

# Deploying Dynamo to Your Company: Getting Everyone to Node and Code

**Tadeh Hakopian**

Design Technology Manager / Developer | @tadeh\_hakopian

Session ID 468508

# INTRODUCTION

# About the speaker

## Tadeh (Todd-A) Hakopian



**Tadeh leverages BIM, VDC and Design Technology to provide his teams with impactful tools for project success. He has over 8 years of experience in the AEC field developing methods and practices to enhance project outcomes. With a background in Architecture he has worked with designers, engineers and contractors in all phases of building design and construction. Over the years he has been a part of large, complex projects in Commercial, Sports, Education, Healthcare and Residential sectors. His current focus is on design automation, data insights in projects and comprehensive workflows that come full circle in planning project life cycles. He is an active speaker at conferences and his local community meetups. Current Professional Goals Help move the AEC profession into new horizons using value driven solutions and innovative research.**

# About HMC Digital Practice



**HMC Architects internal group of innovators and subject matter experts for digital technology**

**Mission is to support the designers in our company by using new tools and methods**

**Group operates company wide to support and improve performance of project teams**

**Main focus areas – Data Analytics, Process Automation, Integrated software workflows**

# OVERVIEW / OUTLINE

## Overview

- What Dynamo is and how it works stand alone with Revit
- Benefits of using Dynamo
- Challenges to deploy it company wide

## Outline

- Intro
- Premise
- Overview
- HMC Situation
- Before you Get started
- Goals And Vision
- RoadMap
- Installs
- Training
- Content
- Launch
- Post Launch
- 3rd Party solutions
- Long Term Planning
- Lessons Learned
- Outro

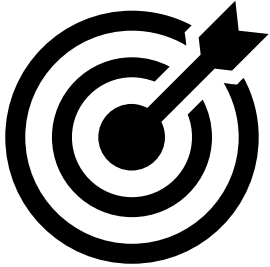
# PREMISE & DISCLAIMERS

- **This talk will show you all the essential steps to launch Dynamo company wide**
- **Each section on its own can be a lesson so don't consider this the final word just a starting point for your own deployment endeavor**
- **The methods described are the ones developed for internal company use and adaptable for most organizations. Always consider the unique adjustments a deployment plan needs to have for your own organization.**

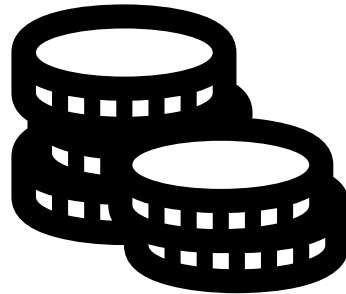
**GETTING STARTED**

# BEFORE YOU GET STARTED

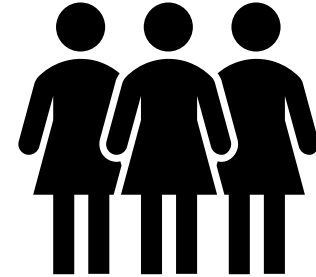
Know what you are trying to achieve in specific terms with goals and deadlines



Budget time – Schedule milestones



Get people to work with you –  
Have a beta team to work out the kinks

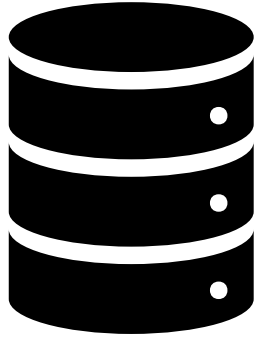




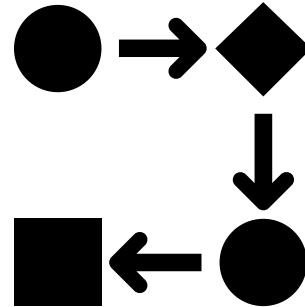
# STRATEGY

# GOALS AND VISION – COMPUTATIONAL DESIGN

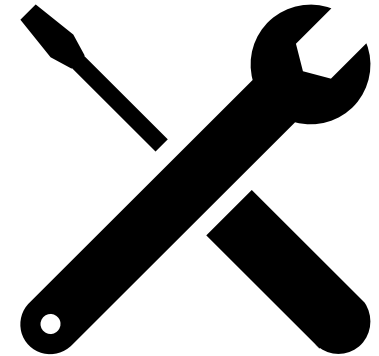
Data incorporated into the  
Design process



Improved workflows with  
Automation methods



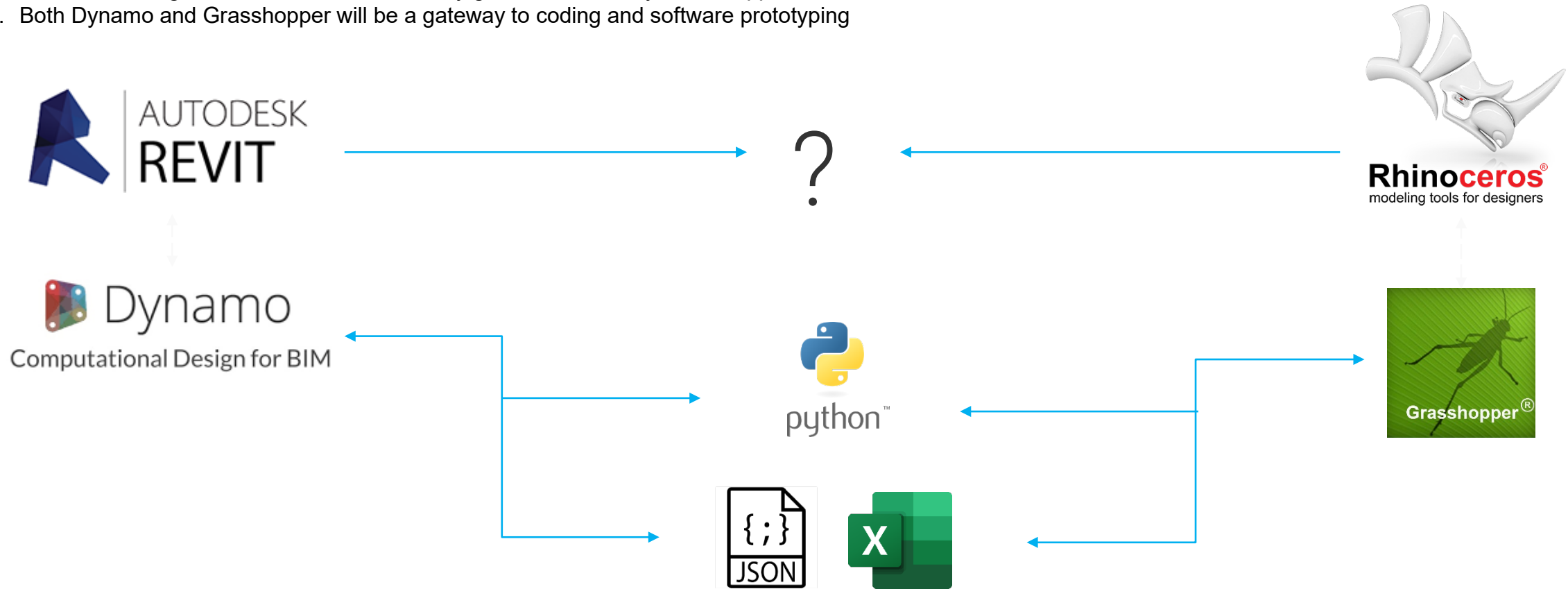
Develop better tools and  
systems to facilitate the design  
process and create better  
deliverables



