BES319545

2020 Workflow for BIM 360, Revit, Robot Structural Analysis, Advance Steel, and Dynamo

Lina El-Khoury
James K.M. Cheng Architects Inc.

Hung Nguyen
SolidCAD

Learning Objectives

- Learn how to set up and manage BIM 360 Design workflow for Autodesk 2020 products
- Learn how to effectively work with the 2020 workflow of Revit, Robot Structural Analysis, and Advance Steel
- Learn how to effectively use Robot Structural Analysis 2020 for structural steel code check and optimization
- Learn the basic concept of Advance Steel connections, detailing, and Dynamo usage
- BIM 360 best practices (What we have learnt)

Description

Specialized applications for structure, analysis, detailing, and more are now included when you subscribe to the Architecture, Engineering & Construction Collection. How is the new, unified AEC Collection changing how you work? In this 60-minute session, you'll learn about the seamless Revit software, Robot Structural Analysis software, Advance Steel software, and Dynamo software. You'll learn how to link a Revit structural model to Robot Structural Analysis for structural steel code check and optimization. You'll also learn how to control all models using Dynamo. This class will also cover how to set up and use BIM 360 Design software for sharing Revit, Robot Structural Analysis, and Advance Steel models, and to curate, coordinate, and manage deliverables throughout the project lifecycle. When design project teams have the right information at the right time, work happens faster.

Speaker(s)

Lina El-Khoury
Design Applications Manager - James K.M. Cheng Architects Inc.

Lina is the Design Applications Manager at James K.M. Cheng Architects in Vancouver BC. With over 25 years of experience in Architecture, Building Systems, Interior Architecture and Building Manufacturing, she now specializes in BIM technologies. She has been the National BIM Lead for GEVINAR (WSP) and worked at Perkins + Will locally and firm wide – always raising the bar for better BIM collaboration, deliverables and efficiency. Equipped with CAD knowledge and BIM expertise in multidisciplinary platforms, combined with 10 years of Building Manufacturing experience, Lina has trained and coached many teams in multiple design and subcontracting AEC firms. Her passion, dedication, contributions to the BIM development and implementation have been very valuable and appreciated by many firms which she's worked.

Hung Nguyen
Technical Consultant - SolidCAD

Hung Nguyen has 26+ years of experience in Autodesk Products. He has a strong background in Architectural and Manufacturing fields. His is a BIM & Manufacturing Technical Consultant. Hung also has extensive experience in a diverse range of CAD-related software such as: Revit, Inventor, Fusion 360, Alias, and Simulation to name a few. He has presented multiple times at Revit Technology Conference (RTC), Canadian Festival of Architecture, CanBIM, and Autodesk University from 2013 to 2017.

Table of Contents

Introduction

AEC projects are incredibly complex and produce an incredible about of data. Historically, syncing and utilizing all this data was impossible, and has been one of the biggest challenges in the industry. Workflows and data have been disconnected. Architectural and Engineering firms have had challenges collaborating across many companies and many disciplines. As projects become more complex there is a high frequency of data that is rapidly being iterated. Bad information and data silos across companies lead to the massive waste that is prevalent in delivering projects, and distributed teams are hurt by delays in communications and waste time searching for the right project information.

BIM 360 is Autodesk's AEC cloud brand & project delivery platform. The unified BIM 360 solution aggregates the data and provides transparency to project stakeholders making everyone more accountable and improving visibility in real time. This delivery platform also tremendously helps the "tridirectionally" structural data exchange between Revit, Robot and Advance Steel.

Autodesk BIM 360 solutions for Design Collaboration

BIM 360 Design is a cloud work-sharing, design collaboration, and data management product for project delivery, built on the new BIM 360 cloud platform. Made for distributed, multidisciplinary teams, you can co-author Revit models with greater file- and folder-based access controls, issue management, deliverable coordination, change visualization, and unlimited storage.

BIM 360 Design includes 3 key items:

1. Controlled Cloud work-sharing in Revit – or what used to be the product we called Collaboration for Revit
2. The document management module on the BIM 360 platform
3. And the Design Collaboration module

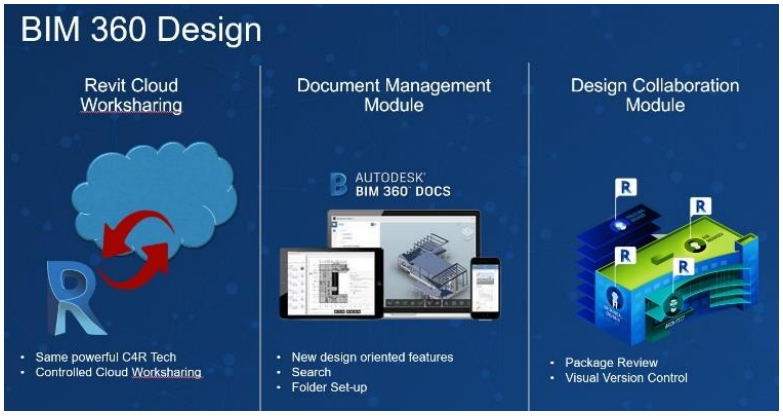


FIGURE 1

Controlled Cloud work-sharing in Revit

Autodesk is providing the same Cloud work-sharing from Collaboration for Revit by simply changing the hosting environment to the BIM 360 platform when sharing projects in the cloud from Revit. Most importantly Docs provides a layer of permissions and controls we didn't have in Team (Classic C4R) (Low Trust or Managed Trust). This allows teams greater permissions control for who has access to the model data. This typically is restricted to the team responsible for that scope of work. So, BIM 360 Docs replaces the BIM 360 Team data management environment and simply provides for greater control across project teams.

FIGURE 2

Document management module

Docs has many of the same features as Team including viewing & storing of project data. Since this platform was built from the ground up to address AEC-related data management requirements, Docs will act as a data management vehicle for extended team members to coordinate project data in 2D or 3D with easy access for all project stakeholders.

Number one key item is that RFI's and Submittals have been removed from the Document Management module for new subscribers to BIM 360. Existing subscribers will be able to continue using these features in a new module entitled Project Management. Today these actions are typically initiated by the contractor, so it only appears in the BIM 360 Build packaging.

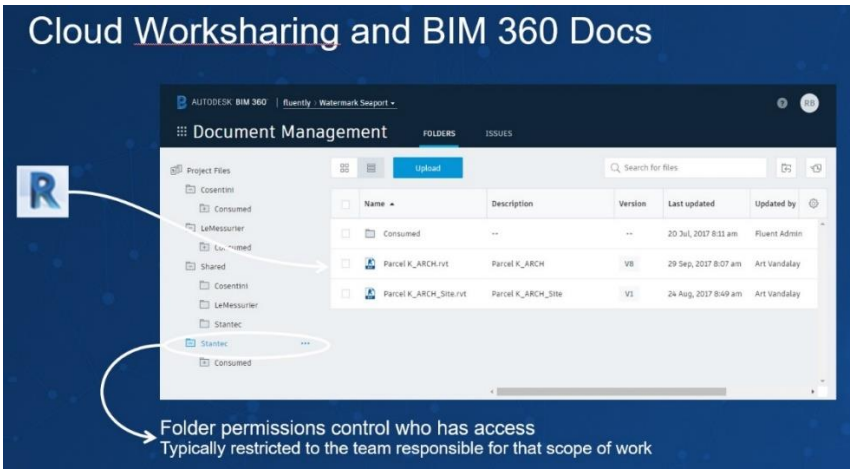


FIGURE 3

Design Collaboration module

Finally – Autodesk has enhanced the collaboration experience for work-sharing by including a new module on the BIM 360 platform called Design Collaboration (this was called BIM 360 Team in the Classic). This module will make BIM dramatically more accessible to the entire project team. Let's look at a few key features of this module.

