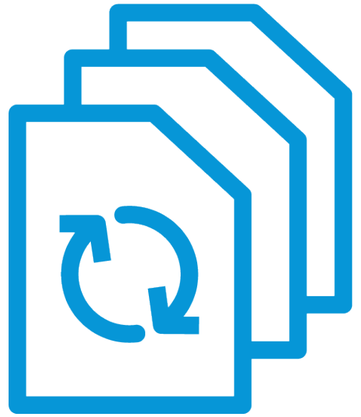
Forge Online

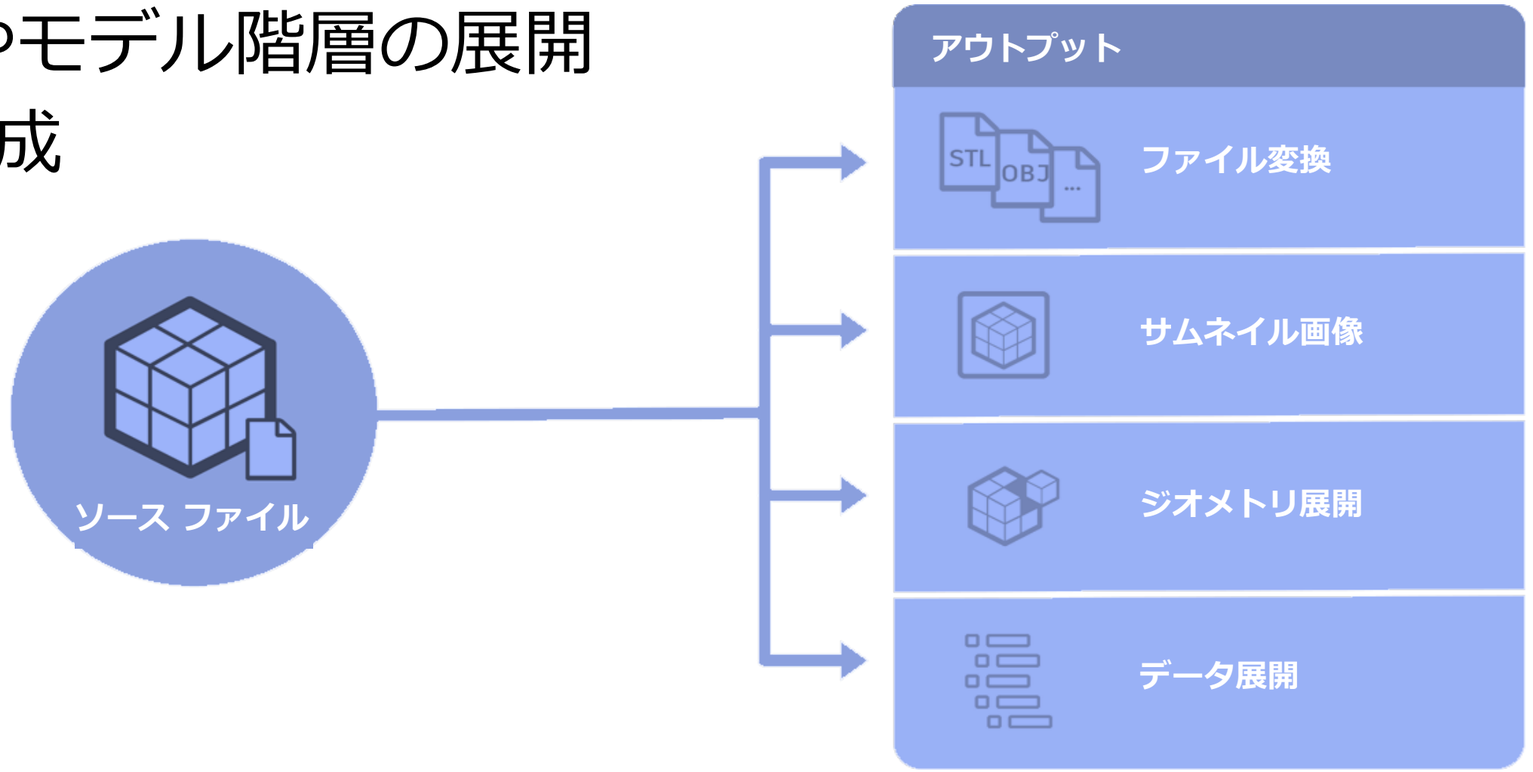
Model Derivative API アップデート Advanced オプション