# GOALS AND VISION – VISUAL SCRIPTING

Develop a game plan for visual scripting in general:

1. Dynamo deployment influenced by earlier Grasshopper deployment
2. Installs, Training and Standards influenced by ground covered by Grasshopper
3. Both Dynamo and Grasshopper will be a gateway to coding and software prototyping

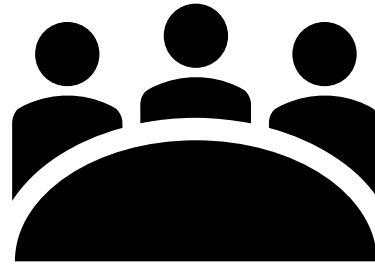


# GOALS AND VISION - DYNAMO

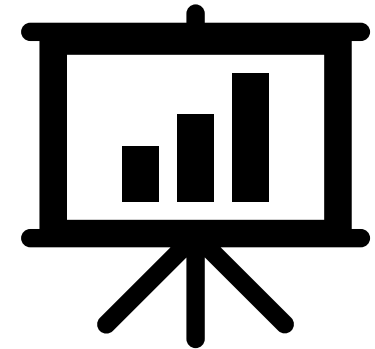
Create scripts for studio use  
and train people to adapt the  
scripts for their own projects



Dynamo is accessible for all  
staff – anyone can run scripts



Track usage – who is using  
dynamo and which scripts to  
help improve adoption and  
support

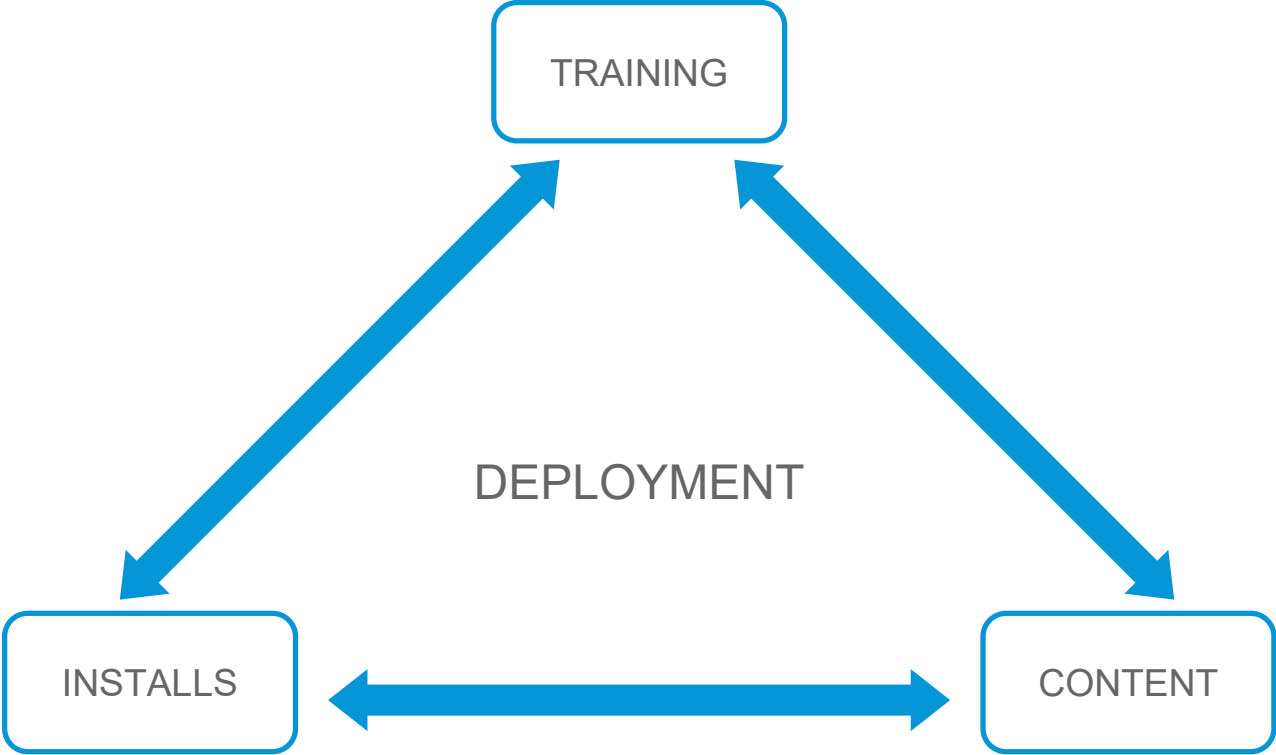


# STRATEGY – THREE ELEMENTS

Training – Knowledgeable users who can work self-sufficient

Infrastructure – Tools to support the users

Content – Resources and Materials to enable users to work with the system provided



# ROAD MAP

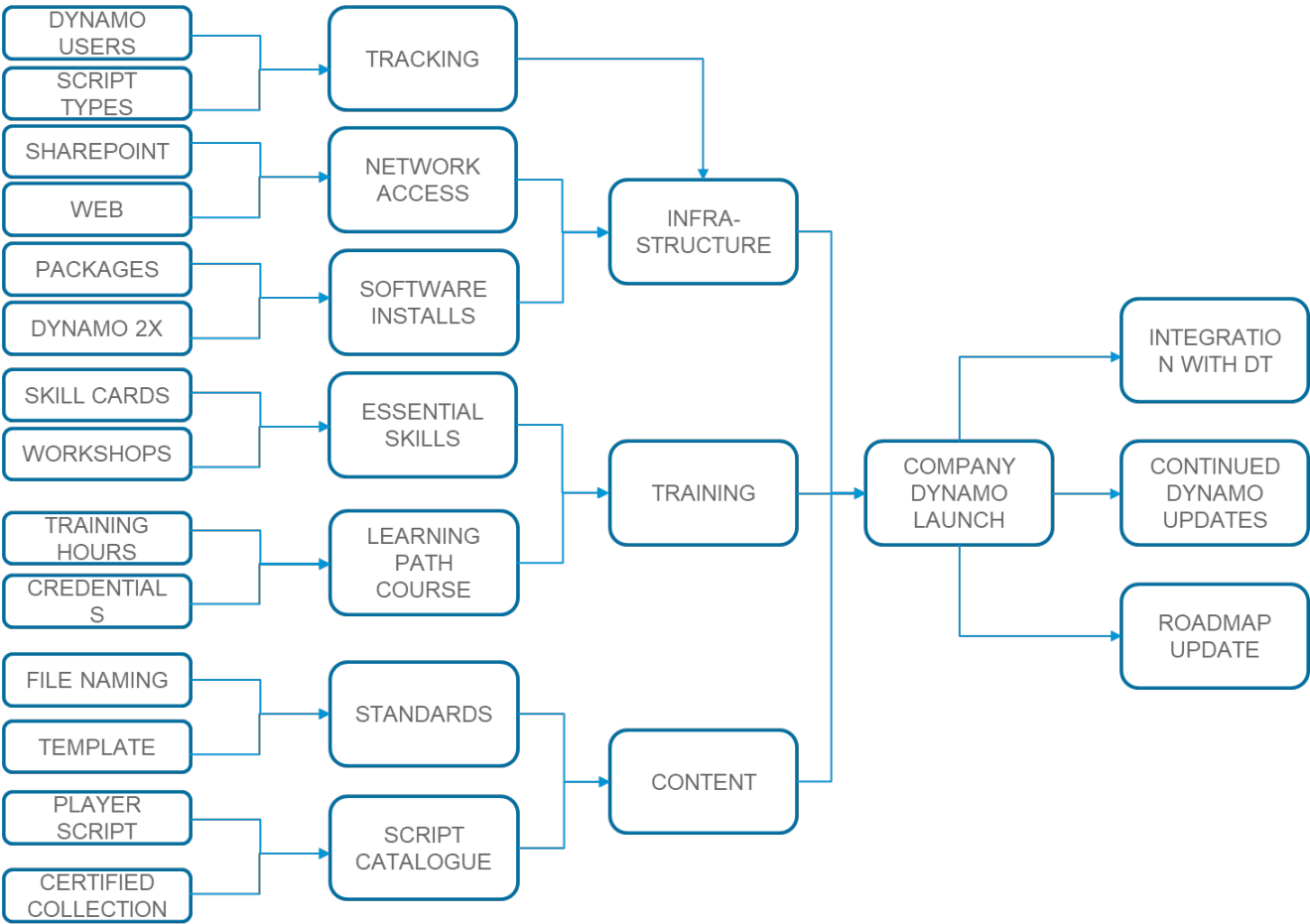
Roadmaps and charts can be a big benefit to visualize a strategy to a launch

