BIM360 Design Collaboration: Everything You Need to Know

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Learning Objectives
- Discover BIM360 Design Collaboration concepts
- Learn how to set up a BIM360 Design Collaboration project
- Learn about BIM360 Docs and BIM360 Design Collaboration folder permissions
- How to effectively use and understand the BIM360 Design Collaboration module

Description
This class will focus on everything you need to know to effectively implement and execute BIM 360 Design Collaboration on your projects. A lot has changed since the first generation of Collaboration for Revit and the BIM 360 Team environment; this class will explain it all. You will learn how to create a new project within the BIM 360 Docs environment, set folder permissions, and integrate Revit workshared models into the project. The class will take a deep dive into the Design Collaboration module where administrators have complete control over model access, folder permissions by company, and model publishing visibility. The class will show how CRB utilized BIM 360 Design Collaboration on an active design/assist project with many stakeholders involved, proving to be a highly effective collaborative design environment.

Speaker(s)
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Introduction

Autodesk’s collection of BIM360 tools is an integral part of design and construction workflows in the Architecture, Engineering and Construction (AEC) industry. The BIM360 Design Collaboration module has seen significant improvements towards supporting multidisciplinary teams since the release of its predecessor, Collaboration for Revit/BIM360 Team, just a few years ago. The key to successfully implementing BIM360 Design Collaboration is understanding its concepts and knowing how it can effectively be applied to any type of design and construction project. This class outlines those concepts and how they were integrated into a project consisting of multidisciplinary teams across five organizations. From there, follow detailed description of ‘everything you need to know’ about project set up, maintenance, and execution utilizing the BIM360 Design Collaboration platform.

BIM360 Concepts

BIM360 is an Autodesk cloud-based solution that allows project teams to effectively work in a collaborative environment. In the AEC industry, it connects all project stakeholders to execute projects from conceptual design through construction and ultimately project turnover. BIM360 is the overarching concept that is comprised of various modules focusing on different aspects of the project lifecycle:

- BIM360 Docs: document and model management
- BIM360 Build (formerly known as BIM360 Field): field management activities
- BIM360 Design Collaboration (formerly known as Collaboration for Revit [C4R]): Revit model worksharing and management
- BIM360 Coordinate (formerly known as BIM360 Glue): model/clash coordination
- BIM360 Layout: construction layout and surveying
- BIM360 Plan: construction production planning
- BIM360 Ops: facilities asset management

While utilizing the entire BIM360 collection can result in project success, this class focuses on the benefits of executing BIM360 Design Collaboration on a project comprised of multidisciplinary teams across five organizations.

Collaboration for Revit

In 2015, Collaboration for Revit (C4R) changed the way project teams across various organizations worked together. With Collaboration for Revit, users could co-author workshared Revit models, in real time, hosted to the cloud environment. The common link that provided all team members access to these models was an Autodesk account. This workflow became highly desirable for teams to collaborate both within and outside an organization.
To execute this workflow, a project needed to be first established in the project hub, also known as BIM360 Team. Revit central models were then initiated, allowing users to access local Revit files via C4R and download/view in the BIM360 Team hub. After initial creation, Revit model access and synching remained live in the C4R environment but required a separate publishing function to view in BIM360 Team. Integrating directly with Revit, BIM360 Team was intended to be a repository for sharing published models with the entire project team. This tool featured model versioning, web viewing/navigation, and markups/comments for enhanced collaboration.

With the C4R/Team approach, Revit model sharing was an open source environment. All central models could only be hosted to a common root folder, preventing a controlled folder structure. Because of these limitations, the following applied to all C4R projects:

- All project team members were able to access any central model initiated in the project regardless of organization
- Any models linked together were updated in real time

While these two concepts were innovative and can still be applicable to projects today, Autodesk sought to improve this workflow by giving more flexibility and control to project teams. C4R/Team was retired in Revit version 2018.3, although Autodesk still supports legacy projects established in the C4R/BIM360 Team environment.

**BIM360 Design Collaboration**

In Revit version 2018.3, the next generation of C4R was introduced: BIM360 Design Collaboration. While BIM360 Design Collaboration is optional in Revit 2018.3 (C4R/Team as the alternative), it is the only form of cloud worksharing available for Revit 2019 and higher. Autodesk introduced this improved method to give project teams more control over model access, permissions and sharing capabilities.

