
# SD323073 - Tips, Tricks, and the Future for Forge Model Derivative Services

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# Learning Objectives

- Discover the basics and use of Model Derivative services
- Discuss tips for successful translations
- Learn about tricks to be aware of for certain file formats
- Learn about the future plans of the Forge Model Derivative services

# Introduction to Model Derivative Service

# Model Derivative

## model

*noun*

a three-dimensional representation of a person or thing or of a proposed structure, typically on a smaller scale than the original

## derivative

*noun*

something that is based on another source

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# Model Derivative

## model

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a three-dimensional representation of a person or thing or of a proposed structure, typically on a smaller scale than the original

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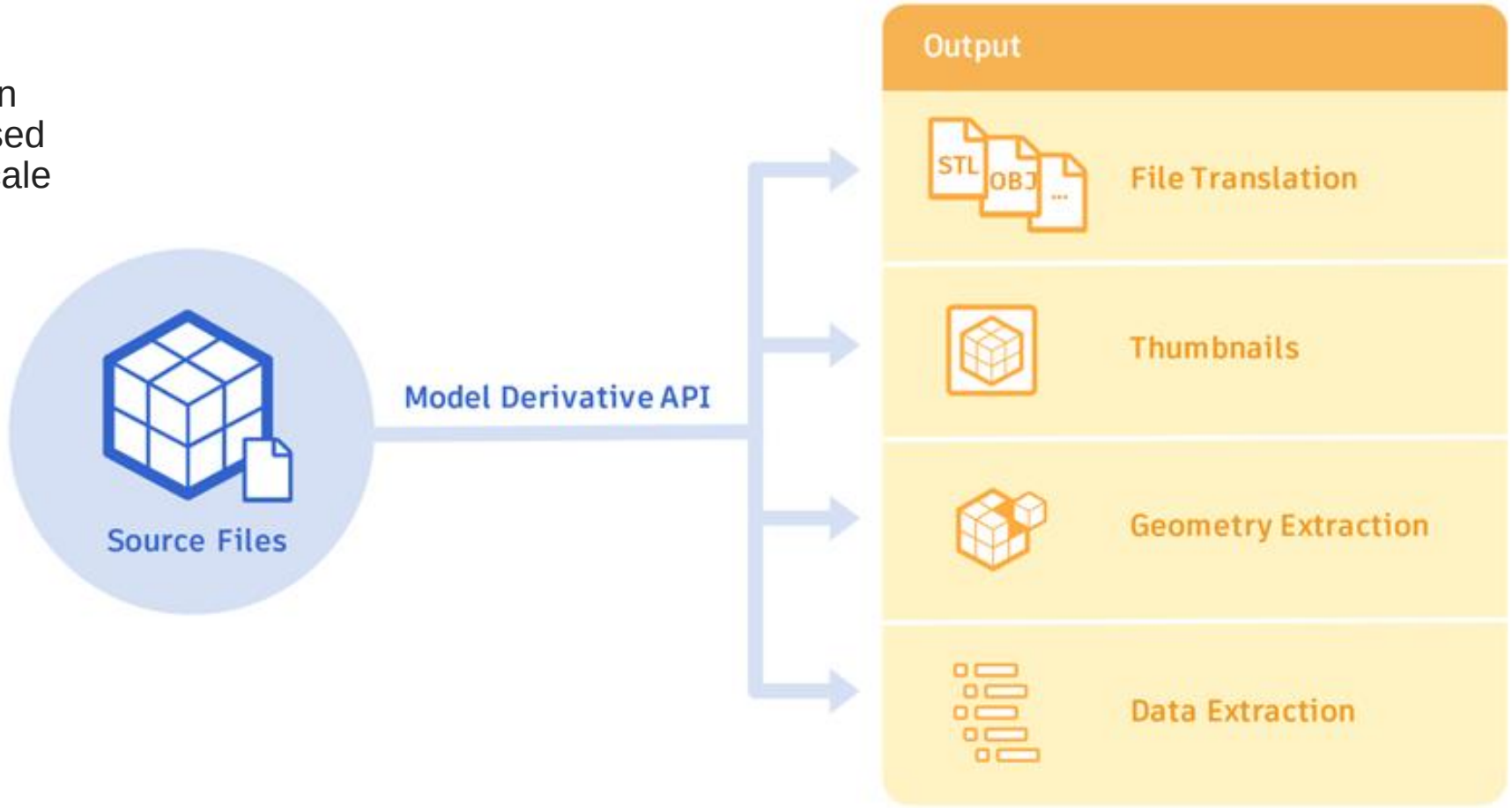
something that is based on another source

