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How to handle Virtual Documents within SharePoint

Executive Summary

The concept of virtual or compound documents is not limited to any one content management software offering. However, virtual documents are one of the often deployed optional features from within the EMC Documentum software stack. In today's business environments, some organizations utilizing both Documentum and SharePoint are at times grappling with the issue of how to manage some functional components when available on one platform but not the other. Virtual documents structures are one such instance where a direct equivalent, as it exists in Documentum, doesn't natively exist in SharePoint.

A virtual document structure is a compound document that isn't an independent object as much as a parent cascading into one or multiple child documents of any possible file type. Though at first glance virtual documents might sound like an odd occurrence limited to a few business sectors, the application of virtual documents is literally all around us.

Imagine a book that takes a great deal of collaboration to publish. The editor or publisher can assign independent chapters of the book or even possibly smaller sections to multiple collaborating authors. They leverage the table of contents like a structure that organizes and consolidates each authored piece via the use of a virtual document. Hence each section of a book could be a separate document and the master virtual document would be the book itself with all the child sections rolling up into chapters.

In the engineering or manufacturing sector, a common application of a virtual document could be in the management of a Build-of-Materials (BOM). For example; when assembling a chair, there could be multiple components that make up a chair where each has its own detailed specification documents. The business need calls for a complete set of documents to be viewed as a consolidated product. The chair could consist of multiple sub-assembly pieces such as a frame, seat or back, and in turn, each of them could possibly consist of multiple components.

Ultimately, though one might use virtual documents readily from within applications like Documentum, there is no direct equivalent in SharePoint. With respect to SharePoint, most organizations decide to use directories and sub-directories, as many as needed to achieve a simulation of this structure, but this approach has a series of irreversible issues beyond the fact that they are simply inapplicable in SharePoint. Though virtual documents are important in other content management products, efficient use of them in SharePoint is even more critical because of the way SharePoint organizes content internally.

This paper focuses on two areas: #1: It discusses why an organization should have serious concerns about using directories or Document Sets in SharePoint to simulate virtual documents. It also discusses not only the challenges in deploying this strategy, but #2: It also discusses the significant complexity it creates when attempting to maintain such content. Beyond the intra SharePoint strategy on how to handle virtual documents, the paper investigates issues to consider when moving content from other platforms over to SharePoint.

Problems with using native SharePoint to manage virtual documents

As stated above, a chair is a good example of how to best explain the issues around managing a Build-of-Materials (BOM) in SharePoint. An engineering or manufacturing organization can potentially have the same basic chair represented in multiple SKUs (A, B & C). These different SKUs could represent different colors, fabrics, branding, etc.

In the manufacturing of a chair, it is a common occurrence to have multiple almost identical chairs, each chair with its own unique specification document. These documents need to be viewed or reviewed as a consolidated complete product. In addition, each chair could have unique specification documents for each of the multiple sub-assemblies associated with items like the seat or possibly even the distinct items or components such as nails and or screws.

Additionally, it is also common to have a situation where even though each chair above could be a unique SKU, the components themselves; padding, screws, nails, staples or even the frame could be the same SKU shared by all three chairs. The cloth or covering might be the only distinct component SKU from one chair to the other due to the color. That advantage in the uniformity of the SKU/specification of each component will not prove to be an asset when using native SharePoint.