The general BIM360 Design Collaboration concepts are similar to C4R/Team. First, a project must be established in the project hub now known as BIM360 Document Management (Docs) with both Docs and Design Collaboration modules activated. Project teams still co-author workshared Revit models hosted to the cloud environment and collaborate via Autodesk account. After initial creation, Revit model access and synching remains live in the Design environment but requires a separate publishing function to view in BIM360 Docs.
Document Management
One of the key features that sets BIM360 Design Collaboration apart from its predecessor is its foundation in BIM360 Docs. C4R/Team was formerly part of a set of modules, including BIM360 Glue and Field, that functioned independently of each other. To better connect various project phases and improve project delivery, these modules migrated into one single source of truth within the Docs platform.

Design Collaboration + Docs Features
As it relates to BIM360 Design Collaboration, BIM360 Docs is intended to be a repository for sharing and exploring published models with the entire project team. The improved features of BIM360 Docs combined with the new Collaboration module has allowed project teams to work more collaboratively and efficiently:

- **Project Teams**: This feature allows the creation of teams that can workshare independently while still being connected to the project. In Docs, a ‘team’ is established, and as a result, a corresponding Docs folder is created as the intended model worksharing location for that team. Each team member then has their own space for model viewing, publishing, consumption and issue tracking within the Design Collaboration module.

- **Folder Permissions**: Adopted from BIM360 Docs, folders associated with teams can be assigned permissions. Establishing permissions gives more regulation over Revit model access, visibility and sharing across other teams. Up to six levels of folder permissions can be granted to team members by user, company or role. For more on folder permission settings, see Folder Permissions.

- **Publish/Consume Models**: Project teams can control when models are made available for all other teams. In this two-step process, a team member first ‘publishes’ the latest Revit models to BIM360 Docs. Through the Design Collaboration module, they then create a package containing the published models, thus making them available for consumption by the entire project team. The other team members then ‘consume’ the published models to integrate into their space.

- **Model Viewer and Explore Features**: The explore features found in the Design Collaboration module allow project teams to visualize model packages directly in the web viewer. These tools include standard model viewing and navigation features, selection by level and phasing and the ability to identify model changes between shared packages.

- **Integrate Issues**: Issues can be utilized to identify areas in need of coordination or further attention. At one time, issues could only be created in plans in BIM360 Docs. With the development of the next generation tools, issues now span across BIM360 Docs and Design Collaboration (along with Field Management). Now, issues created in the Docs module model viewer can be seen in Design Collaboration and vice versa.
Workflow Strategies
Based on the concepts of BIM360 Design Collaboration and Docs, there are four different ways project teams can collaborate on a project. Before diving into the different workflows, it is important to understand what happens when a team is created in the BIM360 Design Collaboration module and how that affects the Docs environment. Upon creation of a team, the following Docs folders are automatically created as a result:

- The root team folder to hold that team’s workshared model
- A consumed folder within that team’s root folder
- A shared folder outside of the team’s root folder

Knowing this helps to understand the following possible project workflow:

**Workflow 1: Live linking models without Teams, least controlled**
This workflow is most familiar to those who have experience using C4R/Team. In this scenario, all models within the project are live linked together from the same Docs root folder. This means that the project team is seeing updates from linked Revit models in real time. In order to achieve this scenario, all team members must have the same access permissions to the root folder containing all models in the project. Also, because no ‘team’ folders are created, the features within the Design Collaboration Module do not exist. This workflow is using BIM360 Design Collaboration at its minimum.

**Workflow 2: Live linking models with Teams, more controlled**
This workflow is similar to C4R/Team in that models are live linked together. In this scenario, teams are created either by organization or discipline and corresponding folders are generated in Docs. Each Revit model resides in its associated team folder and externally linked from the same location. To see live linked models in Revit, team members only require view permissions to other team folders (see Folder Permissions). This workflow restricts Revit model across teams while still giving live linked visibility. Because teams are established in this workflow, the enhanced Design Collaboration module features are also available.
Workflow 3: Linking to Published Models, even more controlled

This workflow gives teams more control over linked model visibility. When a team is created in the Design Collaboration module, a shared folder with that team’s name is also generated. When a team publishes their model and creates a package in BIM360 Design Collaboration, a copy of that model gets placed and updated in the corresponding ‘Shared’ folder. Revit models can be linked directly from this folder.