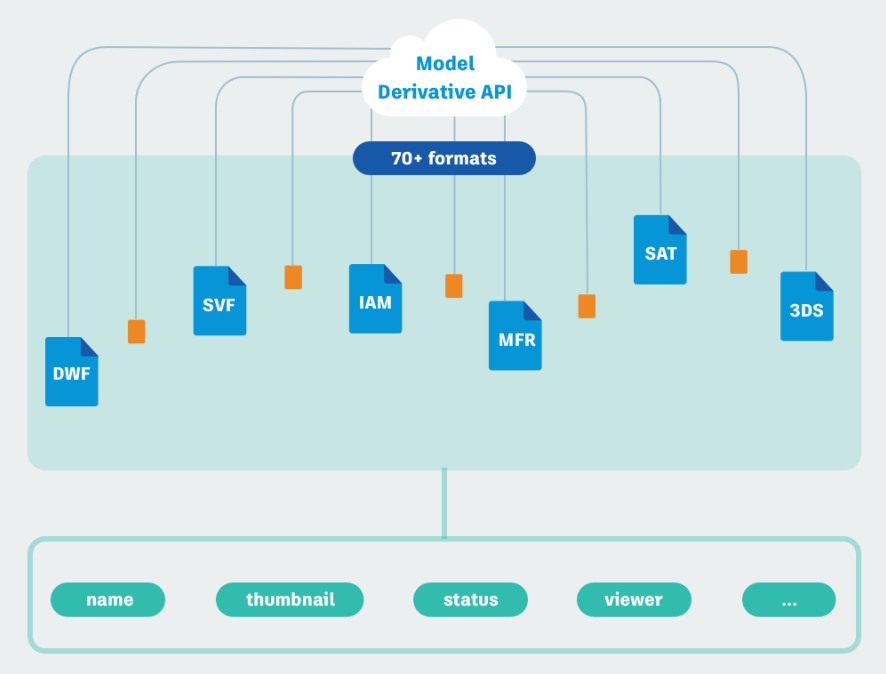


# File Formats

There is a chart in online documentation to show you quickly which formats are supported

However there is also an API. This gives the latest information… and can be used dynamically at runtime

https://forge.autodesk.com/en/docs/model-derivative/v2/developers_guide/supported-translations/




| Source Format | Derivative Format | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| RVT | DWG | IFC | | | | | SVF | thumbnail |
| IAM | | | IGES | OBJ | STEP | STL | SVF | thumbnail |
| F2D | DWG | | | | | | | |
| F3D | DWG | FBX | IGES | OBJ | STEP | STL | SVF | thumbnail |
| FBX | | | IGES | OBJ | STEP | STL | SVF | thumbnail |


https://forge.autodesk.com/en/docs/model-derivative/v2/reference/http/formats-GET/

