

Connecting Authoring Software with Autodesk Construction Cloud

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Connecting Authoring Software with Autodesk Construction Cloud - CS473446

Richard Parker

Class handout



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Richard leads product management for Autodesk's BIM 360 Coordinate and BIM 360 Design products, including Navisworks, Glue, Model Coordination and Design Collaboration. Richard joined Autodesk 10 years ago after spending time at a variety of construction tech startup, and way back in the day he was a practicing architect. Richard lives in Sheffield UK, with his wife and 2 young sons.

Agenda

- Industry Challenge – Disconnected Projects
- Industry Solutions
- What is Autodesk's Approach?
- Connected Workflows

Today's session has a learning objective of helping you understand how Autodesk is working to better connect design to construction

Initially I'll be providing an overview of some of the challenges the AEC industry faces in connecting project teams

Followed by a look at some of the recent trends we are seeing as our industry seeks to overcome those

The bulk of the session will spent looking at how Autodesk is working to better connect project teams, with specific examples of how we are building connected workflows across our design and construction products

Disconnected Projects

Initially let's have a look at some of the challenges our industry faces in connecting project teams

AEC is one of the most collaborative, yet fragmented industries in the world.



AEC is a highly collaborative industry

Many hundreds of individuals - from designers, fabricators, subcontractors, estimators, project managers, schedulers, contractors and more need to work together to successfully complete a project. These individuals will come together for a fixed period of time before disbanding and moving onto other projects

Projects are delivered with a mixture of tools, process, systems and data types, which don't always work together and are often incompatible,

This can result in information that is siloed, which means communication between team members is delayed, or doesn't happen at all.

Industry Challenge

Designer	Design Teams	Contractors	Owner
<ul style="list-style-type: none">• Personal Productivity• In-product features• Design complexity• Hardware optimization	<ul style="list-style-type: none">• Collaboration• Visibility & awareness• Fast iteration• Multi-discipline	<ul style="list-style-type: none">• Project coordination• Oversight & reporting• Conditioned data• Time, cost, safety	<ul style="list-style-type: none">• Defects & quality• Effective handover• Asset Management• Lifecycle Performance
			

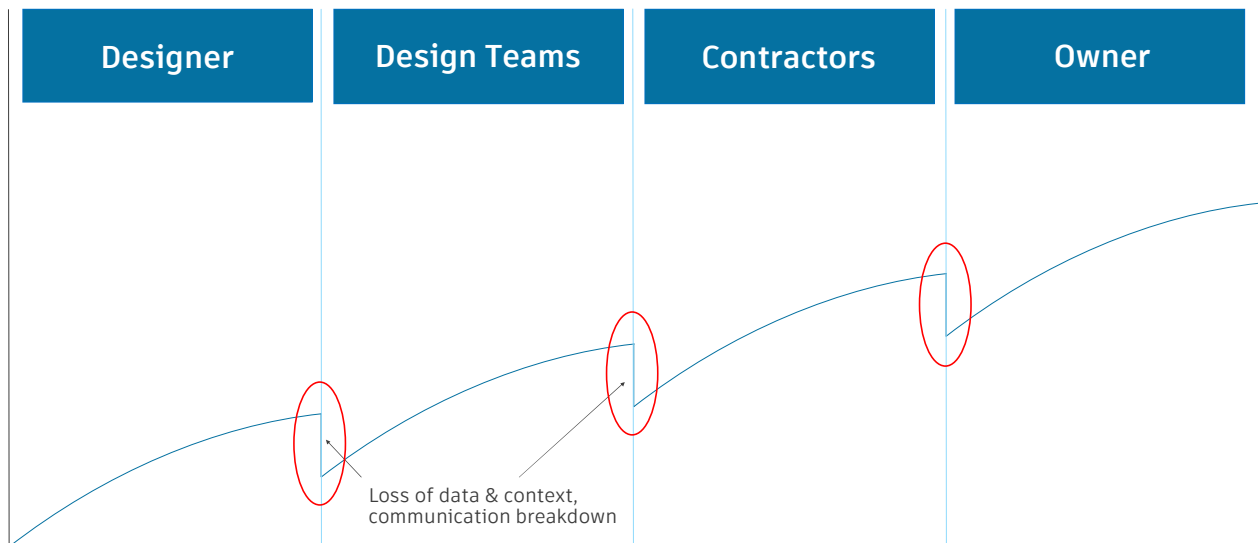
Often the key personas in the project have different concerns and priorities with, each player in the chain optimizing for different objectives

Project stakeholders have different needs and uses for data, meaning that information often needs to be reworked or rebuilt for different purposes.

This challenge is traditionally “solved” by recreating information in each subsequent step of the lifecycle : concept design, detailed design, construction documents, shop drawings, fabrication and installation details are ‘recreated’ by different participants to suit their specific needs

Perhaps the most cited example of this is that “the designer’s model isn’t suitable for construction.”, requiring new BIM datasets to be built specifically to support constructability, schedule, cost and health and safety workflows

Industry Challenge



And it is frequently where project team members interact with each other that much of the data friction can occur.

Where large, distributed teams of multi-discipline designers are collaborating to develop their vision, and when those designers are working with general contractors and subcontractors to convert design intent to construction execution. competing—or missing—data and exchange standards cause communication lags and drop off as information is translated and transmitted;

Collaboration becomes more difficult
as projects have become more complex and
clients expect more from less.

And things are not getting any easier

Projects have become more complex, and clients expect more from less.

When teams and project information aren't connected...

- Project info becomes **scattered**
- Communication is **inconsistent**
- Managing information can be **cumbersome**
- Communication cycles become **extended**
- Errors are found **late**
- Productivity is **lowered**

We also know that when teams and project data aren't connected problems arise:

- Project information becomes scattered;
- Communication is inconsistent;
- Managing information is a painful overhead
- Communication cycles take longer
- Errors are found later
- The net effective is that productivity is lowered

What is the AEC Industry doing?

Clearly this is not new news – the challenges of stagnant productivity growth, wafer thin margins and the cyclical boom to bust cycle of the AEC industry is well recognized and new methods, techniques, policies and technologies are emerging to address these challenges, many with a focus more tightly integrating project stakeholders and data flows.

Prefabrication & Industrialized Construction



Increasingly manufacturing techniques are becoming commonplace within construction. Prefabrication and offsite manufacturing seeks to create construction components and assemblies in a controlled environment offsite before components transported to final destination for installation onsite. The aim is to reduce [material](#), [overhead](#), and [labour costs](#) relative to traditional construction techniques.

Design for Manufacturing and Assembly is a necessary precursor to support offsite manufacturing, with the designer considering the manufacture and assembly of the projects components as an integral part of the design process, rather than focusing solely on the end-state design of the built asset.

Prefabrication is increasingly common for many construction components such as concrete floor slabs, structural columns and beams, complex multi-trade MEP systems plus fully formed pods and volumetric modules

Integrated Project Delivery



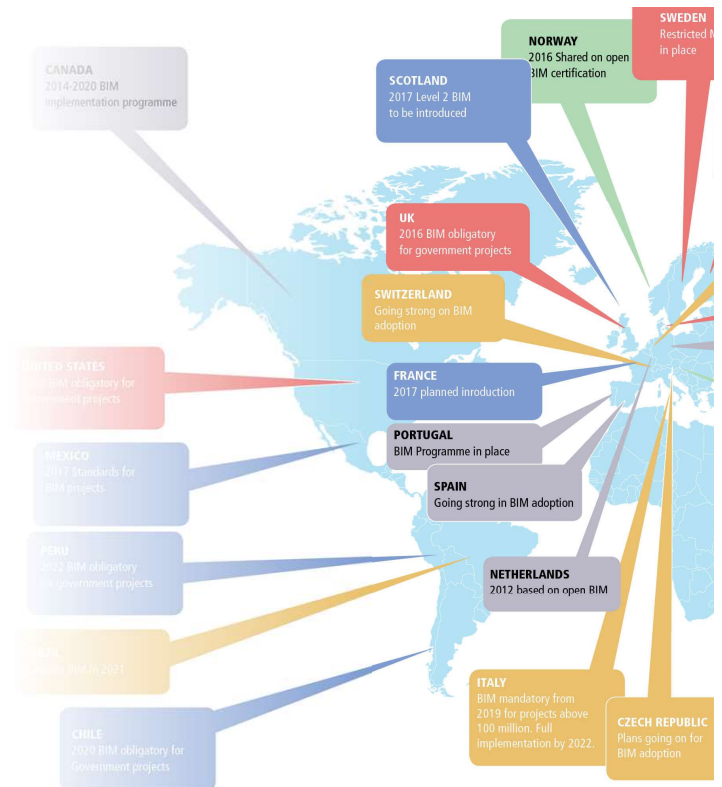
New contract types are seeking to share risk and reward across the full project team. IPD is a collaborative framework within which the owner, contractor, and designer work together to plan and prepare the project. These stakeholders are mutually financially invested in the successful outcome of the project. This model typically includes subcontractor and trade contractors engaging early in the project during the design phase to ensure that construction methods are considered sooner in order to reduce risk during the build phase .

Vertical Integration



And there are other examples that point to the trend for the industry becoming less fragmented and increasingly vertically integrated, as the traditional designer / builder silos become less defined. Larger contractors are acquiring or building out extensive in house design capability as they seek to influence decision making earlier in the project. Traditional Design / bid / build contract types are being supplanted by new turn key, design and build and framework delivery models that blur the traditional distinction between designer and builder.

Government Mandates

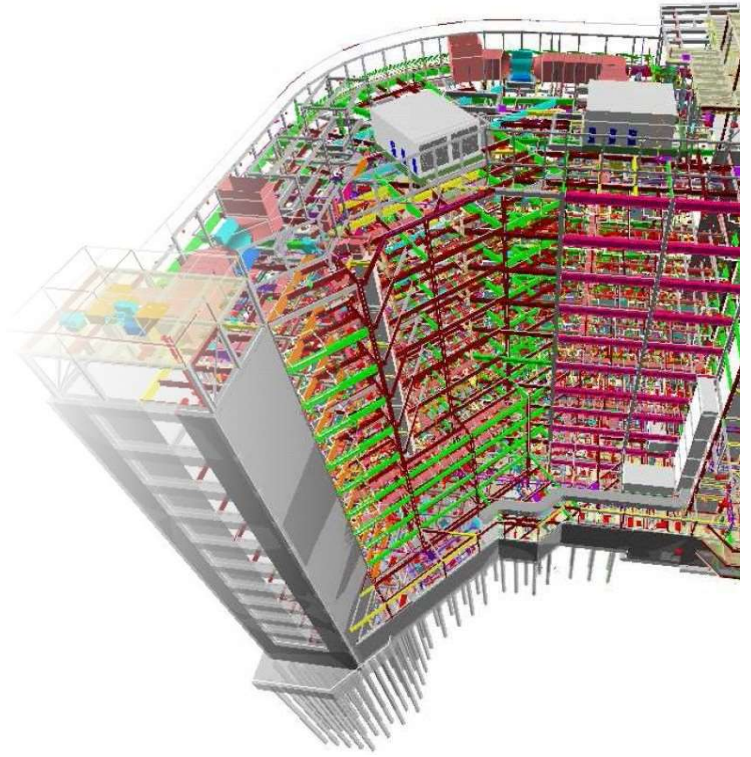


Many of the largest global construction clients are public bodies and increasingly Governments are seeking to address productivity issues within the built environment by enforcing mandates that standardize methodology and data formats