The addition of the design collaboration module allows the enhancement of Cloud work-sharing. This module will give teams the ability to create work in progress models before saving to the team space enabling greater control over their design space before contributing to the shared team project.

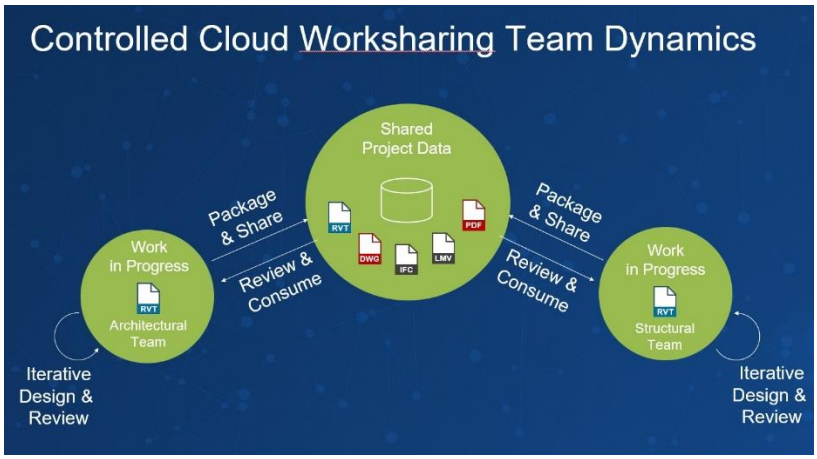


FIGURE 4

Benefits

Faster, more efficient Revit collaboration: With anytime access to Revit models – from anywhere in the world – your design team won't waste time. Virtual colocation means distributed design teams or remote staff can model from wherever they happen to be. And that translates to lower travel and office expenses -- and happier designers.

Access to more projects. Your firm's physical address doesn't matter anymore. Extend your reach and participate in projects or joint venture partnerships wherever they may be located.

Better allocation of team talents and resources. Assign the best team members with the strongest skill set and the talent you need. Enable designers to work on multiple projects based in different locations at the same time.

Include everyone. Use BIM Team to give project team members, partners or consultants who don't have Revit a real-time view of models for faster communication and better buy-in.

Set up and manage BIM 360 Design workflow for Autodesk 2020 products

1. BIM 360 Project Administration

As an Account administrator, you'll need to create a project, assign Project Administrators, and activate services.

2. Setting Up a Project with BIM 360 Docs

BIM 360 Docs is the foundation for all stakeholders on a project where project information is stored. As any AEC project kicks off, this is where it should start. It's the place to centralize, control and give access to all team members.

Log into: https://docs.b360.autodesk.com/

3. Assigning Project Administrators

Having a Project Administrators is essential. Project Administrator can perform a variety of tasks, including:

- Organize Project folders
- Invite Project Members
- Set Folder Permissions
- Manage Files

A project can have more than one Project Administrator. For example, if you're collaborating across multiple companies on a project, each company, acting as a smaller team within the larger project team, can have a Project Administrator, typically their Project or BIM Manager, who can share their team's updates to the larger project team.

4. Creating Project Folders

Now, let's add some folders to our newly created project with the Document Management module.

5. Creating Teams
Now that Project Folders are created, let's assign teams to each of them.

6. Adding Members to Teams
Now let's add members to those teams.

7. Setting Permissions
Each project member can have different levels of permissions.

8. Working with the Document Management Module
Now that the Project Administrator has created folder, teams, assigned members, and set permission levels, project members can now upload project documents via the Document Management module. In this example, an architect uploads a few PDFs and DWGs.

9. Uploading Non-Revit Files
BIM 360 Docs supports a variety of file formats. A list of viewable file formats can be found here.

10. Uploading Revit Files
Now, let's upload our architectural, MEP, and Structure Revit models to the Document Management Module via Revit.

11. Accessing and Reviewing Project Documents
In your browser, go to the Document Management Module to confirm the upload of the three models.

12. Viewing Project Team Progress and Updates
The Team Space is your home portal in the Design Collaboration module. It provides an up-to-date viewing experience of the current state of the model. Here, you will see the "swim lanes" for each team, with the packages for each team shown as dots.

13. Sharing Packages
What is a package? Packages play a prominent role in the Design Collaboration module. If you're already familiar with Revit, you know that a Set equates to Sheets and Views generated by Revit. Extending upon this, a Package is essential a Set plus the Revit model. Packages have different levels of states that indicate their level of consumption. We'll discuss this more later.

14. Understanding Package States
Packages have different levels of states that indicate their level of consumption.

Node Type	Description
Shared	An empty node on another team's line means the package has been shared to the project, but you haven't consumed it yet.
Shared	A filled node on another team's line means you've consumed it.
BNIM	A filled node on your team's line means you've shared the package.
BNIM	A dotted-line node on your team's line means you've started a new package but haven't shared it yet.
6	A numbered badge means there are clusters of packages. The two-tone color means some have been consumed, some have not. Click or zoom to expand the cluster.
2	A numbered empty badge means 0 packages have been consumed. Click or zoom to expand.
4	A numbered filled badge means all packages have been consumed. Click or zoom to expand.
	The plus node allows you to create a new package to share your team's work.

FIGURE 5

Working effectively with the 2020 workflow of Revit, Robot Structural Analysis, and Advance Steel

BIM 360 Design is a cloud work-sharing, design collaboration, and data management product for project delivery, built on the new BIM 360 cloud platform. Made for distributed, multidisciplinary teams, you can co-author Revit models with greater file- and folder-based access controls, issue management, deliverable coordination, change visualization, and unlimited storage. To work with non-Revit files such as RSA, Advance Steel models and detail drawings, you need to Install Autodesk Desktop Connector.

What is Desktop Connector?

Desktop Connector is a desktop service that integrates an Autodesk data management source (or data source) with your desktop folder and file structure for easy file management.

The files in the data source are replicated in a connected drive. You can manage files in the data source through the connected drive, just as you would any other folder on your machine. Changes made in the connected drive are automatically uploaded to the data source.

The following image shows a connected drive for RSA and BIM Document Management.

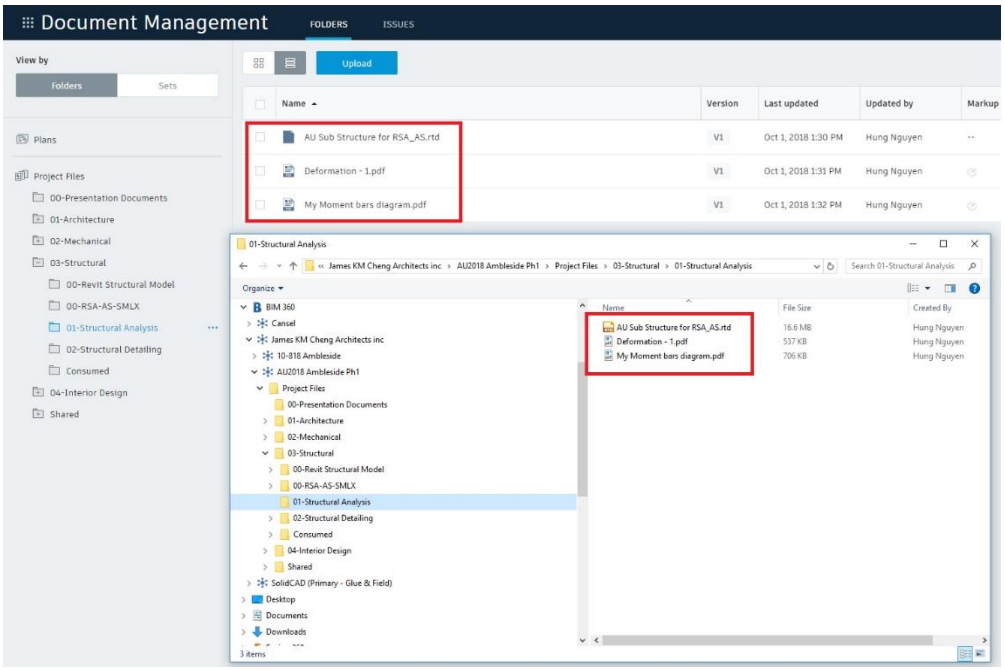


FIGURE 6

Autodesk Desktop connector can be downloaded [here]

Solution Architect for Revit, RSA and Advance Steel

Transfer based on AS **smlx** file already being used for the link between AS and Revit as well as Plant3D and AS which allowed for the link between Plant3D and RSA. **Smlx** file is then converted to **smx** file used for the link between RSA and Revit to store RSA analytical model information.