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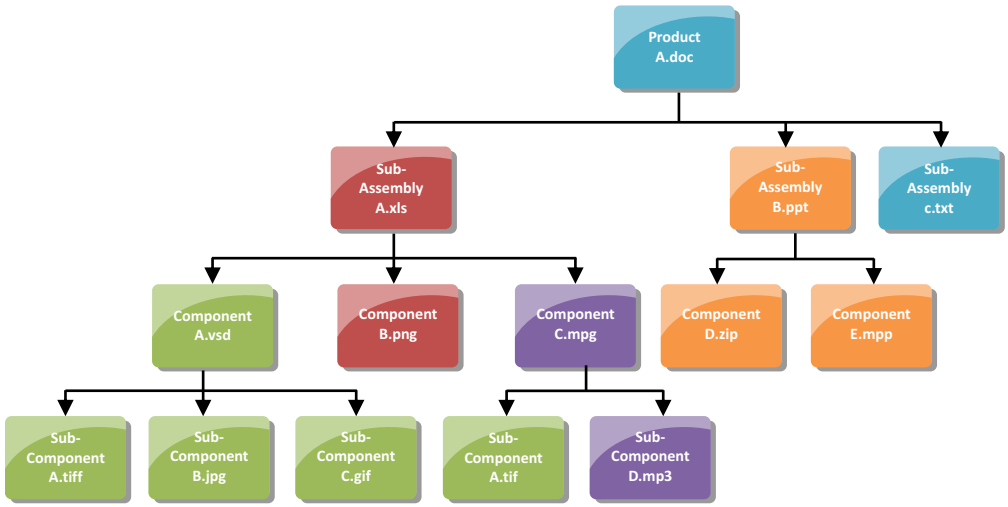
- The chair example shown could have the same screw specification used in multiple parts of the same chair. If one was to use folders to track this type of information, there is no option other than to replicate the same specification for that specific screw multiple times within many folders guarantee the correct level of representation. In the case this is a standard screw used not in one chair only but multiple products such as all chairs A, B & C from the same company, the problem can expand exponentially.
- Beyond the complexity of initially depositing the specifications for this screw in all relevant folders noted above, the issue will be significantly more complicated when one needs to update the specifications of that one screw. Technically, it would not be impossible, but seriously infeasible or significantly time consuming if one was to attempt to update a particular specification document. Aside from the fact that each specification has to be updated, there has to be consideration given to how many such files have to be simultaneously updated to achieve the correct set of uniform information present wherever this screw is used.
- Typically, these documents are either images or Adobe PDFs which tend to be larger files compared to most MS Office documents. In SharePoint, because all the information is stored within the database, this same screw specification would be replicated in multiple folders causing the size of the SharePoint database to explode and compromise the efficiency of the SharePoint environment in general. If multiple versions of this same screw needed to be saved in SharePoint, one can imagine how the problem compounds exponentially.
- If one was to use a combination of document libraries and folders to manage such complex structures and if the complex structures have depth to them, eventually the plan will fail because SharePoint has a forced limit of 256 characters on a URL. Furthermore, if the complex structure has multiple levels, native SharePoint will accommodate only a few levels depending on the length of folder or file names.

How complex can compound/virtual structures get?

Take into consideration an unnamed product A. Let us also assume below is the fully exploded Bill-of-Material (BOM) for this product. To make the BOM complex, a wide number of file types have been used to demonstrate a solution is possible no matter how many different object types are in play.



Product A consists of three sub-assemblies at the top level where the third, Sub-assembly C has no children. However, the first two sub-assemblies have varying levels of complexity.

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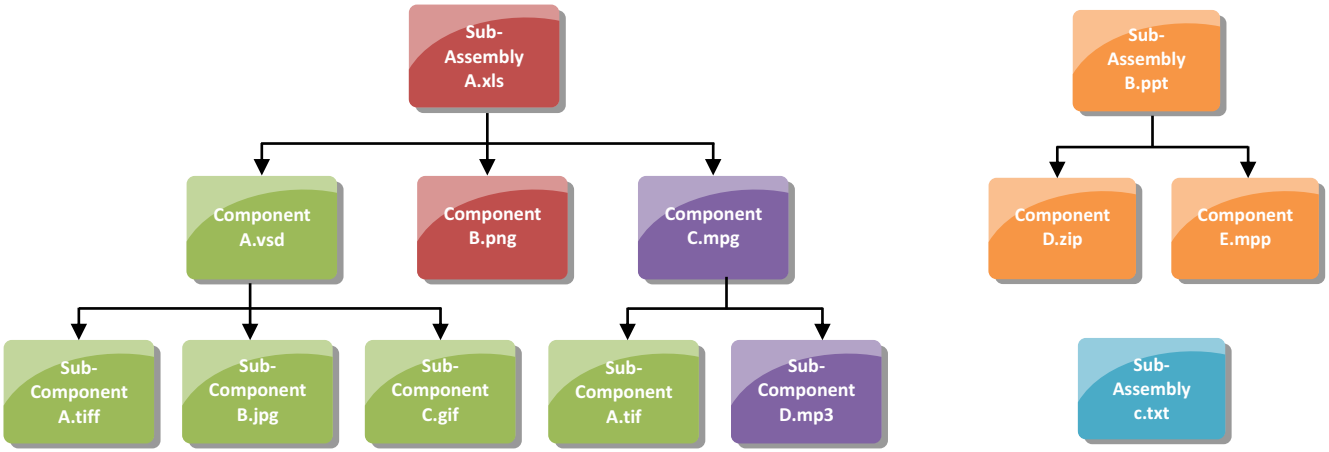
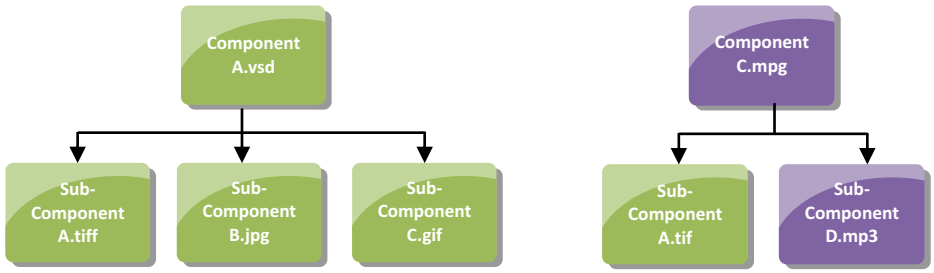
The two left sub-assemblies consist of a pair of structures noted below, while Sub-Assembly C is an independent piece minus children. In reality much like Product A is the parent to Sub-Assembly A, B & C, Sub-Assembly A & B are also parents to a less complicated structure.