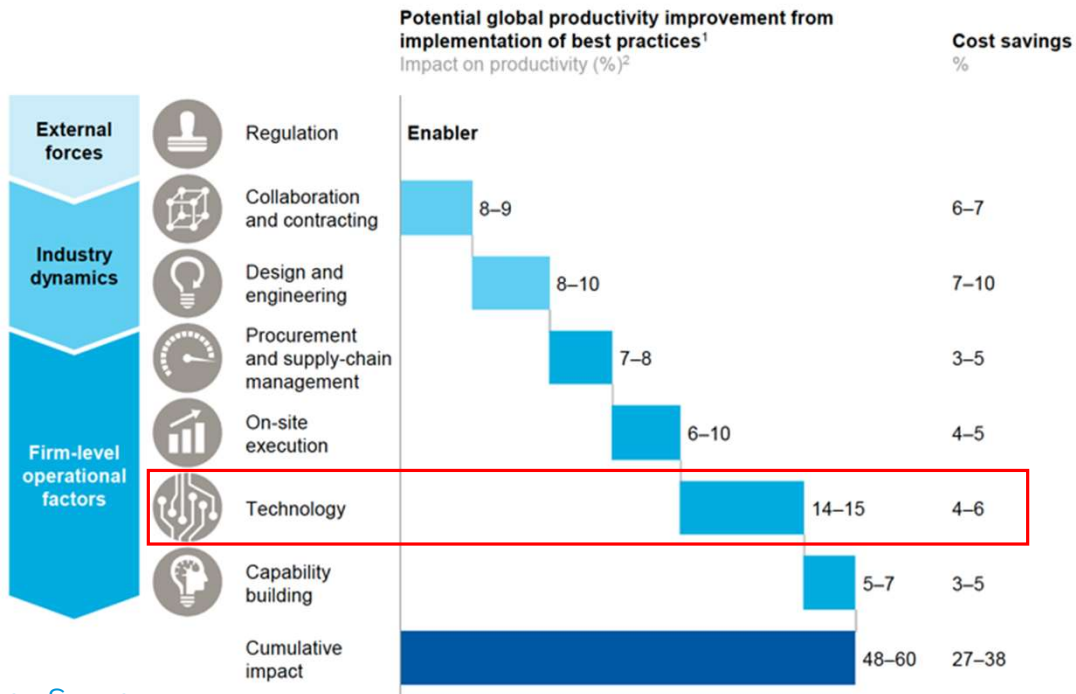
In a specific example close to home for me, The U.K. government, by virtue of its BIM requirements, is forcing cross-industry integration with respect to the development of digital standards.

The increasingly widely recognized ISO 19650 is now an international standard for managing information over the whole life cycle of a built asset using building information modelling (BIM). It is anticipated that this standard will become more widespread as asset owners and construction clients around the world seek to reduce risk, increase predictability and achieve better business outcomes from digital information.

Technology



Technology is an enabler for many of the trends and initiatives that I have just outlined. Established and emergent technologies such as BIM, cloud computing, mobile and distributed computing, AI and machine learning, can all be harnessed to help drive change in the industry.



[McKinsey Survey](#)

Indeed a recent survey from Mckinsey looking at opportunities to address construction inefficiency highlighted more effective use of technology as being the factor that offered most opportunity to increase productivity within the industry

Slide 16

TW5 Alternate to slide 16 zooming in tighter.

Tristram Wallace, 10/18/2020

RP5 yup, definitely an improvement. I'll reference the source of the data in this slide

Richard Parker, 10/18/2020

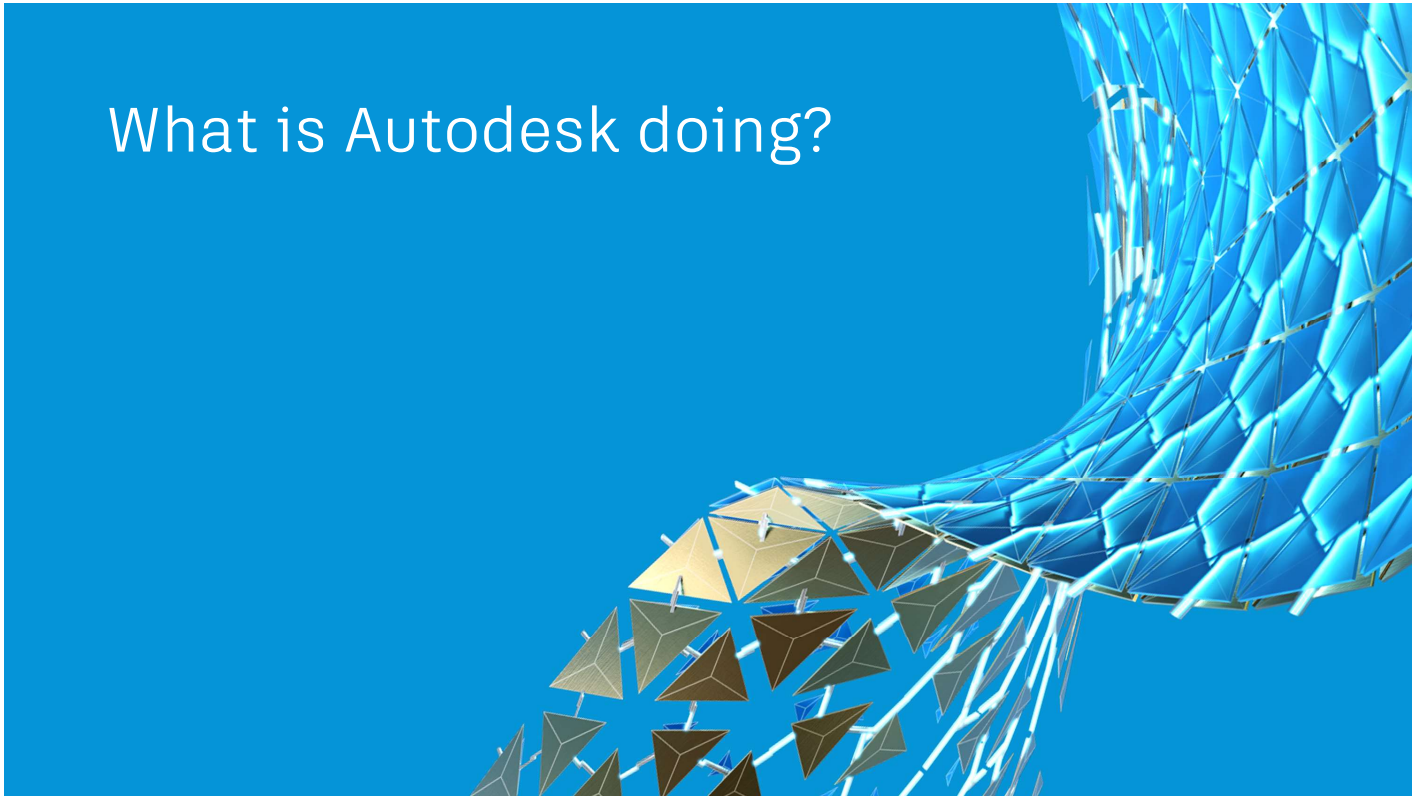
58% of AEC professionals expect to see more technology-driven change within the next five years than there has been in the last 50 years.

[*AGC and FMI Survey](#)

And we can all see it happening – the level of investment, interest and excitement in the potential for technology to change our industry has never been higher.

According to a recent survey by AGC and FMI, 58% of construction professionals expect to see more technology driven change within the next five years than there has been in the last 50 years.

What is Autodesk doing?



So what is Autodesk doing about this

- Design for Manufacturing ✓
- Integrated Project Delivery ✓
- Vertical Integration ✓
- Government Mandates ✓
- Technology ✓



Well we are actively contributing to all of those trends that I highlighted, and I invite you to look at this year's AU timetable for many examples of how we are helping drive change in the industry.

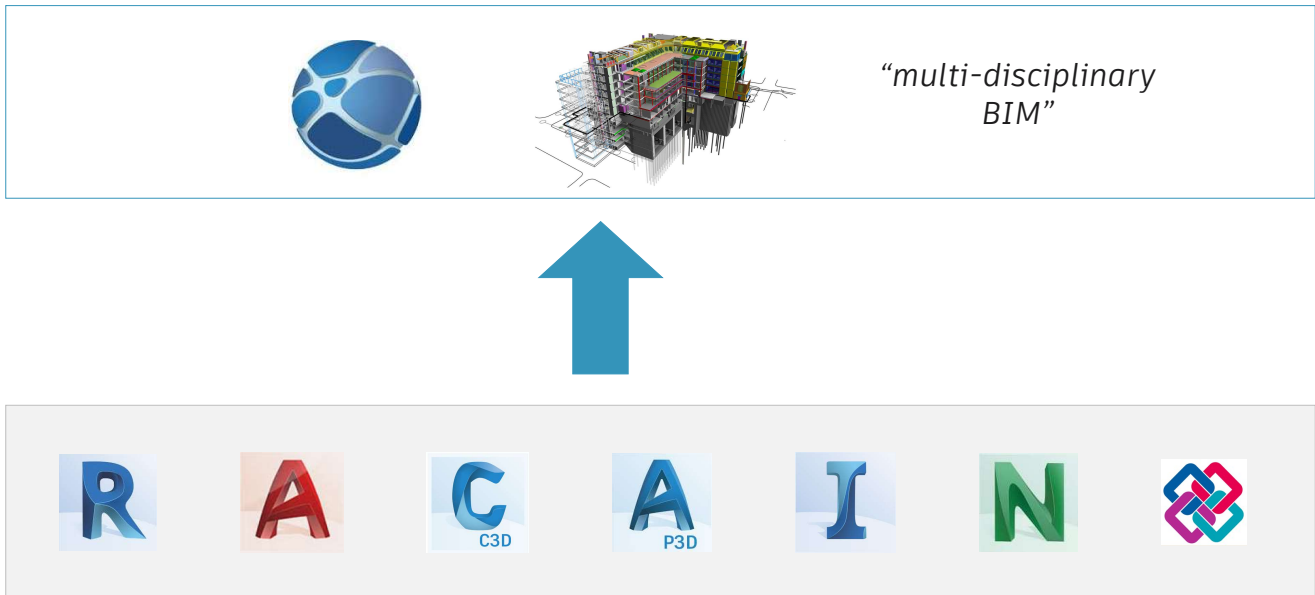
For the remainder of this session I will be focusing on some of the technologies that we have recently introduced that help support better connected workflows across the project team, with a particular focus on more tightly integrating design and construction

