AUTODESK UNIVERSITY 2014

Managing Data in a Multisite Environment

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AB5608-P Managing data can be a challenge. This is especially true for an architecture, engineering, and construction (AEC) project environment, where different sites across the globe might need to collaborate on a daily basis. The Revit Server application can assist in streamlining the communication between Revit software designers. But how does this relate to our data management offering in the AEC space? In this session we will explain how to set up the Revit Server application and Vault Professional software across sites to manage AEC project information.

Learning Objectives

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

- Understand Revit Worksharing software
- Discover the workings of the Revit Server application
- Discover file replication within a Vault Professional software environment
- Understand how the Revit Server application and Vault Professional software communicate

About the Speaker

After obtaining his master's degree in engineering, Ives Veelaert was a data management consultant within the architecture, engineering, and construction (AEC) space for several years. He has helped set up the data management structure for many companies, including for the renovation of the European Community building in Brussels. He joined Autodesk, Inc., 7 years ago and is now helping AEC customers understand the Autodesk EDM (engineering data management) offering

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Introduction

The intent of this class is to give you an understanding of how Autodesk Vault Professional can be used to manage engineering data within a design company.

As many companies will have different types of design data (AutoCAD, Revit, etc), potentially to be accessible on different company sites, we will be looking at how we can set this up so that everyone is looking at the same information.

Furthermore, when it comes to Revit in a workshared environment, one might be using Revit Server to have different users on different sites to work on the same Revit design.

The last part of this class will look at how we can setup Revit Server in a vault-managed environment which spans multiple sites.

The different components we'll be using during this class are:

Autodesk Vault Professional: Autodesk's on premise data management system. Rather than storing information on a shared windows folder, vault allows us to store extra information about documents (projectname, projectnumber, project manager, etc). People will access files through the vault interface which appears in all design tools, as well as the MS Office products. Vault consists of a database (SQL) which holds all of the fileproperties and a hidden filestore, only accessible to Vault. Users will therefore first query the database (according to userrights) to find the relevant document, after which vault allows access to the file.

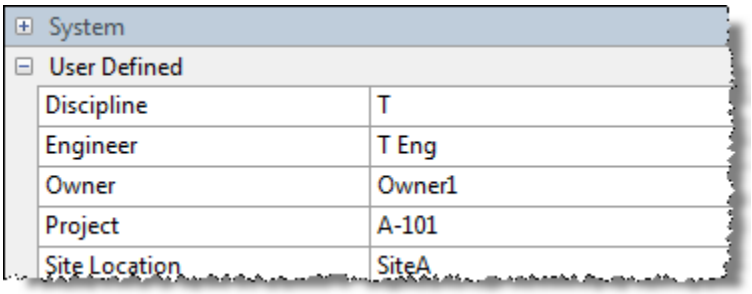
Revit: Autodesk's BIM (Building Information Model) modeler. Through a holistic approach, designers can store their models as unique objects. Those objects can appear on different views and schedules, always as representations of the original objects. This means that, when a change occurs, it manifests itself on every view and schedule the object is visible on.

Revit Server: used when different designers are collaborating on a single design, even when they are situated in different company locations. Revit Server uses the concept of 'worksets', that can be allocated to the different designers. Once a designer has finished working on a workset, he can upload his changes to the central file on revit server, so that all other designers have access to the information he created.

Buzzsaw: Autodesk's hosted cloud solution for collaborative workflows between companies. Vault can interact with Buzzsaw, so that a company can review it's design before sending it to the other stakeholders on the project.

Autodesk Vault Professional: Overview

Metadata



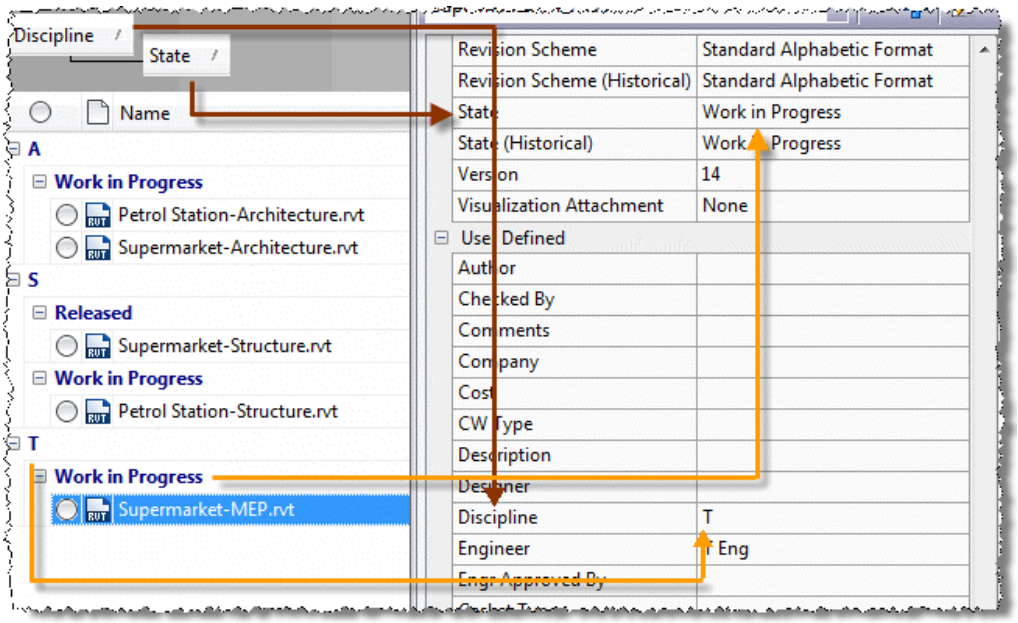
When selecting documents in Autodesk Vault Professional, we get an overview of all the document information that has been attached to it. These properties are called ‘metadata’ of the document.

