

The Pros and Cons of Creating Revit Dynamo Tools vs Add-In Tools

Dan Tartaglia

Senior Associate / nbbj digital - BIM Platform Leader

Nick Burnett

nbbj digital - Studio BIM Leader





About the speaker

Dan Tartaglia

- 32 years in the AEC industry
- Work at NBBJ for 10 years (Columbus OH)
- BIM Platform Leader (firm-wide role)
 - Responsible for effective BIM platform
 - Deploying/Training teams using BIM 360
 - Identify existing/create BIM tools
 - Develop firm metrics for strategic planning
 - Wear many other 'hats'

nbbj



About the speaker

Nick Burnett

- 11 Years BIM AEC experience
- Studio BIM Lead for Los Angeles
- Worked with Over 40 Companies and 2 dozen pieces of software
 - Management
 - Implementation
 - Authoring
 - Development
 - Team Building

Architectural
Design firm

nbbj

10 office locations
700+ staff



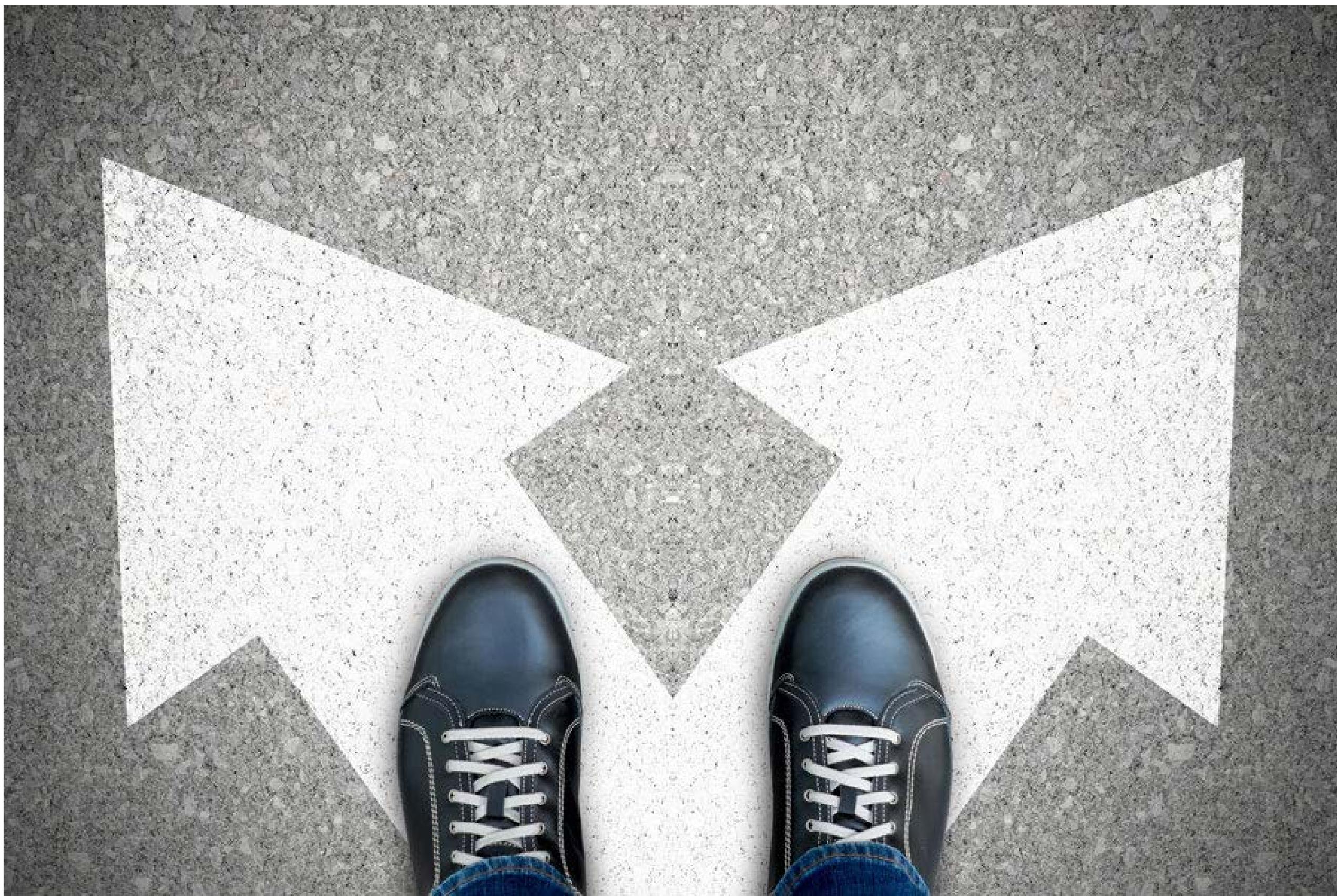
Learning Objectives

- What is the Revit API?
- Learn the basics of what Revit Dynamo & Add-Ins are
- Find Learning Resources for both Revit Dynamo & Add-Ins
- Pros & Cons creating Revit Dynamo & Revit Add-In tools

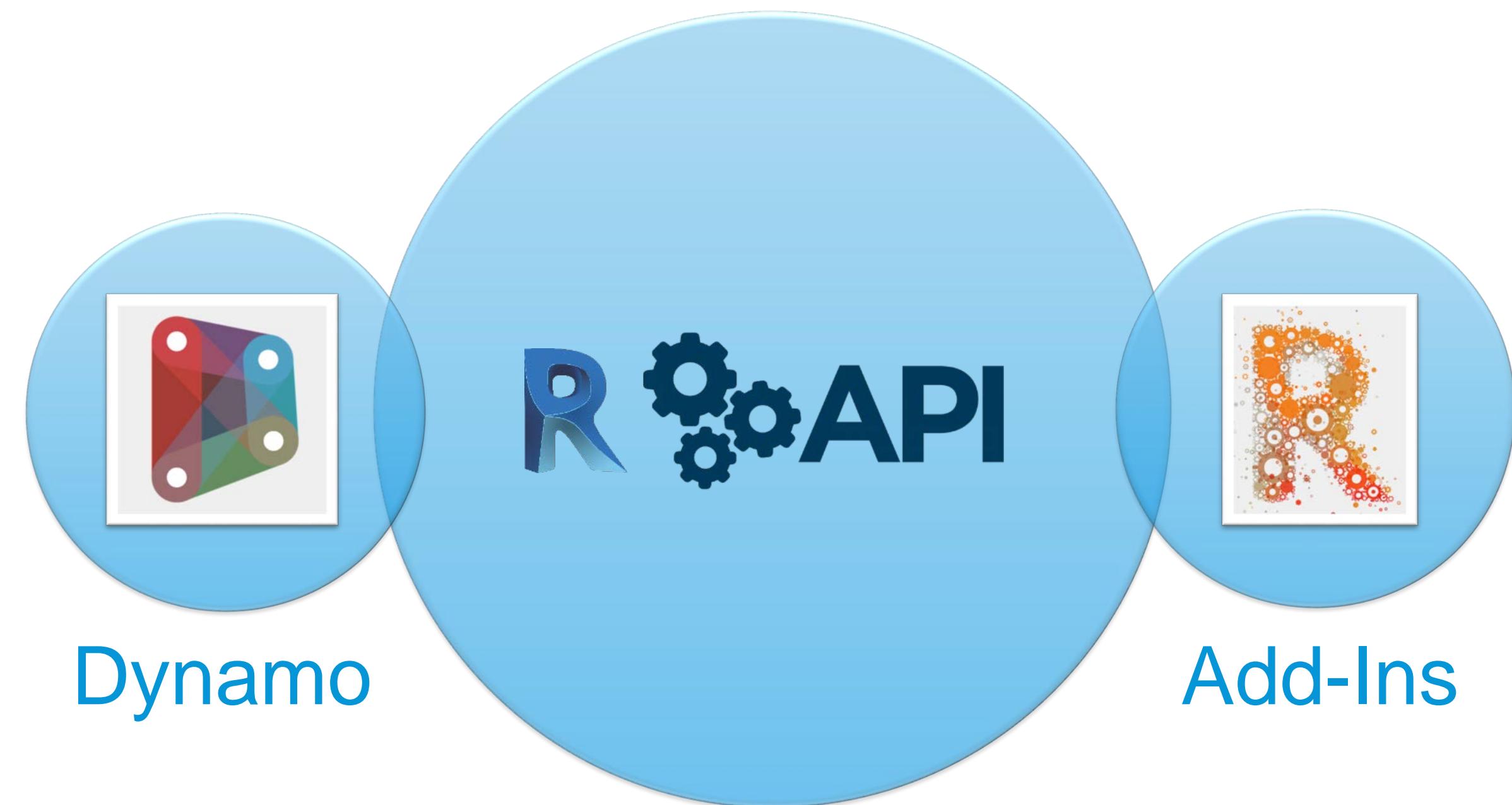
Why Are We Here?