In this scenario, links are not live, but they will automatically update when a team member publishes to Docs then creates a package. Linking through the shared folder can also prevent teams from having any level of access to another team’s Revit model. For a team member to see linked models in Revit, they must have at least ‘View/Download’ permissions set to the appropriate ‘Shared’ folder (for more on permissions, see Folder Permissions). Note that the published models placed in the ‘Shared’ folder are not workshared models and cannot be accessed via Revit.

Workflow 4: Publishing and Linking to Consumed Models, most controlled

This workflow provides the most controlled worksharing environment. When a team is created in the Design Collaboration module, a ‘Consumed’ folder is generated within the team’s root folder.

The first step of this workflow requires that a team publishes a model from BIM360 Design Collaboration to Docs. That published model then becomes available for consumption in the Design Collaboration module (as well as placed in the ‘Shared’ folder per Workflow 3). Once consumed, a copy of the model appears/updates in the team’s ‘Consumed’ folder where it can then be linked into Revit. In this scenario, links are not live, and project teams decide when to show published models that are made available for consumption. No additional permissions are required for the ‘Consumed’ folder since they are inherited from the team folder level.
Choosing the Best Workflow

There is no single way that a BIM360 Design Collaboration project must be executed. The four possible workflows in the previous section give project teams more options and flexibility. There are several factors that can influence the ultimate decision: project type, schedule, stakeholders involved and intellectual property just to name a few. It is critical, however, that the decided workflow is clearly defined in the project’s VDC/BIM Execution Plan.

As the design and construction manager, CRB piloted BIM360 Design Collaboration for a design-build and design-assist project. While there were external design partners, the goal was to also collaborate with trade partners during design to mitigate risk and accelerate the fabrication process to deliver and build the project quickly and more efficiently. Overall, there were multidisciplinary design and trade partners involved that covered a wide range of Revit modeling scope:

- **Team 1**: CRB - Architecture and Electrical
- **Team 2**: Mechanical Trade - Mechanical duct and piping
- **Team 3**: Plumbing Trade - Plumbing
- **Team 4**: Structural Engineer - Structural
- **Team 5**: Interior Designer – Interiors and furnishing

Keeping in mind the four possible BIM360 Design Collaboration workflows, CRB developed a plan that best suited this project. Note that a single workflow does not need to be followed by all teams. A hybrid approach can be implemented, allowing some teams to live link while others to publish and consume. CRB utilized this type of approach based on the needs and scope of each team. At a minimum, teams were created per organization, eliminating Workflow 1. The workflow breakdown for all teams was as follows:

**Workflow 2: Live Link**

- Bidirectional live link: CRB, Mechanical and Plumbing all live link between each other. As design/assist partners to CRB, it was most efficient for these three teams to coordinate in real time.
- Unidirectional live link: CRB, Mechanical and Plumbing live link Structural model. It was decided that it was most beneficial for these three teams to see structural updates in real time.
Workflow 4: Publish/Consume

- Bidirectional publish/consume: CRB, Mechanical, Plumbing and Structural publish models to be consumed by Interiors; Interiors publish models to be consumed by CRB, Mechanical, Plumbing and Structural. To prevent Interiors from reacting to working design changes, control was set to choose when models should be released. Because Interiors scope did not have a significant impact on the balance of the team, publish/consume took the bi-directional approach.

- Unidirectional publish/consume: CRB, Mechanical, Plumbing and Interiors publish models to be consumed by Structural. To prevent Structural from reacting to working design changes, control was set to choose when models should be released.

Project Setup

After the BIM360 Design Collaboration workflows are determined and documented in the project VDC/BIM Execution Plan, project setup can begin. This section takes the administrator through all steps required to successfully set up a BIM360 Design Collaboration project.