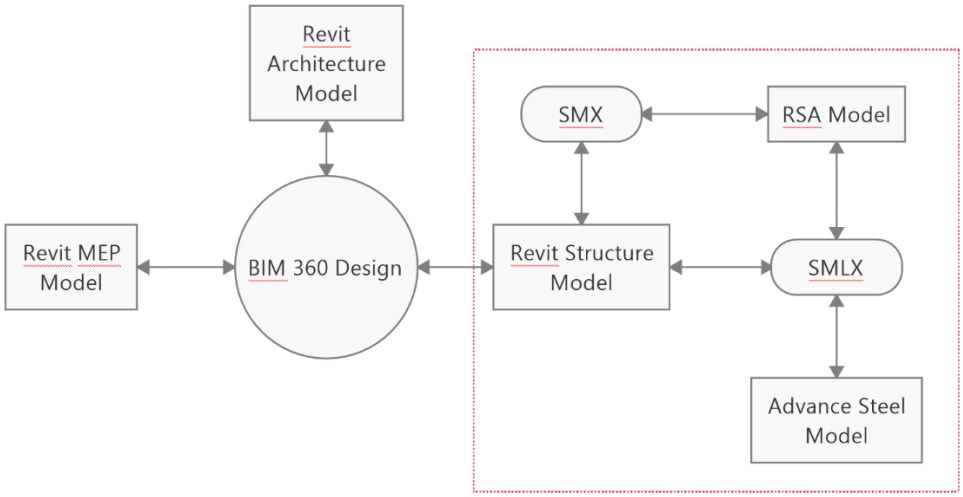


FIGURE 7

How to start the link

The link can be started from either AS or RSA by switching to Export & Import part of the Ribbon and selection of Advance export / import / synchronization buttons.

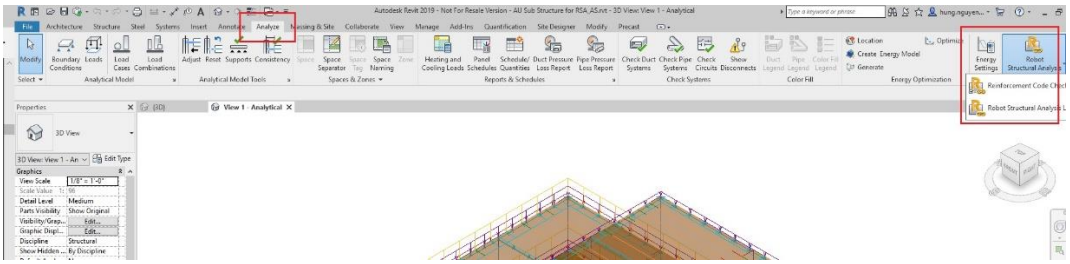


FIGURE 8

FIGURE 9

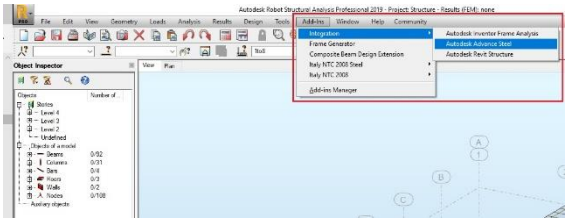


Figure 10

Robot Structural Analysis 2020 for structural steel code check and optimization

The steel design option offers the possibility of a quick and efficient verification of the sections that are used in the structure.

1. Modify member types

Modify member types to prepare a model for verification.

2. Run calculations and review the results

Run calculations and review the outcome of the steel verification process.

3. Modify bar types

Change member types and how to create a new member type.

4. Test the changes and add materials

Modify the materials of bars and change the bar size of existing members.

This demo will guide through the following tasks.

- Change member types.
- Run the appropriate calculations, review the outcomes, and adjust the project so the structural elements are an adequate size for the structure to withstand its loads as shown below.

Basic concept of Advance Steel connections, detailing, and Dynamo usage

Advance Steel contains a variety of preset parametric joints used to connect Advance elements, especially beams. Joints are complex elements that consist of basic elements such as plates, stiffeners, beams, bolts, welds, and dependent elements and are controlled by construction rules. An Advance joint is created with all its parts, connection objects, and features with a single operation. At the same time, the existing connected elements are processed (i.e., shortened, coped, etc.) and connection logic between the parts is established.

A connection (joint) is created with all its parts, connection objects, and features using a single operation. At the same time, the existing connected elements are processed (shortened, coped, etc.) and a connection logic between the parts is established.

Advance Steel contains a variety of default, preset parametric connections to connect Advance Steel elements. You can access these connections, using the Connection Vault. In addition to the default connections, you can define, store and reuse other custom connections.

What's New in Advance Steel 2020 Revit Extension?

- **Transfer and synchronize structural connections**: Starting with this version, you can transfer structural connections between Revit and Advance Steel, using the extension. See Structural Connection Transfer and Synchronization.
- **Transfer and synchronize grids**: Starting with this version, you can transfer grid elements between Revit and Advance Steel, using the extension. See Grid Transfer and Synchronization.
- **The synchronization dialog works with Project Units**: Starting with this version of the extension, the synchronization dialog works with the units and tolerances set in the Revit Project Units dialog. See Advance Steel - Revit Synchronization.
- **New Export based on View Settings option**: This new option was added in the Settings dialog. See Export Based on View Settings.
- **New command graphics**: New images were added for each command in the Advance Steel Extension ribbon. See About Advance Steel Extension for Revit.
- **Removed the IFC export / import option**: The IFC format option used for export and import was removed from this version of the extension. You can

export or import this type of format, using the IFC Link built in Revit.

- **Removed the *Update section mapping to import* option** from the Settings dialog.
- **Renamed the CIS2 format**: The "CIS2" format was renamed to "CIS2 Fabrication" to eliminate confusion about the CIS2 export format the extension can transfer, as, generally, the CIS2 format can be either analytical or fabrication.
- **Changed the ID GTC assigning mechanism**: Groups and assemblies are no longer deleted when a model from Revit is exported to . smlx . The ID GTC Parameter is no longer displayed in the Properties menu. The new mechanism does not allow duplicate IDs to be generated in the model.
- **Added new mapping lines compatible with country specific Revit families**: New mapping lines were added, in order to be compatible with the new Revit families from the Germany, France, Poland, and India country folders. The Revit 2017 library contains new steel framing and steel column families for Australia, Germany, France, India and Poland. This new version of Advance Steel Extension for Revit can use the family-based section mapping when transferring these profiles between Revit and Advance Steel.
- **Added new entries for the section mapping using rules system**: These entries were added for the new families in the US Imperial, US Metric, UK, Australia, Germany and France Revit country folders. The regular expressions are more restrictive and cover all profile types and names. The entries were added in both the GTC_Profile_Conversion and Profile_Exports_Convertion tables of the GTCMapping2017.mdb database, between key 0 and key 1000.
- **The Revit synchronization dialog highlights the selected element in the canvas**. See Advance Steel - Revit Synchronization.
- **Analysis results are exported with selected parts**: Analysis results are also exported when exporting only selected parts of a Revit model via smlx. See Analysis Results Transfer from Revit to Advance Steel.