Multi-Discipline BIM



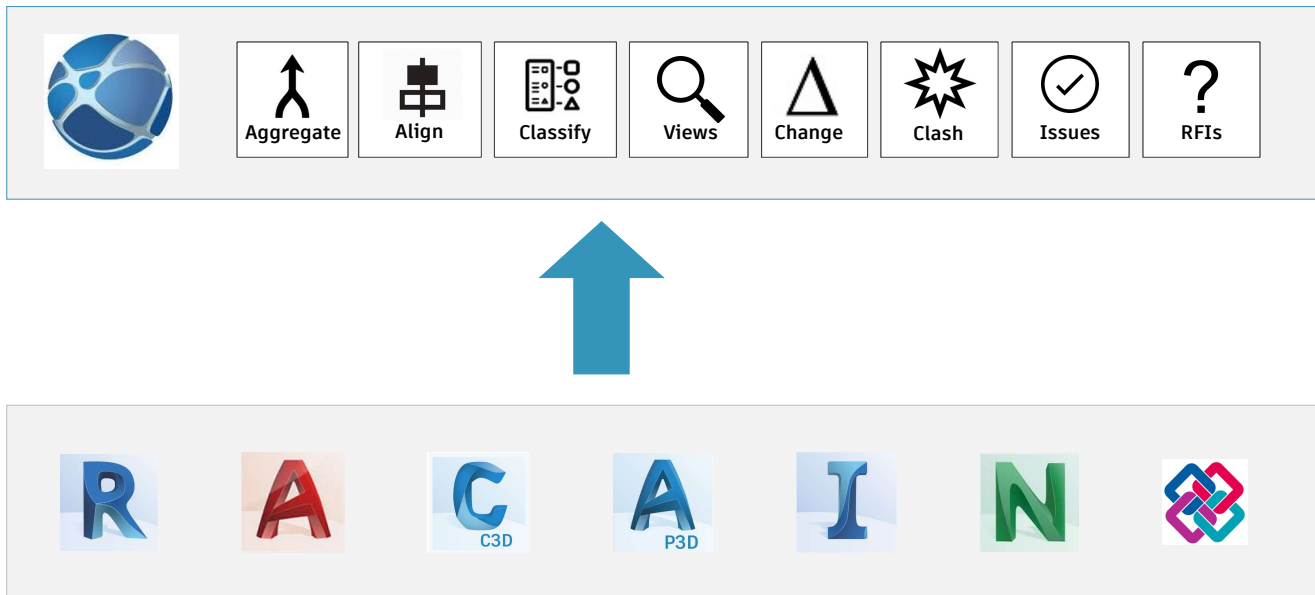
It's our belief that one of the key enabling technologies to support project teams working together more effectively is cloud hosted multi-disciplinary BIM

Multi-Discipline BIM



A key enabler for multi-discipline BIM is the ability to publish and aggregate content from many different sources and that would include both Autodesk and non-Autodesk design products. So we have built out tools that allow content creators – architects, engineers, detailers, fabricators to quickly and easily populate the multi discipline BIM dataset

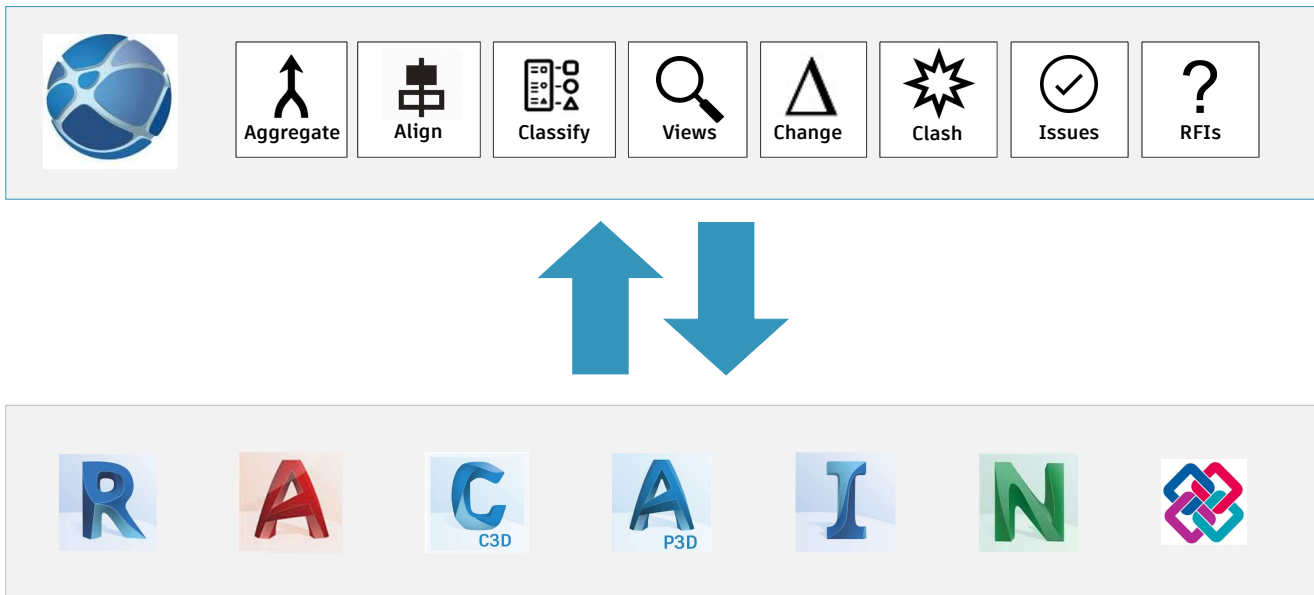
Multi-Discipline BIM



Once that information is made available in the multi-discipline model numerous opportunities and workflows are enabled. By pulling content together from across the project team in a single cloud hosted environment we can start to analyze and understand the shared output of the team in ways that are not possible when considering the output of single disciplines in isolation. We can use cloud computing to automate the analysis and optimization of that data, and identify problem and potential problems across the team sooner.

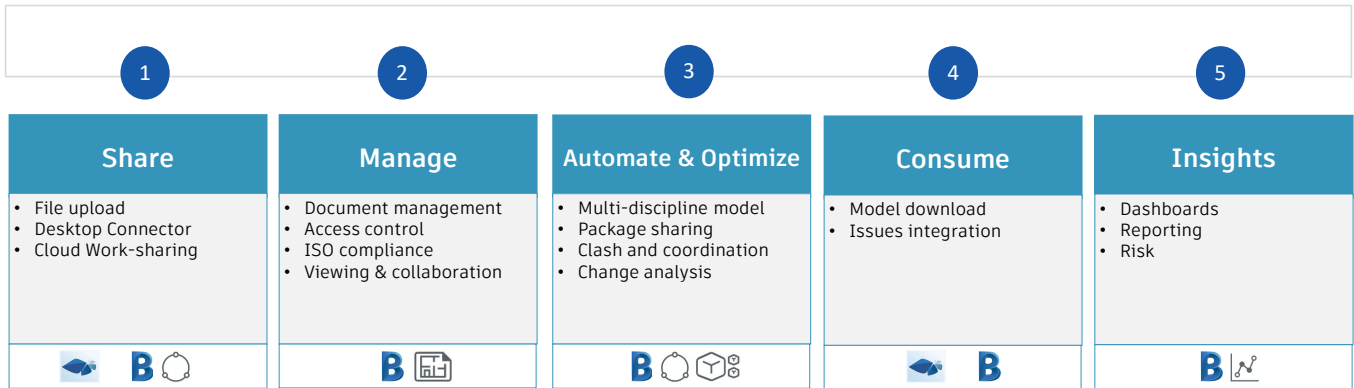
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Multi-Discipline BIM



We can provide mechanisms that notify individuals of how their content will impact others on the project, and offer a communication framework that all team participants can use to collaborate and resolve issues. These workflows can be leveraged during all project phases

Connected Workflows



So let's have a look at those workflows in more detail

We've broken this down into 5 segments

The first of those is focused on allowing project team members to share information with their colleagues

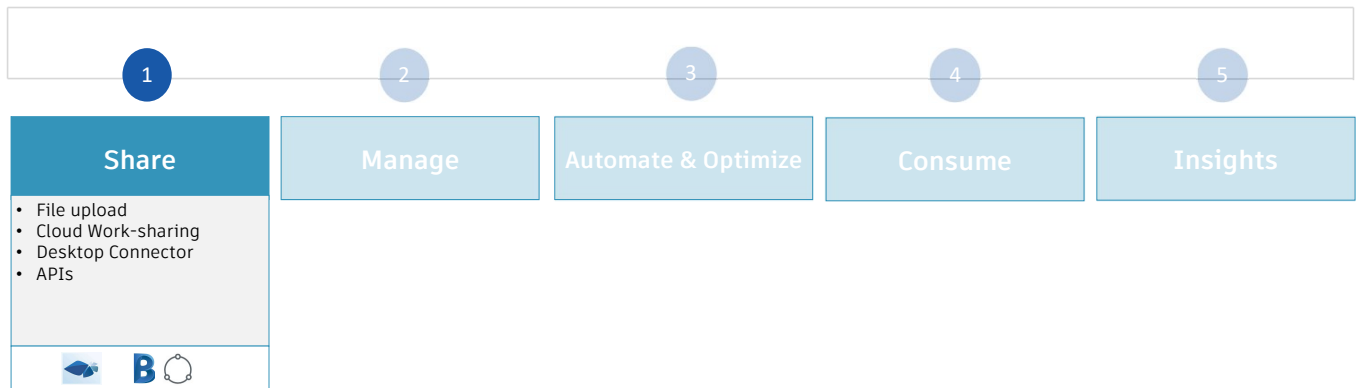
Secondly the tools that allow for the management and control of that published project data

Thirdly the ability to analyze and optimize multi-discipline BIM datasets

Next the tools that allow project team members to consume or round trip the output of the analysis and to collaborate with their colleagues

And finally the oversight and reporting of the entire process

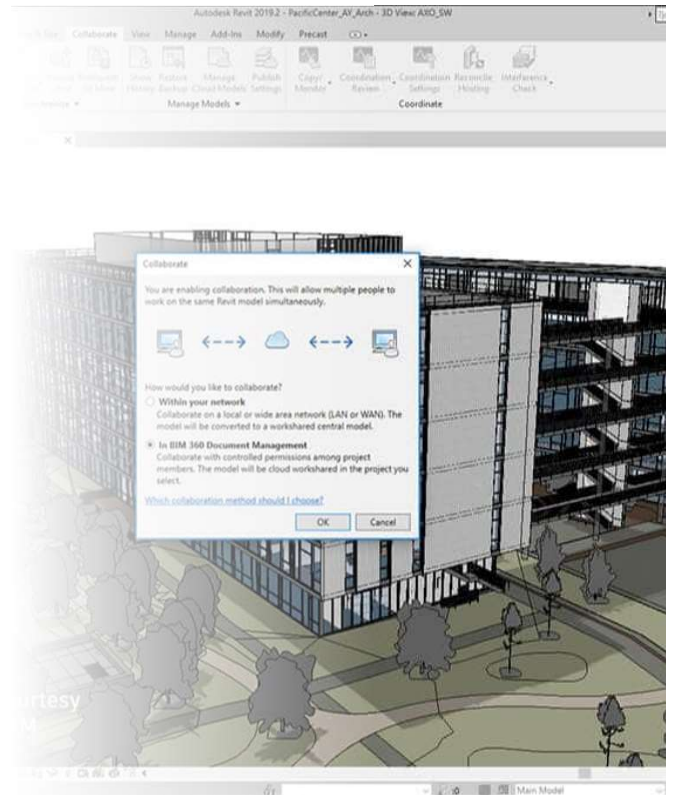
Connected Workflows



There are a number of mechanisms that support the easy sharing of design and fabrication content across the project team

Cloud Worksharing

Who?	<ul style="list-style-type: none">• Designer• Design Teams
What?	B AUTODESK® BIM 360® DESIGN R C A C3D P3D
Why?	<ul style="list-style-type: none">• Multi-discipline co-authoring• Cross-company & cross-location collaboration• Automated publishing & version control













Cloud worksharing enables multi-firm co-authoring allowing designers to concurrently develop BIM datasets from any location, while centralizing the efforts of distributed teams.

