Advanced Strategies for Managing Your Projects in BIM 360 Design Collaboration

Roberto Manna
Desirée Mackey, PE, SE
Stantec
Martin/Martin

**Learning Objectives**

At the end of this class:
- attendees will be able to set-up a new project in BIM 360 Design Collaboration.
- attendees will understand how to adjust permissions to make the system more open for some team members.
- attendees will be familiar with how other team members not working in Revit can still participate in Design Collaboration.
- Attendees will understand the ramifications for third parties who are invited to participate in the environment.

**Description**

With the release of BIM 360 Design Collaboration a whole variety of opportunities are now open to project teams with respect to how they control the information flow between different participants on the team. Understanding the flow of publish, package, share, explore and consume is just the beginning. Understanding the nuances of the permissions system allows you to connect your linked Revit files to each other and to other data types in ways beyond the strict rules imposed by the default behaviors of the system. In this course we will walk you through the most restrictive approach (the default process) then address strategies on how you can make the permission system work for you and approaches to integrating non-Revit design team members into the process using Autodesk Desktop Connector or Forge. Beyond the strategies of using the system we will also address the consequences for consultants engaged in the environment via their architect/client. What are the implications for third parties when they are asked to participate in what is effectively a “low-trust” environment over which they do not have direct control.
Speaker(s)

Robert is a member of Stantec’s Buildings Digital Practice Team and is a leader in the implementation and support of new processes and technology throughout the organization. Trained originally as an architect, including a degree from RPI his currently key responsibilities include (but not limited to): product owner for Stantec’s model database and Stantec’s suite of custom Revit tools, management of the migration and integration of Design Technology for individual acquisitions, interactions with technology vendors, liaison with IT for configuration and deployment of software and technology as well keeping pace with technology trends. Robert also serves as the Chairman of the Design Technology Summit, an annual meeting of design technology leaders from the largest AE firms in North America. When he has time he enjoys skiing (east coast & rockies) does a one sprint triathlon a year and still finds time for his two children and wife!

Desirée has been in the AEC industry since the 1990s. After obtaining her bachelor’s and master’s degrees from University of California, Davis and Massachusetts Institute of Technology, she perpetuated her nerdy tendencies with Revit. She started her career in California with a construction company, then with a structural engineering firm, and now is a structural engineer and BIM Manager at Martin/Martin in Denver, Colorado. Desirée is a regular speaker at many conferences, she co-founded the Rocky Mountain Building Information Society, is the Chair of the Structural Engineers Association of Colorado's BIM Committee, served as an AUGI board member, Treasurer, and Vice President, serves on the AU Advisory Council, and is a member of the BILT North America Committee. Finally, as if that is not enough Revit in her life, she acts as a partner in her husband’s BIM consulting firm, BD Mackey Consulting.
Starting in the Wading Pool
Getting Started with BIM 360

BIM 360 represents a significant shift for Autodesk’s cloud platform in regard to their overall technology stack and how we as users interface with it; so much so that within Autodesk the new platform was often referred to as “Next Generation” given the number of changes being implemented.

A key change above and beyond the nature of collaborating in Revit is what were previously multiple applications are now consolidated and available within a project as multiple services. The platform service is what was previously known as Autodesk Docs 360. Docs is the key service (and not optional) as it provides the primary storage for file-based data (dwg, rvt, txt, doc, pdf, 3dm, etc…). Overlapping with Docs are the services that can be enabled per project, Design Collaboration is one; in addition, what was known as BIM 360 Glue has been rebuilt and re-branded as Model Coordination, Field (formerly Vela Field/Field 360) has been re-built as “Field Coordination”. Underpinning these services, is access to the Project Management Service (named Insight). Prior to these changes Docs, Glue, Field, and Autodesk 360 Teams existed as separate technology silos. With the release of BIM 360 Design, all these elements have been brought together under a single banner and, most importantly, a single technology stack. A key outcome of this merger/rebuild of technology is the significant improvements in data flow between the services, while not yet perfect, it’s clear what the long-term future holds for how Autodesk intends their products and cloud solutions to function together.

