AUTODESK UNIVERSITY

AR17677

The Nuts and Bolts of BIM 360 Team and Collaboration for Revit

Aaron M. Vorwerk, AIA, NCARB, EIT, LEED AP BD+C
Autodesk, Inc.

AP Percowycz
Autodesk, Inc.

Learning Objectives

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

- Navigate and manage projects on BIM 360 Team
- Explain the differences between traditional collaboration offerings and Collaboration for Revit
- Set up and work within a Collaboration for Revit-hosted project
- Assess the potential impact of Collaboration for Revit on your own firm

Description

Heard about the Collaboration for Revit cloud service, but still on the fence? This class is for you! We will take a look at the needs served by this cloud-hosted solution, discuss the value that it brings to the table, and then dive into a live project—first on BIM 360 Team, where all project participants have a stake, and then inside the Revit environment. In one fast-paced hour, you should have the knowledge needed to make the decision to adopt Collaboration for Revit to extend Building Information Modeling (BIM) workflows within your own firm.

Your AU Expert(s)

Aaron Vorwerk is a registered architect, civil/structural engineer-in-training, LEED accredited professional, and AEC industry technology evangelist. A senior technical sales specialist with Autodesk, Inc., Aaron influences customer BIM workflow adoption and strategy as a trusted advisor and serves as a lecturer, panelist, and author on BIM-related topics. Vorwerk holds graduate degrees in architecture and engineering (MArch, MSCE, BSCE) and has acquired widespread experience in architecture, engineering, and construction over the past 20 years, including leading Revit software transition efforts in two design firms.

AP Percowycz has been focused on the architecture, engineering, and construction industry since joining Autodesk, Inc., in August 2015. As a technical specialist, Percowycz has been working closely with Autodesk partners and customers to deliver applicable industry solutions aligned to all phases of design, construction, and turnover. Percowycz's background is in architecture, working most recently with Page as a project designer involved in complex design-and-build projects.

BIM 360 Team

BIM 360: A Platform for Collaboration

As a connected cloud and mobile platform, the Autodesk BIM 360 product portfolio allows rich data captured in the design and coordination phases (via BIM 360 Team, Docs and Glue) to flow through AND gain additional detail in the execution phase (BIM 360 Layout) on through the commissioning/handover phase (BIM 360 Field). All of this can be transferred directly to Autodesk Building Ops at handover, enabling owners to manage their buildings intelligently on day one.

And because the BIM 360 platform is connected via a common cloud database, design and construction data may be exchanged between the BIM 360 products without cumbersome file exports and time consuming preparation steps. Best of all, the data can be shared instantly across project teams—via web browser or mobile apps in the field.

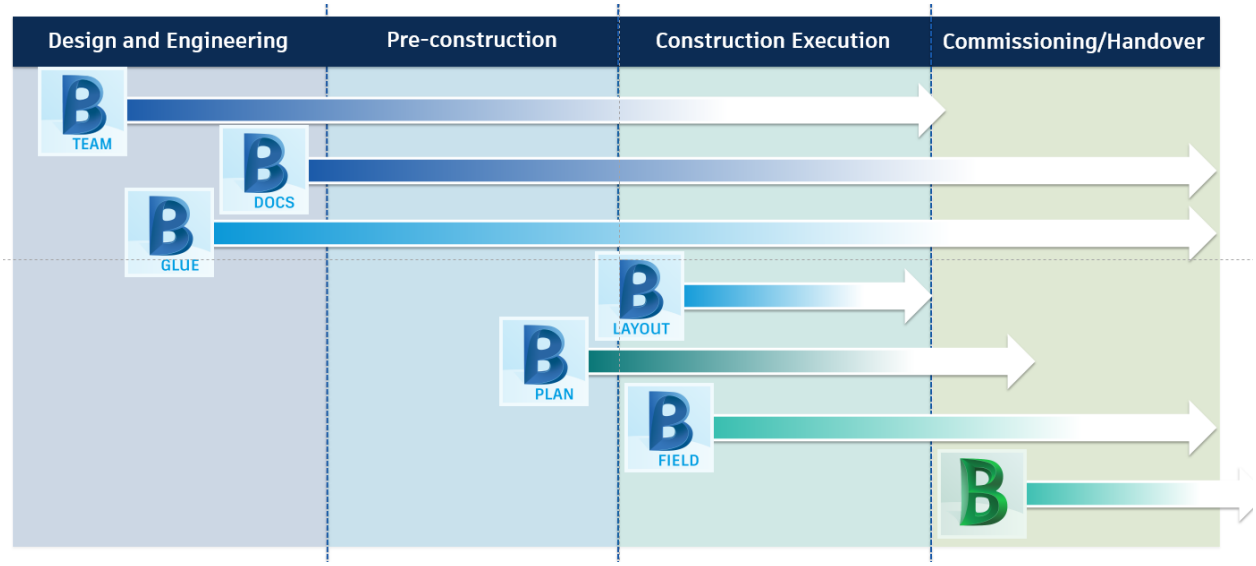

Figure 1: The BIM 360 platform

BIM 360 Team: Overview

BIM 360 Team is the entry point for designers to the BIM 360 platform, enabling design, engineering, and construction teams to work efficiently together in one central workspace. It is much more than a file viewer; if that's what you're looking for, check out the free A360 viewer. If you are ready to do more, and collaborate in BIM, then you'll appreciate that BIM 360 Team shines in four key areas:

Connect

Connect your entire team in one workspace—communicate faster and share feedback in real time. Architects, engineers, and their project stakeholders can participate collaboratively in a single online location. Think of BIM 360 Team as a complete project database in the cloud.

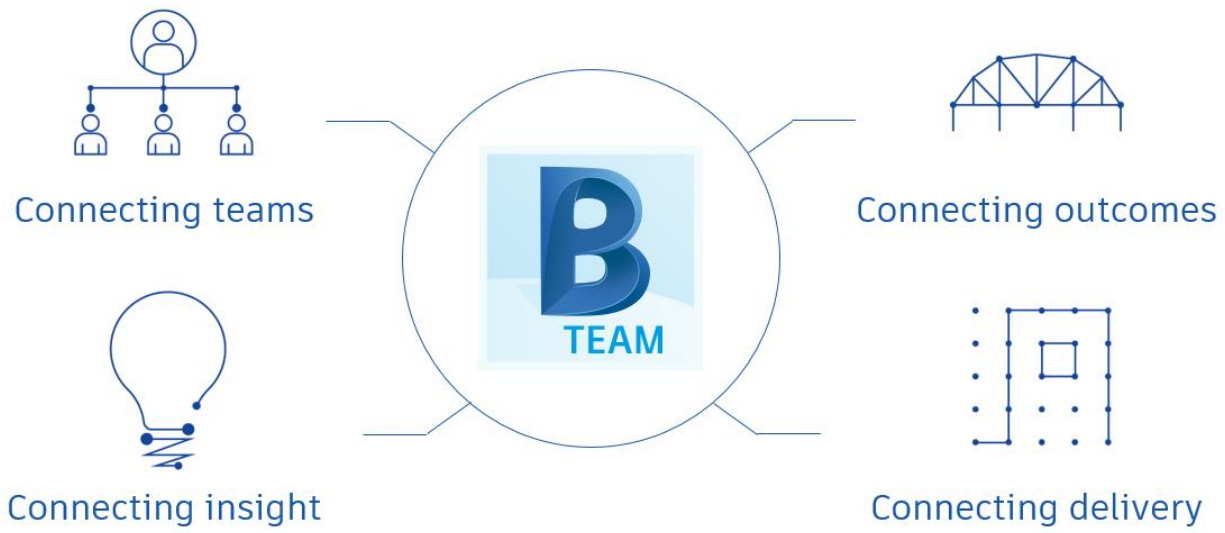

Figure 2: Connecting projects with BIM 360 Team

View

The most powerful viewer in the industry, supporting more than 100 2D and 3D design file formats right in your browser—without any software. Interact directly with 3D models, including deep searching of BIM data in supported formats. This enables you to work more closely, seamlessly, and with more reliable participation from your client when sharing concepts or ideas. It's also more fun for your project team!