Organize all the steps in each stage to ready launch

Start from the end – Determine the launch date and everything you need to get there

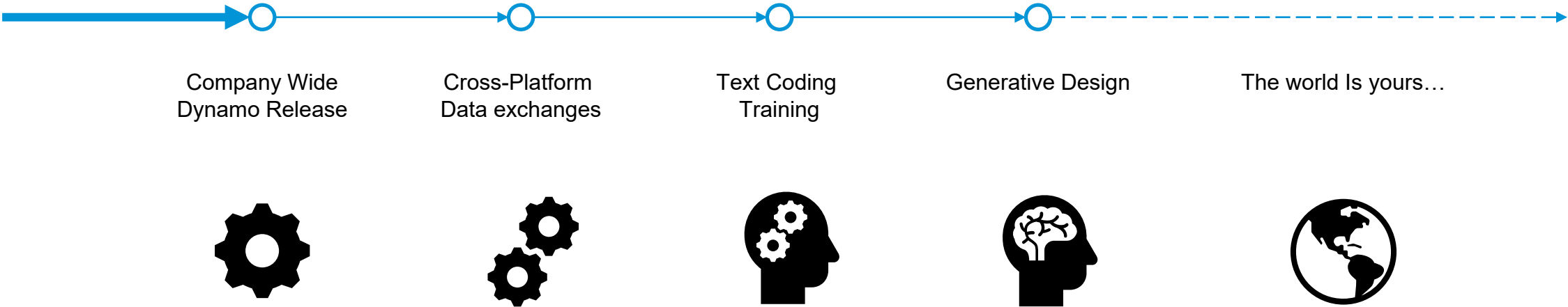
Each broad category needs to be divided into essential completions

From there you can list all the actual work you need to do and who you need to work with in order to do it



# ROAD MAP – LONG TERM

Don't stop at Launching Dynamo, keep going!



# INSTALLS



# INSTALLS – MAIN PART

## Dynamo 2.X

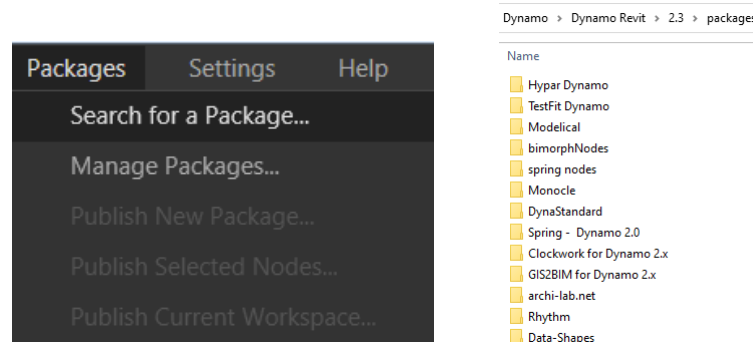
One version to rule them all  
1.X is obsolete and can confuse users when opening  
Dynamo from Revit



<https://dynamobim.org/to-dynamo-2-0-and-beyond/>

## Specific Packages

Vet the package for 2x compatible release  
Install system with SCCM / Software Center



<https://dynamobim.org/issues/extend-dynamo-with-packages/>

## Revit 2018 and newer is preferred

Regularly update Revit and roll your models to the  
most recent year release

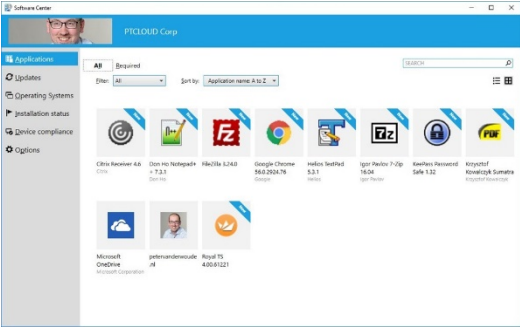


<https://dynamobim.org/dynamo-2-0-4-hotfix/>

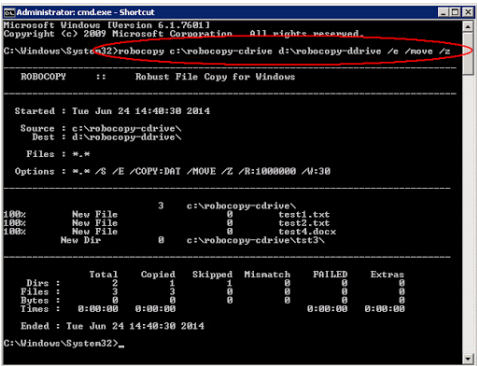
# INSTALLS – METHODS

No ‘best way’ to install Dynamo and External Packages but you have some choices:

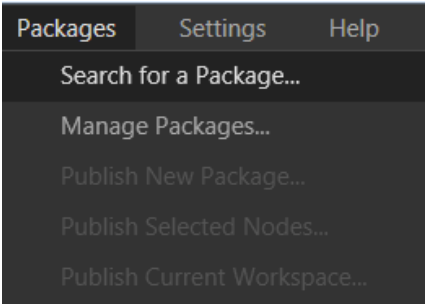
Software Center (SCCM)



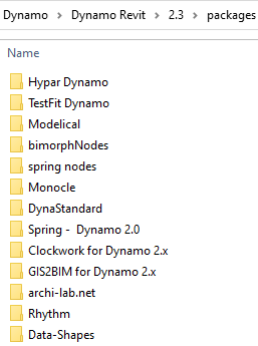
Bat Copy (Robo-Copy)



