



FORGE DevCon 2017

Demystifying the BIM 360 and Forge APIs

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Developer Technical Services

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Class Summary

Are you interested in learning BIM 360 and Forge, but not sure where to start? Are you feeling confused about how Forge APIs work together to give you access to your BIM data? If so, this class is for you. In this session, we'll look at the Forge API from the view of BIM 360 products and provide you with the foundational knowledge for you to implement powerful applications and workflows using these APIs.

Key Learning Objectives

At the end of this class you'll be able to:

- Understand the relationship between Forge and BIM 360
- Understand the basic structure of the Forge Data Management API
- Learn how to use the Forge Data Management API to access and modify BIM 360 Docs data
- Understand current capabilities and limitations of the API to access BIM 360 Docs

Motivation



I don't see "Apps and Integration" tab??

How can I activate API access for my account?

I want to use Forge Viewer to display a model in Glue.

BIM 360 API looks like only admin API?

I'm using Forge Data Management API. I can get A360 and BIM 360 Team hubs, but not BIM 360 Docs account. Why ?!?

What is a hub?

I followed the step-by-step tutorial to upload a file. It works for Team, but not Docs 😞

Agenda

BIM 360 and Family Products

BIM 360 Docs and Forge API

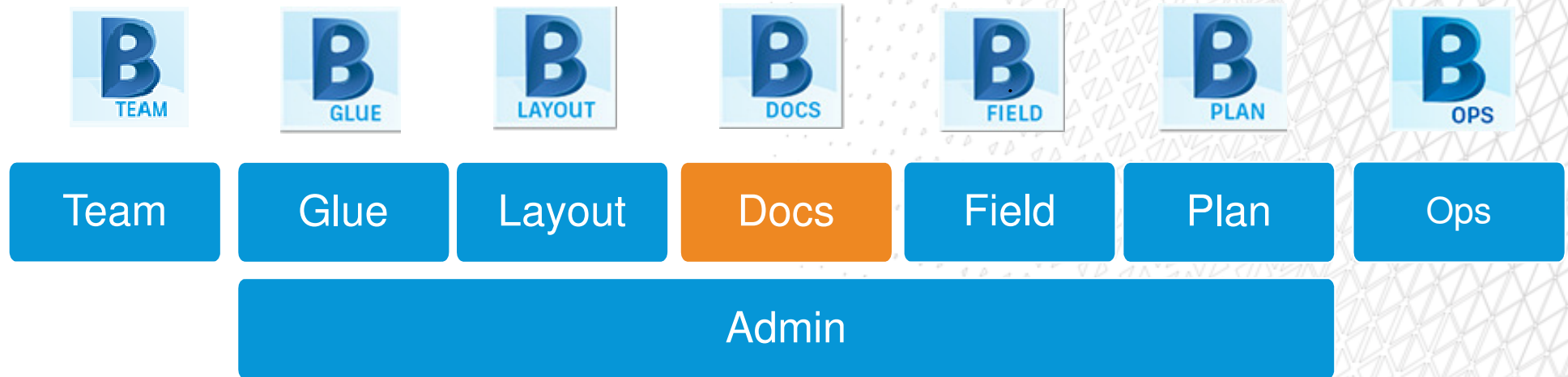
- Overview
- Forge
 - Authentication
 - Account level API
 - Data Management
 - Model Derivative
 - Viewer

Summary

Q&A

BIM 360 Docs & Family Products

BIM 360 Family Products



BIM 360 Family Products

Forge vs. non-Forge

e.g.,

Q. I want to display a Glue model in Forge viewer.

A. You will need to download a model from Glue and upload it to Forge storage.



Team
(Forge)



Glue
(not Forge)



Layout
(not Forge)



Docs
(Forge)



Field
(not Forge)



Plan



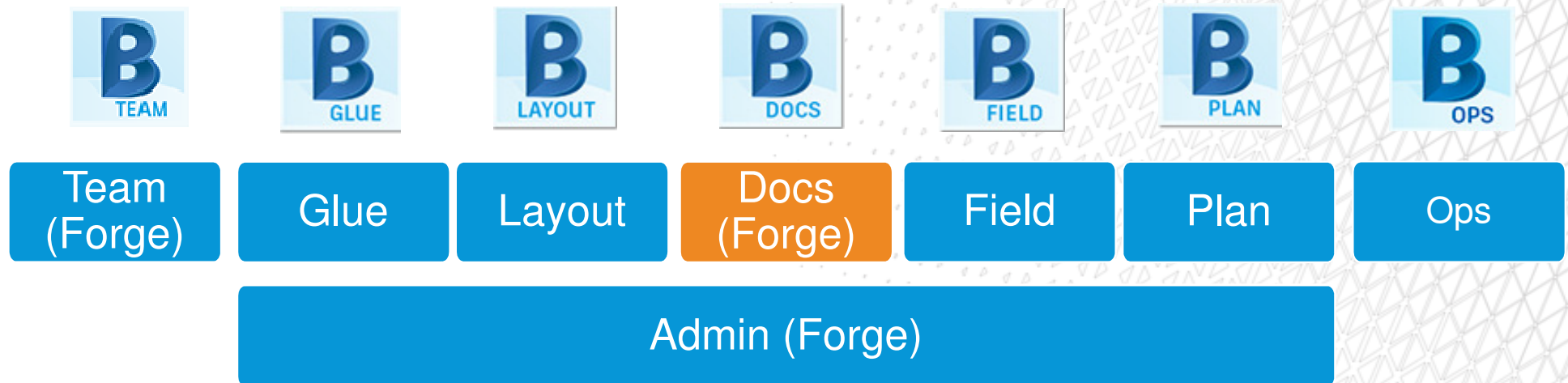
Ops

Admin (Forge, a.k.a. **BIM 360 API**)

BIM 360 Family Products

Docs as data at center

Seamless, unified future



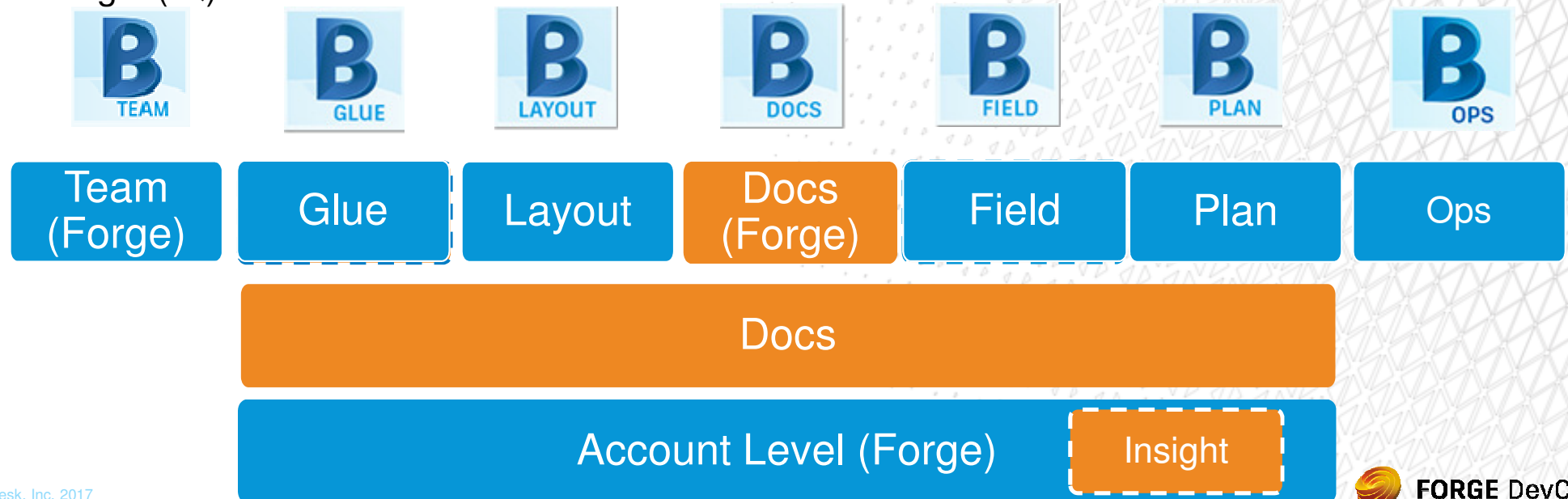
BIM 360 Family Products

Next generation Field and Glue

- Field Management
- Model Coordination

And more

- Insight (IQ)