Figure 3: A sampling of supported viewing formats

Share

Securely share 2D and 3D design files and project files with anyone. Use drag-and-drop move/copy commands as you would with generic file storage platforms. And access project data in BIM 360 Team using web browsers or mobile apps (including Android and iOS apps for tablets or smartphones).

Figure 4: Share on any device

Review

Review designs in real time with your team, capture feedback and make decisions together. Use traditional markup tools together with intelligent object-hosted comments. Compare two versions of a design, whether 3D models or 2D sheets, and easily understand/communicate what has been added, removed, or modified via graphic feedback and a list of changes.

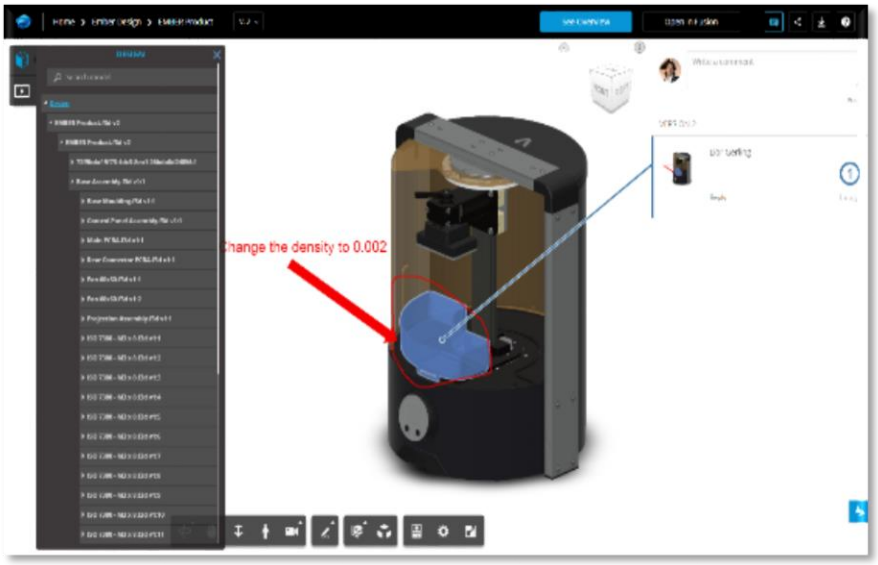

Figure 5: Markups and intelligent comments in BIM 360 Team

A Foundation for Collaboration

At this point, you might be asking why we are devoting so much time to BIM 360 Team in a session on Collaboration for Revit. The answer, of course, is that in order to facilitate a high degree of collaboration, you need to start with a solid foundation. And BIM 360 Team is the platform on which Collaboration for Revit (C4R) is built!

Collaboration for Revit

A New Approach to an Old Problem

We look at the evolution of multi-user project collaboration in Revit as having gone through three distinct phases:

Figure 6: The three phases of Revit worksharing

Team Worksharing

While Revit has supported traditional worksharing—i.e. multiple users editing a single project file at the same time, with Revit handling the permissions and locking—for well over a decade now, the process has its limitations. Effectively, worksharing is a single-premise solution. Users in the same location and on the same domain (i.e. working for the same company) can collaborate quite well, but this is not possible across multiple physical locations and/or across multiple domains (e.g. working from home or collaborating directly with consultants).

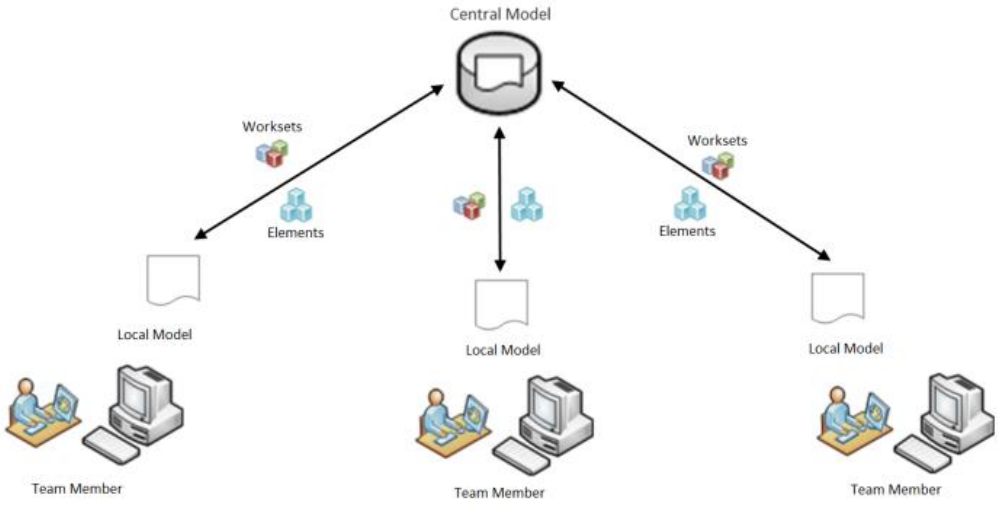

Figure 7: Worksharing illustration (Autodesk Revit help)

Enterprise Worksharing

Revit Server was introduced to enable firms with multiple office locations to collaborate across those locations as if they were co-located. In theory, this was a great step forward. However, the technology is not without its own challenges. Revit Server software is included at no cost with Revit, but it requires a specific server configuration to function properly, and this is often quite expensive for customers that wouldn't otherwise have a spare server or virtual server and/or extra copies of a server operating system lying around. It also didn't address the desire to collaborate with outside firms, necessitating VPN tunneling and other workarounds. Finally, even if Revit Server was configured correctly, performance would still suffer over low bandwidth and/or high latency internet connections, sometimes necessitating third-party WAN acceleration solutions at substantial additional cost. And then you get into the ongoing maintenance of the servers, files, and annual upgrades…

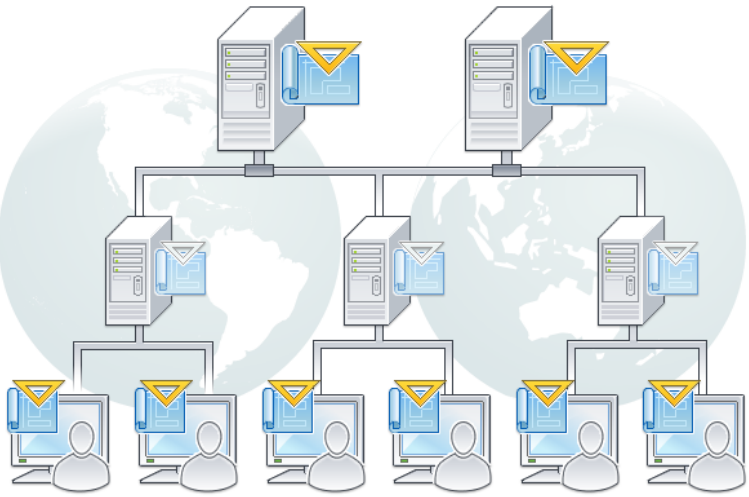

Figure 8: Revit Server illustration (Autodesk Revit help)

Project-based Worksharing

What has been lacking is a true multi-location, multi-firm BIM collaboration platform that functions in much the same way as Revit Server—but without the substantial cost of hardware and IT expertise, and without exposing firms to security risks. Enter Collaboration for Revit, an easy-to-use cloud-based worksharing technology that works across multiple physical locations and domains, requires zero investment in hardware or IT expertise, and doesn't even require a robust internet connection for good performance! The third 'phase' of BIM collaboration has begun.