伊勢崎俊明
オートデスク 株式会社

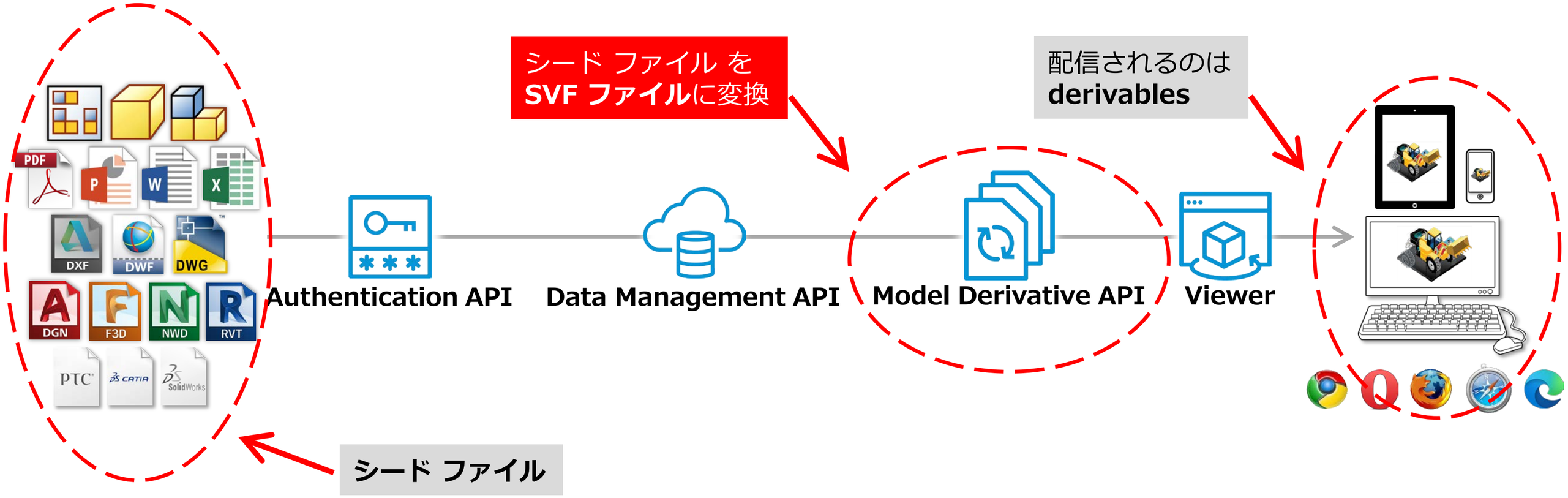
Model Derivative API の役割



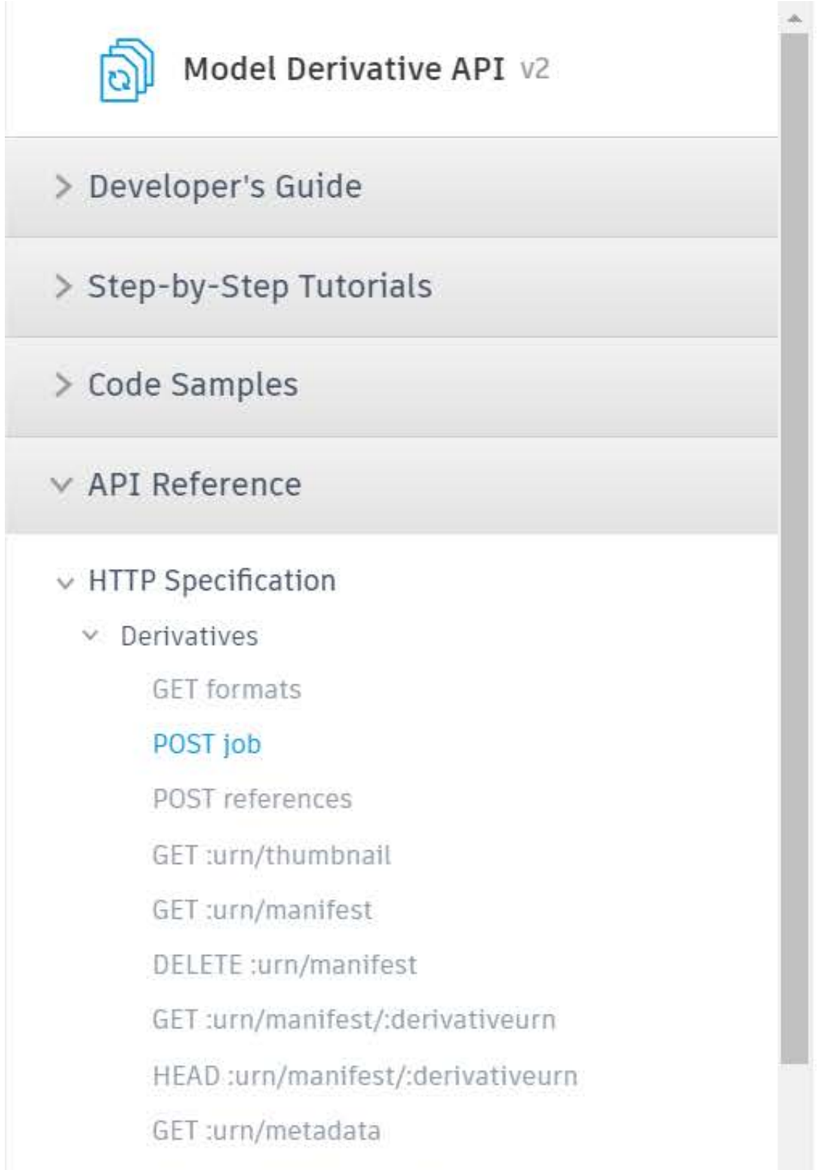
- デザイン ファイルを変換
  - 他のデザイン ファイル形式に変換
  - Viewer 用に SVF 形式に変換してブラウザで表示
  - ジオメトリ データやモデル階層の展開
  - サムネイル画像の生成
  - RESTful API



Forge Viewer ソリューションの流れ



SVF 変換時の変換オプション



Attributes by Output Type

Case 3: Input file type is Navisworks

Navisworks Timeliner 情報の出力指定

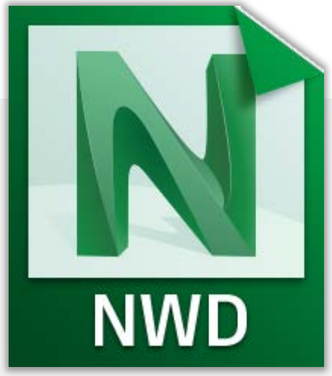
timelinerProperties

bool

An option to be specified when the input file type is Navisworks.
`true` : Extract timeliner properties.
`false` : **(Default)** Do not extract timeliner properties.