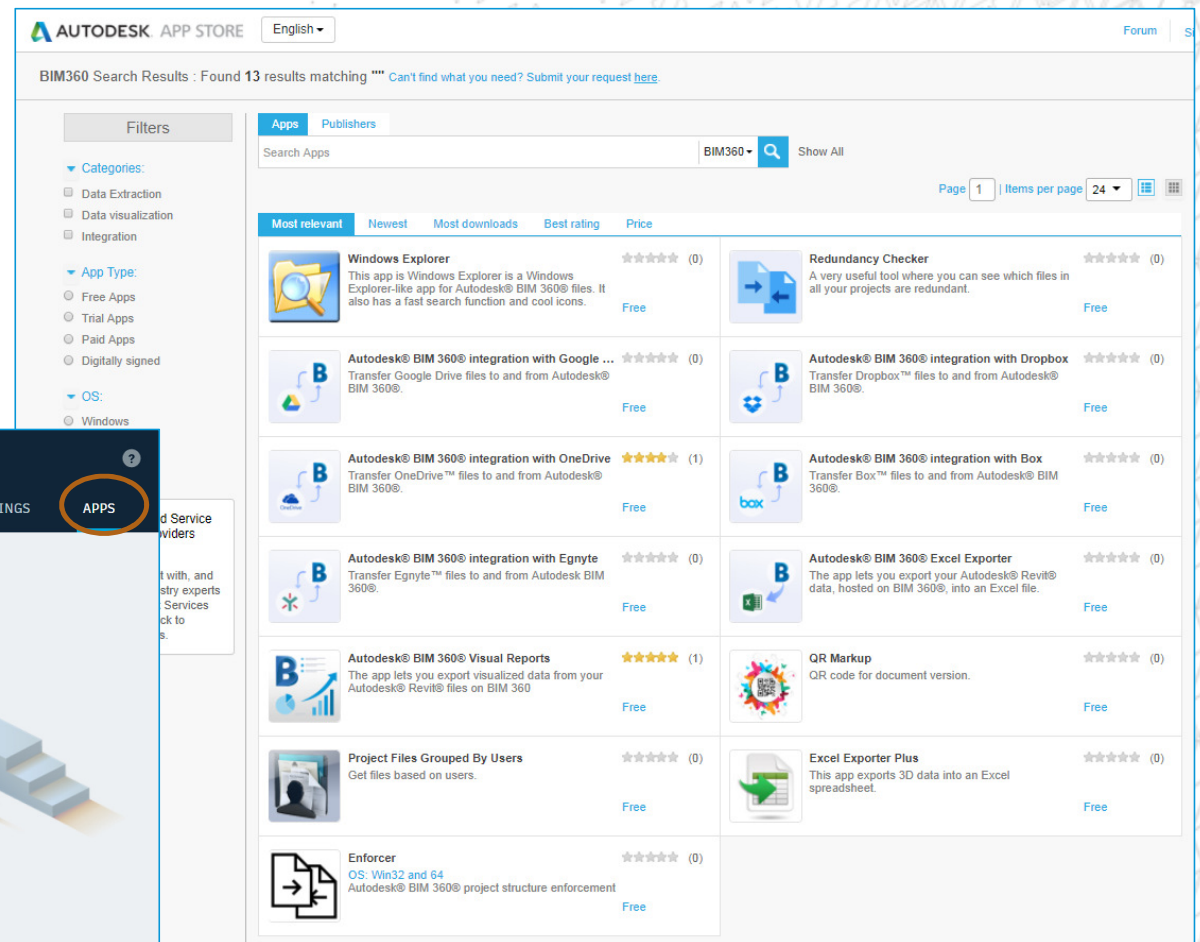
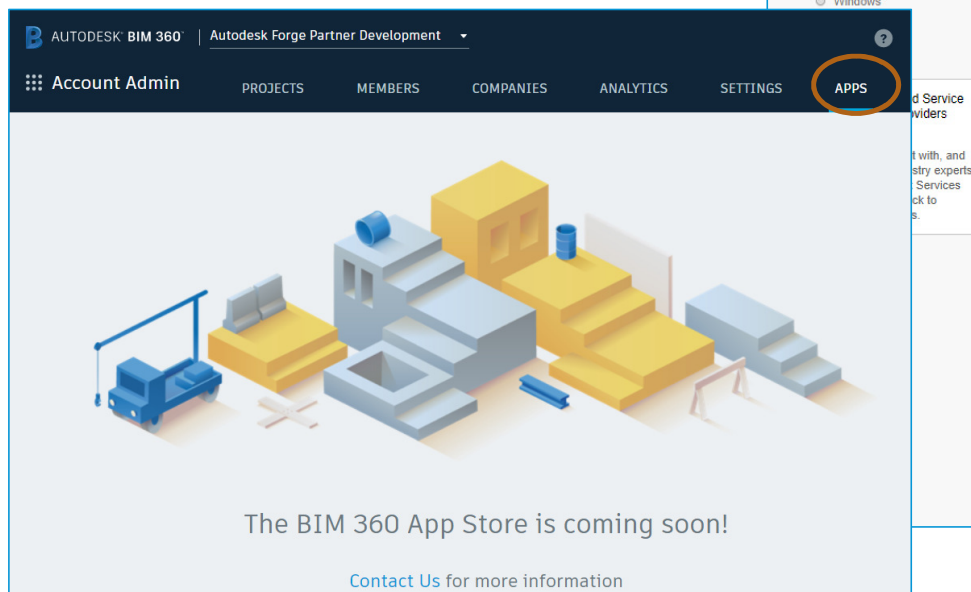
What's coming

- Webhooks
- Issues API
- RFI API
- Submittals
- ...

>> private beta (Roadmap session. Forge answer bar)

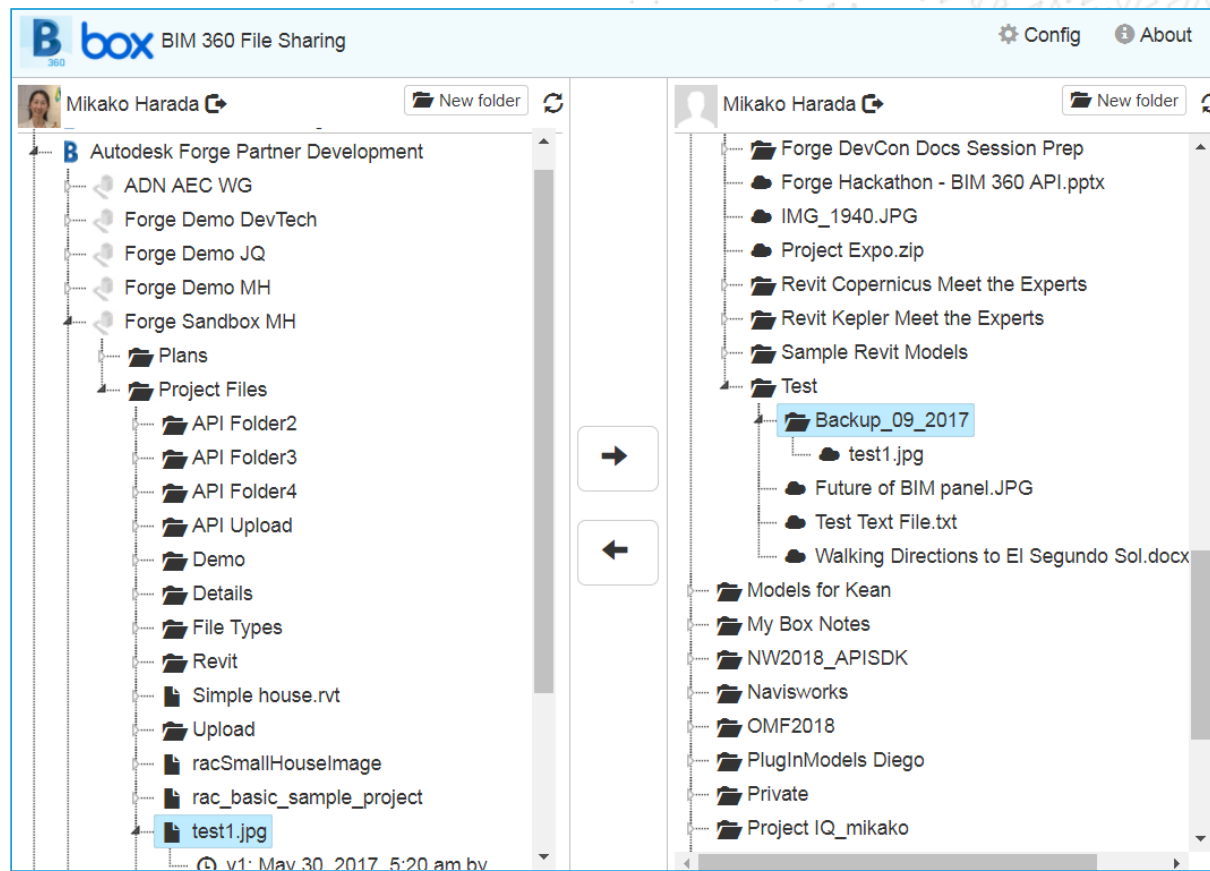
BIM 360 App Store

- apps.autodesk.com
- in product integration (today)



