



Authentic BIM Collaboration using a Private Cloud and Virtual Workstations

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This lecture will illustrate how a private cloud reverses the traditional collaboration models by bringing people to the data. Learn how elegantly the private cloud solves collaboration issues while respecting Revit software's work-share schema without synchronization or caching voodoo. Both internal and external team members are able to work side by side virtually and in real time—remotely, from anywhere—on any device, all accessing a single set of project data. We will share successes and expose challenges of a private-cloud implementation. Key talking points will be software, hardware, licensing, workflows, and administration of virtual desktops, as well as other challenges with training and performance tuning.

Learning Objectives

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

- Describe key components to a Private Cloud
- Understand how a private cloud and virtual workstations provide a platform for authentic BIM (Revit software) collaboration
- Recognize best practices, benefits and challenges for managing a private cloud
- Consider developing an ROI-and-implementation strategy for your firm

About the Speaker

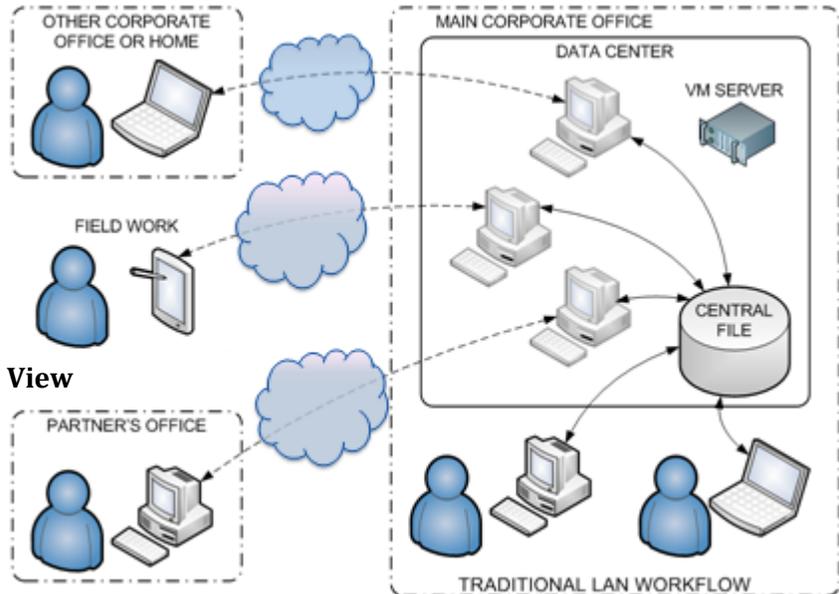
Edward C. Lick, IT Director/AEC Solutions Support Manager

As technologist and evangelist for Autodesk, Inc., since 1984 and for Revit software and Building Information Modeling (BIM) since 2001, Ed has served as CAD manager and instructor; ran a CAD design and consulting firm; developed a unique, one-on-one skills-assessment program; and authored corporate CAD standards. He joined the Autodesk Reseller channel to serve as Architecture, Engineering, and Construction (AEC) Solutions Team director, manager, and instructor. He now serves as IT director at STV Group, Inc., and manages support of the AEC software and the firm's transition to BIM technologies and workflows for over 35 national offices. Ed currently serves on the United States National CAD Standards, Ad-hoc BIM Committee.

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Key components of the private cloud

- WAN
- Storage
- Servers
 - Dell, Grid
- Workstations
- Software
 - VMware Horizon View
- Licensing
- Permissions
- Printing



Project data had traditionally been localized to one of 35+ offices, the one leading the project. The new file management model places project data in one repository, each in their own directory!

The illustration shows the Data Center's VM Server, with enough capacity to support...Storage, Project Setup/Directory (I: Drive), (traditional - stayed the same, no document management software) Then there's storage capacity required for each of the cloud workstation's hard drive.

See the traditional LAN Workstations and workflow. See how the cloud workstation when added to the mix, is the same as LAN!

