

Free your design data

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More Questions? Visit the Forge booth



Class summary

Is this the end of the proprietary file format? The Forge Model Derivative API allows you to easily translate your design files to different formats and also extract data from those files for you to use almost anywhere. In this class we will introduce these APIs by walking you through a series of sample code demonstrations.

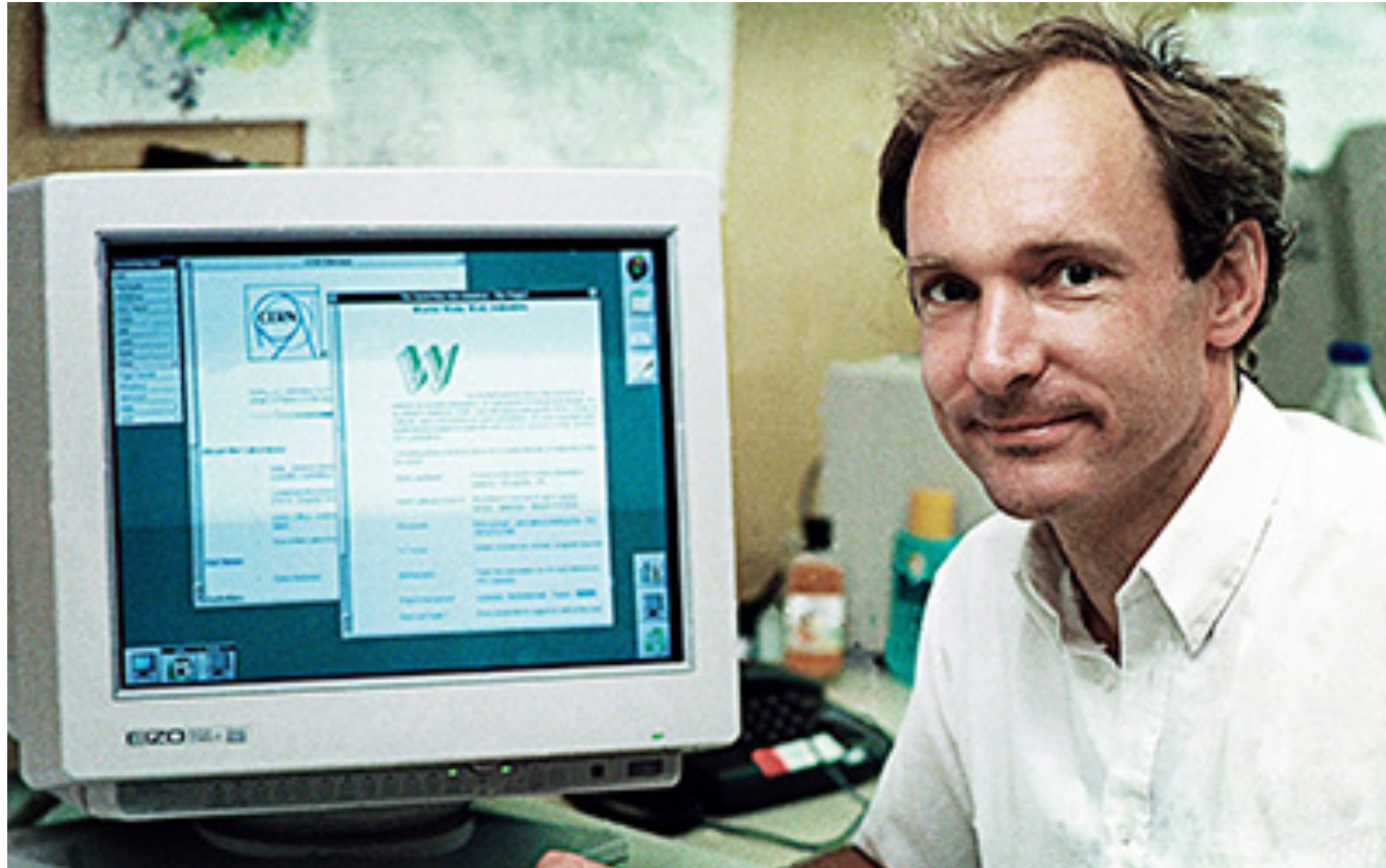
Key learning objectives

At the end of this class, you will be able to:

- Know what services are available as part of Forge
- Know how to access files on OSS and A360
- Know how Data Management and Model Derivative services can work together
- Know how to get information from A360 files through the Model Derivative service

The World Wide Web





Sir Tim Berners-Lee

“In those days [1980’s], there was different information on different computers, but you had to log on to different computers to get at it. Also, sometimes you had to learn a different program on each computer. Often it was just easier to go and ask people when they were having coffee...”

Sir Tim Berners-Lee



“In those days [2000’s], there was different design data on different computers, but you had to use different computers to get at it. Also, sometimes you had to use a different application on each computer. Often it was just easier to go and ask people when they were having coffee...”

Adam Nagy

Design data



Evolution of design access

You need to install the design software

You need to install “the” viewer

Just use Viewer from a web browser

Forge API's

Forge API's

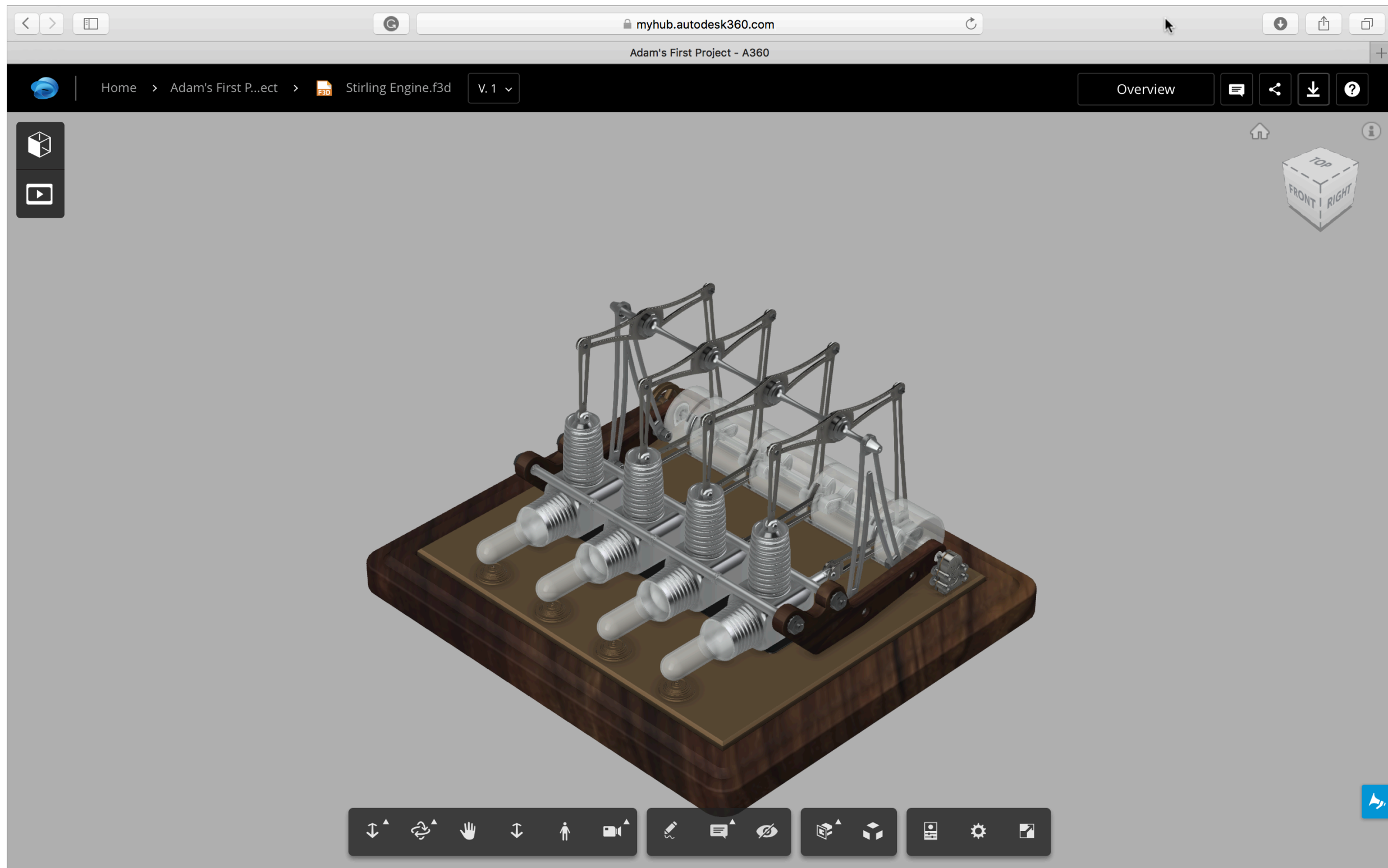
- Authentication
- Data Management API
- Model Derivative API
- Design Automation API
- Viewer