<https://apps.autodesk.com/BIM360/en/Home/Index>

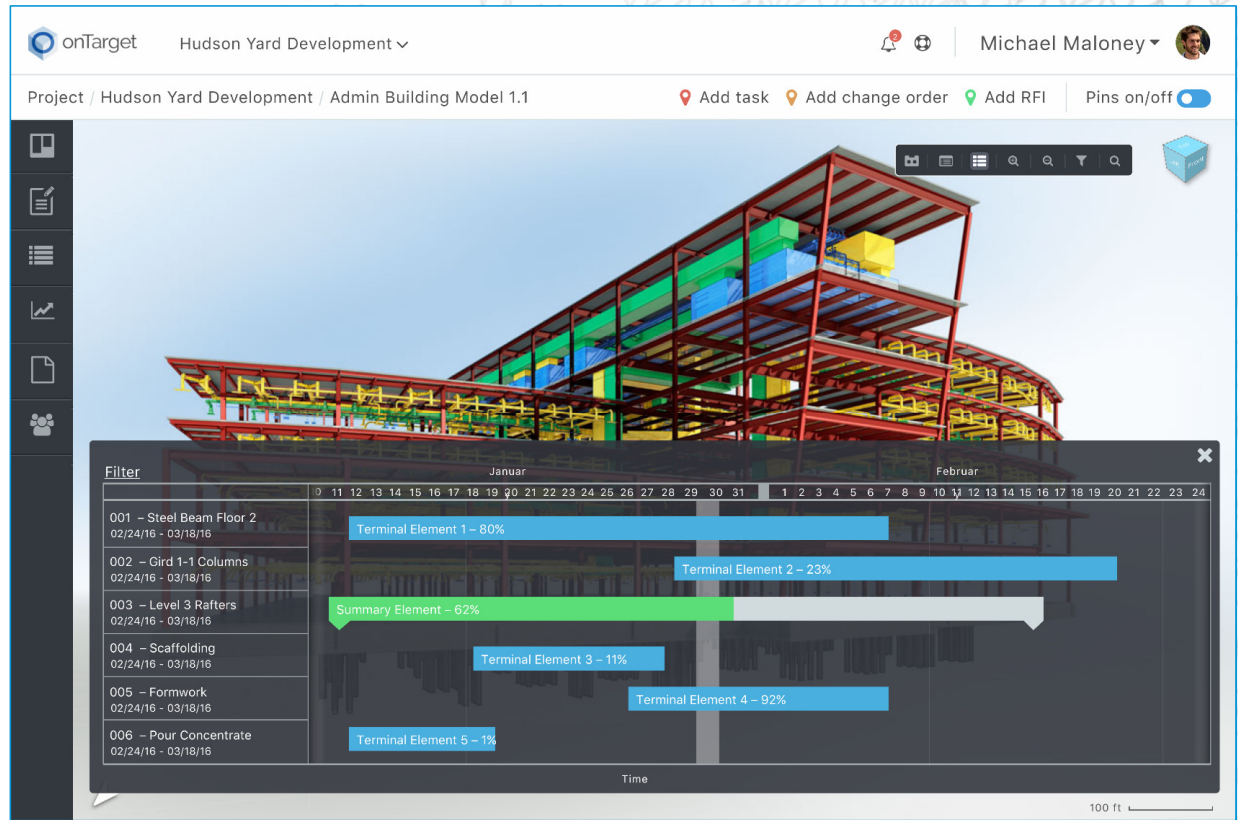
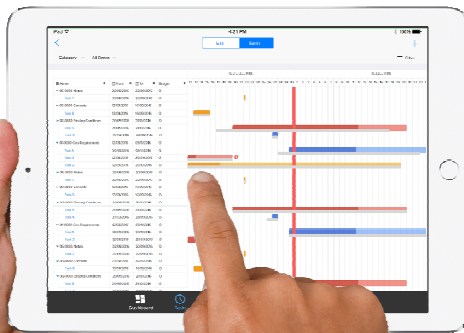
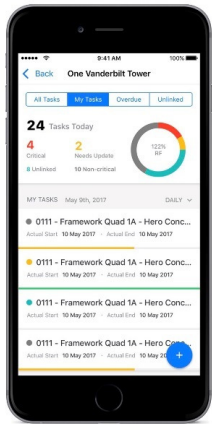
BIM 360 App Store

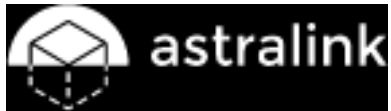




OnTarget - Partner Apps

4D project mgmt.
Analytics, reporting
CS126362 Thurs



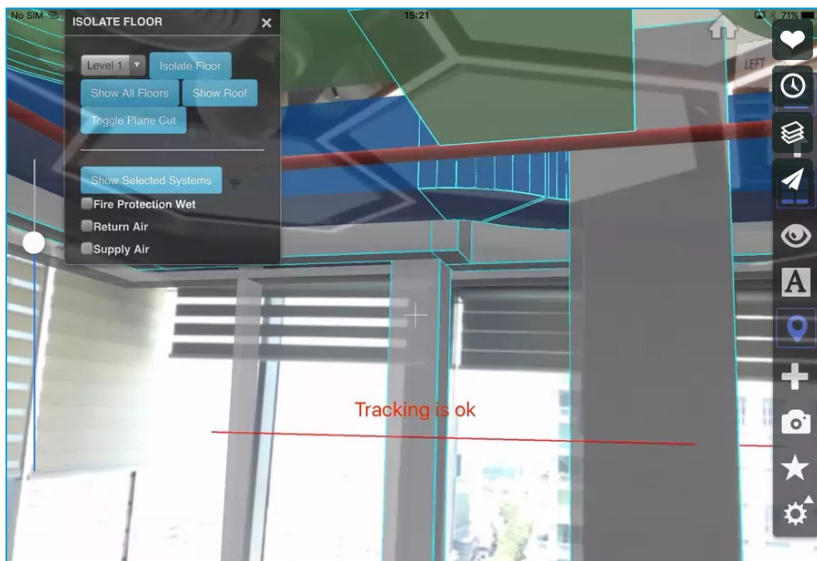


astralink - Partner Apps

Augmented Reality

Reduce construction error

Forge Village



BIM 360 Docs & API - Big Picture

BIM 360 Docs – API Overview

Authentication (OAuth)

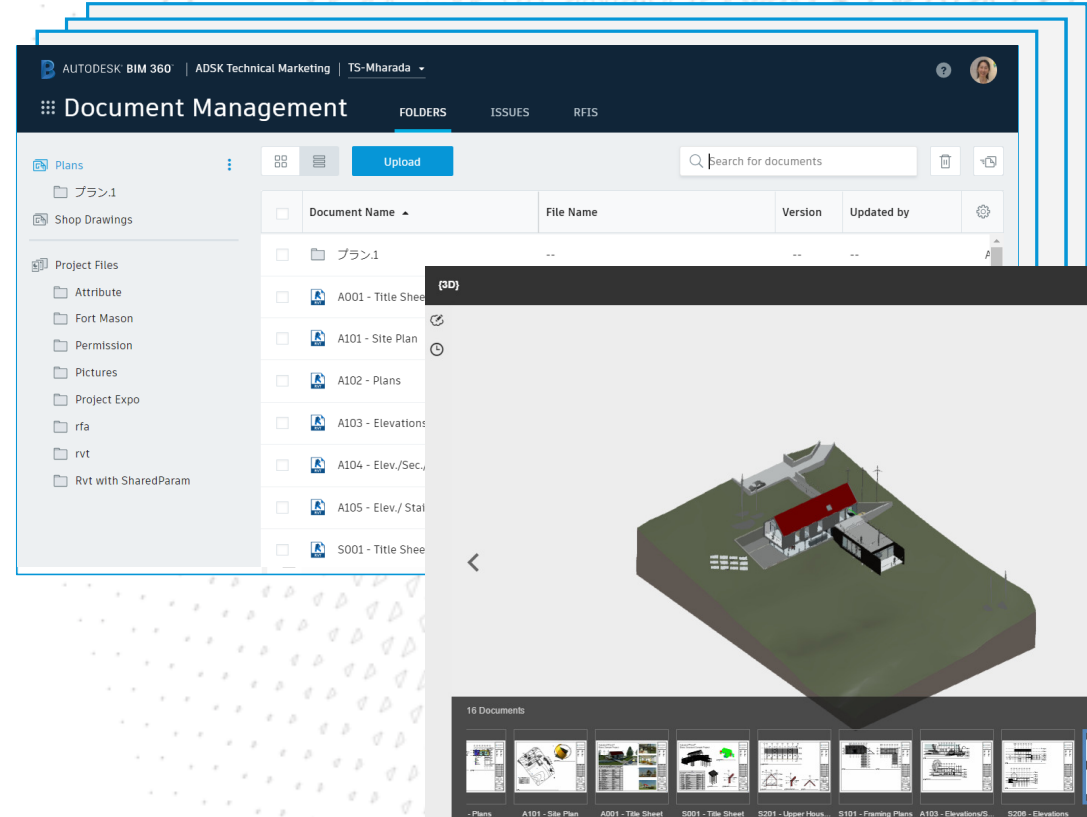
BIM 360 API
(Account/HQ Mgmt)

Data Management API

Model Derivative API

Viewer

Issues API



BIM 360 Docs – API Overview

Authentication (OAuth)