Adding Account Administrators

Only BIM360 account administrators have access to the Account Admin page and can add companies, members, projects and invite other admins at the account level. An account administrator can be added from the Account Admin page.
If a user has already been added to the directory but not as an account administrator, they can be modified at any time. Select the member from the Account Admin page to change the access level.

Adding Companies
Before starting a BIM360 Design Collaboration project, it is beneficial to add companies to the company directory in the Account Admin page. When users are eventually added to the specific project, their company is chosen from that directory. The fields indicated with an asterisk below are required to complete this step. All other company information optional.
Adding Users to the Member Directory

It is good practice to add users to the member directory in the Account Admin page prior to adding them to the project. When adding a team member, the ‘Default Company’ is chosen from the company directory (see Adding Companies) and the ‘Role’ is chosen from default set of options. Note that this step does not add members to the specific project; however, establishing them first in the directory simplifies the process of adding them later at the project level.

The member directory is also the only location where the default company can be defined. This parameter is helpful for sorting, filtering and reporting on all users in a company’s member directory. When assigning company at the project level, that information does not apply as the user’s ‘Default Company.’
Licensing
Before creating the project and inviting members, it is important to understand the functionality of BIM360 Design Collaboration and Docs licensing to ensure that the entire project team can access the project. Both products follow the user-based license model but have different requirements for access.

- For BIM360 Design Collaboration, licenses must be internally acquired by each organization participating in the project. Once a user’s license is internally activated (including members from the host organization), that user can access the host’s project after an invitation is sent by the project or account admin.
- For BIM360 Docs, all licenses are provided by the host organization and do not require that external organizations obtain their own license. This method also applies to the balance of BIM360 modules under the Docs platform.

Visit BIM360 Design Collaboration [Licensing](#) for more information.

Creating a Project
After members and administrators are defined at the account level, it is time to begin creating the project. The first step is creating the project in the BIM360 Docs environment from the Account Admin page. Project name, type, start date, end date and language (all marked with asterisks) are required for project creation. All other information is optional and can later be edited as needed (see [Modifying Project Profile](#)).
Activating Document Management
The next step in creating a project is activating the applicable modules. As noted in BIM360 Concepts, this workflow requires the combination of Docs and Design Collaboration modules. Document Management must be activated first. Once ‘Activate’ is selected, there are two actions required prior to completion:

1) Copy Docs folder structure settings from another project. It is recommended to have a company standard folder structure template project (see Developing Folder Structure) established to simplify project startup.

2) Assign project administrator(s). Project administrators can add members that are already in the member directory. While project admins can also add users at the project level who are not in the directory, it is recommended to first Add Users to Member Directory to establish the ‘Default company.’

Activating Design Collaboration
Activate Design Collaboration by performing the same steps as Activating Document Management, except choose ‘Design Collaboration.’ This step also requires the selection of project administrator(s) who can add teams in Design Collaboration. When complete, select ‘Finish’ to finalize the activation of Docs and Design Collaboration.

If ‘Finish’ was selected prior to activating the Design Collaboration module, activation can still happen in the Project Admin > Services > Overview page. This page gives an overall status of BIM360 modules and allows for activation at any time. Note that deactivating a module is not supported.
Modifying Project Profile
If, at any time, the project credentials have changes or additions, they can always be modified in the Project Admin > Profile page.

Developing Folder Structure
Creating a Docs folder structure is critical when working across multiple stakeholders. Each organization typically has their own preferred work method and it is important to establish a clear path for the team in the project VDC/BIM Execution Plan. It is also good practice to have a company standard folder structure to start from. The Docs folder structure has two central locations: ‘Plans’ and ‘Project Files.’ This can be found by switching to the Document Management module.

At this stage of the setup, it’s time to think about where the Revit central models, supporting files and project team folders are going to reside. Since ‘Plans’ does not support the Design Collaboration module, it is best practice to store Revit models in the ‘Project Files’ folder. When developing this project, a ‘Revit models’ folder was created with the intent of holding all central models. Within the ‘Revit models’ folder, there were two other areas to consider:

1) How will the project teams and their associated folders be broken down? Because each stakeholder owned a specific discipline and varied in their controlled sharing execution (see Choosing the Best Workflow), the teams and folder structure were broken down by company.