Cloud worksharing will support intra company design development, but also collaboration across disciplines spanning architects, engineers, fabricators and contractors

Obviously Revit Cloud worksharing is an established solution that has been widely used within design and construction for a number of years. This year Autodesk has extended cloud worksharing support beyond Revit to include collaboration for Civil 3D and Collaboration for plant 3d enabling a broader set of project participants to engage in collaborative, cross-discipline design.

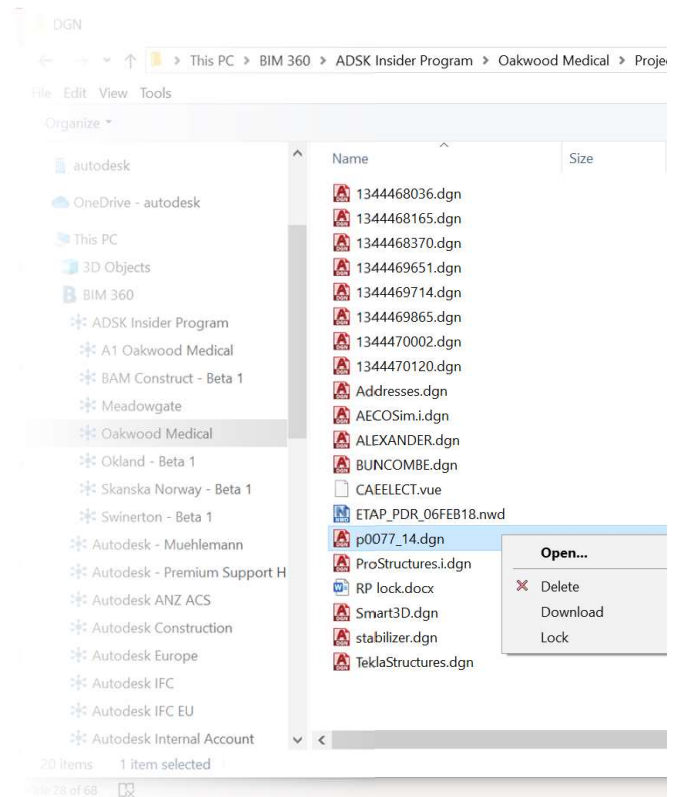
Increasing LOD

	Design		Preconstruction	Fabrication	
	LOD 100 – Conceptual	LOD 200 – Approximate	LOD 300 – Precise	LOD 400 – Fabrication	LOD 500 – As Built
					
Accuracy	<ul style="list-style-type: none"> - Wall is generalized - Wall type is generic - Wall size is generic - Wall location approximate 	<ul style="list-style-type: none"> - Wall is generally located - Wall is approximate in size - Openings are placed and approximately sized - Finishes generalized 	<ul style="list-style-type: none"> - Location is accurate - Wall size & type precise - Openings accurate - Drywall may be shown - Finishes are finalized 	<ul style="list-style-type: none"> - Location is coordinated with trade contractor - Wall framing location - Drywall shown - Openings show framing and accessories required 	<ul style="list-style-type: none"> - LOD 400 reflecting as built conditions - O&M data may be linked to objects - FM systems may be linked or embedded
Usage	<ul style="list-style-type: none"> - Conceptual design - Massing - Feasibility study 	<ul style="list-style-type: none"> - Spatial Coordination - Design Development - Approximate quantities - Conceptual Estimation - Sequencing / 4D viz 	<ul style="list-style-type: none"> - Design Coordination - Quantification - Estimating - Tendering / Bid Packages - Constructability 	<ul style="list-style-type: none"> - Trade Coordination - Fabrication & manufacture - Assembly & Installation - Layout - As-built check 	
Persona	<ul style="list-style-type: none"> - Design Architect - Engineer 	<ul style="list-style-type: none"> - Architect - Engineer 	<ul style="list-style-type: none"> - Design Technician - VDC / BIM Engineer - Detailer 	<ul style="list-style-type: none"> - BIM Technician - VDC / BIM Engineer - Fabrication detailer - MEP detailer 	<ul style="list-style-type: none"> - Facilities Manager - Maintenance Engineer
Cost of Error	\$	\$\$	\$\$\$	\$\$\$\$\$\$\$\$\$\$\$\$	\$
Participants					
File Formats	RVT, SKP	RVT, IFC	RVT, IFC, DWG, DGN	RVT, IFC, DWG, IPT, DGN, 3DM, PRT, STP, CRR..	

An additional consideration is also the progress that has been made to extend Revit downstream from design to support fabrication levels of details. As discussed earlier this is bringing new personas into model-based project delivery as trade contractors and fabricators increasingly adopt a common platform and toolset alongside architects and engineers.

Docs Publish, Desktop Connector & APIs

Who?	<ul style="list-style-type: none"> • All project team members
What?	
Why?	<ul style="list-style-type: none"> • Connect Windows environment to the cloud • File access, control and publish • Tightly integrated with desktop apps



In addition to cloud worksharing there are a number of tools that support the efficient sharing of information from multiple sources, including non-Autodesk design products

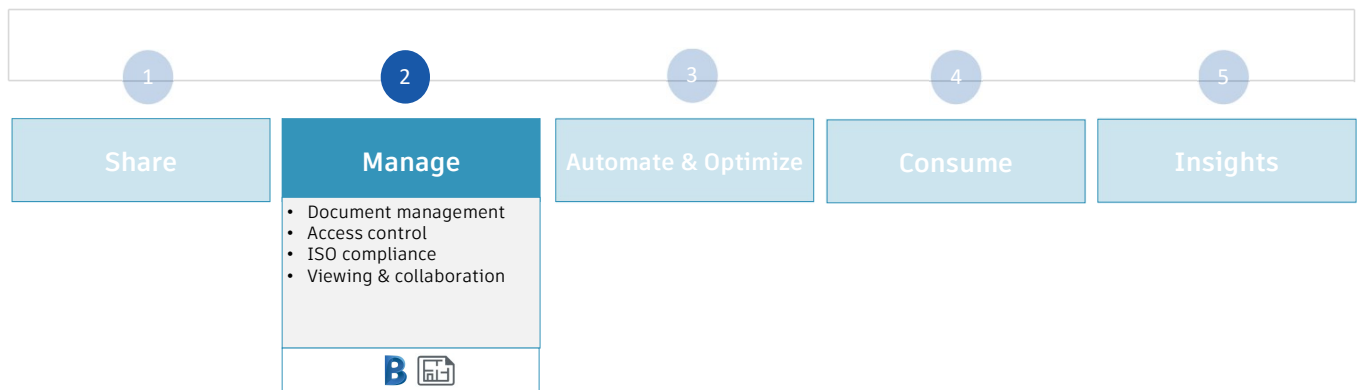
Docs offers comprehensive publishing tools directly with its web interface.

And the Desktop Connector provides an embedded Windows components that allows saving and retrieval of cloud hosted content using the standard in-product file management tools that you will find in pretty well any Window application.

Additionally, these tools will support the management of file references, and will automatically establish child / parent relationships during the upload process to ensure all relevant data is published.


Apis provide the opportunity for full publishing automation by connecting 3rd party document and data storage systems directly to the Autodesk Cloud

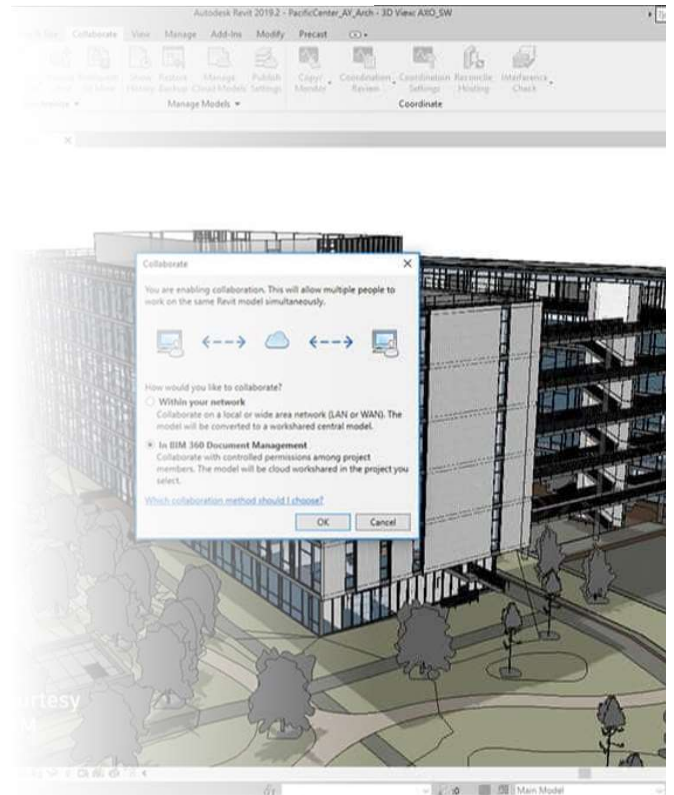
Connected Workflows



All of that published content is managed within Docs

Common Data Environment

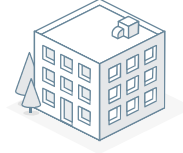
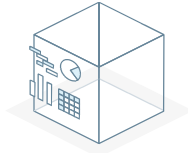
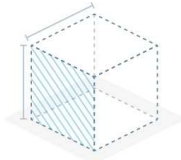
Who?	<ul style="list-style-type: none">• All project team members
What?	 AUTODESK® BIM 360™ DOCS
Why?	<ul style="list-style-type: none">• Anytime, anywhere access to project information in one place• View, markup, and manage documents• ISO 19650



Docs provides the common data environment for the whole project team and underpins our connected design and construction data strategy