No One Knows Everything



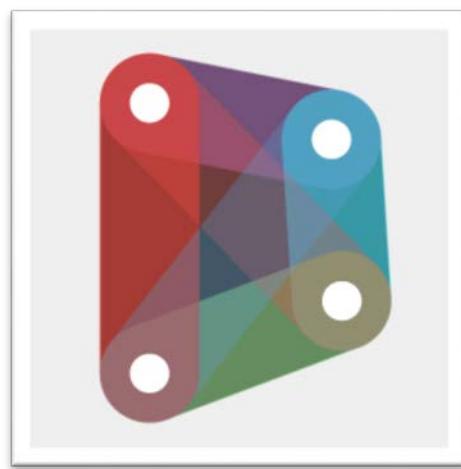
How This Works



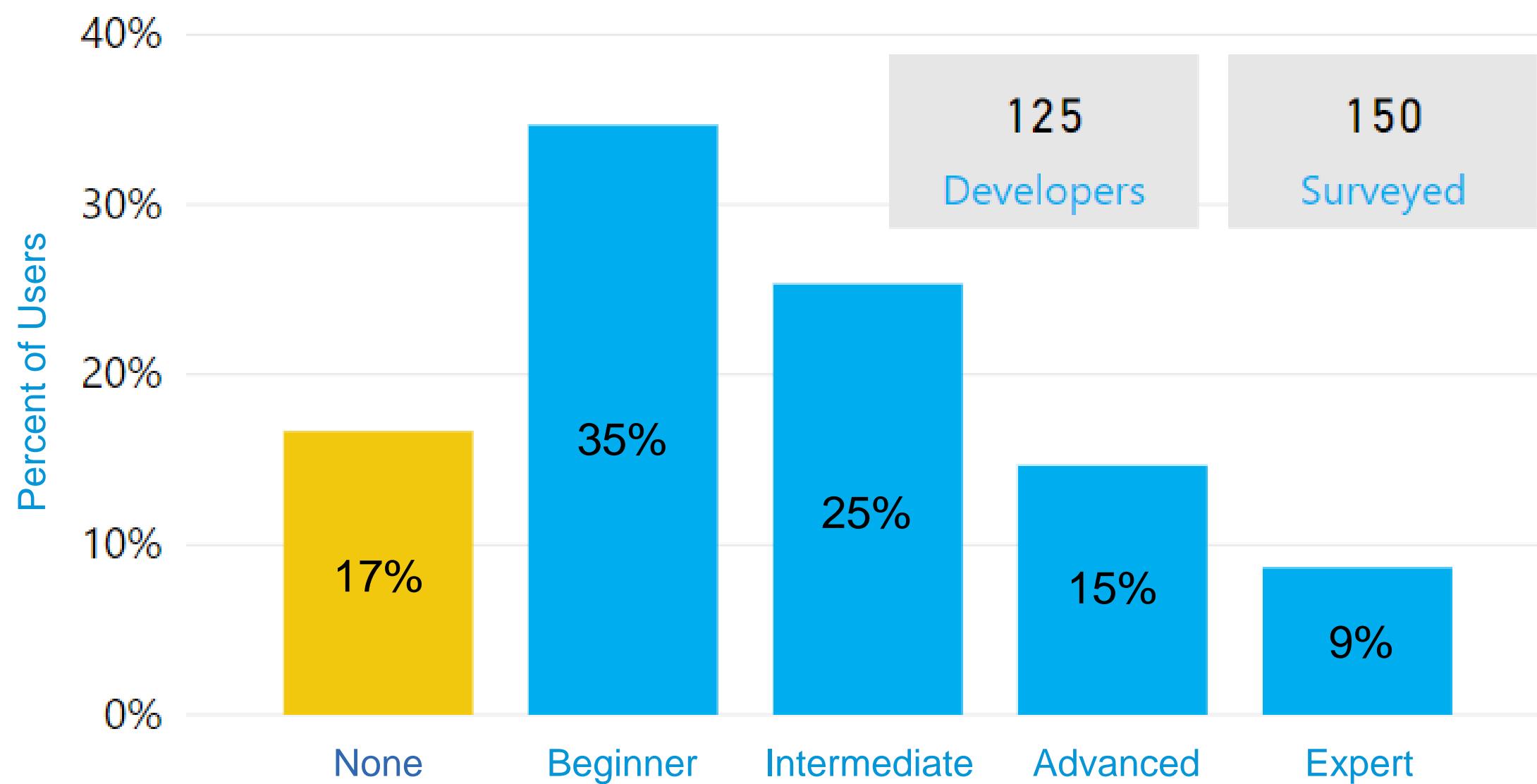
Quick Class Survey



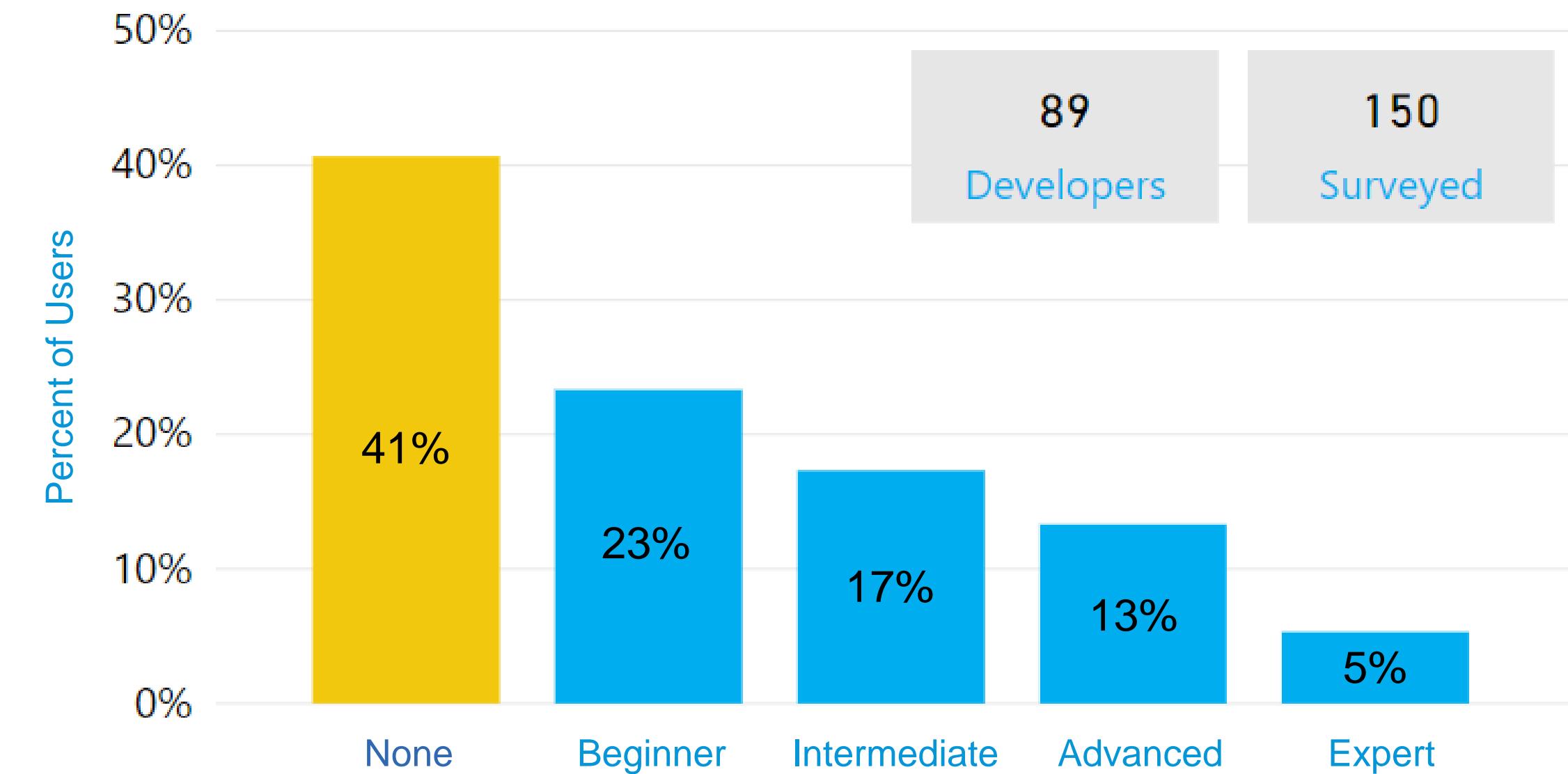
On-Line Survey Results – Tool Creation Skills



Dynamo



Add-Ins



Sources:



Thread: Revit Timeline (W.I.P.)

A Brief History of Things



2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
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Calendar Years

Sources:



Thread: Revit Timeline (W.I.P.)



The Genesis of Revit and its API

A Brief History of Things



Sources:



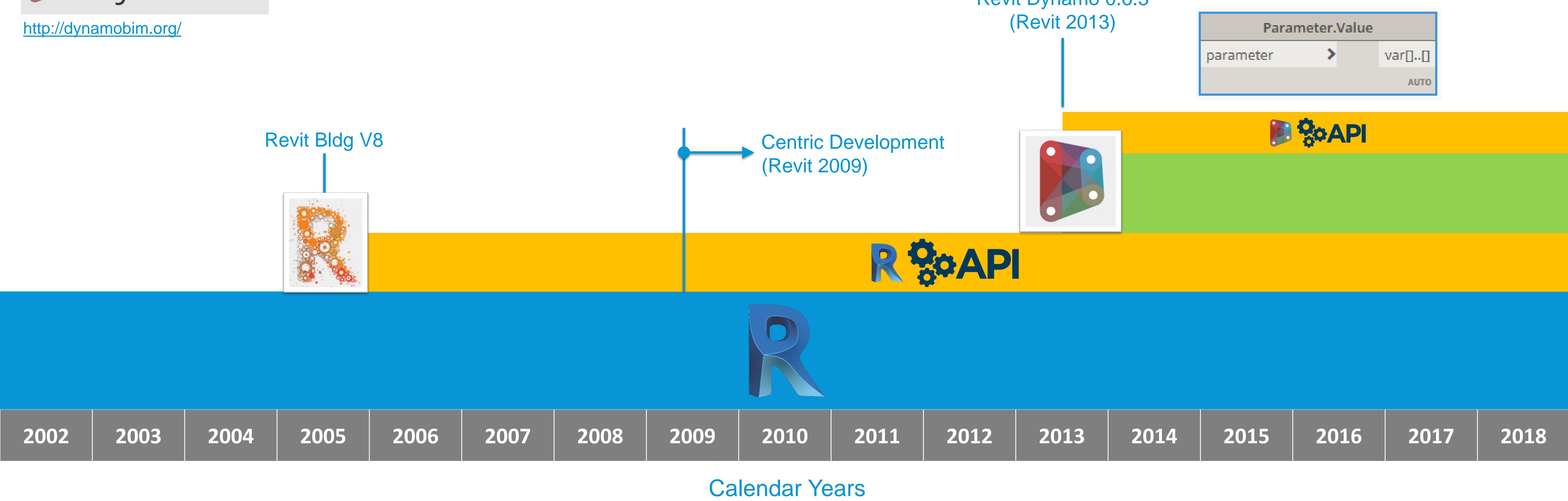
Thread: Revit Timeline (W.I.P.)



The Genesis of Revit and its API



<http://dynamobim.org/>



What is the Revit API?



Install the Software Developer Kit (SDK) to get the *RevitAPI.chm* and many examples (The MSI can be found in the Revit installation folder's, sub folder: ...\\Utilities\\SDK) —————

...also use the web tool: <http://www.revitapidocs.com/>

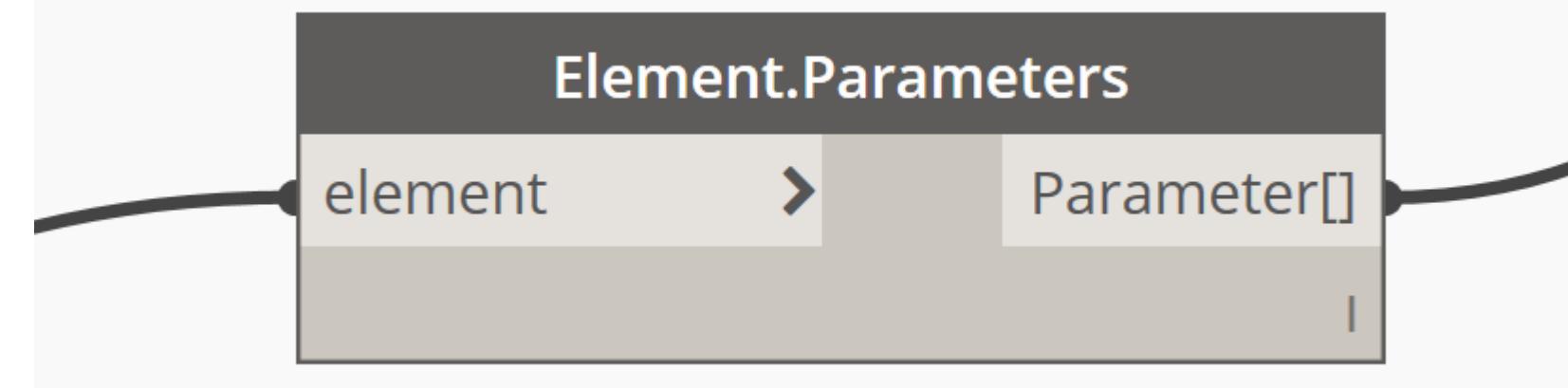


Revit API Docs

Online Documentation for the Revit API



What is Revit Dynamo?



VISUAL PROGRAMMING LANGUAGE

Dynamo was created as a graphical programming language that allows users without a programming background to build algorithmic processes to implement as tools and resources in a BIM project



```
graph TD; A[MAKE SURE I SAY "TITLE BLOCK"] --> B[All Elements of Category]; B --> C[Parameter.ParameterByName]; C --> D[Parameter.SetValue]; D --> E[Parameter.Value]; F[SET ME] --> D;
```

FILES

- New
- Custom Node
- Open

RECENT

- Family_Para_Types DYN
- RLS-2_DualInputExcel_TypeParameter_S
- Shape_Developer_V2 DYN
- Shape_Developer DYN
- TITLEBLOCK_SHEETISSUE_UPDATE DYN

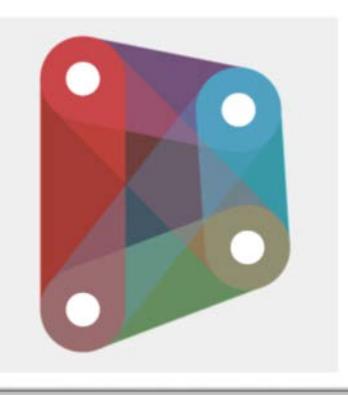
CODE

ASK

- Discussion forum
- Dynamo website

REFERENCE

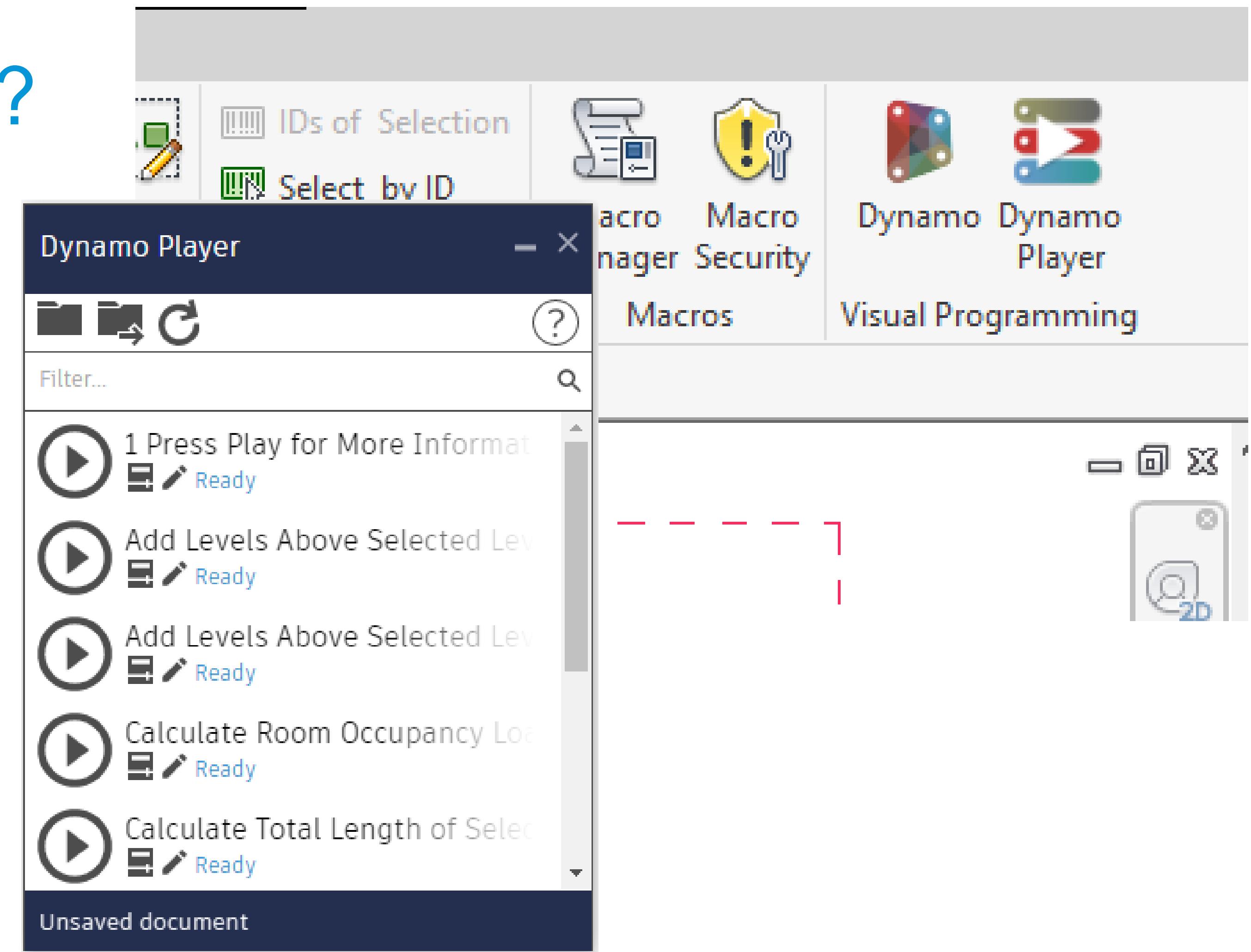
- Getting Started
- Dynamo Primer
- Video Tutorials
- Dynamo Dictionary



What is Revit Dynamo?

INTUITIVE TO THE REVIT ENVIRONMENT

Dynamo connects directly to the Revit environment of whichever current project you have open, seeing both all developed project information and accessing all Revit tools and abilities



PROJECT ENHANCEMENT

The Dynamo interface connects with whichever Revit project you have currently open but works in its own windowed environment to develop the graphical scripts.



What is a Revit Add-In?

REVIT ADD-IN = REVIT TOOL

In this context, a tool created with a manifest file (`.addin`) and one or more **DLLs**.