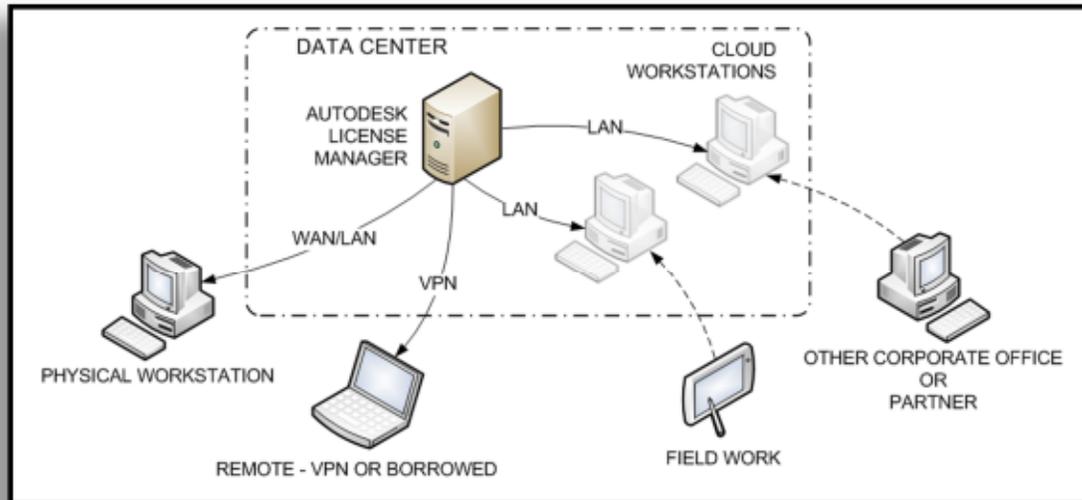
See how remote users log onto the "LAN situated" virtual PCs! They access these dedicated cloud workstations using VMware Horizon View client or URL; each user gets a dedicated cloud workstation. (WAN traffic is reduced to Mouse clicks and Graphics)

See the remote users at home, in the field! Optionally, a user can access by way of URL in the browser.

See how joint venture partners can collaborate on Revit Projects, given the appropriate credentials/permissions

- **Licensing**

Illustration of software licensing



First, it's no different than traditional and physical machines. Each new and old EULA was and is reviewed. If there's language regarding virtual servers, machines or virtualizing software, address it directly with vendors.

It has helped to have dedicated cloud workstations because licensing is more traditional and software itself isn't virtualized. STV uses FlexLM, concurrent license pools for its Autodesk Products. The STV cloud workstation is configured such that it is issued a license the same way as physical machine, because to the LM, it's just another PC. It looks at the license pool the same way as a physical machine.

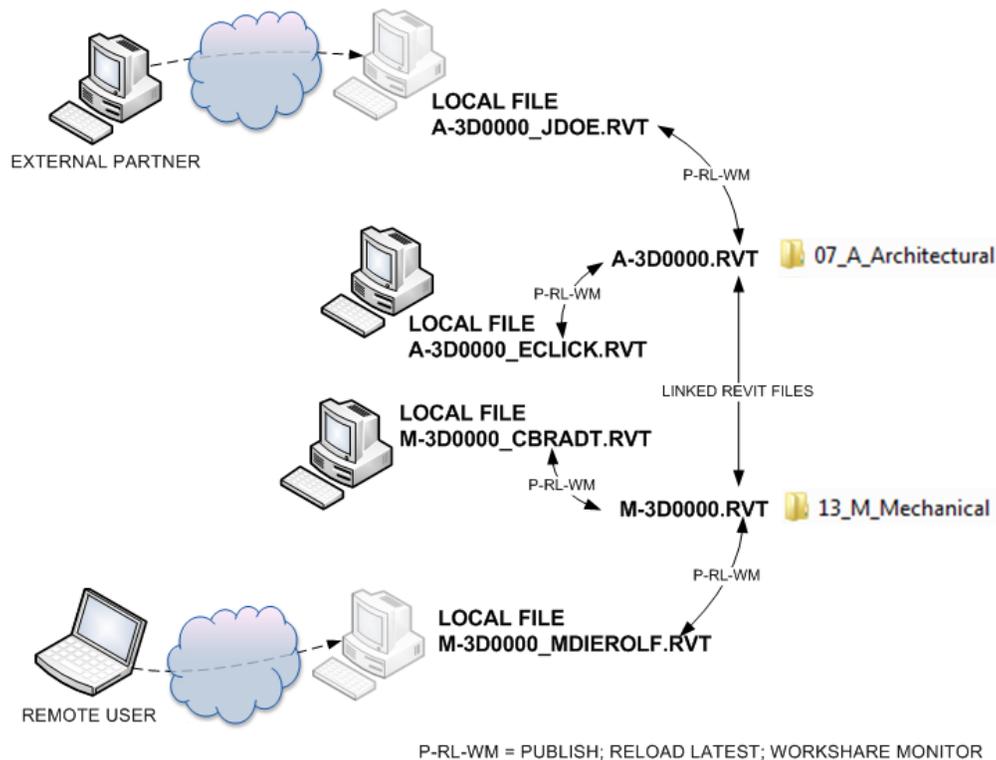
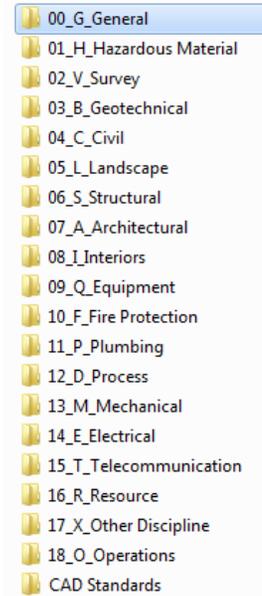
How a private cloud and virtual workstations provide a platform for authentic BIM (Revit software) collaboration

STV has its project data stored in one place. It wasn't always that way and there will be no wholesale collapse. It will be done over time with each new project.