Figure 9: BIM 360 Team and Collaboration for Revit

Day-to-day Benefits of BIM 360 Team and Collaboration for Revit

What's it really like to use BIM 360 Team and Collaboration for Revit on a project? Easier than you might think! We'll go through an example in this section, but our focus here is on the day-to-day experience, and we're going to skip over the basics of getting a project up and running. That said, if this is your first exposure to C4R, please check out these resources for more detail on getting started:

> Start to Finish Setup of Collaboration for Revit (AU 2015 class by Chris Aquino)
>
> How to Get Started with Your Collaboration for Revit Subscription (Note that this link to the Autodesk Knowledge Network makes references to A360 Team, now supplanted by BIM 360 Team, but it is still useful)
>
> Workflow: Get Started with Collaboration for Revit (Revit 2017 online help)
>
> Collaboration for Revit: Setting up a Project (YouTube)
>
> Collaboration for Revit: Uploading Revit Models (YouTube)
>
> Collaboration for Revit: Using Communicator (YouTube)

A Project Example

In this section, we'll take a look at BIM 360 Team and Collaboration for Revit through the lens of a typical project (e.g. a K-12 school building) with architectural, structural, and MEP disciplines participating in Revit. In this case, we even have a site model (likely created by the architect with information provided by the civil engineer), so we can see the building in its context. So what's different in a C4R-based workflow than the traditional FTP-based file exchange?

Leveraging BIM 360 Team

Go back and review those four areas where we stated that BIM 360 Team really shines: Connect, View, Share, and Review. That's our starting point. We head for our firm's Team Hub, find the project that we are interested in working on, and select it. This places us on our project's landing page, where we find a simple description of our project, its team members, the files and folders it contains, and any other relevant info on the main page (Fig. 10).

Once inside the project, we can add and manage users, add content (e.g. wiki pages, calendar invites, upload files, etc.), and share files, of course. But what we are most likely to do day-in and day-out is to review design files and add comments and/or markups for the team (Figs. 11 and 12).

