

CS472935 – BIM 360 and Data Analytics

Carol Poon

Technical Manager, AEC Industry, Autodesk Hong Kong and Macau



About the speaker

Carol Poon

- 10 years of experience in BIM
- Autodesk Hong Kong and Macau Office
- Worked for Atkins, WSP, Starbucks, local main contractors and BIM consultants



 YouTube



HK BIM (香港建築信息模型)

Agenda

1. BIM 360 Quick Overview
2. Relationship between BIM 360 and Data Analytics
3. Workflow between BIM 360 Insight and Power BI
4. Python and Google Colab applications in Data Science

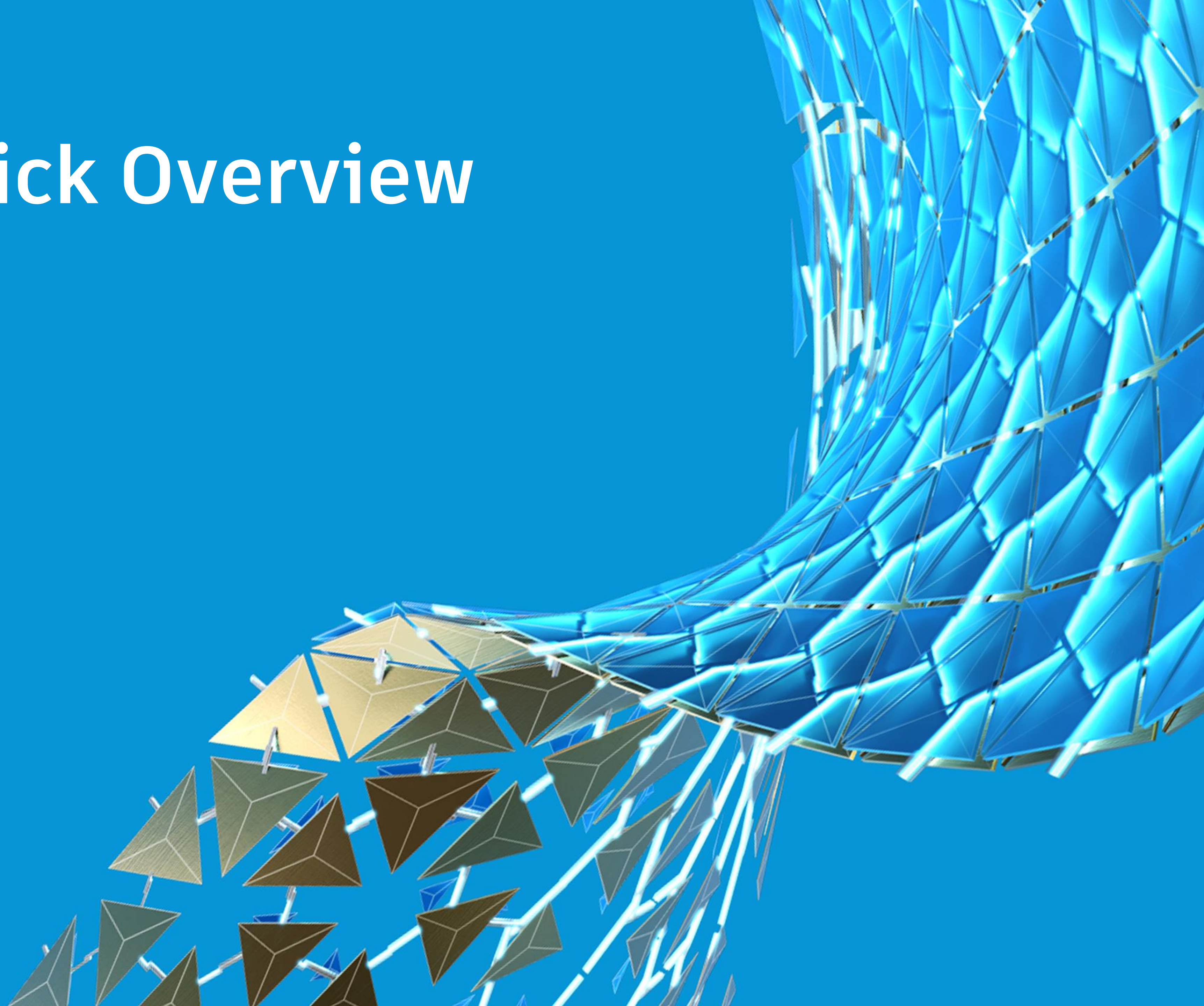


Tools will be
mentioned....



Power BI

BIM 360 Quick Overview





AUTODESK
CONSTRUCTION
CLOUD™



AUTODESK® BIM 360™



assemble™



PlanGrid



BUILDINGCONNECTED



AUTODESK® BIM 360™ PRODUCTS

Docs

Construction & Design Document
Management Software

Design

Worksharing and Design
Collaboration

Ops

Mobile-first Maintenance
Management

Build

Quality Control, Safety, and
Project Management

Plan

Lean Construction and Production
Planning

Coordinate

Coordination and Constructability

Layout

Field Layout and Verification

Autodesk BIM 360 Home Page

CONSTRUCTION MANAGEMENT SOFTWARE

Connect, organize, and optimize your projects

BIM 360 is a unified platform connecting your project teams and data in real-time, from design through construction, supporting informed decision-making and leading to more predictable and profitable outcomes.

Get a demo

Explore the platform →

Balfour Beatty

Mortenson
construction

VAN WIJNEN

Stantec

DPR
CONSTRUCTION

JEDUNN
CONSTRUCTION



**Project Management Tool +
Common Data Environment (CDE)**



Access BIM 360



Google Chrome



Safari



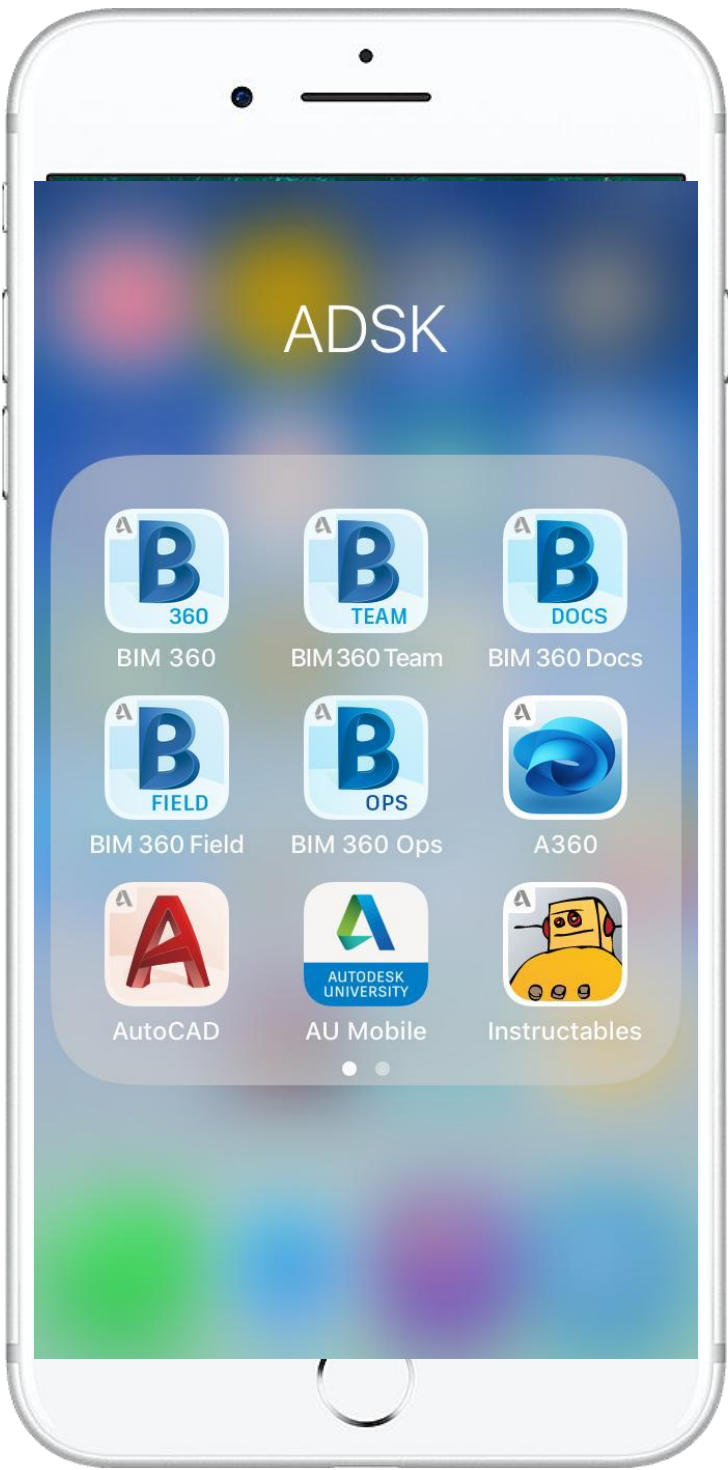
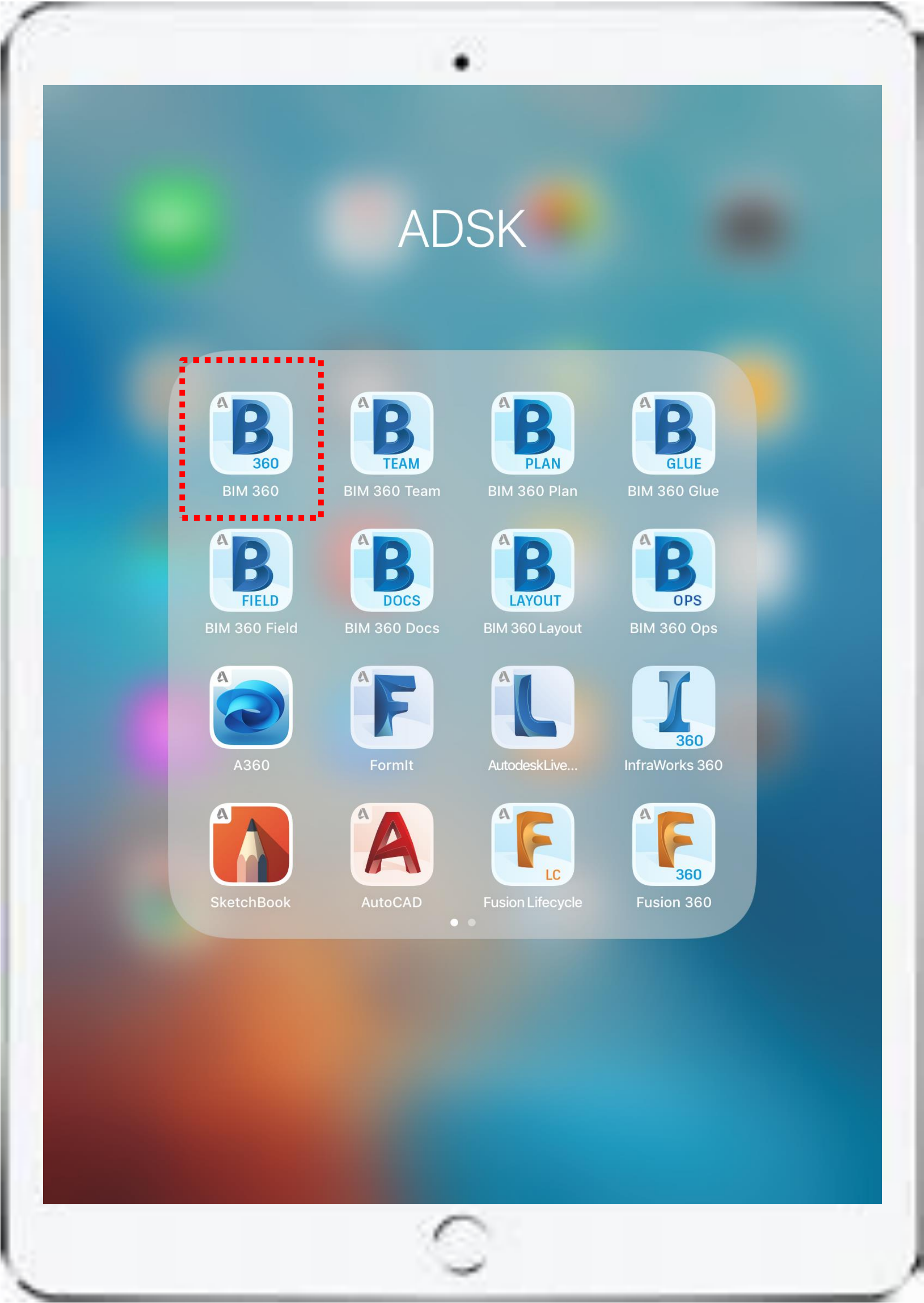
Mozilla Firefox



Internet Explorer



Microsoft Edge

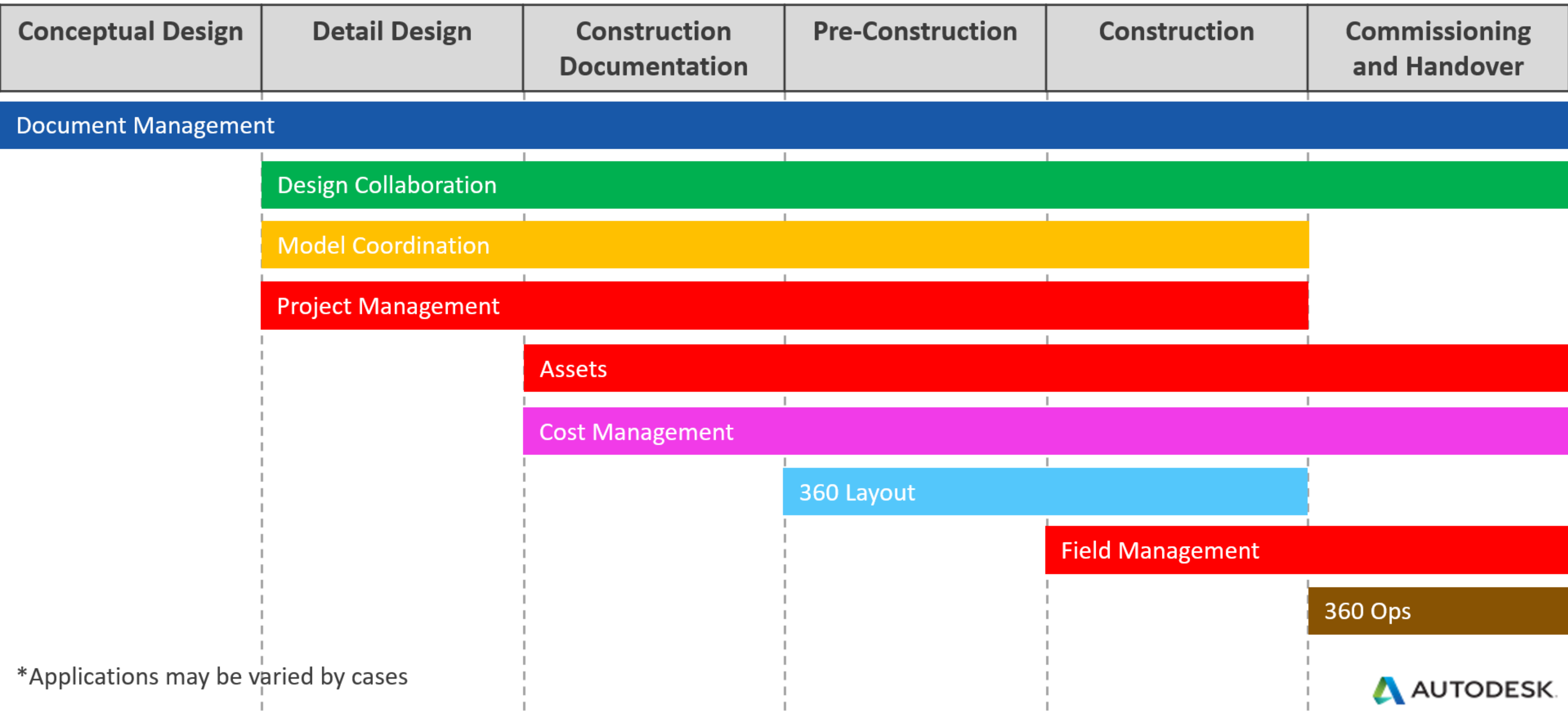


BIM 360 Modules (2020 Nov)

Module	Functions
1. Account Admin	Top authority of BIM 360 Site, assign Project Admin(s)
2. Project Admin	Project control, assign Project Member(s), set workflows and permissions
3. Insight	Index, charts and reports for management (Safety, Quality, RFIs, Issues summaries, etc.)
4. Project Home	Dashboard for individual user (as to-do-list)
5. Document Management	Folder structure and permissions settings, document reviews, transmittals, issues, etc.
6. Design Collaboration	Revit Cloud Worksharing + Timeline to monitor multi-discipline Revit models.
7. Model Coordination	Coordinate IFC, Revit, NW models + Clash Detection
8. Project Management	RFIs + Submittals
9. Field Management	Checklists (Safety, Quality, Commissioning, Punch-list)
10. Asset	Manage Building Assets
11. Cost Management	Top-up module of Build package, Cost + Budget calculations

BIM 360 Modules for Building Project

Building Project Stages >>>>>>



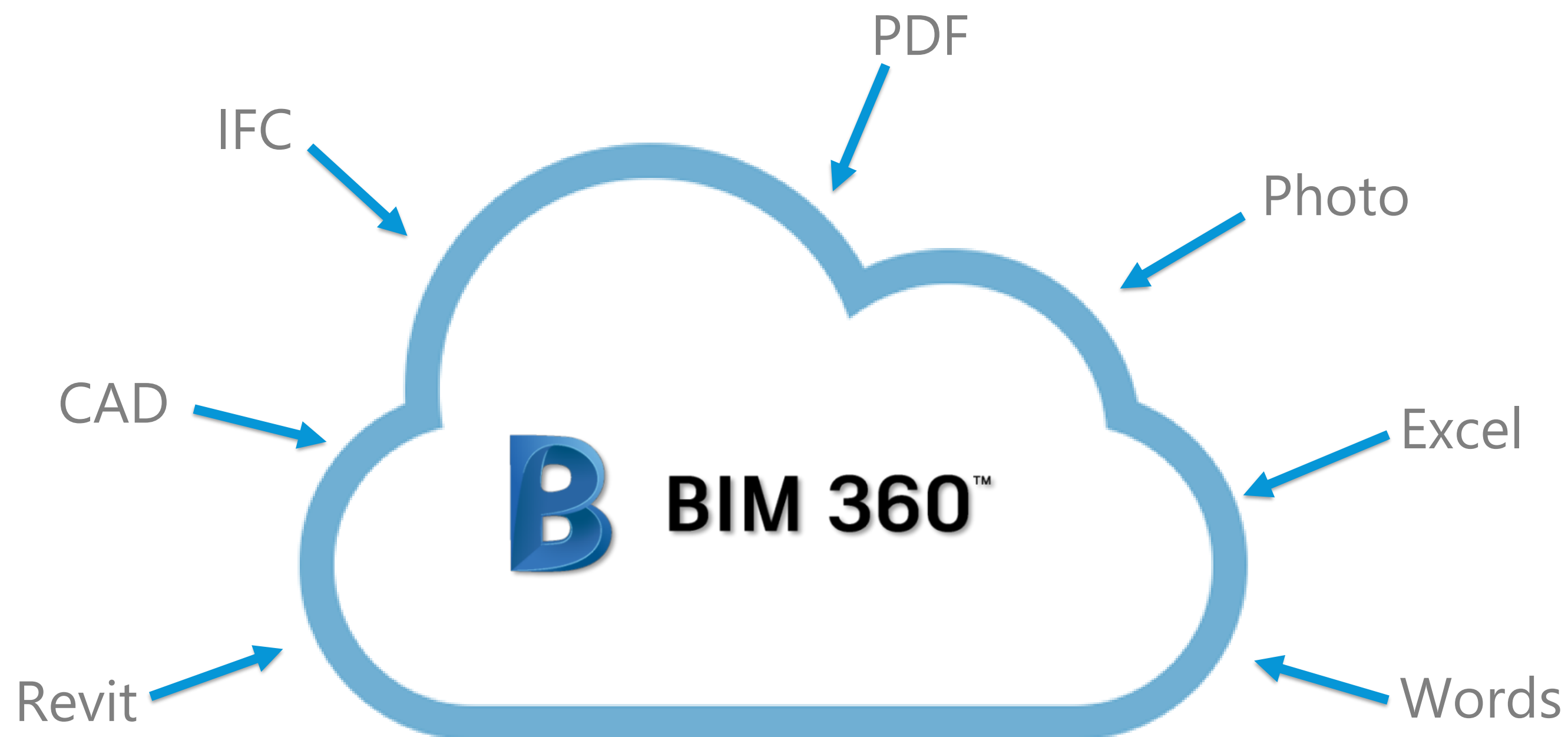
*Applications may be varied by cases

Relationship between BIM 360 and Data Analytics



Types of data input/created on BIM 360....