Forge API's



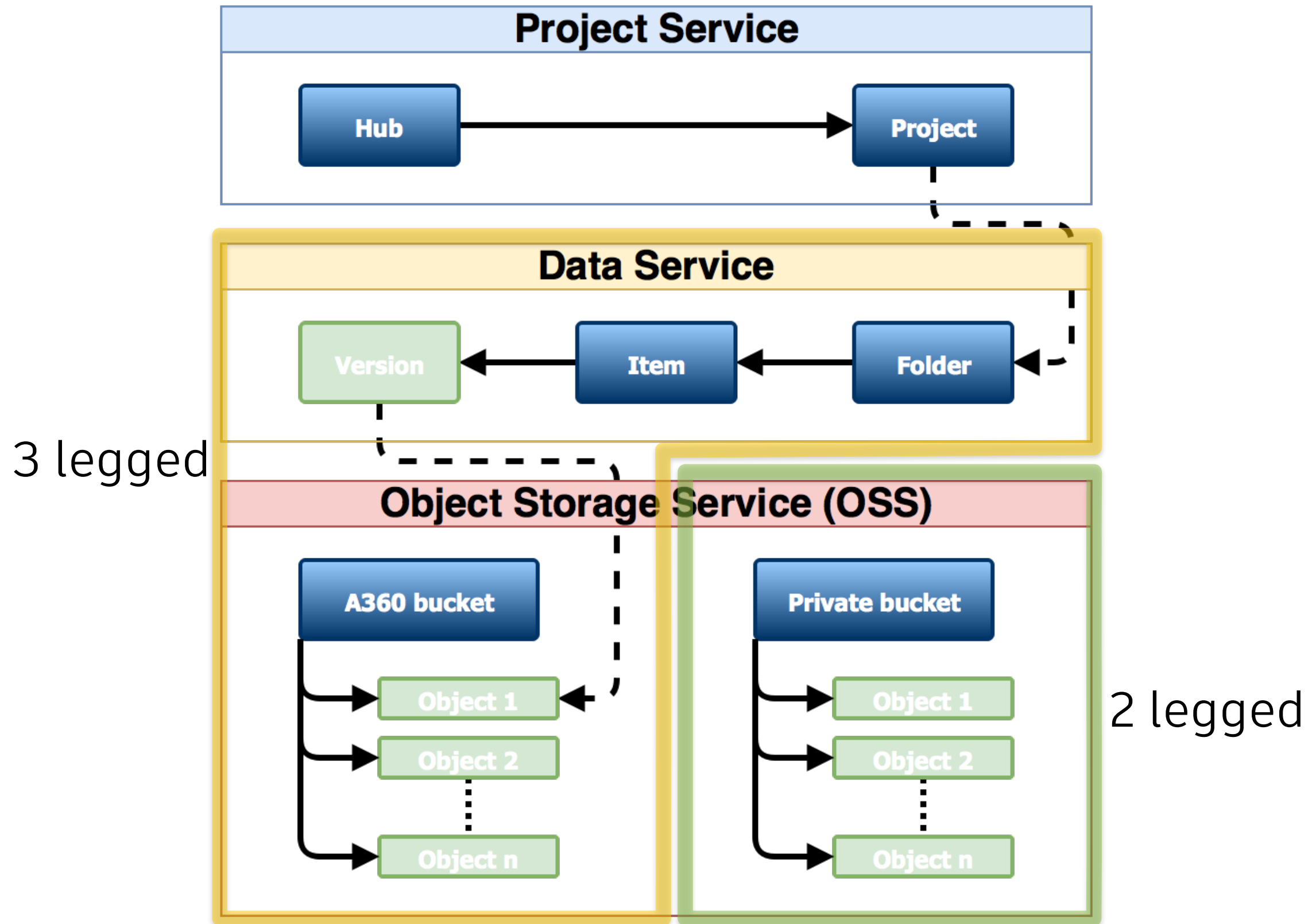
Viewer

(enabled by Model Derivative API)



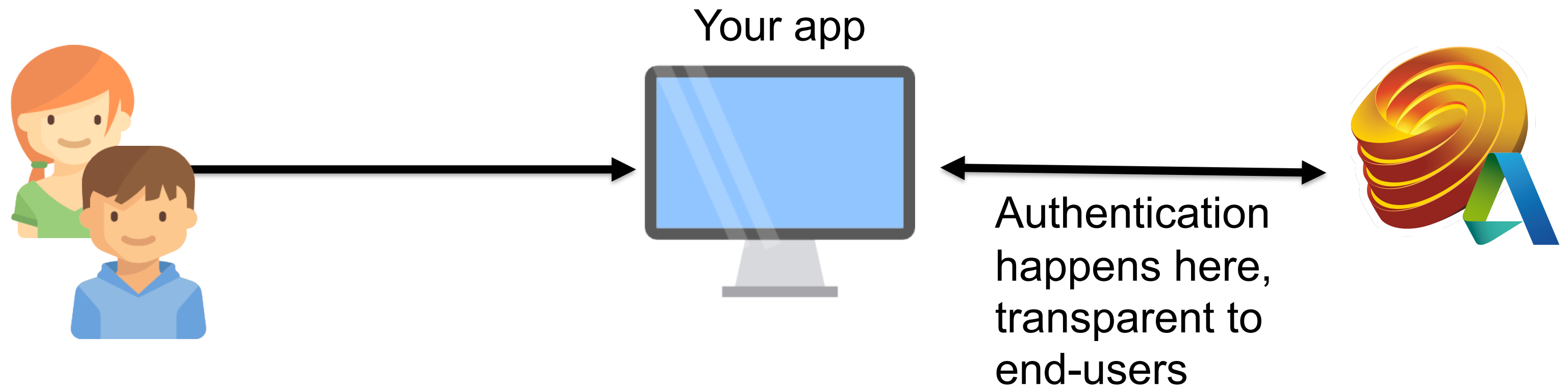
Data Management API





The **green** items can be used by the Model Derivative API

2-legged authentication



2-legged authentication

- Transparent to end-users (no Autodesk Forge brand appear)
- All files are stored under your developer account (OSS buckets)
- Get 2-legged token tutorial
 - `/authentication/v1/authenticate`