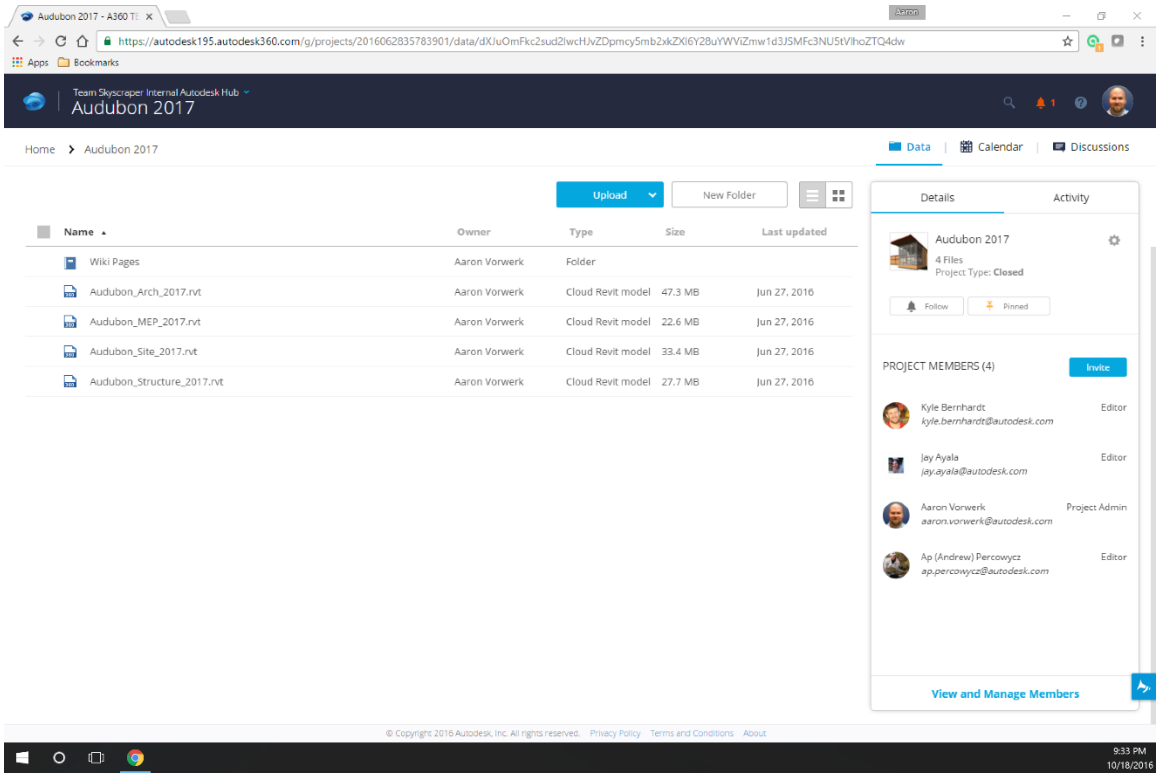

Figure 10: Project landing page in BIM 360 Team

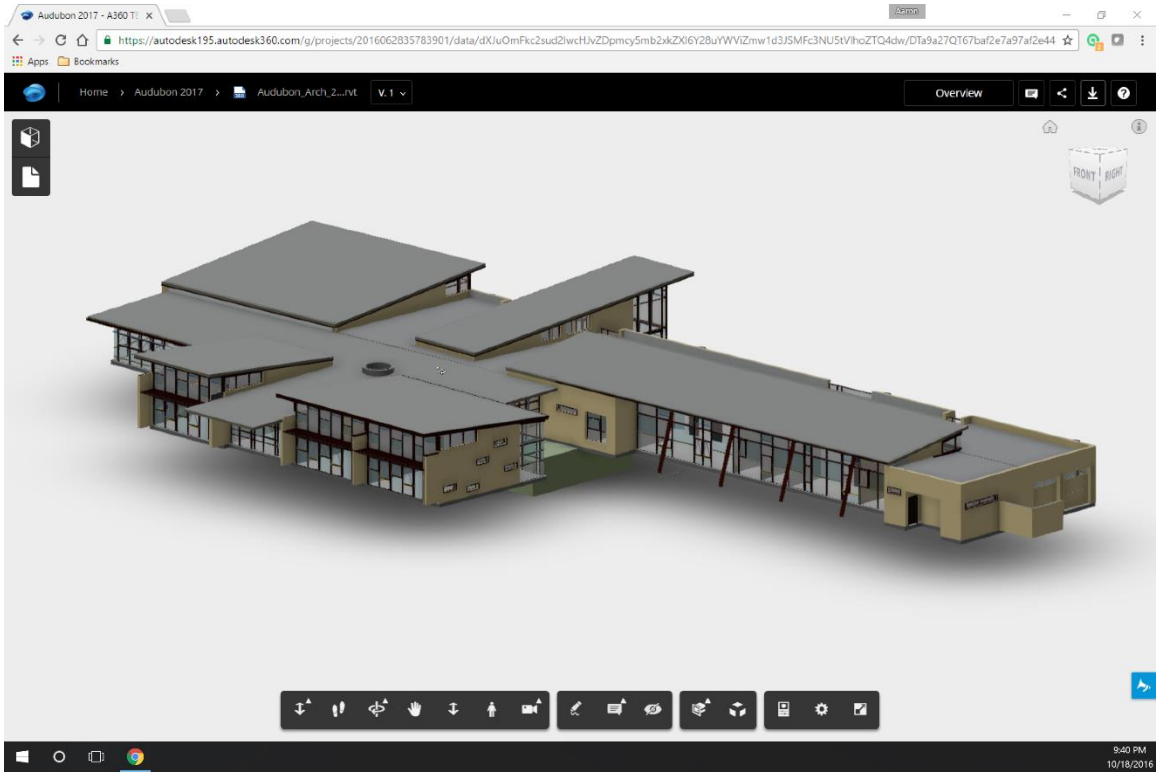

Figure 11: Viewing 3D model in BIM 360 Team

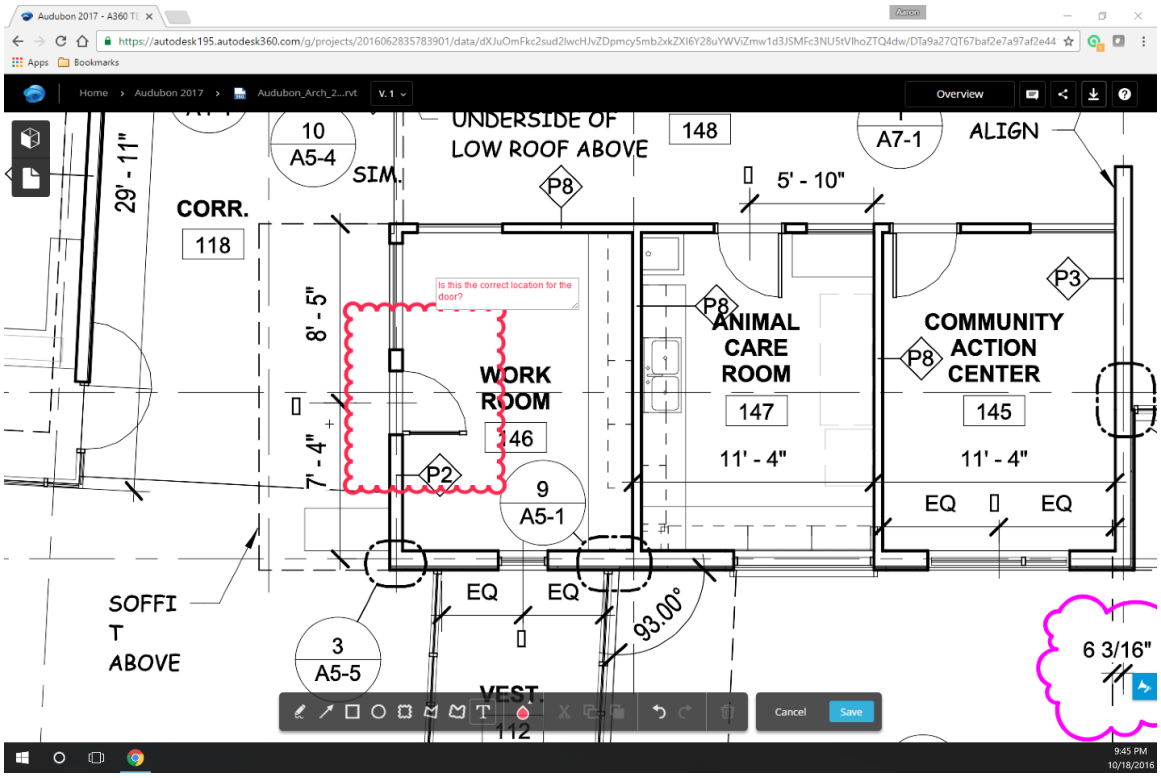

Figure 12: Marking up a 2D Revit sheet (from the same file as above) in BIM 360 Team

The BIM 360 Team file viewer is impressive. Known internally known as the Large Model Viewer, or LMV, it is able to display very complex models in a browser or mobile app. And it goes way beyond that…we can cut sections, explode the model, turn on/off object categories, use the walk tool to explore, and much more! (Fig. 13)

This is fantastic for working with clients, for example, as we could very easily publish this model from Collaboration for Revit to BIM 360 Team (more on that later) and enable them to view and ask questions without installing any software. Also remember that while we're working exclusively in Revit, BIM 360 Team supports viewing of more than 100 popular formats…no exporting required!

And then there's the benefit within the project team itself. BIM 360 Team users can take advantage of the Live Review features to study a shared view of the model in real time…and on any device. (Fig. 14)

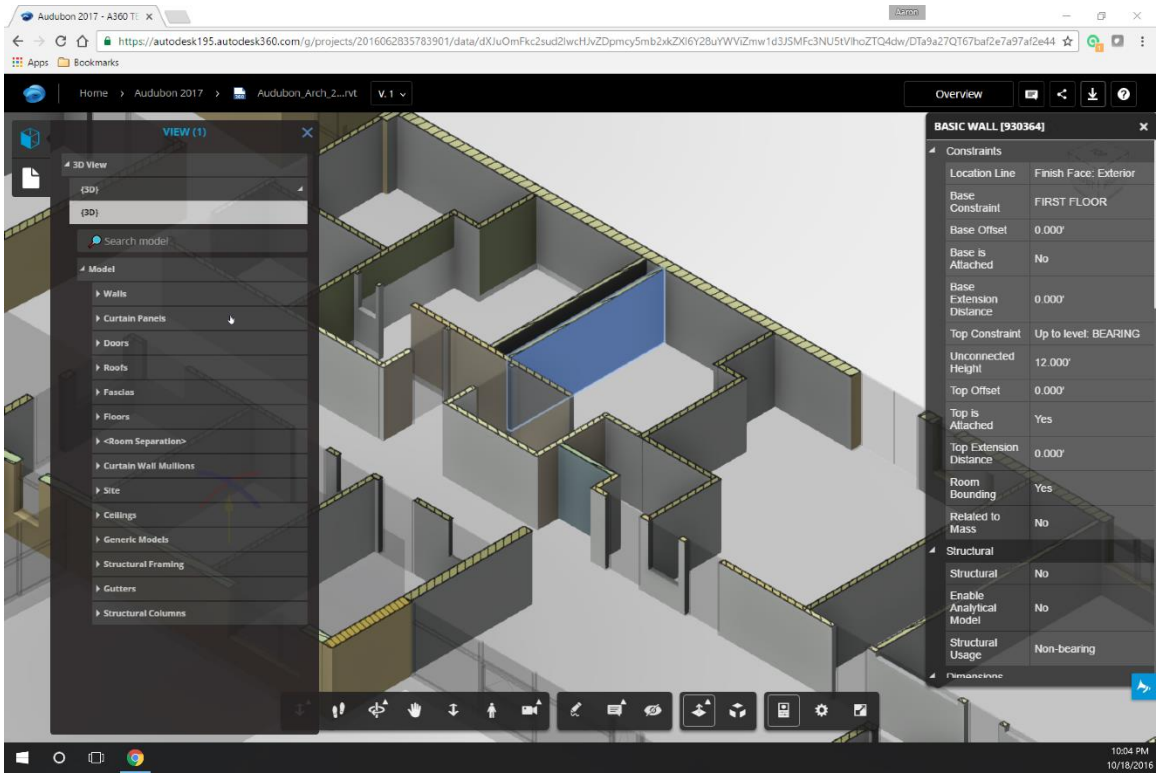

Figure 13: Isolating categories, cutting a section, and viewing properties simultaneously in BIM 360 Team