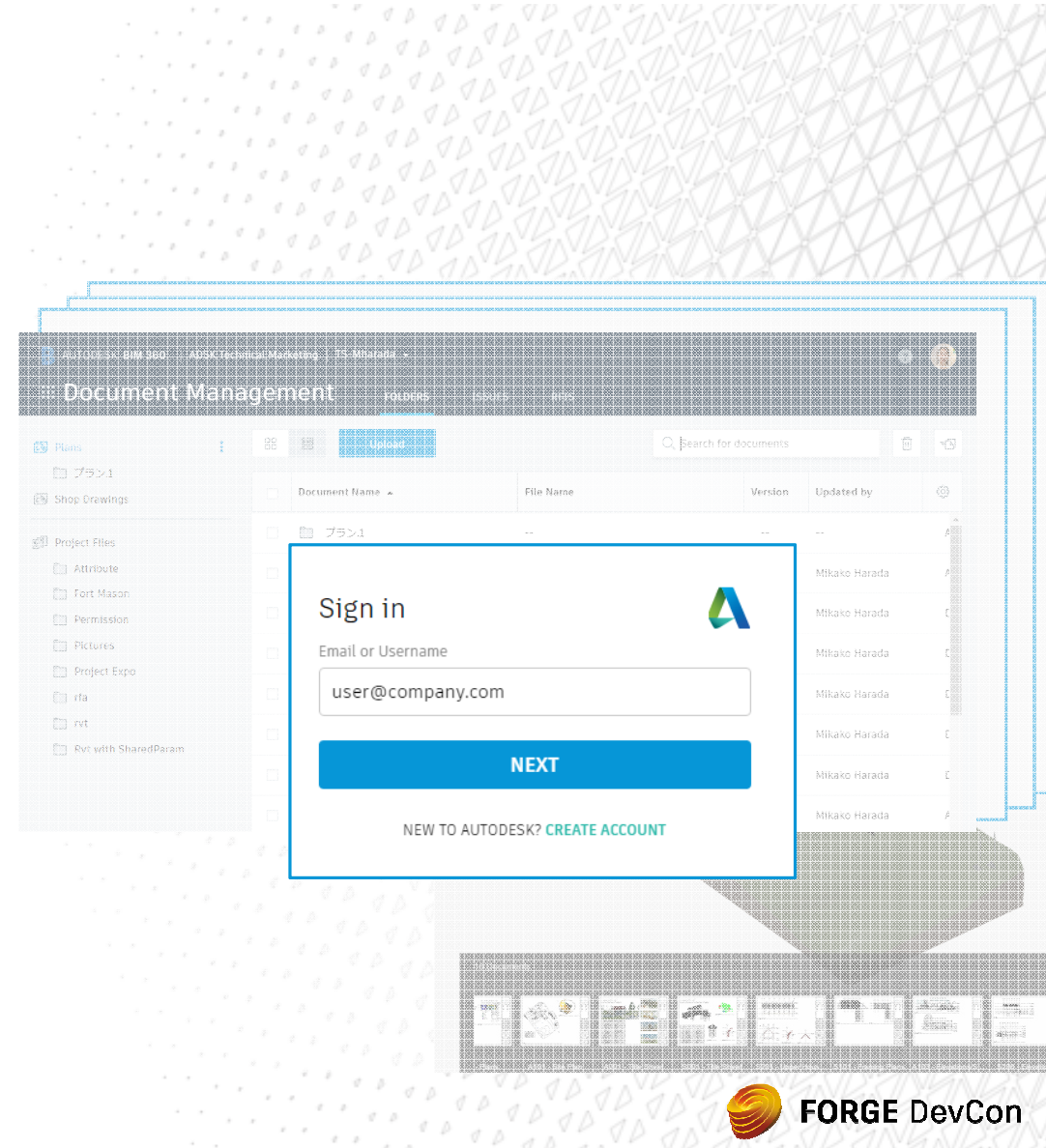
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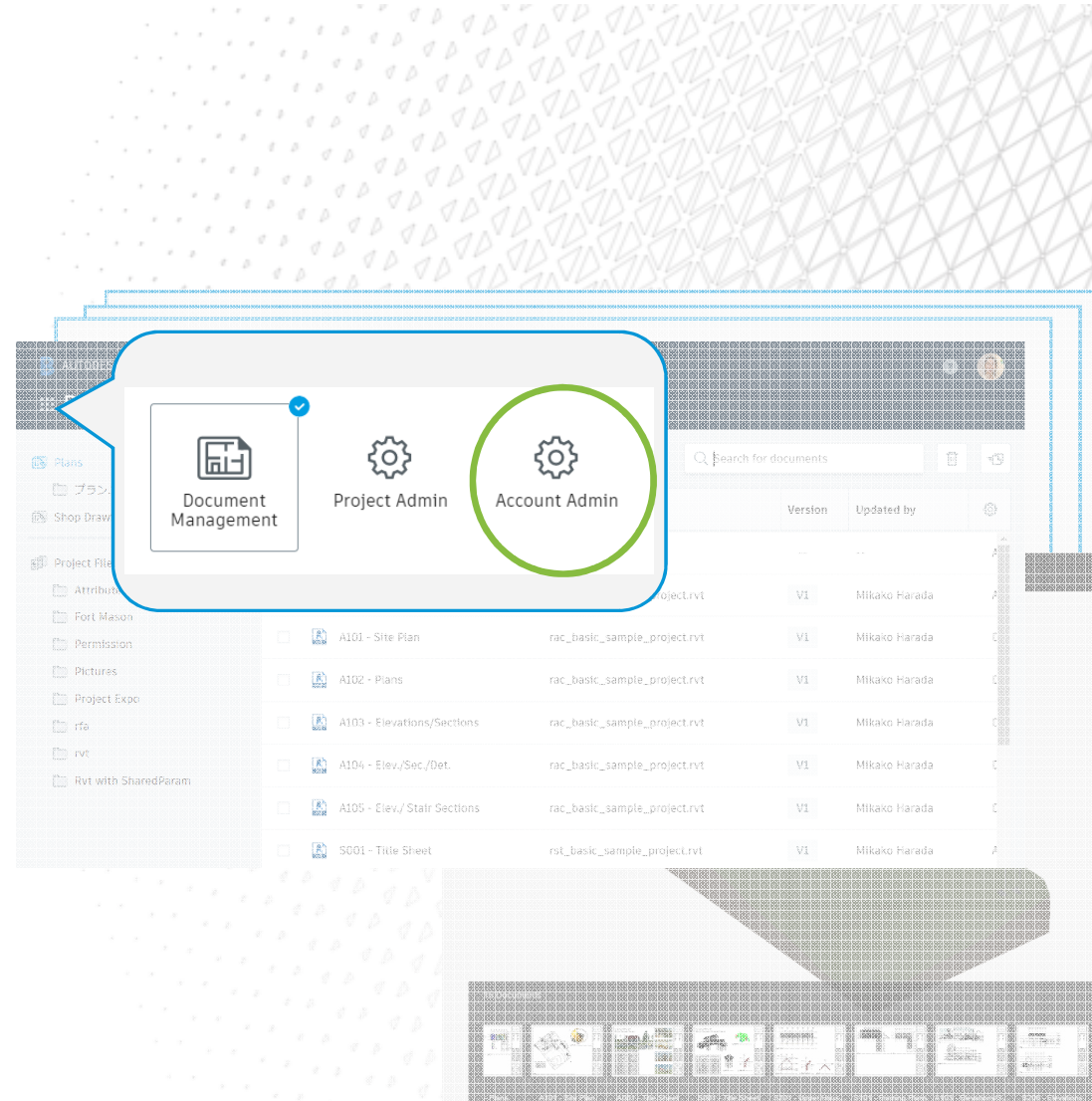
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BIM 360 Docs – API Overview

Authentication (OAuth)

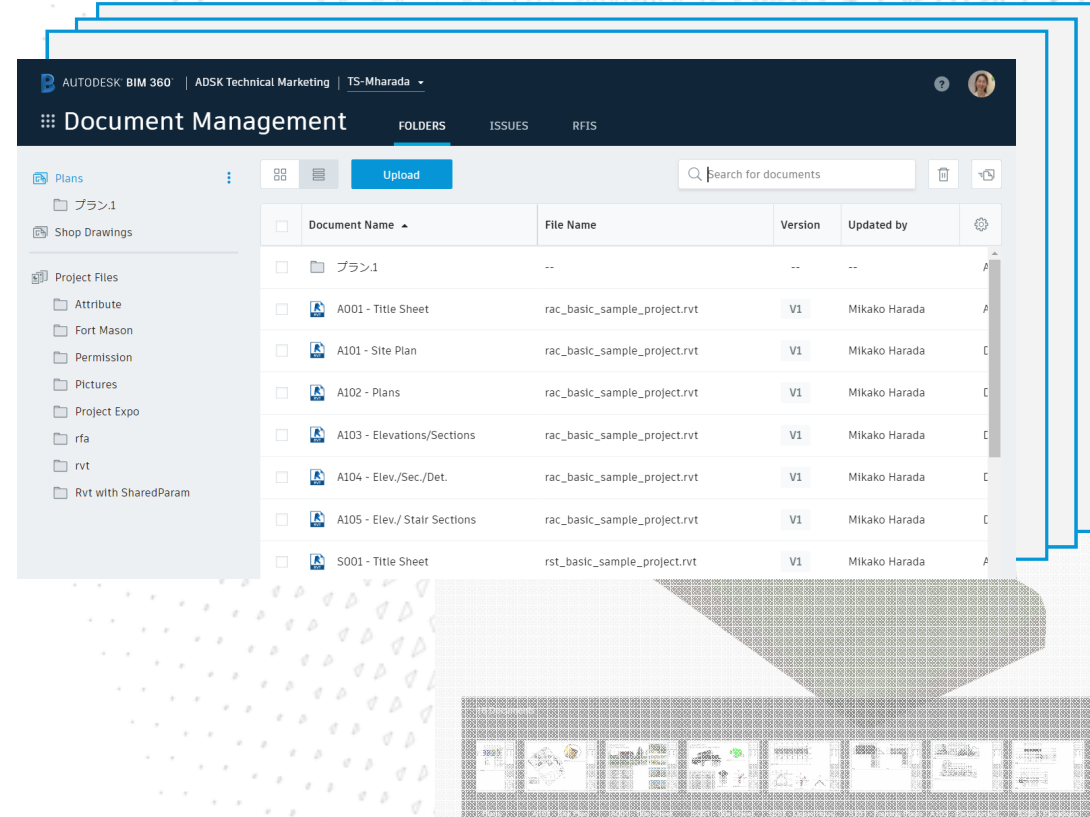
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BIM 360 Docs – API Overview