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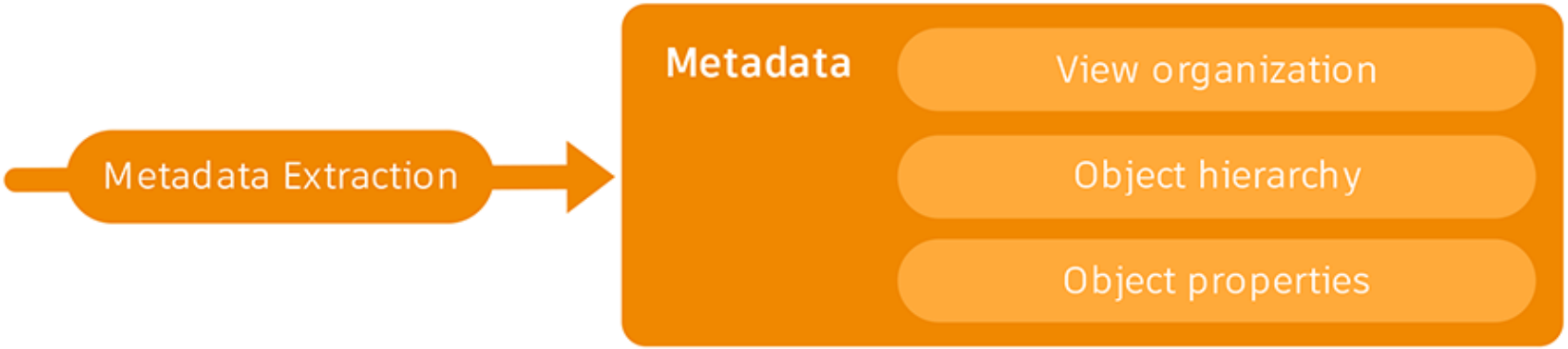
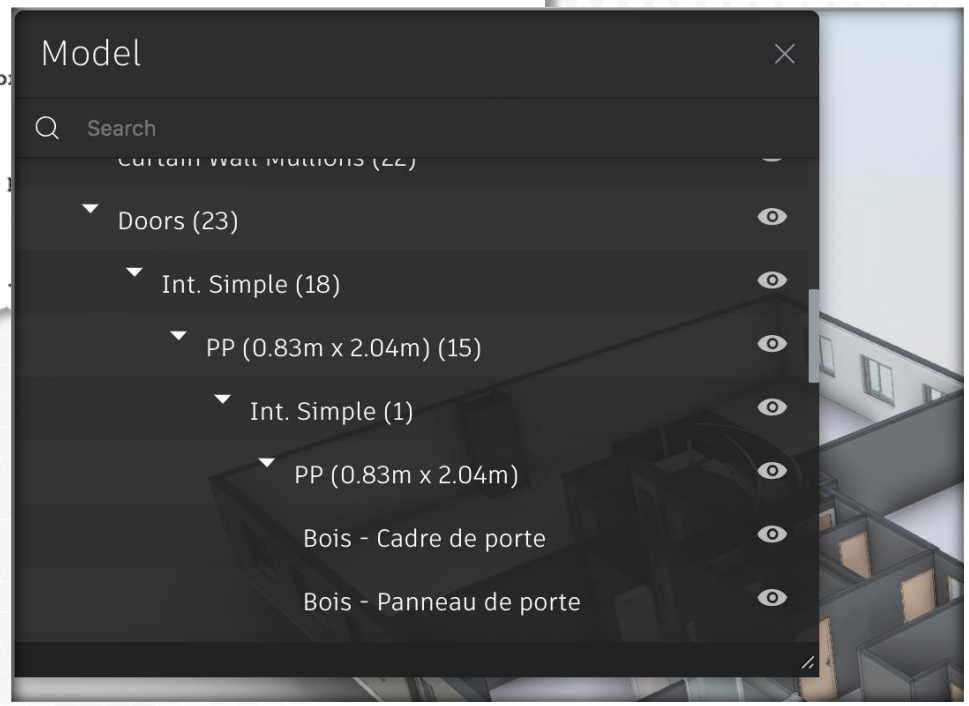
# Data Extraction

- Get the “meta” data that the translation process extracted
- Metadata is like a database of the information the translator deemed important
- Includes Model Structure and Component Properties information
- Data Rich formats…
  - CAD Data rich environments
  - Revit
  - Inventor
  - Fusion 360
- Low value metadata
  - Generic formats and traditional M&E formats
  - Can provide Model Structure, but component specific details are limited
  - OBJ
  - FBX
  - MAX/3DS