- Design Reviews – RFIs/Issues/Markup
- Modelling Contents - Revit Model/CAD/IFC/NWD
- Workflows and Analytics – Review/RFIs/Submittal/Issues/Construction IQ
- User Record – Upload/Download/View/Task Completion/Overdue



DATA



Data
Processing

INFORMATION

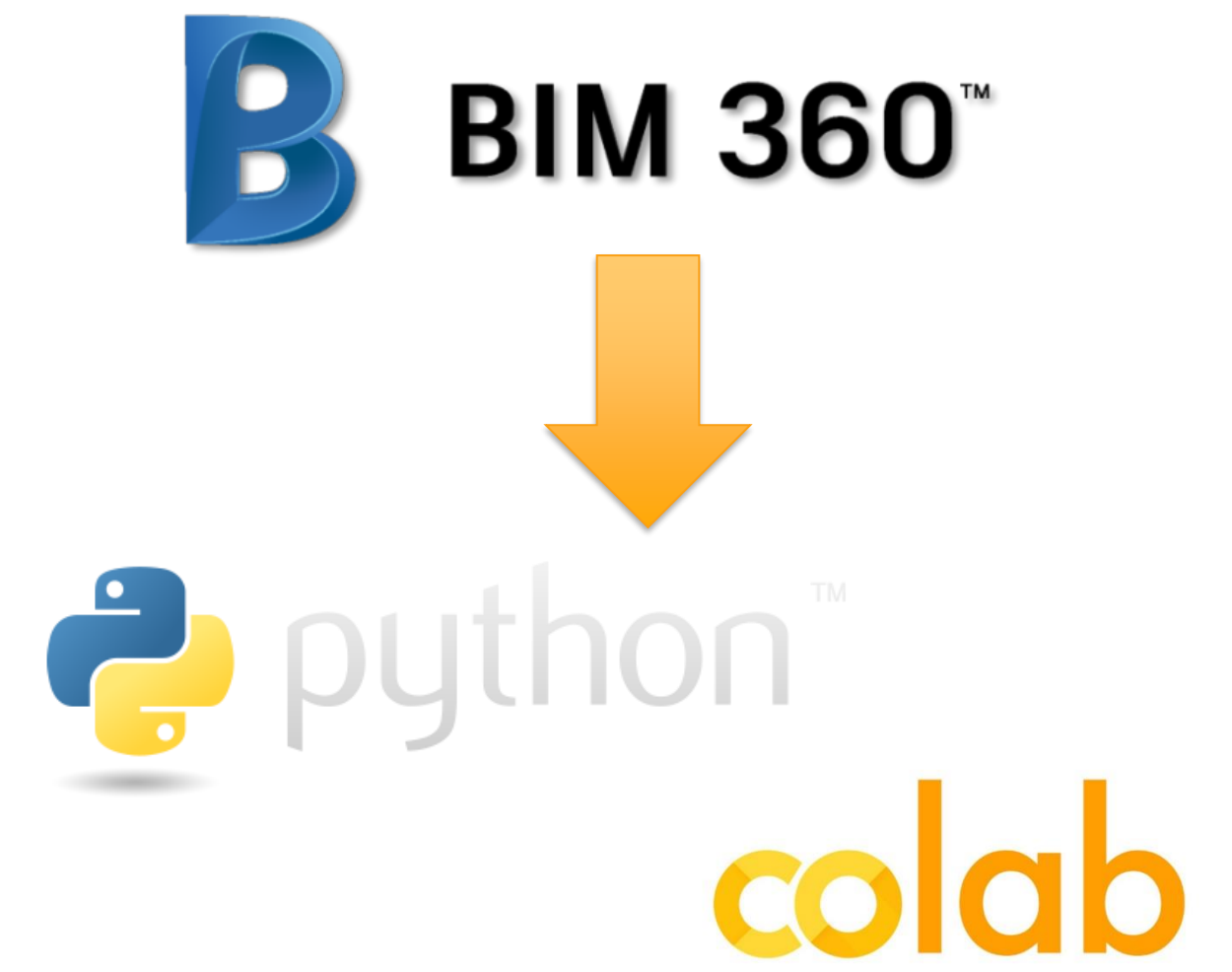
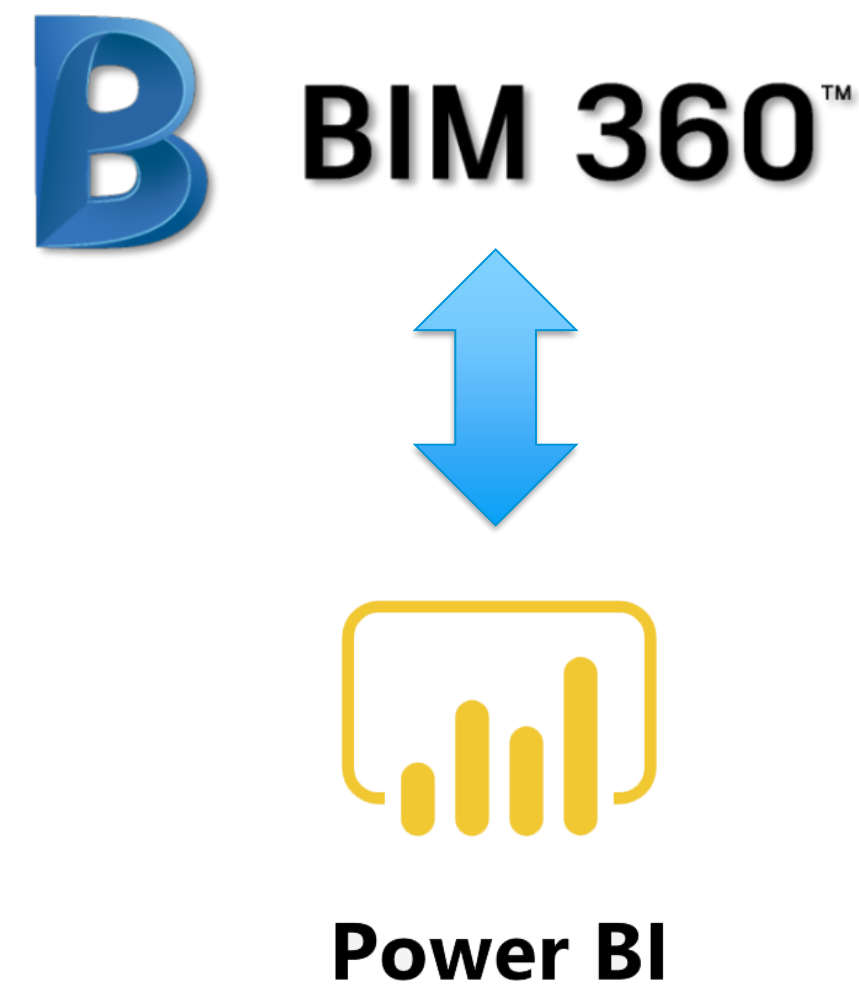
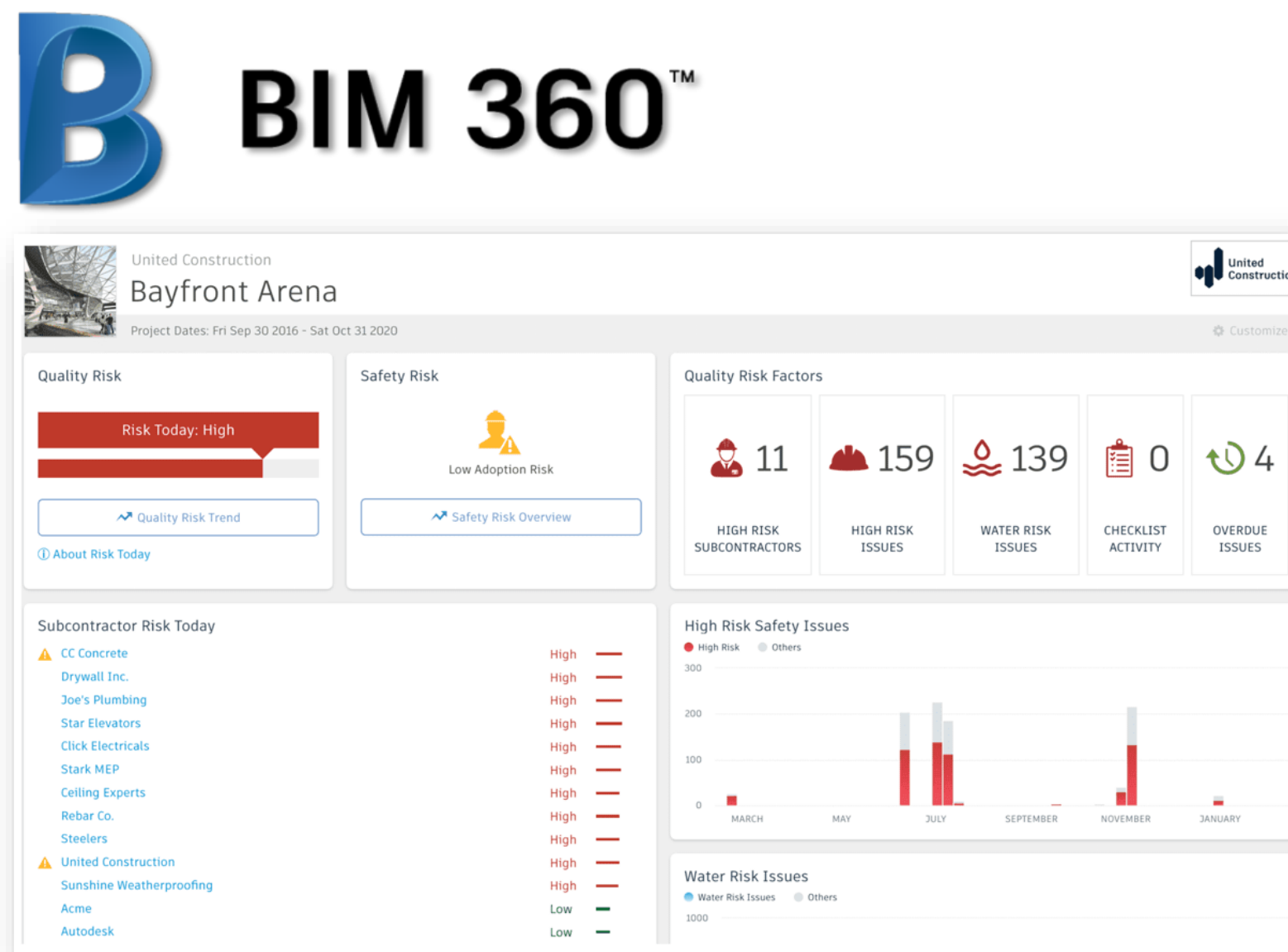


USE DATA
ASSETS
WISELY!



Ways to maximize the value of project data..

1. BIM 360 Dashboard – Executive Overview/ Insight Module/ Project Home Module
2. BIM 360 Data to Power BI
3. BIM 360 Data to Python/Google Colaboratory



Project Home



Synnex Ken
BIM 360 Demo Folder (20180615)

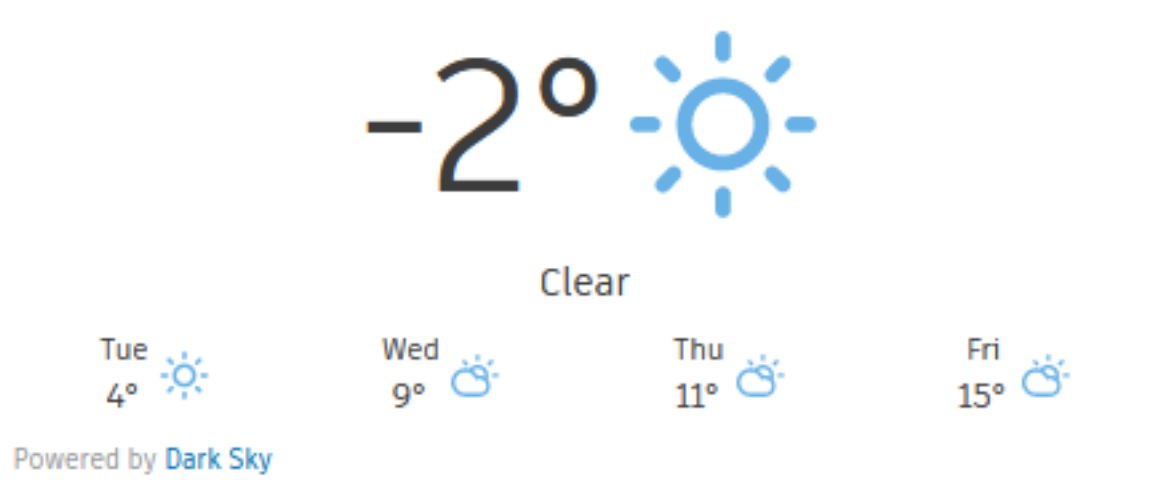
Project Dates: Thu Jun 14 2018 - Fri Jun 12 2026