The screenshot shows the Autodesk Forge developer portal interface. At the top, the 'FORGE' logo is visible, along with 'APIs' and 'Support' dropdown menus. The main navigation sidebar on the left includes 'Overview', 'Step-by-Step Tutorials', 'Create an App', 'Get a 2-Legged Token', 'Get a 3-Legged Token', and 'API Reference'. The 'Step-by-Step Tutorials' section is highlighted with a blue box, and a blue arrow points from the 'Authentication (OAuth)' link in the 'APIs' dropdown menu to it. Below 'Step-by-Step Tutorials', the 'Get a 2-Legged Token' link is also highlighted with a blue box. To the right of the sidebar, the 'APIs' dropdown menu is open, showing a list of API categories: 'GENERAL AVAILABILITY', 'Authentication (OAuth)', 'Data Management API', 'Design Automation API', 'Model Derivative API', and 'Viewer'. The 'Authentication (OAuth)' link is highlighted with a blue box. Below the API list, there is a section for 'BETA' APIs, including '3D Print', 'BIM 360', and 'Reality C'. At the bottom of the page, there is a blue link that says 'Create an app. Note your client ID a' and a green heading that says 'Step 1: Use Your Client'.

FORGE

APIs ▾ Support ▾

GENERAL AVAILABILITY

Authentication (OAuth)

Data Management API

Design Automation API

Model Derivative API

Viewer

BETA

3D Print

BIM 360

Reality C

Overview

Step-by-Step Tutorials

Create an App

Get a 2-Legged Token

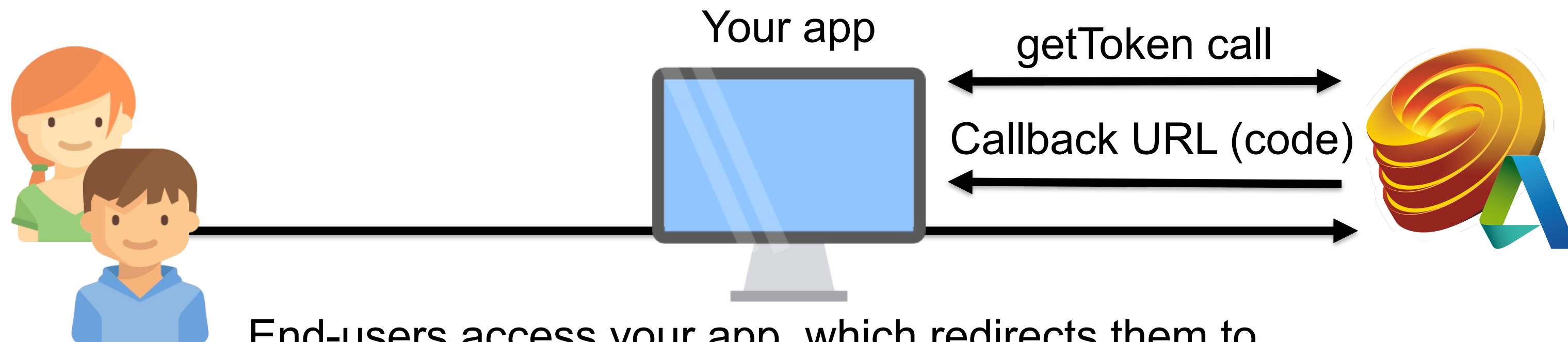
Get a 3-Legged Token

API Reference

Create an app. Note your client ID a

Step 1: Use Your Client

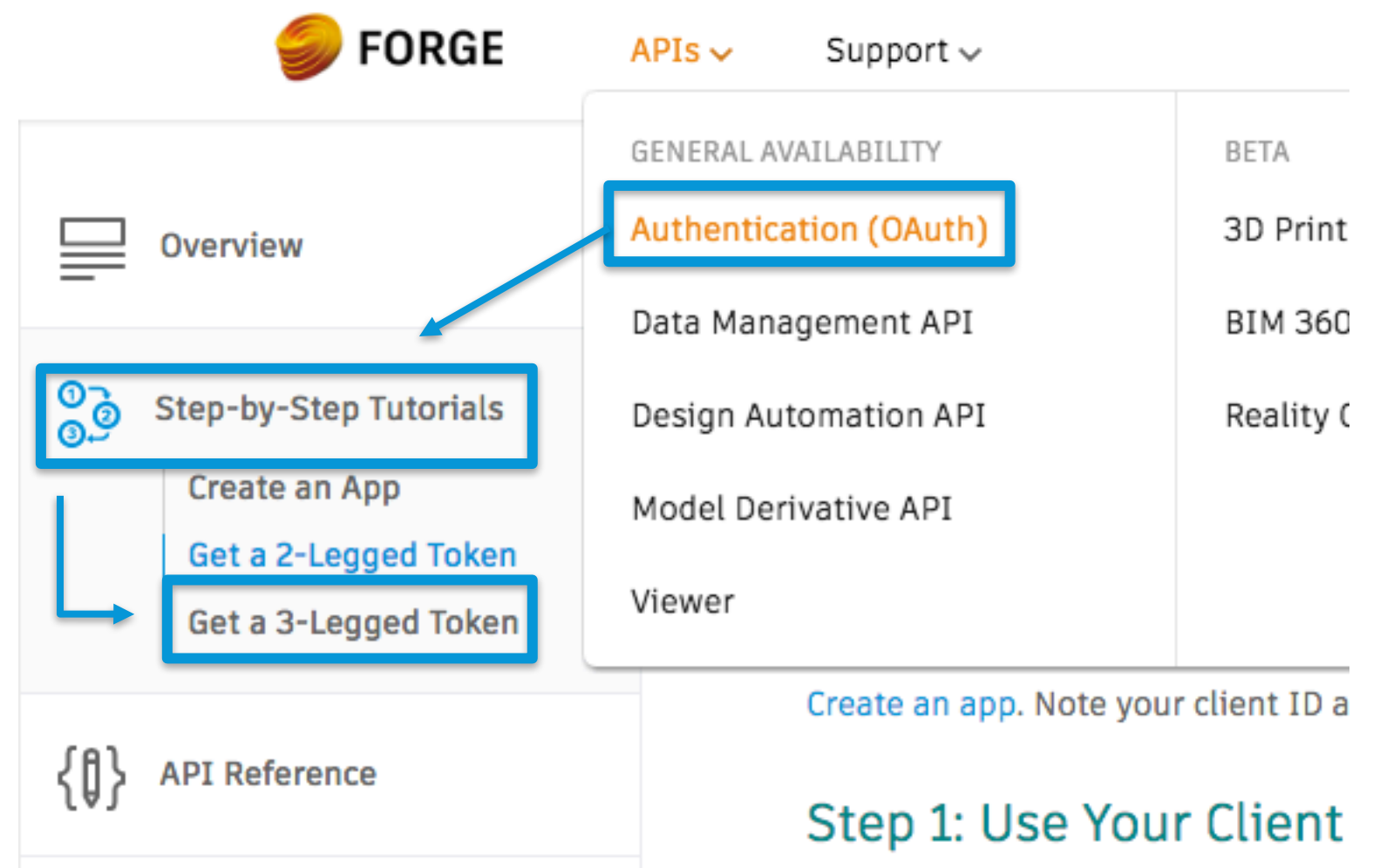
3-legged authentication



End-users access your app, which redirects them to Autodesk sign-in where they can allow access to their data

