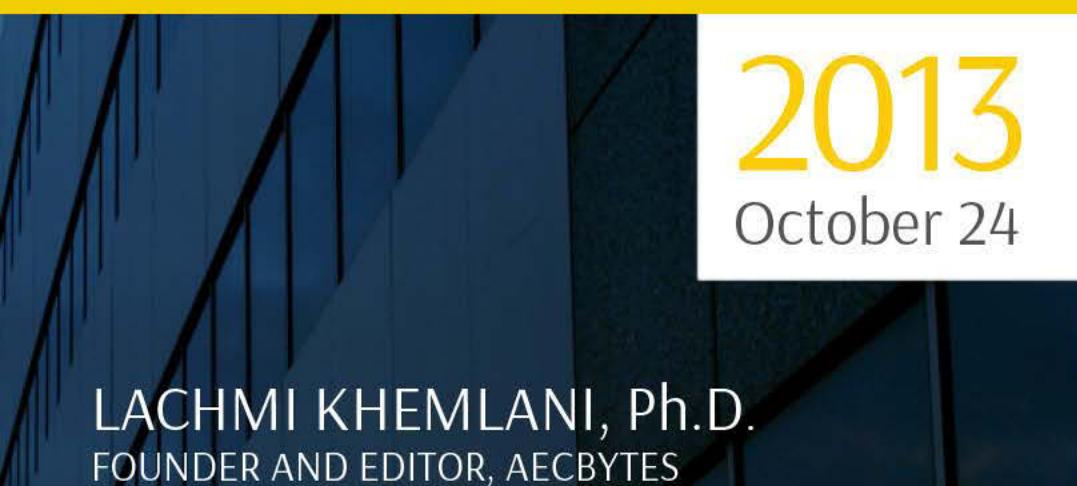




Comparison of Bentley ProjectWise and Autodesk Vault for AEC



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The objective of this research was to compare the applications, Bentley's ProjectWise and Autodesk's Vault, for data management and collaboration in AEC. The impetus was to respond to a number of readers who have written in over the years to find out if such a comparison exists. As part of the research for the comparison, AECbytes conducted a brief survey earlier this year among its readers to gather information about the usage of each of these two solutions—the type of firms and projects on which they were being implemented, their benefits, challenges, and so on. The results of this survey were published in an [AECbytes feature article](#) in May.

There are two key points that emerged from the survey results, which are very relevant to this research:

- ProjectWise is the undisputed leader in the field, with usage in over 90% projects.
- ProjectWise is used for managing project files even when Revit, rather than Bentley's AECOsim Building Designer, is used as the BIM solution for a project.

Given these results, it was felt that the AEC industry would be better served by understanding the reasons for the overwhelming popularity of ProjectWise over Vault, rather than by a feature-to-feature comparison between the two applications. In any case, such a comparison was not found to be very enlightening, as the two applications have a lot of functionality in common. Thus, AEC firms are not choosing ProjectWise over Vault simply because of its features. Why then? It is this question that this research report hopes to shed light on. The information in it was culled from various sources including published material on the two applications by Bentley and Autodesk, individual briefings, and the AECbytes survey mentioned earlier.

Overview of ProjectWise

ProjectWise has a long history in the AEC industry. It is developed by Bentley Systems and was introduced in 1995 as TeamMate, which was a file management tool for Bentley's MicroStation CAD application. MicroStation relied heavily (and still does) on the use of reference files to support distributed workflows, and needed some mechanism for managing the relationships between them, which was the objective of TeamMate. The application was renamed ProjectWise in 1998, and has evolved from a basic application for managing project files to the hub for project collaboration and worksharing across all of Bentley's products in different infrastructure industries.

Unlike Autodesk, Bentley is entirely focused on infrastructure and has over 100 products in its portfolio, serving an ever-growing number of specialized industries such as Bridges, Buildings, Campuses, Communications, Factories, Roads, Utilities, and others. All of these products are based on the MicroStation platform, which means that ProjectWise continues to be the data management and collaboration solution of choice for all the projects on which these products are deployed. Also, Bentley has continued to hone the ability of its products to support large, distributed workflows, which has led them to be used on some of the largest and lengthiest infrastructure projects around the world. This has also required Bentley to continue to improve the capabilities of ProjectWise, so it can be used to efficiently manage the ever-increasing size and complexity of infrastructure projects and their diversified, globally distributed workforce.