Project Address

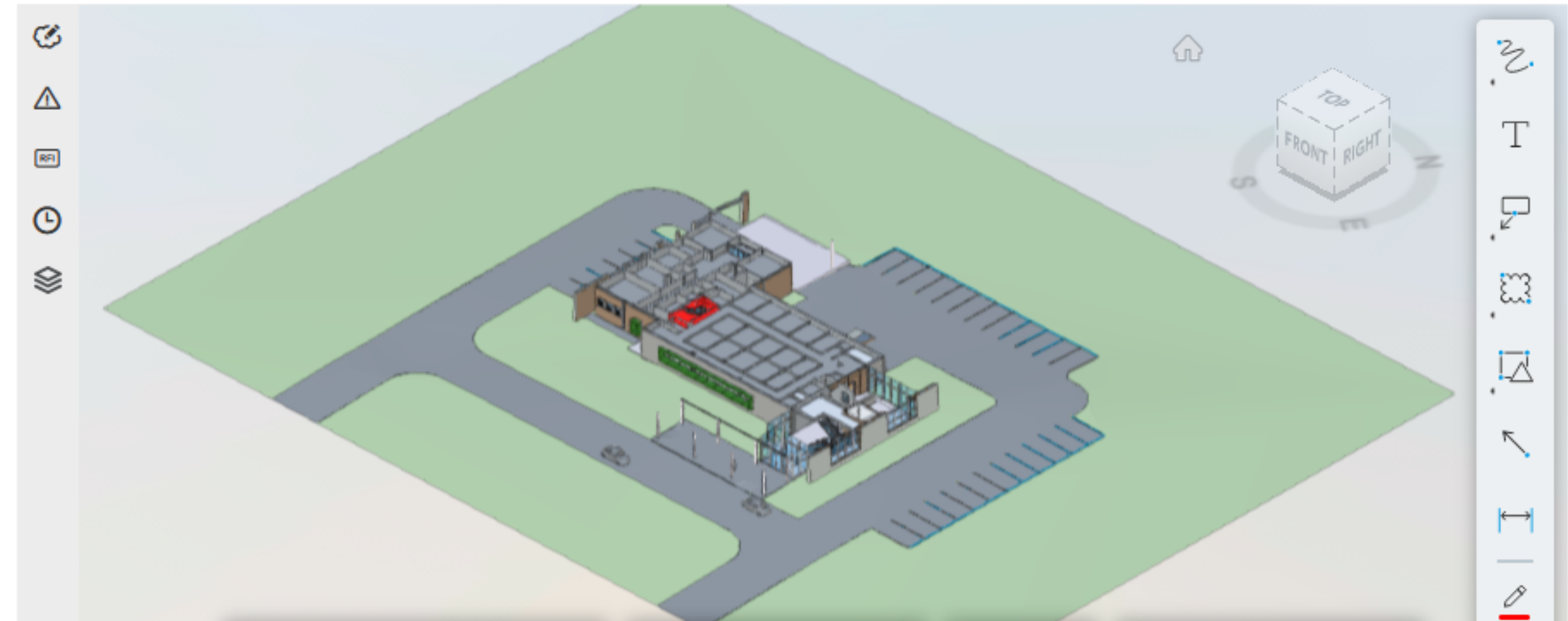


1 Harbour Road, Wan Chai, Hong Kong.

Weather



Option A



Excel

Excel - income - View-only

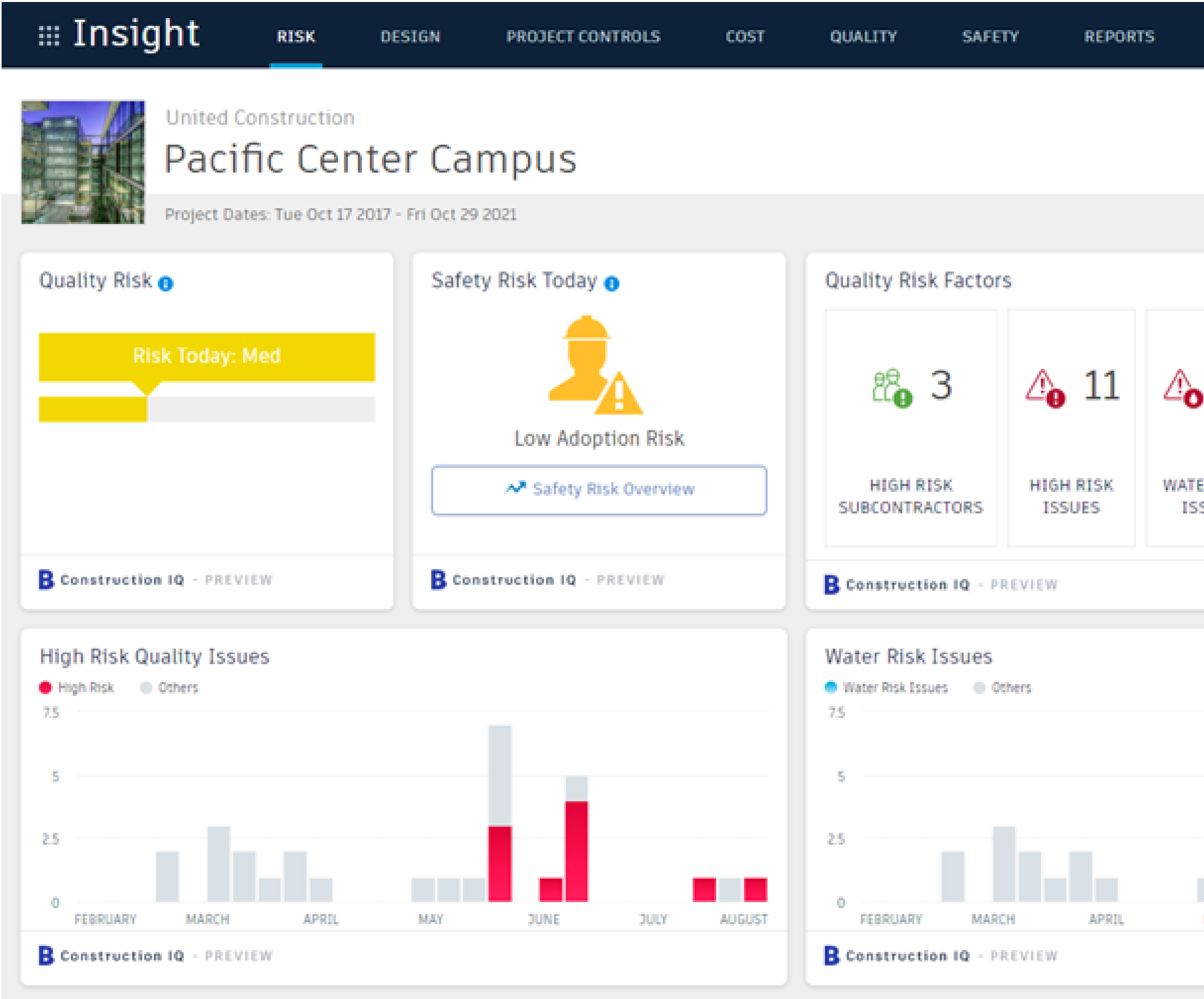
	A	B	C	D	E	F	G	H	I	J	K	L	M	N	
1	Index	State	Y2002	Y2003	Y2004	Y2005	Y2006	Y2007	Y2008	Y2009	Y2010	Y2011	Y2012	Y2013	Y2014
2	A	Alabama	1296530	1317711	1118631	1492583	1107408	1440134	1945229	1944173	1237582	1440756	1186741	1852841	1
3	A	Alaska	1170302	1960378	1818085	1447852	1861639	1465841	1551826	1436541	1629616	1230866	1512804	1985302	1
4	A	Arizona	1742027	1968140	1377583	1782199	1102568	1109382	1752886	1554330	1300521	1130709	1907284	1363279	1
5	A	Arkansas	1485531	1994927	1119299	1947979	1669191	1801213	1188104	1628980	1669295	1928238	1216675	1591896	1
6	C	California	1685349	1675807	1889570	1480280	1735069	1812546	1487315	1663809	1624509	1639670	1921845	1156536	1
7	C	Colorado	1343824	1878473	1886149	1236697	1871471	1814218	1875146	1752387	1913275	1665877	1491604	1178355	1
8	C	Connecticut	1610512	1233844	1181848	1518933	1841266	1876876	1764457	1872730	1868730	1845524	1228520	1582248	1

Project Checklists

Title	Scheduled
Weekly Safety & Environmental Inspection	Aug 4, 2020
HVAC AIR DISTRIBUTION (AHU-123)	

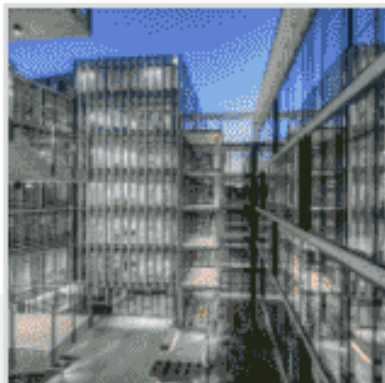
BIM 360 Project Home

BIM 360 Insight



BIM 360 Insight categories (Project-level)

- 1. Risk**
- 2. Design**
- 3. Project Controls**
- 4. Schedule**
- 5. Quality**
- 6. Safety**
- 7. Reports**



United Construction

Pacific Center Campus

Project Dates: Tue Oct 17 2017 - Fri Oct 29 2021



Customize

Design Review Risk Factors



4

Code Compliance



6

Critical Components



12

Documentation Incomplete



75

Overdue Issues

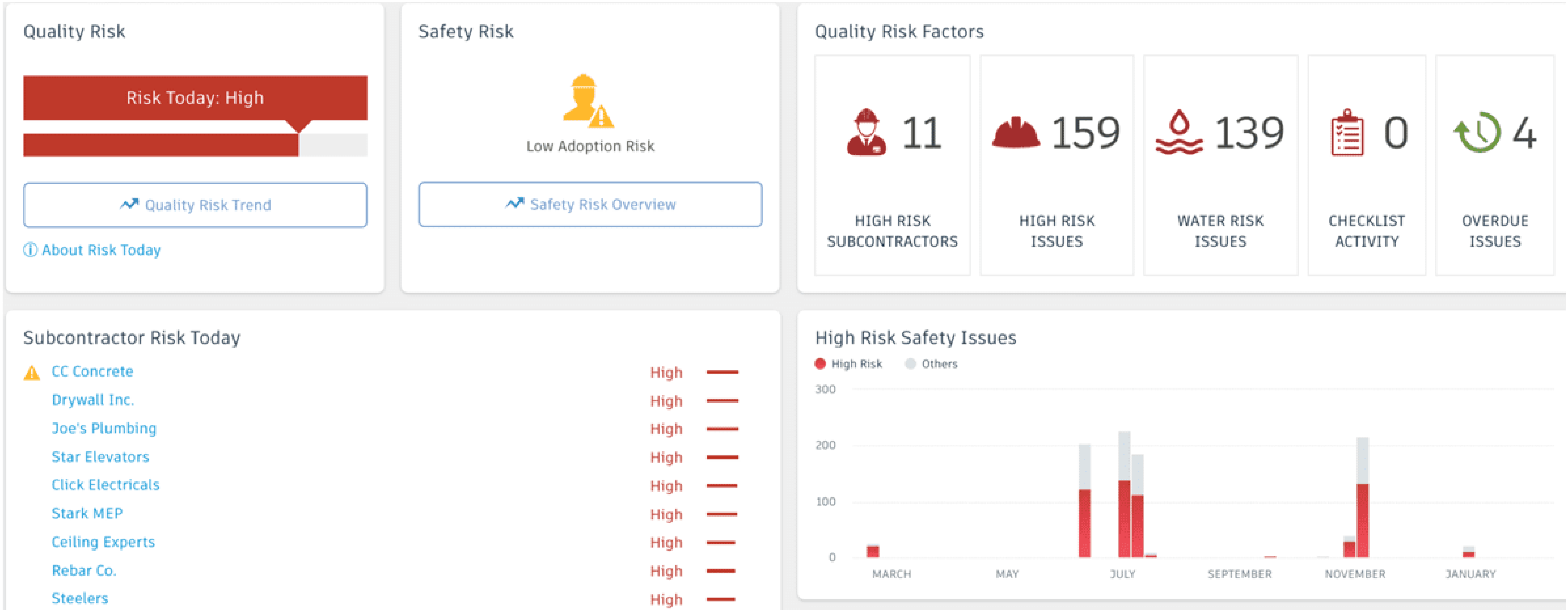


7

Overdue Reviews

Status	ID	Title	Root Cause	Building Components	Location	Assigned To	Company	Due Date
OPEN	255	Need ADA spec to verify design meets c...	Code Compliance		North Bar, Men's R...	Unassigned	Unassigned	Jan 12, 2019
OPEN	275	Elevator Shaft Clearance	Documentation In...			Laurie Spitler	United Construction	Feb 20, 2019
ANSWERED	347	Ceiling Material Change Requested	Code Compliance	Ceiling		Joan Allen	Autodesk	Apr 27, 2019

Design Risk



Organize the order and add new cards to your dashboard.

Excel
BIM 360 Plan

The screenshot shows the Microsoft Excel application window. The title bar indicates the file name is 'income - View-only' and it was last modified by 'Carol Poon'. The ribbon includes tabs for File, Home, Insert, Formulas, Data, Review, View, and Help. The 'Home' tab is active, displaying options for Undo, Paste, Clipboard, Font, Alignment, Number, Conditional Formatting, Format as Table, Cell Styles, and Insert. The formula bar shows the active cell is G3 with the value 1861639. The spreadsheet grid shows columns labeled A through M and rows numbered 1 through 8. The data in row 3 starts with 'A' in column A, followed by state names and numerical values across columns B through M.

	A	B	C	D	E	F	G	H	I	J	K	L	M
1	Index	State	Y2002	Y2003	Y2004	Y2005	Y2006	Y2007	Y2008	Y2009	Y2010	Y2011	Y2012
2	A	Alabama	1296530	1317711	1118631	1492583	1107408	1440134	1945229	1944173	1237582	1440756	1180134
3	A	Alaska	1170302	1960378	1818085	1447852	1861639	1465841	1551826	1436541	1629616	1230866	1510134
4	A	Arizona	1742027	1968140	1377583	1782199	1102568	1109382	1752886	1554330	1300521	1130709	1900134
5	A	Arkansas	1485531	1994927	1119299	1947979	1669191	1801213	1188104	1628980	1669295	1928238	1210134
6	C	California	1685349	1675807	1889570	1480280	1735069	1812546	1487315	1663809	1624509	1639670	1920134
7	C	Colorado	1343824	1878473	1886149	1236697	1871471	1814218	1875146	1752387	1913275	1665877	1490134
8	C	Connecticut	1610512	1232844	1181949	1518933	1841266	1976976	1764457	1972730	1968730	1945524	1220134

The screenshot shows the Autodesk BIM 360 PLAN interface. At the top, there's a header with the Autodesk logo and the text 'AUTODESK® BIM 360™ PLAN'. Below this, there's a '+ Activity' button and a date filter set to '10/26/20 to'. The main area contains a table with two visible columns: 'Activity' and 'Company'. The table lists several construction activities, each preceded by a checkbox and a pencil icon, indicating they can be edited or selected. All listed companies are 'Autodesk'. On the left sidebar, there are three icons representing different views or filters. At the bottom of the sidebar, there's a status indicator showing 'PPC 60%' with a red upward arrow and the number '60' below it.

Activity	Company
<input type="checkbox"/> Steel Erection 1st Floor	Autodesk
<input type="checkbox"/> Detailing 3rd Floor	Autodesk
<input type="checkbox"/> Steel Erection 2nd Floor	Autodesk
<input type="checkbox"/> Steel Erection 3rd Floor	Autodesk
<input type="checkbox"/> Install Stairways	Autodesk

FILTERS

- Construction IQ
- Companies
- Issues
- Project Controls
- Design
- Reviews
- RFIs
- Submittals
- Coordination
- Quality
- Safety
- Schedule
- Partner Cards
- Planning

DESIGN REVIEW RISK FACTORS In Use

Risk Factor	Count
Code Conflict Issue	4
CEQA or Compaction	8
Break in Chain of Custody	3
Discontinue Issues	18

RFI RISK FACTORS In Use

Risk Factor	Count
High Risk RFI	8
Design Coordination	6
MEP and Structural RFI	4
Discontinue RFI	24

SAFETY RISK FACTORS In Use

Risk Factor	Count
High Risk Subcontractors	4
High Risk Risks	8
Hazardous Sites	12
Partner Obligations	18

HIGH RISK ISSUES In Use

Date	Description	Status	Impact
8/20/2020	Pace of business continues slow down.	Open Item	High
8/20/2020	AES ARJIS Design presentation through meeting.	Open Item	High
8/20/2020	The end of fiscal year review is about the entry.	Open Item	High
8/20/2020	Team is still working the transfer of work items.	Open Item	High
8/20/2020	Pre-closeout CM2 on select OLC's, the target is off.	Open Item	High
8/20/2020	Currently there is a fire sprinkler not working.	Open Item	High
8/20/2020	Existing copper water lines need to be replaced.	Open Item	High

HIGH RISK QUALITY ISSUES In Use

Bar chart showing the frequency of high-risk quality issues across multiple categories.

QUALITY RISK In Use

Risk Today: High

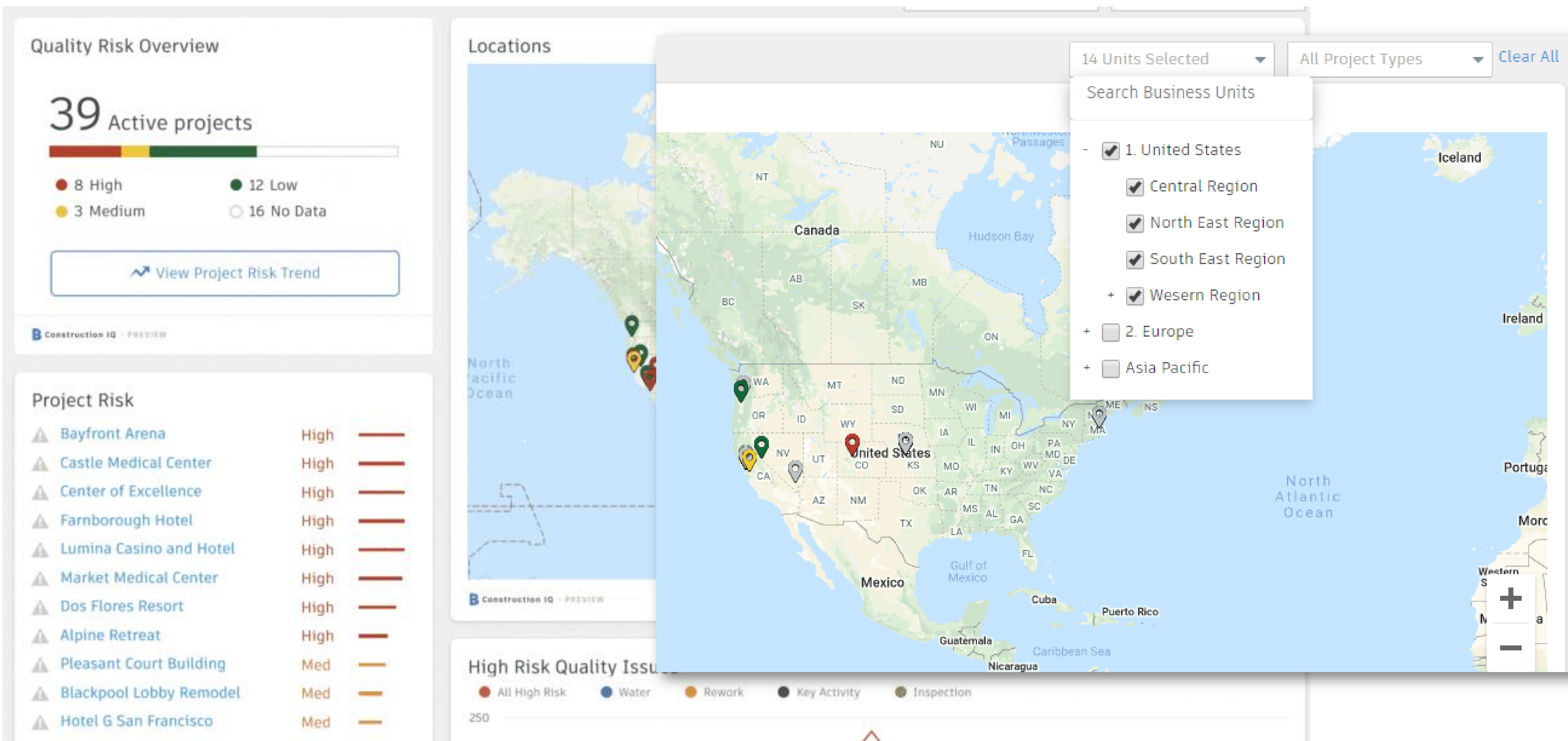
Quality Risk Trend

Subcontractor Quality Risk Trend

Company	Quality Risk Trend
CC Concrete	Low
Jack's Plumbing	Medium-High

Card Library

BIM 360 Executive Overview



Member Directory

The Member Directory lists all members in your account, including project members. This list includes members added to the directory who have not yet been granted access to the account or any projects.