# Model Structure


```
"objectid": 134,
"name": "Doors",
"objects": [
  {
    "objectid": 135,
    "name": "Int. Simple",
    "objects": [
      {
        "objectid": 136,
        "name": "PP (0.83m x 2.04m)",
        "objects": [
          {
            "objectid": 137,
            "name": "Int. Simple",
            "objects": [
              {
                "objectid": 138,
                "name": "PP (0.83m x 2.04m)",
                "objects": [
                  {
                    "objectid": 139,
                    "name": "Bois - Cadre de po
                  },
                  {
                    "objectid": 140,
                    "name": "Bois - Panneau de
                  },
                  {
                    "objectid": 141,
                    "name": "Finition Peinture
```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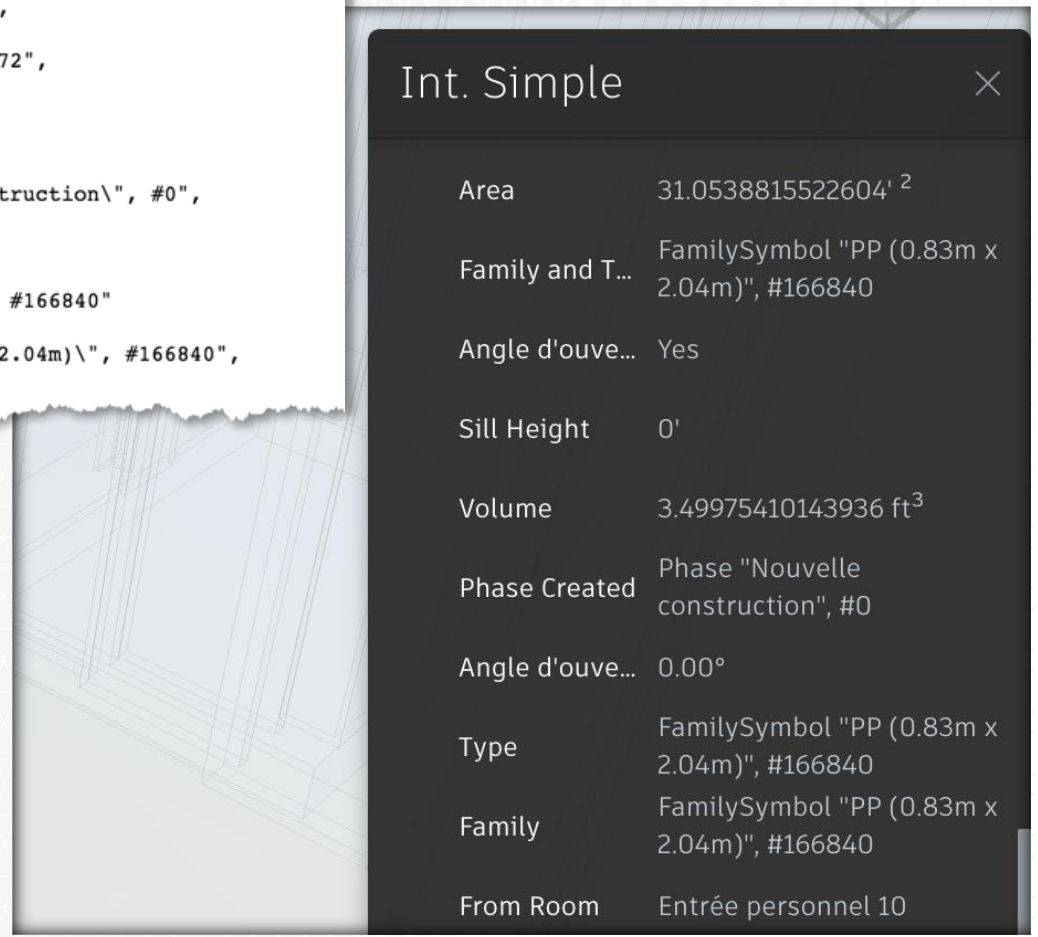
# Component Properties