When configuring Autodesk Vault Professional, we decide what information is relevant and what business logic we want to apply to it (required, fixed list of values, etc).

Different ‘types’ of documents can have different sets of information attached to them. This is based on the document’s ‘category’.

Searching

Grouping

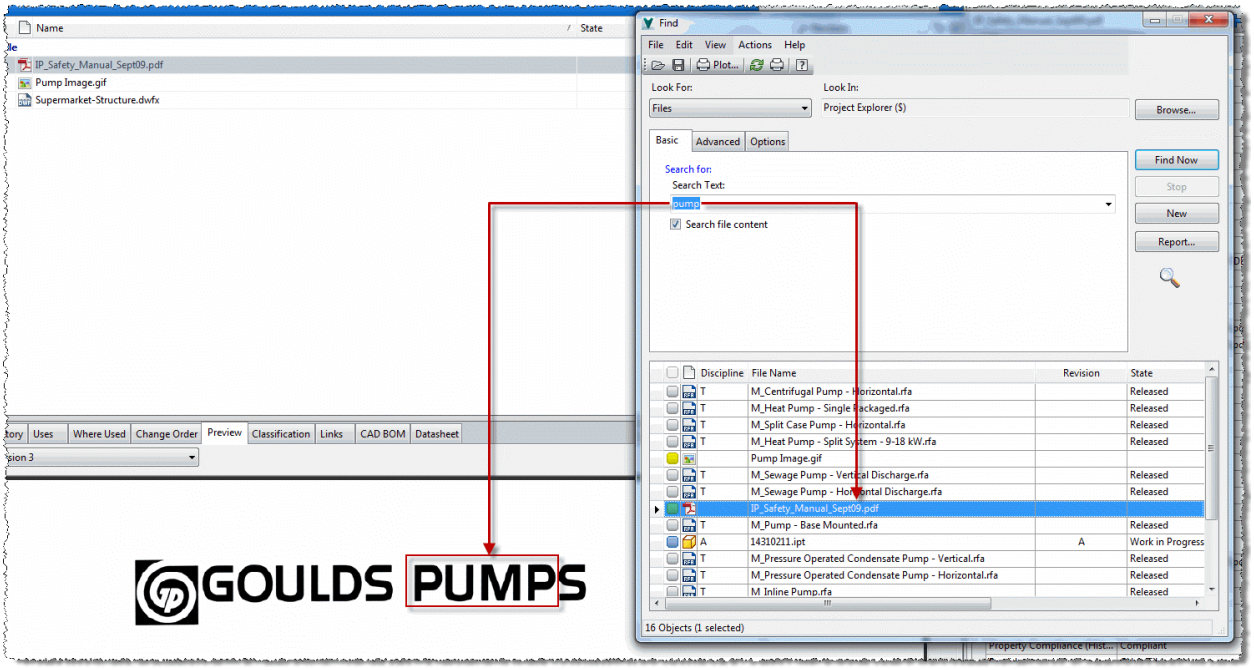


Because we maintain metadata about the documents, we can use these properties to find and retrieve documents from the repository.

One way of doing this, is by organizing the documents into ‘virtual folders’: folders based upon the content of the metadata. This is called ‘Grouping’.

Full Content Search

There are many other ways of finding the correct document within Autodesk Vault Professional. We’ll highlight just one more: searching across multiple properties and within the content of the document itself.