Add

More Actions

Email/Name

Search by name or email

- Add people to the member directory
- Invite Account Admins
- Invite Executives
- Import members by spreadsheet
- Invite Project Admins
- Add members to a project

<input type="checkbox"/>		New Member
<input type="checkbox"/>		New Member
<input type="checkbox"/>		New Member
<input type="checkbox"/>		Hin Fung Chow
<input type="checkbox"/>		New Member
<input type="checkbox"/>		Emma Chan
<input type="checkbox"/>		Siu Hang Lam
<input type="checkbox"/>		New Member

Email	Status	Default Company	Last Sign In
	Inactive	CIC	May 27, 2019
	Inactive	CIC	
	Inactive	CIC	
	Inactive	CIC	
	Inactive	CIC	
	Inactive	CIC	
	Inactive	CIC	
	Inactive	CIC	
	Inactive	CIC	Jun 15, 2019
	Inactive	CIC	May 14, 2019
	Inactive	CIC	

Filters

STATUS

Active290

Pending12

Inactive560

ACCESS LEVEL

Account Admin9

Executive Overview2

Project Admin235

Other Member626

SERVICE

Document Management111

Project Management53

Cost Management20

Design Collaboration71

Model Coordination37

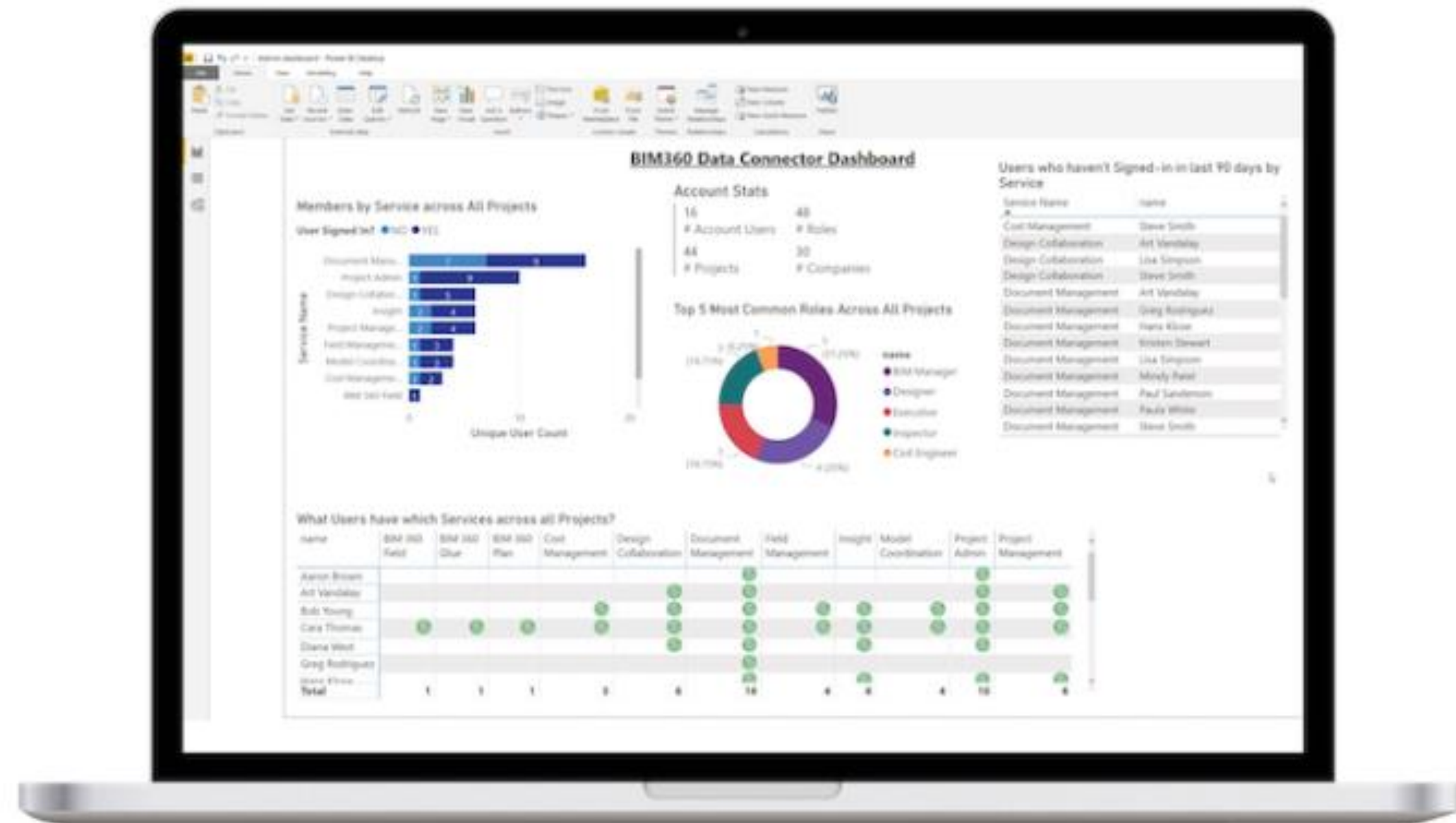
Feedback

Workflow between BIM 360 Insight and Power BI



Get Power BI Templates for Construction

Start leveraging all your project data, with Data Connector



Through a single click, Data Connector allows teams to:

- Quickly extract project data from BIM 360 for customized use in robust business intelligence tools like Power BI
- Save time and money by giving them a tool to extract data without needing expensive API's or custom code
- Improve data visualizations to make more informed business decisions

* WORK EMAIL

* WHAT'S YOUR ROLE?

Select...

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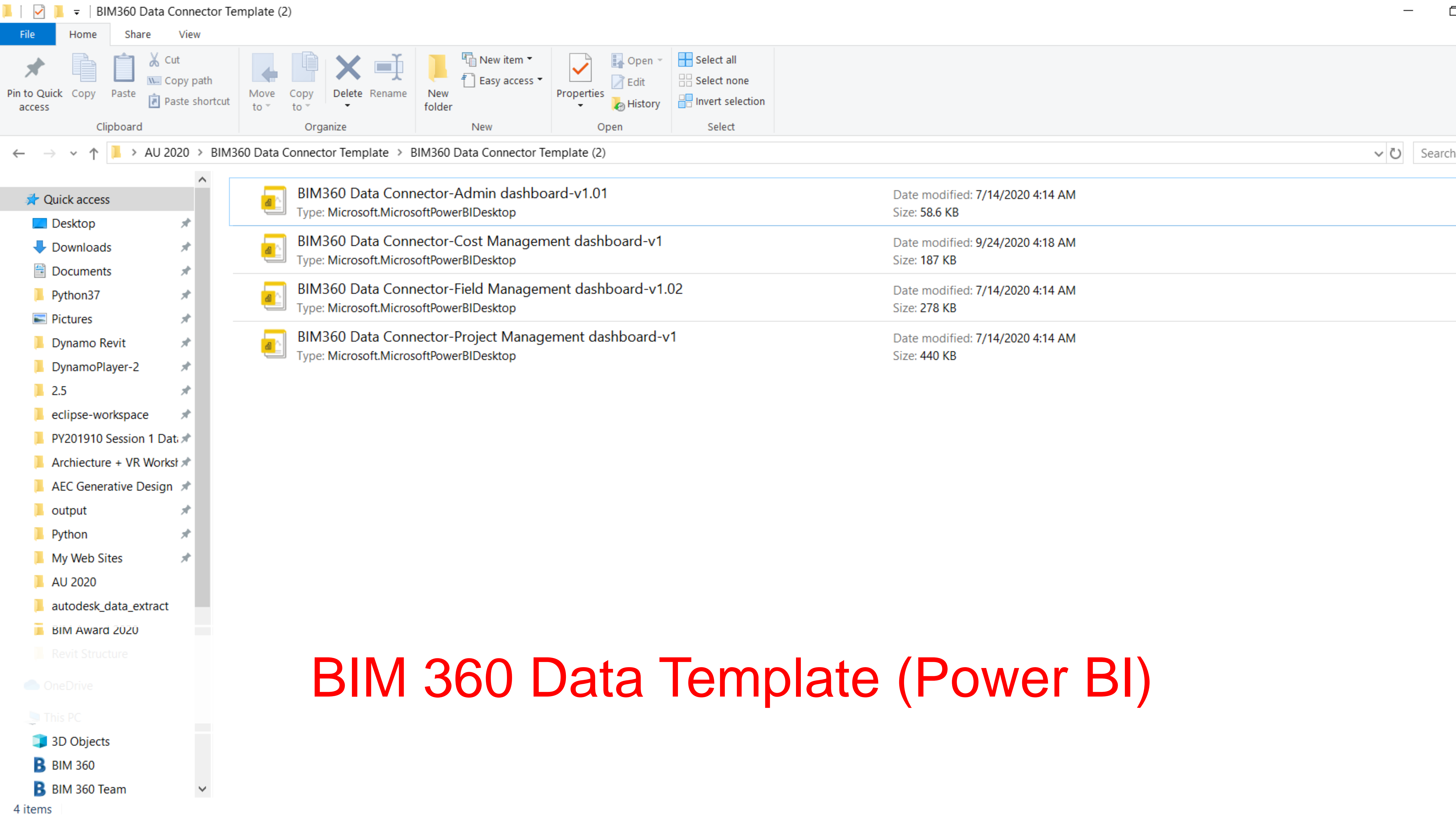
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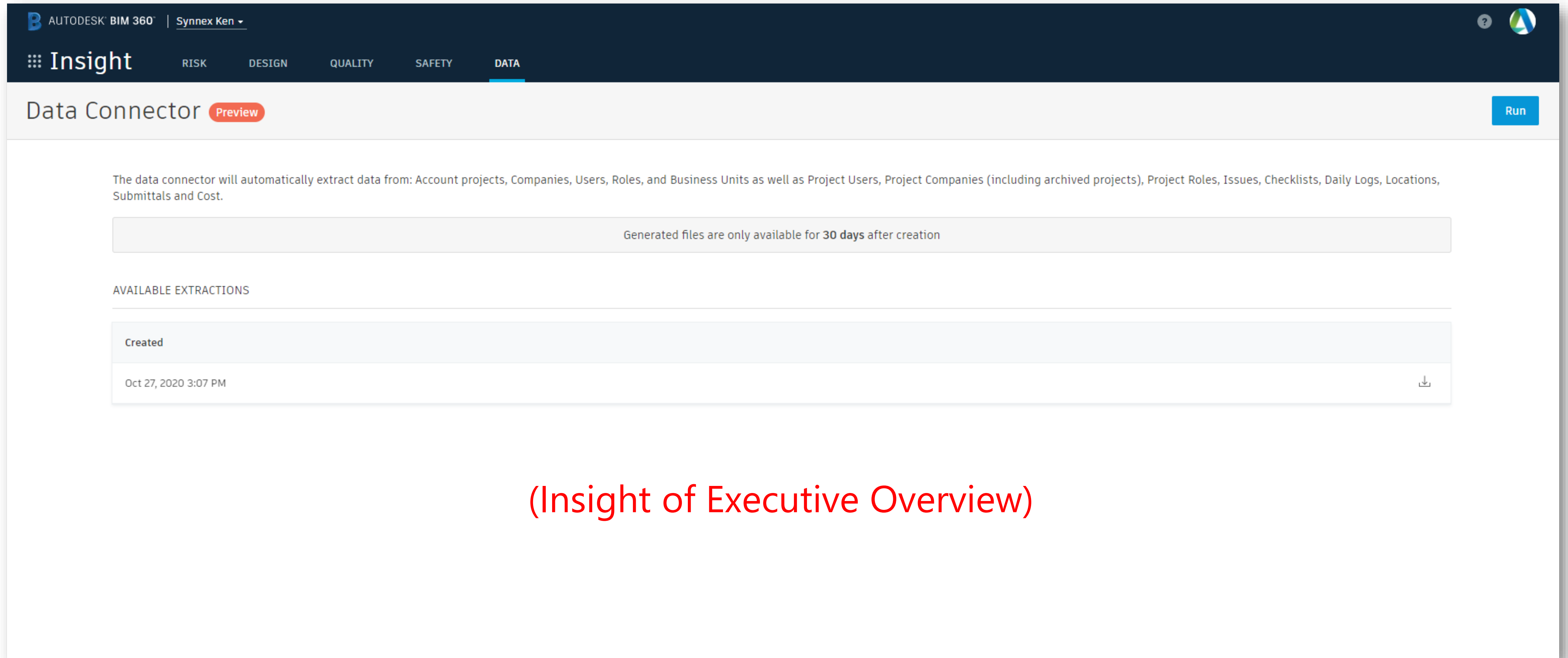
BIM 360 Insight Data Connector

<https://www.autodesk.com/bim-360/power-bi-template-construction-projects/>



BIM 360 Data Template (Power BI)

BIM 360 Insight – Data Connector



The screenshot shows the BIM 360 Insight Data Connector interface. The top navigation bar includes the Autodesk BIM 360 logo, the user name 'Synnex Ken', and a menu with options: Insight, RISK, DESIGN, QUALITY, SAFETY, and DATA (which is currently selected). Below the navigation bar, the page title is 'Data Connector' with a 'Preview' button. A 'Run' button is located in the top right corner. The main content area contains a description of the data connector's functionality, a warning about file availability, and a table of available extractions.

AUTODESK BIM 360 | Synnex Ken

Insight RISK DESIGN QUALITY SAFETY DATA

Data Connector Preview Run

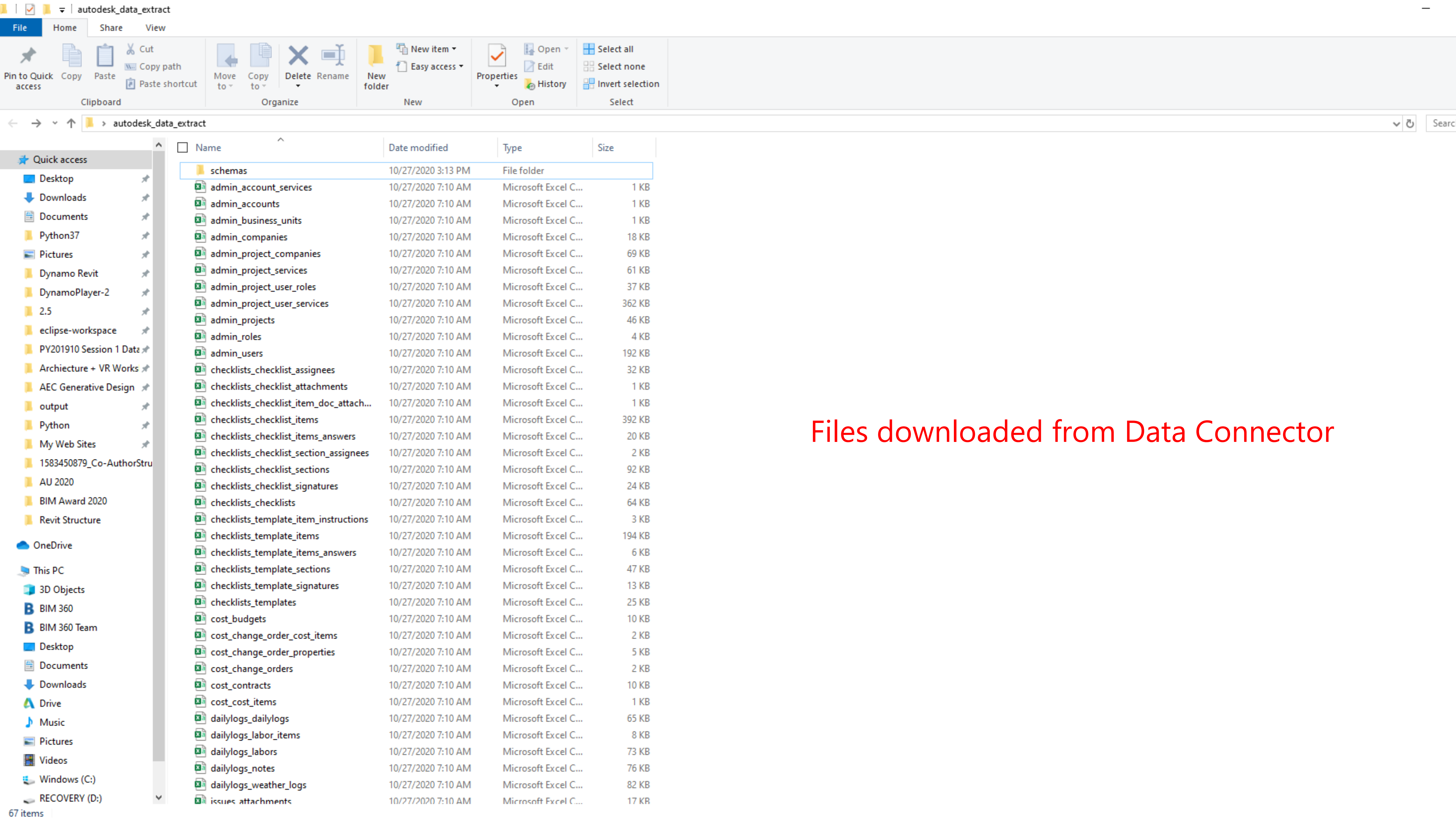
The data connector will automatically extract data from: Account projects, Companies, Users, Roles, and Business Units as well as Project Users, Project Companies (including archived projects), Project Roles, Issues, Checklists, Daily Logs, Locations, Submittals and Cost.