COMMAND = Performs a task then stops

`nwexportrevit.addin` = Loads the DLL

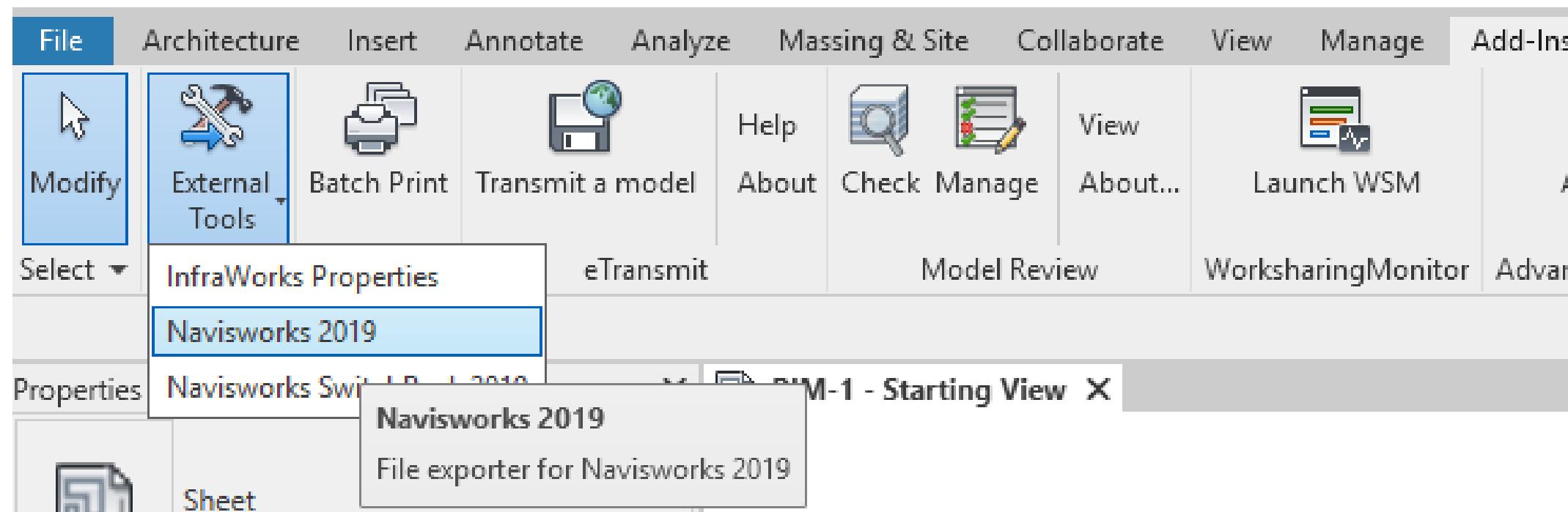
`nwexportrevit_16.dll` = The compiled code

APPLICATION = Starts when Revit launches

`RevitExtractData.addin` = Loads the DLLs

`RevitExtractData.dll` = The compiled code

`CommonMethods.dll` = The compiled code





Revit Dynamo Learning & Resources

A screenshot of a web browser displaying the dynamobim.org website. The page features a collage of various 3D architectural models and wireframe designs. At the top, there's a navigation bar with links for 'Dynamo', 'Learn', 'Explore', 'Gallery', 'Blog', 'Help Center', 'Forum', and 'Events'. Below the navigation, the text 'Community-driven' is visible. The central focus is the slogan 'Open source graphical programming for design' in large, white, sans-serif font. Below this, there are three calls-to-action: 'WATCH VIDEO' with a play button icon, 'DOWNLOAD DYNAMO' with a right-pointing arrow, and 'LEARN MORE' with a downward-pointing arrow. The browser interface at the top includes standard controls like back, forward, and search, along with a tab labeled 'Dynamo BIM' and a URL bar showing 'dynamobim.org'.

One website for all your needs!



Revit Add-In Learning & Resources

REVIT ON-LINE HELP FILE:

<http://help.autodesk.com/view/RVT/2019/ENU/>

The screenshot shows the Revit 2019 Help file. The main navigation bar includes 'Installation Basics', 'Installation Administrator's Guide', and 'Revit Developer's Guide' which is expanded to show 'Revit API Developers Guide' (selected), 'Introduction', 'Getting Started' (expanded to show 'Welcome to the Revit Platform API' and 'Using the Autodesk Revit API'), 'Walkthroughs' (expanded to show 'Walkthrough: Hello World', 'Walkthrough: Add Hello World', 'Walkthrough: Ribbon Panel', 'Walkthrough: Retrieve Selected Elements', 'Walkthrough: Retrieve Filtered Elements'), 'Add-In Integration', 'Application and Document', 'Elements Essentials', 'Basic Interaction with Revit Elements', 'Revit Geometric Elements', 'Discipline-Specific Functionality', 'Advanced Topics', 'Appendices', and 'FAQ'.

REVIT API AUTODESK COMMUNITY:

<https://forums.autodesk.com/t5/revit-api-forum/bd-p/160>

Revit API Forum

Welcome to Autodesk's Revit API Forums. Share your knowledge, ask questions, and explore popular Revit API topics.

POST TO FORUMS

All Posts FAQs Accepted Solutions Unanswered

OPTIONS ▾

< Previous 1 2 3 ... 257 Next >

- | | | | | |
|--|---|--|------------|-------------|
| | Revit 2019.1 add-in and CEFsharp library | by mikako.harada on 08-16-2018 09:17 PM Latest post 2 weeks ago by mikako.harada | 7 REPLIES | 486 VIEWS |
| | Known Change Requests – Community Tracking | by mikako.harada on 06-20-2017 01:53 PM Latest post 2 weeks ago by matthew.taylor | 7 REPLIES | 1117 VIEWS |
| | ✓ This forum is for Revit API/Programming questions ** NOT FOR PRODUCT QUESTION
** | by mikako.harada on 04-24-2015 10:16 PM Latest post on 08-20-2015 03:15 AM by jeremytammik | 2 REPLIES | 8746 VIEWS |
| | Check out the self-paced guide "My First Plug-in" [1 2 3 4] | by saikat on 05-23-2011 02:47 AM Latest post on 08-01-2018 11:09 AM by ron.allen | 78 REPLIES | 11857 VIEWS |

THE BUILDING CODER:

<http://thebuildingcoder.typepad.com/>



SOFTWARE DEVELOPER KIT (SDK):

In the installation folder: *Utilities/SDK*

- Help file
- Many, many working samples
- More

<http://www.revitapidocs.com/>

The logo for Revit API Docs features a stylized icon of a document with a pencil, followed by the text 'Revit API Docs' and 'Online Documentation for the Revit API'.

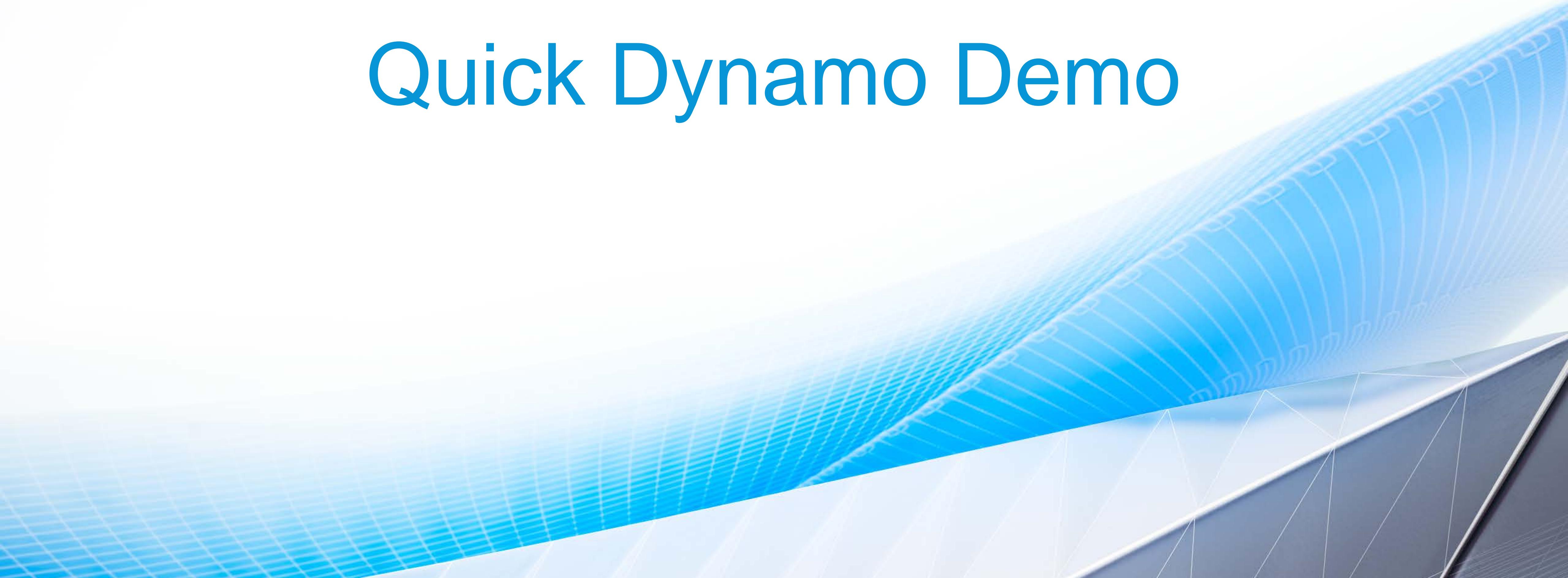
ADN (need to be a member):