Package Manager



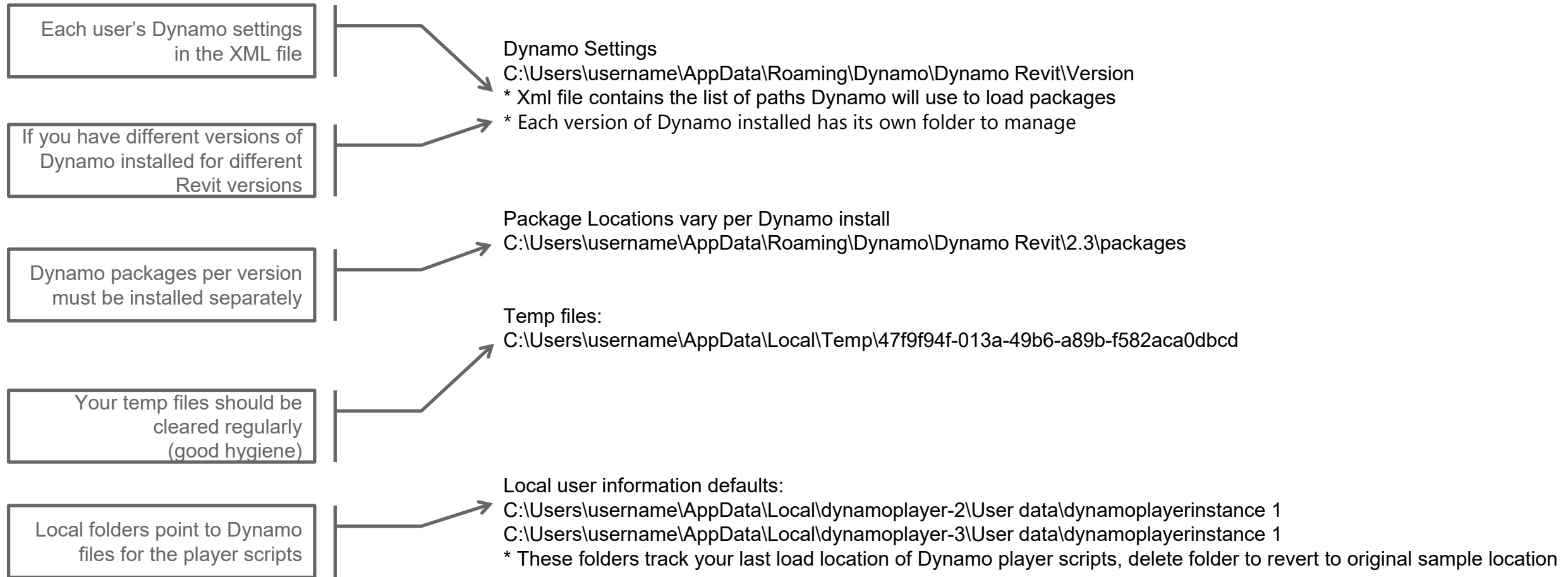
Copy From a Central Location



\* Link to Robocopy - <https://adamtheautomator.com/robocopy-the-ultimate/>

\* More on this from Archsmarter: <https://archsmarter.com/office-hours-200430/>

# INSTALLS – FILE PATHS



\* See more from Dana De Filippi on Preparing for deployment: <https://youtu.be/KZWcs9nDbZU>

# DEPLOYMENT - 3<sup>RD</sup> PARTY SOLUTIONS

Get some help from tools available by developers

Some are open source and other are a license subscription

They may be just what you need to bring your deployment together

## PyRevit

Can launch Dynamo graphs from one of its many tools

Added Bonus: Make your own tools!

<https://github.com/eirannejad/pyRevit/releases>



## Orkestra

Software to manage Dynamo scripts and packages from the cloud and organize local environments per administrator's requirements

<https://www.orquestra.online/>



## Imaginit Clarity

Automates Revit actions and can launch Dynamo scripts across multiple projects

<https://www.imaginit.com/software/imaginit-utilities-other-products/clarity>

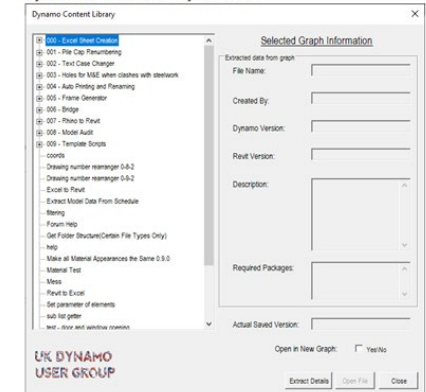


## DynaStandard

Dynamo Package to help manage other package deployments and company wide settings

[https://github.com/brencas/s/DynaStandard\\_public](https://github.com/brencas/s/DynaStandard_public)

Dynamo Content Library window:

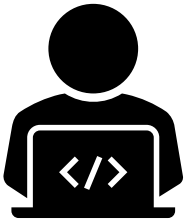


# CONTENT

# CONTENT - SCRIPTS

What kind of scripts you need for your company  
Figure out the use case then create the scripts

Developer



Design



Construction



Analysis

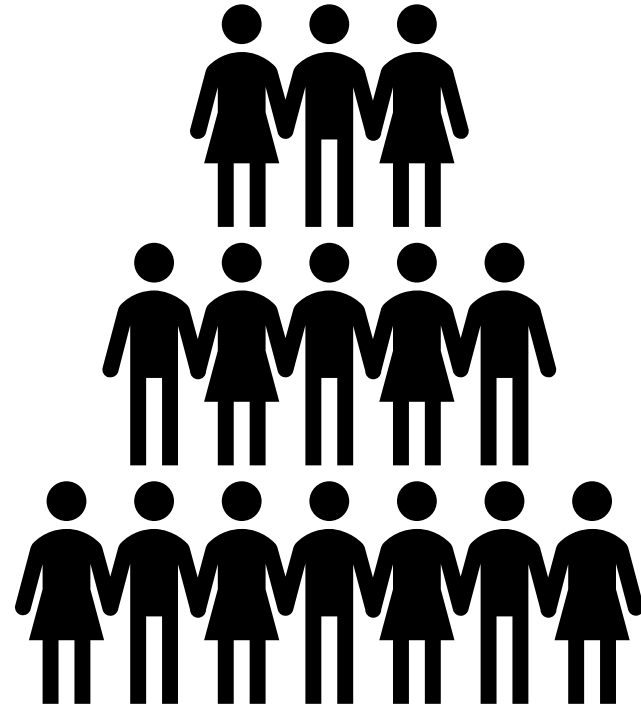


Take suggestions from internal teams about solutions they need




# CONTENT – INTERNAL SOURCE






Sourcing content should always be vetted and adjusted for your company standards Get scripts from your project teams



# CONTENT – EXTERNAL SOURCE

Sourcing content should always be vetted and adjusted for your company standards  
Online – Dynamo forum , AU , GitHub , stack overflow , YouTube and more

 Learn Explore Blog Help Center Forum

  DOWNLOAD   

all categories ▾

Latest

New (35)

Unread (67)

Top

Categories


+ New Topic


Topic

Replies


Views


Activity


 How to get help on the Dynamo forums 10

 FAQ


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](#)


 4 28.3k Jan '19

 Welcome to the Dynamo Forum

 FAQ

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](#)

 20 14.6k Sep '18

 About Products For Teams


python image numpy amazon-dynamodb revit

asked Jun 24 by Moon Ahae

2 votes

Q: How to automatically handle DialogResultShowing event in Python(Revit Dynamo)?

How do I subscribe to Revit events in Python (Dynamo)? Specifically DialogResultShowing so I can see if it is "Export with Temporary Hide/Isolate" warning and select "Leave the Temporary Isolate Mode ..."

 3 answers


revit-api revitpythonshell pyrevit

asked Jul 5 '17 by JayW

0 votes

Q: Dynamo: Can I draw a system family into revit by programing in Dynamo?