Generated files are only available for 30 days after creation

AVAILABLE EXTRACTIONS

Created
Oct 27, 2020 3:07 PM

(Insight of Executive Overview)



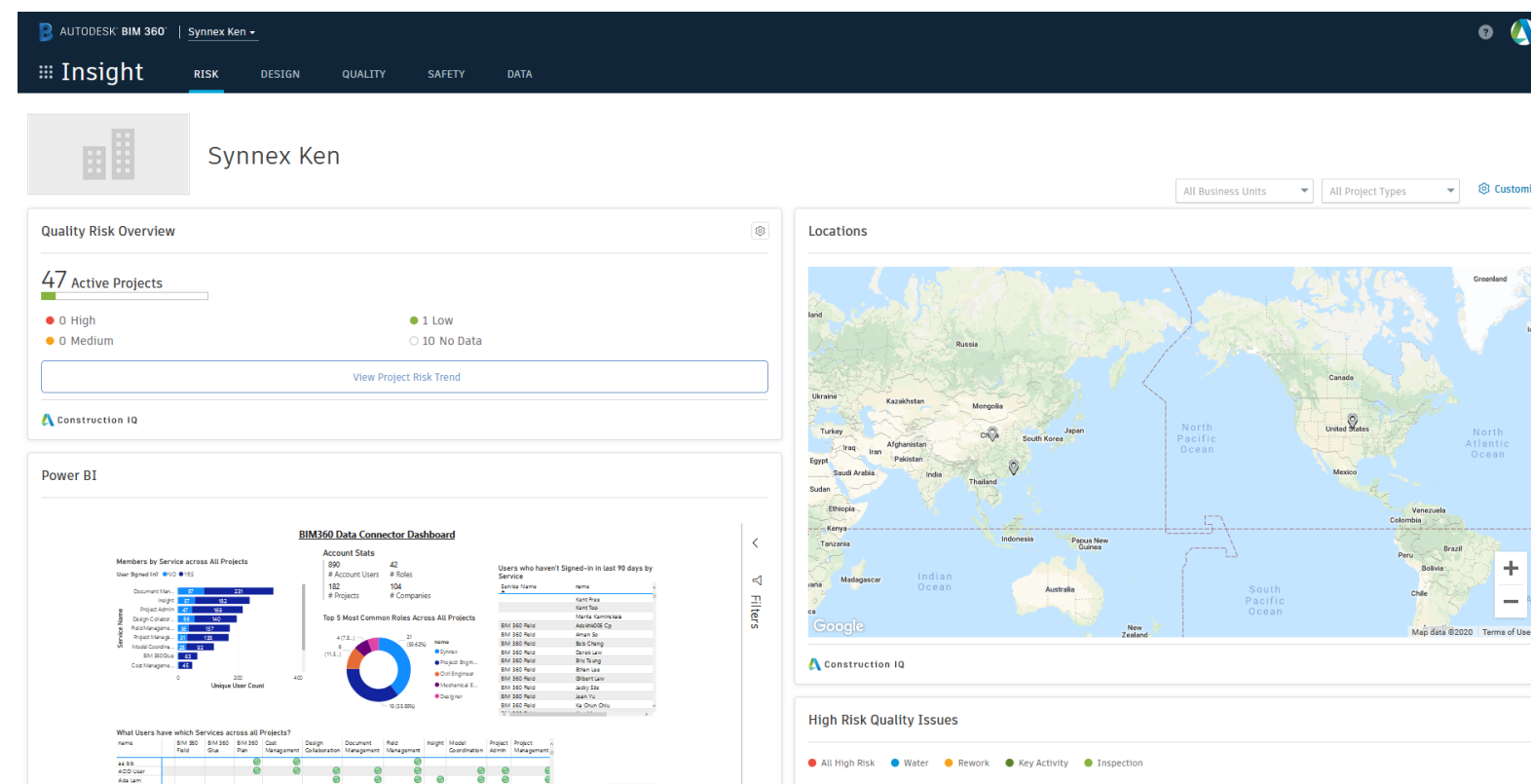
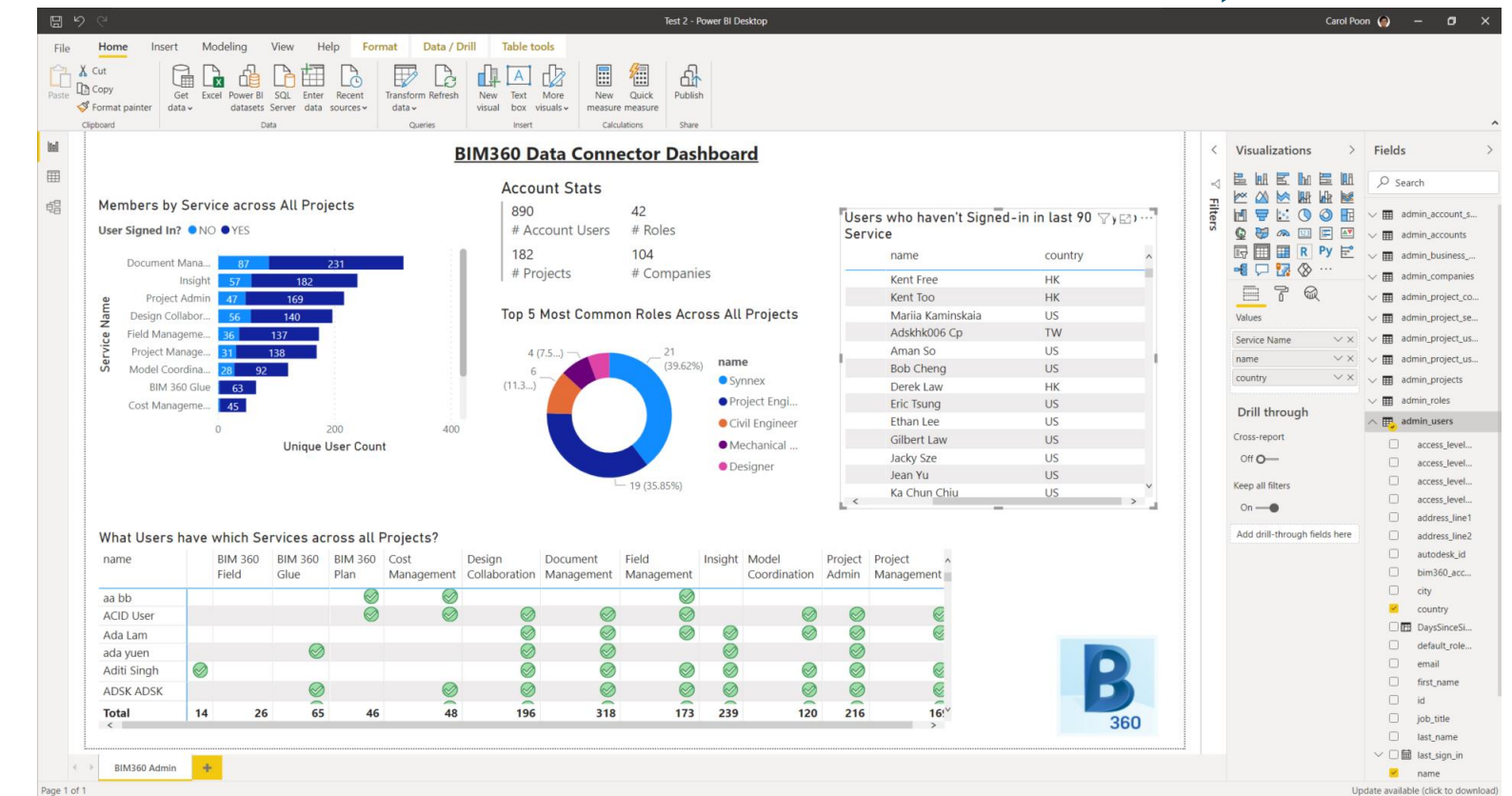
Files downloaded from Data Connector

⋮ ☐ ☒ f_x

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S
1	project_id	bim360_a	user_id	role_id	created_at														
2	190fd28b-35a5-44be-8b93-1fcef	af74adf	415b0d72-da7a-477e-9039-0a0a4ae5e5d4	aa192c92-b33d-4e3d-b11e-505031f855a9	18:06.4														
3	190fd28b-35a5-44be-8b93-1fcef	af74adf	1236d562-4431-4d42-b76a-b1f262cf4dda	aa192c92-b33d-4e3d-b11e-505031f855a9	18:06.4														
4	190fd28b-35a5-44be-8b93-1fcef	af74adf	786b622b-bf69-41ec-b528-9dd058059d63	aa192c92-b33d-4e3d-b11e-505031f855a9	18:06.4														
5	190fd28b-35a5-44be-8b93-1fcef	af74adf	027ef0b1-45e2-4f28-b2f2-ef8e7771f448	aa192c92-b33d-4e3d-b11e-505031f855a9	18:06.4														
6	190fd28b-35a5-44be-8b93-1fcef	af74adf	d9f0663f-b24c-4a13-889d-f3d7b672d1d9	aa192c92-b33d-4e3d-b11e-505031f855a9	18:06.4														
7	b017ffc3-0eff-432b-a1a1-6a510cc1722d	b74993af-	60041d28-8c65-407f-80bd-745f0a96a136	66902f75-d8ac-458a-84a5-dd2e7dca26c1	30:11.1														
8	4d705ed4-2cff-4748-8da1-aa353b800642	b74993af-	027ef0b1-45e2-4f28-b2f2-ef8e7771f448	7c44ac6f-aea3-482e-bb56-63165098d619	20:34.4														
9	80c7838e-55d8-4a0d-aa86-158f12e433ac	b74993af-	d6815a5a-e5c1-4a88-8cb7-009e465a6e51	b46201da-6b57-4df2-bd92-77f67eba46d5	16:40.9														
10	80c7838e-55d8-4a0d-aa86-158f12e433ac	b74993af-	8eaf5596-c492-4356-91bc-d03a3cb8ab87	b46201da-6b57-4df2-bd92-77f67eba46d5	16:40.9														
11	80c7838e-55d8-4a0d-aa86-158f12e433ac	b74993af-	786b622b-bf69-41ec-b528-9dd058059d63	b46201da-6b57-4df2-bd92-77f67eba46d5	16:40.9														
12	80c7838e-55d8-4a0d-aa86-158f12e433ac	b74993af-	5964c182-3c0b-4951-867f-6f38a46ed7b5	b46201da-6b57-4df2-bd92-77f67eba46d5	16:40.9														
13	80c7838e-55d8-4a0d-aa86-158f12e433ac	b74993af-	64a4d7c3-4350-4f05-8d04-65494d8e8baf	b46201da-6b57-4df2-bd92-77f67eba46d5	16:40.9														
14	5bbbd652-ba49-4f9f-99f3-2f4ff24f0fbc	b74993af-	027ef0b1-45e2-4f28-b2f2-ef8e7771f448	c0a0f2f2-b067-47ea-b7d3-4f719e5b09f9	44:31.1														
15	2159f0ad-64ea-49b1-b7dd-add5fa1b65b9	b74993af-	786b622b-bf69-41ec-b528-9dd058059d63	b46201da-6b57-4df2-bd92-77f67eba46d5	50:51.6														
16	1e3fa3b9-d7ac-4081-b0fd-5061c5fa7926	b74993af-	3c33f548-aab4-45dc-874e-2d3e7459f388	0bdbbbe6e-db93-4df5-ae15-12ca4de37602	36:16.7														
17	c4f1b9c2-52c9-419b-a3ee-86aeec72c63f	b74993af-	19971296-919c-490f-aa57-cc1a6af9ed16	2be8fd85-d58d-4460-ac45-7189efce9623	05:12.9														
18	c4f1b9c2-52c9-419b-a3ee-86aeec72c63f	b74993af-	4b60aa38-f6ea-4d00-a701-abb864c90a2b	2be8fd85-d58d-4460-ac45-7189efce9623	05:12.9														
19	4d705ed4-2cff-4748-8da1-aa353b800642	b74993af-	cb5cec2c-37cc-482d-9f49-8e57ebb2b427	6ae237de-68b3-476a-aa3e-215b2b3ff458	20:34.3														
20	b017ffc3-0eff-432b-a1a1-6a510cc1722d	b74993af-	bd2f8a6e-a0bc-4dc1-9ca5-234e46164c37	bba5b408-e78b-4ed2-8752-530fd0ec5738	30:11.4														
21	190fd28b-35a5-44be-8b93-1fcef	af74adf	c8675af4-2c09-4b9d-ae70-53902f4b68a2	66902f75-d8ac-458a-84a5-dd2e7dca26c1	18:06.4														
22	190fd28b-35a5-44be-8b93-1fcef	af74adf	d9f0663f-b24c-4a13-889d-f3d7b672d1d9	2fb3bad8-6825-4763-88ef-8c8fbadb458c	18:06.8														
23	c66ce2fc-215c-4b24-9fad-82a34a9946f2	b74993af-	ffc0b01d-9a94-4391-ac83-8615ca70dbcc	7c44ac6f-aea3-482e-bb56-63165098d619	14:18.6														
24	c66ce2fc-215c-4b24-9fad-82a34a9946f2	b74993af-	149c90bc-57a8-4a76-95b0-865c4efc1d2e	7c44ac6f-aea3-482e-bb56-63165098d619	14:18.6														
25	190fd28b-35a5-44be-8b93-1fcef	af74adf	d9f0663f-b24c-4a13-889d-f3d7b672d1d9	c41fbbee-f9d2-4174-aa11-7545edaa81ce	18:06.4														
26	5fcdfb7a-d4bf-4a1b-a702-94d00ae475e3	b74993af-	027ef0b1-45e2-4f28-b2f2-ef8e7771f448	c0a0f2f2-b067-47ea-b7d3-4f719e5b09f9	11:22.3														
27	4d705ed4-2cff-4748-8da1-aa353b800642	b74993af-	cb5cec2c-37cc-482d-9f49-8e57ebb2b427	aa192c92-b33d-4e3d-b11e-505031f855a9	20:34.1														
28	4d705ed4-2cff-4748-8da1-aa353b800642	b74993af-	786b622b-bf69-41ec-b528-9dd058059d63	aa192c92-b33d-4e3d-b11e-505031f855a9	20:34.1														
29	4d705ed4-2cff-4748-8da1-aa353b800642	b74993af-	b14fa4a2-1e86-45a2-b70c-b17a0604579e	aa192c92-b33d-4e3d-b11e-505031f855a9	20:34.1														
30	190fd28b-35a5-44be-8b93-1fcef	af74adf	19971296-919c-490f-aa57-cc1a6af9ed16	473b7c65-3655-4abc-bc1b-e931ab9be0b6	50:17.4														
31	bbd7e998-d1a8-4002-8d12-020fc74b8754	b74993af-	027ef0b1-45e2-4f28-b2f2-ef8e7771f448	c0a0f2f2-b067-47ea-b7d3-4f719e5b09f9	17:30.8														
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33	22dfbd0c-c5e9-479f-a588-3a1e59d1277c	b74993af-	058865ed-db0f-451a-bec4-573f31444661	f7fda662-d33e-4ea2-805b-3fb18b547a95	04:48.8														
34	22dfbd0c-c5e9-479f-a588-3a1e59d1277c	b74993af-	786b622b-bf69-41ec-b528-9dd058059d63	f7fda662-d33e-4ea2-805b-3fb18b547a95	04:48.8														
35	5fcdfb7a-d4bf-4a1b-a702-94d00ae475e3	b74993af-	e0d4809e-fe08-4786-9548-1c330969596d	aa192c92-b33d-4e3d-b11e-505031f855a9	11:21.8														
36	3617cd8a-6cae-4c06-96d1-7e30ec861ca5	b74993af-	b0e6cefe-6fcc-40ee-837d-7103e1603e32	aa192c92-b33d-4e3d-b11e-505031f855a9	48:23.4														
37	f5c10829-8f95-4a14-9080-ef6206692d36	b74993af-	58711af1-bba8-4589-b411-34e37f97ec33	aa192c92-b33d-4e3d-b11e-505031f855a9	49:11.9														
38	65166bbb-856b-48de-9b86-bff7ca6cdd2f	b74993af-	b14fa4a2-1e86-45a2-b70c-b17a0604579e	66902f75-d8ac-458a-84a5-dd2e7dca26c1	23:41.6														
39	363c5fb9-1051-4143-8804-748db43fcee2	b74993af-	027ef0b1-45e2-4f28-b2f2-ef8e7771f448	6daec2ed-5d3c-41e7-8771-84db09cd873f	05:26.3														
40	3617cd8a-6cae-4c06-96d1-7e30ec861ca5	b74993af-	6e0c7cf0-32eb-42fc-8ba8-9f61d9529c3e	66902f75-d8ac-458a-84a5-dd2e7dca26c1	48:23.0														
41	3617cd8a-6cae-4c06-96d1-7e30ec861ca5	b74993af-	f8a44ec5-ea16-4ca8-ba16-8b268f6bca20	66902f75-d8ac-458a-84a5-dd2e7dca26c1	48:23.0														
42	3617cd8a-6cae-4c06-96d1-7e30ec861ca5	b74993af-	6c98e0d1-6641-47b9-a5ea-c2d0c1065f34	66902f75-d8ac-458a-84a5-dd2e7dca26c1	48:23.0														
43	3617cd8a-6cae-4c06-96d1-7e30ec861ca5	b74993af-	bf69cc27-ba38-4450-bc53-3421b18264ad	66902f75-d8ac-458a-84a5-dd2e7dca26c1	48:23.0														

Live Demo

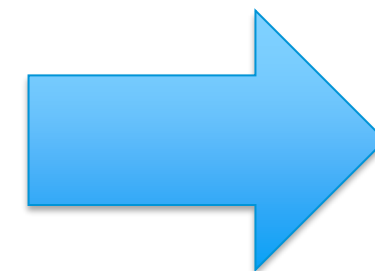
- Walkthrough **Power BI** reports
- Embed **Power BI** report to **BIM 360** Dashboard