- **New in the Advance Steel 2020 Extension for Revit can be found here**:

https://knowledge.autodesk.com/support/revit-products/learn-explore/caas/CloudHelp/cloudhelp/2020/ENU/Revit-AddIns/files/GUID-E7F2CCB1-07D4-44D6-AC4F-2D038F788355-htm.html

Transferred Elements (.smlx)

You can transfer numerous elements from/to Revit to/from Advance Steel, such as levels, steel beams, plates, wood, concrete elements, grating, some connection elements, some beam features and some plate features. All element transfers are dependent on the feature extent and limitations of each application (Revit and Advance Steel). For more detailed information on transferred elements see the table below:

CLASS	OBJECT TYPE	REVIT TO ADVANCE STEEL	ADVANCE STEEL TO REVIT
General	Level	✓	✓
	Grid	✓	✓
Steel Beams	Beam	✓	✓
	Column	✓	✓
	Compound beam	**X**	✓
	Welded beam	**X**	✓
	Tapered beam	**N/A**	✓
	Curved beam	✓	✓
	Poly beam	**N/A**	✓
	Folded beam	**N/A**	**X**
	Aluminum beam	**X**	✓
Plates	Rectangular plate	✓ **(AS-Revit-AS)**	✓
	Polygonal plate	✓ **(AS-Revit-AS)**	✓
	Circular plate	✓ **(AS-Revit-AS)**	✓
	Folded plate	**N/A**	✓
	Twisted folded plate	**N/A**	✓
	Conical folded plate	**N/A**	✓
Wood	Timber beam	✓	✓
Concrete elements	Wall	✓	✓
	Polygonal wall	✓	✓
	Slab	✓	✓
	Polygonal Slab	✓	✓
	Concrete beam	✓	✓
	Concrete curved beam	✓	✓

CLASS	OBJECT TYPE	REVIT TO ADVANCE STEEL	ADVANCE STEEL TO REVIT
	Concrete column	✓	✓
	Isolated footing	✓	✓
	Continuous footing	✓	✓
Grating	Standard grating	**N/A**	✓
	Bar grating	**N/A**	✓
	Variable grating, rectangular	**N/A**	✓
	Variable grating, polygonal	**N/A**	✓
Connection elements	Bolts	**X**	**X**
	Anchors	**X**	**X**
	Shear Studs	**X**	**X**
	Welds	**N/A**	**X**
	Holes	✓ **(AS-Revit-AS)**	✓ **(only on plates)**
Beam features	Shorten	✓	**X**
	Contour	✓	**X**
	Cope	**N/A**	**X**
	Weld preparation	**N/A**	**X**
	Corner cut	**N/A**	**X**
	Cope (from Revit)	✓ **(only shorten)**	**N/A**
Plate features	Shorten	**N/A**	✓
	Contour	**N/A**	✓ **(only polygonal)**
	Weld preparation	**N/A**	**X**
	Corner cut	**N/A**	✓
Structural analysis results	Torsor (N,V,M)	✓	**X**

Legend:

✓ - present in the source application, is imported in the target application (limitation)

X - present in the source application, is NOT imported in the target application

N/A - NOT available in the source application

✓ **(AS-Revit-AS)** - transfer from Advance Steel to Revit and back to Advance Steel

Advance Steel connections

A connection (joint) is created with all its parts, connection objects, and features using a single operation. At the same time, the existing connected elements are processed (shortened, coped, etc.) and a connection logic between the parts is established.

Advance Steel contains a variety of default, preset parametric connections to connect Advance Steel elements. You can access these connections, using the Connection Vault. In addition to the default connections, you can define, store and reuse other custom connections.

In Advance Steel 2020, you can automate steel connection creation by propagating connections already in place. Just select the joint box from one connection and select the Propagate Joint option available in the contextual menu. The steel connection will then be automatically inserted in other locations where the framing conditions are similar. Since all these connections are now part of the same group of connections, modifying this connection will automatically update similar connections accordingly.

With the installation of Advance Steel 2020 in US English, users receive access to a more localized version for the US market. This includes files like a new cut symbol added for general arrangement drawings or new process suites to speed up shop drawings creation.

The Connection Object

All individual elements in the connection, including their properties and processing objects, are held together and represented as a bounding box (connection object). All connection elements and definitions are included in the gray box.

To display the box: In the Extended Modeling tab Joint Utilities panel, click (Display).

The connections are intelligent: If a beam, connected using a connection, is changed, the connection automatically adapts to the new situation according to the set parameters. These set parameters are stored in the connection object (the gray box) that is hidden (by default) when the connection is created. It contains all the connection information but not individual component properties. Connection objects can be displayed, updated, deleted, copied and changed.

Connection Creation

Connections can be created between various elements. To create the connection, the connected elements should meet several geometric requirements that may vary, according to the connection type.

After selecting a connection in the Connection Vault, you need to select the members to connect by pressing Enter after each selection. The number of selected members as well as their type vary depending on the selected connection.

Examples:

- For a base plate only one element should be selected: a column.
- For a gusset plate for 3 diagonals, four elements should be selected: a beam of any section type and three diagonal beams with suitable sections (angle, channel, flat, hollow).

In several situations, after the connection is created, a confirmation dialog box appears. Simply click OK to finish the creation. The connection properties dialog box appears allowing you to make the desired settings

Advance Steel Detailing – Generation of drawings

Once the design and numbering of the 3D model is completed, create 2D drawings based on that information.

Numbering Workflow

This workflow provides an overview of the automatic numbering process.

1. At first, all structural parts should be numbered, so start with single part marks.
2. The program then determines the assembly marks for parts connected in the shop. The biggest part of an assembly is the main part and will get an assembly mark while all the other parts are considered attached parts and will have a single part mark.
3. Standard parts are numbered using additional options. Any part in the current model that matches a standard part in the template will get the same mark (single part mark or assembly mark, according to the case).
4. A post numbering method can be applied after the initial numbering is complete in order to obtain the desired result.

During the numbering process beams, followed by plates, are the first to be numbered. In each case, the group with the most elements will get the lowest number.

Switch between Single Parts and Assemblies

In the Output tab -> Part marks panel, the highlighted button (Toggle switch display SP/MP) is a switch between single parts and assemblies. According to the switch position, the numbering options refer to single parts or to assemblies.

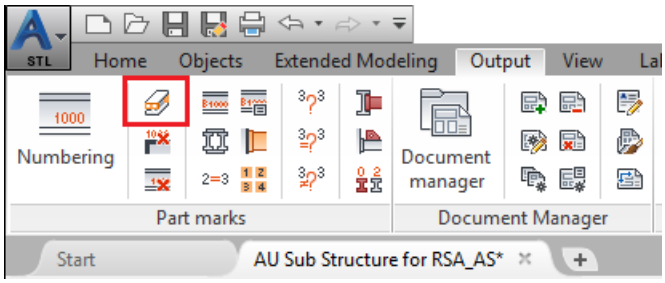


Figure 11

	Switches to single parts. In the Numbering dialog box, only Process single parts is selected.
	Switches to assemblies. In the Numbering dialog box, only Process assemblies is selected.

FIGURE 12

Drawing Styles

Advance Steel offers a variety of drawing styles for creating general arrangement drawings, sections, and shop drawings in various designs.

Drawing Management

Use the Document Manager to preview, manage and erase details in separate DWG files. A connection (joint) is created with all its parts, connection objects, and features using a single operation. At the same time, the existing connected elements are processed (shortened, coped, etc.) and a connection logic between the parts is established.

Dynamo for RSA and Advance Steel 2020

Dynamo for Revit Structural

Very few classes focus on how Dynamo software could be used in the structural design office from a practical level until 2017. One AU class which is very helpful was done by Marcello Sgambelluri:

https://www.autodesk.com/autodesk-university/class/Dynamo-Structure-2017#downloads

Other Dynamo for Revit Structural are listed at the Reference session of this handout.