Why is this important? Understanding Autodesk’s philosophical approach will prepare you to use the services as they are today, as well to mentally prepare you for changes and patterns you can expect in the future.

So What Did Change..?
Contrary to popular belief Collaboration for Revit (C4R) is not (quite) dead yet. C4R is still a service that interfaces between the cloud infrastructure and Revit to provide control and management of cloud-based Revit Central Files. What has changed is that the C4R service is now able to store data within Docs, as opposed to Teams. Mysteriously just about all mention of “Collaboration for Revit” has vanished in Autodesk marketing material, even though it is still required that the C4R plugin for Revit be installed in order for Revit to “talk” to the cloud. Granted the plugin installs by default with Autodesk’s installation builder, but some firms still elect to remove it, and it is still necessary to keep an eye out for updates that might be out of sync with updates to Revit itself.

1 C4R models are now referred to as models that have Cloud Work-sharing enabled, this is inclusive of Central models stored in BIM360 (Docs) or the traditional Teams environments.
The other key piece of the puzzle that integration of C4R with Docs brought to the mix was a permission model for managing access to Revit files. From its start, Docs has had a permission structure to support its original use for managing electronic documents. The C4R team was able to adopt that same structure while bolting C4R onto Docs. It is worth noting that the permission structure works well enough that cloud-based Revit models that a user can view, only show up for the purposes of linking and do not show up when browsing for models to open (more later on why that is important).

How models and project data are shared is by far the biggest change introduced with BIM 360, and more specifically the Design Collaboration Service. To have cloud-based Revit models, the Design Collaboration (DC) service must be enabled, but it is not required that the DC features be used to leverage Cloud Worksharing, merely enabling DC in the project is sufficient. Commentators, AEC technology pundits, and the average user have all noted that the combination of Docs and DC have added a significant amount of complexity and set-up to something that was once relatively simple. Here it is worth noting how quickly the industry can shift and how something that a few years ago would be looked at askance can become second nature; when Teams was first launched people were leery about the “high trust” environment that it imposed. Now it has become second nature to create a Team, invite users, initiate models and then go to work, this has become “easy” as opposed to what Docs demands and offers. The industry learned to accept high trust and the benefit was ease of set-up; Docs offers significantly more control over access (controlled trust) but the cost is more complex set-up and maintenance.

Since the first days of being able to link CAD drawings to each other design and construction disciplines alike have consistently sought a low barrier environment to transparently share work, between teams that are almost never the same from project to project. In some respects, BIM 360 is a cornerstone to the Holy Grail many have sought, and it delivers:

- Execute your work, within your segment of the design team, which can include anyone you choose.
- When you are ready, share your work with the rest of the design team.
- Review work shared by other parts of the design team to understand changes.
- Choose when you consume the changes coming from other parts of the design team to minimize disruption to your efforts.
- Share mark-ups and issues internal to your team and the broader design team.
- Navigate and view the models and drawings.
- Eliminate uploading and downloading of files.

The above bullets summarize both what we have sought as technologists regarding Design Collaboration and what BIM 360 Design in general delivers. Whether the greater industry likes it, or thinks it is too complex, is an entirely different conversation.
Setting up a Project: the basics and tips & tricks

This course assumes a familiarity with the basics of creating a new project in BIM 360, if not, a review of Autodesk’s help and support material will fill in the basic picks and clicks.

With that said, the following tips and suggestions will likely make life easier when setting things up.

- Name the project with the assigned Project Number for the lead design firm, include the “name” or “nickname” after some type of text separator, hyphen, colon, etc; for example: 444422333 – ACME Warehouse

- Even if the plan is not to package, publish, consume (repeat) it is still advised to set up the folder structure and organize the models under the assumption that this process may shift in the future. There are a number of benefits to doing this, which we will discuss. Fundamentally its easier to do it up-front, then worry about moving stuff around later. Doing it at the beginning is just easier (promise!).
  - Why? “We” are in the cloud and features change regularly. While today there may not be sufficient justification for a team to embrace the Design Collaboration Workflow, no one knows what tomorrow holds.