Overview of Vault

Vault came to Autodesk in 2003 as an acquisition of a company named truEInnovations, Inc., which was developing an affordable tool for managing engineering data called truEVault. After the acquisition, Autodesk renamed it as Vault and started integrating it into the manufacturing product line, most notably Autodesk Inventor. For several years, Vault remained a product exclusive to the MCAD (mechanical CAD) industry, in which designs are essentially hierarchies of “parts” coming together to form “sub-assemblies,” which in turn are comprised into “assemblies.” The objective of a solution like Vault was to manage all the individual part, sub-assembly, and assembly files and automatically maintain their hierarchy. In 2006, Vault was extended to integrate with other Autodesk applications like AutoCAD and Civil3D, and subsequently with AutoCAD Electrical, AutoCAD Mechanical, and 3ds Max. It was integrated with AEC applications such as Revit and Navisworks in 2011.

Thus, compared to ProjectWise, Vault has a relative short history in the AEC industry. Also, unlike ProjectWise that has been consistently maintained and known as a product for over 15 years now, Vault has been characterized by a lack of consistency, particularly in AEC. It was purely an MCAD product for several years, and is still perceived by many users as an MCAD application. Autodesk did not have a data management product for the AEC industry similar to ProjectWise, and it attempted to create a Vault version specific to AEC. This AEC avatar of Vault was dubbed “Vault Collaboration for AEC” and it was this version that the AECbytes survey conducted earlier this year was based on. However, with the release of Autodesk’s 2014 product family, there is no longer a product called “Vault Collaboration for AEC.” Instead, in an attempt to simplify the product line, there are now just three Vault versions: Basic, Workgroup, and Professional, with increasing levels of capabilities and features. The features of the earlier “Vault Collaboration for AEC” product have been folded into the Professional version, which is the most comprehensive, and it is this version that would now be used by AEC firms implementing Vault.

Comparative Usage

As mentioned in the preceding section, AECbytes conducted a brief survey earlier this year among its readers to gather information about the comparative use of ProjectWise and Vault. While the complete results of this survey can be seen in the AECbytes article "[Bentley ProjectWise and Autodesk Vault Collaboration AEC: AECbytes Survey Results](#)" published in May, some of the key findings most relevant to the comparison are given below.

The most critical finding was that the usage of ProjectWise for data management and collaboration far exceeded that of Vault—75% as opposed to 7.5%—as shown in the graph in Figure 1. (Recall that the version of Vault used by AEC firms at that time was called Vault Collaboration AEC.)