Reporting



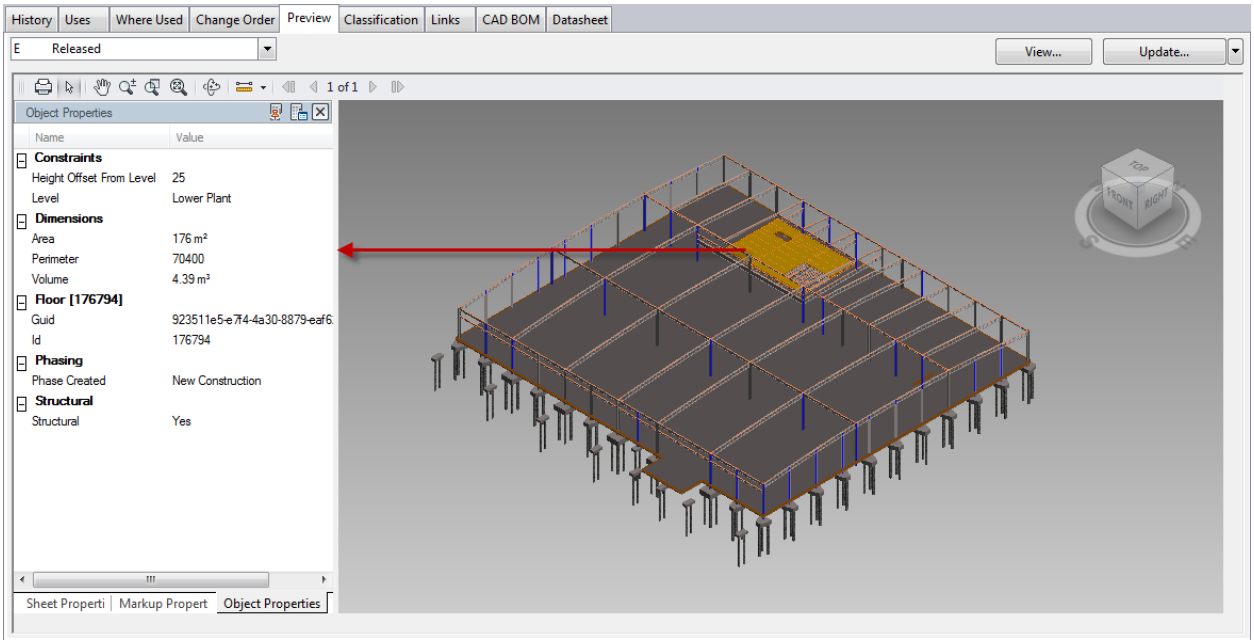
To get an overview of the status of all documents within one or more projects, we can use the reporting tool of Autodesk Vault Professional.

Multiple report definitions can exist and all can be formatted according to desired properties and layout.