- Name the sub-folders in a logical manner. Some teams have adopted the following naming scheme which is straight-forward, simple, and intuitive:
  - 05-Architecture-Stantec (<Code>-<Discipline>-<CompanyName>)
  
  For a large project, a project team may adopt a prefix (<BuildingName>-<Code>-<Discipline>-<CompanyName>)

- Add members now, not later. It is currently a pain, so get it down now and in bulk as much as possible.
  - You can always dial back access for people if you don’t want them accessing the project even though you have added them.

- Consider leveraging the “Company” field for users to basically create “groups” within the Project (more on this later).

- Stress with/remind users that they must accept the project invite and login to fully enable access (this wasn’t true with Teams).
  - One nice thing, once a user is a member of one BIM 360 project, reliance upon emails invitations is no longer required; the project will show up in the users’s drop-down.
• For Your Information (oh by the way….)
  o Sorry, no Autodesk Communicator, and no, there is currently no replacement solution either.
  o Don’t plan to upgrade a project (yet). Currently there is no efficient workflow for upgrading a project.
  o Unlike A360 Teams, a “normal” member cannot ever see all the members in a project. Currently this is “by design” given the historical background of Docs itself. One may want to go back to the good old days of maintaining a project contact list, so if there is no other shared space to post it, consider posting it in the Shared Folder or a “General” folder for all Project Members to access.
  o Speaking of “normal” members versus “Admins”, it is easy to forget that an Admin (particularly a top-level project admin) has a very different view of the environment than the typical project member. Admins should consider setting up a secondary account that has the lowest level of access so as to understand the experience of the typical project member.
    ▪ Tip: a quick way to do this is create an additional e-mail alias that points to your corporate account then create an Autodesk account with the alias. If Stantec IT will do this, yours will too!

The sequence for project creation that seems to work best is:

1. Create the project (at Stantec this is someone else, not “us”)
2. Set-up folders.
3. Create teams – even if it is not the plan to share/consume do it this way anyway, it helps keep the permissions cleaner.
4. Apply override or elevated permissions as necessary; this might include:
   i. Full control on certain folders for “BIM Managers” from other companies.
   ii. Viewing or even editing permission for groups of users on other folders to establish higher trust environments.
5. Start populating models, publish, share, consume and link as necessary.
Consider your consultants…
Before diving into some of the ways you can extend and configure BIM360, it would be appropriate to pause to consider consultants (or anyone) invited to access BIM360. In its intended/current state, BIM360 is a bit of an odd duck in how we have traditionally worked and managed our files, particularly in the Buildings Industry. The closest analogy is Bentley’s Projectwise, or perhaps Vault, but neither have ever had significant market share for those focused on delivering the design of “typical” buildings.

“We” as the architects set up a site (project) for document storage and management. We exercise complete control over that site. We then invite our consultants to participate. However, unlike the Teams approach where all users were in the same data silo and anyone could always invite someone else to the party, Design Collaboration introduces a set of barriers that didn’t previously exist. On top of that we are asking the consultants to then put their work, their production, their value, into an environment over which they may have little to no direct control or authority and could in fact be locked out (admittedly the same was true for Teams, but in some aspects BIM360 makes it worse). Interestingly there has already been one lawsuit that covers this ground, and makes for some interesting reading (spoiler alert, it wasn’t BIM’s fault). Regardless the suit highlights the understandable trepidation that consultants might have with using BIM 360 from a risk/control perspective.

To discuss this more generally from the perspective of the consultant, there are many pros and cons of this new “low trust” environment. One benefit is the significantly increased up-front set up and leg work is greatly taken on by the “owner” of the project. In this sense consultants are somewhat shielded, and delightfully unaware of the effort required to establish the much more robust working environment. Since knowledge is also power, this may also have a bit of a downside – it isn’t always so nice to be in the dark. Furthermore, consultants have little control, or visibility of the whole process. They are at the mercy of the owner of the project, who may or may not be better versed in the nuances of the project. Consultants are very much “along for the ride”.