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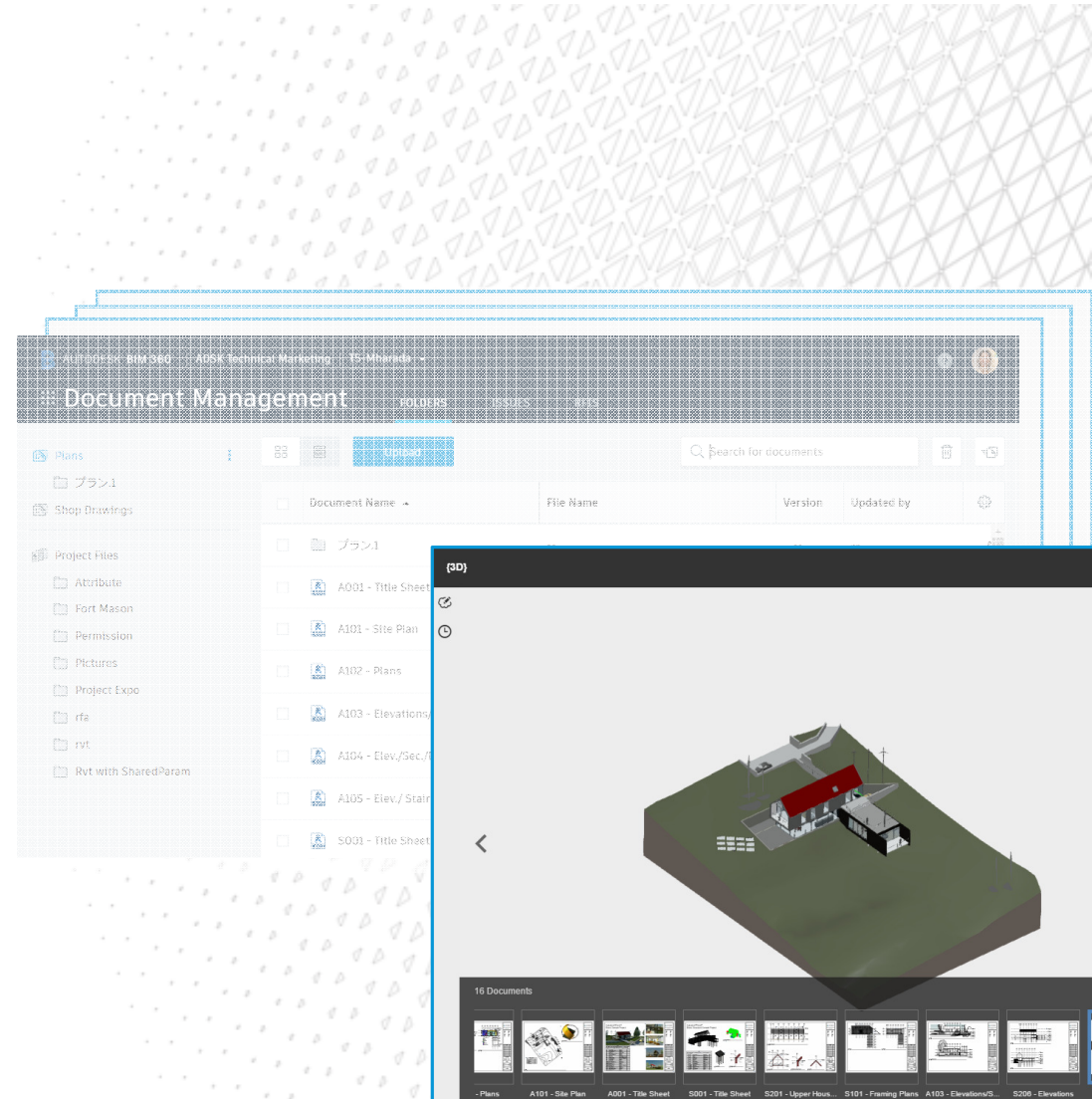
BIM 360 API
(Account/HQ Mgmt)

Data Management API

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Viewer

Issues API



BIM 360 Docs – API Overview

Authentication (OAuth)

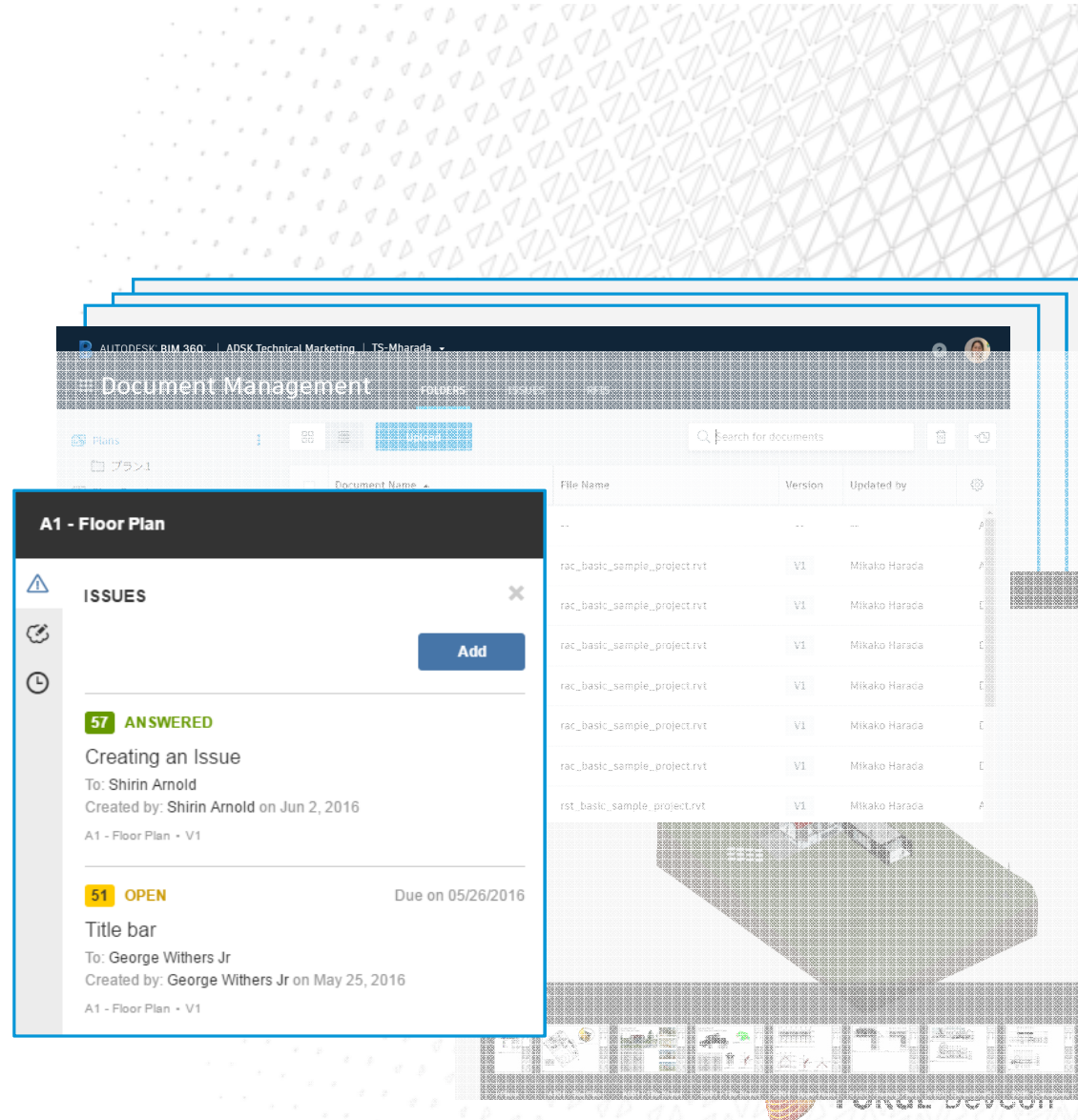
BIM 360 API
(Account/HQ Mgmt)

Data Management API

Model Derivative API

Viewer

Issues API*



BIM 360 Team – API Overview

Authentication (OAuth)

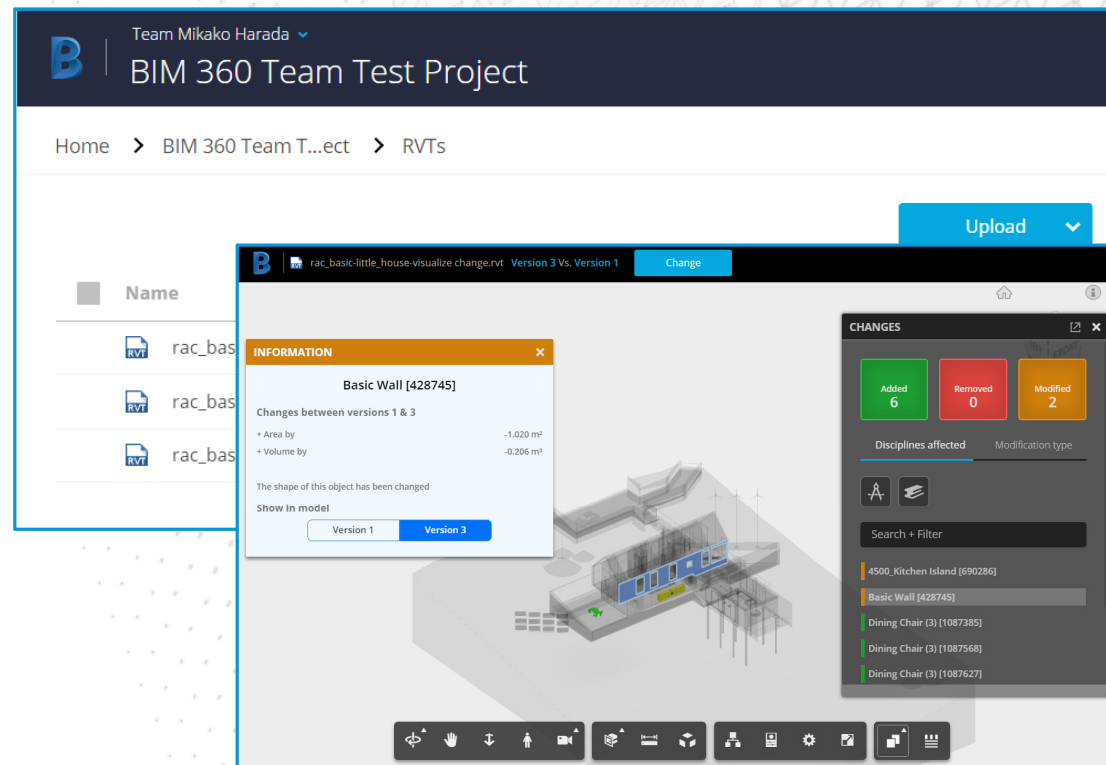
~~BIM 360 API~~
~~(Account/HQ Mgmt)~~

Data Management API

Model Derivative API

Viewer

~~Issues API*~~



Forge API

Forge API

Authentication (OAuth)