We can use FamilyInstance to call out and insert the custom family into the revit project. However, it doesn't work for system family. For example: How can I draw a pipe using dynamo? Which one is the suitable node for this problem? ...

 1 answer

pipe revit

asked Jun 24 '16 by Annie



 thakopian	Add files via upload	
	00.AUTOMATE_BORING_STUFF.dyn	Add files via upload
	01.level-by-code.dyn	Add files via upload
	02.CREATE_FLOORS_AND_CURTAINW...	Add files via upload
	03.VIEWS_FROM_LEVEL.dyn	Add files via upload
	04.SHEETS_FROM_EXCEL_04.dyn	Add files via upload
	04.SHEETS_FROM_EXCEL_05-FIX.dyn	Add files via upload
	04.SHEETS_FROM_EXCEL_05.1-GRAPH...	Add files via upload
	05.GRIDS_FROM_CODE_02.dyn	Add files via upload



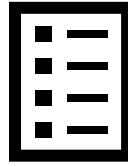
# CONTENT – FILE NAMING



Don't Overthink it – Keep it simple

Make it easy to search and read the file names

Have standard names that are easy to remember



Dynamo naming logic

Category:







- Project Setup - PS
- Health Check - HC
- Compliance Standards - CS
- Life Safety - LS
- Modeling - MD
- Annotation - AN
- Player Script Append - PLY

Description:

- HC-Warning-Review
- LS-Room-Occupancy-PLY
- LS-Room-Occupancy



Name everything consistently for easy review by users

-  CS-Export-JPG-by-View-PLY.dyn
-  AN-Append-Name-on-Sheets-PLY.dyn
-  CS-Export-JPG-by-Category-PLY.dyn
-  CS-Select-Instance-In-Room-PLY.dyn
-  MD-Color-Override-by-View-PLY.dyn
-  MD-Walls-Form-Floor-PLY.dyn

# CONTENT - TEMPLATES

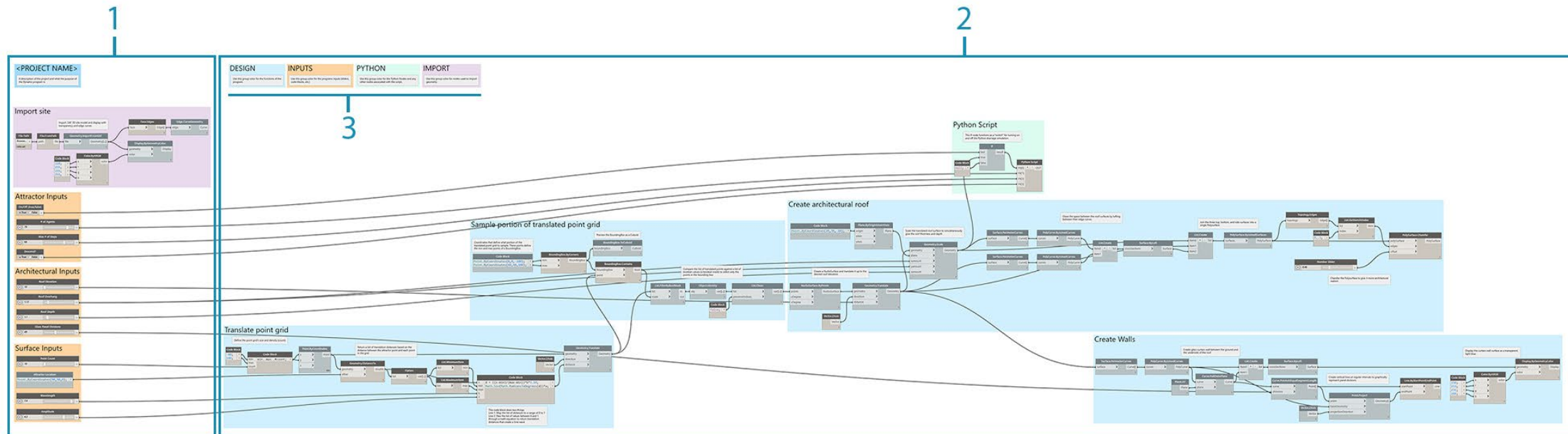
Create a standard format for all graphs

Set the template file into an accessible location

<https://forum.dynamobim.com/t/can-i-start-dynamo-with-a-template-instead-of-a-blank/15002/13>

\*Also possible to use Monocle Package for this effort

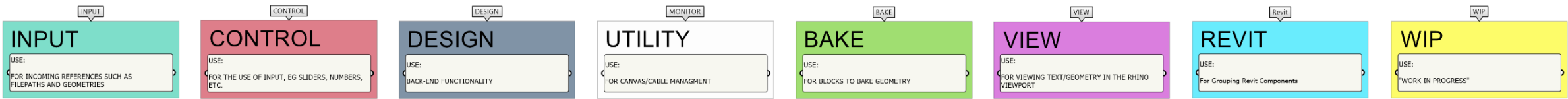
Train staff to understand and use this system



# CONTENT - TEMPLATES

Create easy to read grouped blocks for every script

## LEGEND



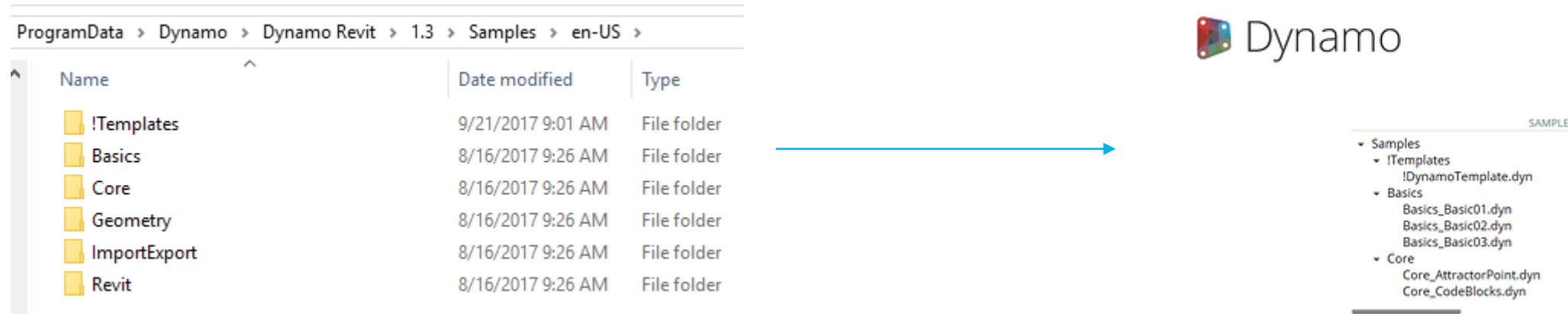
**Input:** For incoming references such as file paths and geometries.  
**Control:** For the use of input(e.g. sliders, numbers, etc.)  
**Design:** For back-end functionality  
**Utility:** For canvas/cable management

**Bake:** For nodes to bake geometry  
**View:** For viewing text/geometry in the rhino viewport  
**Revit:** For grouping Revit interoperability components  
**WIP:** Work in progress

# CONTENT - TEMPLATES

Create easy to read grouped blocks for every script

A workaround is to save any “template” files in your examples folder. C:\ProgramData\Dynamo\Dynamo Revit\1.3\Samples\en-US