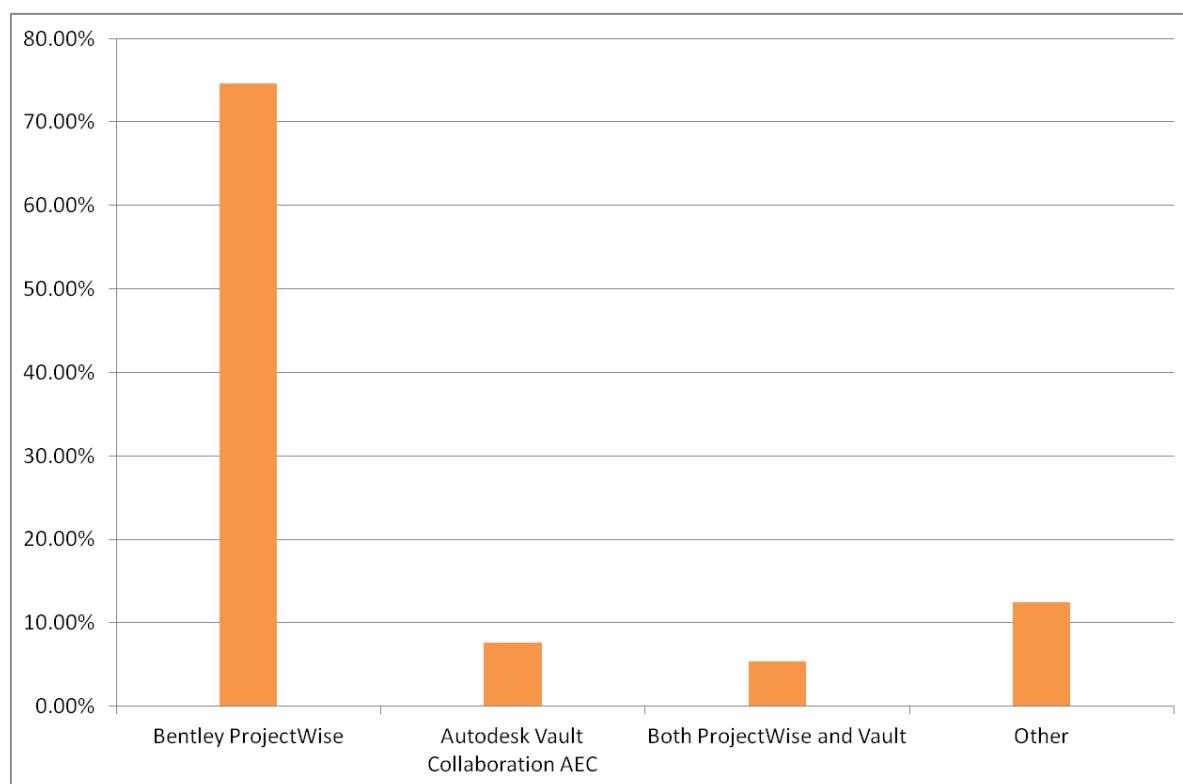


Figure 1. The comparative usage of ProjectWise and Vault for data management and collaboration, as reported in the AECbytes survey conducted earlier in 2013.

The other key findings relate to the size of the firms using these solutions and the number of offices they have. As shown in the graphs in Figures 2 and 3, most of the ProjectWise users came from large firms with over 1000 people, distributed across multiple offices. In contrast, Vault users were more evenly spread out between firms of different sizes and locations, although the larger, multi-office firms still dominated in their usage.

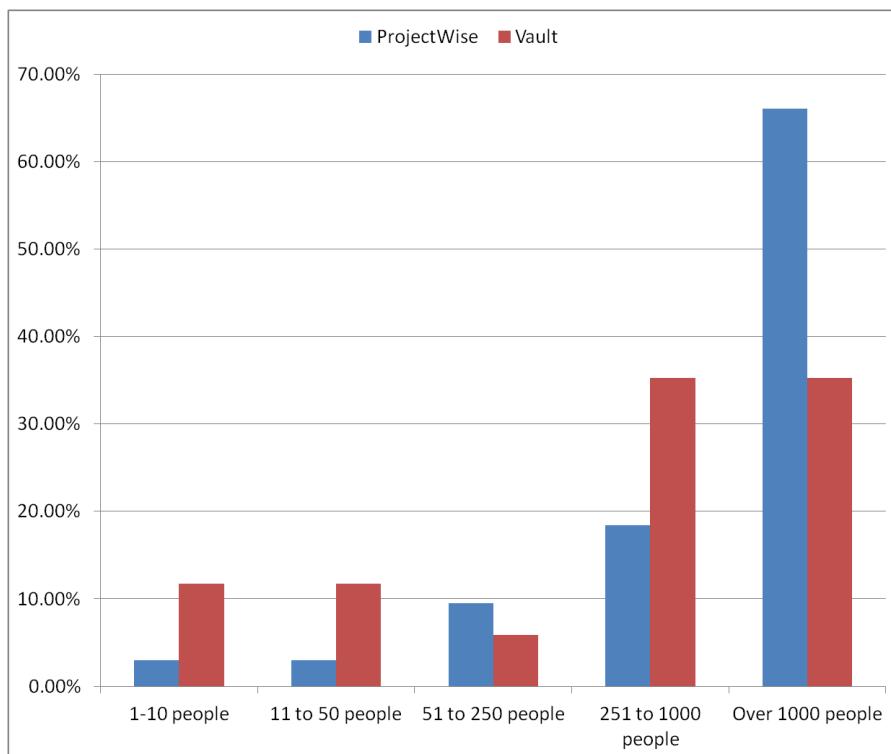


Figure 2. The size of the firms using ProjectWise and Vault.