2) What about supporting Revit data that is typically network based? This project, like many others, contained non-Revit based information that needed to be shared across models: CAD links, keynote files, shared parameters, drawing lists, etc. Folders indicating locations for this information were essential for keeping the project organized.
Desktop Connector
Desktop Connector is an integral part of the Docs + Design collaborative workflow. It replicates the Docs folder structure to the user’s computer drive for easy file management. Supporting files placed in the Docs environment appear in the desktop connector windows drive and vice versa. All users require the installation of desktop connector to allow linking and/or viewing supporting files such as CAD links, keynote files, shared parameters, etc. in Revit models. Desktop Connector should be used as a common storage location for supporting files and should never be used as the source to open workshared Revit models.

Creating Teams

Option 1: Creating from Docs Folders
Teams are created via ‘Add Team’ in the Design Collaboration services tab in Project Admin. If no folders have been previously created, team folders generated and added to the root ‘Project Files’ folder by default.
However, for this project, the folder structure was already established (see Developing Folder Structure) to locate Revit models by team. For this project, teams were created from predefined Docs folders. After creation of teams, take notice that the corresponding Docs ‘Consumed’ and ‘Shared’ folders are generated.

Option 2: Creating from Workshared Models
Per the August 2019 update, BIM360 Design Collaboration can recognize a new team if a workshared model has been initiated in a Docs folder. In the background, BIM360 identifies the folder where the Revit model resides and suggests a team named after that folder.

To follow this option, the Revit model must be created in advance of creating teams. See Initiating Revit Worksharing to follow this step first.
Adding Team Members
After teams are established, it’s time to add members to the project. There are two types of roles that can be added: project admins and project team members.

Adding Project Admins
Project Admins can add team members that already exist in the member directory. As a project admin, full folder control permissions are inherited (See Folder Permissions). To add a new project admin, navigate to the ‘Members’ tab of the Project Admin page and type in the user’s name. Ensure that the company is accurate (this auto-populates per the default company defined in the member directory) and add the member’s role. Once added, activate the ‘Project Admin’ option for that user. As project admin, the user has admin privileges to the Docs and Design Collaboration modules.

Adding Project Team
To add the balance of team members, follow the same steps as Adding Project Admins. Instead of activating the project admin option, only the Docs and Design Collaboration should be enabled.
Folder Permissions

After teams are created and users added to the project, folder permissions must be set by the project admin to control model viewing, access and sharing. In the Docs/Design Collaboration environment, permissions can be set to users in three ways: by individual user, company or role. Adding and tracking permissions at the individual level can be cumbersome to manage and therefore is not a recommended workflow. For ease and consistency, assigning by company or role is the best approach. For this project example, it was most fitting to assign permissions by company. However, depending on project type, assigning by role works just as successfully.

Before explaining how to assign permissions, it is important to understand the levels of access between Docs and Design Collaboration modules and how they determine Revit access and visibility.

**Docs Folder Permissions**

<table>
<thead>
<tr>
<th>Permission Type</th>
<th>Document Management Definition</th>
<th>Revit Model Access</th>
<th>Revit Link Visibility</th>
<th>Desktop Connector Access</th>
</tr>
</thead>
<tbody>
<tr>
<td>Upload Only</td>
<td>User can upload documents but cannot see contents within folder</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>View Only</td>
<td>User can view documents and create private markups and issues</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>View/Download</td>
<td>User can view documents and create private markups and issues</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>View/Download + Upload</td>
<td>User can perform all the above plus upload documents to folder</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>View/Download + Upload + Edit</td>
<td>User can share their own documents with team members, view and edit any other documents and publish markups</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Folder Control</td>
<td>User has all access listed above plus typical project admin tasks such as adding project members and managing permissions</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
</tbody>
</table>