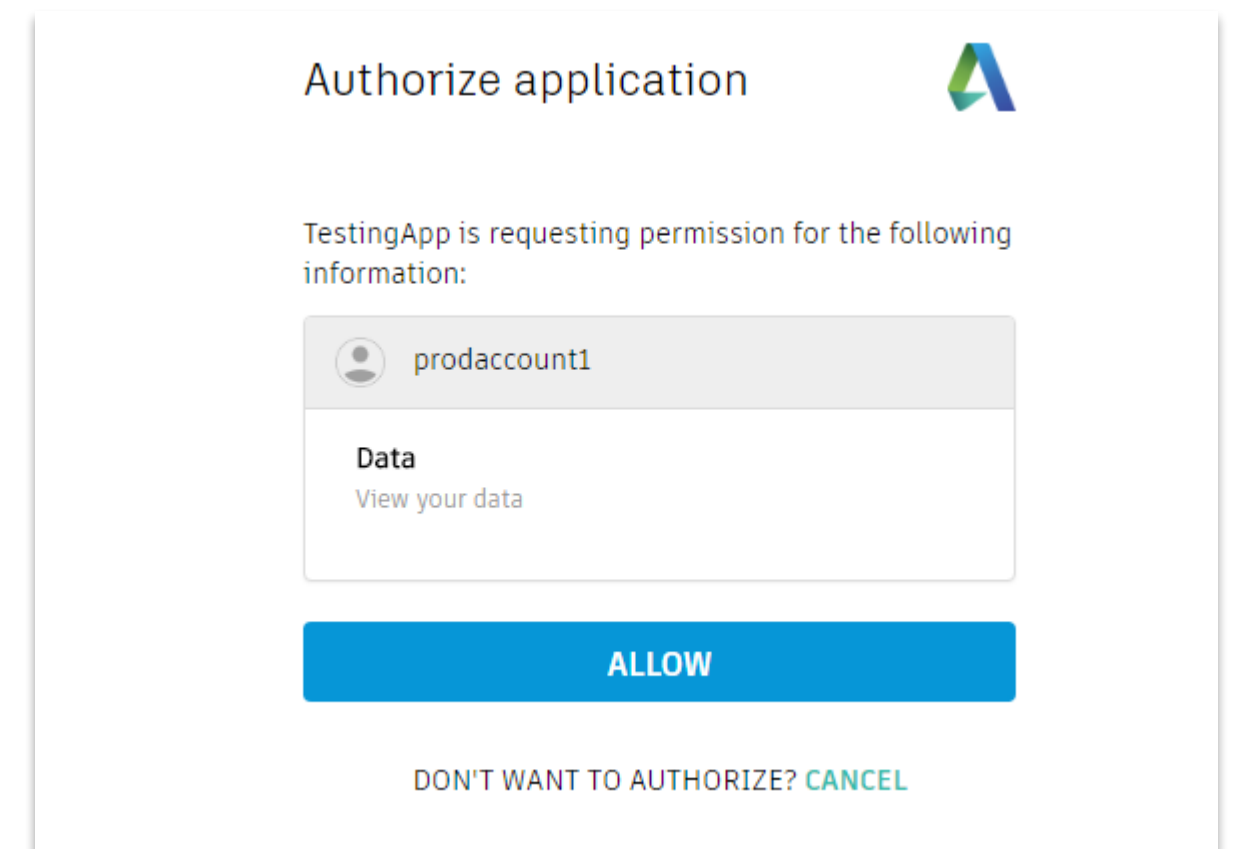
3-legged authentication

- End-user will need to enter his/her credentials and approve access at least once.
- All files are stored under the end-user account (hubs & projects)
- Get 3-legged token tutorial
 - /authentication/v1/authorize
 - [callback your app]
 - /authentication/v1/gettoken




OAuth scopes

- Define which data is accessible for the token (both 2- or 3-legged)
- On 3-legged, the scope define the permissions the end-user will need to approve on the consent page.
- **IMPORTANT:** if the end-user have access to the token, create a token with restricted access (e.g. read-only).
 - Malicious end-user with a write-enabled token can modify data directly on your account (e.g. your buckets)



OAuth scopes



APIs ▾

Support ▾

SIGN UP

SIGN IN

Model Derivative API

API Reference

HTTP Specification

POST job

v2 ▾

Derivatives

GET formats

POST job

GET :urn/thumbnail

GET :urn/manifest

DELETE :urn/manifest

GET :urn/manifest/:derivativeurn

GET :urn/metadata

GET :urn/metadata/:guid

GET :urn/metadata/:guid/properties

POST job

Translate a source file from one format to another.

Derivatives are stored in a manifest that is updated each time this endpoint is used on a source file.

Note that this endpoint is asynchronous and initiates a process that runs in the background, rather than keeping an open HTTP connection until completion. Use the [GET :urn/manifest](#) endpoint to poll for the job's completion.

Resource Information

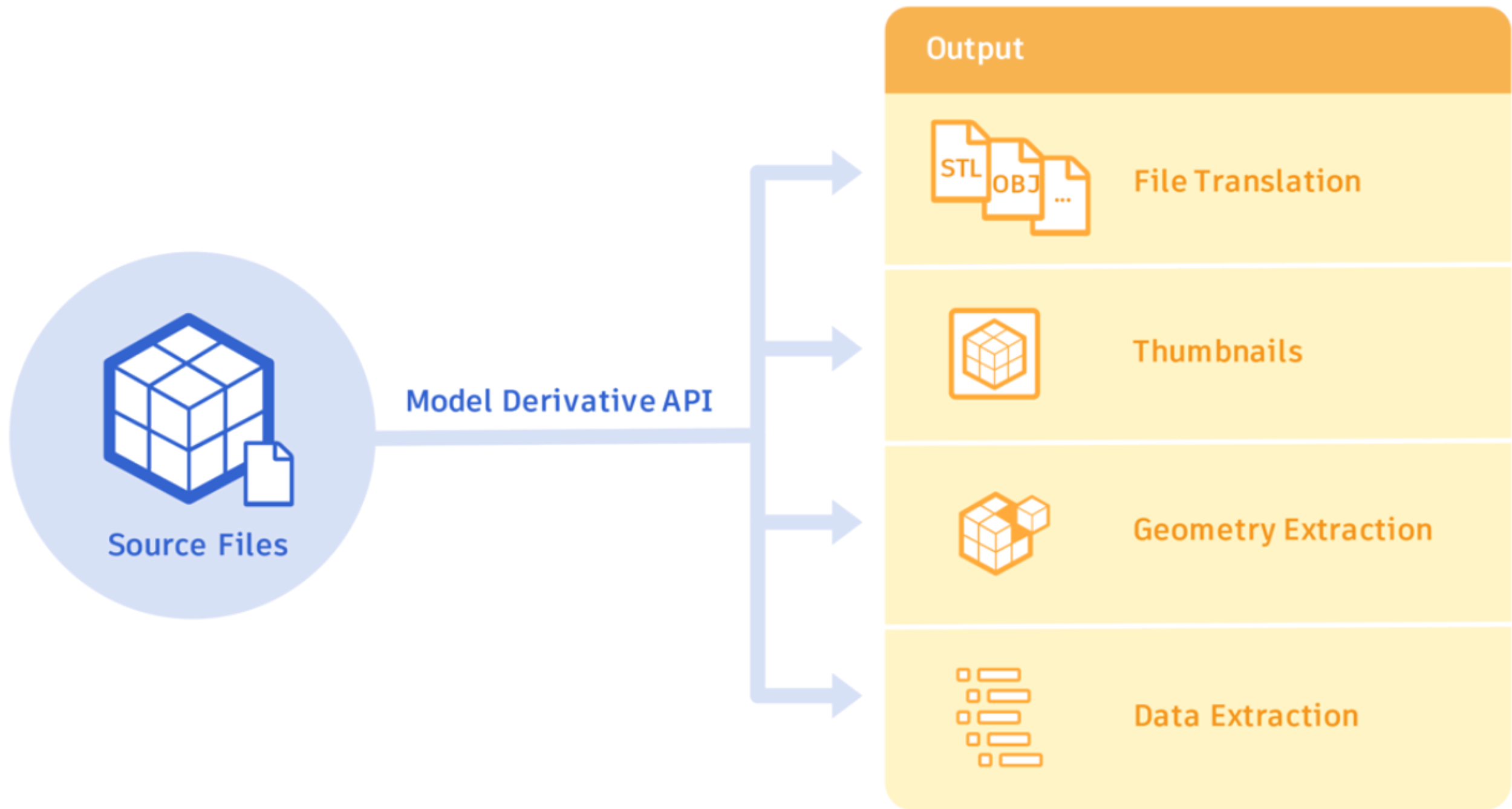
Method and URI	POST https://developer.api.autodesk.com/modelderivative/v2/designdata/job
Authentication Context	app only
Required OAuth Scopes	<code>data:read</code> and (<code>data:write</code> or <code>data:create</code>)
Data Format	JSON