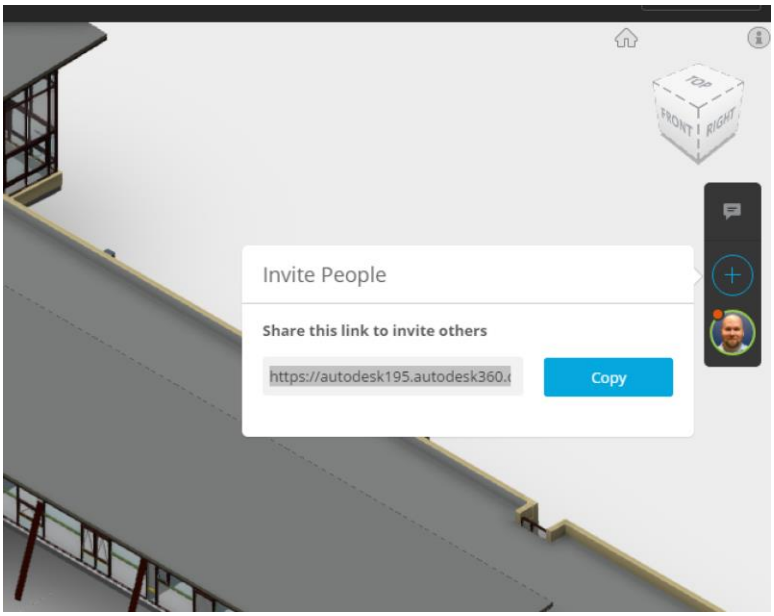

Figure 14: Initiating Live Review feature in BIM 360 Team

Collaboration for Revit

Invariably, when I show someone C4R for the first time, they will express several emotions: excitement at the prospect of working together…with anyone…from anywhere; a sense of relief that this technology will make their lives easier without any great implementation or management hurdles; and (just maybe) a bit of disappointment from end users that there are no significant changes to the Revit user interface when using C4R. In other words, there's really no drama; just sign in and go!

Of course, there's a little more to it than that. Let's look at what is different for a user of Collaboration for Revit.

First, when initiating worksharing for the first time via the Collaborate button on the Collaborate tab, Revit will ask users whether they want to collaborate within their network (i.e. the old-fashioned way) or collaborate using the cloud (C4R):

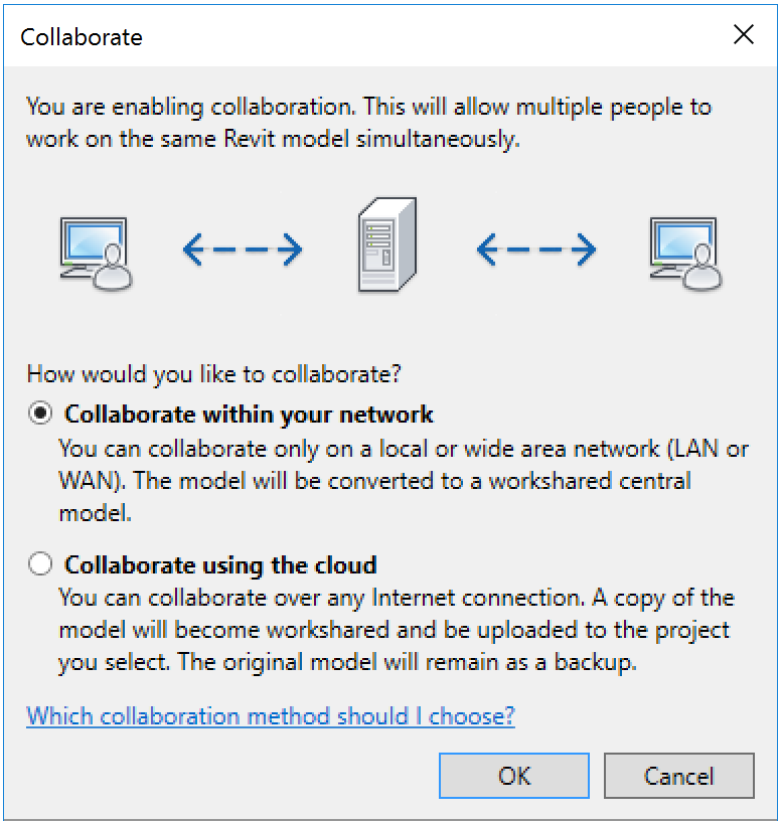

Figure 15: Collaboration options in Revit 2017

This is a one-time step for those choosing the second option, as the Collaborate button will go away and leave the traditional Workset management tools…business as usual there.

So now we're in a cloud-hosted Revit project. What else is new? For one thing, the location where everyone will go to *open* files and to *link* files has changed. When opening a file, the C4R-enabled user will see a BIM 360 Team icon in their quick access toolbar (Fig. 16):

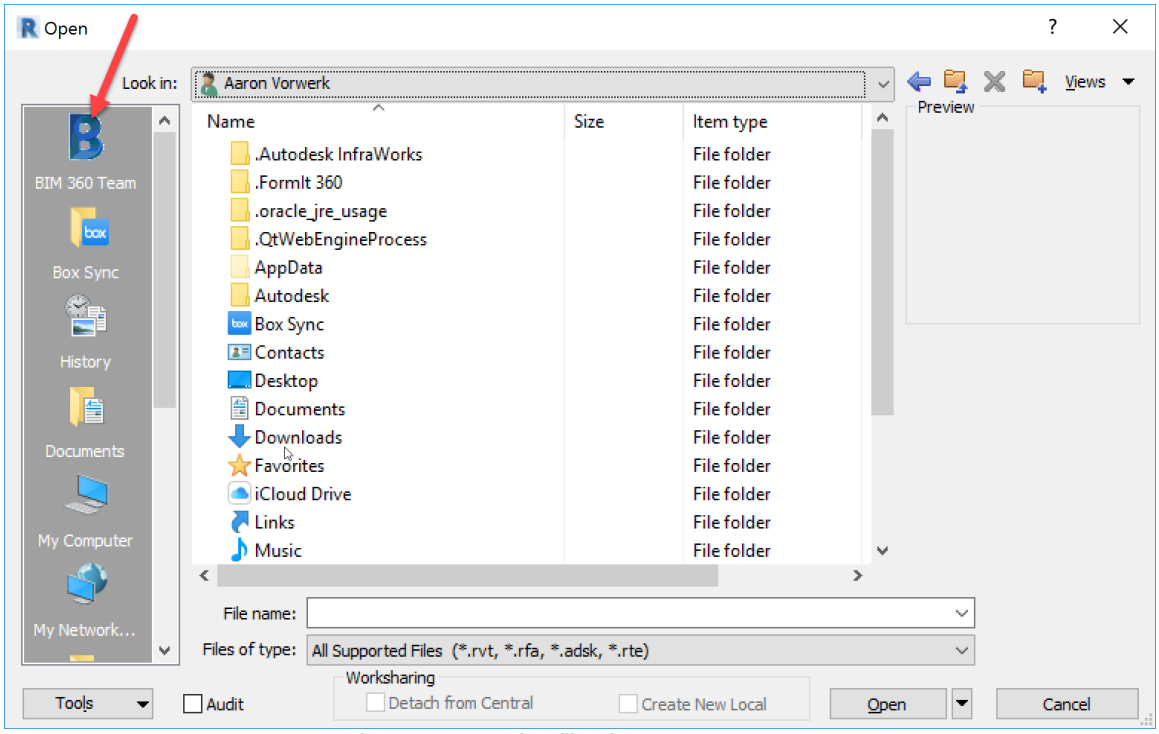

Figure 16: Opening files from BIM 360 Team

Likewise, a user that wants to link a file via the Manage Links function will see a new icon to identify cloud-hosted files (Fig. 17):