BIM 360 API
(Account Admin)

Data Management API

Model Derivative API

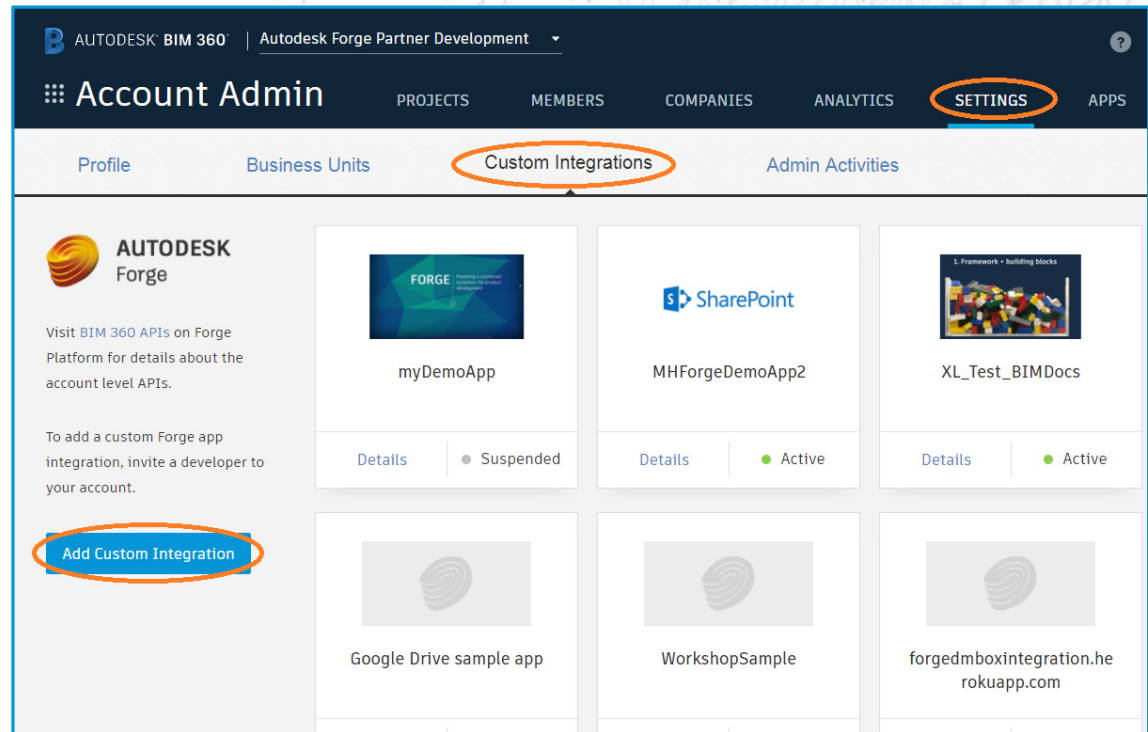
Viewer

Viewer



Activating API Access

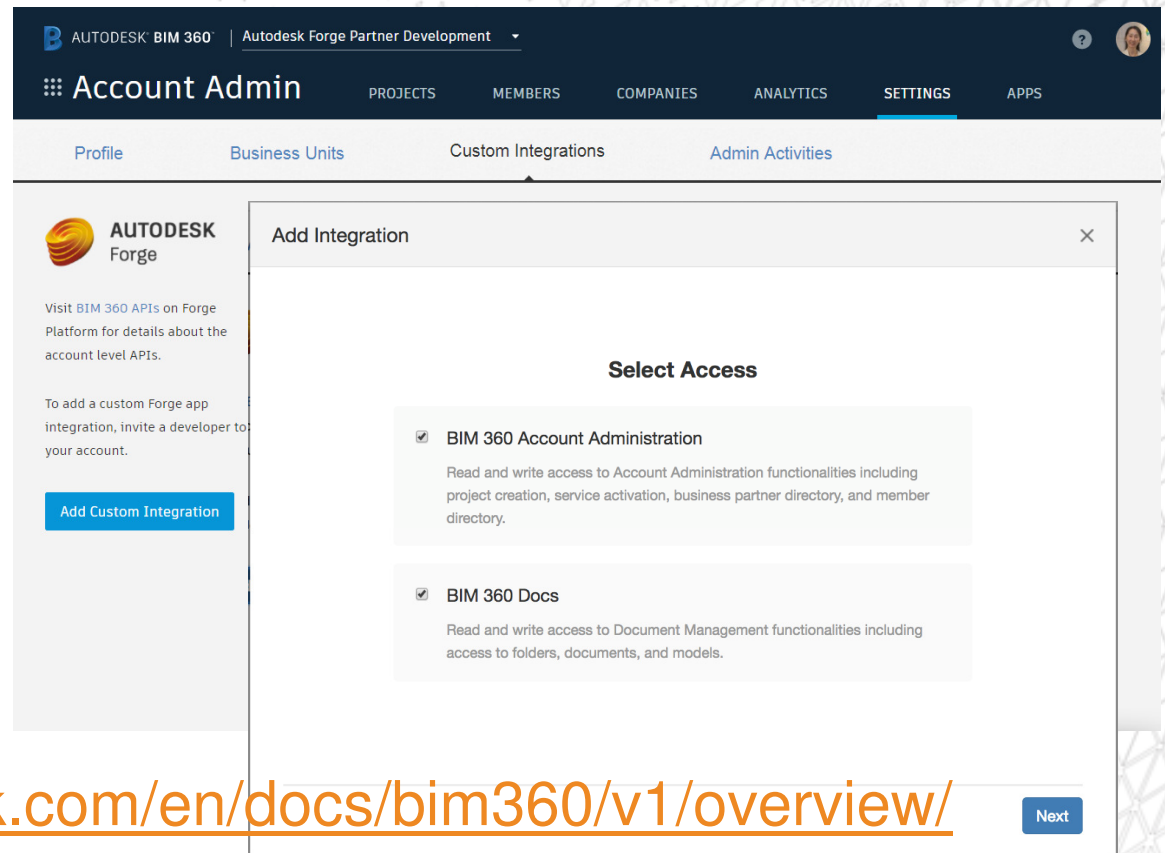
- Account admin need to activate API access in
Settings >> Custom Integration



<https://developer.autodesk.com/en/docs/bim360/v1/overview/>

Activating API Access

- Both Account Admin and Docs
- In house development or invite the 3rd party



<https://developer.autodesk.com/en/docs/bim360/v1/overview/>

Autodesk, Inc. [US] | [https://admin.b360.autodesk.com/...](https://admin.b360.autodesk.com/)

Autodesk F...

Add Integration

BIM 360 info you need

When accessing BIM 360 APIs from your app, you need to specify the BIM 360 Account ID. Before proceeding, please make sure to save the BIM360 Account ID info for your records.

BIM 360 Account ID

☒ I have saved the Account ID information

Fill in App Information

* Forge Client ID

App Logo



Select image to upload

* App Name

App Description

<https://developer.autodesk.com>
>> Sign In >> My Apps

AUTODESK
FORGE

Solutions ▾ Documentation ▾ Pricing Get Help API Status

ForgeIntroApp

About this app (Created 29 May 2017)

Client ID

Client Secret  [REGENERATE](#)

App Name

Description

CallBack URL

No “Custom Integrations” Tab?

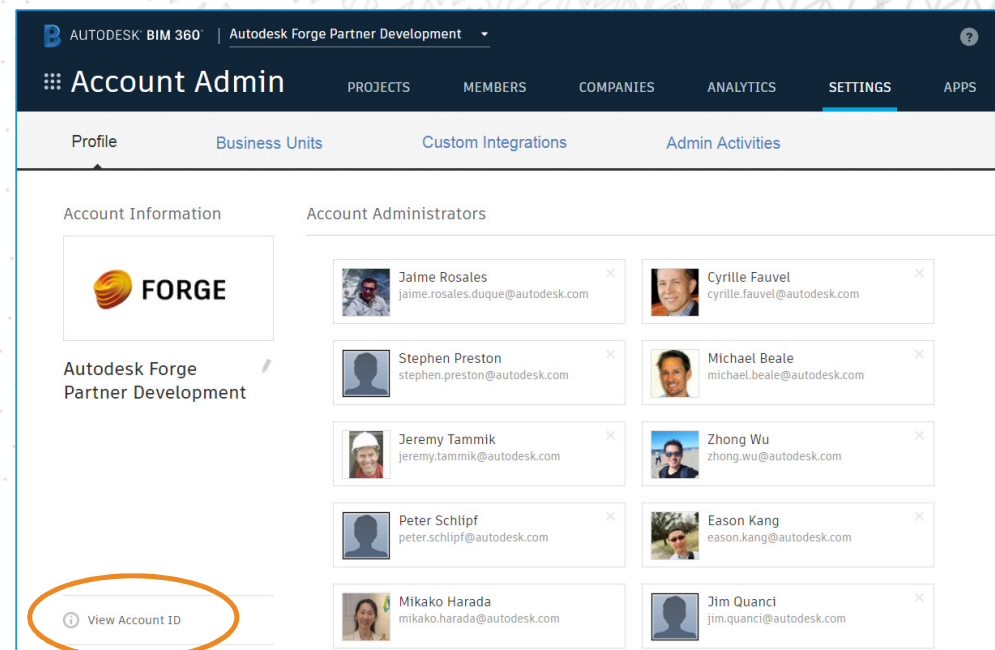
Send the requests to: bim360appsactivations@autodesk.com

Information needed:

- BIM 360 Account ID(*)
- BIM 360 Account Name
- BIM 360 Account Admin Email

*) BIM 360 Account Admin >> “Settings” tab
>> Profile >> “**View Account ID**” link
at the bottom-left of the screen.