The project directory structure is standardized per division and familiar with the users. Access to STV Drives is controlled through Active Directory. Our project managers use a home grown interface to assign resources to their project. It sets access and permissions to folders and for charging their time, CAD users are regulated to the "CAD Models and Sheets" subdirectories. For contractors or external stakeholders we provide credentials with (3) month expiration.

If you're familiar with Revit and its work share schema you see how the central file is just that – CENTRAL to all. Central Files are located in the discipline folders, typically Structural (S-3D0000.RVT), Architecture (A-3D0000.RVT), Mechanical (M-3D0000.RVT), Plumbing, Fire Protection, etc. BIM Execution plan dictates this.

It's not uploaded, downloaded, side loaded, it works the way it was designed to work and with work share monitoring. Therefore it is easy to learn to collaborate! No new interfaces or new workflows to learn or follow! Movement of linked files and publishing of changes is efficient and REAL TIME!



Best practices, benefits and challenges for managing a private cloud

Software licensing and End User License Agreements still apply. Again Autodesk products are served via FlexLM. Bentley products are licensed off Bentley servers via URL with trusted licensing. Of course it too works identically to a physical machine. There have been products where EULAs insist on site licensing despite only being installed on the cloud workstation in our data center, a single site. This is because users are actually working in a remote office. Just be sure to talk to vendors and negotiate terms to support you and the technology.

License pools and their number of seats for products potentially can be pushed to inflated levels to satisfy short term demand of project and collaborative partnering. Therefore after project is completed the hosting firm would end up underutilizing the seats. This hasn't happened yet but the potential exists and unpredictable.

Consolidation is one of the many benefits. The collapse of project data, software support files and deployments to a single location and the reduction of system administration are beneficial. Consider too the elimination of unreliable file sharing methods (Email DWGS). Mapped drives had been another technique but requires the large amount of model data to traverse the WAN. The cloud workstation puts but a small load on the WAN – keyboard & mouse clicks with some graphics. That's it!

A private cloud provides the opportunity to create discipline specific and/or general administration cloud workstations. Using the Unidesk platform, "software install layers" get created. These "layers" are snap shots of a workstation before and after the installation of a product. It then is applied either as part of a "Template" or as needed on a single cloud workstation. New software releases get their layer updated (once) which is then pushed to (many) machines already "owning" that layer. An example; Structural Engineers get assigned a "Structural Cloud Workstation" which has Building Design Suite Premium (Revit Structural), CSC Fastrak, RISA, SAP2000...the need to deploy to desktops across the enterprise is eliminated.

In rare instances, software manufacturers and their product installation schemas may not work as expected within virtual workstation management platforms. Autodesk's use of PIT files forces the need to "stack" all products into one "installation layer" versus a separate "layer" for each title.

So, it's not perfect. The demand on the server for managing software graphics is improving but not quite ready for rendering. So, the Autodesk rendering cloud is a great option here. Know the computer graphic industry continues to develop and provide solutions for distributing GPU to virtual machines. It's only a matter of time and money.

It's a challenge to balance the requirements and capacity of a cluster of BIM cloud workstations, the capacity and cost of the VMware server and number of cloud workstations it serves up. Distributing more RAM to what could be an idle BIM cloud workstation consumes resources away from active machines. Reported machines that have never been logged onto get deleted.

Selling the technology internally and to external partnering stakeholders was more challenging than expected. A surprising number of employees perceived the system to be magical and far more complicated than it is. Be prepared to present the topic and teach.

External partners were concerned about their model on our cloud. Once refused to use the cloud and reverted to less desirable methods – static linked files. Trust is important and no different than before.

Another example is one of our collaborative partners was located in Buffalo NY. The amount of hops through the cloud caused them performance degradation, enough for them to seek another option – RDP machines.

Developing an ROI-and-implementation strategy

Consider the following points when developing a return on investment in virtual desktop infrastructure (VDI) also known as a private cloud.

- Firm size
 - The more you have the more cost effective it becomes
 - Scalability is easy and a benefit
 - “Lego” approach
 - Start small – e.g. 8 Cloud workstations
 - Use the latest gear
- CAD/BIM Users, number of disciplines
 - A small firm doing pure architectural may not benefit as much as...
 - Multi-discipline AEC firm routinely collaborating on BIM projects
 - It's not just for CAD/BIM Users – Executives/Marketing/Others benefit
- Human Resources
 - Recruiting, work from home policy
 - Disaster Recovery work
- Upgrade schedules
 - Frequently deploying upgrades
 - Large number of titles to manage
- WAN
 - Consider upgrading the WAN first
- Joint Ventures
 - Are you frequently partnered and collaborating, especially BIM
- Challenges
 - Presenting and teaching fellow employees
 - Convincing partners
 - Tip - Develop and implement a corporate strategy