<https://www.autodesk.com/developer-network/overview>

Autodesk Developer Network Program



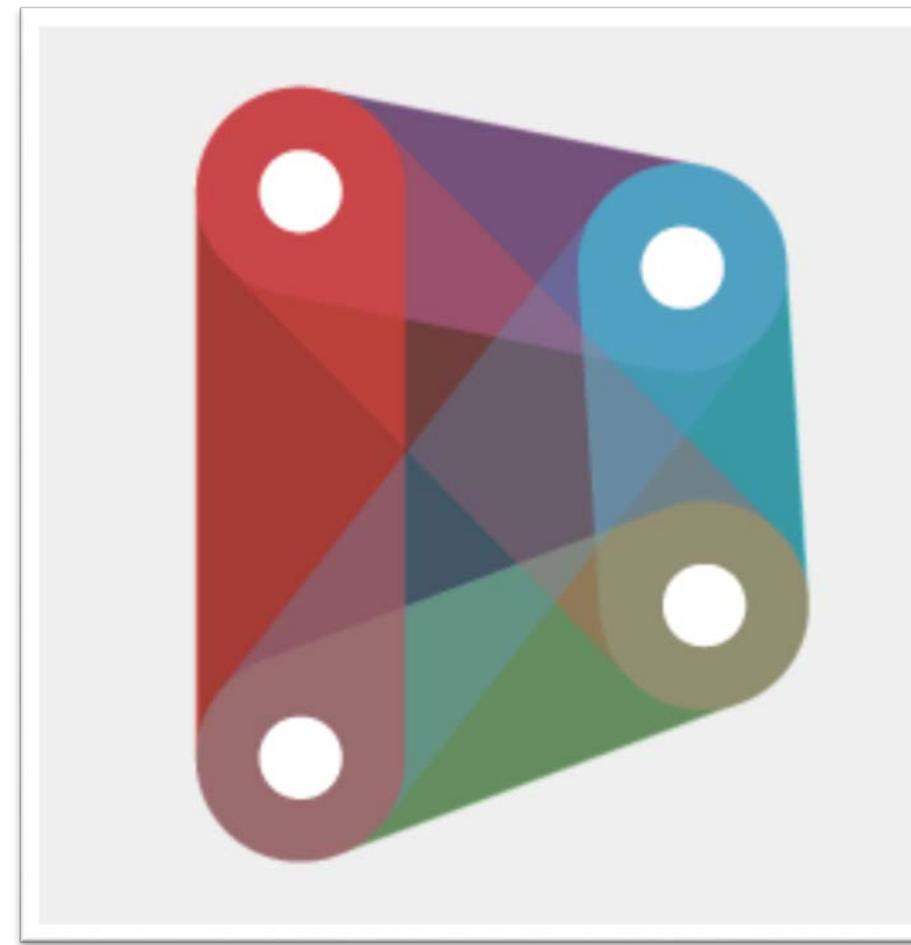
Quick Dynamo Demo





Quick Add-In Demo

Pros and Cons

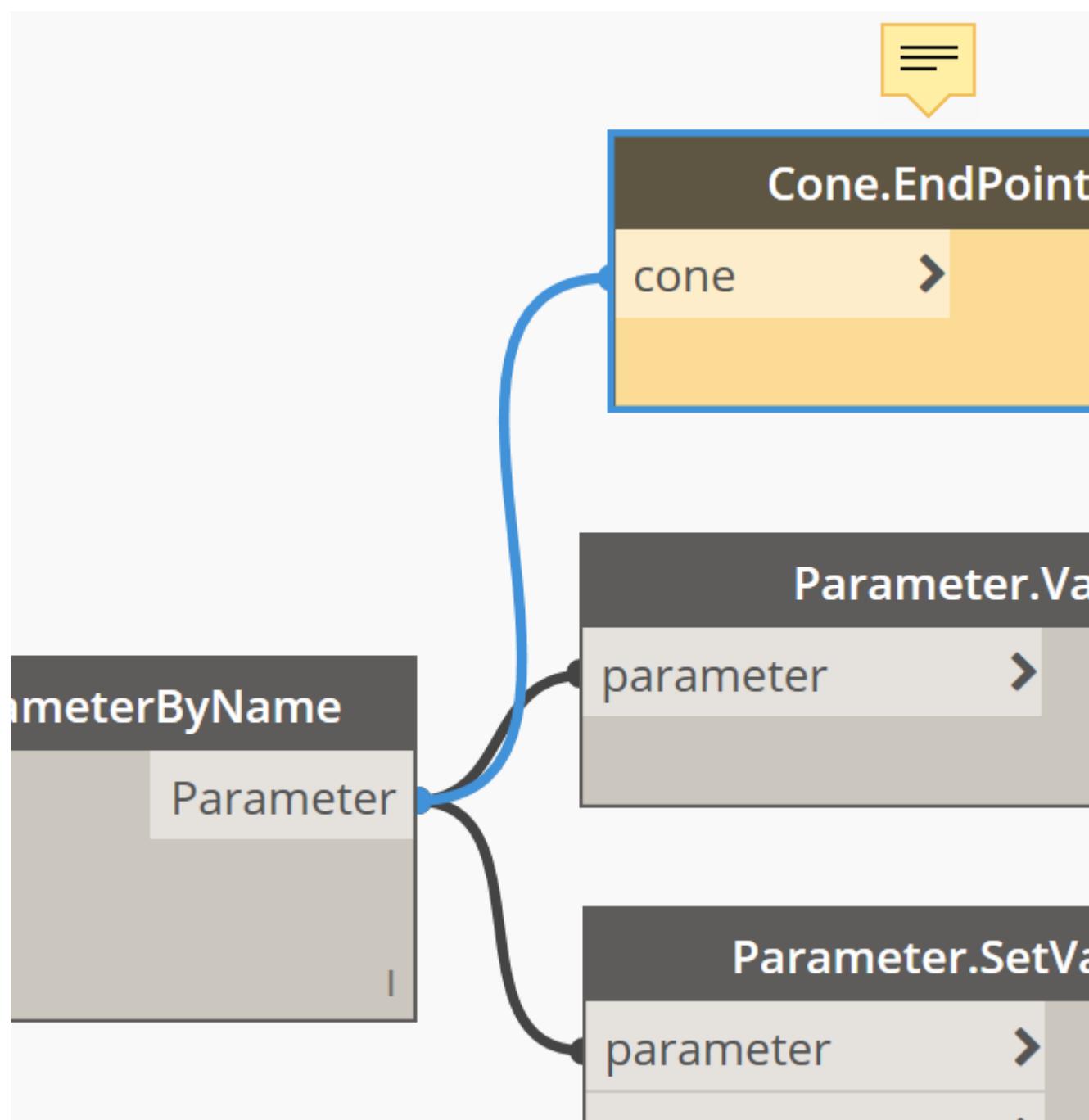




- No coding background needed

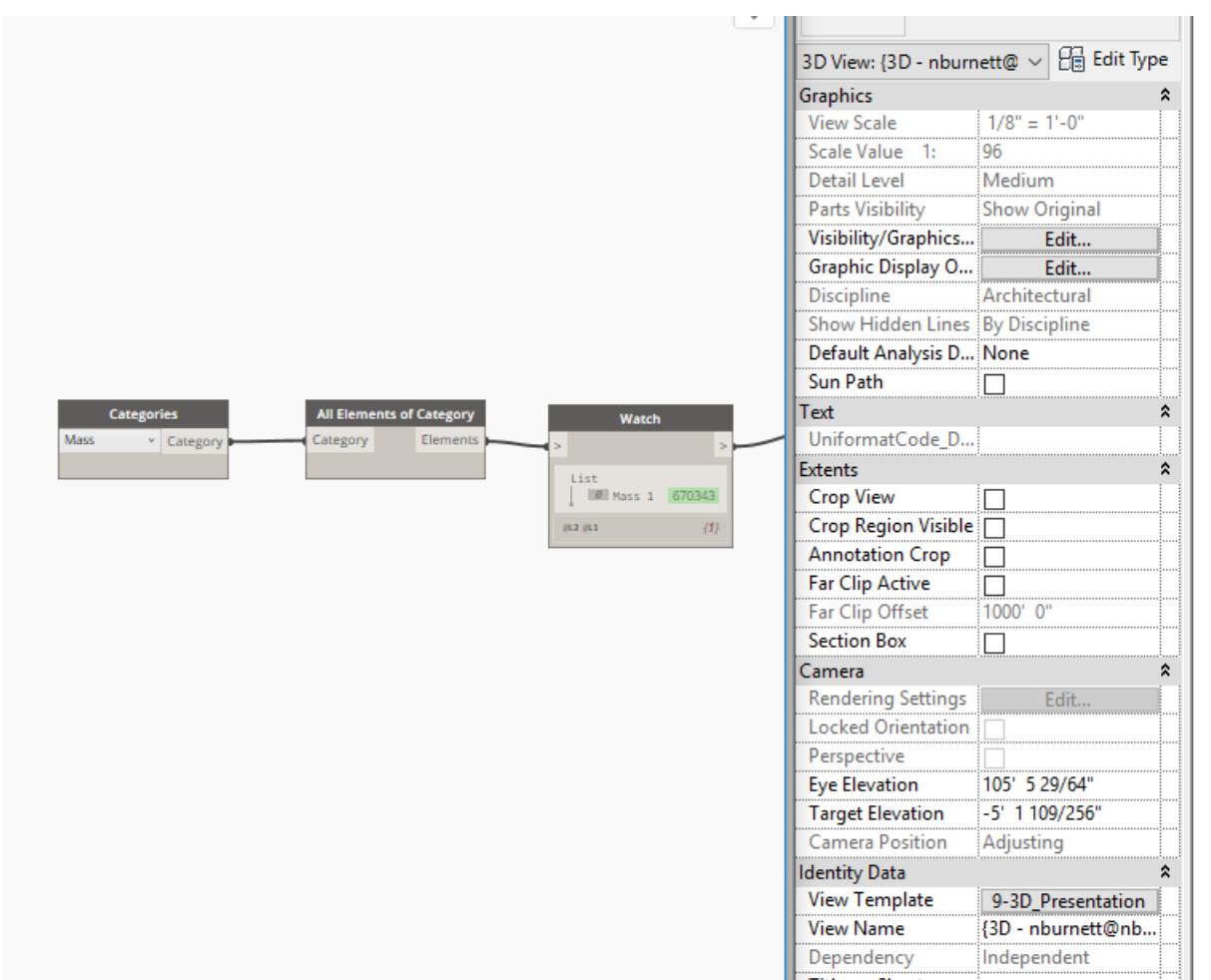


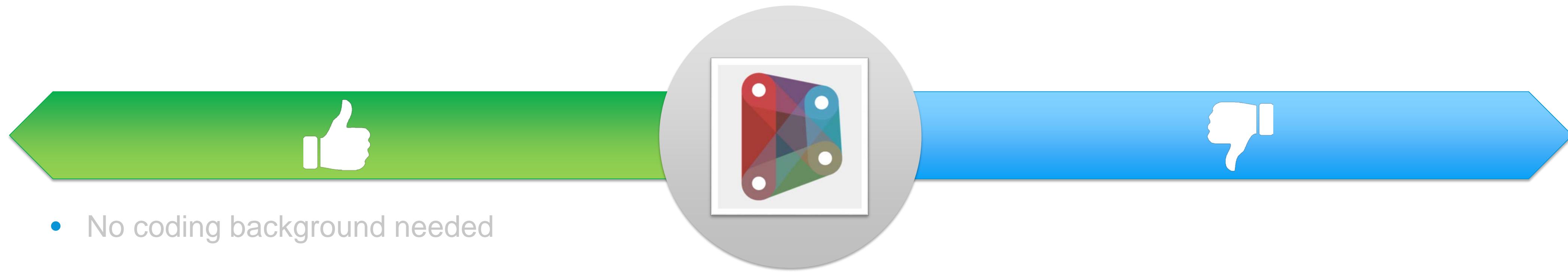
- No coding background needed
- Easy learning curve for novices



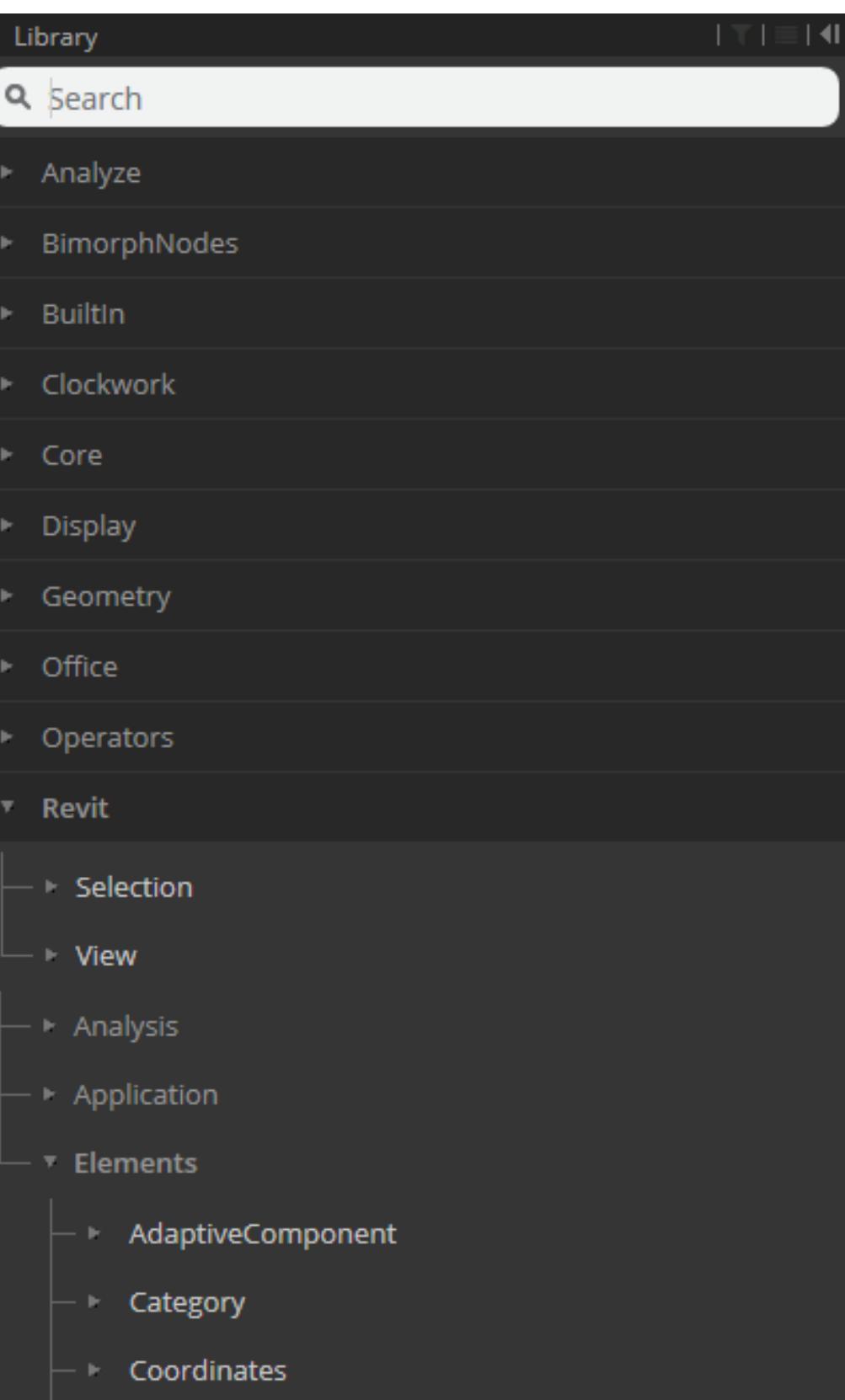


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- Easy learning curve for novices
- Fast development and use





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- Fast development and use
- Easy rapid logic changes



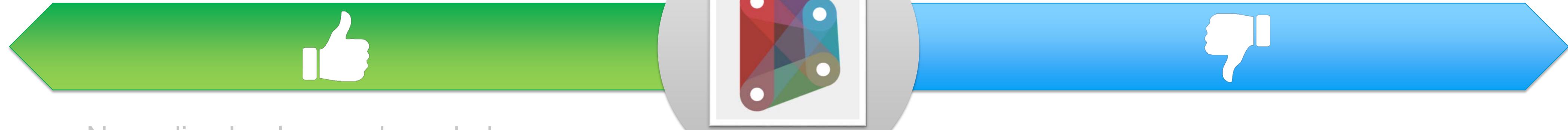


- No coding background needed
- Easy learning curve for novices
- Fast development and use
- Easy rapid logic changes
- Large, helpful user community