Request

HTTP Headers



Model Derivative API



 **FORGE**

APIs ▾Support ▾

SIGN UP

SIGN IN

Model Derivative API > Overview > Supported Translations

v2 ▾

Overview

API Basics

Field Guide

Supported Translations

Step-by-Step Tutorials

API Reference

Supported Translation Formats

The Model Derivate API enables you to translate over 60 different types of source file formats into derivatives (output files). Use the [GET formats](#) endpoint to return an up-to-date list of Forge-supported translations, which you can use to identify which types of derivatives are supported for each source file type.

Note that we are constantly adding new file formats to the list of Forge translations.

The following table shows a list of supported translations, **current as of 2016-06-05**:

Source Format	Derivative Format					
3ds					svf	thumbnail
3dm					svf	thumbnail
asm					svf	thumbnail
asm\.\d+\$					svf	thumbnail
dwf					svf	thumbnail
dwx					svf	thumbnail
dwg					svf	thumbnail
xpr					svf	thumbnail
wire	iges	obj	step	stl	svf	thumbnail
zip					svf	thumbnail

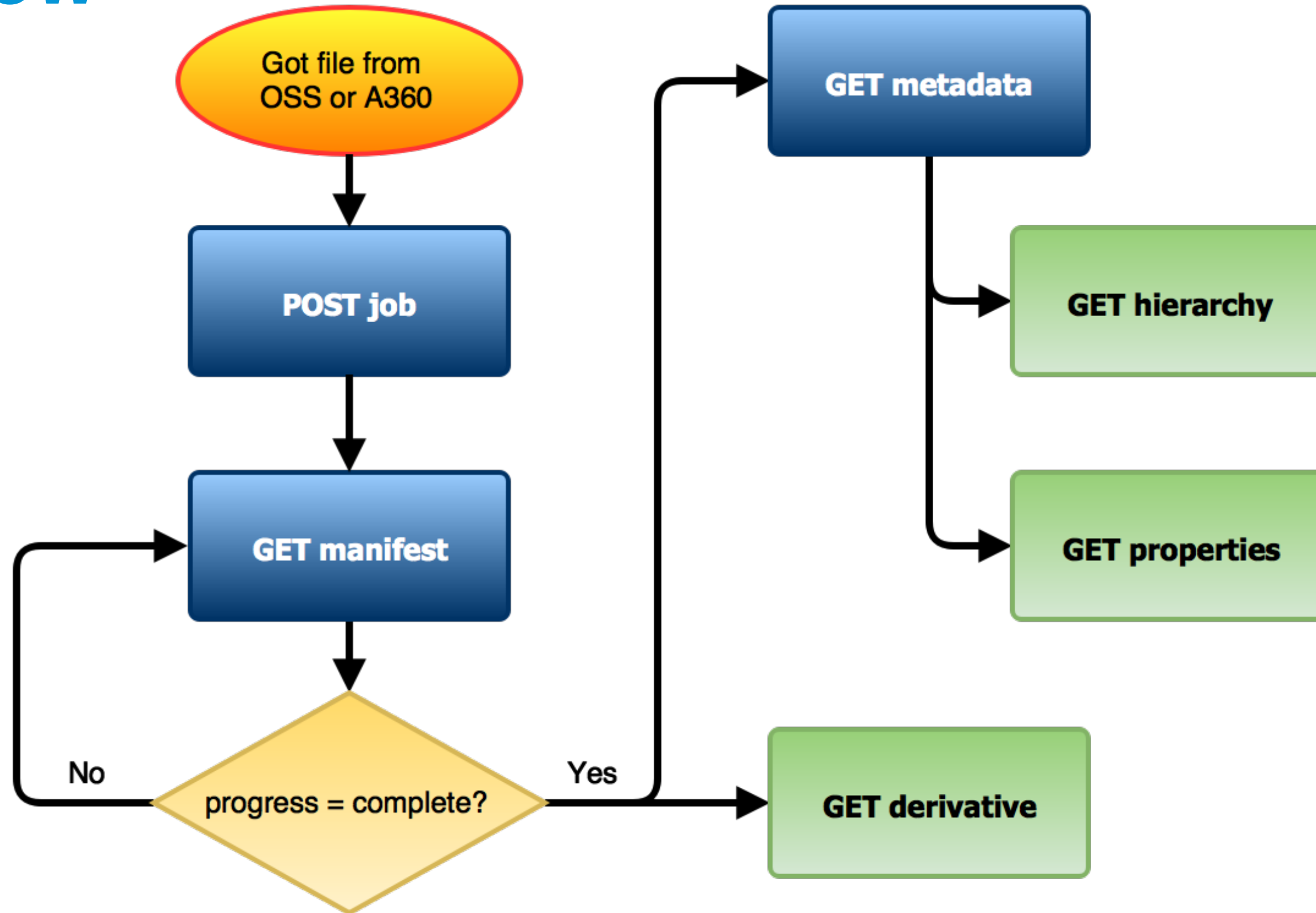
<https://developer.autodesk.com/en/docs/model-derivative/v2/overview/supported-translations/>



Translation

- Viewing/Data extraction: 60+ file formats
- OBJ:
 - all file formats at component level
- STEP, IGES, STL:
 - fewer file types and only at file level
- Let us know what you need! 😊

Workflow



(OSS = Object Storage Service)

Endpoints

<https://developer.api.autodesk.com/modelderivative/v2/designdata/> ...