Vault – Revit Integration: Overview

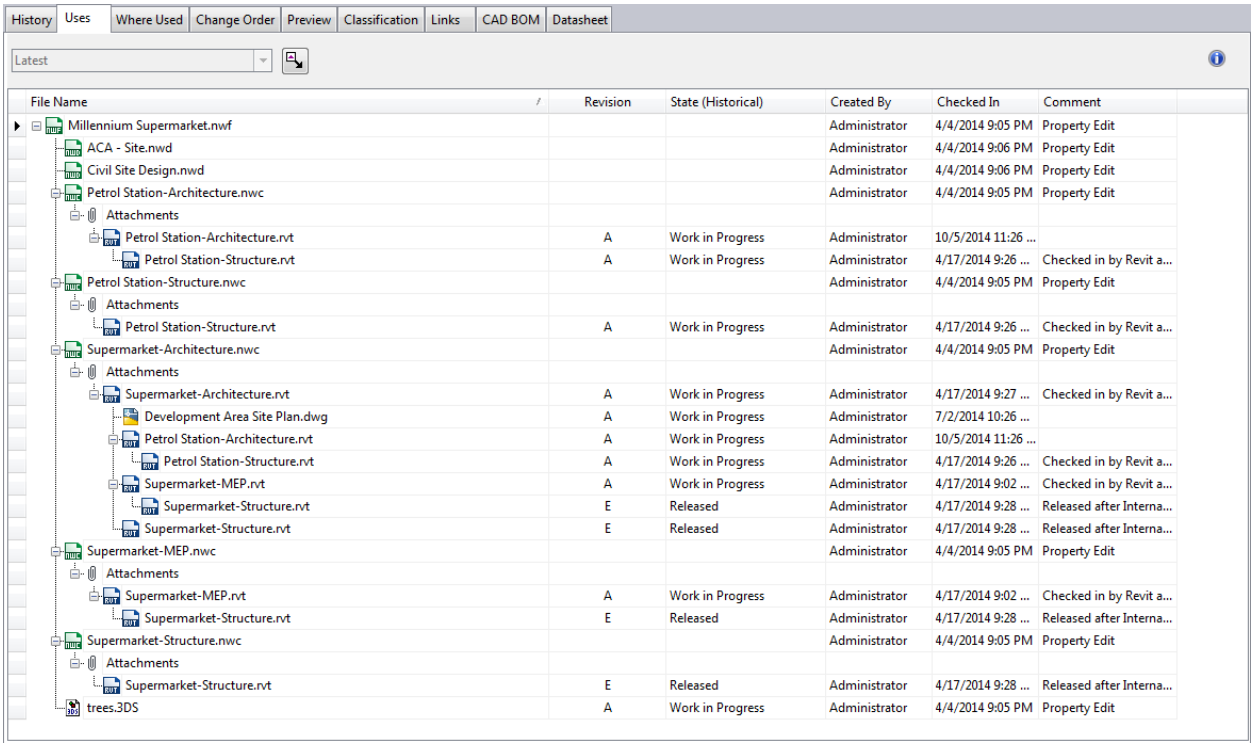
Viewing

Vault Explorer comes with a built in viewer, which allows us to view many formats, such as a rendition (a generated DWF) of a revit file. Not only is this file lightweight, it also means, in a 3D DWF, we can navigate to the objects within the file and query it's properties.



Linking

Autodesk Vault Professional also traces relationships between files. These could be physical links (such as links between parents and xrefs in AutoCAD), but also logical links (such as a link between a revit file and its generated Navisworks NWC file):

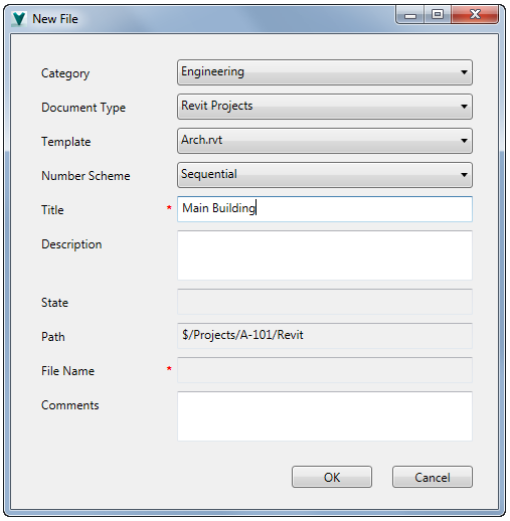


File Name	Revision	State (Historical)	Created By	Checked In	Comment
Millennium Supermarket.nwf			Administrator	4/4/2014 9:05 PM	Property Edit
ACA - Site.nwd			Administrator	4/4/2014 9:06 PM	Property Edit
Civil Site Design.nwd			Administrator	4/4/2014 9:06 PM	Property Edit
Petrol Station-Architecture.nwc			Administrator	4/4/2014 9:05 PM	Property Edit
Attachments					
Petrol Station-Architecture.rvt	A	Work in Progress	Administrator	10/5/2014 11:26 ...	
Petrol Station-Structure.rvt	A	Work in Progress	Administrator	4/17/2014 9:26 ...	Checked in by Revit a...
Petrol Station-Structure.nwc			Administrator	4/4/2014 9:05 PM	Property Edit
Attachments					
Petrol Station-Structure.rvt	A	Work in Progress	Administrator	4/17/2014 9:26 ...	Checked in by Revit a...
Supermarket-Architecture.nwc			Administrator	4/4/2014 9:05 PM	Property Edit
Attachments					
Supermarket-Architecture.rvt	A	Work in Progress	Administrator	4/17/2014 9:27 ...	Checked in by Revit a...
Development Area Site Plan.dwg	A	Work in Progress	Administrator	7/2/2014 10:26 ...	
Petrol Station-Architecture.rvt	A	Work in Progress	Administrator	10/5/2014 11:26 ...	
Petrol Station-Structure.rvt	A	Work in Progress	Administrator	4/17/2014 9:26 ...	Checked in by Revit a...
Supermarket-MEP.rvt	A	Work in Progress	Administrator	4/17/2014 9:02 ...	Checked in by Revit a...
Supermarket-Structure.rvt	E	Released	Administrator	4/17/2014 9:28 ...	Released after Interna...
Supermarket-Structure.rvt	E	Released	Administrator	4/17/2014 9:28 ...	Released after Interna...
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Supermarket-Structure.nwc			Administrator	4/4/2014 9:05 PM	Property Edit
Attachments					
Supermarket-Structure.rvt	E	Released	Administrator	4/17/2014 9:28 ...	Released after Interna...
trees.3DS	A	Work in Progress	Administrator	4/4/2014 9:05 PM	Property Edit