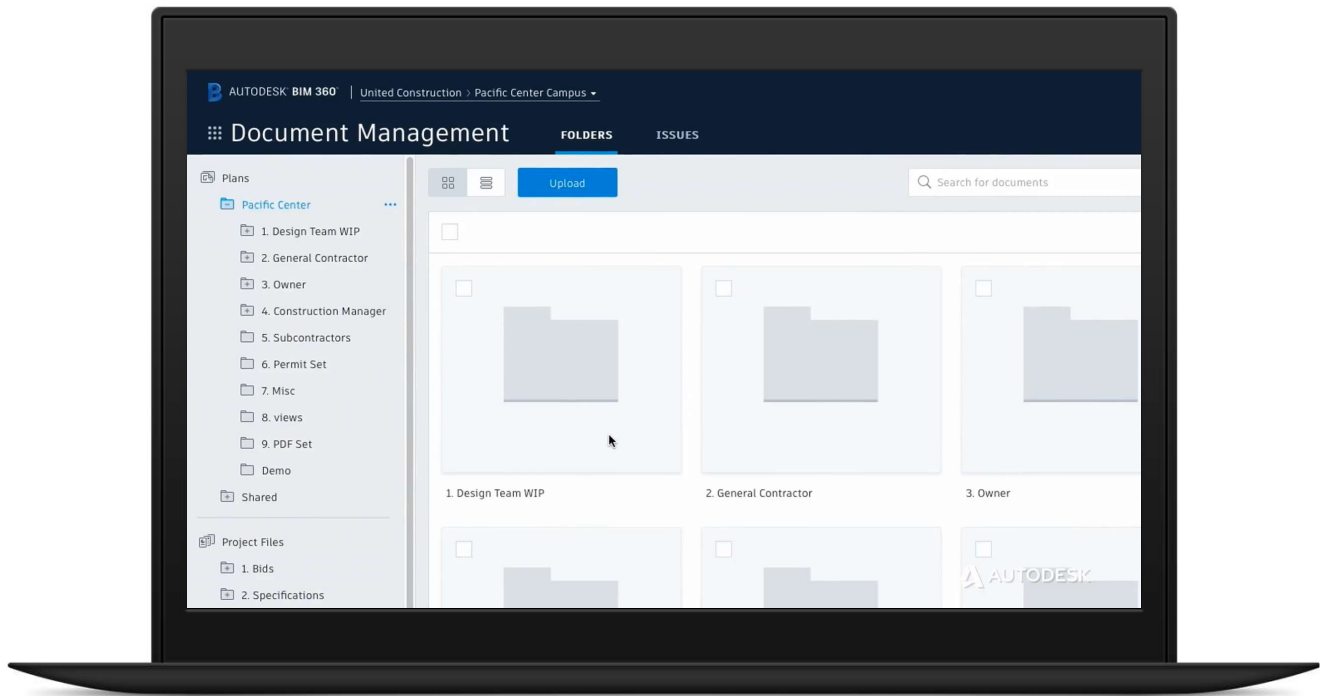


AUTODESK CONSTRUCTION CLOUD™



	DESIGN	PLAN	BUILD	OPERATE
Capabilities	<ul style="list-style-type: none">•Design Authoring•Design Collaboration	<ul style="list-style-type: none">•Model Coordination•Model Conditioning•Quantification•Bid Management•Qualification	<ul style="list-style-type: none">•Project Management•Cost Management•Quality•Safety•Project Closeout	<ul style="list-style-type: none">•Facilities Maintenance•Asset Lifecycle
Shared Data	<div>Data</div> <div>Models · Drawings · Issues · Specifications · RFIs · Cost · Assets · As-Built</div>			
Insight	<div>Predictive Analytics & Risk Management</div> <div>Executive Dashboards · Reports · Construction IQ · Data Connector</div>			
Network	<div>Builders Network</div>			

Because Docs provides a single data platform that spans the entire project lifecycle, design content is available throughout all phases of the project and can be used and augmented during downstream construction workflows, for instance to support quantification,, bidding, rfis, cost management, plus on site for inspection, approvals and health and safety.



Let's take a quick tour of Docs features

Administrators can structure the project content to reflect the organizational requirements of the project team. A huge range of file formats are supported and users have the ability to view both 2D and 3D representations of design content.

Granular controls ensures that project participants are only going to get access to the information that is relevant to them. Docs supports the option of working in a high trust environment such as you might find in an IPD project, whilst also supporting lower trust environments more typical of traditional contract types. Docs can also be configured to support private areas for Work In Progress content development, plus shared spaces for cross-discipline collaboration. All activities are tracked for audit purposes, providing a comprehensive archive throughout the project.

When viewing content a set of collaboration tools allow users to markup and create issues for structured communication across the team.

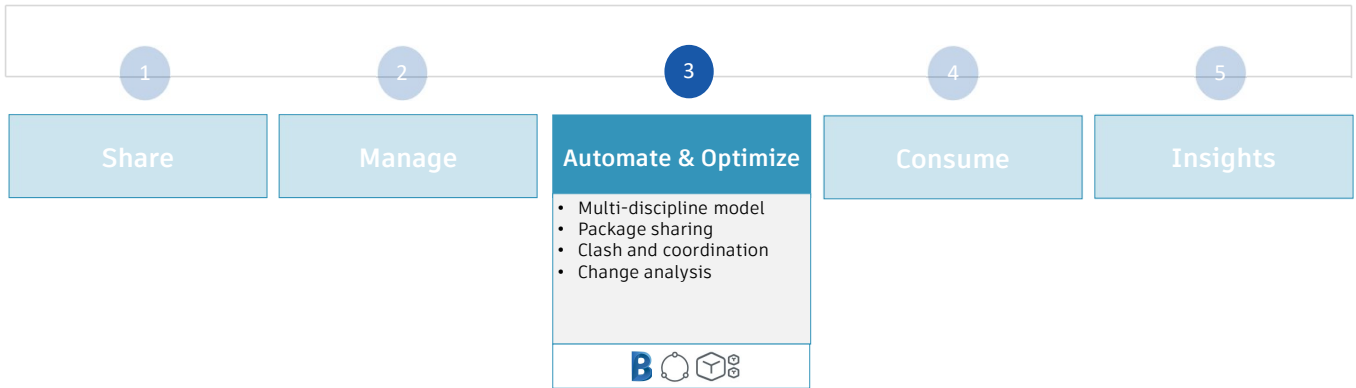
Earlier I had describe how governments are starting to mandate data protocols within the AEC industry. Docs has implemented a set of features that are currently in beta that support the standardized flow of data transfer across project team members.

What we are looking at here are a set of tools that allow an administrator to define the

file naming conventions of published data in line with ISO 19650 definitions.

When publishing to Docs, automated checks will ensure that the information being shared on the project is meeting the data requirements defined by the project protocol.


Connected Workflows

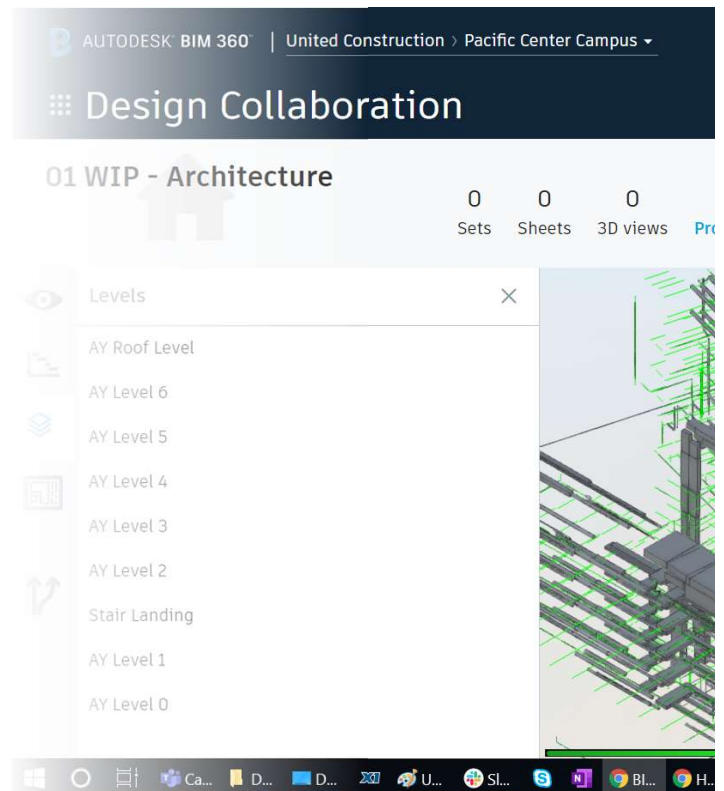


Whilst Docs provides a comprehensive document and data management toolset, as discussed earlier by pulling that design content into a single cloud hosted environment and leveraging the multi-discipline BIM dataset, we can start to automate and optimize design and construction workflows.

Once information has been published to Docs we can undertake a set of analysis beyond that which you would find in a traditional document management system

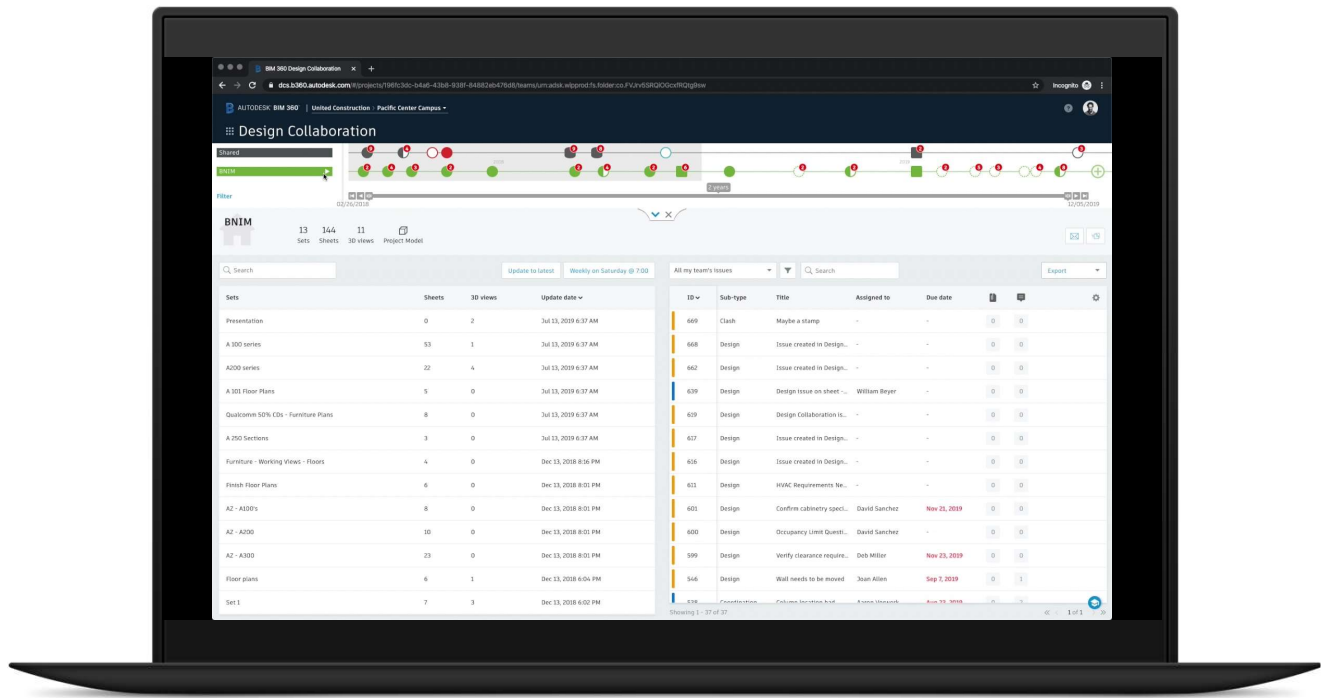
Design Collaboration

Who?	<ul style="list-style-type: none">• All project team members
What?	 AUTODESK® BIM 360® DESIGN
Why?	<ul style="list-style-type: none">• Visualize and explore the whole project• Share and consume of design packages• Understand change during the project



Design collaboration provides a set of tools that open up access to BIM design review and development for all project team members

And whilst the design content within Design Collaboration is exactly the same as that which has been published to Docs, the user experience and workflow is has been specifically designed for ease of access and participation for all project stakeholders.



Let's have a look at some examples

A key feature of Design Collaboration is a timeline that shows when information has been shared by project team members. For each discipline we can drill in to see the datasets that were published on a given date. This allows the whole team to track design development as the project progresses.

Design Collaboration automatically aggregates the output of the various disciplines to generate a whole-project view. A set of visualization tools then allow all stakeholders to explore and understand the design without the need for specialist BIM tools or skillsets. Users can drill down into subsets of the model, for instance to look at specific disciplines or levels. To better support collaboration during design development users can create issues to raise questions or suggestions with other team members.