Dynamo for RSA

Dynamo Plug-in for Robot Structural Analysis is a free technology preview that allows designers and engineers to drive Robot Structural Analysis or React Structures from Dynamo. The plug-in helps designers to create parametric and complex structural frames models in Dynamo, submit it to Robot Structural Analysis or React Structures for simulation and review the results returned from the analysis. The technology preview includes an executable and a package.

Dynamo for Advance Steel

The Dynamo Extension for Advance Steel adds the functionalities of Dynamo to Advance Steel, in order to quickly generate complex structures using Advance Steel beams and plates. You can assign materials, beam sections or user attributes from Dynamo to the generated elements in order to minimize the number of steps required for modeling.

A Dynamo package called “Autodesk Steel Connections” is now available. It enables Dynamo to control steel connections creation, streamlining the modeling of steel buildings in Revit. It can identify similar geometrical conditions for placing standard and custom connections.

Learn more about Installing the Steel Connections for Dynamo in Revit 2020:
https://www.youtube.com/watch?v=u98zssWMJZQ

Best Practices (What we have learned):

Project Name

The issue I have always had with C4R and now with Design Collaboration is that you cannot access the project through Revit unless you are using the correct version of Revit.

So if you need to do any model management though Revit (such as Publish, or Relinquish) or simply to open the model, you need to know the version of Revit to open first, because once a model is saved into your Collaboration service (Classic C4r or Design Collaboration) it is now only accessible by that version of Revit

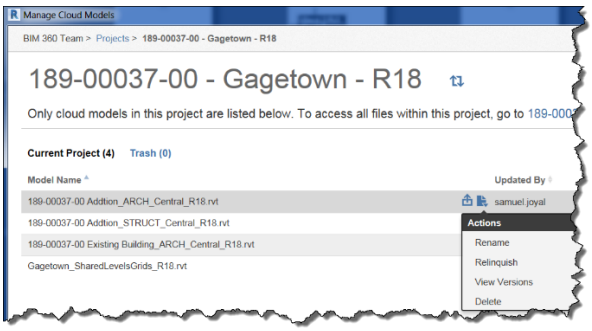


FIGURE 13

This also cause issues with users trying to open the model though Revit, they tend to believe they are not invited to the project or they do not have Design Collaboration Entitlement because they cannot see the project though Revit when opening, simply because they are not in the right version of Revit.

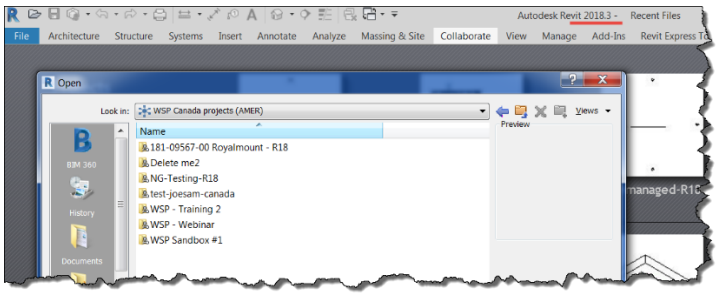


FIGURE 14

So, with that said, what we tend to do is place the version of Revit in the project name, in our case we use

[Project Number] – [Project Name] – [Revit Version]
189-0000-00 – ABC Hotel – R18

This way if someone needs to access the model, they immediately know the version to use (for opening the model or to do model management though Revit)

Some other naming conventions we tend to use is also adding the version on the end of the model file as well **XXX-R18**, this helps enforce the version to use (when exporting out of BIM360, or when using the Desktop Connector)

Model Placeholder

As I mentioned above, the BIM360 project is only accessible by that version of Revit, BUT
When you first create a BIM360 project, that project is in version limbo until it is imprinted to a version of Revit, once a model is saved to that project, that project is then imprinted to that version of Revit and CANNOT be changed (you have to use the upgrade project through Revit, which is another topic for another day).

Before a model is saved to that project, that limbo project runs the risk of someone saving the wrong version of Revit to that limbo site, so if the project was intended to be a BIM360 Design Collaboration project for Revit 2018, but then a user saves a Revit 2019 model, that project is now imprinted for Revit 2019 model files (Oh No).

So what we tend to do is create a BIM360 project (Example 999-99999 – ABC Hotel – R18), then before we invite anyone else to the Project site, we save a blank placeholder model for the intended version of Revit **"Placeholder – R18.rvt"**, this way there is no possibility of having the wrong version of Revit saved to the project and being imprinted incorrectly. This is a larger issue with Classic C4R as it can have Revit 2015-2018 projects, less of a concern right now with Design Collaboration (2018.3 – 2019), but will eventually be an issue as time goes on

Autodesk Desktop Connector (ADC)

The ADC has been a great addition to the BIM360 environment, it not only allows you to connect AutoCAD files that are located in BIM360 into your models, but also allows you

to connect other Revit models that are not authored on BIM360 environment (Revit 2018 and higher)

The issue with Classic C4R was for model collaboration to work, everyone needed to be all in, all consultants sharing their model on the cloud. That means they had to pay for that BIM360 Design Collaboration entitlement, and this is where a lot of consultants opted out and you had to do workarounds to have the consultant model in BIM 360.

This is where the ADC can help with Revit 2018 and above, allowing consultants to add their models in a BIM360 ecosystem without having to pay for Design Collaboration Entitlement (and no workarounds), but I believe they will still require BIM360 Document Management seats/licenses assigned to them in order to use the ADC (Document Management is way cheaper then Design Collaboration entitlement to my understanding anyway) , similar to where they will need BIM360 Docs entitlement to access the BIM360 Document Management site.

Did you know:

- Did you know you can now Drag and Drop an Empty Folder structure into the ADC to create all your folders

Caveats/Concern with ADC (Autodesk Desktop Connector)

The ADC is there to allow someone to drop a model there for others to link to, this is more of an unmanaged model file, it is not intended to save a work directly though the ADC.

It's not intended to work directly from the ADC and save back to it, if this is done (for Central or even non-workshare models) you will get the typical backup files created in your ADC area and in your BIM360 site (Ugly)

Something to be aware of with Models in ADC, if someone opens a model though the ADC, it will create the standard Central backup files (the ones that generally appear on Local servers) or the standard non-workshare backup files (**Project1.0001.rvt**)