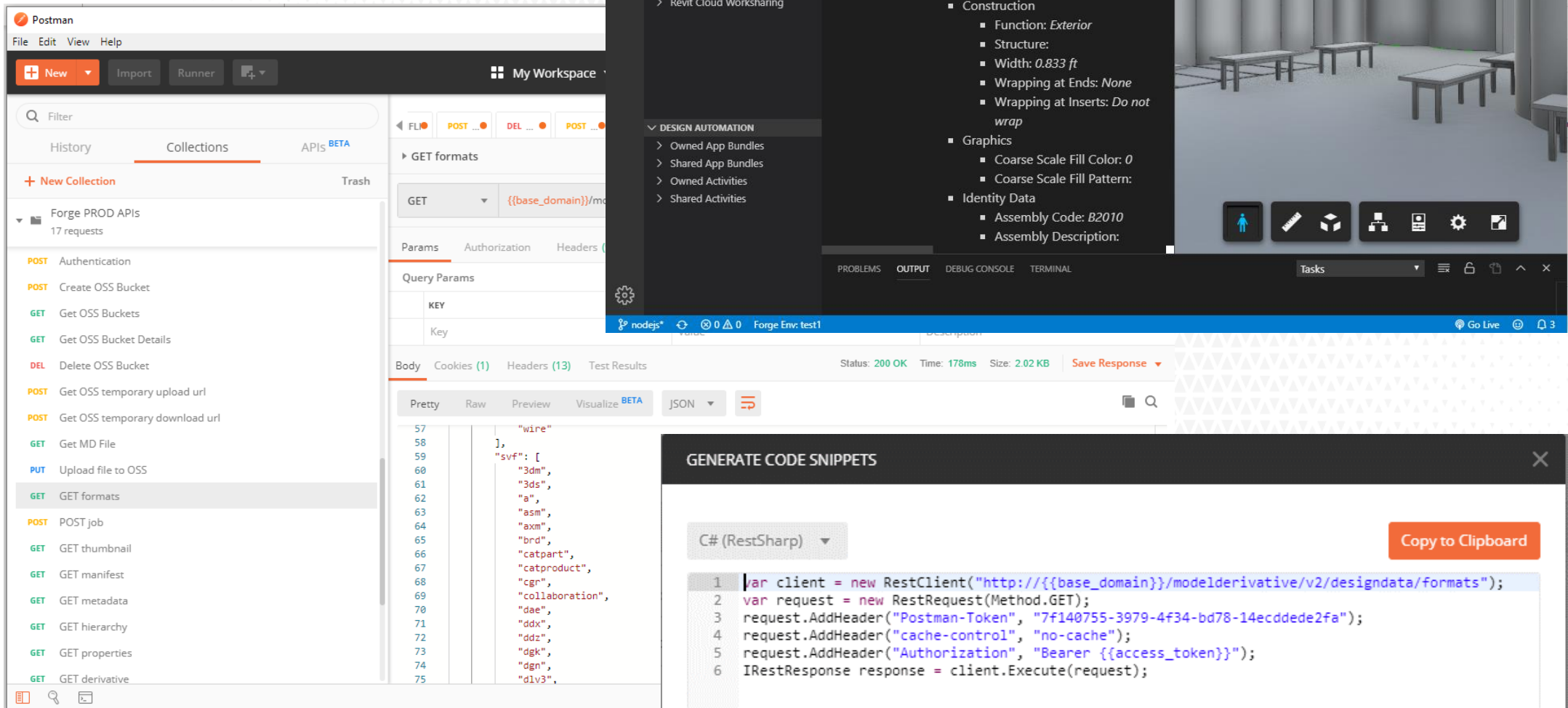

```
"objectid": 137,
"name": "Int. Simple",
"externalId": "1/3/0/0/0",
"properties": {
  "Element": {
    "Angle d'ouverture 2D fixe": "Yes",
    "Angle d'ouverture 3D": "0.00\u00b0",
    "Area": "31.054 ft^2",
    "Category": "Doors",
    "Family": [
      "Int. Simple",
      "FamilySymbol \"PP (0.83m x 2.04m)\", #166840"
    ],
    "Family and Type": "FamilySymbol \"PP (0.83m x 2.04m)\", #166840",
    "From Room": "Entr\u00e9e personnel 10",
    "Head Height": "6.693 ft",
    "Host Id": "Wall \"Voile BA 18\", #248972",
    "Id": "252589",
    "Level": "Level \"Niveau 0\", #608",
    "Mark": "1",
    "Name": "PP (0.83m x 2.04m)",
    "Phase Created": "Phase \"Nouvelle construction\", #0",
    "Sill Height": "0.000 ft",
    "Type": [
      "PP (0.83m x 2.04m)",
      "FamilySymbol \"PP (0.83m x 2.04m)\", #166840"
    ],
    "Type Id": "FamilySymbol \"PP (0.83m x 2.04m)\", #166840",
    "Visible dans les nomenclatures": "No",
    "Volume": "3.500 ft^3"
```

# Tools to help master Model Derivative

## VS Code Forge API Extension

## Postman



# Component Properties

## Tips!


https://forge.autodesk.com/en/docs/model-derivative/v2/reference/http/urn-metadata-guid-properties-GET/

```
413 Request Entity Too Large
{Diagnostic": "Please use the 'forceget' parameter to force querying the data."}
```

## large data sets

GET :urn/metadata/:guid/properties**?forceget=true**

# Component Properties

## Tips!


https://forge.autodesk.com/en/docs/model-derivative/v2/reference/http/urn-metadata-guid-properties-GET/