GET	formats	- get table of supported translations
POST	job	- start a translation
GET	:urn/ thumbnail	- get thumbnail
GET	:urn/ manifest	- get manifest (info about translations)
DELETE	:urn/ manifest	- delete manifest
GET	:urn/ manifest/ :derivativeurn	- download a derivative (translation)
GET	:urn/ metadata	- get view GUID's
GET	:urn/ metadata/ :guid	- hierarchy
GET	:urn/ metadata/ :guid/ properties	- component properties



Workflow

The screenshot displays the Autodesk Forge developer portal interface. At the top, the Forge logo is on the left, and 'APIs' and 'Support' dropdown menus are in the center. On the right, there are 'SIGN UP' and 'SIGN IN' buttons. The left sidebar contains a navigation menu with 'Overview', 'Step-by-Step Tutorials', and 'API Reference'. The 'Step-by-Step Tutorials' section is expanded, showing a list of tutorials: 'Translate a Source File into OBJ Format' (highlighted), 'Translate a ZIP Source File into STL format', 'Prepare a File for the Viewer', 'Extract Data From a Source File', and 'Extract Geometry From a Source File'. The main content area shows the title 'Translate a Source File into OBJ Format' and a version selector 'v2'. The tutorial text explains that it demonstrates how to translate a source file into an OBJ output (derivative) file, including steps for encoding the source URN to Base64, translating the source file into an OBJ file, and downloading the OBJ file. A 'Before You Begin' section lists prerequisites: registering an app, acquiring an OAuth token with 'data:write' and 'data:read' scopes, and uploading a source file to OSS. A note mentions that the Model Derivative API uses two types of URNs. The 'Step 1: Convert the Source URN into a Base64-encoded URN' section begins with the instruction to encode the source file URN to Base64 format.

FORGE APIs ▾ Support ▾ SIGN UP SIGN IN

Model Derivative API > Step-by-Step Tutorials > Translate a Source File into OBJ Format > v2 ▾

Overview

Step-by-Step Tutorials

- Translate a Source File into OBJ Format
- Translate a ZIP Source File into STL format
- Prepare a File for the Viewer
- Extract Data From a Source File
- Extract Geometry From a Source File

API Reference

Translate a Source File into OBJ Format

This tutorial demonstrates how to translate a source file into an OBJ output (derivative) file. The steps include encoding the source URN to Base64 format, translating the source file into an OBJ file, and downloading the OBJ file.

Before You Begin

- Register an app
- Successfully acquire an OAuth token with the `data:write` and `data:read` scopes.
- Upload a source file to OSS, as described in the [Create an App-Managed Bucket and Upload a File](#) tutorial, and note the source URN.

Note that the Model Derivative API uses 2 types of URNs. The source URN is generated when you upload the source file to Forge, and is used when calling most of the Model Derivative API endpoints. A derivative URN is generated for each translated output file format and is used for downloading the output files.

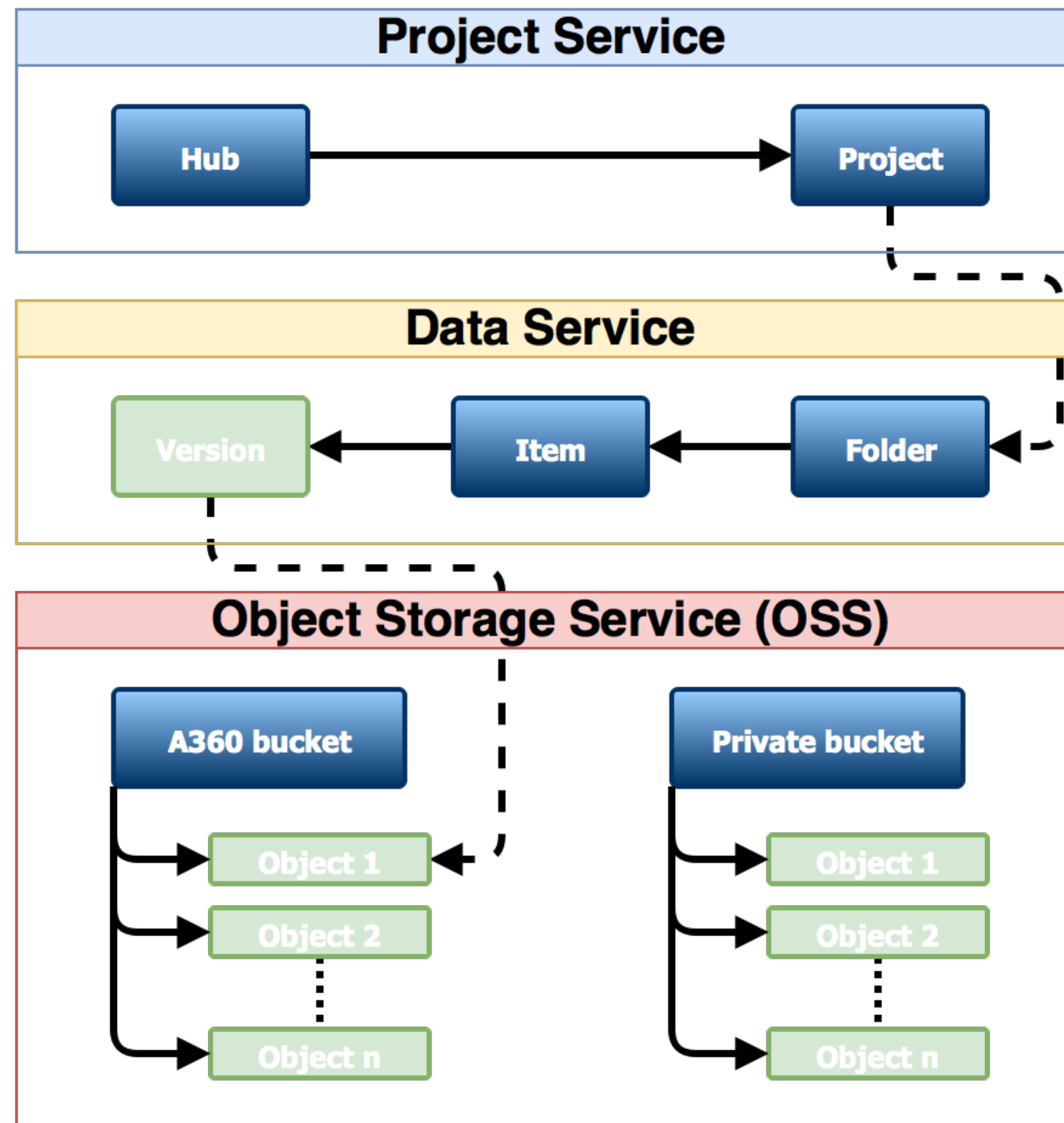
Step 1: Convert the Source URN into a Base64-encoded URN

First, you need to encode the source file URN (that you retrieved when calling the [PUT buckets/:bucket_key/objects/:object_name](#) endpoint) to Base64 format.