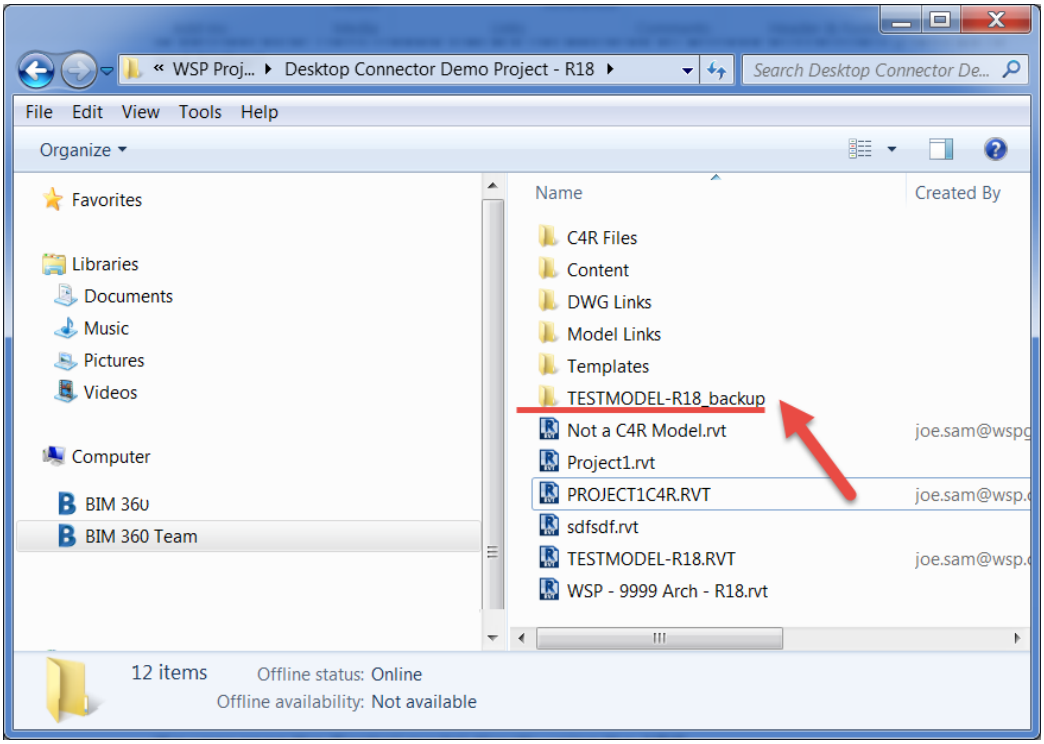


FIGURE 15

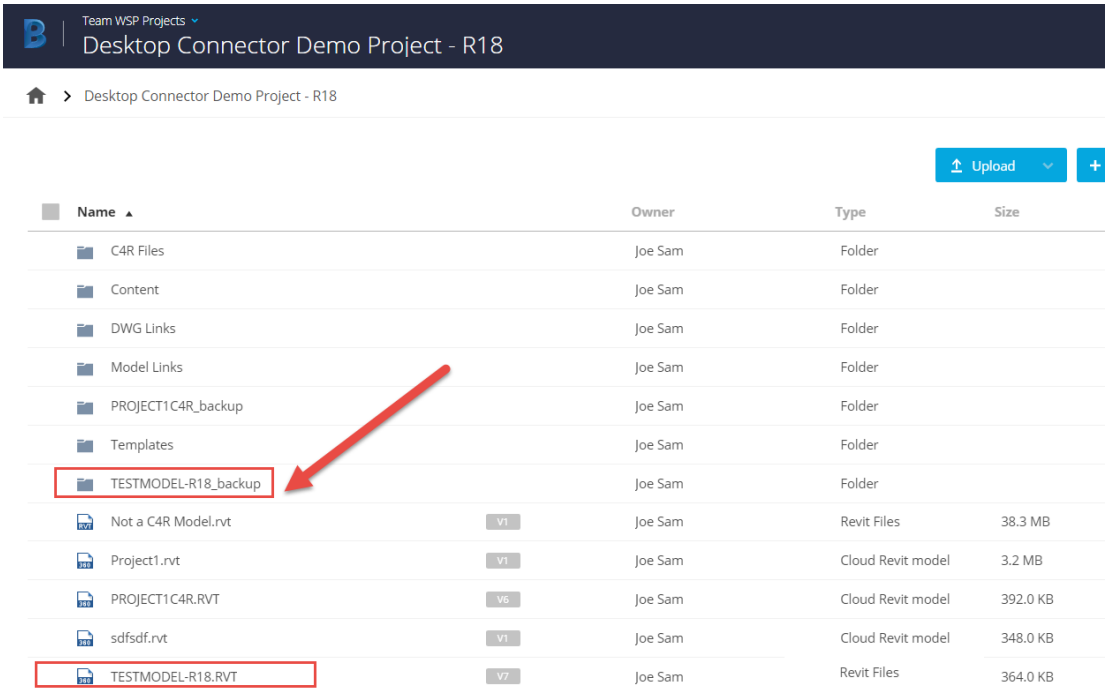


FIGURE 16

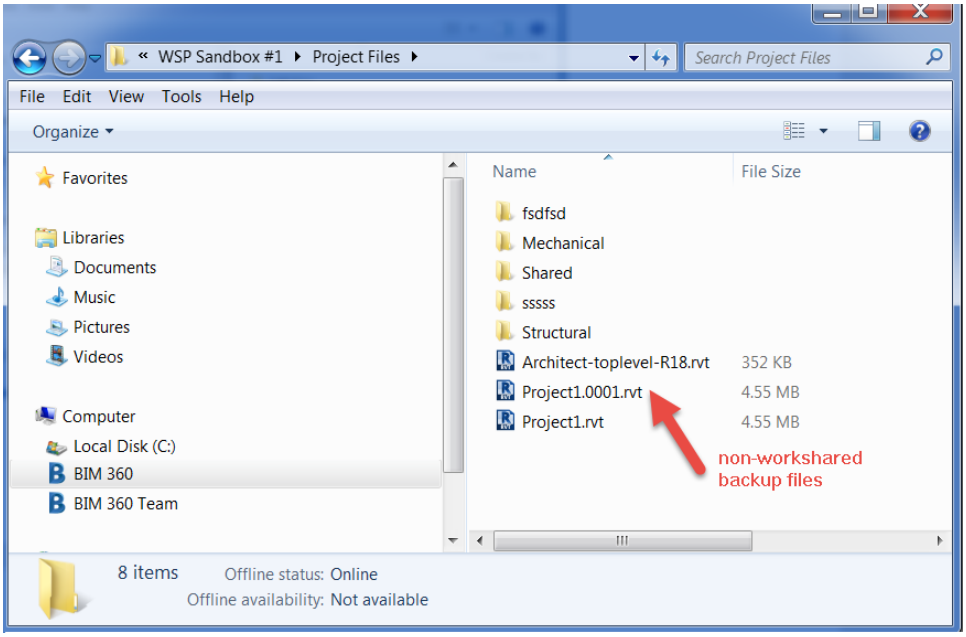


FIGURE 17

Sorry, there is no way to avoid the file bloating/backup issue.

So, in a nutshell, never open a model directly from within the ADC, instead work on the model from within your own network (or workstation) and copy the updated model into the ADC or uploaded it to the BIM360 Project website

Membership Roles

When creating Members, we have found that using just the companies allows you more flexibility the using the Role, simple because you can create your own company's, but the Role list is fixed and we have found them to vague

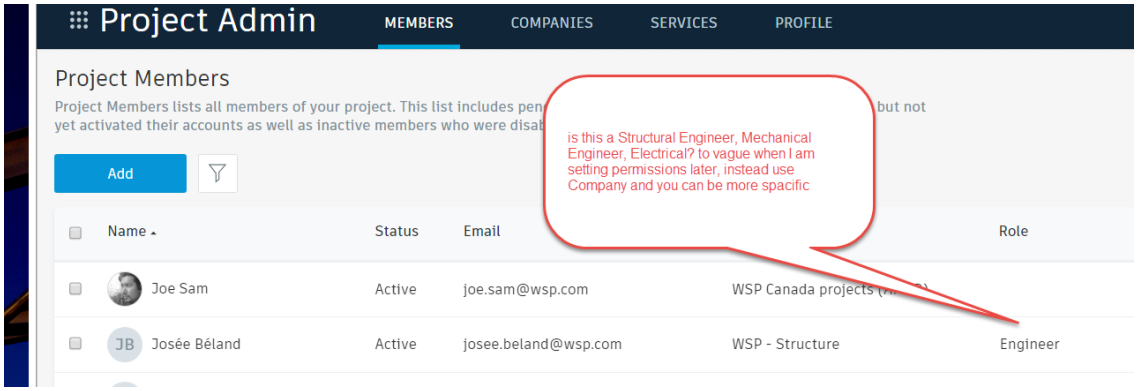


FIGURE 11

Remove the bad linking habits

We have found this more issue with newer users to BIM360 Cloud Environment, linking in CAD and Revit models to your local LAN instead of placing the model/cad file on BIM360 and linking them to the cloud (ADC)