Currently, the account with 100+ users will see
Custom Integrations tab.

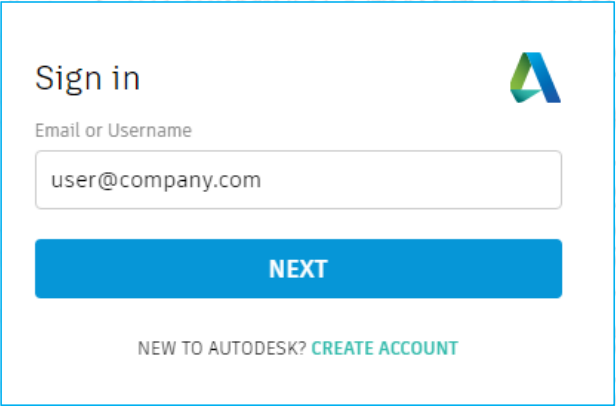


Authentication Methods for BIM 360 Docs

OAuth2

- 2-legged
 - Application-only
- 3-legged
 - User context
 - Re-direct to accounts.autodesk.com

	A360/Team	BIM 360 Docs	BIM 360 Admin
2-legged	X	○	○
3-legged	○	○	X

A screenshot of the Autodesk sign-in interface. It features the Autodesk logo in the top right corner. Below the logo, the text "Sign in" is displayed. Underneath, there is a label "Email or Username" followed by a text input field containing the placeholder "user@company.com". A blue button labeled "NEXT" is positioned below the input field. At the bottom, there is a link that says "NEW TO AUTODESK? CREATE ACCOUNT".

Sign in

Email or Username

user@company.com

NEXT

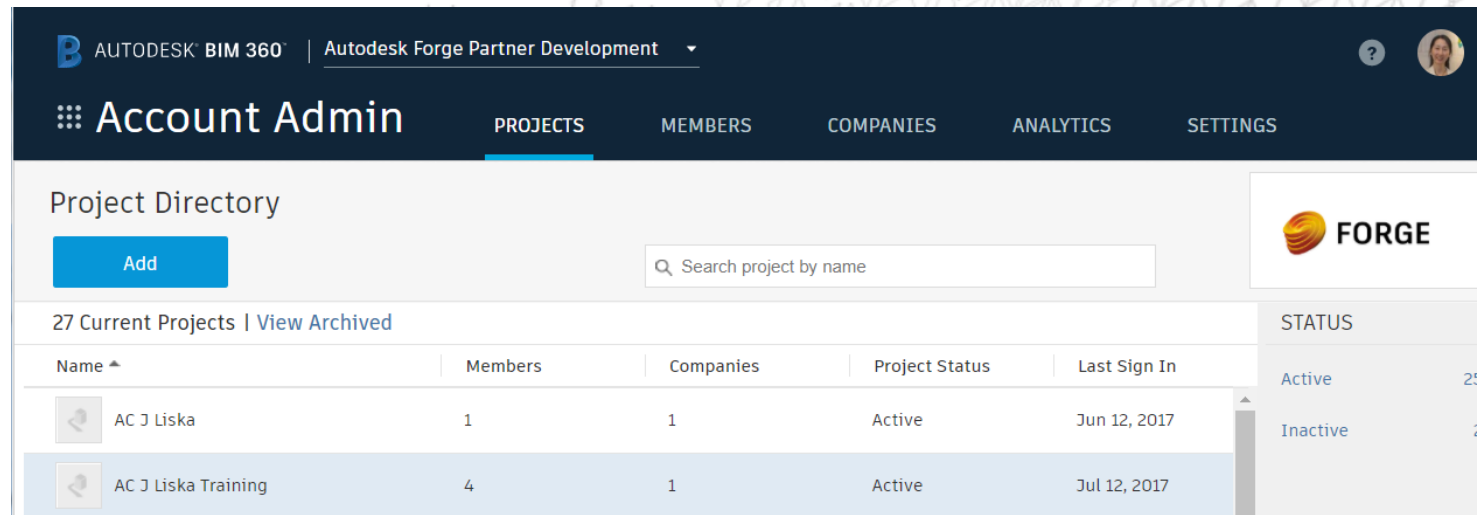
NEW TO AUTODESK? [CREATE ACCOUNT](#)

- 2-legged authentication gives you power user privilege. Use 3-legged where possible.
- <https://forge.autodesk.com/blog/expanding-net-desktop-apps-cloud-oauth>

<https://developer.autodesk.com/en/docs/oauth/v2/overview/>

Account Admin API (a.k.a. BIM 360 API)

- admin.b360.autodesk.com
- Projects
- Members
- Companies



The screenshot displays the Autodesk Account Admin interface. The top navigation bar includes the Autodesk BIM 360 logo, a dropdown for 'Autodesk Forge Partner Development', and a user profile icon. The main navigation menu features 'Account Admin' (selected), 'PROJECTS', 'MEMBERS', 'COMPANIES', 'ANALYTICS', and 'SETTINGS'. The 'Project Directory' section shows a table of projects with columns for Name, Members, Companies, Project Status, and Last Sign In. Two projects are listed: 'AC J Liska' and 'AC J Liska Training'. A search bar and an 'Add' button are also visible.

Name	Members	Companies	Project Status	Last Sign In
AC J Liska	1	1	Active	Jun 12, 2017
AC J Liska Training	4	1	Active	Jul 12, 2017

<https://developer.autodesk.com/en/docs/bim360/v1/overview/>

Data Management API – Overview

- Document Management
- Common across Autodesk products
 - A360
 - Fusion/Life Cycle
 - BIM 360 Docs
 - Consumer products (Tinker CAD)
 - ...

Data Management API – Service Groups

- Project service
- Data service
- Object storage service (OSS)
- Schema services

Service Group

project

project

data

oss

modelderivative

hq

issues

Service Group

project

Resource

project

health

health

hubs

hubs/{hub_id}

hubs/{hub_id}/projects

hubs/{hub_id}/projects/{project_id}

hubs/{hub_id}/projects/{project_id}/topFolders

<https://developer.autodesk.com/en/docs/data/v2/overview/>

Data Management API

JSON API

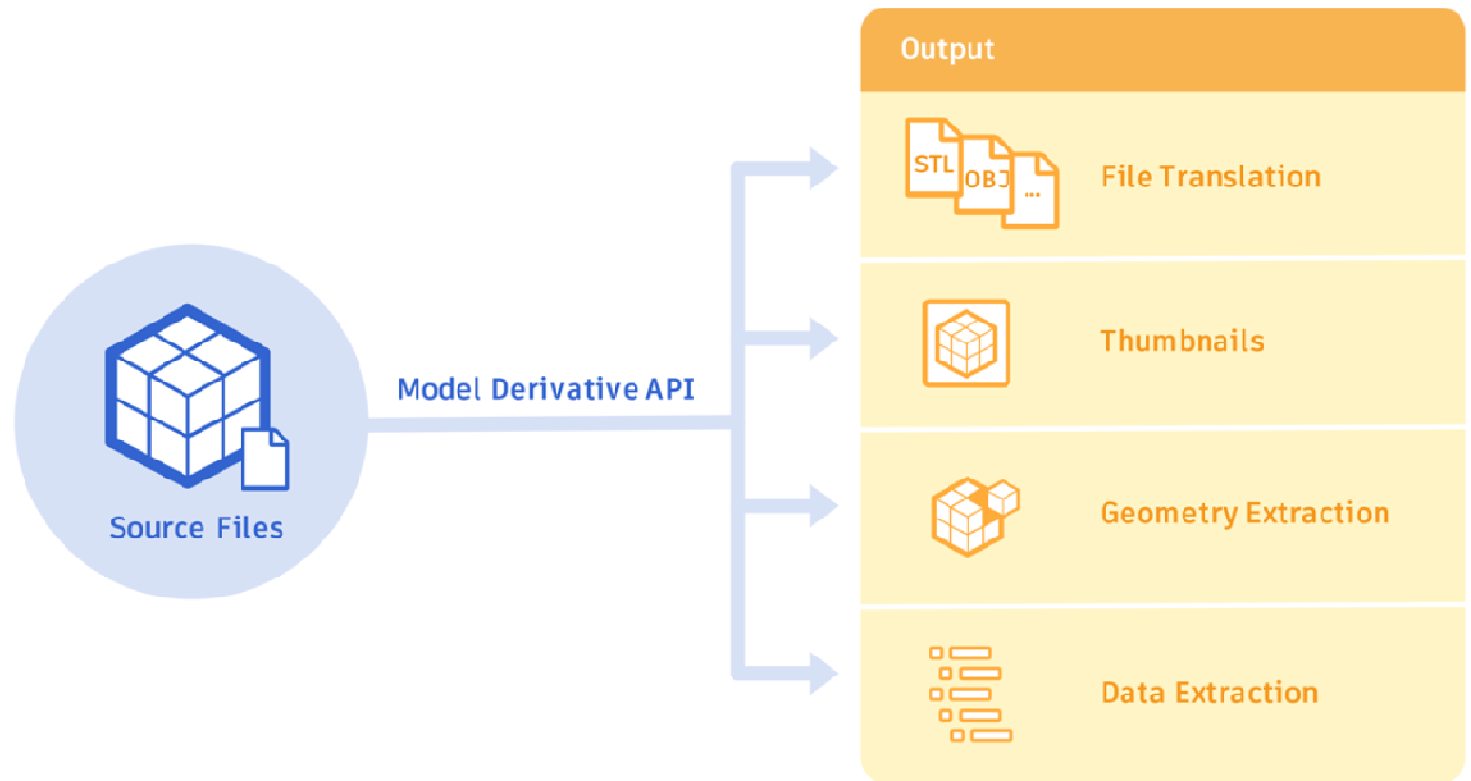
{json:api}

<http://jsonapi.org/format/>



Model Derivative API

All about model data



<https://developer.autodesk.com/en/docs/model-derivative/v2/overview/supported-translations/>

Data Management API

Drill down with Test Harness

(download: <http://a360.co/2zwJdyh>
Note: intended to move to github later.)