<https://developer.autodesk.com/en/docs/model-derivative/v2/tutorials/>



POST job



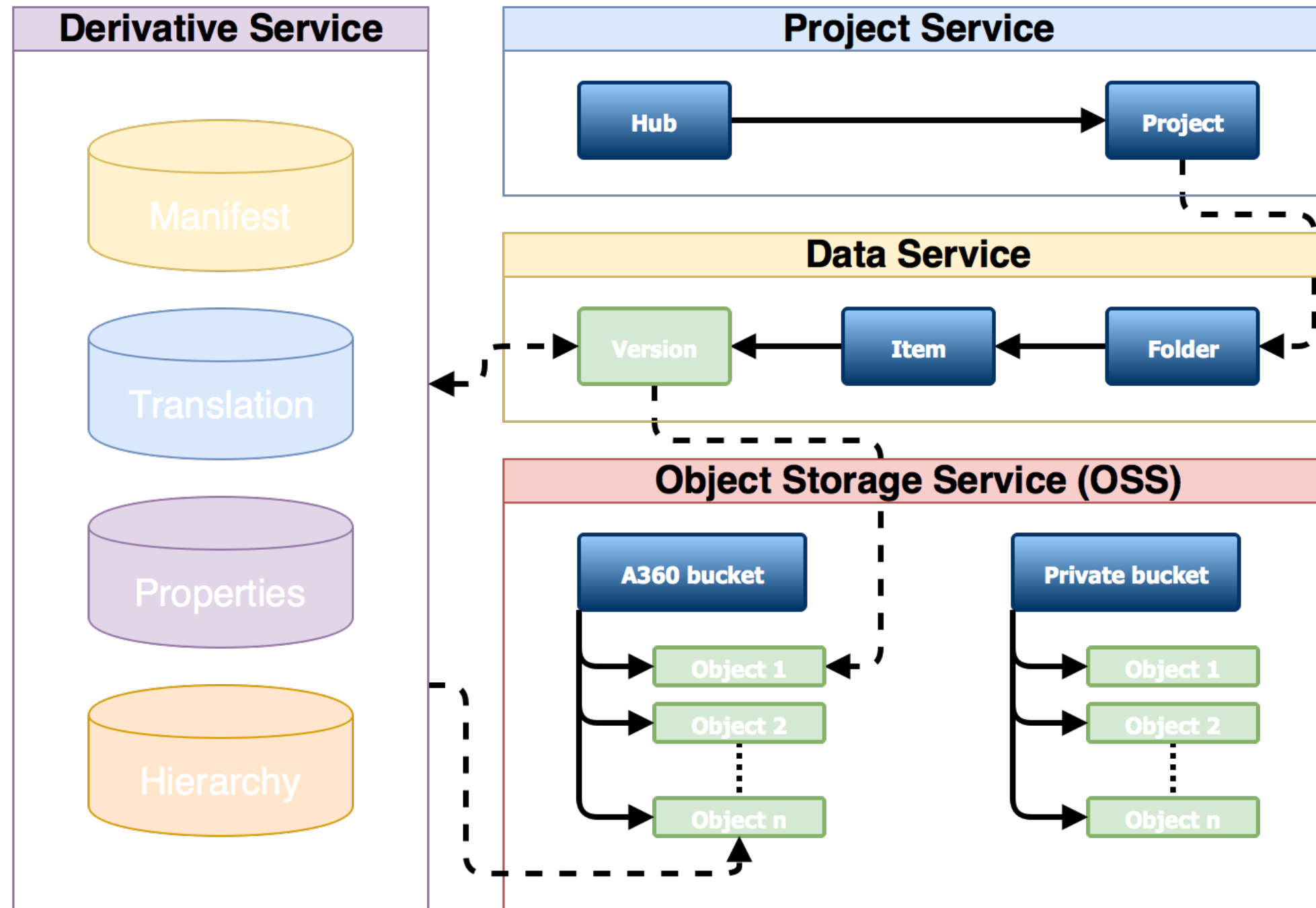
The **green** items can be used by the Model Derivative API

POST job

- Complex models are uploaded in a zip
 - e.g. **main.iam**, **part1.ipt**, **part2.ipt** >> **main.zip**
 - automatic reference resolution
 - set input.**compressedUrn** = **true**
 - set input.**rootFilename**, e.g. **main.iam**
- Simple models are uploaded in their own file format
 - e.g. **part1.ipt**
 - input.**compressedUrn** = **false**

Important: keep the extension! – e.g. a part file should end with “.ipt”

GET manifest, hierarchy, properties



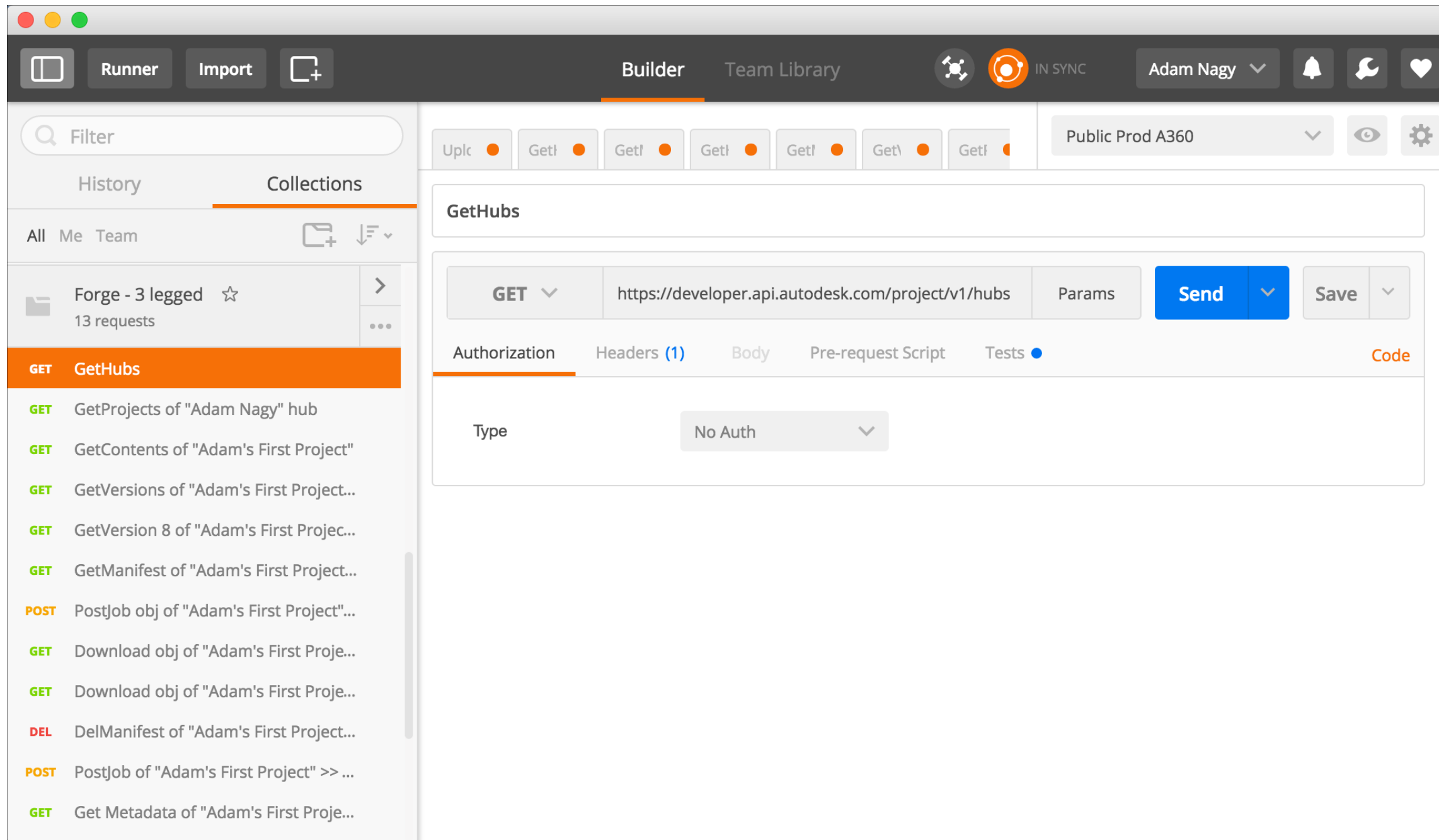
The **green** items can be used by the Model Derivative API