This will generally not be a problem if all team members are working on a BIM360 project and happen to be in the same office (on the same LAN and have the same drive mapping)

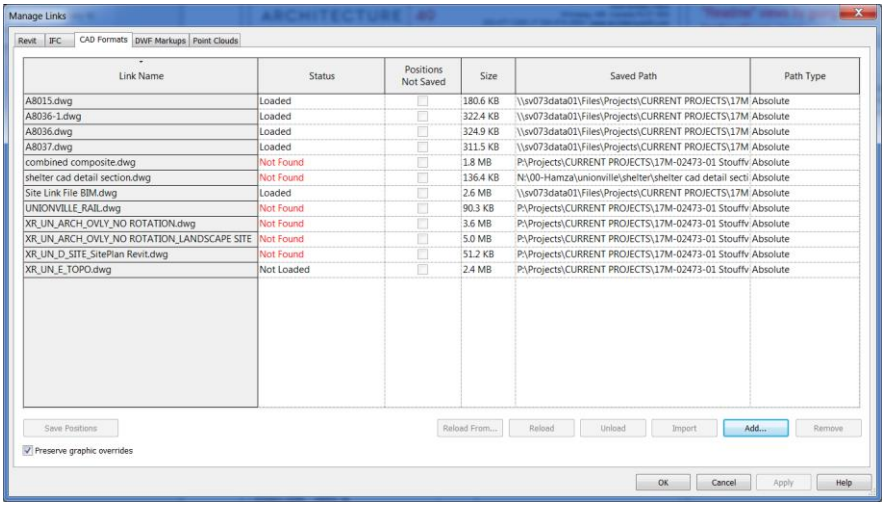


FIGURE 18

But if you have others that need to work on this model and do not have the same drive mapping OR they are on your network but are in a different office and all the above link need to be then pulled over the WAN (Gees this BIM360 thing is very slow)

Team members can have a bad experience working on this model

So, if your team is distributed and working on the same model, I suggest placing the models in BIM360 and link to them from there and do the same with the CAD files, and utilize the ADC for lining those files

BIM 360 Team Communicator (Not Supported)

The Team Communicator is no longer support in Revit 2019 and above, was anyone using this?

Where has all my hard drive space gone?

The other discovery we have had found working with Cloud Services, especially BIM360 Collaboration for Revit (Classic or Nextgen) is we are quickly running out of local hard drive space
We (as an WSP standard) have moved to SSD hard drives for better efficiencies, but the tradeoff is the SSD are generally smaller, and when working with Collaboration for Revit, all files you work on (including linked models) need to be downloaded to your local C:\ drive.

So, if you are a team member that works on many projects and your model files are huge and has many linked files, you will start consuming local hard drive space FAST Before you ask, there is no way (easy way) of changing the location of where a local model file gets changes on your local c:\ drive

Note: here is a workaround on how to change the Reference to where cached files go https://forums.autodesk.com/t5/revit-cloud-worksharing-forum/hard-disk-when-use-c4r/td-p/6494036

Location of Local Cached Revit files:

C:\Users\%USERNAME%\AppData\Local\Autodesk\Revit\Autodesk Revit 2018\ CollaborationCache

So, if you are running out of space, you will need to peruse to your Collaboration Cache folder and start deleting folders/files, BUT.

The files are all obfuscated, so you will not know what files or folders to delete

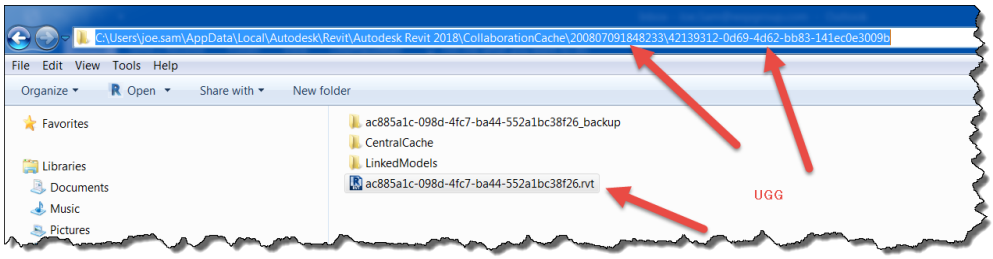


FIGURE 19

To figure what file/folder belongs to what BIM360 project, you will have to put your detective hat on and look through your Journal files to discover this, someone does not want you messing with these files

I have reached out to Autodesk to help manage this issue (its on their list) to either give us the ability to control where cached files go but I think this is a larger systemic issue and I think they need to supply an application to help us manage all cached cloud data for all the cloud services in general.

In the meantime, we have developed our own application to help manage local BIM360 cached files

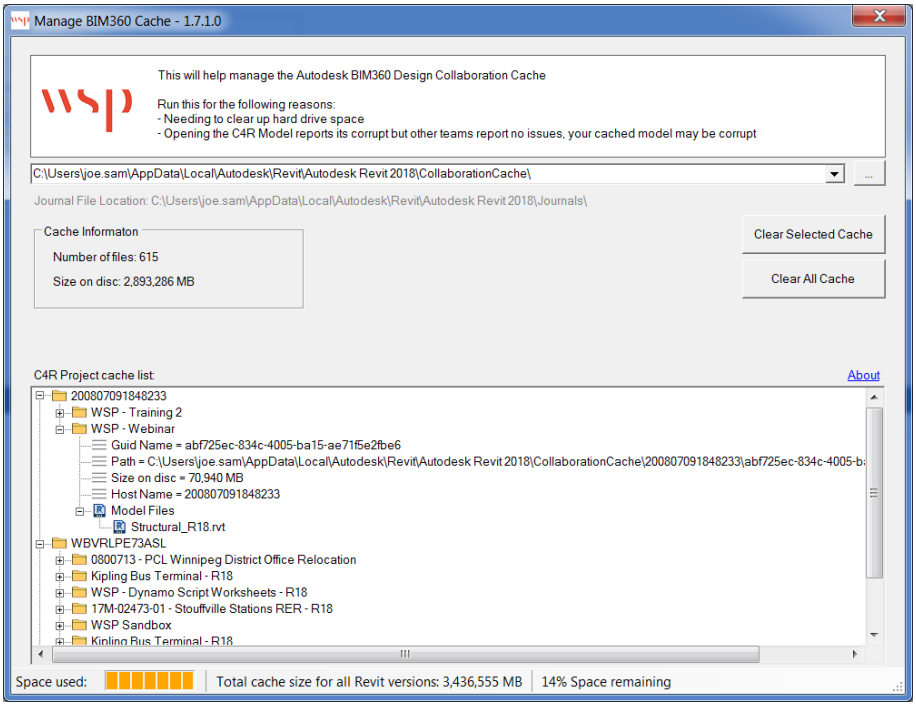


FIGURE 20

Data in the model is Corrupt

So, since we just finished talking about clearing cache, you will also need to clear your cache from time to time if you receive the Corrupted error message when opening or saving a BIM360 model

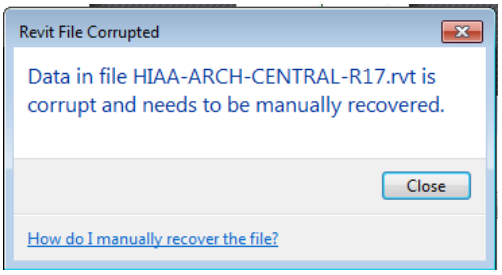


FIGURE 21

You will know this is the case when you talk with other team members on that are working with the same workshare model and they DO NOT have issues, probably means the model (or a linked model) is corrupt

In this case delete that cache and try re-opening, 90% of the time this does the trick, otherwise you will need to access your Versions though the Manage Cloud Model though Revit