As previously alluded to; for consultants the new DC platform is still very much a “high trust” environment. The ability to incrementally share progress is really an illusion since the owner of the site can access anything at any time. Therefore, the added steps to publish, share, consume are cumbersome and still do not offer complete control of who has access to the data. Sure, other consultants can’t open the file, but the owner of the site can, so in that sense Autodesk has not closed the loop. Another nuance for DC versus Teams is that it is now more difficult to invite someone to a project. A consultant must effectively submit a request to the site owner, and often the person in control of adding project participants is not someone working on the project in a daily capacity. Delay in onboarding new staff is now inherent to the process. This becomes particularly difficult during “fire drills” – consultants cannot easily throw manpower on a job at deadline time. This new platform is also more expensive because more services are included, but are they products the consultants use or need? Often the choice to participate is not dictated by the consultant, but the bring your own (BYO) license structure necessitates a hard cost to the consultant nonetheless. Not that a consultant would dispute the choice since all see the benefits to the platform, but in this sense, someone else is spending the consultant’s money.
Complicating the BYO license structure is the stand-alone Docs license without the BIM 360 Design component. The old BIM 360 Teams license worked much the same as Design – buy and use your own. However, Docs licenses are set up and assigned on a project-by-project bases, by the owner of the project. This means that the owner of the project must buy Docs licenses for all to be included, on a per-project bases, so a single person on many projects could conceivably consume several licenses at once. This is both costly and inefficient. Furthermore, a misunderstanding of this functionality has caused project owners to force consultants to unnecessarily purchase Docs licenses, while (at the time of writing) a glitch in the Autodesk licensing system is allowing owners to assign unlimited Docs licenses thus creating the illusion that the BYO license structure also applies to Docs. Confused yet? Yep, us too.

But We Like to Play in the Same Pool….

Extending BIM 360, Breaking the Rules

As mentioned earlier there are plenty of users who have grown to like the advantages of a “high trust” or open environment where models are live-linked to each other. At first glance it may seem like a similar environment cannot be established with BIM 360 Design, but the good news is that is not the case. In fact, with BIM 360 Design’s permission model it is possible to mix and match approaches on a single project to meet different requirements.

Back to the Future – Teams re-incarnated

Looking for that old school approach just like A360 Teams? Well the truth is that Design Collaboration can be used; first activate Design Coordination on your Project, then from Revit start initiating models into the Project Files folder. With everyone working in the same folder, this effectively mimics the classic C4R/Teams behavior. No set-up of “Teams”, no permissions, no sub-folders.

Something to consider: Just because you can do something doesn’t mean you should. As briefly touched on earlier, the challenge or concern with taking this traditional high trust approach is that should the direction of the project change later, all models will need to be moved into various sub-folders. Additionally, on projects with a large quantity of models a folder structure broken into a logical structure is simply easier for end users to navigate and focus on the models that are most relevant to them.

One of two things are likely to happen that will cause the team to change their minds about the high-trust set-up option. Either the project dynamics will change in such a way that more control is desirable, or Autodesk will add more features that are compelling enough that the team wants to further embrace the Design Collaboration workflow. Keep
in mind that Design Collaboration is the place where multiple models are federated together to place either an entire building or multiple buildings on a single site. One can imagine based on that core functionality that there are likely future enhancements in the pipeline that will continue to make Design Collaboration a compelling module.

How do we achieve this open, high trust nirvana while maintaining a safe-guard against future changes? Easy; create the sub-folders, then give blanket permission to all Companies, or Roles, on the project. Everyone will have full access everywhere. It may be worth considering retaining full control for a limited number of (power) users while providing View, Edit and Upload permissions for the majority of users.

“I kinda like that part of the team; but I don’t trust those other folks at all!”