Users can view BIM datasets via sheet or model views, and Design Collaboration also supports hybrid 2D / 3D representations to optimize the user's understanding of design intent, and also to provide easy tools for navigating the model.

It's easy to understand changes that take place as the design develops by comparing versions to identify new, removed and edited content.

An individual user or discipline can use the whole project model to inform *their* design development, and understand how the output of other team members may impact their work. Users can define packages of content that they wish to share with other project team members on an ad-hoc or automated basis, and can choose when to consume the output of other team members within their local dataset.

Together these features provide a framework that optimizes the process of sharing and consuming data, allowing the extended team to concurrently develop the design. This results in greater visibility, transparency and understanding across the team.

Coordination

Who?	<ul style="list-style-type: none"> • Designers & Detailers • VDC Professionals
What?	 AUTODESK® BIM 360® COORDINATE
Why?	<ul style="list-style-type: none"> • Cross-team coordination • Empower the extended team to self-coordinate • Automated aggregation, clash

AUTODESK BIM 360® | ADSK Insider Program > Meadowgate

Model Coordination

MODELS CLASHES VIEWS

Active Assigned Closed

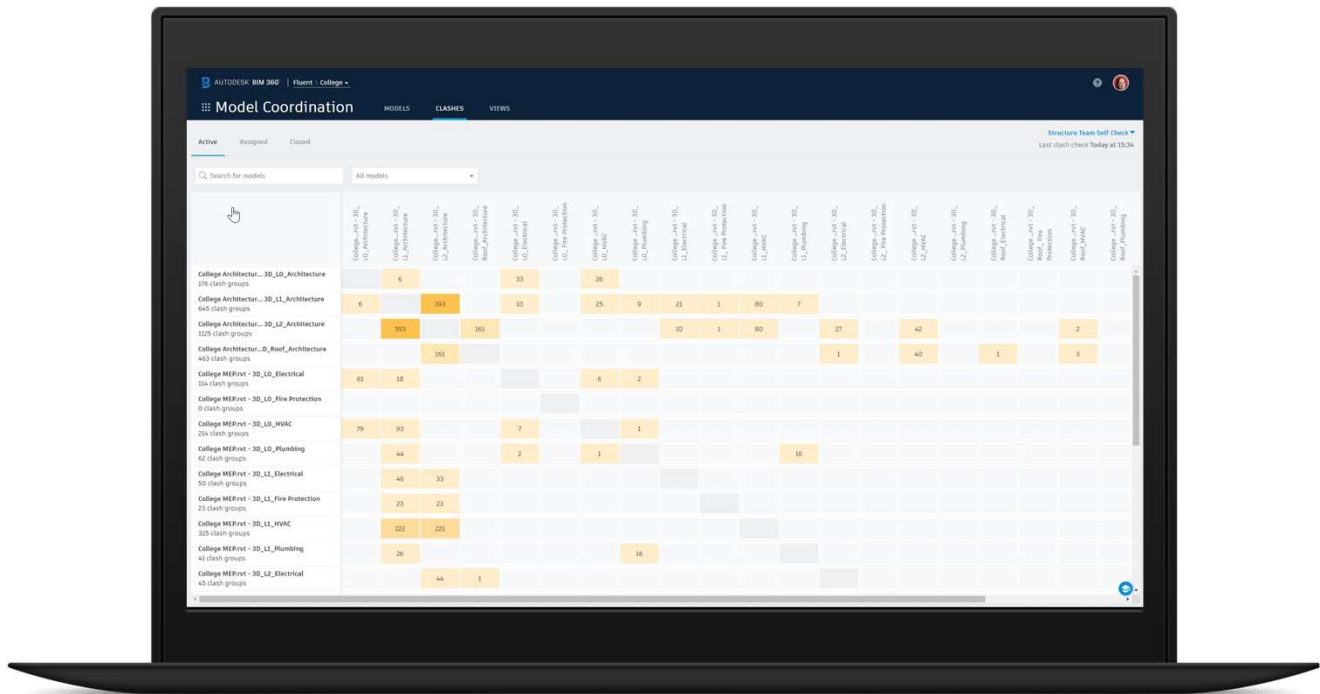
Search for models Select a view All 11 models

	Meadowgate...3D Views	Meadowgate...3D Views	Meadowgate...3D Views
Meadowgate - Architecture - 3D Views 47 clash groups			6
Meadowgate - Civil - 3D Views 3 clash groups			
Meadowgate - Servic...Ductwork - 3D Views 308 clash groups	7		
Meadowgate - Servic...Pipework - 3D Views 333 clash groups	13		25
Meadowgate - Servi...uctwork - 3D Views 359 clash groups			
Meadowgate - Servi...ipework - 3D Views 529 clash groups	4		
Meadowgate - Servi...antroom - 3D Views 0 clash groups			
Meadowgate - Services - Roof - 3D Views			

And we can also use that multi-discipline BIM dataset to address a contractor's critical concerns around coordination and constructability.

It's well understood that finding design, fabrication and installation *coordination* problems early before they hit site can have a huge impact in reducing rework, waste and expense

Typically the process of coordinating multi-discipline BIM datasets is undertaken by a BIM wizard who has a copy of Navisworks and a super high spec workstation under their desk. They will receive content from other project participants on a regular basis, undertake some black magic in Navisworks to figure out the clash and coordination problems before managing these through to resolution. Rinse and repeat this process every week or 2



Model Coordination transforms this process. As soon as information is shared in Docs, either through cloud work sharing or any of the other publishing mechanisms we looked at, theconCC will automatically aggregate the data, as well as running clash algorithms to identify potential coordination problems.

Users can break the project down into subsets, for instance to focus on particular locations or zones within the project that are a priority for coordination. Users can also create private WIP spaces for resolving their own coordination challenges before sharing with the broader team.

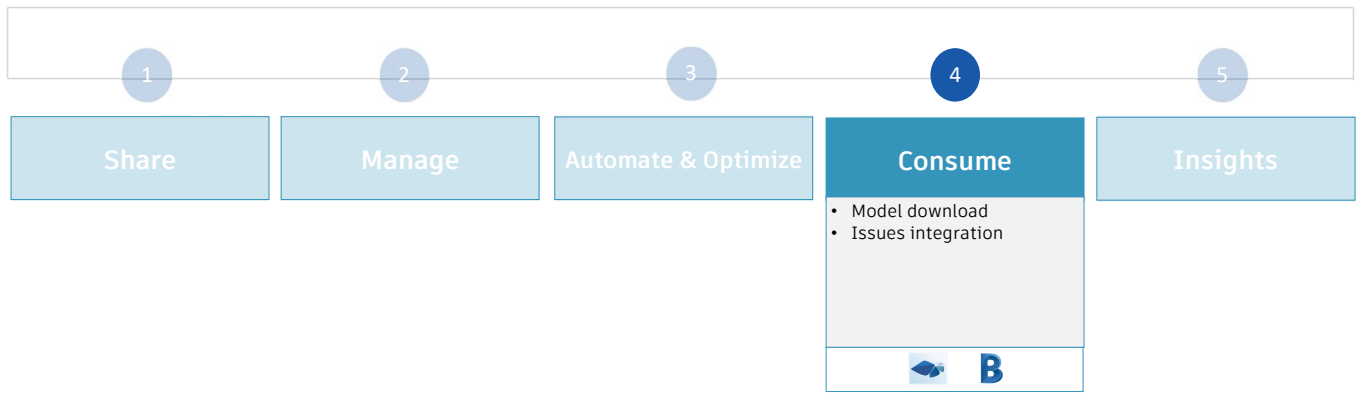
Model Coordination will serve up reports that provide a heat map overview of the status of the project, identifying coordination hotspots across disciplines and systems

Users can then drill down to view specific clashes and Model Coordination provides the tools to explore and resolve potential problems. Users can create coordination issues comprising individual clashes or groups of clashes that they can assign to other team members for resolution

By automating the coordination process for multi-discipline teams, Model Coordination enables each participant to take responsibility for the quality of their own output. Architects, engineers, fabricators, detailers, contractors are


empowered to collectively resolve coordination problems without the bottlenecks that can sometimes arise if they are dependent on the intervention of a single BIM expert to undertake coordination on their behalf.