As noted above, within Sub Assembly A, there are three more components which are Component A, B & C. Again, Components A & C by their own rights are parents to yet a structure of a lesser complexity while Component B has no children. Comparatively Sub-Assembly B is a simpler structure.



Just to make things interesting, Sub-Component A is used in both Component A and Component C. This occurrence in native SharePoint would present a situation where the file now has to exist twice.

Imagine the situation where this issue with Sub-Component A was the screw that needed to occur repeatedly hundreds of times! Once there is clarity on how these BOMs are structured, the next obvious question would be: How is SharePoint setup natively to address this situation?

How can one represent such structures in native SharePoint?

The most commonly used and obvious way is to use a combination of document libraries, folders, sub-folders and, if necessary, document sets to manage such a structure. However, such an idea has a whole volley of other issues associated with it.

Files have to be stored together: Within native SharePoint, there is no option other than to co-locate all files together into a folder structure. If two unrelated departments use the same screw, there is no way to have one file to manage the specifications for that one screw.

Files will have to be repeated: As was the case with Sub-Component A above; some files have to be replicated multiple times. In the example, above Component A has to be replicated into two different folders, existing once in the Component A folder and again in the Component C folder.

No easy way to visualize the complete structure: The user has to go folder by folder to examine the contents and identify what makes up a potential compound structure. Even with that approach, it is assumed that the user is taking copious notes so as to remember which files exist in which folder.

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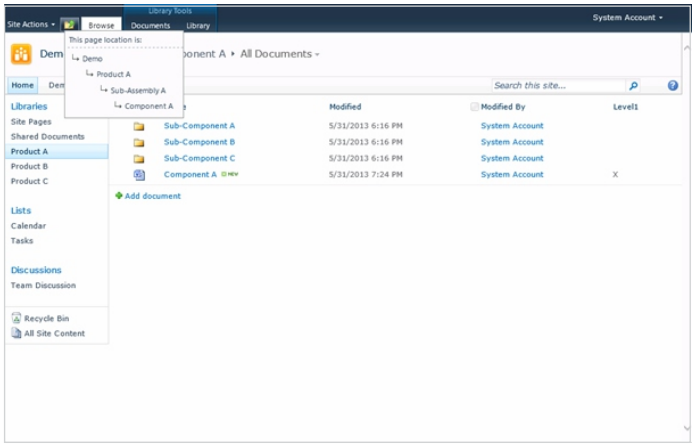
Re-use of an existing component means copying entire structure: If this organization wanted to market a new chair called SKU D and the only difference was one SKU in Sub-Assembly C, there is no other choice other than to create a new folder for chair D and pretty much copy all the contents of chair A minus the so difference in Sub-Assembly C.

Access grants power to modify both files and structure: If the organization needs to split responsibility of the maintenance of the structure versus maintenance of the files, there is no simple way to do that within native SharePoint. Once given access to a directory, any person can modify both the structure and the contents of this compound structure.