This is an unfortunate reality for many consultants/teams – collaboration is great, but when it comes down to it, no one wants anyone else in their models. This is relatively easy to do, just identify who should have access to what, and to what level. Some
examples of this are: the structural engineer wants to live link the architecture model. They need view rights, but they likely do not need edit rights for the architecture team’s folder. Another example is if the interior design team models separate from the architecture team but all architects and interior designers need full edit rights on all models; or stereotypically, the architects could have full access to the interior design models, but interior design does not have to have permission to edit and open the architecture. The brilliant part of limiting permission to “view” versus “edit” is those settings will be reflected in Revit’s Open and Link file dialogs. When a user has view only rights to a folder, in Revit, in the file open dialog they can browse to the folder, but the models will not be visible; however, when that same user browses to the same folder from the Insert Link dialog, the model(s) will be visible.

Again this is relatively easy to achieve by assigning permissions appropriately in bulk to the different teams. The most efficient way to achieve bulk permission changes is to use the Company name as a substitute for a “group”. We have found that the fully locked down “roles” field is simply too limiting to manage a complex series of permissions/folder access on a large team. Where Stantec has encountered issues is when a Stantec team covers multiple disciplines and segregation is desired. The best approach seems to be to modify the company name. For example, we always start with “Stantec Consulting” but on a number of occasions we have had to assign people with various permutations, such as; Stantec – Architecture or Stantec
MEP, etc. From a data and identify management perspective this is not ideal, but at current this is the best option. Looking ahead, it seems inevitable that at some point Autodesk will need to introduce the idea of groups if not in concept, then actual name and form.

**I Want to Play Too!**

*More than Revit Can Join In the Fun*

The other significant challenge that Teams/C4R introduced for project teams was the lack of ability to easily link to files that were not cloud enabled Revit workshared models. The problem, of course, is that there are few Revit projects (particularly large ones) that can claim to exclusively have Revit files that are part of “the model”. Additionally, a design team may also have parts of the team working in Revit but choosing not to participate in the cloud infrastructure; in which case the non-participating team would send their Revit model to the rest of the team and vice versa. Yet there was nothing a C4R team could do with the dead model from the non-C4R part of the team! The best the C4R team could do was strategically place the dead model on a file server and its own dedicated workset and set expectations appropriately with the Revit users. The other choice has been to initiate the dead model into C4R, however since Teams has no model “replace” functionality, this process entails some significant link management efforts when updates are delivered.

With the release/introduction of Autodesk Desktop Connector earlier this year, many of these issues are finally resolved! Chief among them, Autodesk Desktop connector allows you to store Revit models in the cloud and link to them, without having the models be “cloud enabled” models. Document Management (Docs) already had the ability to consume any type of Revit model as part of its sheet extraction and management functionality; this also meant that Docs could version Revit models as new versions were uploaded into the system. Docs also does not care if the Revit model has Worksets enabled or not; prior to Design Collaboration, its primary job was to extract sheets and the model for viewing. Desktop Connector is the missing link that allow Revit to link to non-cloud workshared Revit models stored in Docs.

Additionally, Desktop Connector provides the same link to a variety of other file formats; effectively anything that you can link to in Revit can live-link in the cloud (dwg, dgn, ifc, txt, etc.), even images (for example material maps, decals) could be stored and accessed/loaded via Desktop Connector.
Now that the initial burst of excitement has worn off, there are a few things to know about Desktop Connector (DConn) and its relationship with files stored in Docs:

- DConn can only see the Project Files folder tree (for now?). It will not help with easy uploading/downloading of files stored in the Plans folder tree, nor is it a back-door to get access to that data via Revit.
- DConn has no file locking mechanisms; this is not currently a replacement for Projectwise or any other Document Editing Control mechanism. While you can open and edit DWGs via DC we do not endorse or recommend that at all! If user 1 opens DWG A and user 2 opens DWG A whomever saves last will “win”. In addition, neither user will receive any indication or warning that they are concurrently editing the same file.
- If you upload a non-workshared Revit model to the cloud via DConn, you can continue to edit that model via DConn. Same rules about lack of file locking still apply and this will not work with a “Central File”.
- Models can be uploaded via the Docs website or drag-n-drop via DConn. Either will work.
- When you copy in a newer version of an existing model (by name) Docs will version the Revit model for you, providing a full history of versions received.
- The only way to navigate to DConn and therefore the files stored in Docs is by browsing to “This PC” (Windows 10 nomenclature) and going to BIM 360. Do not be fooled by the BIM 360 shortcut used to open C4R models or link to C4R models!
- Civil 3D 2019.1 and Revit 2019.1 brought new exciting developments for coordinating from C3D to Revit via Desktop Connector!