Power BI

BIM 360 to Power BI Steps

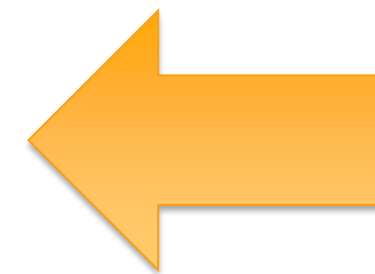
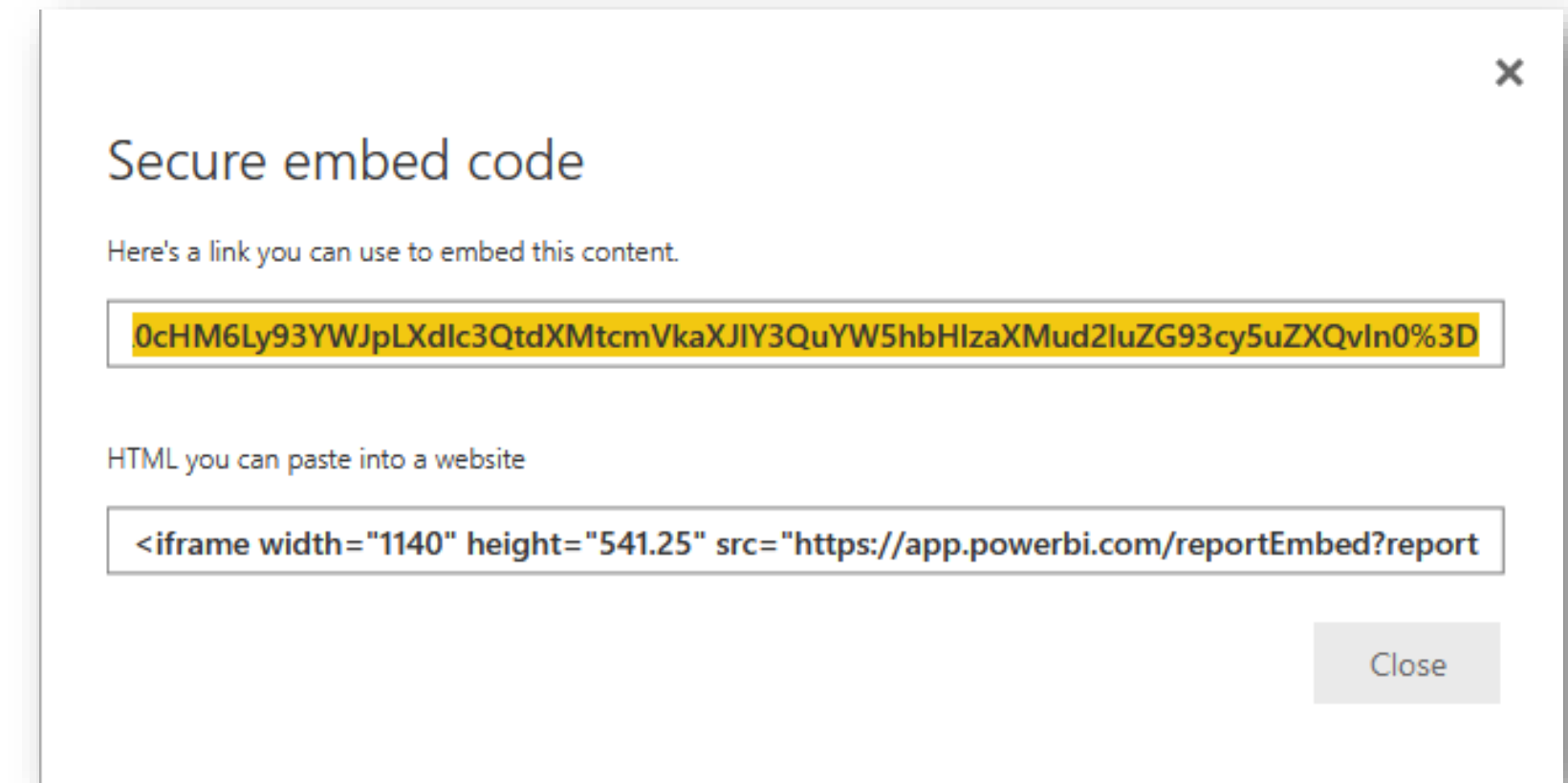
1. Get [Power BI Templates](#) for BIM 360. (4 Sets)
2. Activate the [Executive Overviews](#) in BIM 360. (Only for Account Admin)
3. Executive [Insight > Data Tab \(Data Connector\)](#) to run and download Excel datasets.
4. Open the Power BI Template and [input the path of Excel Datasets](#) on your computer.
5. Read or customize the [Power BI reports](#).



Power BI

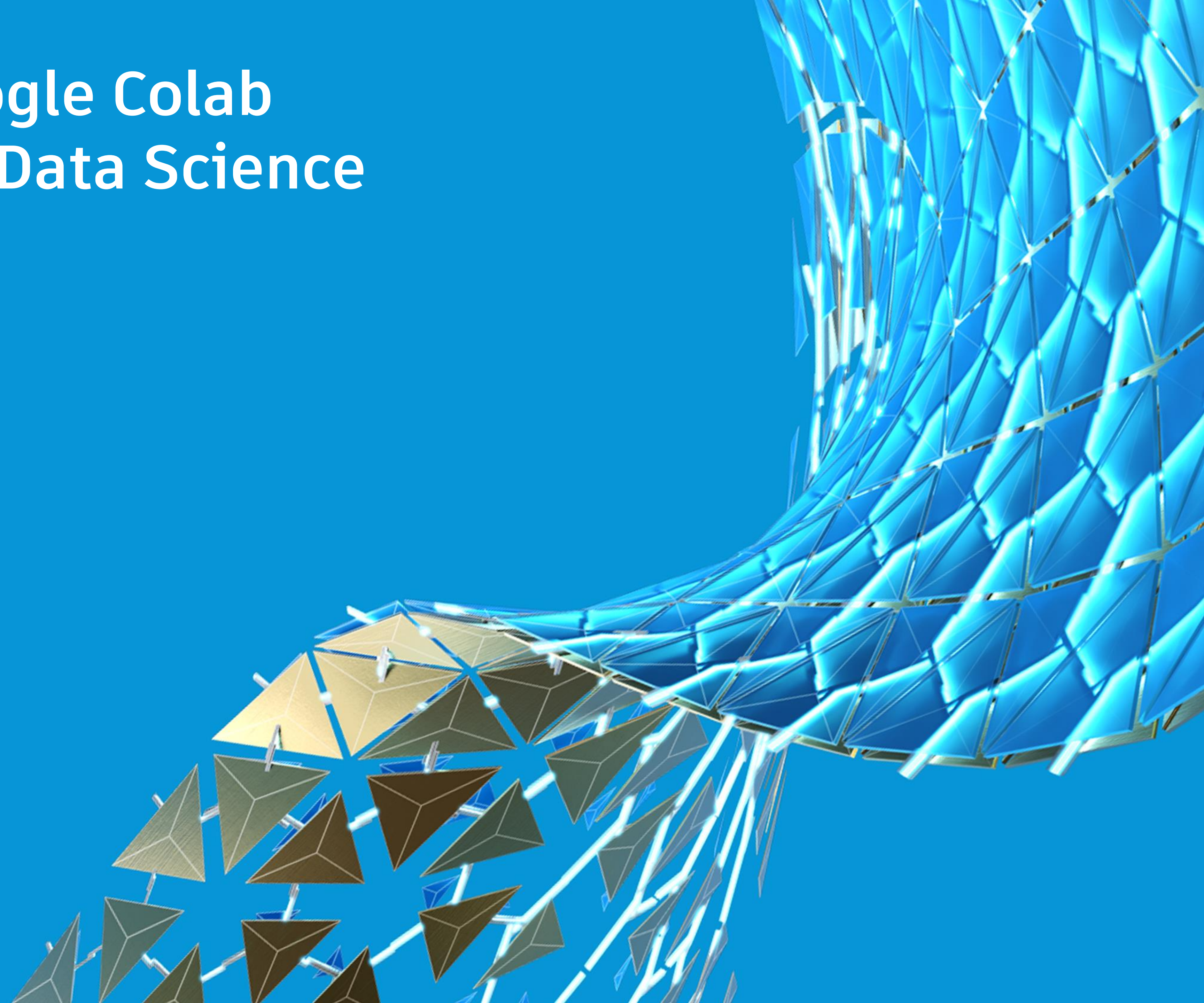
Power BI to BIM 360 Steps


1. [Publish](#) the report to your Power BI [Workspace](#).
2. Go to the [Workspace > File > Embed](#). (Copy the 1st link)
3. Go to BIM 360 Executive Insight Dashboard > [Add Power BI partner card](#).
4. [Paste the link](#) and then rename the card if necessary.



Power BI

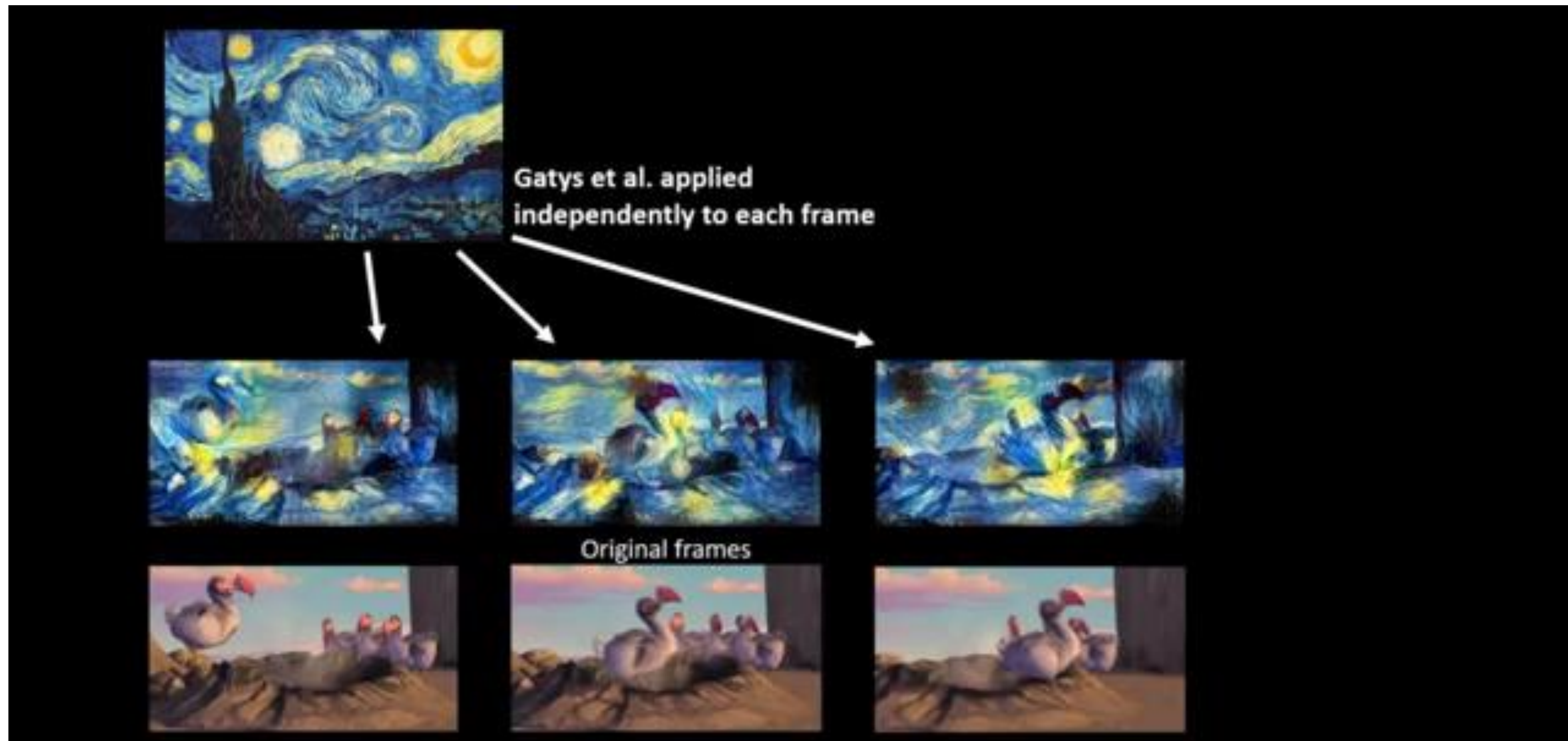
Python and Google Colab applications in Data Science





SOPHIA AWAKENS

Machine Learning for Art (Style Transfer)



Fake Obama Speech

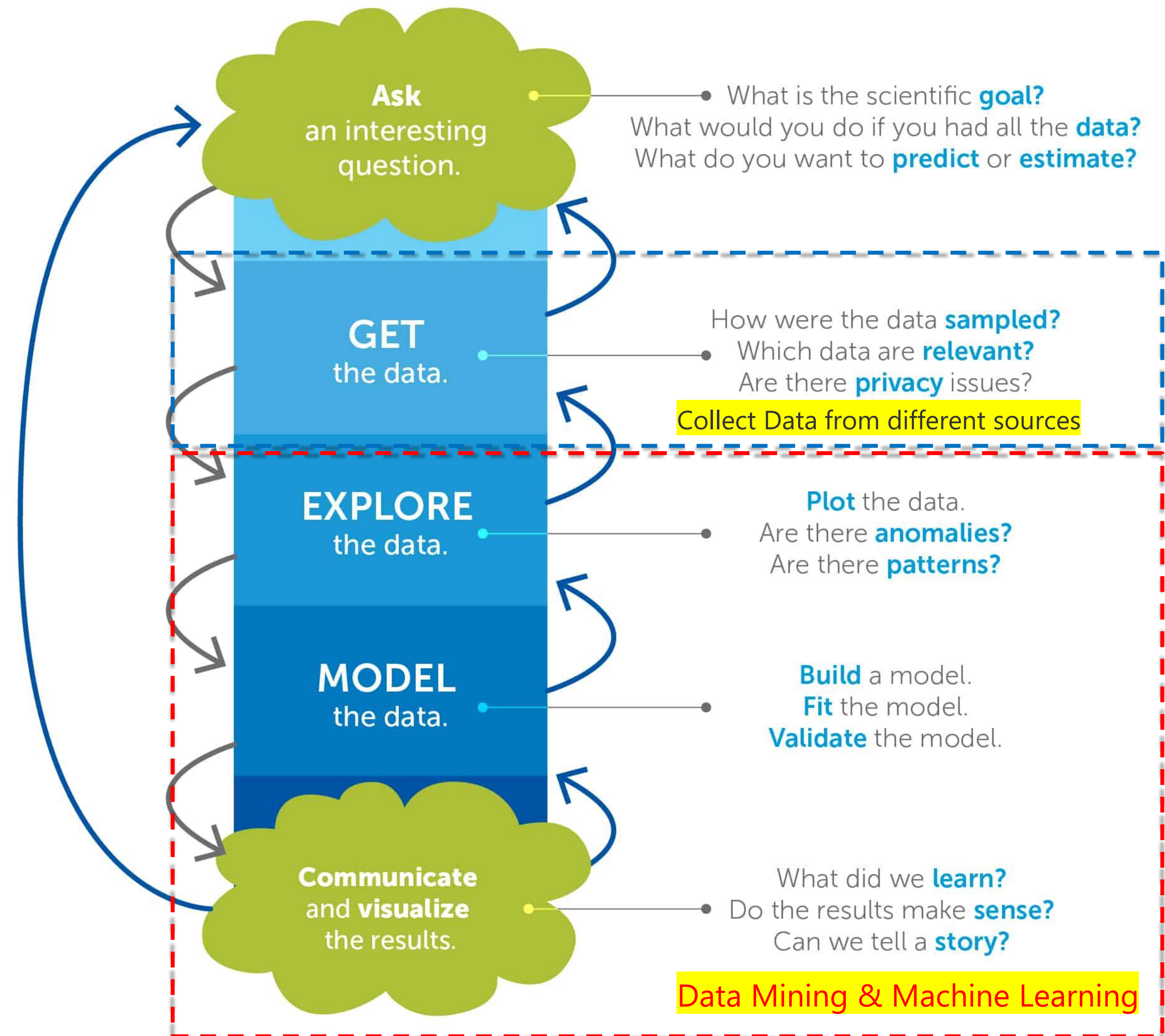




ALL ABOUT DATA

DATA SCIENCE IS THE WAY OUT

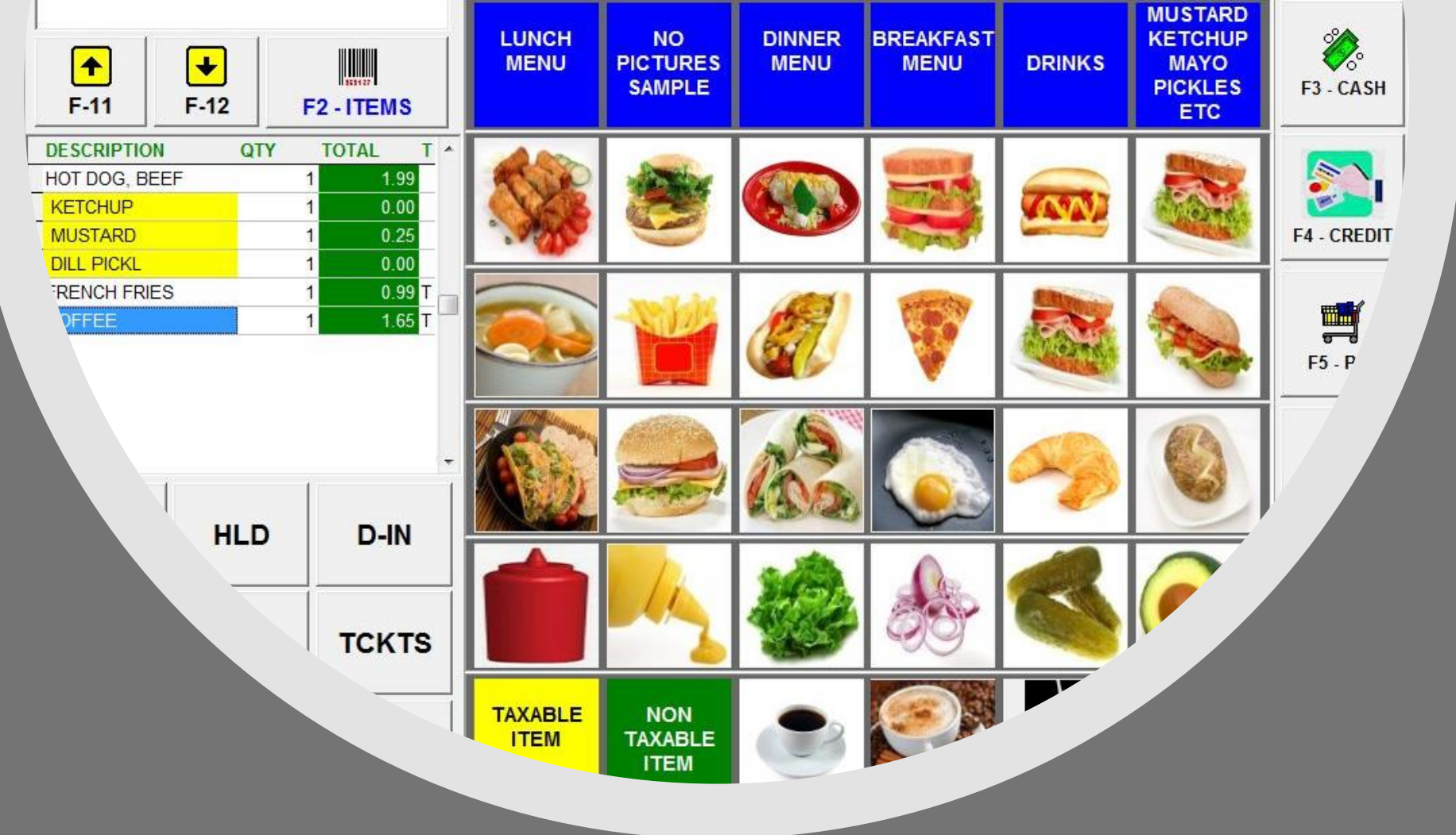
The Data Science Process



Derived from the work of Joe Blitzstein and Hanspeter Pfister, originally created for the Harvard data science course <http://cs109.org/>.