Revit 'standalone' workflow using Autodesk Vault Professional

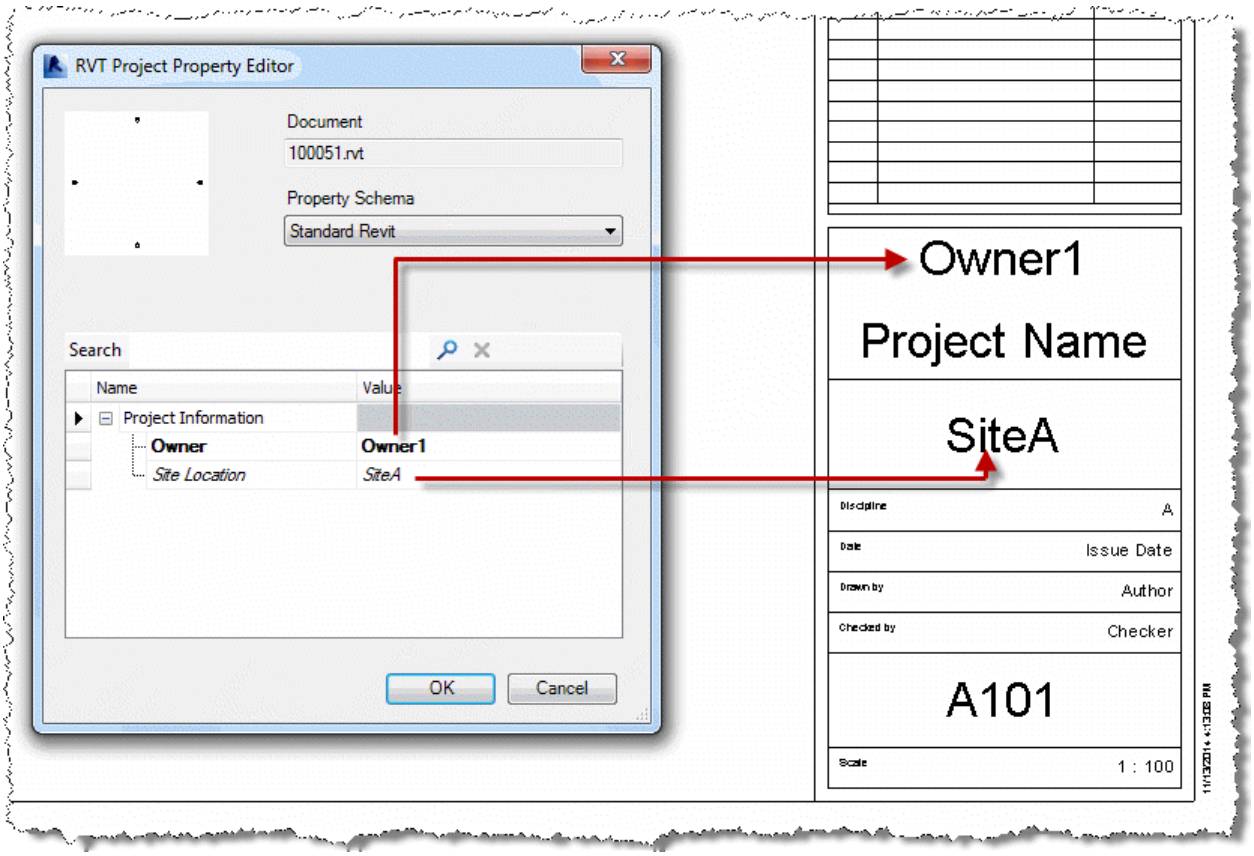
Data Standards

Within Vault Explorer, we can right-click on a folder to create a file, based upon a template:



Edit Properties

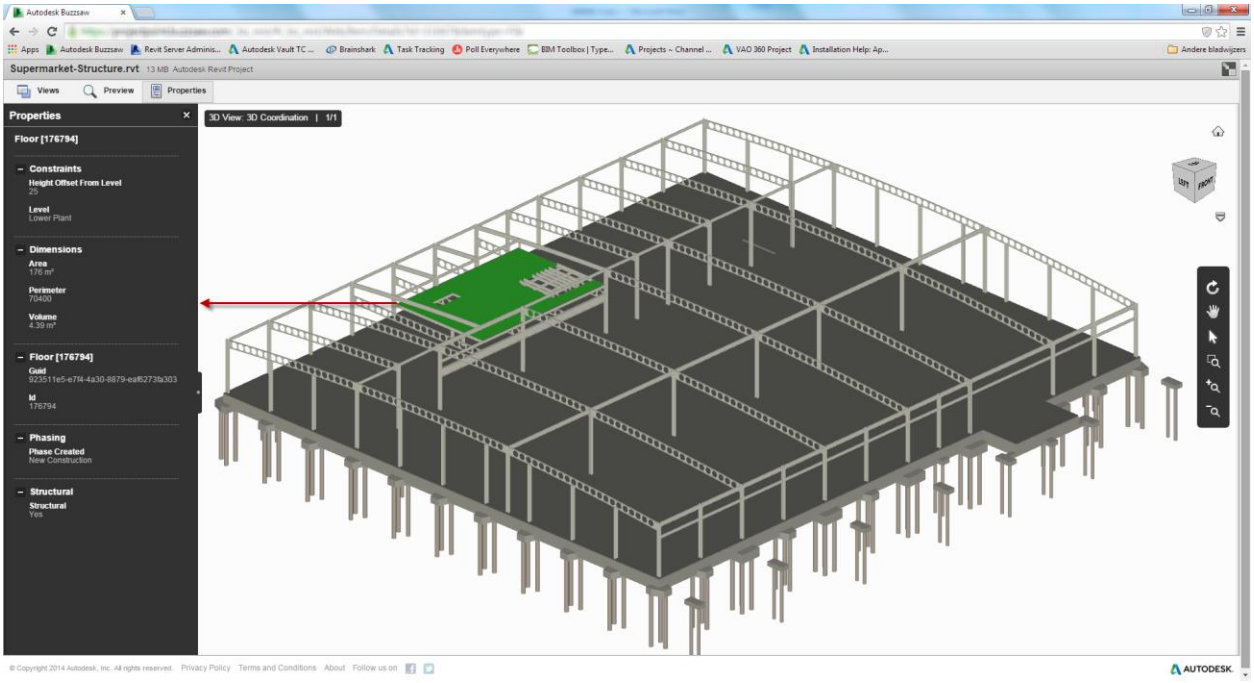
When we open the file in Revit, we can then configure more properties, using the vault interface:



Owner	Owner1
Site Location	SiteA

Worklow with Buzzsaw

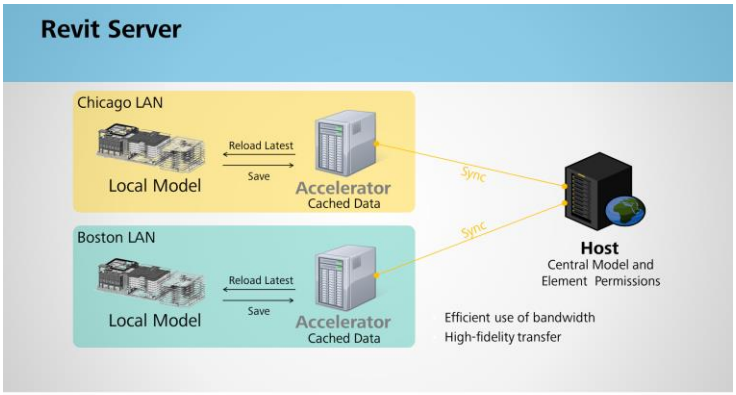
Autodesk Vault Professional interacts with Autodesk Buzzsaw. When approving a document the system can be configured to send data across to the cloud.



Revit Server

Revit Server is the server application for Revit Architecture, Revit Structure, Revit MEP, and Autodesk Revit. It is the foundation for server-based worksharing for Revit projects.

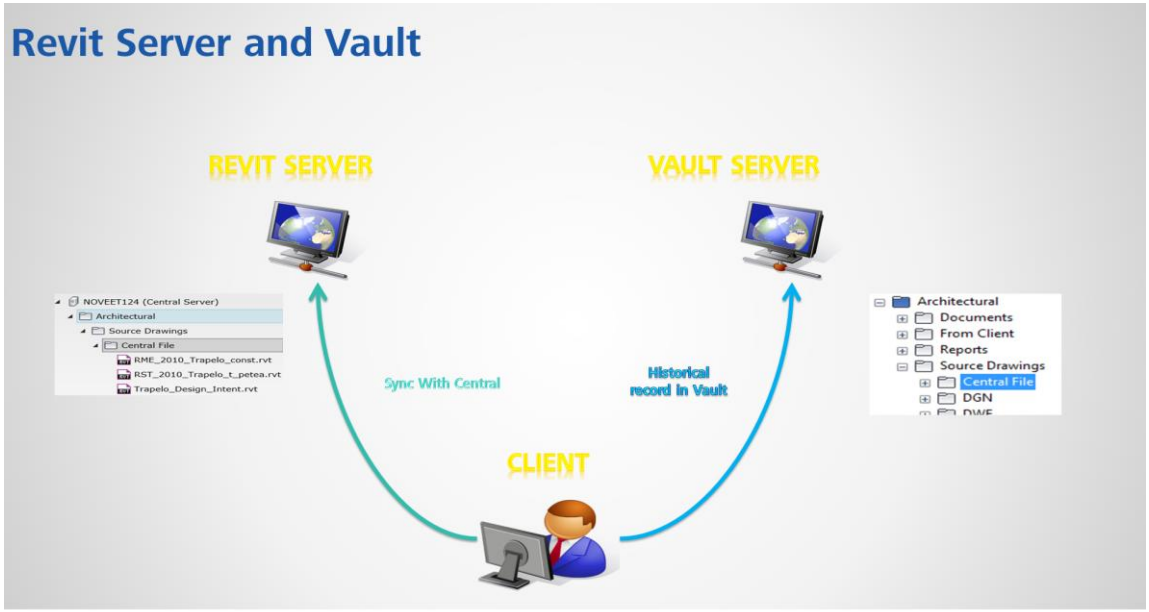
A workshared project is a Revit building model that multiple team members can access and modify at the same time. With server-based worksharing, multiple instances of Revit Server are installed at different sites and configured to perform specific roles to support optimal project collaboration across a wide area network (WAN). Together, these instances of Revit Server make up the Revit Server network.