## properties of single component

GET :urn/metadata/:guid/properties**?objectid=XXX**

# Geometry Extraction

Extract components from SVF into OBJ

Tip! Any format that can be translated to SVF, can then be translated to OBJ

Specify the objectid of root to get entire model


```
"objectid": 134,
"name": "Doors",
"objects": [
  {
    "objectid": 135,
    "name": "Int. Simple",
    "objects": [
      {
        "objectid": 136,
        "name": "PP (0.83m x 2.04m)",
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                  },
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                    "objectid": 141,
                    "name": "Finition Peinture - Blanc satin\u00e9"
```
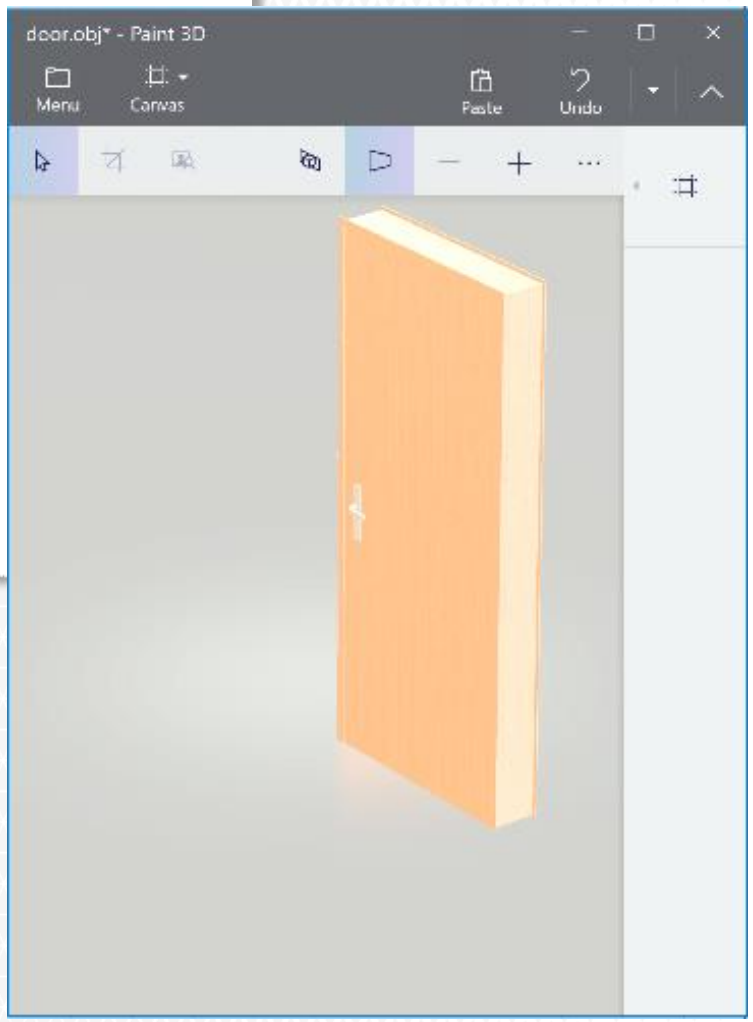




# Special Cases

# Special Cases

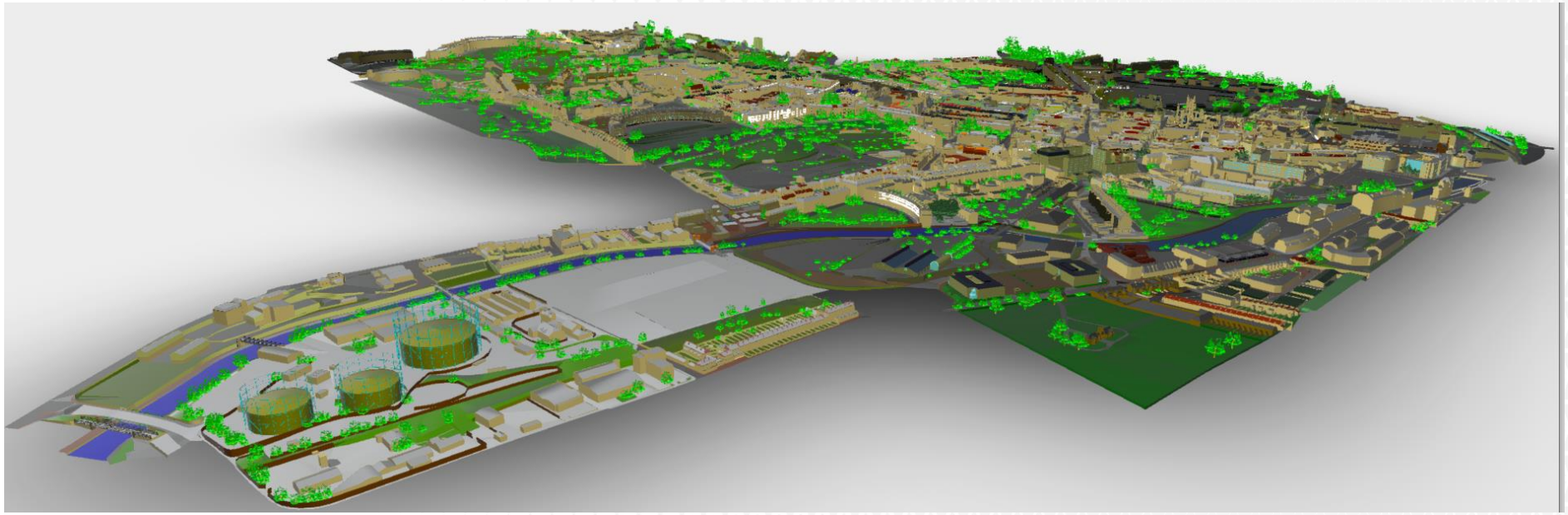
Tips!

https://forge.autodesk.com/en/docs/data/v2/reference/http/buckets-:bucketKey-objects-:objectName-PUT/