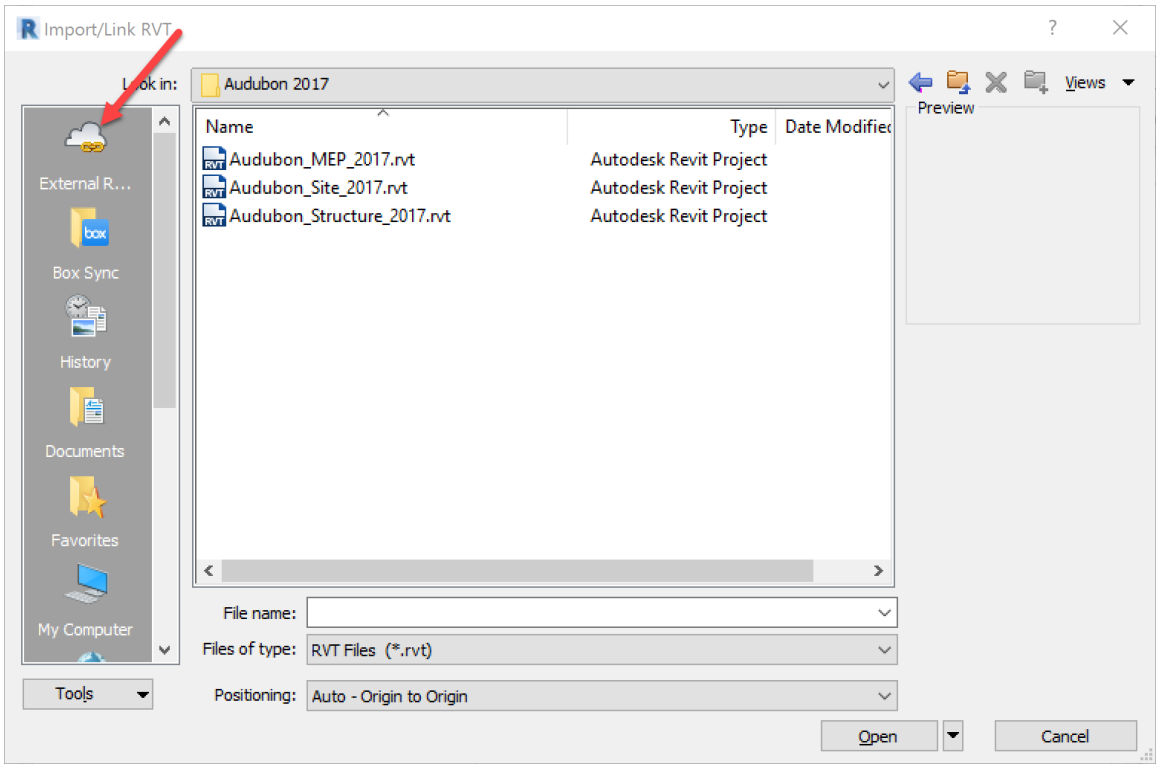

Figure 17: Linking cloud-hosted files ("External References") in Revit 2017

Once files have been opened and links loaded from these new locations, the rest of the Revit 2017 user experience is unchanged. Worksets operate as normal, syncing is performed as normal, and so on. Remember, this is a good thing! Under the hood, Collaboration for Revit is handling the complexity of managing file locking and permissions across the room, city, state, or globe.

There are just a few more buttons on the Collaborate tab that play a role in the daily operation of Revit. Two of those are found on the Manage Models panel: **Manage Cloud Models** and **Publish Settings**. Let's look at the latter first:

Publish Settings

When a model is published in the cloud, the default 3D view and all 2D sheets are published by default. Use the Publish Settings tool to select and save one or more sets of views and sheets to publish to the cloud. For example, we wouldn't need or likely want to publish all of our working views and unfinished sheets in this school project for our client to review. Rather, we might publish completed sheets hosting documentation views and possibly a few cleanly-displayed 3D views. Read more about Selecting Views to Publish to the Cloud in the Revit 2017 online help.

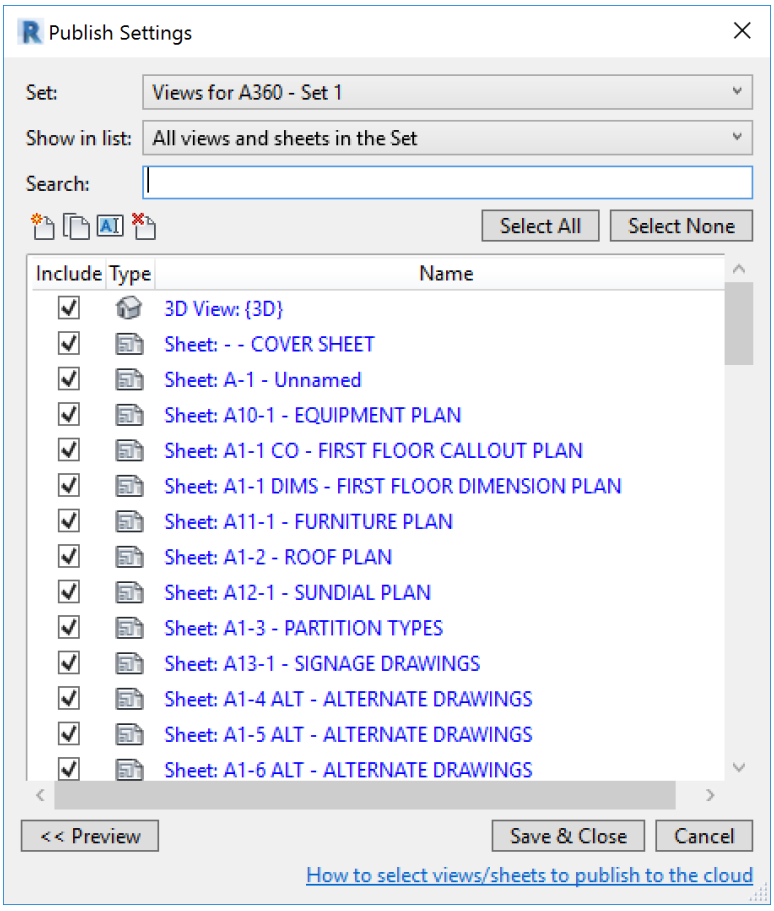

Figure 18: Publish Settings in Revit 2017

Manage Cloud Models

The Manage Cloud Models feature enables the user to view cloud projects that contain Revit models…even if he/she is not currently working in those projects. Only those cloud projects to which the user has been invited and which contain Revit models are displayed.

Within a project, tabs for **Current Project** and **Trash** are displayed with the number of models listed under each tab. From the Current Project tab, the following tasks may be performed:

Publish: The latest version of all Revit models for that project may be published to the cloud to enable team members without Revit to view, search, and interact with them on BIM 360 Team.

Publish Latest: The latest version of a particular Revit model may be published to BIM 360 Team.

Rename: Revit models may be renamed without affecting or disrupting the work of other project team members.

Relinquish: The ownership of model elements for another user may be relinquished on demand.

View and Restore Versions: Collaboration for Revit tracks every sync (ever), and it is possible to roll back (restore) to any previous version if needed.

Delete: Deleting a model will move it from Current Project to Trash, where it will remain for 30 days to permit recovery, if needed.