Version link to manifest

https://developer.api.autodesk.com/data/v1/projects/:project_id/versions/:version_id

```
"derivatives": {
  "data": {
    "type": "derivatives",
    "id":
"dXJuOmFkc2sud2lwcHJvZDpmcy5maWxlOnZmLkNjQUUNLT2gwUi02YjV2anJXcE4tcXc_dmVyc2lvbj04"
  },
  "meta": {
    "link": {
      "href":
https://developer.api.autodesk.com/modelderivative/v2/designdata/dXJuOmFkc2sud2lwcHJvZDpmcy5maWxlOnZmLkNjQUUNLT2gwUi02YjV2anJXcE4tcXc\_dmVyc2lvbj04/manifest
    }
  }
},
```


Postman



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

Postman

- http://adndevblog.typepad.com/cloud_and_mobile/2016/06/using-postman-for-testing-restful-apis.html
- http://adndevblog.typepad.com/cloud_and_mobile/2016/06/using-3-legged-oauth-for-forge-apis-with-postman.html

Demo

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

Use WIP (instead of Storage)

Retrieved hierarchy

- jigsaw
- AssemblyTestOld.iam
- BB8 Droid.f3d
- Blower.iam
- ButterFly.f3d
- Exhaust.obj
- Model (6).obj
- Stirling Engine.f3d
- Table v3.png
- Table.obj
- Warquad.f3d
- Table
 - Table (v8)
 - Table (v7)
 - Table (v6)
 - Table.f3d (v5)
 - Table.f3d (v4)
 - Table.f3d (v3)

Upload attachment

- Table v4
 - Table v4
 - Leg
 - Leg (1)
 - Leg (2)
 - Top

stl

Download

Delete

- Appearance = Oak - Semigloss
- Area = 50910
- Density = 0.000641
- Mass = 234.328
- Material = Ash
- Name = Leg (2)
- Volume = 365600



Demo

Live

<https://derivatives.autodesk.io>

Source-code

<https://github.com/Autodesk-Forge/model.derivative-nodejs-sample>

<http://www.youtube.com/watch?v=v8ngEnN3qZk>



Libraries?




`npm install forge-oauth2, forge-oss,
forge-data-management,forge-model-derivative
OR
forge-api-nodejs-client`

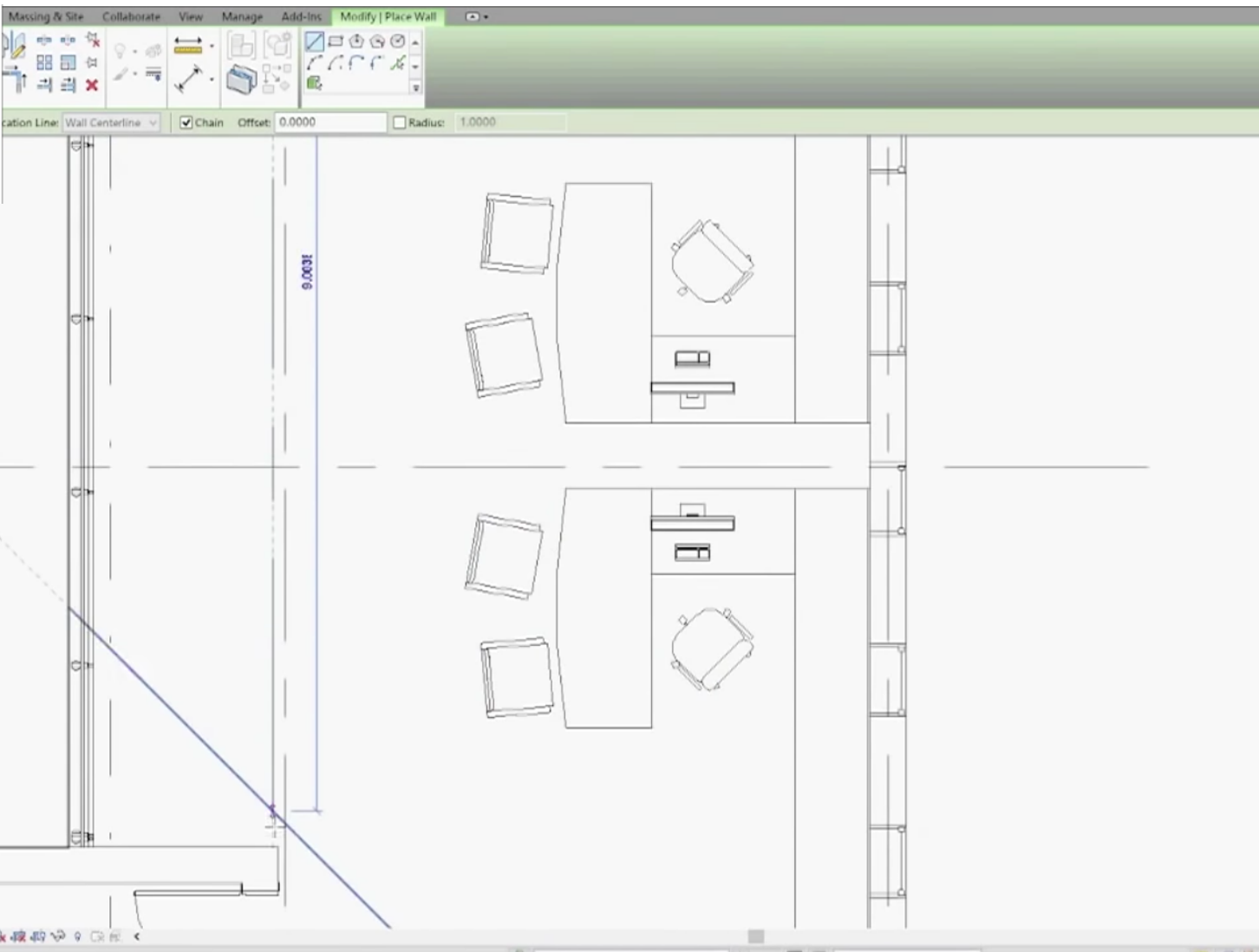


What's next?

- Register & get a key
developer.autodesk.com
- See documentation & tutorials
developer.autodesk.com/en/docs/data/v2
- Reuse code from  **GitHub**
github.com/Developer-Autodesk & github.com/Autodesk-Forge
- Ask questions on  **stackoverflow**
TAG: [autodesk-model-derivative](#) & [autodesk-data-management](#)






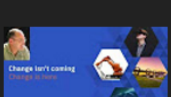
What's next?





Autodesk Forge

Autodesk • 3/24 videos

- 6  Forge and Fusion 360 Hackathon - Intro to BIM 360 Autodesk
- 7  Forge and Fusion 360 Hackathon - Intro to Design Automation API Autodesk
- 8  Forge and Fusion 360 Hackathon - Intro to Viewer API Autodesk
- 9  Forge and Fusion 360 Hackathon - Intro to Model Derivative API Autodesk
- 10  Forge and Fusion 360 Hackathon - Intro to OAuth and Data Management Autodesk
- 11  Forge and Fusion 360 Hackathon - Intro to Autodesk Forge and the Autodesk App Store Autodesk

https://www.youtube.com/playlist?list=PL_6ApchKwjN9CZCqUL4RZrsyDvnTV1Jgb

More Questions? Visit the Forge booth



How did I do?

- Your class feedback is critical. Fill out a **class survey** now.
- Use the AU mobile app or fill out a class survey online.
- Give feedback after each session.
- AU speakers will get feedback in real-time.
- **Your feedback results in better classes and a better AU experience.**