**Design Collaboration Folder Permissions**

<table>
<thead>
<tr>
<th>Permission Type</th>
<th>Design Collaboration Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Custom</td>
<td>Permissions have been defined elsewhere (Document Management)</td>
</tr>
<tr>
<td>View Only</td>
<td>User can view the team’s work in progress folders</td>
</tr>
<tr>
<td>View + Edit</td>
<td>User can publish Revit models, create packages and consume models</td>
</tr>
<tr>
<td>View + Edit + Share</td>
<td>User has all ‘View + Edit’ permissions plus ability to share packages with other teams</td>
</tr>
<tr>
<td>View + Edit + Share + Control</td>
<td>User has all permissions above plus the ability to share contents of a package to Docs and schedule regular publishes of a package</td>
</tr>
</tbody>
</table>
Folder Permission Strategy

Folder permissions can be assigned either within Docs or Design Collaboration. As indicated above, there are variations between the two sets of permissions; however, they are also directly related. When a folder permission type is assigned in Docs, it correlates to an equivalent permission type in Design Collaboration and vice versa. To better understand, see the equivalency tables below.

<table>
<thead>
<tr>
<th>Defined Docs Permission</th>
<th>Equivalent Design Collaboration Permission</th>
</tr>
</thead>
<tbody>
<tr>
<td>Upload Only</td>
<td>Custom</td>
</tr>
<tr>
<td>View Only</td>
<td>View Only</td>
</tr>
<tr>
<td>View/Download</td>
<td>View Only</td>
</tr>
<tr>
<td>View/Download + Upload</td>
<td>View Only</td>
</tr>
<tr>
<td>View/Download + Upload + Edit</td>
<td>View + Edit</td>
</tr>
<tr>
<td>Folder Control</td>
<td>View + Edit</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Defined Design Collaboration Permission</th>
<th>Equivalent Docs Permission</th>
</tr>
</thead>
<tbody>
<tr>
<td>Custom (Cannot be defined here)</td>
<td>N/A</td>
</tr>
<tr>
<td>View Only</td>
<td>View/Download</td>
</tr>
<tr>
<td>View + Edit</td>
<td>View/Download + Upload + Edit</td>
</tr>
<tr>
<td>View + Edit + Share</td>
<td>View/Download + Upload + Edit</td>
</tr>
<tr>
<td>View + Edit + Share + Control</td>
<td>Folder Control</td>
</tr>
</tbody>
</table>

It may be challenging to determine what permissions to assign and which module to define them in. When planning a Design Collaboration project across multiple teams, there are a few key questions to keep in mind:

- Who needs to access Revit models?
- Who needs access to Desktop Connector/see files from other teams linked in Revit?
- Who needs access to publish models and share packages with other teams?
- Who needs project administrator/folder control access?

Considering those questions, see below for how folder permissions were determined in this project:

1) For all teams to access and edit their own Revit models, they required at least the Docs ‘View + Download + Upload + Edit’ permission for their own folder. Looking at the equivalency tables, that permission in Docs equals ‘View + Edit’ in Design Collaboration, which prevents users from sharing packages. Since it was decided that any team member should be able to share their own packages, the permission level was defined in Design Collaboration as ‘View + Edit + Share.’ Looking back at the equivalency tables, ‘View + Edit + Share’ is equivalent to ‘View/Download + Upload + Edit.’ Therefore, setting this in Design Collaboration allows Revit model access, publishing, and sharing sets.
2) For teams using the live linking approach (see Choosing the Best Workflow), it was necessary to allow visibility of linked Revit models in other team folders. The Docs 'View/Download' permission gives visibility of linked models from other folders and/or other files via Desktop Connector. The equivalent Design Collaboration permission is ‘View Only.’ In this case, there are no feature differences between the two, and so setting this in either module does not make a difference. Note that this permission gives linked Revit model visibility but prevents live access.

3) For teams using the publish/consume approach (see Choosing the Best Workflow), no additional folder permissions were needed to be given. In this workflow, other teams’ models are linked via the ‘Consumed’ folder found in the team’s root folder. From step 1, teams already have View + Download + Upload + Edit’ access to their own folder which contains models consumed from other teams. Note that consumed models can’t be accessed via Revit.

Assigning Folder Permissions
To assign folder permissions via Docs, navigate to the team’s folder in Document Management, right click or select the ellipses, select ‘Permissions’ and add permission either at the company or role level.
To assign the folder permissions via Design Collaboration, select the team and navigate to ‘Manage team members’ in the Project Admin module.