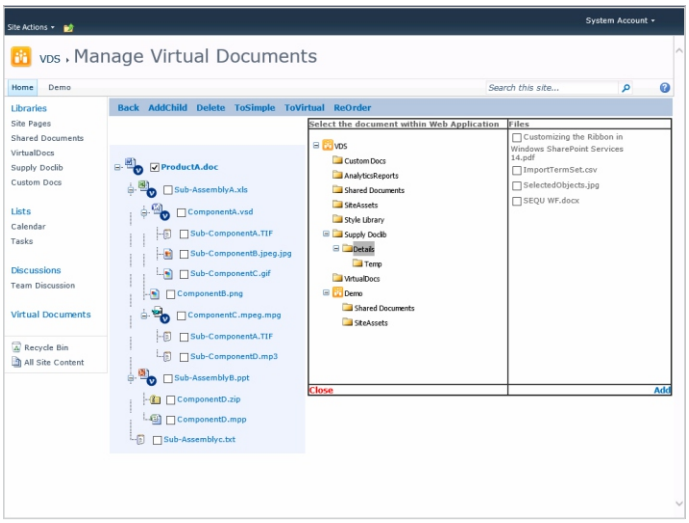
Where are the advantages of Virtual Document Structure (VDS)?

First and foremost, VDS exists as a deployed site within SharePoint. Each issue above is eliminated via the use of VDS to manage virtual or complex documents.

No replication: Each file for a SKU, no matter if it is something minute like a screw or complex like a sub-assembly, it will only exist once and only once. A file consisting with the same screw will be related to each of the three chairs above.

Structural Privilege & Security: Because VDS is a deployed site within SharePoint, only members that should be granted privileges to impact the structure of the BOM above will be granted access. Even within VDS, there are varying levels of access rights to make sure control is maintained.

File level Privilege & Security: SharePoint's security is overarching above VDS and controlling who has access to read or modify files. Therefore, if one individual is not granted access to modify any files but granted access to use VDS he/she will be limited to the ability to modify the structure of the BOM but not the actual documents.



Ease of use: VDS was developed to be simple to use. Anyone familiar with the BOM or a similar complex structure can easily relate to it, providing a user friendly experience and easy to use platform for managing such documents.

Version Control: When new versions are created (a new version document within SharePoint), VDS will update the structure to point to the current version of the component.

Multi-level compound structure: As noted in the image above, VDS easily handles multi-level component structures. Note: The total set of complex structures within Product A are not limited to the top parent itself but also include Sub-Assemblies A & B as well as Components A & C.

File storage is not structure dependent: In native SharePoint, compound structures are dependent on Doc Libraries and folders in order to be stored together. In VDS, files required to complete a structure can be located anywhere within the site collection and can easily be linked to complete the virtual structure.

No boundary on depth of structure: In the example provided above there are four levels to the compound structure. In a true business setting, that number can be much higher. When using document libraries and folders, one is bound to brush up against SharePoint's limit of 256 characters on a URL. VDS on the other hand is not subservient to such limits as the structure is in existence virtually.

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Verinon: Worldwide Locations

AMERICAS

Illinois (Corporate HQ)
3395 North Arlington Heights Road
Arlington Heights, IL 60004
tel:847.577.5256
fax : 847.577.5905

New Jersey
515 Plainfield Avenue #201
Edison, NJ 08817.2598
tel:732.947.4375

California
3590 Edison St.
San Mateo, CA 94403
tel: 650.357.0992

ASIA PACIFIC

India (Asia Pacific HQ)
1-10-98/36/1, Dwaraka Building
Dwarakadas Colony, Begumpet
Hyderabad, Andhra Pradesh
India 500016
tel: +91.40.40314141
fax: +91.40.40314100

Malaysia (MSC Status Company)
Lot L1-I-1, Enterprise 4, Technology Park Malaysia
Lebuhraya Puchong Sg-Besi 57000
Bukit Jalil, Kuala Lumpur, Malaysia.
tel: +60.38996.3423
fax: +60.38996.6424

Singapore
6 Eu Tong Sen Street (The Central)
05 -07 Singapore 059817
tel: +65.6222.8897
fax: +65.6222.4749

EUROPE, MIDDLE EAST AND AFRICA

UK
Great West House, Great West Road
Brentford, TW8 9DF, U.K
tel: +44.208.326.5644
fax: +44.208.326.5645

Dubai
Unit No. 606, Fortune Towers
Plot No. C1, Jumeirah Lakes Towers
P.O. Box: 120450, Dubai, UAE
tel: +971.557457126

Ethiopia
H.No K/2049/96
Sub city-Kirkos, Kebele-04
tel: +251.923.517.345

Contact Us: info@verinon.com
Visit us: http://www.verinon.com

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