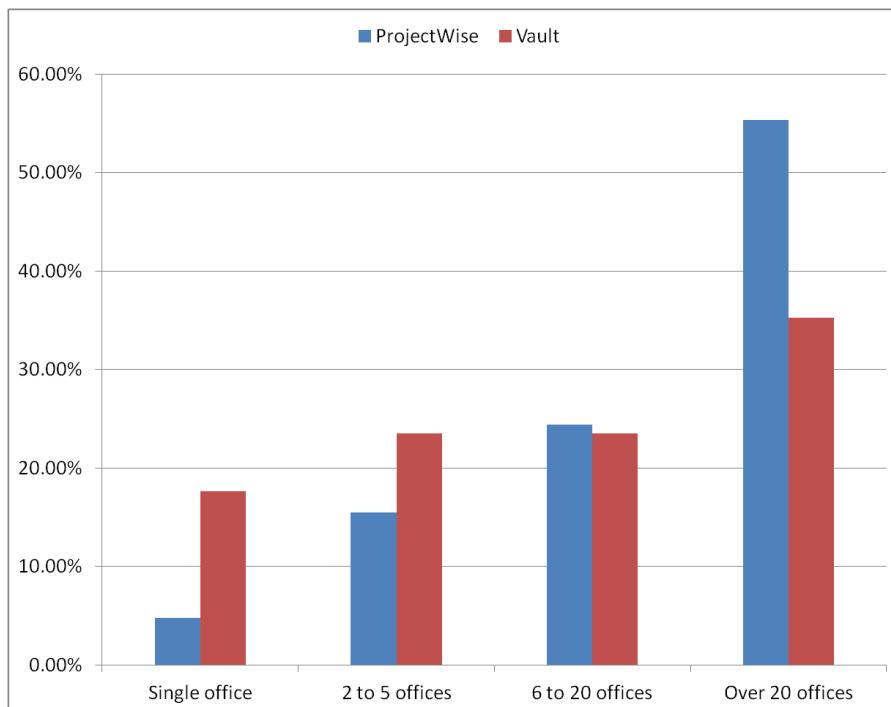


Figure 3. The number of offices of the firms using ProjectWise and Vault.

Comparative Functionality

The basic value proposition of both ProjectWise and Vault is quite similar. They each provide a central repository for all project files—including models, drawings, images, PDFs, spreadsheets, and other related documents and data—to be stored and organized, so that they can be easily accessed and retrieved. There are many additional benefits of implementing such a solution for a project, including secure and controlled data access (users can only see the data for which they have been assigned permissions), avoiding unnecessary and error-prone duplication, preventing unintentional overwriting of existing data, reducing the time typically spent in organizing and searching for project files, managing the implementation of CAD and BIM standards, and improving the overall efficiency of the process. The version control capabilities of these solutions can help to ensure that everyone is working with the correct version of a file, as well as capture the history and workflow of a project, from which an audit trail can be put together, if required. Both ProjectWise and Vault also integrate with Microsoft SharePoint, helping to connect a firm's design data with its extended business enterprise data.

While a detailed analysis of the individual features of ProjectWise and Vault is not the objective of this report, a brief overview of each is provided below, enabling a high-level, at-a-glance comparison of the two applications for key categories.

Deployment and Cost

Both ProjectWise and Vault manage project data and organize the relationships between files through an underlying SQL database. They can be deployed either internally on a company's servers, or on an external cloud. ProjectWise comes in many versions and packages tailored for specific industries and project requirements, allowing firms to start with a simple implementation that can be expanded as project requirements change. Thus, its deployment is somewhat complex and would likely need some support from Bentley. In contrast, Vault is simpler and can be set up and configured by a CAD manager, program manager, or IT professional within the firm itself. The difference is analogous to installing a software product as opposed to setting up an enterprise solution.