Initiating Revit Worksharing
Initiating a workshared model in Revit 2020 is not much different than the C4R/Team workflow. But unlike Revit 2018.3 and prior, the only option for cloud collaboration is now ‘BIM 360 Document Management.’ When initiating, select the company hub the central models belong to. From there, select the project and navigate through the Docs folder structure until the team folder is reached.
Linking Revit Models
When linking workshared Revit models together, utilize the ‘External Resource’ command to pull models directly from BIM360. Once this is selected, navigate through the folder structure (similar to the previous step) to select desired Revit link.
Project Execution

This section takes the user through the updated features of Revit 2020 and functionality of the Design Collaboration module during project execution.

Accessing Revit

In Revit 2020, there is no longer a BIM360 icon from which models can be opened. All BIM360 projects now appear on the Revit splash screen. To access a model, select the project from the company hub and navigate through the folder structure until the model is found. Either select the file or navigate to the ellipses for additional opening options, such as auditing or specifying worksets.

Publishing Models

While synchronization keeps live Revit models up to date, publishing is required to update in BIM360 Docs/Design Collaboration. A published model contains, at a minimum, a default 3D view. Additional views and sheets can be added to a published set in the Revit model’s publish settings. This saved set is part of all future publishes unless it is later altered.
There are three ways that a model can be published from Revit to BIM360 Docs/Design Collaboration. Note that per Folder Permissions, a user must be assigned ‘View + Edit’ in Design Collaboration or ‘View/Download + Upload + Edit’ in Docs.

Option 1: From Revit Home Screen
The new Revit 2020 home screen has an option to publish models directly. There is an indicator that identifies when model updates are available for publishing. Navigate to the ellipses to choose ‘Publish Latest.’

Option 2: From Revit’s ‘Manage Cloud Models’
This option is identical to the workflow in the historical C4R/Team environment. This is still an optional workflow, although it requires more steps than option 1. In Revit, navigate to ‘Manage Cloud’ models, select the project and publish applicable models.
Option 3: Update to Latest or Schedule Publish

Publishing a Revit model can also happen via the Design Collaboration module. Navigate to the team page and select ‘Update to latest.’ This task can also be scheduled via the ‘Schedule publish’ option.

If scheduling a publish, ensure that the scheduled ‘Day’ and ‘Time’ are selected first to enable the option to toggle the ‘Schedule publish’ option on. Alternatively, scheduling a publish can be achieved via Project Admin page. Note that currently, Autodesk only supports weekly scheduled publishing. Also note that the user must be assigned ‘View + Edit + Share + Control’ in Design Collaboration or ‘Folder Control’ in Docs to use the schedule feature.
Project Timeline
The project timeline is a visual representation of when models have been published and packages have been shared by all teams. It is also used to consume packages from other teams. To view the project timeline, select the pull-down in the Design Collaboration module's team homepage. Click 'Shared' to see the entire project team.

The nodes along each team's timeline represent published models and shared packages. Each type of node has a significant meaning from the perspective of the team located at the bottom of the list. To switch the team perspective, click on the team name on the timeline. In the image above, team CRB is selected as the main subject to explain how the node variations apply to the CRB.

An open circle indicates that there is a package available that has not been consumed. Looking from CRB team’s perspective in this example, the Structural, Plumbing and Mechanical partners all have shared packages, but they have not been consumed. For CRB, these circles remain open, as this project dictates live linking between the three partners.

A filled circle can mean one of two things:
- A package was made available for consumption by one’s own team. A team can never see an open circle in their own timeline because it is not possible to consume one’s own model.
- A package was made available by another team and it has already been consumed. In this example, the Interior Design partner had made a package available and it was consumed by CRB.
The filled square addition is part of the August 2019 Autodesk update. This indicates when a model has been published or updated in BIM360 Docs. This update allows both internal and external teams to better collaborate and understand when design changes are happening to all models. Note that all squares are always filled.

The square/circle combination, or squircle, indicates that there is a consumed and published model too close in time to be displayed individually on the timeline scale. The bubbled number attached to it indicates how many instances are included in that combination. Click on the combination to expand the timeline scale and display each instance. There are other possible scenarios of clustered nodes, including combinations of consumed and unconsumed packages, publishes and unfinished package shares.