Credit to John Pierson and Dynamo Forum: <https://forum.dynamobim.com/t/can-i-start-dynamo-with-a-template-instead-of-a-blank/15002/4>

# CONTENT – SCRIPT DIRECTORY

Script library

Network Folder Directory

Easy to access

May be restricted depending on company

Limited controls



Share Point

Easy to access

Version control Built in



User Location copy

On the User Computer

No Version control just updates through a central source or downloads to local machines



Dynamo Extension

Requires further installs to use

DynaHub (requires Github)



# CONTENT - PACKAGES

Two options when it comes to packages.  
Either keep it OOTB (out of the box) for your content or use external packages

OOTB

External

Dynamo Nodes

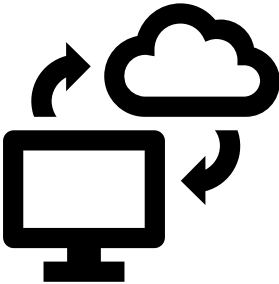
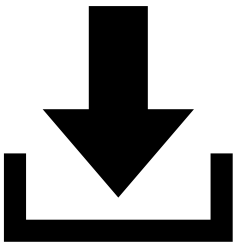
Third Party Packages

Revit Nodes

Third Party View Extensions

From Dynamo team, updated regularly  
as part of the core product

From independent developers who  
update on their own schedule



# CONTENT - PACKAGES



Vetted Packages:

- archi-lab.net
- Bang!
- bimorphNodes
- BumbleBee
- Clockwork
- Data-Shapes
- LunchBox
- Monocle
- Orchid
- Rhythm
- spring nodes
- SteamNodes



But wait, there's more!

Dynamo has an entire package manager website to see all files available:

<https://dynamopackages.com/>



Carl Storms and John Pierson have an AU presentation on different packages to use:

<https://www.autodesk.com/autodesk-university/class/Dynamo-Packages-Have-You-Tried-These-Yet-2018#presentation>

# TRAINING



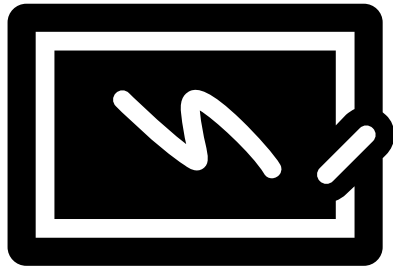
# TRAINING



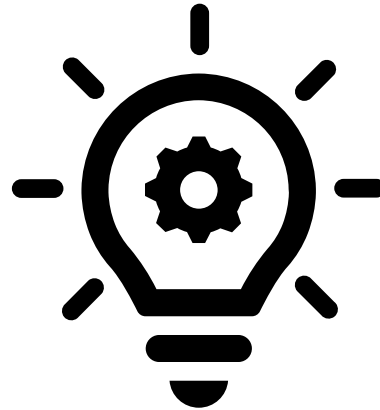
KISS principal for training – Keep It Simple Stupid

# TRAINING

Teach fundamentals and reinforce their learning



Create lessons on problem solving and working with confidence



Train everyone to become contributors to your Dynamo content and provide completion certifications for their career goals

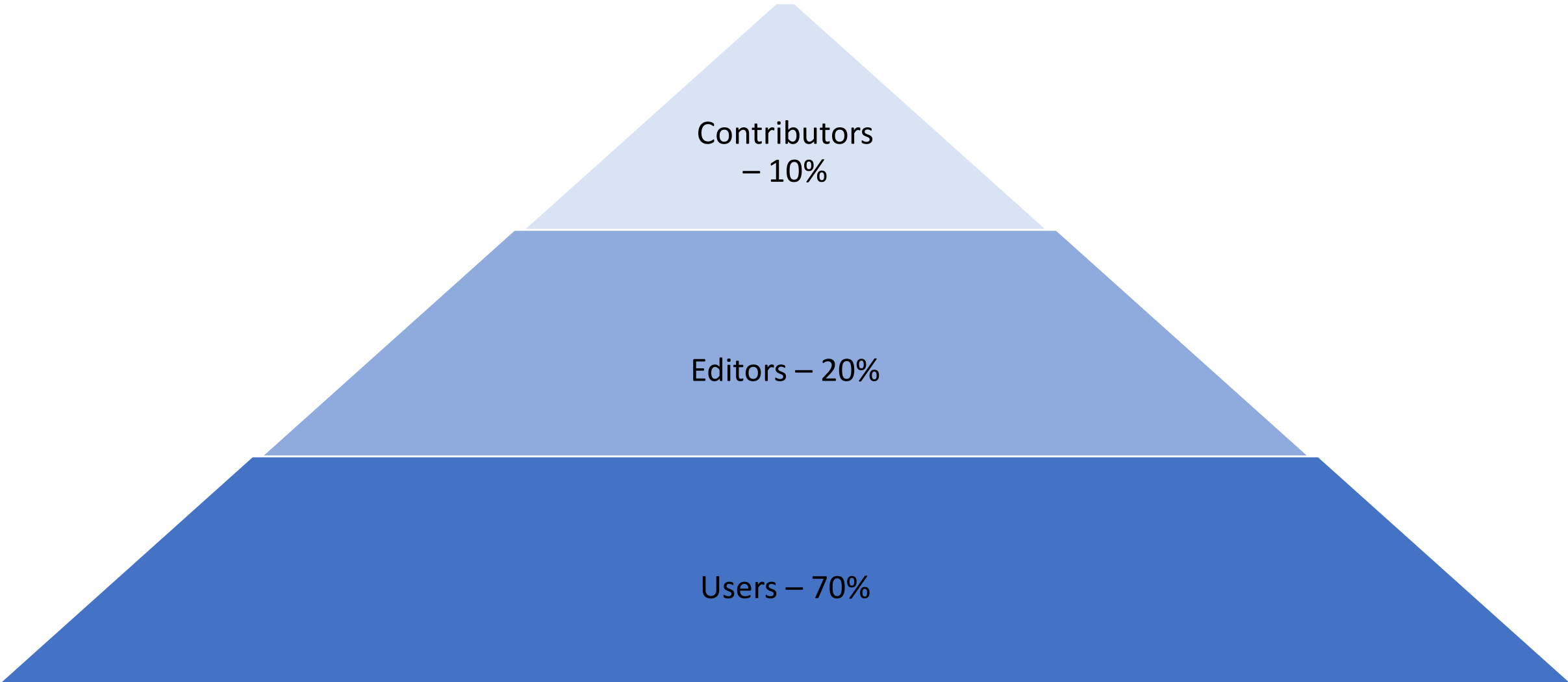


# TRAINING – TIMELINE

Near term training and time requirements

Long term training and preparing your office

Overall training expectations for X% of people to become capable of dynamo access