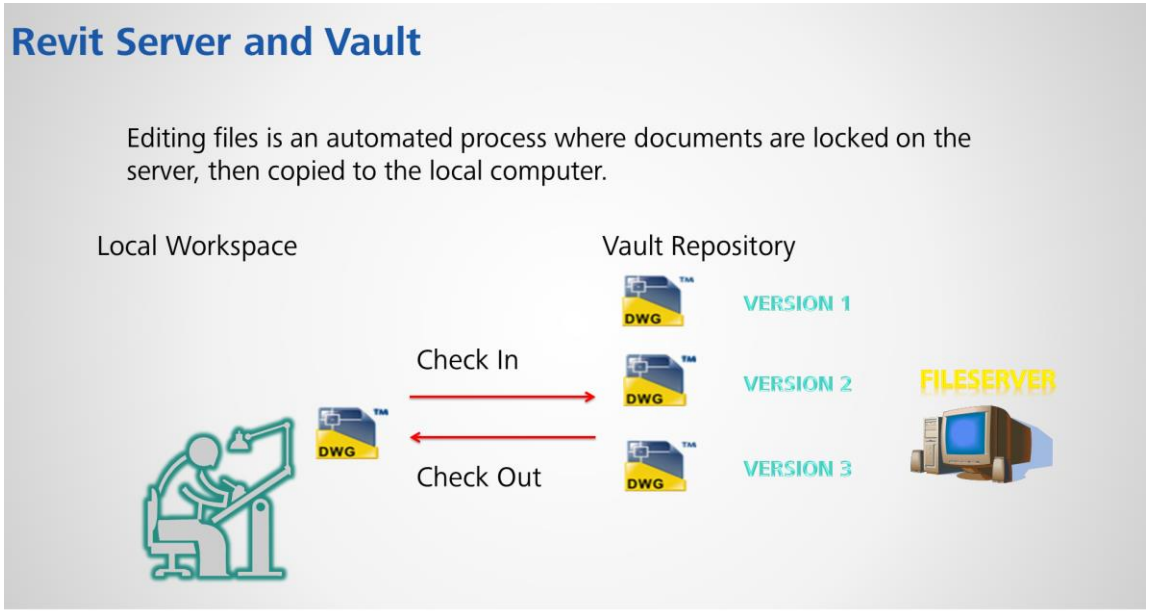
Revit Server + Autodesk Vault Professional

When collaborating on revit files using revit server, we can also benefit from the integration with Autodesk Vault Professional.

Specific users on the team can be setup to upload the latest version of the design to the central repository when synchronizing to the central file.



This behavior is based on vault's standard philosophy of checking in and checking out files:



As the first action during 'Synchronize with Central' is a 'Reload Latest' operation, one designated vault user saving on a regular basis, will ensure that a version will get uploaded to Autodesk Vault Professional. Revit Server can therefore be looked upon as 'Local Workspace" in a collaborative environment.

Replication

Autodesk Vault Professional can be setup to manage data across company sites. Two scenario's exist (that can be combined if need be):

-File Replication: only the hidden file store with the actual file versions is being replicated between sites. This means users still log into vault through the main database, but when opening files, they use a locally managed copy.

-Full Replication: both file store and database are being replicated.

To understand this in more detail, we need to look at some of the key defining components of Autodesk Vault Professional:

-  **Microsoft SQL Server** – stores the metadata extracted from files when they are added to the vault.
-  **File store** – the file system that stores the actual files checked in by the clients.
-  **Internet Information Services (IIS)** – Web services used for client-to-server communications. It uses standard HTTP methods, communicating over port 80 by default.
-  **Autodesk Data Management Server (ADMS)** – a standalone application which allows you to create and manage vaults and libraries.