Where to
get data?



Business Systems



Touch Sensor



Ultrasonic Sensor



PIR Sensor



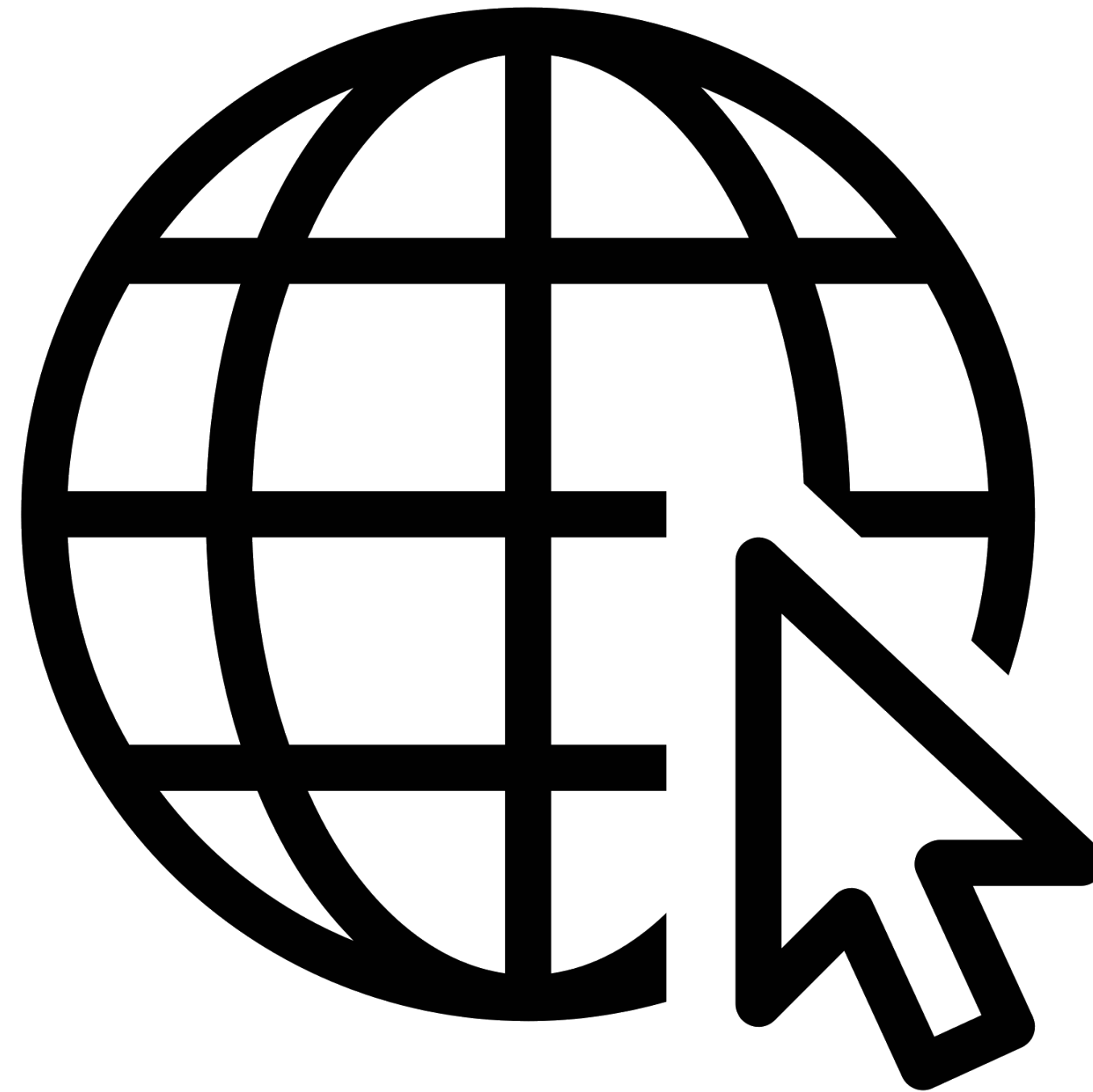
Speed Sensor



Temperature Sensor

**Different Types
Sensors and The
Applications**

IoT Sensors



Internet

DATA MINING



What Python can do?

- **Data Analytics and Visualization**
- **Game Development**
- **Internet of Things (IoT)**
- **MS Office Automation**
- **Machine Learning**
- **Video Editing**
- **Web Development**
- **Web Scrapping**

Excel vs Python



Excel Features

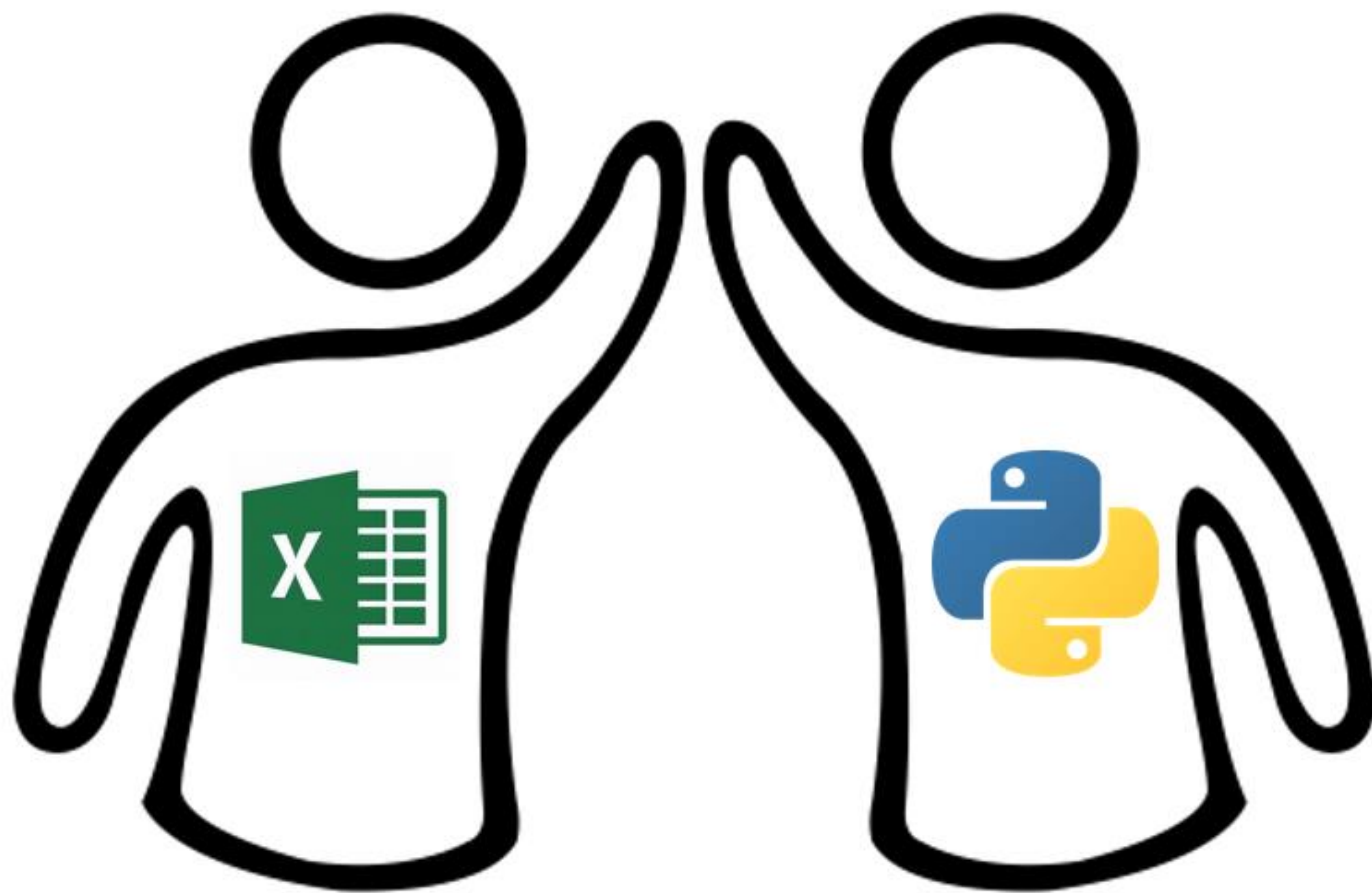
- Common standard
- Traditional practice
- Easy to use & learn
- Small to medium size data handling



Python Features

- Rich python libraries
- Data Scientist favorite tool
- Medium to Large size data handling
- Export to csv / xlsx formats
- Include data collection, cleaning, analyzing and plot graphics





https://hk.finance.yahoo.com/quote/0005.HK/history?p=0005.HK

Jupyter Notebook... https://www.daad... MapR 5.2 Docume... DataLake - Visual ... FWD Demo Hadoop Security Projects - Dashbo... Facebook Permiss...

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64.650 -1.250 (-1.90%)

收市價：11月9日 4:08PM HKT

內容摘要 圖表 對話 統計資料 歷史數據 基本資料 金融 分析 期權 持股人 可持續性

時段: 2017年11月10日 - 2018年11月

顯示: 過往股價

頻率: 每天

套用

在新的索引標籤獲取即時報價及新聞

貨幣為 HKD

↓ 下載數據

日期	開市	最高	最低	收市*	經調整收市價**	成交量
2018年11月09日	65.500	65.750	64.650	64.650	64.650	17,284,987
2018年11月08日	66.200	66.450	65.750	65.900	65.900	13,072,384
2018年11月07日	65.650	66.650	65.600	65.950	65.950	25,492,921
2018年11月06日	65.750	66.450	65.350	66.050	66.050	19,930,868

stock_data

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iCloud Drive

Applications

Desktop

Documents

Downloads

Devices

Ha's MacBo...

Remote Disc

Skype

Tags

Red

Orange

Name	Date Modified	Size	Kind
0001_5years.xlsx	Today, 7:32 PM	7 KB	Micros...c
0002_5years.xlsx	Today, 7:32 PM	7 KB	Micros...c
0003_5years.xlsx	Today, 7:32 PM	7 KB	Micros...c
0004_5years.xlsx	Today, 7:32 PM	7 KB	Micros...c
0005_5years.xlsx	Today, 7:32 PM	7 KB	Micros...c
0006_5years.xlsx	Today, 7:32 PM	7 KB	Micros...c
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0012_5years.xlsx	Today, 7:32 PM	7 KB	Micros...c
0013_5years.xlsx	Today, 7:32 PM	7 KB	Micros...c
0014_5years.xlsx	Today, 7:32 PM	7 KB	Micros...c
0015_5years.xlsx	Today, 7:32 PM	7 KB	Micros...c
0016_5years.xlsx	Today, 7:32 PM	7 KB	Micros...c
0017_5years.xlsx	Today, 7:32 PM	7 KB	Micros...c
0018_5years.xlsx	Today, 7:32 PM	7 KB	Micros...c
0019_5years.xlsx	Today, 7:32 PM	7 KB	Micros...c

Predict Titanic Survivors



Image source: <https://wallpapertag.com/titanic-sinking-wallpapers>

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```
# For loop on a list
>>> numbers = [2, 4, 6, 8]
>>> product = 1
>>> for number in numbers:
...     product = product * number
...
>>> print('The product is:', product)
The product is: 384
```

All the Flow You'd Expect

Python knows the usual control flow statements that other languages speak — *if*, *for*, *while* and *range* — with some of its own twists, of course. [More control flow tools in Python 3](#)

[1](#)[2](#)[3](#)[4](#)[5](#)

Python is a programming language that lets you work quickly and integrate systems more effectively. >>> [Learn More](#)

[Join the official 2020 Python Developers Survey](#)[Start the survey!](#)

Python Official Website: <https://www.python.org/>

Whether you're new to programming or an experienced developer, it's easy to learn and use Python.

[Start with our Beginner's Guide](#)

Python source code and installers are available for download for all versions!

Latest: [Python 3.9.0](#)

Documentation for Python's standard library, along with tutorials and guides, are available online.

[docs.python.org](#)

Looking for work or have a Python related position that you're trying to hire for? Our **relaunched community-run job board** is the place to go.

Integrated Development Environment (IDE)

- Python IDLE Editor: <https://www.python.org/>
- Atom: <https://atom.io/>
- Jupyter: <https://jupyter.org/>
- Google Colab: <https://colab.research.google.com/>
- PyCharm: <https://www.jetbrains.com/pycharm/>
- Sublime: <https://www.sublimetext.com/>
- Visual Studio: <https://visualstudio.microsoft.com/>



Table of contents

Getting started

Data science

Machine learning

More Resources

Machine Learning Examples

Section

Data science

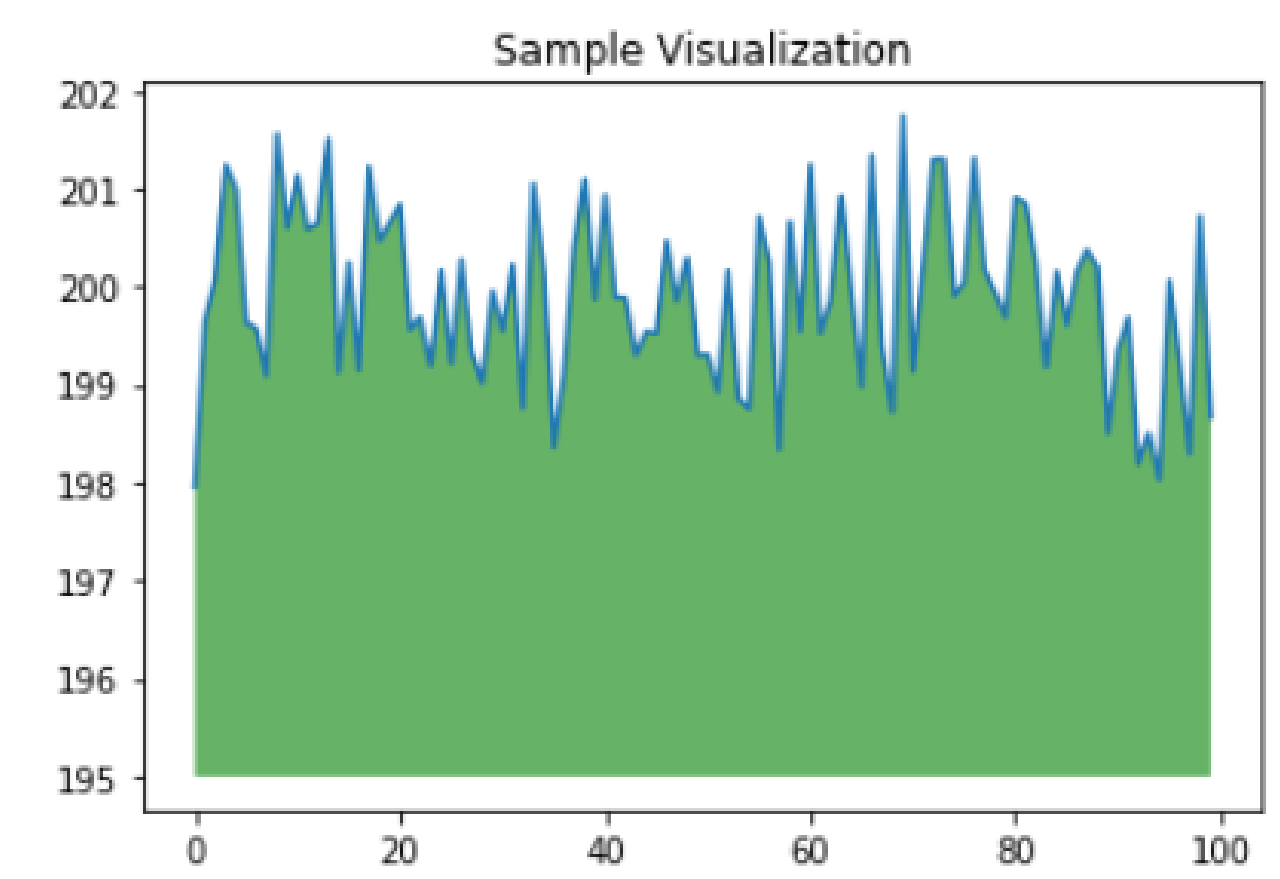
With Colab you can harness the full power of popular Python libraries to analyze and visualize data. The code cell below uses **numpy** to generate some random data, and uses **matplotlib** to visualize it. To edit the code, just click the cell and start editing.