Contributors  
– 10%

Editors – 20%

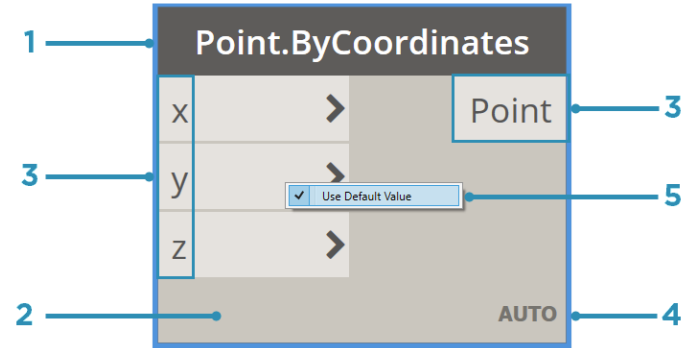
Users – 70%

# TRAINING - BASICS

## Basics of Dynamo UI

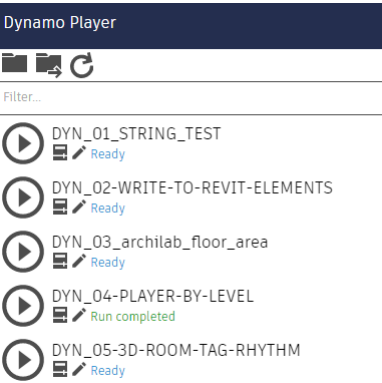
### Anatomy of a Node

Most Nodes in Dynamo are composed of five parts. While there are exceptions, such as Input Nodes, the anatomy of each Node can be described as follows:

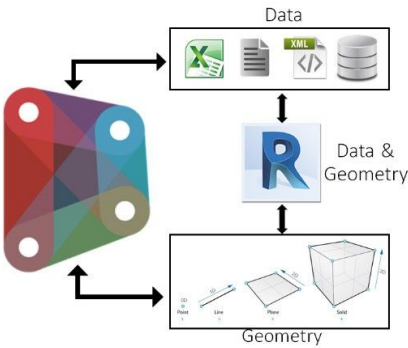


1. Name - The Name of the Node with a Category.Name naming convention
2. Main - The main body of the Node - Right-clicking here presents options at the level of the whole Node
3. Ports (In and Out) - The receptors for Wires that supply the input data to the Node as well as the results of the Node's action
4. Lacing Icon - Indicates the Lacing option specified for matching list inputs (more on that later)
5. Default Value - Right-click on an input Port - some Nodes have default values that can be used or not used.

## Basics of Dynamo Player



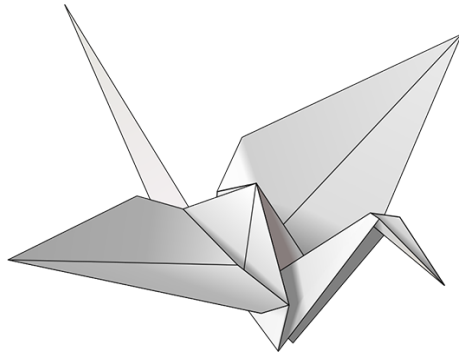
## Creating your own scripts



# TRAINING - OUTLINE

Training outline  
Use the Dynamo Primer – covers everything

<https://primer.dynamobim.org/en/index.html>



Sample Training outline:

- What is Visual Programming
- What is Dynamo
- Launching Dynamo
- Dynamo UI
- Visual Script parts
- Using Nodes
- Connecting Nodes
- Finding Nodes
- Data Flow
- Data Types
- Geometry
- Curve
- Solids
- Lists
- Managing Lists
- Modifying content in Revit
- Reading from Revit
- Edit your Revit model
- Customization
- Documentation

# TRAINING – FORMATS AND RESOURCES



Workshops – Sessions that get together a small group of people to review the training in detail



Lunch webinars – Hour long calls to show the broader company what is going on with the product launch and how people can benefit from it



Skill cards – One page documents going over essentials steps for using a software



External coursework – Learning from providers like LinkedInLearning, Autodesk University or another content provider



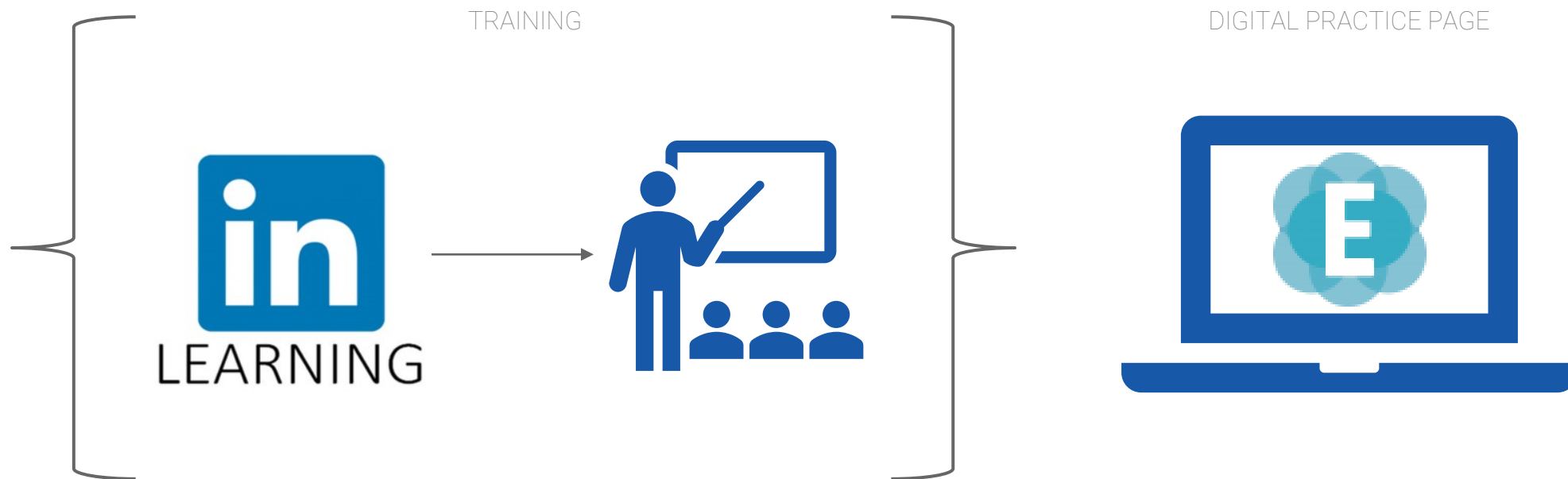
Company coursework - Internally made courses that go into detail the company requirements for using a given product with certification of completion

# TRAINING – HMC INTERNAL TRAINING COURSES

You can create an internal system for training to match your company needs

HMC uses linkedin learning for fundamentals in Dynamo followed by Custom course work to finish the education

That along with ProNow for education tracking we can mark who has completed a course and is ready to apply their skills to a team project



**LAUNCH**



# LAUNCH - COMMUNICATE



Announce the software release ahead of time



Company posts – Intranet, Emails, External Social media



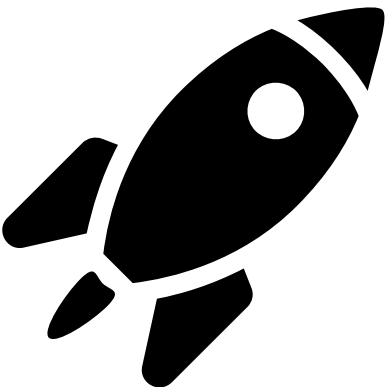
Webinars – Hour long calls to promote the tools and take questions