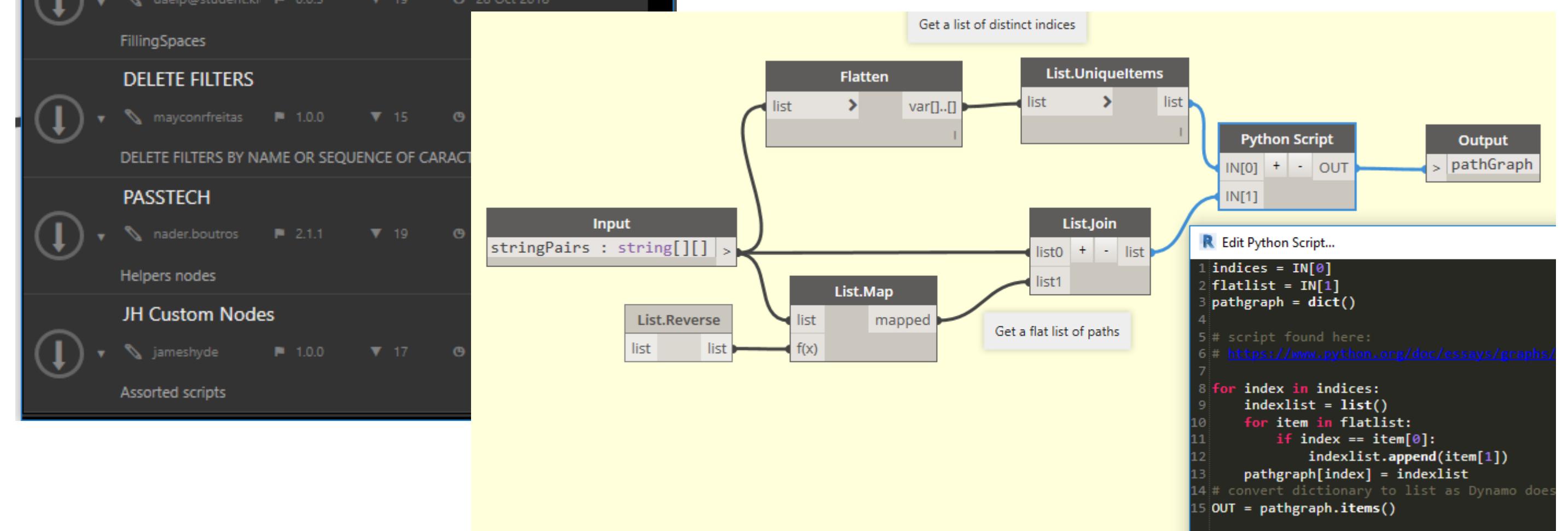
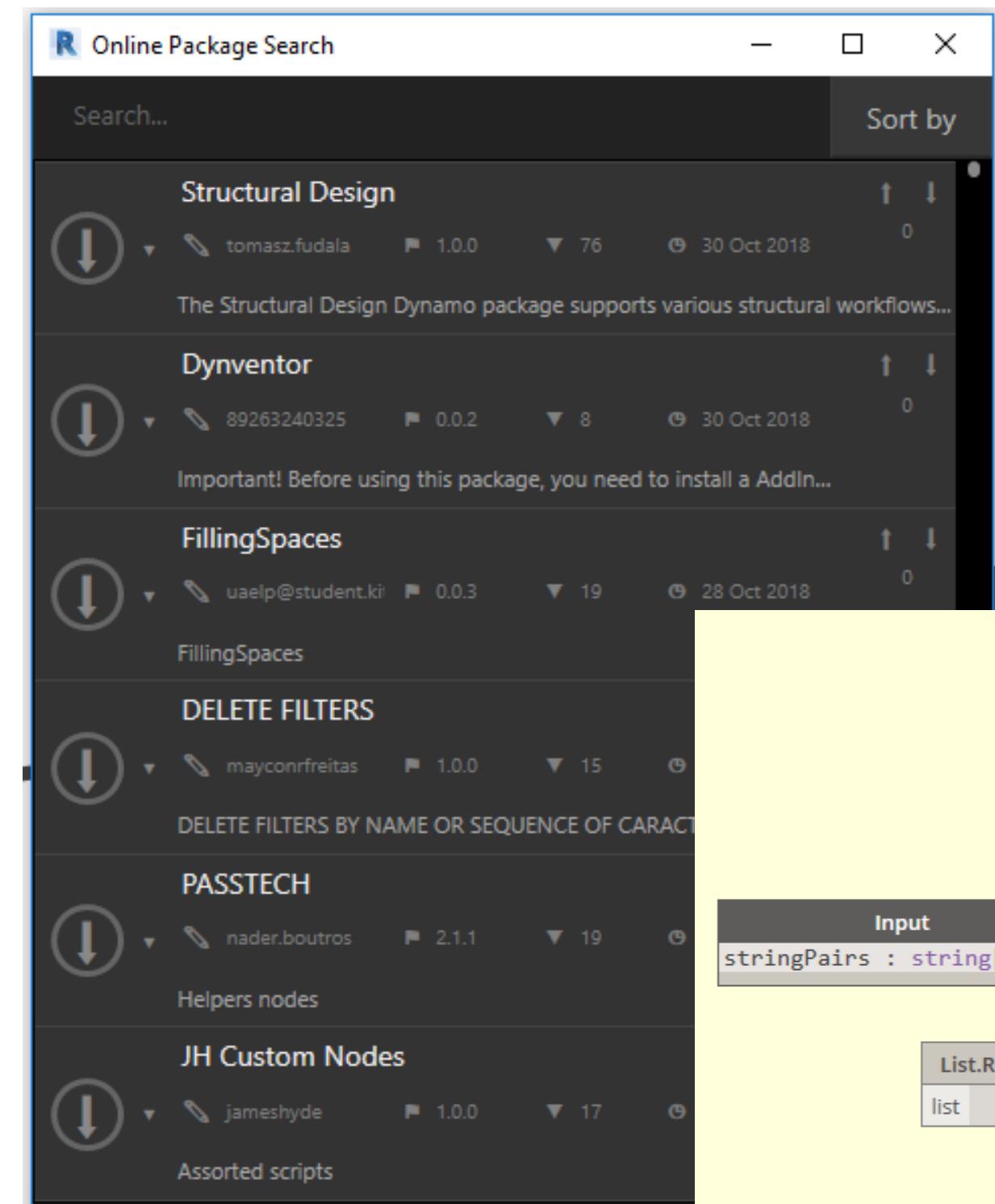
The screenshot shows the homepage of the Dynamo Forum. At the top, there is a navigation bar with links for Learn, Explore, Gallery, Blog, Help Center, Forum, and social media icons for Twitter and Facebook, along with a DOWNLOAD button and a Log In link. Below the navigation bar, there is a search bar and a menu icon.

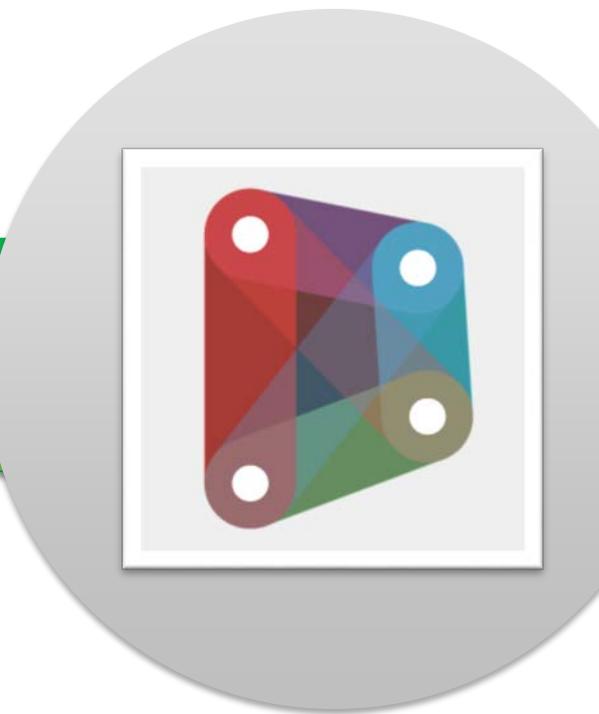
The main content area displays a list of forum topics:

Topic	Category	Users	Replies	Views	Activity
[Intellisense step by step configuration on visual studio code] Hi all, I just found a way to configure the intellisense in visual studio code and I thought it might be useful to others 😊 here below there are the steps to follow: 1 - INSTALL VISUAL STUDIO CODE you... read more	Developers	5 users	7	306	3d
[Welcome to the Dynamo Forum] Welcome to the new and improved Dynamo Forum! Please make yourself at home and feel free to ask/answer questions about Dynamo, the general purpose graphical algorithm editor for designers, architects, artists, and en... read more	FAQ	5 users	20	9.0k	25d
[How to get help on the Dynamo forums] One of the main goals of the Dynamo community is to help others. One way to do that is by answering your questions. But to get the right answer, you'll first have to ask your question in the right way. Although people ar... read more	FAQ	5 users	4	14.2k	27d
Divide line into equal parts	Revit	G N	1	4	5m
Image pixel symmetry	Geometry	2 users	5	79	6m

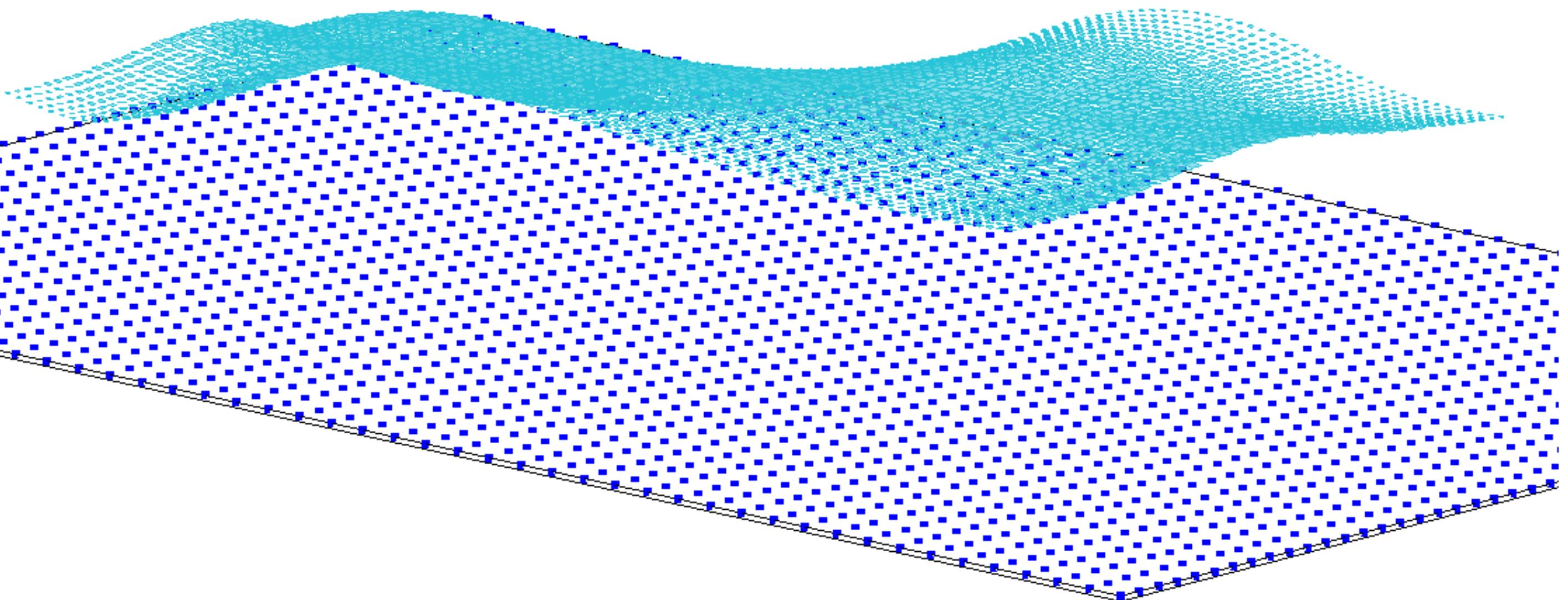


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- Open source, a lot of content available





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- **Element bindings**





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- **Very powerful under right circumstances**



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- *"Fun"*

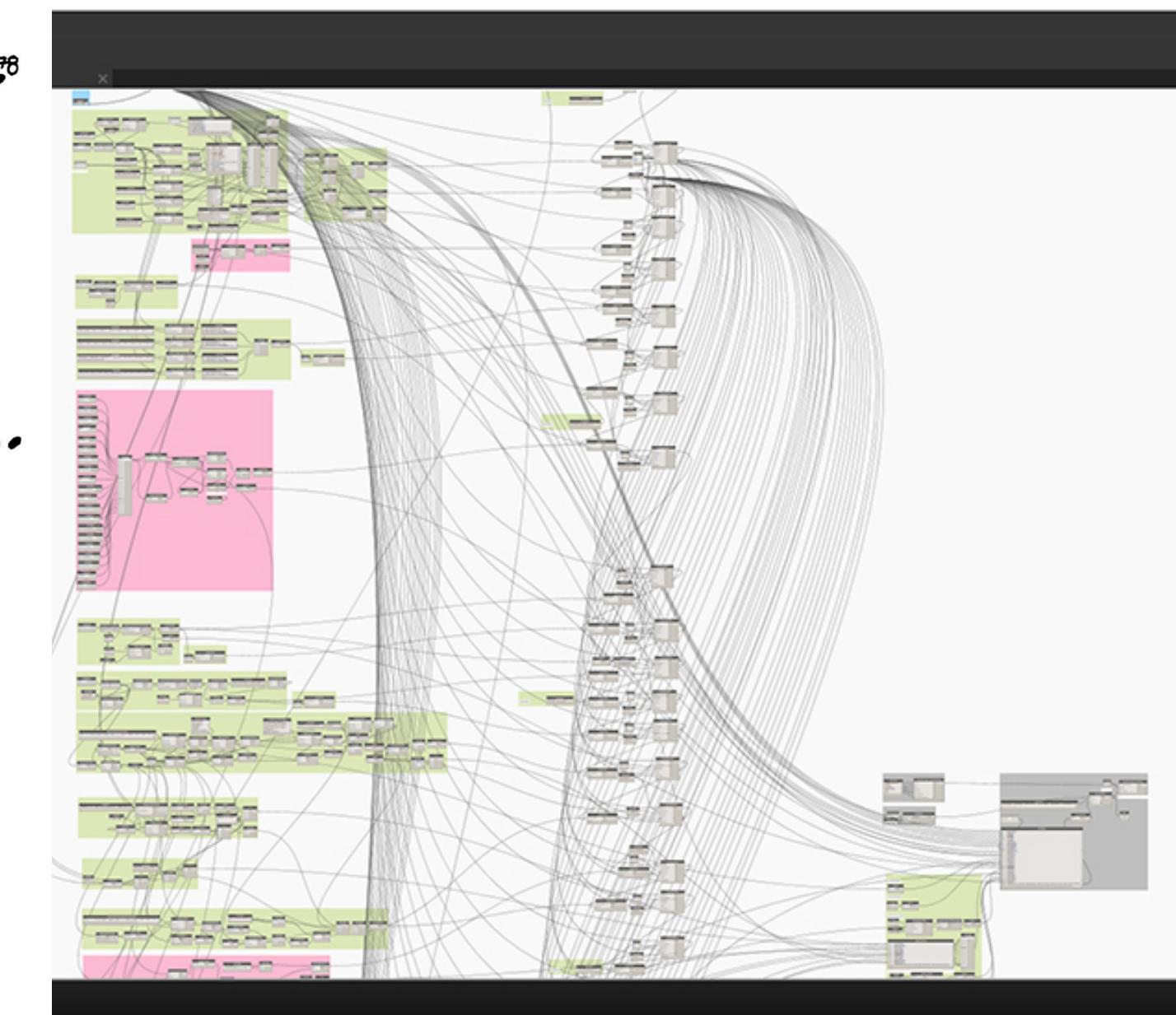
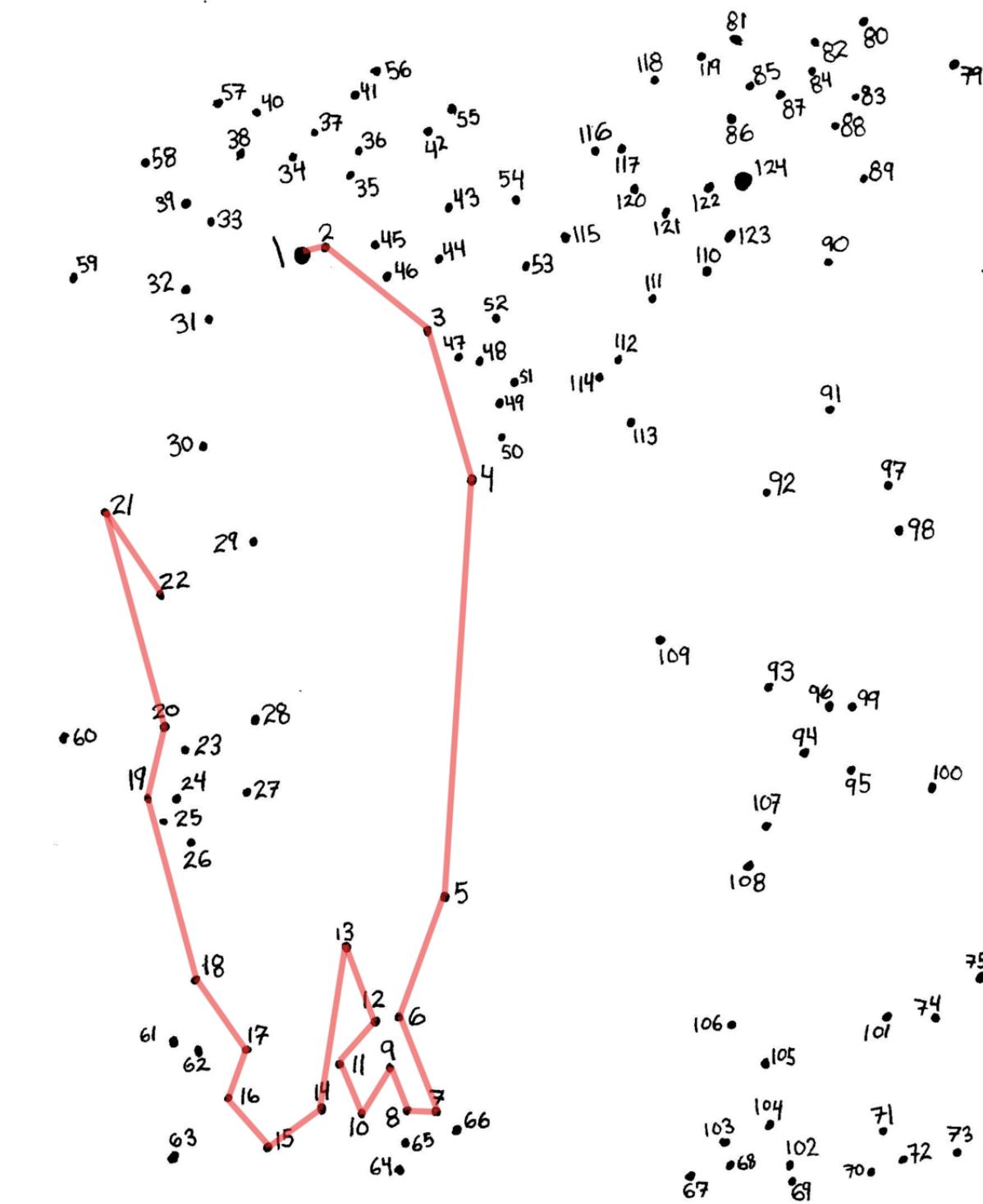




