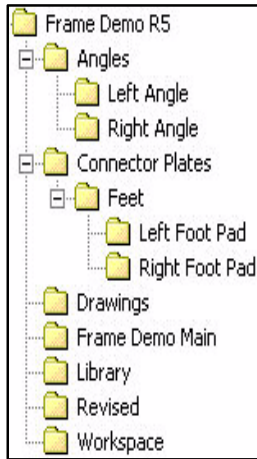
Use of relative paths in Inventor projects allows projects to be easily moved from one drive/directory to another without affecting file resolution. Properly used, all references to a specific drive and folder are removed. This is accomplished by placing the project file(ipj) in the root folder of the project, and by setting the project file to

Use Relative Paths = True.

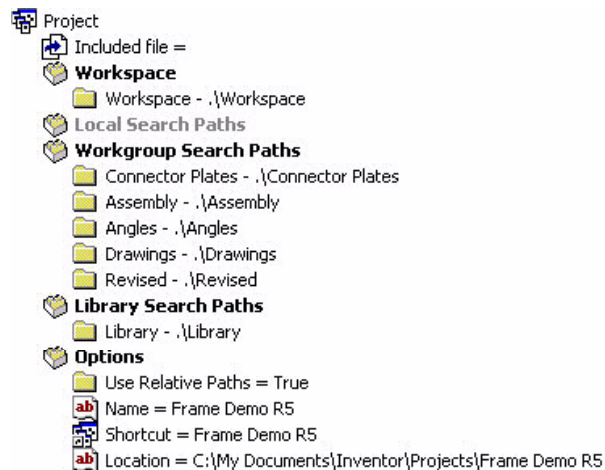
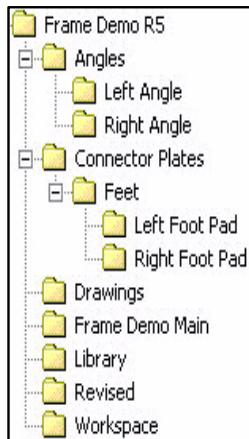
Use Relative Paths = False is the default setting for pre-R5 project files migrated into R6. In those occurrences, moving the project to another drive/directory will result in many trips to the Resolve Link dialog box. If you re-locate a project, you must re-direct each named path in the project file. You can avoid a lot of resolution issues by setting **Use Relative Paths = True**, and allowing the resolution process to proceed.

In order for Use Relative Paths = True to work properly, the Project File must exist in the uppermost directory in the project. All files must exist in subfolders below the project file, or be located in libraries, workspace or local search paths.

IPJ Structure With “Use Relative Paths” = False



IPJ Structure With “Use Relative Paths” = True



Included File =

The Included File statement in the project file allows the referencing of another project file(ipj). This procedure is most useful for library file paths that may be moved after a project is in use. By placing the paths of library files in another IPJ, only that IPJ will have to be edited if the library paths are moved. All projects referencing this single IPJ file will have no problem resolving links following the editing and redirection to a new library location.

- The Included file category can contain only one project file (IPJ).
- The Included file category contains a second project file with path components needed for the current project.
- The multi-user setting in an included project file overrides the setting in the parent project file.
- Users cannot override the multi-user setting of an included project.
- The Included file category can be used in a project with any of the multi-user settings.

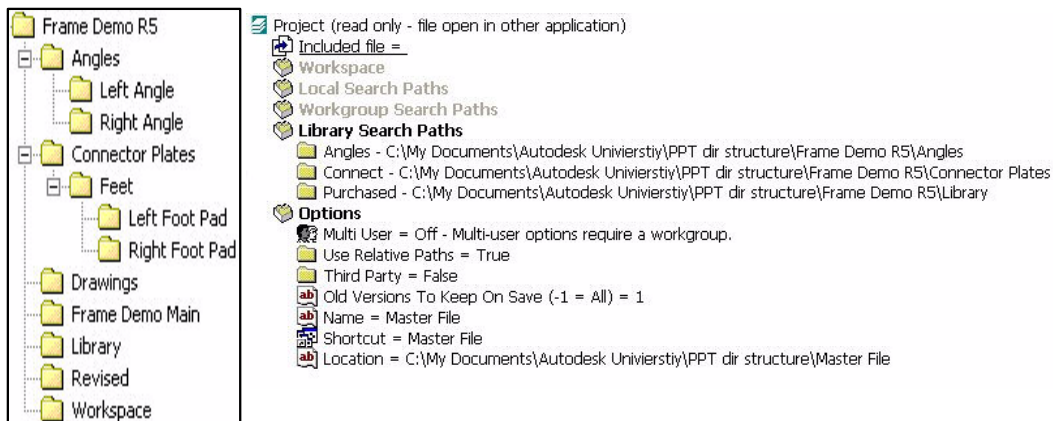
Using Workgroup in Semi-Isolated Mode With Included File

The administrator creates a master project file, including the workgroup, library search paths and settings needed for the entire project.