We can combine these components in different site and workgroup setups:

- **Site** – A location where the Vault server software is installed for users to connect to with their client application.
- **Workgroup** – A group of sites connecting to the same SQL database.

Multiple sites can be combined to retrieve information from the same SQL database, thus configuring file replication.

When multiple workgroups are being combined we are using full replication. One SQL database will be the 'master' (or publisher) the others are 'slaves (or subscribers):

- **Publisher** – the first SQL server configured in a full replicated environment.
- **Subscriber** – SQL servers connected to the Publisher in a full replicated environment.

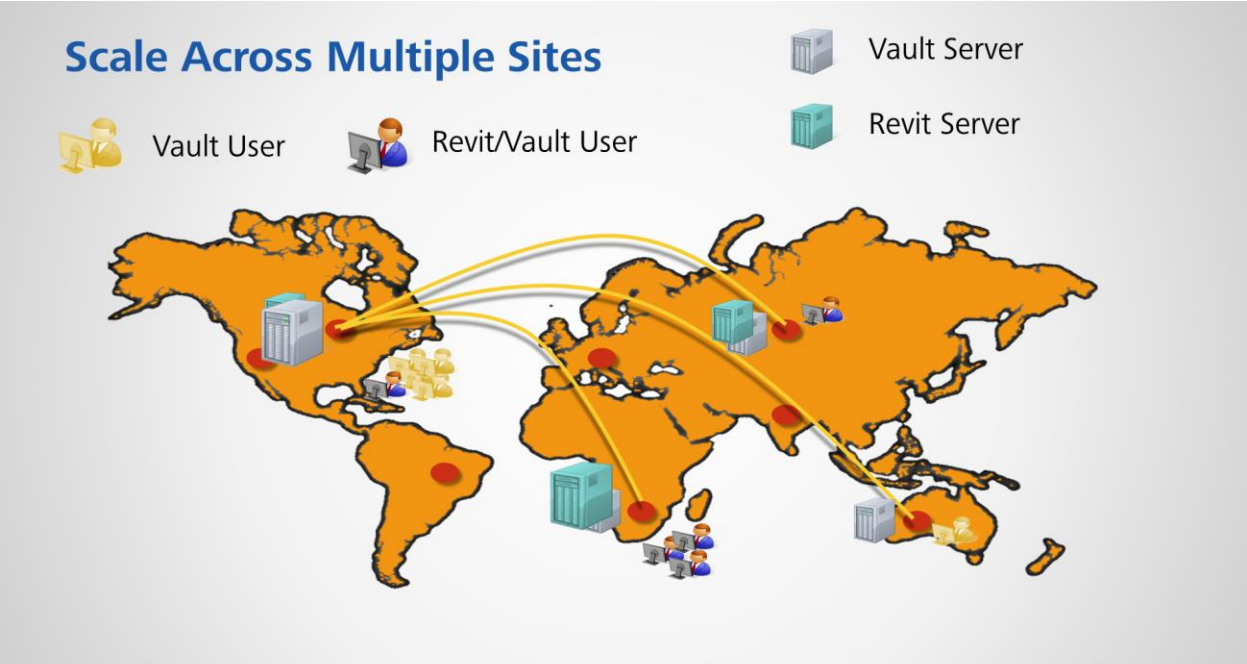
The full replication setup is very similar to a revit server network:

the revit host server initiates all communication and hosts ownership of the worksets. Geometry is being accessed locally through the revit accelerator.

The publisher tracks the 'lease' on the documents and folders. Documents are being retrieved locally from the subscriber.

When combining vault in replication with revit server, this is actually quite easy to do: simply decide on where most vault users are: this will probably be the publisher site. Similar to this, check where most revit users are, this is probably the best location for the revit host server. Getting data across to other sites is really a background process for vault/revit server.

The last thing one needs to decide is: which user will push information into Autodesk Vault Professional.



References

Blog:

http://autodesk.typepad.com/bimtoolbox/

Workflow videos:

Navisworks - Vault: https://www.brainshark.com/autodeskinc/vu?pi=zH4zeErSszAQ1Hz0

Inventor - Revit - Vault: https://www.brainshark.com/autodeskinc/vu?pi=zFmz3IBpfzAQ1Hz0

Revit - 3Ds Max - Vault: https://www.brainshark.com/autodeskinc/vu?pi=zGozj9ttHzAQ1Hz0

Revit and Vault: https://www.brainshark.com/autodeskinc/vu?pi=zGszj6MwszAQ1Hz0

Revit Server and Vault: https://www.brainshark.com/autodeskinc/vu?pi=zGAzJRGsUzAQ1Hz0