File is too large…

PUT `buckets/:bucketKey/objects/:objectName`

PUT `buckets/:bucketKey/objects/:objectName/resumable`



# Special Cases

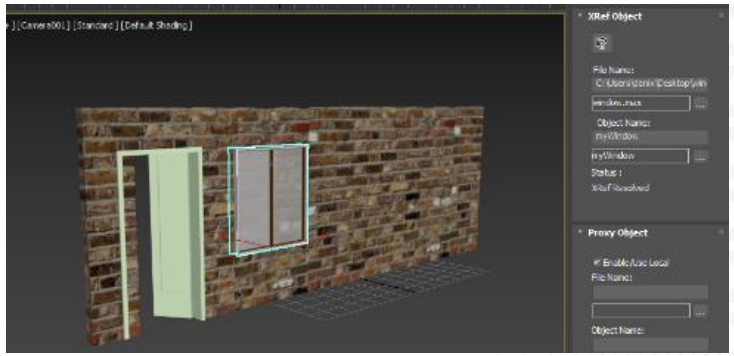
## Tips!

https://forge.autodesk.com/en/docs/model-derivative/v2/reference/http/job-POST/

## File has references

POST modelderivative/v2/designdata/job

3ds Max



Successful Translation as shown in Forge Viewer


```
job_endpoint = '/modelderivative/v2/designdata/job'
header = {
    "Authorization": "Bearer " + token,
    "Content-Type": "application/json",
}

payload = json.dumps({
    "input" : {
        "urn": '"' + encoded_urn + '"',
        "rootFilename": "wall.max",
         "compressedUrn": True
    },
    "output": {
        "formats": [
            {
                "type": "svf",
                "views": [
                    "2d",
                    "3d"
                ]
            }
```

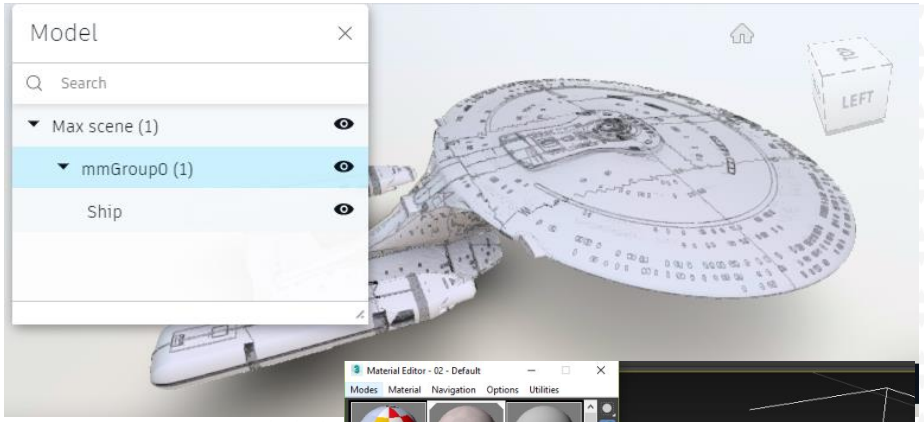
# Special Cases

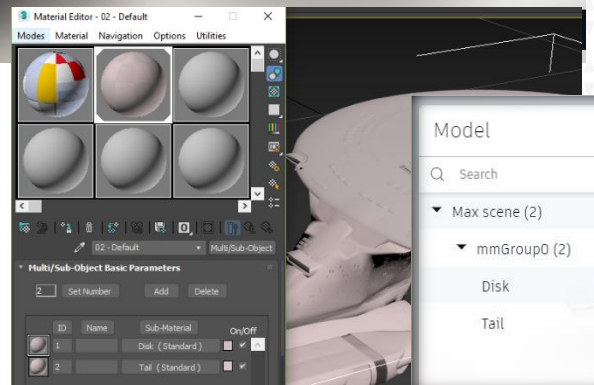
## Tips!