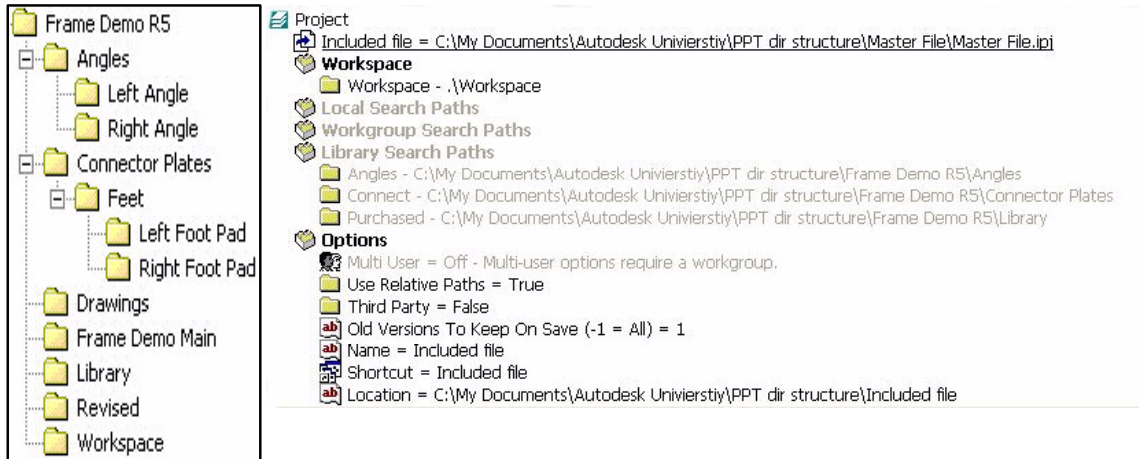
Each workgroup member creates a local project that defines a **workspace** with only the Included file specified.

Workgroup members all have the same project settings and subfolder paths from the Included file.

Included Path File Example – Original IPJ

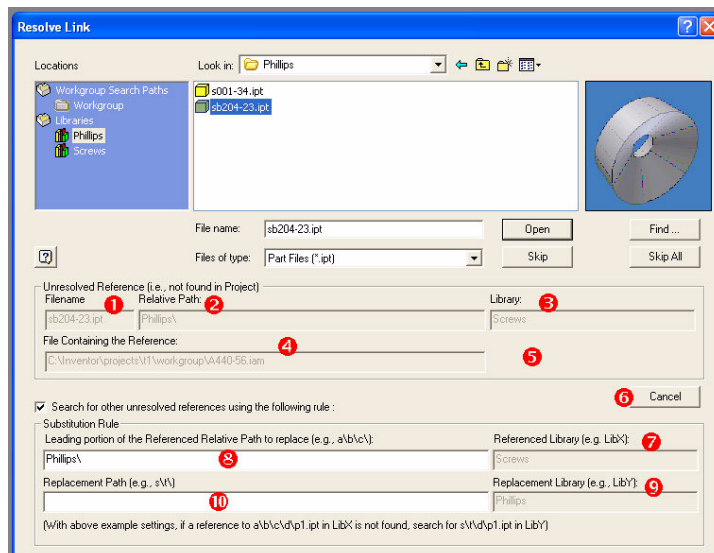


Included Path File Example – Included IPJ



Resolving Linked Files

Users will experience this dialog if someone has renamed, moved, or deleted a referenced file (or the folder containing it), or changed the project folder definitions in some way. Resolution conflicts also occur if the user is trying to open the source file in some other project context, or if the assembly is referencing a file that is located outside the project, or located above the project file.



Changes in The Resolve Link Dialog

What the Inventor Resolve Link Dialog showed prior to R6:

%library%subfolderpath\filename.

%library% was omitted if the reference wasn't to a library

these fields (1, 2, 3) are now split and labeled as key reference information. Prior to R6, Inventor didn't denote source file location, or library reference. Inventor now shows these fields labeled 4 and 5.

New in R6 is the Cancel button (6) which allows the user to cancel loading of the assembly for any reason. This is useful when resolve times could be extended due to problems in the project file search paths.

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Additional Links:

<http://www.autodesk.com/au>

<http://support.autodesk.com/enu/Homepage.asp>

<http://www.design-excellence.com/au2002>