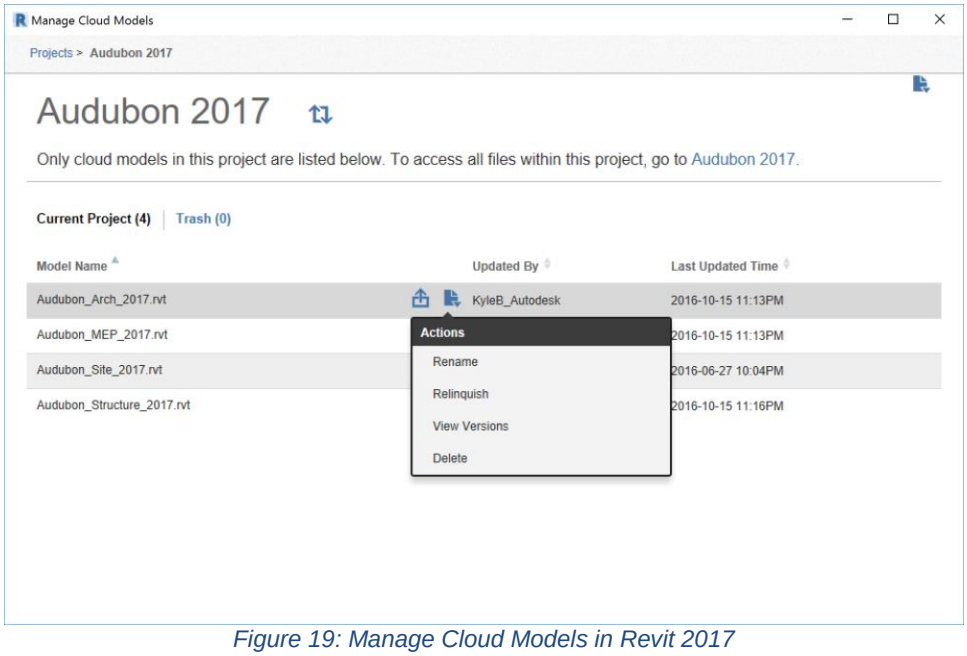

Figure 19: Manage Cloud Models in Revit 2017

These are powerful features, as they allow team members to perform tasks like renaming files that would potentially have had negative consequences for all users in the

past. For more information, see Manage Revit Models in the Cloud in the Revit 2017 online help.

Finally, we've come to perhaps the most *interactive* of the features available to C4R users: **Communicator for Revit**.

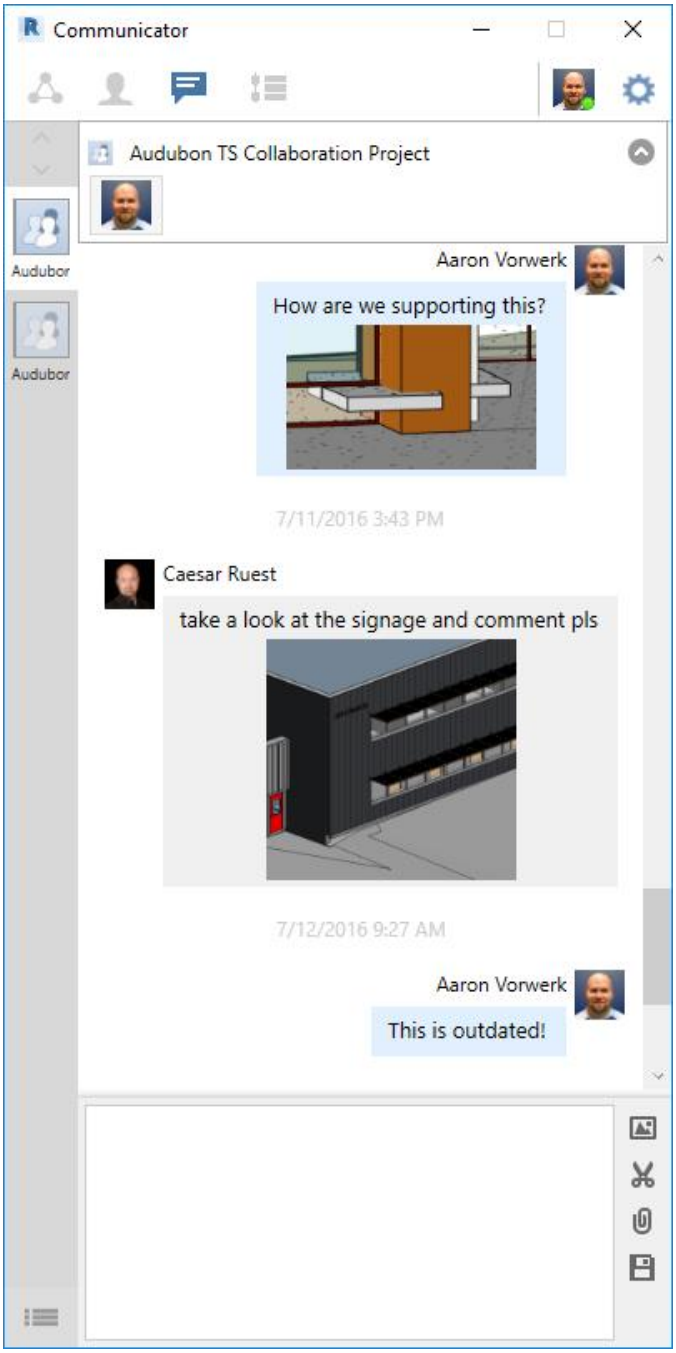

Figure 20: Communicator for Revit

Communicator works with BIM 360 Team single sign on to provide contextual communication and collaboration tools for teams working on building and construction projects. When a C4R-

enabled user opens Revit, Communicator will launch and display in a floating window. It will stay open if Revit is closed, and it is always available—even when Revit is busy opening, updating, syncing, etc.

Communicator essentially performs the combined tasks of providing project synchronization information (much like the trusty old Worksharing Monitor utility) in an instant messaging application that enables all Revit users in a project to share screenshots, documents, and chats with groups of participants within the context of Revit itself. In this school project, for example, we'd create chat groups for each consultant, our own internal chat group, and a project-wide group for mass notifications. This will allow us to quickly converse with the appropriate stakeholders at any time.

Finally, everything entered in Communicator is recorded and exportable, just in case we need to revisit that design decision down the road and review the thought process that went into making that choice. For more information, see Use Communicator for Revit in the Revit 2017 online help.

To Recap…

As we stated at the beginning of this section, the day-to-day experience using BIM 360 Team and Collaboration for Revit is a lot easier than you might think.

What we have seen in the preceding pages is that we have changed how we initiate worksharing and we open/save/link files from different places than we used to, but that's about it in terms of changes to our traditional work process. By design, C4R is a straightforward to an 'old problem'.

At the same time, we have gained significant functionality:

- We have seen that BIM 360 Team offers a powerful set of features for connecting, viewing, sharing, and reviewing 3D and 2D project information with anyone and everyone on the project team. This has the potential to be a real game-changer, particularly with our clients.

- We have found that we can manage cloud-hosted models in new ways, from file operations (e.g. rename, relinquish, delete, etc.) to controlling which information is published out to the project team.

- We have gained the ability to streamline project communications between Revit users in a unique instant messaging application with built-in screenshot, attachment, and model synchronization reporting features.

You might find that instead of changing the way you use Revit, these additional capabilities have the potential to trigger changes in your firm's overall workflow, e.g. how you typically engage with consultants and clients.

Drawing Your Own Conclusions

Is Collaboration for Revit right for you and your business needs? Only you can answer that question, but we hope we've made a compelling case for an easy-to-use, affordable collaboration solution. To assist you with your decision, we've compiled a list of common customer questions and answers:

Common Questions

Data Security

Q: Is my data secure when hosted on Collaboration for Revit? What assurances does Autodesk offer in this regard?

A: We strongly recommend that you visit the Autodesk Trust Center to learn more about Autodesk's policies around data security. You'll find other info there too, e.g. confirmation that you own your data, updates to security protocols, and so on.