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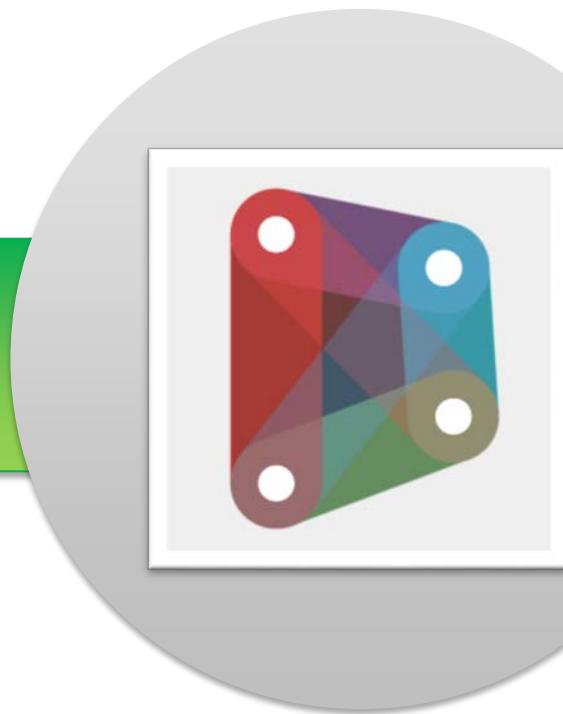


- "Connecting dots" or "Spaghetti"





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- "Connecting dots"
- Less efficient computing time



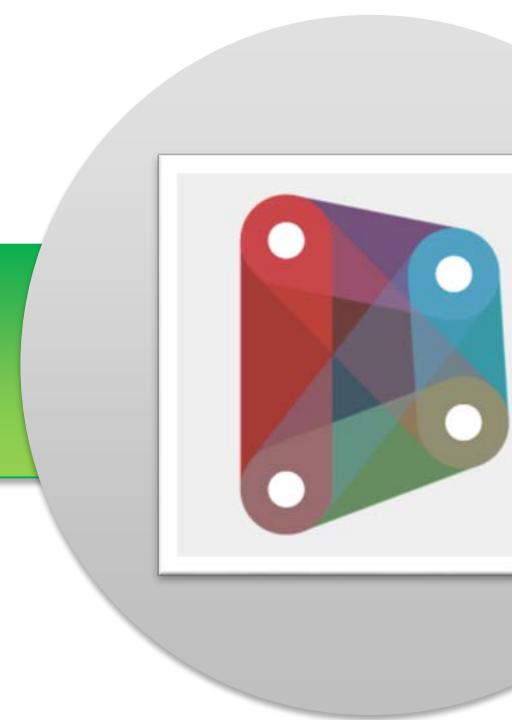


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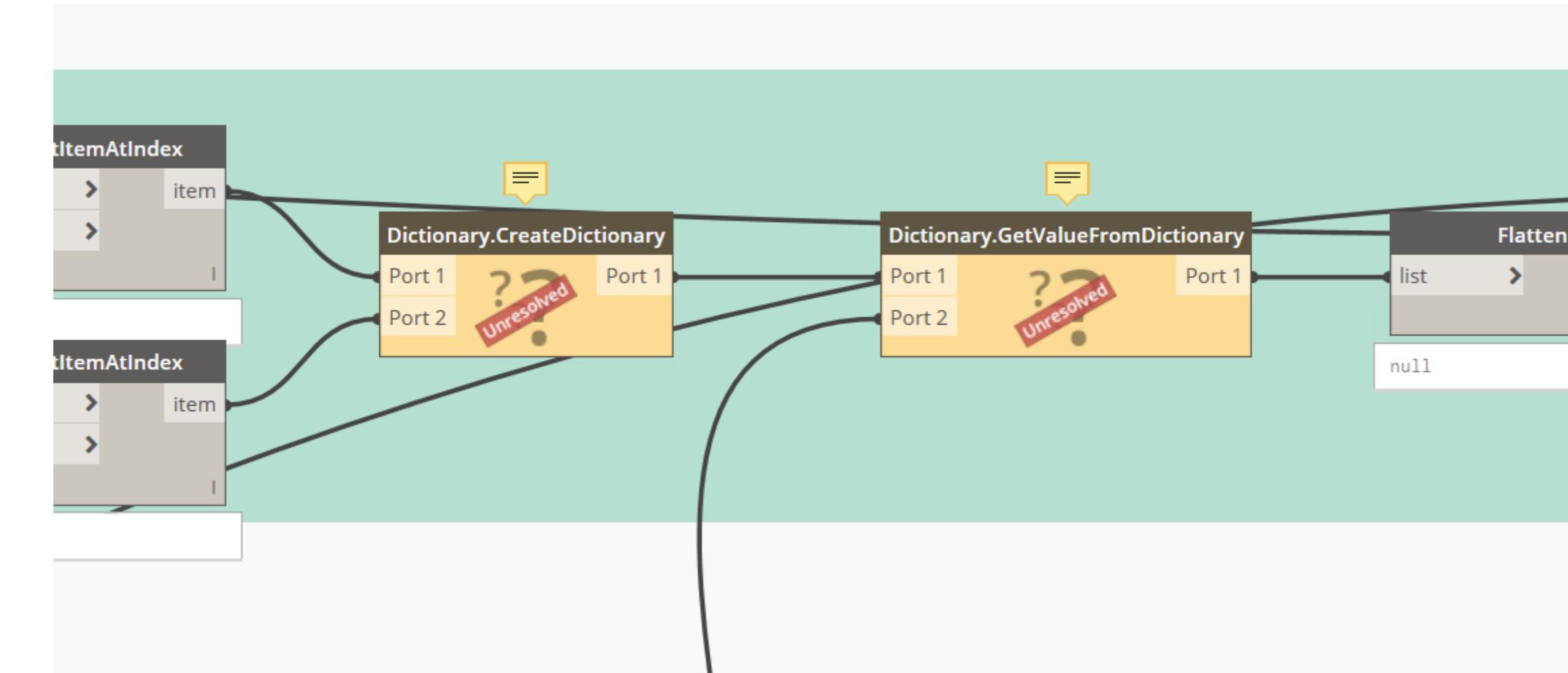
- "Connecting dots"
- Less efficient computing time
- Maintenance between versions



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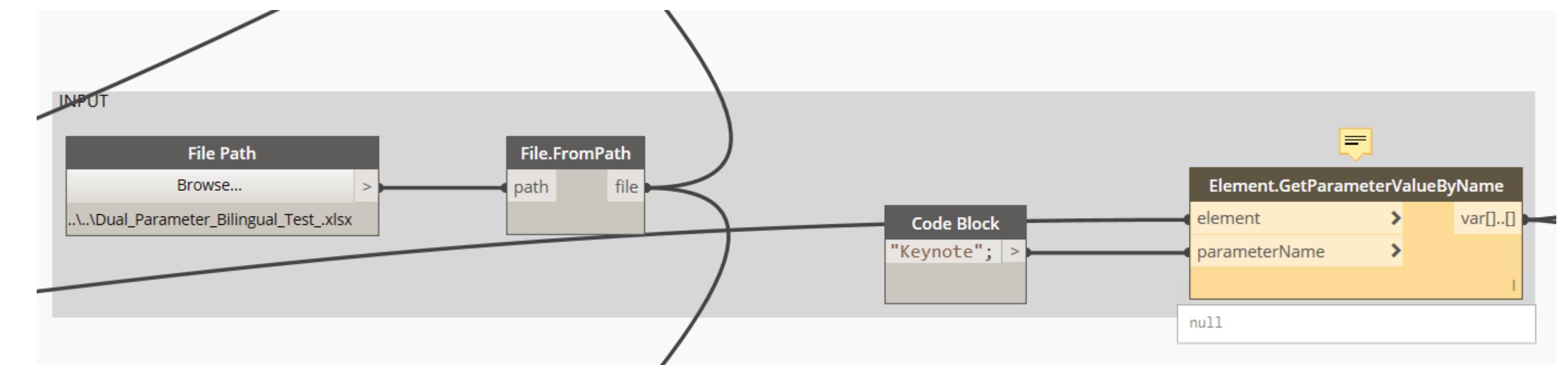
- "Connecting dots"
- Less efficient computing time
- Maintenance between versions
- Node and script updating





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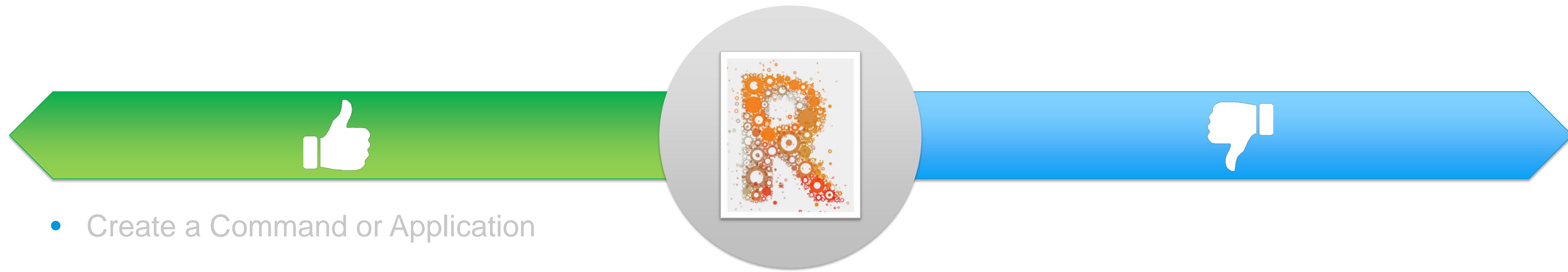
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 - May seek employment in other fields...



- Create a Command or Application

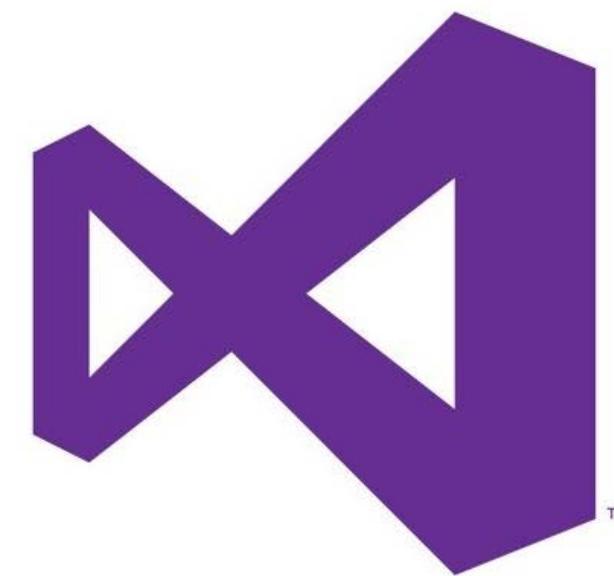


- Create a Command or Application
- Ability to use Revit API Events

The screenshot shows the Revit 2019.1 API documentation interface. The title bar reads "Revit 2019.1 API". The menu bar includes "Hide", "Locate", "Back", "Forward", "Stop", "Refresh", "Home", "Print", and "Options". The main content area has tabs for "Contents", "Index", and "Search". The "Contents" tab is selected, displaying a tree view of namespaces. A red box highlights the "Autodesk.Revit.DB.Events Namespace" under the "Namespaces" section. The right pane displays the members of this namespace, including event args such as [DocumentSavingAsEventArgs](#), [DocumentSavingEventArgs](#), [DocumentSynchronizedWithCentralEventArgs](#), [DocumentSynchronizingWithCentralEventArgs](#), [DocumentWorksharingEnabledEventArgs](#), [ElementTypeDuplicatedEventArgs](#), [ElementTypeDuplicatingEventArgs](#), [FailuresProcessingEventArgs](#), [FamilyLoadedIntoDocumentEventArgs](#), [FamilyLoadingIntoDocumentEventArgs](#), [FileExportedEventArgs](#), [FileExportingEventArgs](#), [FileImportedEventArgs](#), [FileImportingEventArgs](#), and [LinkedResourceOpenedEventArgs](#).