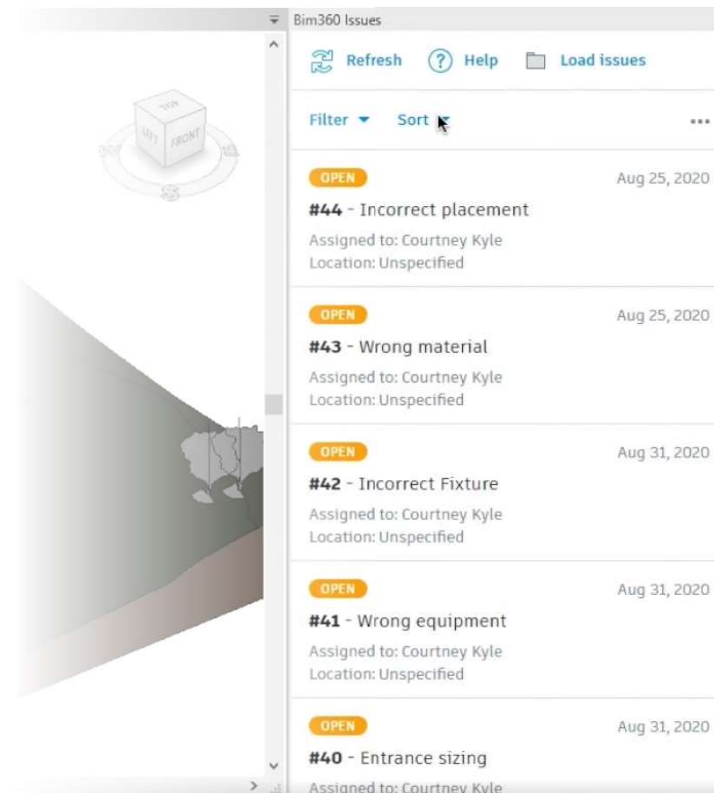
Connected Workflows



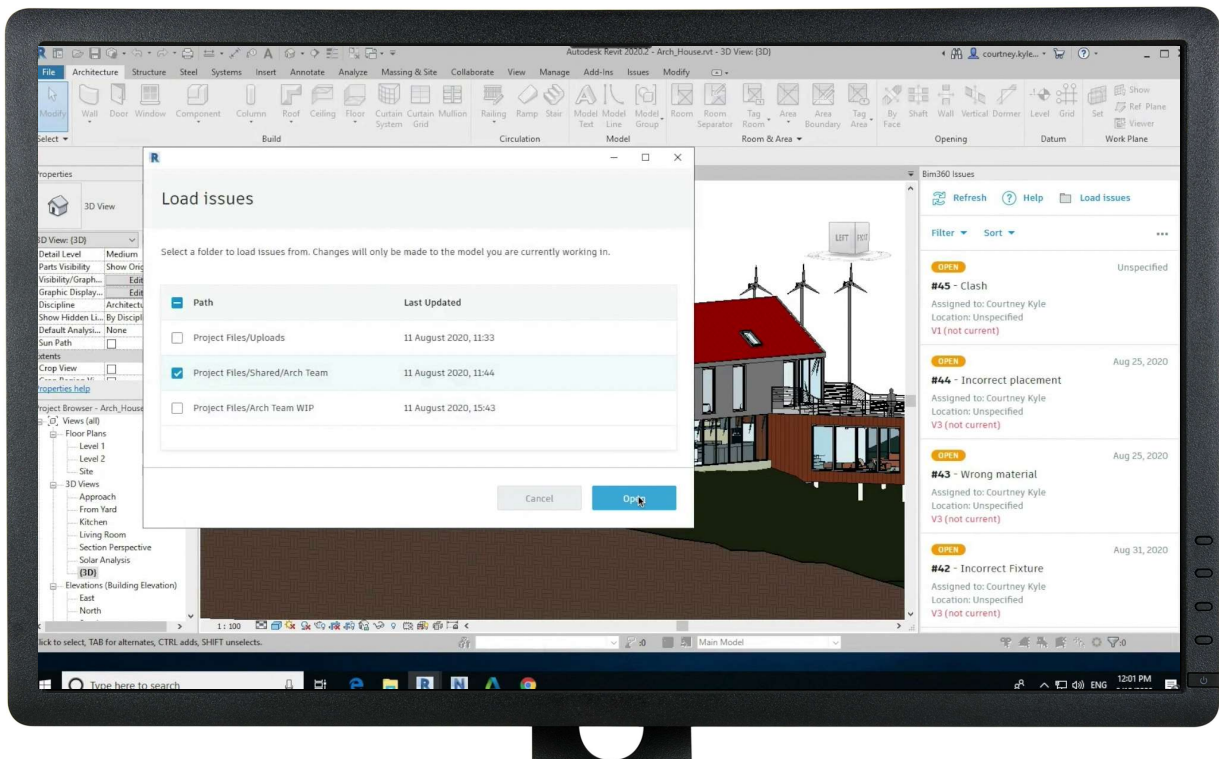
So we've had a look at how the construction cloud can support the sharing, management and optimization of multi-discipline BIM datasets, but we need to get that useful information back to the content creators in the design products

Revit Issue Integration

Who?	<ul style="list-style-type: none">• Designers & Detailers
What?	
Why?	<ul style="list-style-type: none">• Round-trip issues from cloud to desktop• Connect field, site office & design office• Collaborate and resolve project issues faster




We saw how issues provides an important common framework for collaboration and discussion across Docs, Design Collaboration and Model Coordination. A workflow that we currently have in a generally available beta supports the round tripping of those issues back into Revit so that designers and fabricators can participate in the resolution of potential problems and answer questions that colleagues may have.

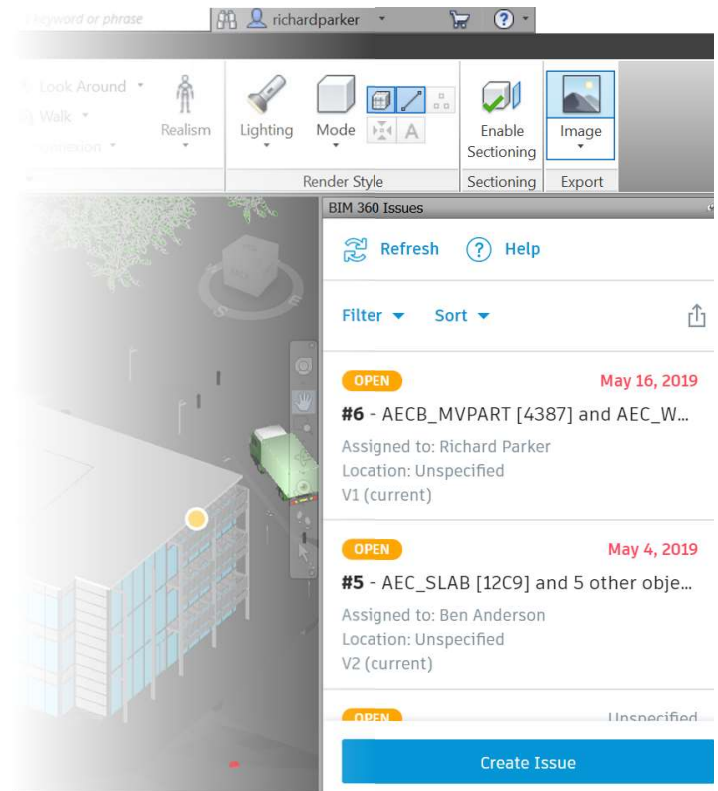


When a designer in Revit opens a model that has been published to the Construction Cloud, Revit will pull down any issues that are associated with the model and display them within the Revit canvas. Users can click on individual issues to view the detailed content, including the specific pushpin and camera view that the originator of the issue saw. Users have the option of replying to issues, updating the content or changing the status.

Important to remember that the issues toolset extends to all phases of the project, enabling workflows that truly span the design office through to the construction site. A project manager out on site with his iPad may have a question relating to the installation of some cladding that he can send direct to the architect, who from within Revit can find the answer to the question and reply to the project manager.

Navisworks / Model Coordination Integration

Who?	<ul style="list-style-type: none"> BIM / VDC Professionals
What?	
Why?	<ul style="list-style-type: none"> Complementary coordination workflows Issues integration Connect the BIM expert to the broader team

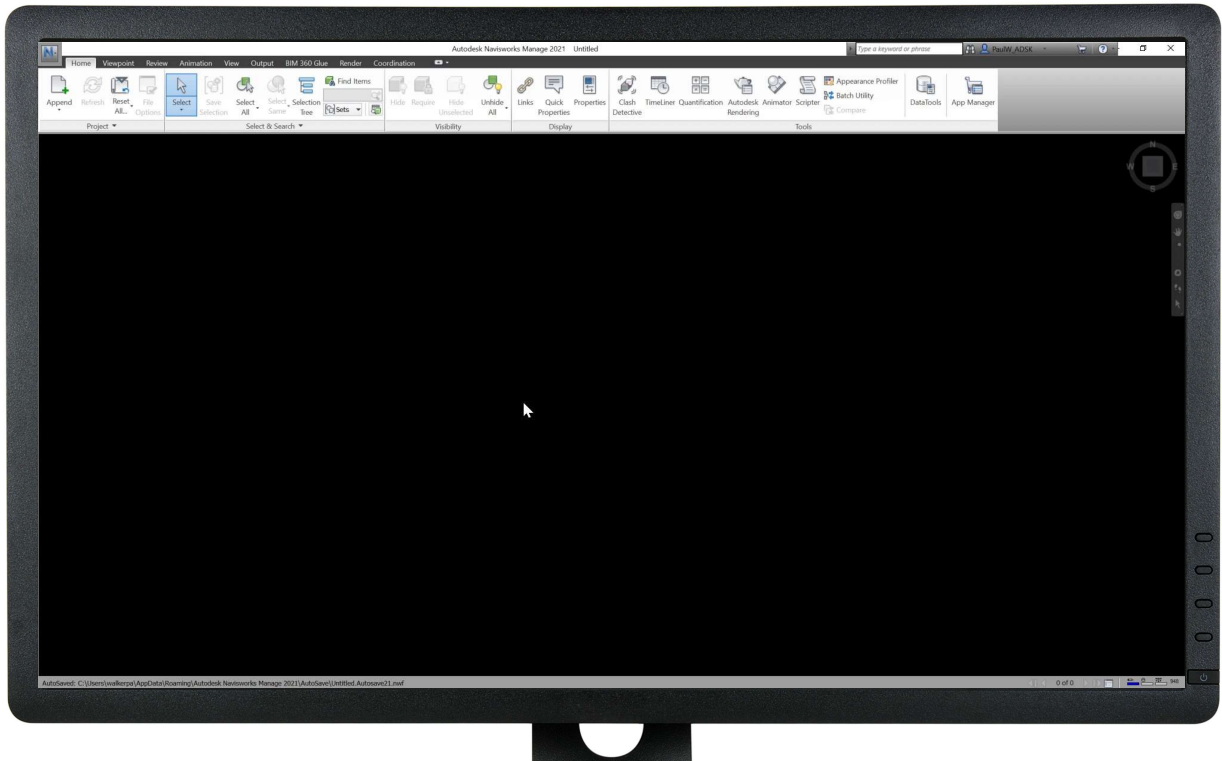


And I referenced Navisworks earlier. Navisworks continues to play a key role providing a sophisticated BIM analysis toolset for the expert.

In the same way that we are connecting our design *content creation* apps to the construction cloud, we are also connecting Navisworks which is our primary construction *analysis* app.

We recognize that Navisworks advanced features play a critical role for most of our customers, and we think that by building out complementary integrations between Navisworks and the construction cloud, particularly Model Coordination, we can unlock new workflows for project teams.

Let's have a look at how that works.



As previously discussed, Model Coordination empowers the extended team to start taking responsibility and addressing coordination issues themselves without the direct involvement of a BIM expert in Navisworks.

We think that this will result in the BIM experts having to deal with less ‘noise’ fixing coordination issues on behalf of team members, now that designer and fabricators can fix them themselves. This will free up the BIM experts up to focus on those really challenging coordination problems that require their expertise,

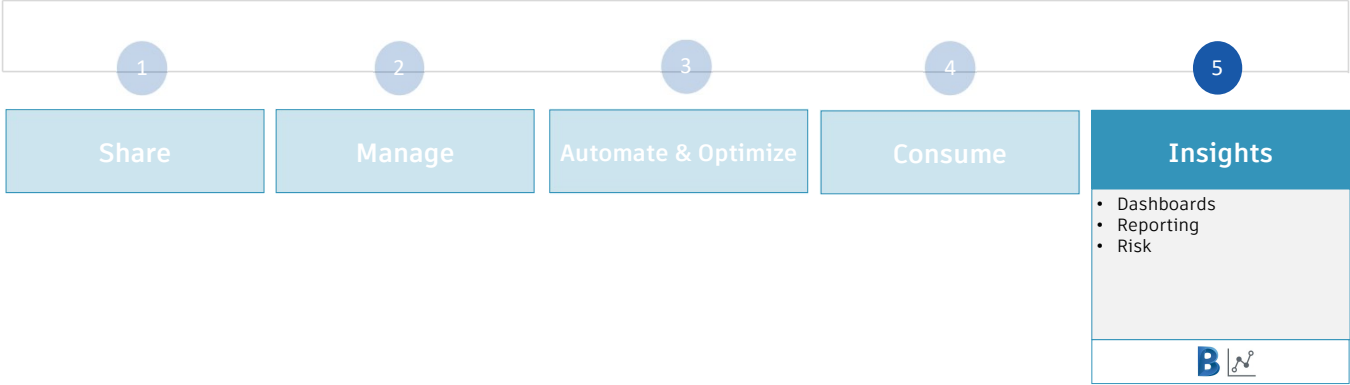
From within Navisworks the user can connect to Model Coordination and select the project and BIM datasets that they are interested in .

Those models will be opened within Navisworks and the full armoury of Navisworks features will be available— that includes all of the sophisticated features that Clash Detective offers, plus the 4d, quantification, visualization and simulations tools that are available.

The Construction Cloud issues toolset is integrated into these workflows, allowing the Navisworks user both to view and resolve issues that have been created in the construction cloud, and to create issues directly in Navisworks, for instance when they find a coordination issue using clash detective that was not addressed in Model Coordination.

Please do look out for an AU class by my colleague Paul Walker that will talk about these workflows in more detail.