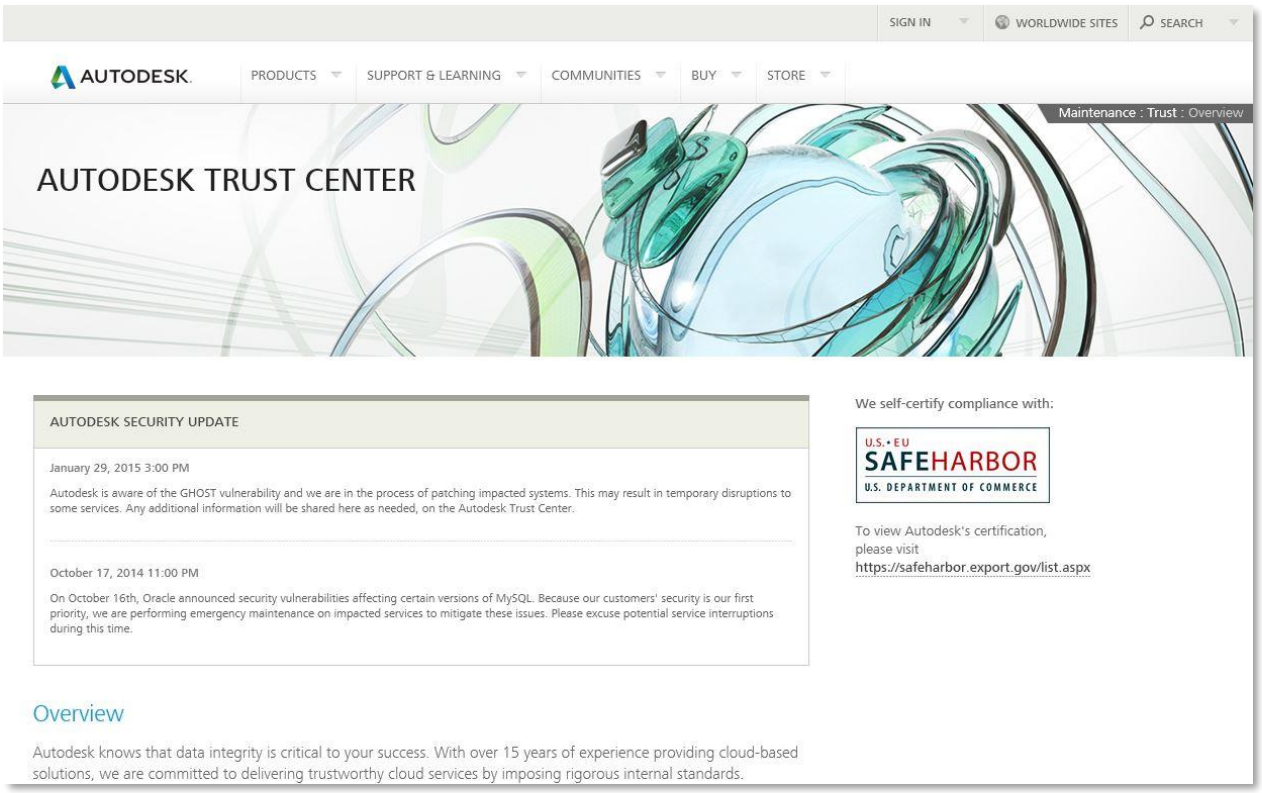

Figure 21: Autodesk Trust Center

File Sharing

Q: We don't work with consultants using Revit…it's just us (and/or) we only have one office. How would we use C4R?

A: Collaboration for Revit gives you the flexibility to work from home, from the coffee shop, from a jobsite, or even from your client's office on live Revit projects with no hassles. Just sign in and go!

Q: We're concerned that other members of the project team could edit our models.
A: With Collaboration for Revit, you will know who synced your models and when. And you can roll back to any previous sync.

Additionally, BIM 360 Team enables you to share data easily and securely with external team members that do not need model editing features.

Q: We use another file sharing solution (e.g. Dropbox). What do we gain with BIM 360 Team?
A: Generic file storage tools work very well for that purpose. But they weren't built for design-based collaboration, and they do not fully address those needs.

BIM 360 Team enables you, your clients, and extended project team members to view and interact with 3D models together in a web browser or on mobile devices and provide feedback, markups, etc. Team communications are also tied directly to the project.

Figure 22: Advantages of BIM 360 Team

Storage

Q: Is there enough storage?
A: BIM 360 Team offers 500 GB of storage, a major increase over A360 Drive (25 GB). Also keep in mind that you will be using BIM 360 Team primarily for active projects. Completed projects may be deactivated and do not count against the quota. Also, all storage inside of Collaboration for Revit (i.e. every file sync) is completely free—it never counts against the storage quota. Only models published from C4R to BIM 360 Team are counted.

Q: What happens to my 25 GB of storage on A360 Drive?
A: Nothing at all. A360 Drive and BIM 360 Team are two distinct products. Your storage on A360 Drive is independent, while your storage on BIM 360 Team is pooled among your fellow users.

Also, you are able to access A360 Drive data from BIM 360 Team, so you can leverage BIM 360 Team's collaboration tools with your legacy data stored in A360 Drive.

Pricing

Q: What does this cost?

A: BIM 360 Team costs $10-15/user/month, depending on the term of purchase. It's important to note that in a Revit-based approach, most of your project participants won't even be purchasing BIM 360 Team. Anyone using Collaboration for Revit will receive a subscription to BIM 360 Team with that service. Your clients and external consultants will be invited to participate as free Project Contributors, so they will not require licenses of BIM 360 Team either. It will only be the non-users of Revit in your firm that happen to create and manage projects (e.g. principals or project managers) that might need subscriptions to BIM 360 Team alone.

Collaboration for Revit costs $67-100/user/month, depending on the term of purchase. As mentioned above, it also includes a subscription to BIM 360 Team, since C4R is built on top of that platform. To put this pricing into perspective, we've done a very simple ROI calculation: $800/year at $100/hour of billable time translates to 8 hours/year. 8 hours/year translates to 9.23 minutes/week. So if the time savings alone resulting from not having to upload/download projects files from FTP sites on a weekly basis saves a user 10 minutes/week, then Collaboration for Revit has already paid for itself. The payback would be much more dramatic if compared to the hardware and IT costs of configuring and maintaining Revit Server or third-party collaboration solutions. And this ROI calculation ignores any consideration of the other benefits, e.g. the ability to workshare on Revit models and host design reviews from just about anywhere.

Summary

BIM 360 Team is the entry point for designers to the BIM 360 platform, enabling design, engineering, and construction teams to work efficiently together in one central workspace. It is much more than a file sharing service or viewer; BIM 360 Team enables project participants to connect, view, share, and review projects together. It is because of these capabilities that BIM 360 Team was selected to serve as the platform on which Collaboration for Revit (C4R) has been built.

Speaking of Collaboration for Revit…while Revit has supported worksharing for many years, what has been lacking is an affordable, easy-to-use, multi-location, multi-firm collaboration platform. This is where Collaboration for Revit steps in; C4R is a cloud-based worksharing technology that functions across multiple physical locations and domains. Requiring zero investment in hardware and/or IT expertise, and with built-in capabilities that allow C4R to perform well even over modest internet connections, this service has proven to be wildly popular with firms large and small. If only this technology existed when I was implementing BIM 'back in the day'!

In this session, we've taken a look at the project-based collaboration workflows enabled by BIM 360 Team and Collaboration for Revit. The introduction of C4R has taken us into a new era of Revit-based collaboration. After this overview, it is our hope that you will decide to jump in and explore the benefits that this technology will bring to you and your firm.