Request
https://developer-stg.api.autodesk.com/data/v1/projects/b.e9074a8c-60a1-4546-aea4-6c60c10e44d2/folders/urn%3Aadsk.wipstg%3Afs.folder%3Aco.CkAYk1eRTxmIEuHXVcKw80/contents

Response
Status Code: OK
{ "jsonapi": { "version": "1.0", "links": { "self": { "href": "https://developer-stg.api.autodesk.com/data/v1/projects/b.e9074a8c-60a1-4546-aea4-6c60c10e44d2/folders/urn%3Aadsk.wipstg%3Afs.folder%3Aco.CkAYk1eRTxmIEuHXVcKw80/contents" } }, "data": {

Service Group
data

Resource
projects/{project_id}/folders/{folder_id}/contents

GET
/data/v1/projects/{project_id}/folders/{folder_id}/contents

Run

Tree View
JSON
├─ jsonapi
├─ links
├─ data[8]
├─ included[8]
│ └─ included
│ └─ included
│ └─ included
│ └─ included
│ └─ included
│ └─ included
│ └─ included
│ └─ included
└─ type : versions
└─ id : urn:adsk.wipstg:fs.file:vf.VQ7hO3x8T5q5
└─ attributes
└─ links

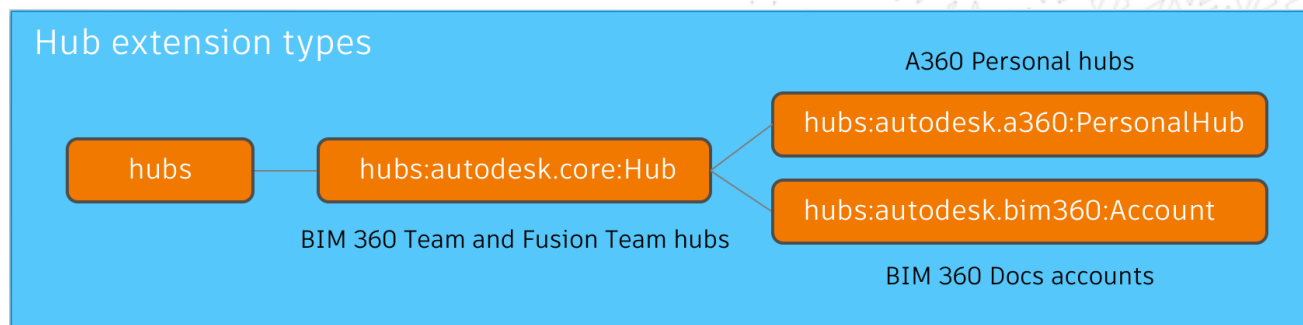
Parameters

Parameter	Value
filter[id]	
filter[attributes.name]	
filter[attributes.extension.type]	
hub_id	b.0db98458-a803-49fd-89c8-e750
limit	
offset	
sort	
field	
account_id	
project_id	b.e9074a8c-60a1-4546-aea4-6c60
filter[type]	
folder_id	urn:adsk.wipstg:fs.folder:co.CkAYk1

3D Model View
dXJuOmFkc2sud2lwc3Rn View

BIM 360 Docs & Forge

- Basic workflow is identical to A360 Personal & Team Hubs
- A few differences:
 - Docs support 2-legged and 3-legged.
 - “Hubs” is equivalent of “Accounts” in BIM 360 Docs.
 - Docs requires an additional step for [activating API access in Account Admin Page](#).
 - Id’s: of A/Team 360 starts **a**.xxx, Docs has **b**.xxx
 - Look for the use of extension types, such as ***:autodesk.bim360:*** instead of ***:autodesk.core:***
- Details: <https://developer.autodesk.com/en/docs/data/v2/overview/basics/>



BIM 360 Docs & Forge

Uploading files

- In [Step 5/6 of tutorial](#), use `*:autodesk.bim360:*` instead of `*:autodesk.core:*`
- Use topFolders relationships (most user does not have access to rootFolder)
- If you upload to Plans folder, it will automatically create Documents.
- pdf in Plans – appear as review documents. Still needs to manually review.

<https://developer.autodesk.com/en/docs/data/v2/tutorials/upload-file/>

Steps

1. Get a hub_id
2. Get a project_id and folder_id
3. Create a storage location
4. Upload a file
5. Create the first version
6. Update a version

BIM 360 Docs & Forge

Folder creation

- For BIM 360 Docs
 - use **command** instead of post folder (for now)
<https://developer.autodesk.com/en/docs/data/v2/overview/commands/>
- For A360/BIM 360 Team
 - use post folder
POST `projects/:project_id/folders`
https://developer.autodesk.com/en/docs/data/v2/reference/http/projects-project_id-folders-POST/

Want to start, but no Docs Account for Development?

- ADN members -- adn.autodesk.io >> Development Software and Web Services Request Form
- Paid account owner – ready to use
- Not ADN, no paid account
 - Contact www.autodesk.com/joinadn

Learn more

<https://developer.autodesk.com/>

<https://autodesk-forge.github.io/>

<https://fieldOfViewBlog.wordpress.com/forge>

Model Derivative API – Basic Node.js Sample

Model Derivative API - Basic Node.js Sample

Show the entire list of Hubs, Projects, Folders, Items and Versions under your account.
Select an item version to show a file using [Autodesk Viewer](#)

You're logged in

Retrieved hierarchy

The interface displays a file hierarchy on the left with the following structure:

- Mikako Test
 - Mikako Test2
 - Boston Build Space
 - Mikako Sandbox
 - DirectShapeSample.rvt
 - DirectShapeSample
 - Urban Innovation Festival
 - Autodesk Cloud Accelerator
- DevTech AEC
 - Revit Collaboration
 - Samples
 - Golden Bridge Gate.dwt
 - House Design.rvt
 - House Design.rvt (selected)
 - Office Building.nwc
 - Robot.iam
 - Sports Car.sldasm
 - V8 Engine.iam

The right pane shows the hierarchy for the selected file:

- Roofs
 - Basic Roof
 - Typical Roof
 - Basic Roof [143181] (selected)
 - Basic Roof [145079]
 - Basic Roof [177761]
 - Basic Roof [186659]
 - Slab Edges
 - Specialty Equipment
 - Stairs

Below the hierarchy, there are buttons for 'Download' and 'Delete'. The bottom section displays analytical properties:

- Analytical Properties
 - Constraints
 - Construction
 - Dimensions
 - Area = 387.871206
 - Slope = 5.093698
 - Thickness = 0.541667
 - Volume = 209.458295

The rightmost pane shows a 3D model of a house with a blue roof. Navigation controls include 'RIGHT' and 'BACK' buttons, and a toolbar with icons for view, download, print, settings, and share.

<https://derivatives.autodesk.io/>

Learn more this week (not exhaustive list...)

Date Time	Class ID	Class Title	Speaker	Focus
Mon 11am-12pm	FDC128455	Forge Road Map	Forge PMs	Roadmap
Mon 1-2pm Tues 3:45-4:45pm	FDC125725/ CS129232	BIM 360 and API for a Connected Construction Ecosystem	BIM 360 PMs	Roadmap
Mon 1-2 pm	FDC126529	Deep Dive with the Model Derivative API	Sharmila Phadnis	MD
Mon 1-2 pm	FDC122160	Seamless integration with Forge Webhooks	Monmohan Singh, Adam Nagy	Notification(beta)
Mon 1-1:30pm	FDC123224	10 Useful (and Cool) Forge Applications	Jim Quanci, Stephen Preston	Apps
Mon 2:15-3:15	FDC124141	Best Practices with Forge REST APIs	Philippe Leefsma, Jaime Rosales	Dev tips
Mon 3:45-4:15pm	FDC124079	Integrating Forge Data Management API with Other Storage Providers	Augusto Goncalves	DM
Tues 1-2pm	SD121052	Forge Platform / API: Meet the Experts	PMs	

Contact for further inquiry

Meet us at Forge Answer Bar

<https://developer.autodesk.com/>

>> Get Help <https://developer.autodesk.com/en/support/get-help>

StackOverflow

API product manager tomergalon@autodesk.com

Business tomculotta@autodesk.com

FPD AEC tech lead mikako.harada@autodesk.com



**AUTODESK
FORGE**

Accelerator San Francisco

Feb 26 – March 2, 2018

<http://autodeskcloudaccelerator.com/>



@autodeskforge



FORGE DevCon

Summary

BIM 360 and Family Products

BIM 360 – API

- Overview
- Forge
 - Authentication
 - Account level (HQ)
 - Data Management
 - Model Derivative
 - Viewer



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