Communicate benefits to managers and leadership to see the light



Build interest because and create user groups to try out the software

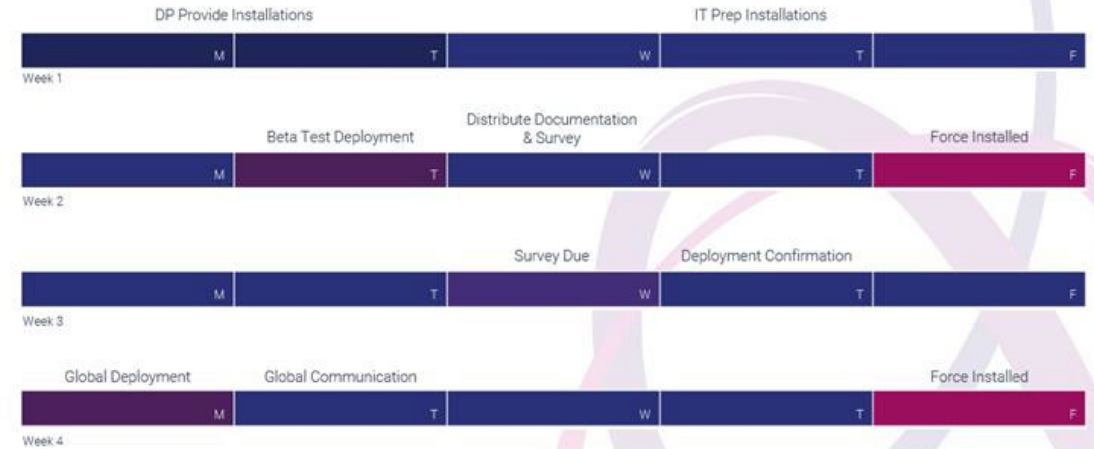


# LAUNCH - SCHEDULE

- Don't do it all at once!
- Create a deployment schedule
- Use a beta tester group and get survey responses from them on how the install went
- Start from one office or group and release the installs in a timeframe
- Install the deployments on all user machines
- Uninstall the old versions of Dynamo
- Install the designated 2X versions
- Install External Packages

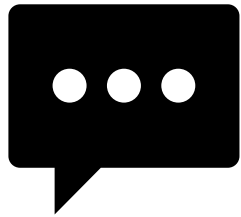
## Deployment Schedule

Monthly Deployment



# POST LAUNCH

Feedback on Installation and  
improvements to be made



Get classes started



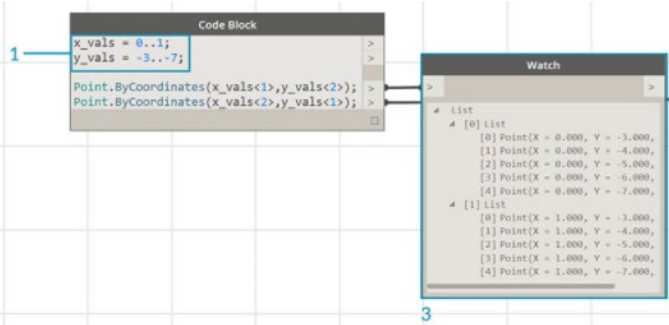
Monthly releases



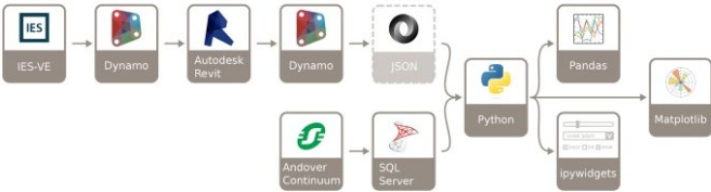
# LONG TERM PLANNING

Beginning the next step in your roadmap in computational design

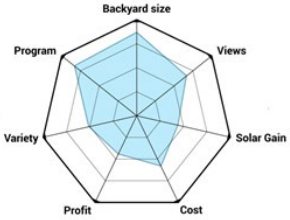
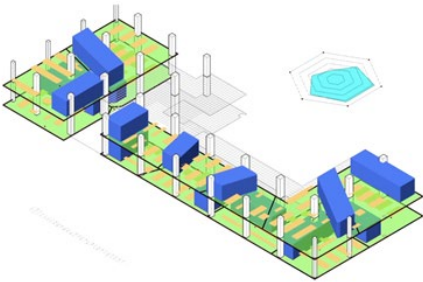
## Advanced Dynamo



## Software integration



## Generative Design



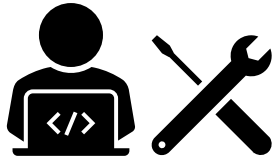
# LONG TERM PLANNING



Dedicated personnel for the studios to have staff for using Computational Design tools



User groups to support collaboration and further learning

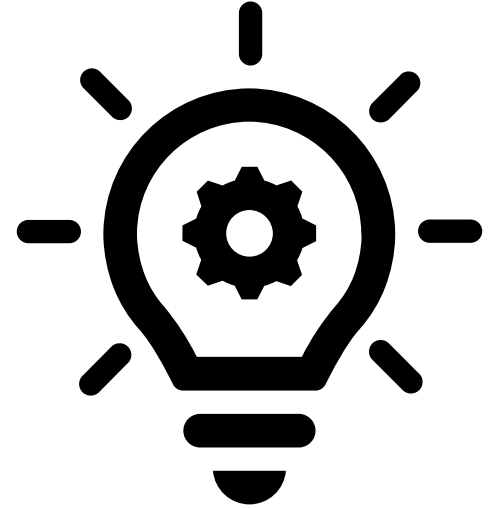


Internal Projects for Computational Design

**TAKE AWAYS**

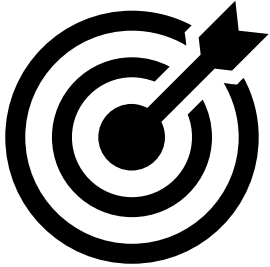
# LESSON LEARNED

- It's OK if something is messy, just get started and refine the process
- Dynamo is a software to make tools so it's a different process from install of other software
- Ask for help from co-workers and external professionals
- Let your Leadership know what you are doing and explain the value
- Don't rush it – slow is smooth, smooth is fast
- It's an ever changing environment so get used to modifying your plans
- Reach out to Dynamo team for questions about specifics

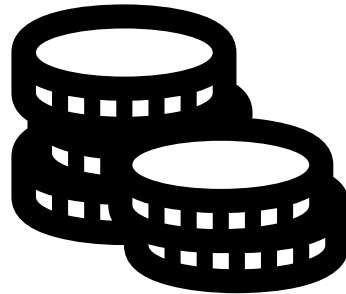


# BEFORE YOU START THE NEXT STEP

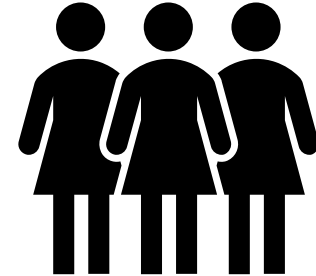
Know what you are trying to achieve in specific terms with goals and deadlines



Budget time – Schedule milestones



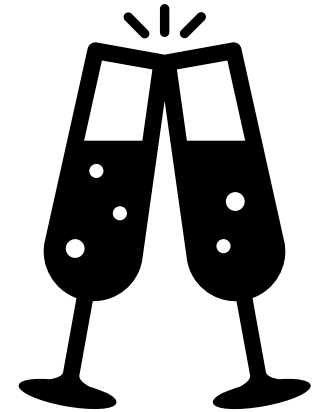
Get people to work with you – Have a beta team to work out the kinks





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# CONTACT INFORMATION

## Tadeh Hakopian Contact Information:

Twitter: [https://twitter.com/tadeh\\_hakopian](https://twitter.com/tadeh_hakopian)

Linkedin: <https://www.linkedin.com/in/thakopian/>

Github: <https://github.com/thakopian>





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