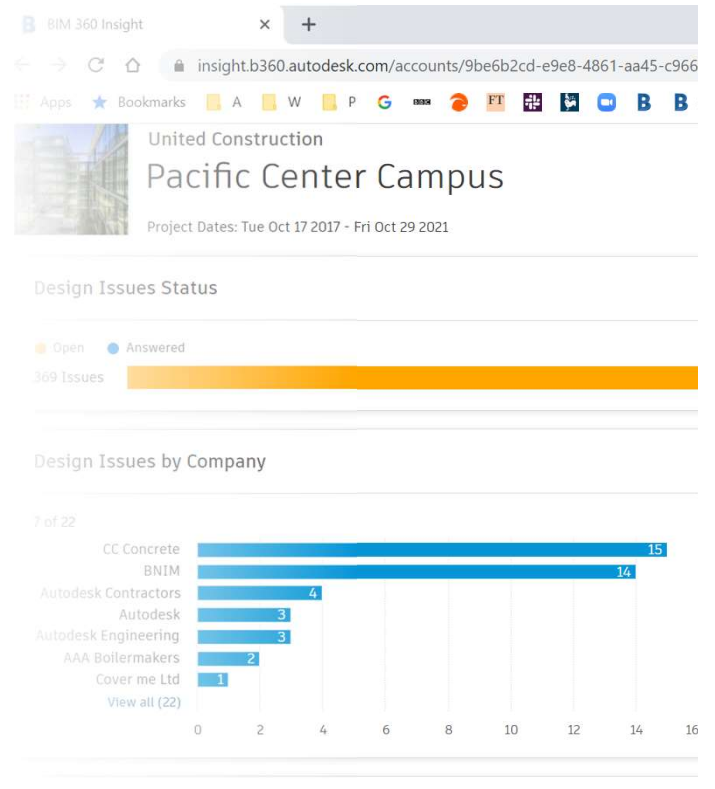
Connected Workflows



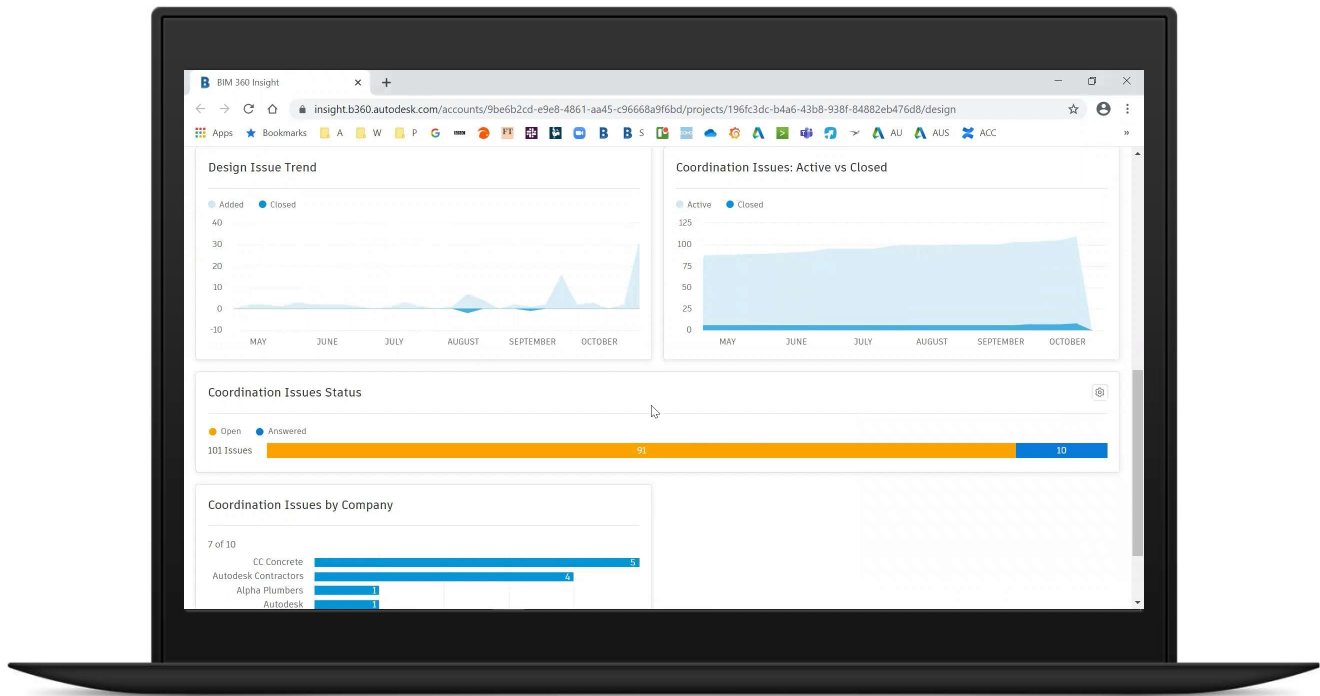
Finally we will look at how we provide oversight and reporting for these connected workflows.

Insights

Who?	<ul style="list-style-type: none">• BIM / VDC Professionals• Designers and Detailers
What?	
Why?	<ul style="list-style-type: none">• Summary and dashboard reporting• Machine learning to highlight risk



Insight delivers a unified data analytics, and reporting platform, identifying trends and patterns across the entire project lifecycle, including during the design development and coordination phases.



By analyzing design and coordination datasets and surfacing risk the team can identify and take action to resolve problems before they become costly changes during construction.

Analyzing factors such as the volume of issues over time, the performance of resolving issues and the root causes of design and coordination problems can help predict and prevent critical design failures.

Some of the areas of risk that Insight identifies include

- Code compliance
- Incomplete or incorrect documentation
- The absence of critical components
- Late or delayed resolution of issues on the project

Benefits of integrated workflows

Consistent flow of data
across project phases

Repurpose and reuse,
rather than recreate

Enhance visibility across
the project team

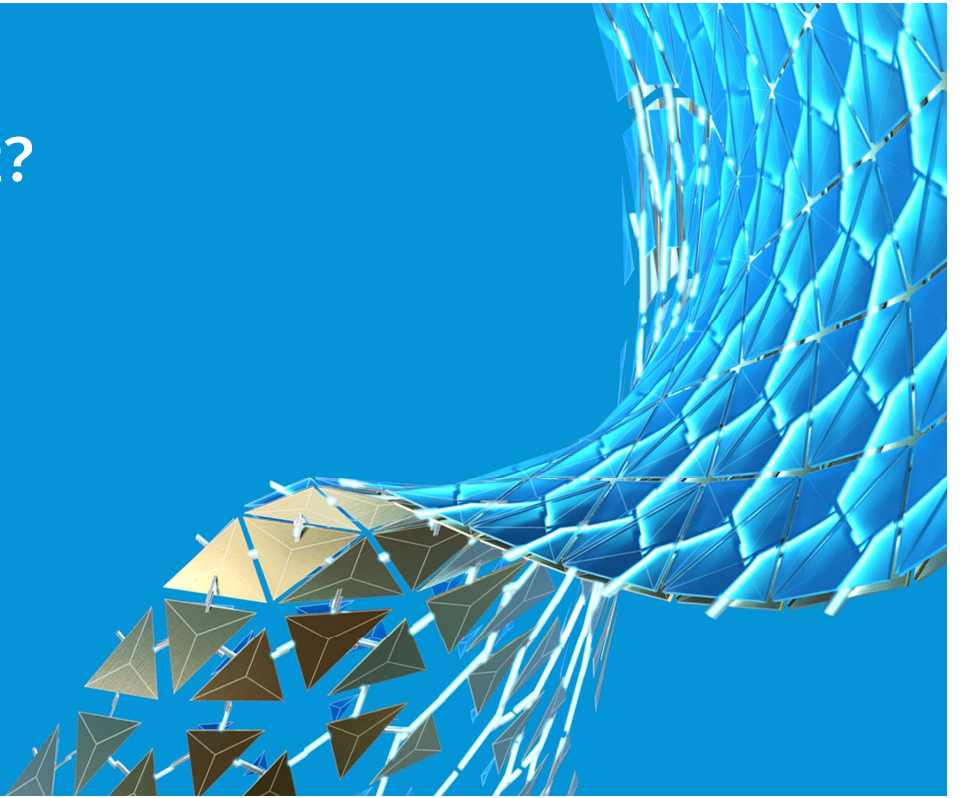
Reduce misunderstanding
and error

Faster identification and
resolution of problems

Better project outcomes

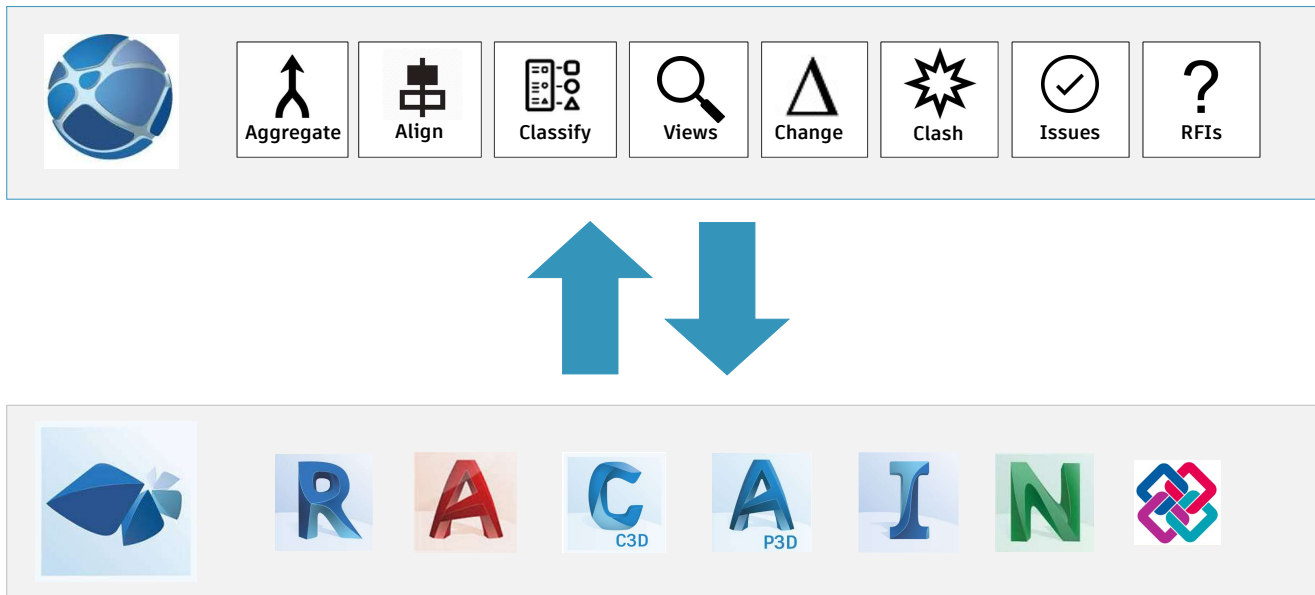
OK, to wrap up here are a few of the benefits delivered by integrated workflows

What's Next?



So what's next

Opportunity



Well usually at AU I'm providing lots of roadmap presentations and talking about what we're planning and thinking of next, but unfortunately this is not one of those sessions!

Suffice to say we see huge opportunity in leveraging that multi-discipline BIM dataset to connect design to construction and we are looking forward to enabling new and better workflows for our industry, so stay tuned!

Thanks very much for your time today and I hope you found some value in the session, if you have any questions or thought please feel free to reach out to me for further discussion.

Bye for now!



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