```
[5] import numpy as np
    from matplotlib import pyplot as plt

    ys = 200 + np.random.randn(100)
    x = [x for x in range(len(ys))]

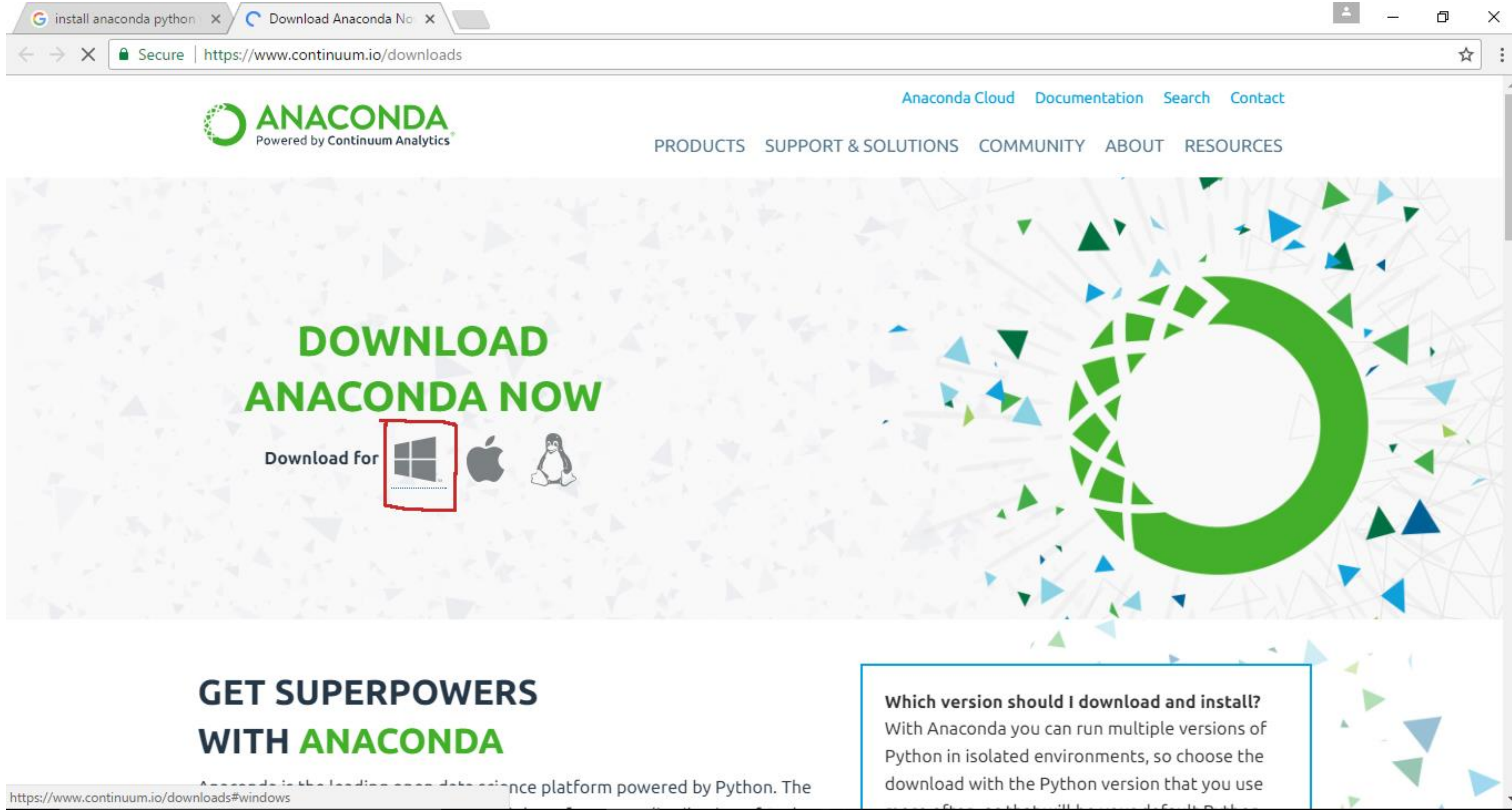
    plt.plot(x, ys, '-')
    plt.fill_between(x, ys, 195, where=(ys > 195), facecolor='g', alpha=0.6)

    plt.title("Sample Visualization")
    plt.show()
```



You can import your own data into Colab notebooks from your Google Drive account, including from spreadsheets, as well as from Github and many other sources. To learn more about importing data, and how Colab can be used for data science, see the links below under [Working with Data](#).

Anaconda



The image is a screenshot of a web browser displaying the Anaconda download page. The browser's address bar shows the URL <https://www.continuum.io/downloads>. The page features the Anaconda logo at the top left, which includes the word "ANACONDA" in green and "Powered by Continuum Analytics" below it. To the right of the logo is a navigation menu with links for "Anaconda Cloud", "Documentation", "Search", and "Contact". Below this is a secondary menu with "PRODUCTS", "SUPPORT & SOLUTIONS", "COMMUNITY", "ABOUT", and "RESOURCES". The main content area has a large green "C" logo on the right side, surrounded by a pattern of small blue and green triangles. On the left, the text "DOWNLOAD ANACONDA NOW" is displayed in green. Below this, the phrase "Download for" is followed by three icons: a Windows logo (highlighted with a red rectangle), an Apple logo, and a Linux penguin logo. At the bottom left, the text "GET SUPERPOWERS WITH ANACONDA" is shown, with "ANACONDA" in green. To the right of this, a blue-bordered box contains the text: "Which version should I download and install? With Anaconda you can run multiple versions of Python in isolated environments, so choose the download with the Python version that you use". The browser's status bar at the bottom shows the URL <https://www.continuum.io/downloads#windows>.

[install anaconda python](#) [Download Anaconda No](#)



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Which version should I download and install?
With Anaconda you can run multiple versions of Python in isolated environments, so choose the download with the Python version that you use

<https://www.continuum.io/downloads#windows>

How To Construct A Variable?

```
In [1]: variable_one = 1
```

How To Use A Variable?

```
In [2]: 10 - variable_one
```

```
Out[2]: 9
```

How To Use Variable In A Function?

```
In [3]: print("10 - 9 equeals {}".format(variable_one))
```

```
10 - 9 equeals 1
```

```
In [ ]:
```

Jupyter Notebook



Google Colab vs Anaconda



Google Colab

Online Jupyter Notebook

No need to install

Harder to manage dataset



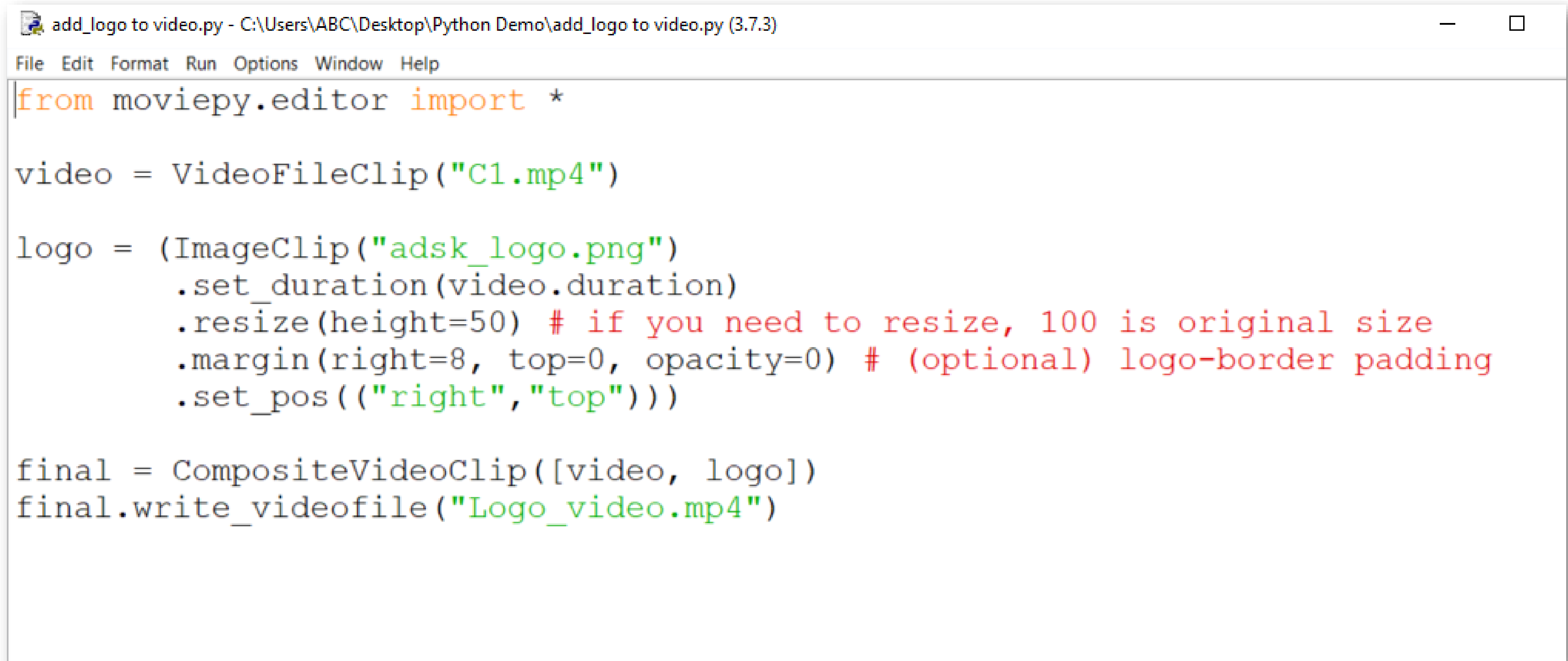
Anaconda

Local environment

Have to install

No additional effort in dataset management

Video Editing Tool

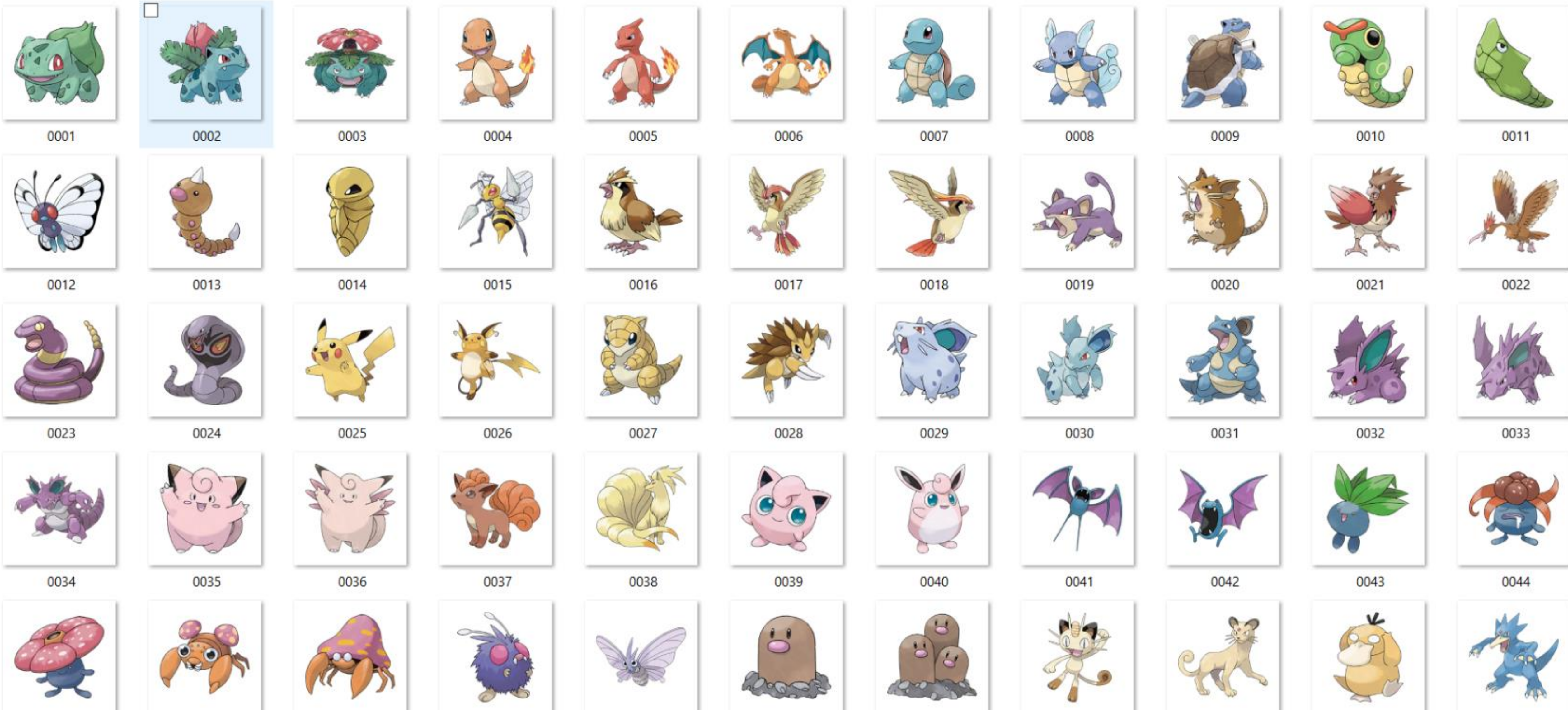
A screenshot of a Python IDE window titled "add_logo to video.py - C:\Users\ABC\Desktop\Python Demo\add_logo to video.py (3.7.3)". The window has a menu bar with "File", "Edit", "Format", "Run", "Options", "Window", and "Help". The code editor contains a Python script that uses moviepy to add a logo to a video. The script imports everything from moviepy.editor, creates a VideoFileClip from "C1.mp4", creates an ImageClip from "adsk_logo.png", sets its duration to match the video, resizes it to a height of 50, sets a right margin of 8, and sets its position to "right" and "top". Finally, it creates a CompositeVideoClip from the video and logo, and writes it to "Logo_video.mp4".

```
add_logo to video.py - C:\Users\ABC\Desktop\Python Demo\add_logo to video.py (3.7.3)
File Edit Format Run Options Window Help
from moviepy.editor import *

video = VideoFileClip("C1.mp4")

logo = (ImageClip("adsk_logo.png")
        .set_duration(video.duration)
        .resize(height=50) # if you need to resize, 100 is original size
        .margin(right=8, top=0, opacity=0) # (optional) logo-border padding
        .set_pos(("right", "top")))

final = CompositeVideoClip([video, logo])
final.write_videofile("Logo_video.mp4")
```

Can you Collect all Pokémon?

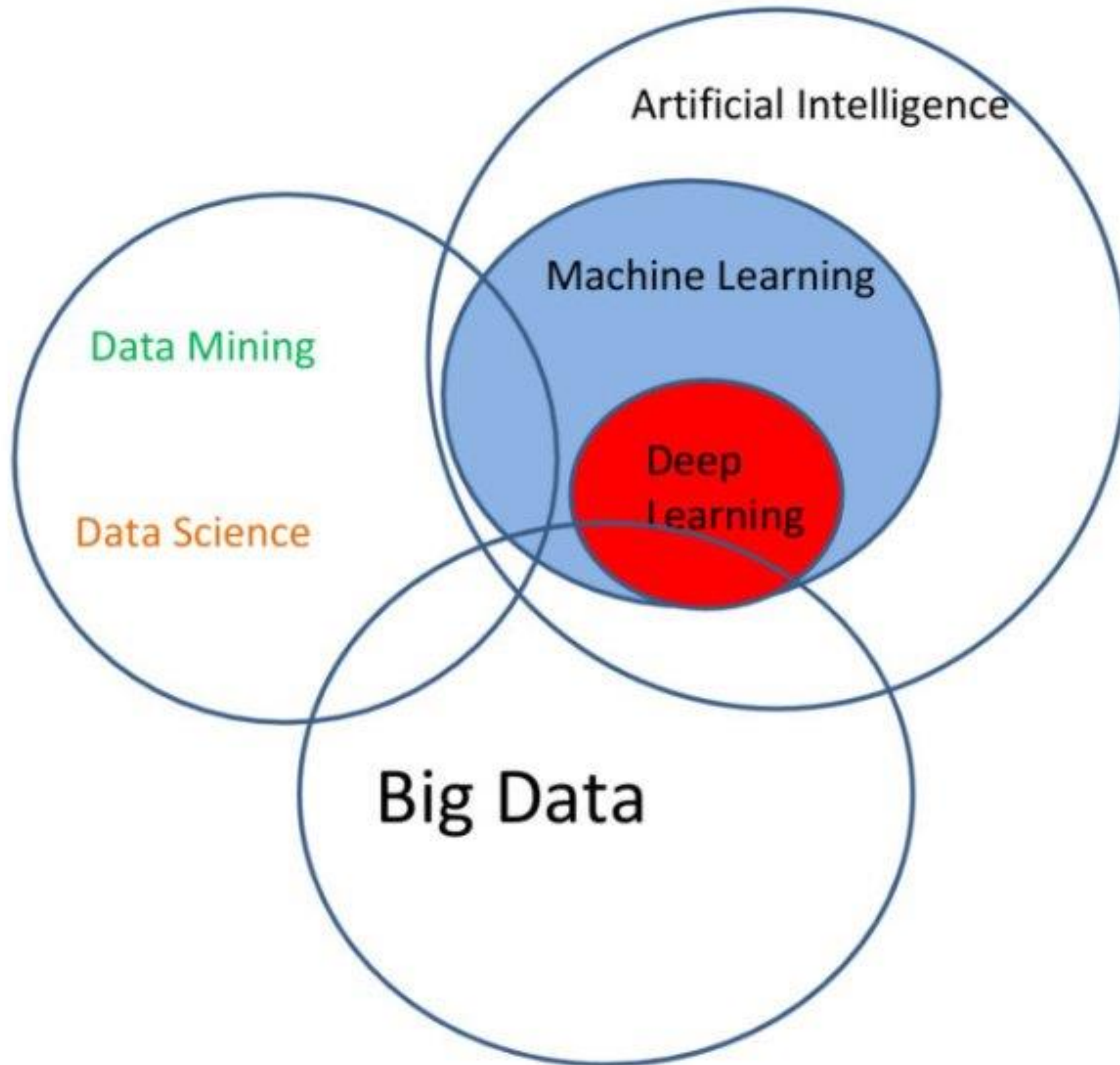
untitled

Scrap multiple images.py

```
1  import cv2
2  import numpy as np
3  import urllib.request
4  import time
5
6
7  start_time = time.time()
8  for i in range(1, 51):
9      try:
10         url = 'https://assets.pokemon.com/assets/cms2/img/pokedex/detail/' + \
11             '{:03d}'.format(i) + '.png'
12         request = urllib.request.Request(url)
13         response = urllib.request.urlopen(request)
14         binary_str = response.read()
15         byte_array = bytearray(binary_str)
16         numpy_array = np.asarray(byte_array, dtype='uint8')
17         image = cv2.imdecode(numpy_array, cv2.IMREAD_UNCHANGED)
18         cv2.imwrite("images/" + '{:04d}'.format(i) + '.png', image)
19         print('Saved' + '{:04d}'.format(i) + '.png')
20     except Exception as e:
21         print(str(e))
22
23 end_time = time.time()
24 print('Done')
25 print('Time taken : ' + str(end_time - start_time) + 'sec')
26
```

Web Image Scraper - Python

<https://www.youtube.com/watch?v=4Di6mCMH0kY>



Buzz words

YouTube – BIM 360 Basics

<https://www.youtube.com/channel/UCv4RtbdbnRrKmeZLql6Yt3Bw/playlists>



YouTube - HK BIM (香港建築信息模型)

https://www.youtube.com/playlist?list=PL_0MRuoLVDCUBnZPiBWOVzmZIt4hEK6AF





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