Collaboration Scenarios with Desktop Connector

**Linked Data Managed Internally Single Team Access**

Your team is working in Design Collaboration with your Revit models in C4R. You want to link to “static” data coming from another source (RVT, DWG, IFC, SAT, etc.). Easy to do! You can add the linked data directly to your team’s work-in-progress (WIP) folder then link via Desktop Connector. Note; this assumes that only your team needs to see the linked data and assumes you have made no changes to the default permissions on your WIP folder.

**Linked Data Managed Internally Multi-Stakeholder Access**

You want to provide access for multiple teams to link to data that you’re managing but you don’t want to give access to your WIP folder. The easiest place to put this data is in...
the “Shared” folder automatically created with Design Collaboration. To keep things clean and organized you may want to consider creating a subfolder to hold this content. The sub-folder name should align with your overall folder naming conventions for ease of use.

Linked Data Managed by the Data Owner Scenario A

Part of your team just doesn’t work in Revit (its ok, it happens). They do want to participate in BIM 360 as much as possible and their data will be linked into one or more Teams’ Revit models. In this case create a folder for the “Team” and assign permissions accordingly so that the Data Owners can edit/modify and provide view access to the teams that need to link their data into their Revit models. At this time, it is not possible to include non-Revit files in a Package so there is no point in having this team participate in Design Collaboration.

Linked Data Managed by the Data Owner Scenario B

Like Scenario A, except in this case this team wants to/is willing to consume Revit data (even though they are not in Revit). Create an actual full team for this team; while they cannot share their data via a package, they can still consume packages coming from other parts of the team. The consumed Revit files are visible to be downloaded from BIM 360 or via Desktop Connector from the “Consumed Folder”. Making use of the consumption of packages provides tracking as to what models the team is using.

Revit 2019.1 & Civil 3D 2019.1

With the release of the 2019.1 updates, designers working in Civil 3D can share topography information with their partners working in Revit by way of Autodesk Desktop Connector and BIM 360 Design. In this case Desktop Connector is used to “publish” a topo surface to BIM 360 (via Desktop Connector). Revit users are then able to link the topo surface into Revit directly. Re-publishing from Civil3D will update the surface, which in turn refreshes in Revit when reloaded. Like previous discussions, the appropriate folders need to be set-up with proper permissions for Civil3D users to write the topo surface export from Civil3D to the cloud, and Revit users need the viewing capability to link to the topo surface.

Conclusion

To wrap things up this handout is meant to help provide guidance on how you might broadly apply BIM 360 in a variety of situations and extend it beyond the “as advertised” approach(s) for sharing data between team members. The challenge that an ultimately flexible system brings is that it will always require significantly more set-up than a system with few options and limited flexibility. Arguably what people have asked for following the original Revit Server release and then the release of Teams & C4R is “more control over who can access files”. That control has now been handed to us, but the cost is needing to understand the nuances of the platform and an appreciation of how to determine what a team’s needs are and fit that appropriately with the platform. Furthermore, there will likely be a need to consider the legal implications of this
platform, especially as it relates to ownership, intellectual property, etc., and addressing the necessary topics in contracts would be prudent.

Like anything, this new platform offers pros and cons, upsides and downsides, enhancements and challenges, and more. All those things aside, and perhaps even some of our preferences aside, working in the cloud is a reality (no longer “the future”) and we all must determine how to efficiently operate within this new platform.