Creating a Package
Once the latest models are published to BIM360, a package can be created to share with teams that are utilizing the publish/consume approach. Note that per Folder Permissions, ‘View + Edit’ allows users to create a package, but ‘View + Edit + Share’ allows them to share the package with other teams. When the team is selected, choose the plus sign node on the far bottom right of the timeline. Select models and/or sets to be included in the package.
Consuming a Package
To consume a team’s package, identify the open circle node from the project timeline. Hover over the node to verify the package name and date and select ‘Consume.’ The model(s) that is part of the consumed package automatically updates in the team’s consumed folder in Docs, which is then linked into the team’s Revit model. Note that to consume a package, a user must be assigned either ‘View + Edit’ in Design Collaboration or ‘View/Download + Upload + Edit’ in Docs (see Folder Permissions).

Sharing/Consuming Notifications
Per the August 2019 Autodesk update, all teams can now receive an e-mail notification when a package has been shared and consumed, promoting more efficient communication. In the Design Collaboration team page, toggle the team e-mail notifications on. Once this is enabled, all teams will be notified when a package is shared with the team and the user who shares that package will also be notified when a team consumes it.
Issue Integration
Issues can be utilized to identify areas in need of coordination or further attention. At one time, issues could only be created in the ‘Plans’ section in BIM360 Docs. Now, Design Collaboration supports issue creation and management as well. Issues created in the Docs model viewer can be seen in the Design Collaboration and vice versa.

To create an issue in Design Collaboration, navigate to the issue icon in the team pages project model, select ‘Create Issue’ and tap the applicable location in the 3D view. The process to complete the issue fields is identical to Docs, requiring at least a title, type and status. Additional fields include assignee, due date, location, details and description.

Note that there are also permissions associated with issue creation. In the Project Admin Services page, issue permissions can be defined by user, role or company, similar to the folder/team permissions in Docs and Design Collaboration.
Design Collaboration Model Viewer

The model viewer features found in the Design Collaboration module allow project teams to visualize current and packaged models directly in the web viewer. These tools include standard model viewing and navigation features, selection by level and phasing and the ability to identify model changes between shared packages. To enable the model viewer, select the project model from the team page. See below for further descriptions of the navigation tools.

**Teams:** Toggle team models to control visibility of individual model vs. federated model

**Phases:** Isolate the model by phases defined in Revit. In **Project Admin > Design Collaboration > Manage models**, choose the master model that defines the phases in the Design Collaboration model viewer.

**Levels:** Isolate the model by the levels defined in Revit. In **Project Admin > Design Collaboration > Manage Models**, choose the master model that defines the levels in the Design Collaboration model viewer.

**Content Browser:** View additional contents of shared packages, including sheets.

**Issues for the current view:** Visibility of all issues created in either Docs or Design Collaboration

**Change Visualization:** Changes graphic representation of solid elements.

**First Person:** When activated, the first-person perspective supports model walk throughs with a helpful corresponding 2D mini map.
Show Changes
Model changes between shared packages can be seen via the ‘Show changes’ option in Design Collaboration. This option enhances coordination between the entire team as it gives an understanding of what has been added, modified or removed from the project. To activate this tool, select the shared package directly from the project timeline and select ‘Show changes.’ Once selected, the timeline indicates the span of time between shared packages that account for the changes.

- **Green** represents added elements
- **Red** represents removed elements
- **Yellow** represents modified elements
Users can focus on individual elements by either selecting from the results list or the 3D model itself.

For additional data collection and manipulation, the user can also pull an entire report of model differentials with the export to Excel option.

**Project Status Page**

Included in the August 2019 update is a project status page that gives the team a high-level overview of project activity. The list shows a history of all published models, including package name and details, status and path to their location.
Stay Up to Date with BIM360

BIM360 is a frequently evolving tool and it is important to stay up to date with its releases. Autodesk's BIM360 Release Notes is a helpful resource to stay connected to the latest feature and workflow improvements of BIM360 Design Collaboration along with the entire BIM360 suite. Having this information will help further improve the collaborative worksharing environment across organization both for current and future projects.