- Create a Command or Application
- Ability to use Revit API Events
- Power of an Integrated Development Environment



Visual Studio®



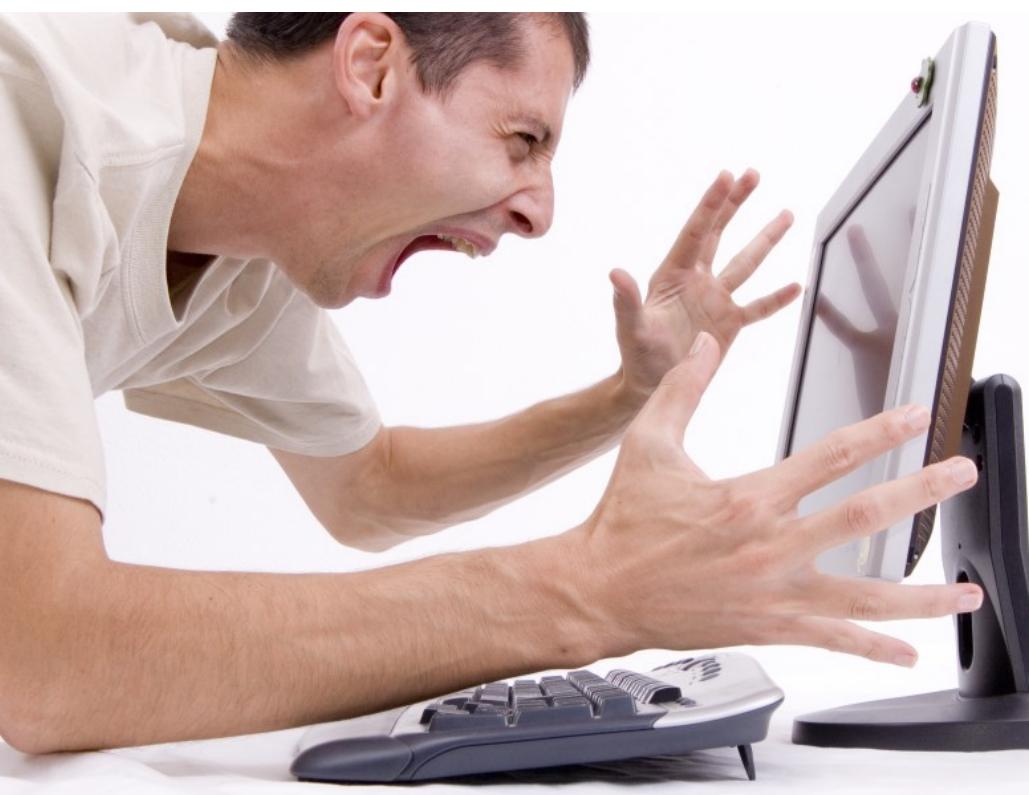


- Create a Command or Application
- Ability to use Revit API Events
- Power of an Integrated Development Environment
- Complete Control of code logic





- Create a Command or Application
- Ability to use Revit API Events
- Power of an Integrated Development Environment
- Complete Control of code logic
- Error handling and clear messages





- Create a Command or Application
- Ability to use Revit API Events
- Power of an Integrated Development Environment
- Complete Control of code logic
- Error handling and clear messages
- Firm-Wide Deployment

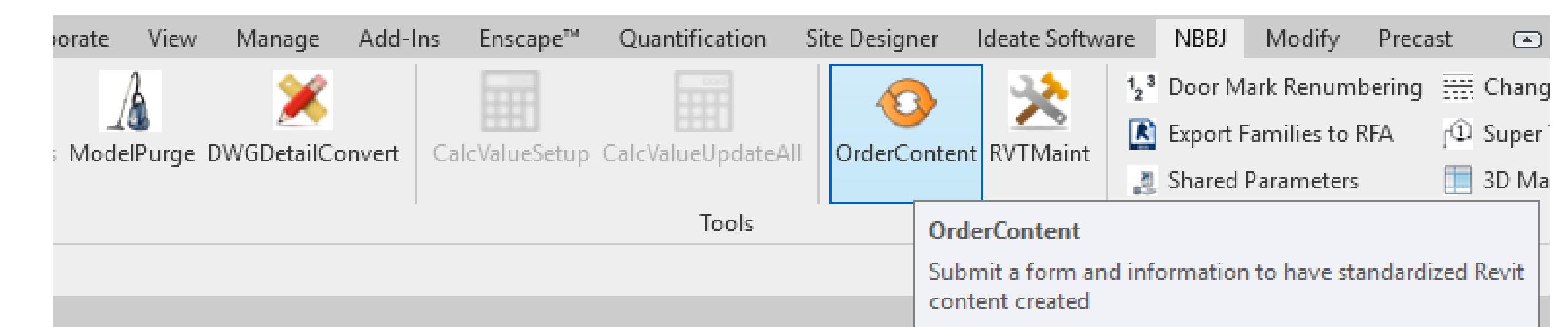
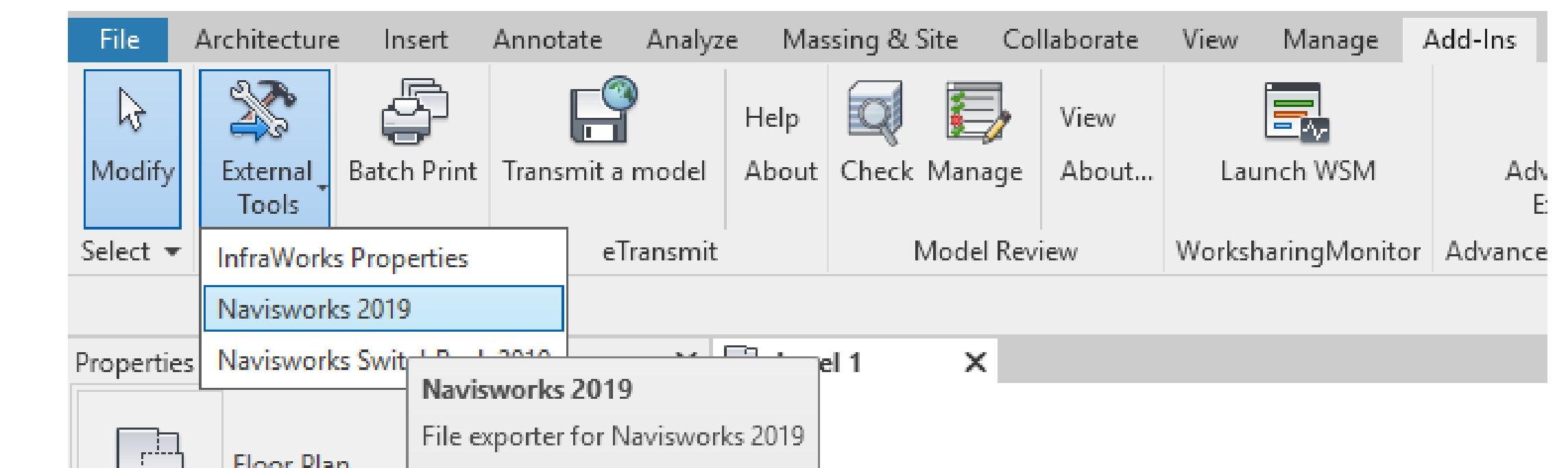


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- Ability to use Revit API Events
- Power of an Integrated Development Environment
- Complete Control of code logic
- Error handling and clear messages
- Firm-Wide Deployment
- Faster Computing Time





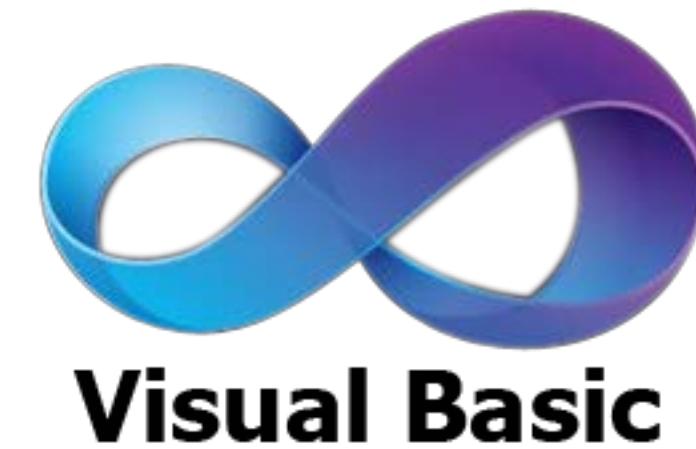
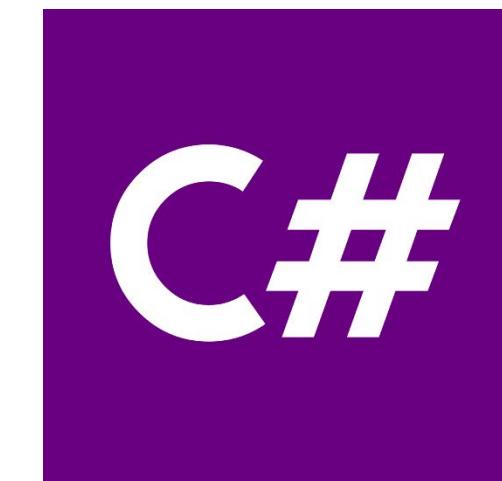
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- Learning a coding programming language
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 - More time consuming





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 - Learning the Revit API
 - More time consuming
 - Restarting Revit to debug

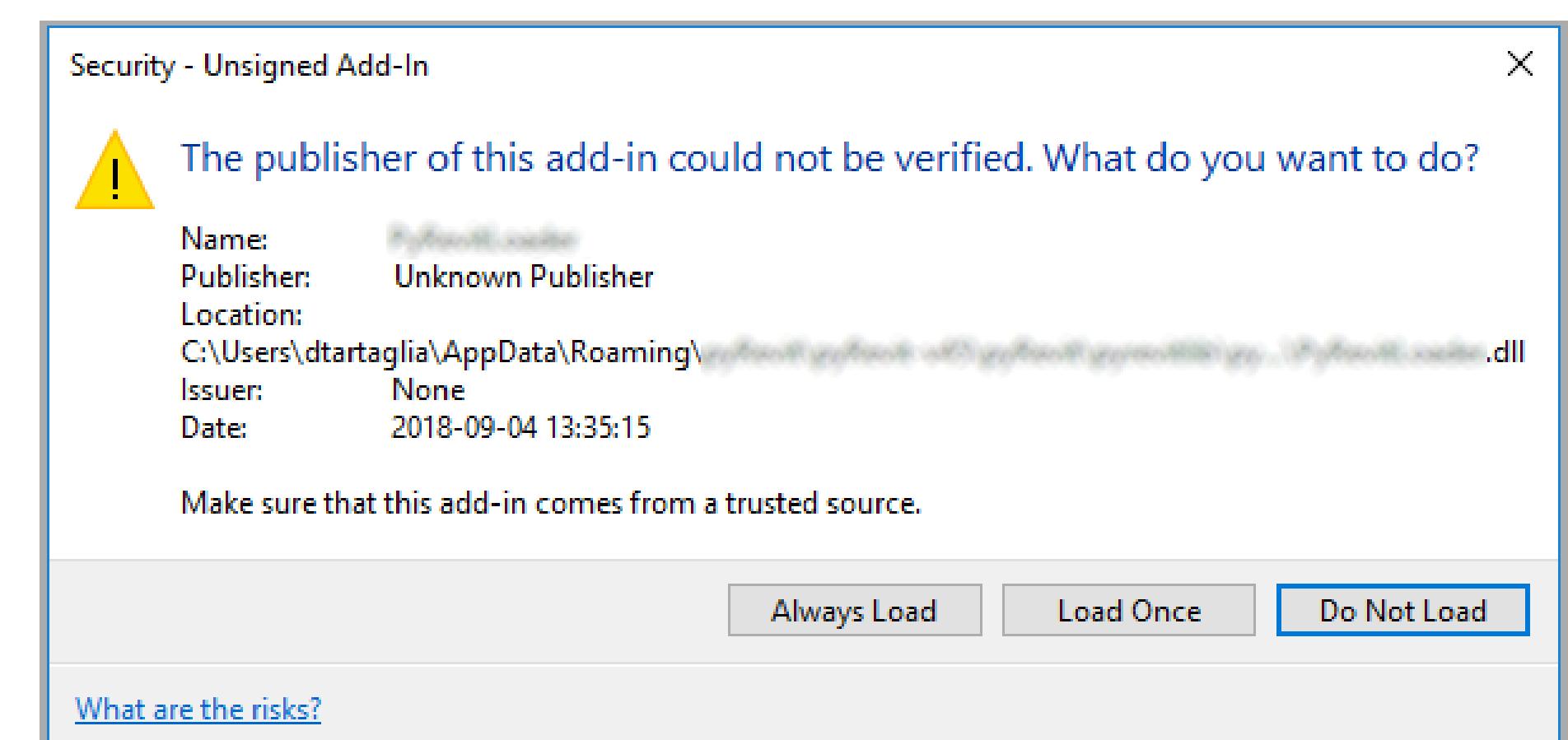


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- Learning the Revit API
- More time consuming
- Restarting Revit to debug
- Rapid logic changes are challenging
- Having to digitally sign
- “*No stand-alone ability for batch processing*”

UIApplication.Idling Event

[UIApplication Class Example See Also Send Feedback](#)

Subscribe to the **Idling** event to be notified when Revit is not in an active tool or transaction.