This difference in the nature of the two solutions is also reflected in their cost. Vault is sold as a stand-alone application like other Autodesk products, with a single license of Vault Professional priced at \$1775. This comes with a copy of Buzzsaw, which can be used to share project files with external team members. In terms of usage, there is usually a 1:1 ratio of Vault licenses to design licenses. In contrast, ProjectWise is priced on a subscription model, with a range of different rates for the number of users, depending upon which of the many different configurations a firm is looking to implement. The exact pricing is not published, but has to be determined in consultation with Bentley.

Internal and External Collaboration

One of the key reasons behind the overwhelming popularity of ProjectWise is that it works equally well for internal collaboration (with team members from the same firm) and external collaboration (with the extended project team from multiple firms). In contrast, Vault is primarily for collaboration with internal team members within a company's firewall; for external collaboration, firms would have to use Buzzsaw, which is included with Vault Professional. Vault, however, does have a new extended license agreement where available licenses can be temporarily loaned to external team members outside a firm's firewall, enabling them to access project data and participate in the project workflow just like any internal team member.

Integration with AEC Applications

ProjectWise integrates with the entire range of Bentley AEC applications, and directly supports Revit models, AutoCAD, and all AutoCAD-based disciplinary products. The Revit integration, in particular, is a big plus, and enables firms to continue using ProjectWise to manage their products even if they are using Revit for BIM.

Similar to ProjectWise, Vault integrates with all the applications developed by its own vendor, including AutoCAD, AutoCAD Structure, AutoCAD MEP, the Revit family of BIM applications, AutoCAD Civil 3D, and Navisworks. In addition, Vault also integrates with some third-party applications, the leading one being MicroStation. The big plus for Vault here is the direct integration with Navisworks, which is extremely popular in the AEC industry for design coordination and review. Although ProjectWise can manage Navisworks files just like any other file types, it does not really plug in into Navisworks the way it does with Revit.

For the Revit integration, both ProjectWise and Vault provide support for views, sheets, families, BIM content, and any additional components related to the project. In addition, Vault also supports worksharing in Revit and interacts with the Revit Server, if it is deployment. In contrast, ProjectWise does not offer this level of Revit integration, which is understandable since it has to work as a third-party developer using the Revit APIs that Autodesk makes available.

Performance

The key strategy used by ProjectWise to speed up performance, particularly for large file sizes such as those of Revit models, is a built-in Delta File Transfer (DFT) technology that accelerates access to files by only transmitting the bits of the file that have changed between a user and the main file server storage area. The users can get the experience of working over a LAN (local area network) even when they are actually working over a WAN (wide area network). In contrast, Vault uses a replication strategy to boost performance, making multiple copies of files at each remote location to provide LAN-like performance over wide area networks.

Mobile Access

ProjectWise is accompanied by an iPad app called ProjectWise Explorer Mobile, which allows users to create, browse, and view ProjectWise Documents on the iPad. In contrast, Vault does not have a mobile version to access the project data it is managing. However, Buzzsaw comes with a mobile app, and if Vault files are synchronized with Buzzsaw, they can be made available in the field on a mobile device via this app.

Viewers for drawing/model files

Vault generates DWFs for the files and models stored in it, which can be viewed by the free Autodesk Design Review application, which is installed with Vault. In contrast, ProjectWise uses Bentley View, a free viewing application for files and models.

Printing and Publishing

Both ProjectWise and Vault support the publishing and printing needs of AEC firms. Vault allows the creation of plot lists to help keep track of documentation sets, print settings, and number of sheets to print for all documents within the project. ProjectWise has a dedicated InterPlot Server that automates production plotting for paper, PDF, and 3D plots. It also integrates with Bluebeam, a leading provider of PDF solutions for the AEC industry.