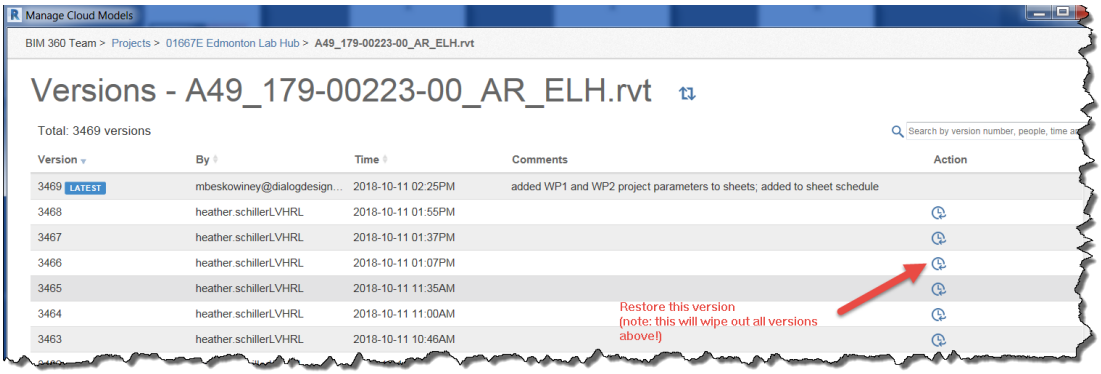


FIGURE 22

Create BIM360 project to house your company standard content

Since there is no cost on the amount of cloud space used when using BIM360, just the cost for BIM360 Docs entitlement

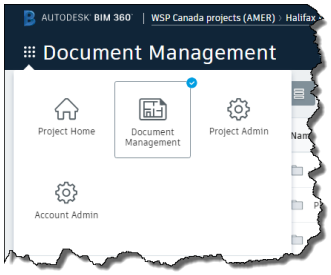
Create a BIM360 project and invite other team members in your company (that have the BIM360 Document Management Entitlement) to this project, here you can place all your company families, templates, and even the Revit OOTB Content

In conjunction with the ADC, this makes it really easy and efficient to access your Revit Company families, templates, dynamo files, etc.

Of course, you will need to select a version of Revit, so name your BIM 360 project accordingly

BIM 360 Document Management for internal users

We have been using BIM 360 Docs for design collaboration without the BIM 360 Design Collaboration module turned on
We do this for internal team BIM 360 projects, so for instance if we need to design collaborate with WSP Structure, WSP Mechanical, WSP Electrical teams on a BIM 360 project, we will create a BIM 360 Document Management project alone with no other modules
This allows us the ease of setup and administration for a design team, this is a very similar setup of what
we had in classic C4R Team projects, BUT with the addition of Managed Access (where BIM360 Team is a High Trust access)
So, you can control the other internal teams to only have view access (they can't open your model or
cannot access the model though 'Manage Cloud Models' in Revit)



Also, this workflow using just the Documents Management module only, give us the Live linking,
again what we had when using classic C4R Live linking, so there is no need to publish models through Revit (Manage Cloud Models)
You would publish if you want to show that version of your model on the Docs site

For internal teams, they did not want to create package and consume packages and they would
not be adding in external consultants that want to do that as well
You still must have BIM 360 Design entitlement for each user by the way

FIGURE 23

Conclusion

BIM 360 Design is a cloud work-sharing, design collaboration, and data management product for project delivery, built on the new BIM 360 cloud platform. Made for distributed, multidisciplinary teams, you can co-author Revit models with greater file- and folder-based access controls, issue management, deliverable coordination, change visualization, and unlimited storage.

References

- Dynamo for Advance Steel—Hands-On for Beginners
  https://www.autodesk.com/autodesk-university/class/Dynamo-Advance-Steel-Hands-Beginners-2017

- BIM 360 Design Workflow for Revit, Robot Structural Analysis, and Advance Steel
  https://www.autodesk.com/autodesk-university/class/BIM-360-Design-Workflow-Revit-Robot-Structural-Analysis-and-Advance-Steel-2018

- Advance Steel Powered by the Magic of Dynamo
  https://www.autodesk.com/autodesk-university/class/Advance-Steel-Powered-Magic-Dynamo-2017

- Extended Structural Workflow Integration Between AutoCAD Plant 3D, Revit Structure, Robot Structural Analysis, and Advance Steel
  https://www.autodesk.com/autodesk-university/class/Extended-Structural-Workflow-Integration-Between-AutoCAD-Plant-3D-Revit-Structure-Robot

- Advance Steel for BIM: Seamless Workflow from Design to Fabrication
  https://www.autodesk.com/autodesk-university/class/Advance-Steel-BIM-Seamless-Workflow-Design-Fabrication-2018

- The Structural Design Workflow Based on Revit as a Core Platform with Dynamo
  https://www.autodesk.com/autodesk-university/au-online/profile?code=brq1C3ZMlnaE3JUs9o%2FJVQ%3D%3D

- Dynamo for Structure
  https://www.autodesk.com/autodesk-university/class/Dynamo-Structure-2017

- More Dynamo for Structure
  https://www.autodesk.com/autodesk-university/class/More-Dynamo-Structure-2018

- Daily Dynamo: Innovative Solutions to Everyday Structural Problems
  https://www.autodesk.com/autodesk-university/class/Daily-Dynamo-Innovative-Solutions-Everyday-Structural-Problems-2016

- Dynam(o)ite Your Steel Design
  https://www.autodesk.com/autodesk-university/class/Dynamoite-Your-Steel-Design-2017

- Structural Dynam(o)ite: Optimized Design and Fabrication Workflows with Dynamo
  https://www.autodesk.com/autodesk-university/class/Structural-Dynamoite-Optimized-Design-and-Fabrication-Workflows-Dynamo-2018

- Dynam(o)ite Your Design from Concept to Fabrication
  https://www.autodesk.com/autodesk-university/class/Dynamoite-Your-Design-Concept-Fabrication-2015

- Dynam(o)ite Your Design for Engineers
  https://www.autodesk.com/autodesk-university/class/Dynamoite-Your-Design-Engineers-2015

- Optimizing Structural Analysis with Dynamo
  https://www.autodesk.com/autodesk-university/class/Optimizing-Structural-Analysis-Dynamo-2015#handout

- Precast Building Design Using Revit, Robot Structural Analysis, and Dynamo
  https://www.autodesk.com/autodesk-university/class/Precast-Building-Design-Using-Revit-Robot-Structural-Analysis-and-Dynamo-2016#downloads

- The Structural Design Workflow Based on Revit as a Core Platform with Dynamo
  https://www.autodesk.com/autodesk-university/class/Structural-Design-Workflow-Based-Revit-Core-Platform-Dynamo-2017

- From Revit to FEM and Back-with Use of Dynamo
  https://www.autodesk.com/autodesk-university/class/Revit-FEM-and-Back-Use-Dynamo-2017

- Conceptual Structural Design Using Revit Adaptive Components and Dynamo
  https://www.autodesk.com/autodesk-university/class/Conceptual-Structural-Design-Using-Revit-Adaptive-Components-and-Dynamo-2017

- Extended Workflows with Advance Steel
  https://www.autodesk.com/autodesk-university/class/Extended-Workflows-Advance-Steel-2016

- Dynamo for Structural Precast
  https://www.autodesk.com/autodesk-university/class/Dynamo-Structural-Precast-2018

- Automated Structural Load Calculation Using Dynamo and Revit
  https://www.autodesk.com/autodesk-university/class/Automated-Structural-Load-Calculation-Using-Dynamo-and-Revit-2018

- Steel Fabrication Element Transfer
  https://knowledge.autodesk.com/support/revit-products/learn-explore/caas/CloudHelp/cloudhelp/2020/ENU/Revit-AddIns/files/GUID-912942CC-9126-4135-B098-0ABE912A5F27-htm.html