Namespace: [Autodesk.Revit.UI](#)

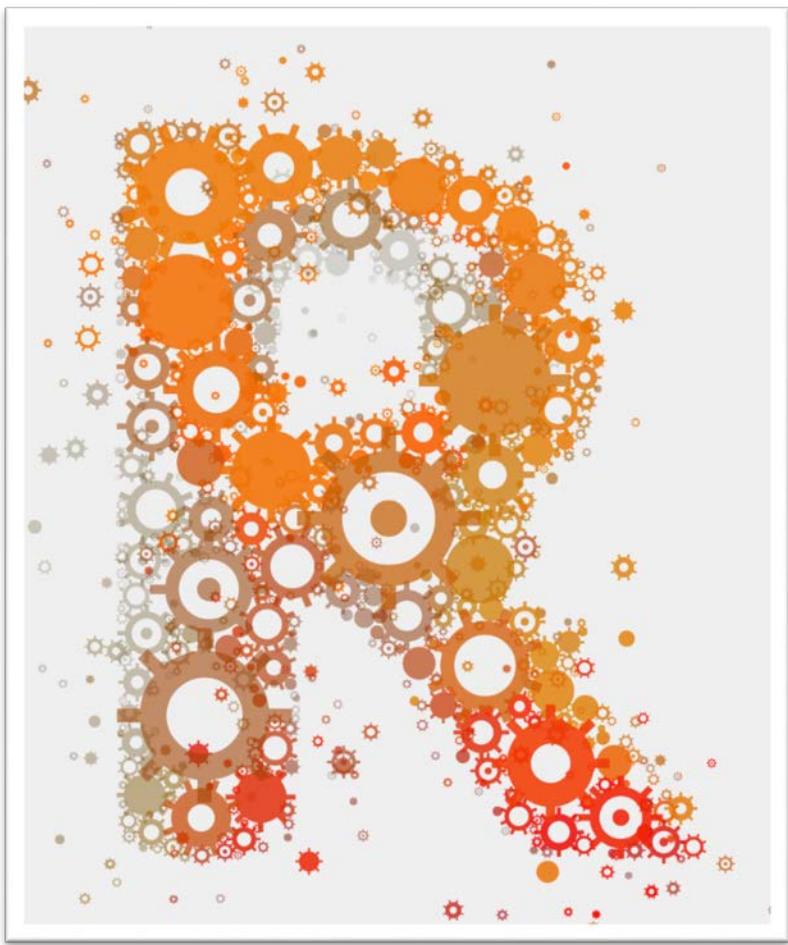
Assembly: RevitAPIUI (in RevitAPIUI.dll) Version: 19.0.0.0 (19.1.0.0)

Since: 2010

Scenarios



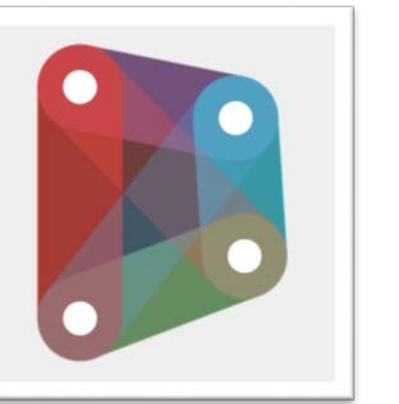
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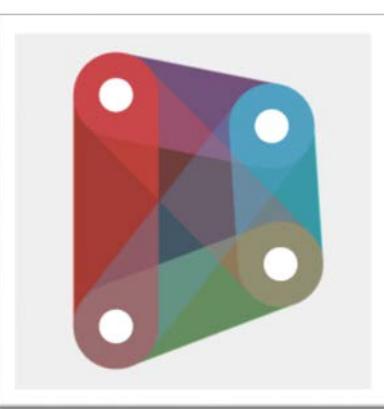


- Need to quickly change parameter values?

- Need to quickly change parameter values?



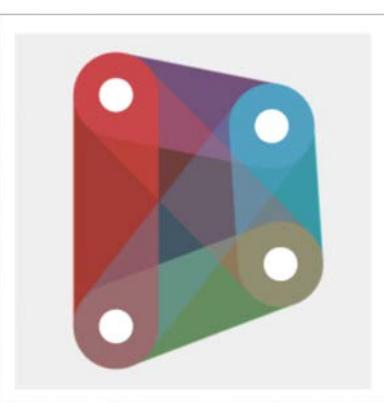
- Need to quickly change parameter values?



- Prevent users from loading non-standard families?



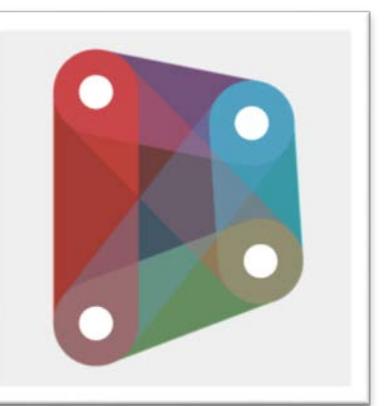
- Need to quickly change parameter values?



- Prevent users from loading non-standard families?



- Need to quickly change parameter values?

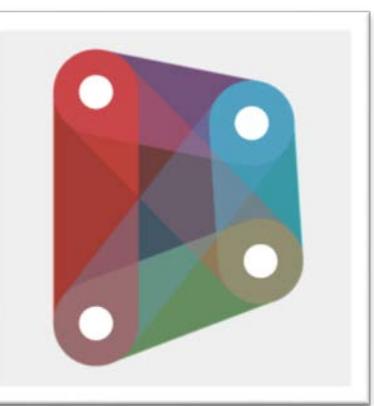


- First year architect looking to check which schedules are on which sheets?

- Prevent users from loading non-standard families?

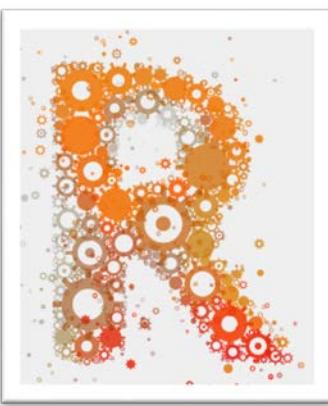


- Need to quickly change parameter values?

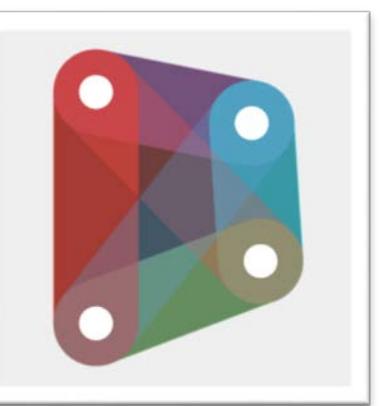


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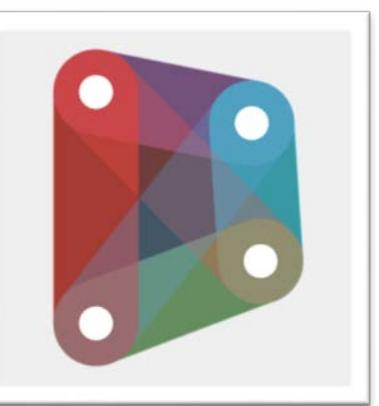
- Prevent users from loading non-standard families?



- Create a complex tool with a GUI?

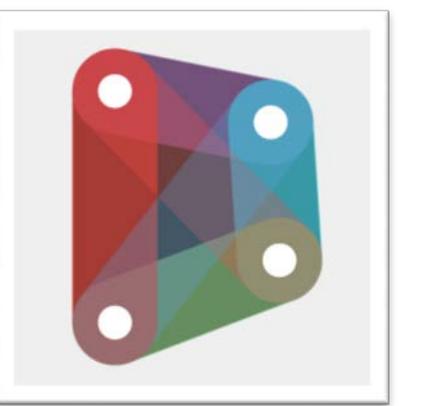


- Need to quickly change parameter values?



- First year architect looking to check which schedules are on which sheets?

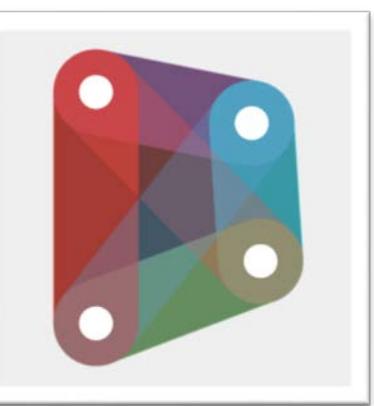
- Prevent users from loading non-standard families?



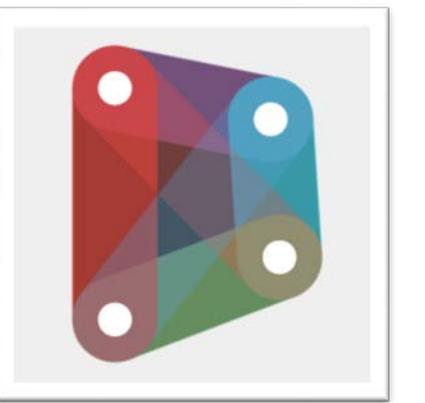
- Create a complex tool with a GUI?



- Need to quickly change parameter values?



- First year architect looking to check which schedules are on which sheets?



- Generative design?



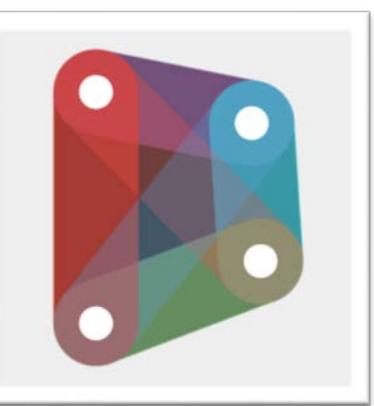
- Prevent users from loading non-standard families?



- Create a complex tool with a GUI?



- Need to quickly change parameter values?



- First year architect looking to check which schedules are on which sheets?



- Generative design?

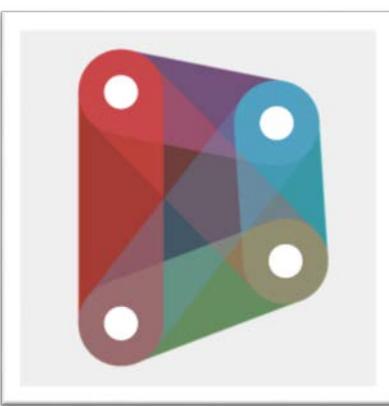
- Prevent users from loading non-standard families?



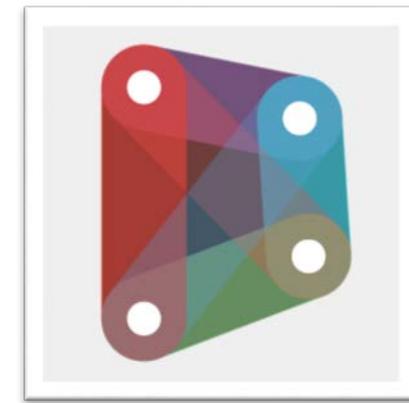
- Create a complex tool with a GUI?



- Need to quickly change parameter values?

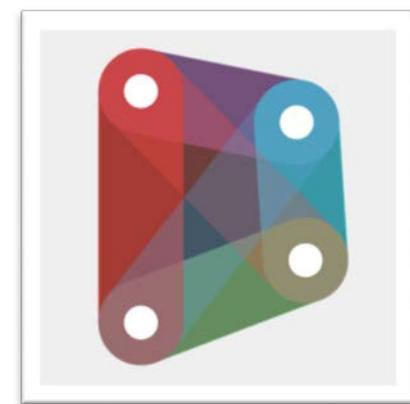


- First year architect looking to check which schedules are on which sheets?



- Generative design?

- Prevent users from loading non-standard families?



- Create a complex tool with a GUI?



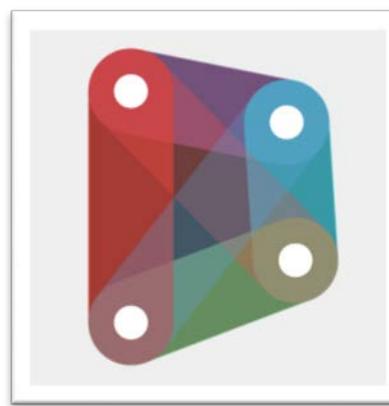
- Automate audit or health metric checker?



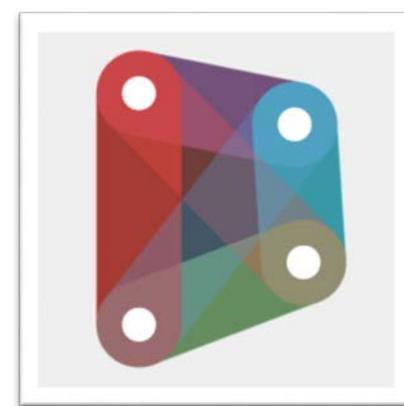
- Need to quickly change parameter values?



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- Generative design?



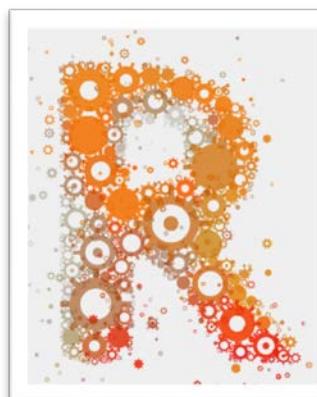
- Prevent users from loading non-standard families?



- Create a complex tool with a GUI?



- Automate audit or health metric checker?



...Last Words





DTartaglia@nbbj.com
NBurnett@nbbj.com



www.linkedin.com/in/dantartaglia/
www.linkedin.com/in/nickaburnett/



@DanTartaglia66

Thank You for Attending! Question?

A large, abstract graphic in the background features a blue color gradient. It includes a wavy, grid-like pattern that resembles water or a digital signal, and a dark blue triangular area at the bottom right with internal white lines forming a mesh or network structure.



Make anythingTM

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