Analysis and Conclusions

ProjectWise has been focused on data management and collaboration in the AEC industry for many more years than Vault, and has, as a result, gained in capabilities, prominence, and industry adoption. It has developed into a comprehensive application that can be used for internal as well as external collaboration on a project. It integrates not only with the entire range of Bentley applications, but also with many Autodesk applications, including Revit, which is by far the leading BIM application in use today. It also supports DWG and AutoCAD Xrefs, which many in the industry are still using. This makes ProjectWise especially popular with the vast majority of AEC firms, who are not forced to use a Bentley application to take advantage of its capabilities. In particular, large infrastructure projects need an “industrial-strength” data management solution like ProjectWise, and firms who have been using it to manage their projects for several years and are comfortable with it have no reason to switch to another application.

In contrast, Vault is still relatively new in the AEC industry, and while it can be made to work to manage data on a project, it is not that overwhelmingly feature-rich to encourage firms to switch to it from ProjectWise. It seems to be less expensive than ProjectWise, easier to configure, and suitable even for smaller projects, smaller project teams, and small to medium size firms. Also, it has a deeper integration

with Revit than ProjectWise and also integrates with Navisworks. However, it does not support collaboration with external team members (outside a company's firewall) as easily as ProjectWise, which does not make it very compelling to use on large projects. Also, it mostly integrates with Autodesk products, which is fine if the entire project team is using them, but that is usually not the case with different disciplines using products from diverse vendors.

More than anything else, however, the messaging behind Vault by Autodesk has been confusing, to say the least. Autodesk has attempted to provide a worthy competitor to Bentley's ProjectWise several times, starting with Buzzsaw over 10 years ago, which continues to be its SaaS application for storing and sharing files for internal and external collaboration. Autodesk then acquired Constructware for construction management, but little is seen or heard of it today. Recently, the cloud-based suite of services, Autodesk 360, was launched and one of its components is BIM 360 Glue, an online "BIM coordination and management service" for project information that Autodesk is promoting heavily. Vault does not figure prominently on Autodesk's website, at least for AEC, indicating that Autodesk does not see it as one of its key applications. If you dig a little deeper, Vault Professional does get listed under some AEC product categories. However, surprisingly, it is listed (as the last product) for MEP, Structure, and FM (Building Owners, Operations, and Management), but not under Architecture or Construction. This does indicate some internal confusion within Autodesk about the usefulness of Vault in the AEC industry, and where and how it should be implemented.

Unlike Autodesk, Bentley has stuck with one solution and one brand, to which it has kept adding improvements. This has allowed its solution to gain traction with consumers, resulting in the establishment of ProjectWise as the leading solution for data management and collaboration in the AEC industry, implemented by firms even if they are not using Bentley's BIM solutions. The roster of ProjectWise users has expanded to include many of the top ENR firms. If the importance of a solution to a vendor is any indication of its success, ProjectWise wins hands-down, as it a big part of Bentley's story. Bentley may be trailing significantly behind Autodesk when it comes to BIM, but data management and collaboration is one area of AEC technology in which Bentley is far ahead.

About the Author

Lachmi Khemlani is the founder and editor of AECbytes (www.aecbytes.com), an online publication that has been researching, analyzing, and reviewing technology products and services for the building industry since its establishment in 2003. She also consults extensively on the development and implementation of AEC technology, gives frequent presentations before both professional and academic audiences, and serves on juries for technology awards.

Lachmi completed her Ph.D. in Architecture at UC Berkeley, specializing in the application of computing technology to the building industry. Her thesis was focused on developing a computational representation of a building that could be analyzed and evaluated, in line with present-day BIM concepts. Her earlier credentials include a professional B.Arch. (Honors) degree from the Indian Institute

of Technology, Kharagpur, India, and an M.Phil. in Architecture from the University of Cambridge, England. She worked on several design projects as a practicing architect in India and has taught CAD and 3D modeling for several years at UC Berkeley. In addition to writing in industry publications for several years, she has authored books on CAD and modeling. She continues to stay closely involved with the research community, recently serving on the editorial board of the journal, Automation in Construction, for which she continues to review journal submissions. She can be reached at lachmi@aecbytes.com.