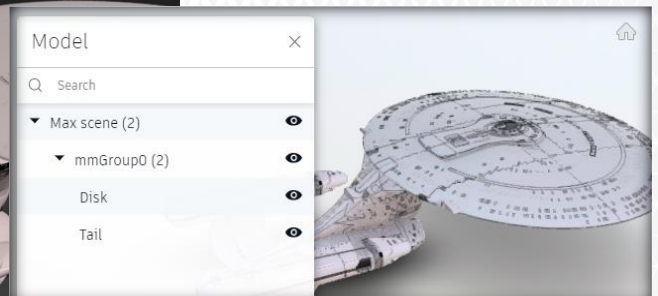
https://forge.autodesk.com/en/docs/model-derivative/v2/reference/http/job-POST/

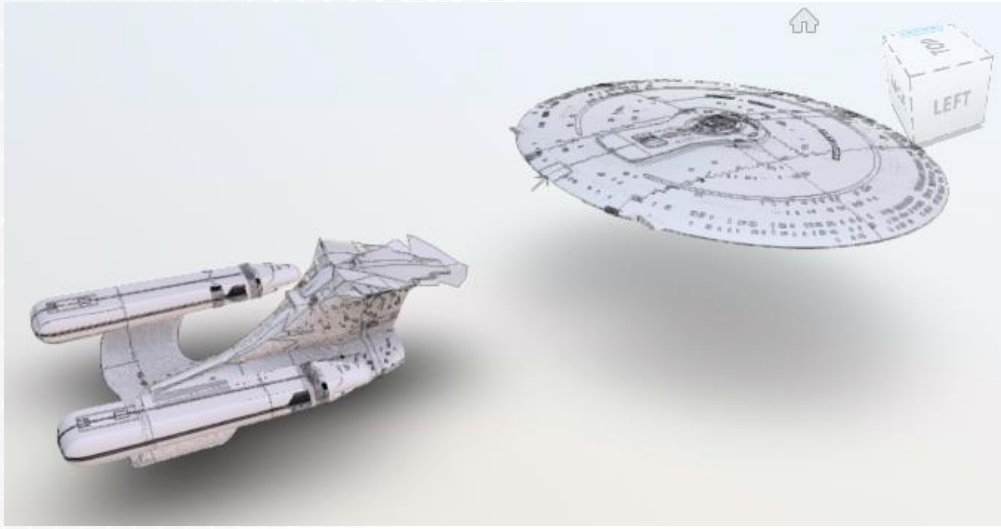
## Special Behaviors

POST modelderivative/v2/designdata/job

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# Special Cases

Tips!

https://forge.autodesk.com/en/docs/model-derivative/v2/reference/http/job-POST/

`advanced` attributes

POST `modelderivative/v2/designdata/job`

For example:

`generateMasterViews`

```
{
  "input": {
    "urn": "{{Base64URN}}"
  },
  "output": {
    "formats": [
      {
        "type": "svf",
        "views": [
          "2d",
          "3d"
        ],
        "advanced": {
          "generateMasterViews" : true
        }
      }
    ]
  }
}
```

- generates views for all phases
- all elements including
  - rooms
  - spaces

https://forge.autodesk.com/blog/new-rvt-svf-model-derivative-parameter-generates-additional-content-including-rooms-and-spaces

# The Future of Model Derivative Service

# What is the future of Model Derivative?

## Efficiency of getting translation status

The current workflow to translate a file is the following:

- having an object in a bucket will trigger the translation;
- check if the model is translated by getting the manifest;
- get the derivative.

This workflow will be changed in the following way:

- no need to get the manifest, switching to Resource-based Request API:
  - `GET /derivativeservice/v2/viewable/3d/<seed urn>`
  - `GET /derivativeservice/v2/convertible/dwg/<seed urn>`
- The response and the status code will indicate the state:
  - If derivative exists, returns 200 OK, with the binary stream or signed URL
  - If derivative does not exist, but is under construction, returns 202 ACCEPTED, and the progress
  - If derivative does not exist, and there is no running generation, returns 404 NOT FOUND

# What is the future of Model Derivative?

## OTG

- Kean Walmsley has a good description here:

  https://www.keanw.com/2019/06/this-years-forge-accelerator-in-barcelona.html
- Optimized “post-process” of the SVF format -> OTG
- deduplicates “similar” meshes
- Rebar and other large models will see a big increase in performance

  https://www.youtube.com/watch?v=66VGvdzap-Y&feature=youtu.be
- Big performance increase for models with large numbers of simple 6 sided meshes and cylinders (most buildings, process plants, etc)

# Support?

Forge Portal
Model Derivative
https://forge.autodesk.com/en/docs/model-derivative/v2/developers_guide/overview/

Ask on StackOverflow
Tag **autodesk-model-derivative**
autodesk-model-derivative

Github
Autodesk-Forge
https://github.com/Autodesk-forge

# Resources – Learn more - Getting started….

https://forge.autodesk.com

Tutorials

https://forge.autodesk.com/developer/getting-started

https://learnforge.autodesk.io/#/tutorials/viewmodels (includes model derivative)

Samples

https://forge.autodesk.com/code-samples

Help

https://forge.autodesk.com/en/support/get-help

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