リクエスト パラメータ timelinerProperties

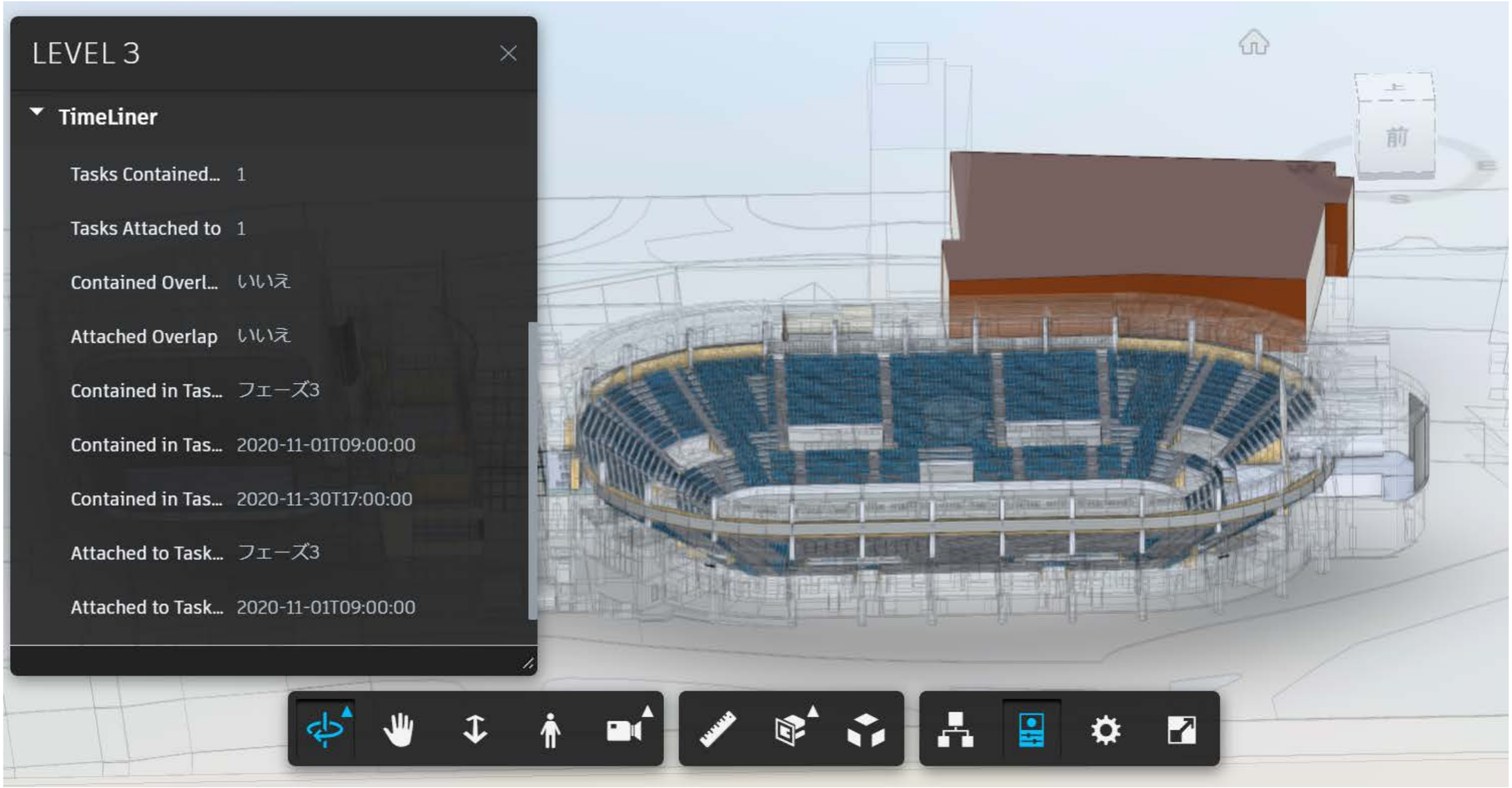
- POST job のリクエスト ボディ



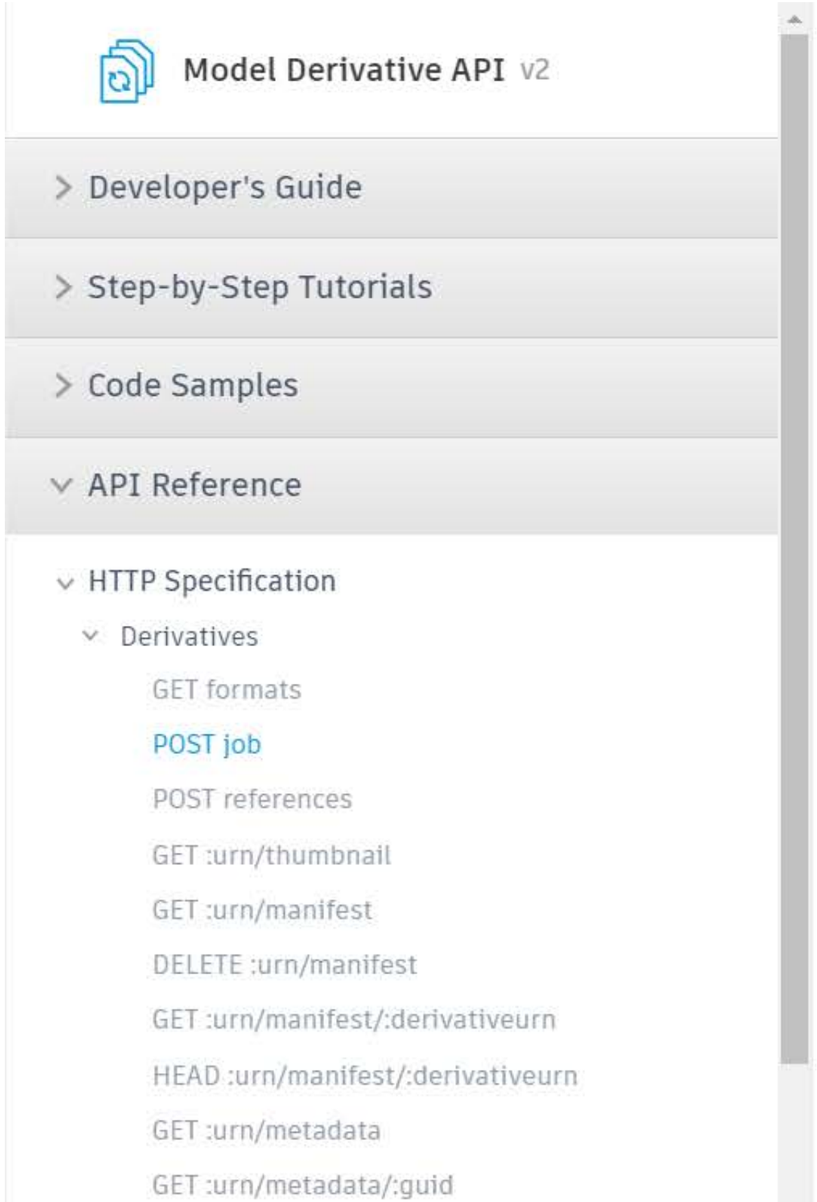

```
{
   "input": {
     "urn": <urn>
   },
   "output": {
     "formats": [
       {
         "type": "svf",
         "views": [
           "2d",
           "3d"
         ],
         "advanced": {
            "timelinerProperties": ”true”
         }
       }
     ]
   }
 }
```

参考ブログ記事：https://adndevblog.typepad.com/technology_perspective/2020/11/timeliner-information.html

Timeliner (NWD ファイルのみ)



SVF 変換時の変換オプション



Attributes by Output Type

SVF Output

Revit 「部屋」情報の出力指定

generateMasterViews

bool

An option to be specified when the input file type is Revit.
Generates master views when translating from the Revit input format to SVF. This option is ignored for all other input formats. This attribute defaults to `false` .

Master views are 3D views that are generated for each phase of the Revit model. A master view contains all elements (including “room” elements) present in the host model for that phase. The display name of a master view defaults to the name of the phase it is generated from. However, if a view with that name already exists, the Model Derivative service appends a suffix to the default display name.

Notes:
1. Master views do not contain elements from linked models.
2. Enabling this option can increase the time it takes to translate the model.

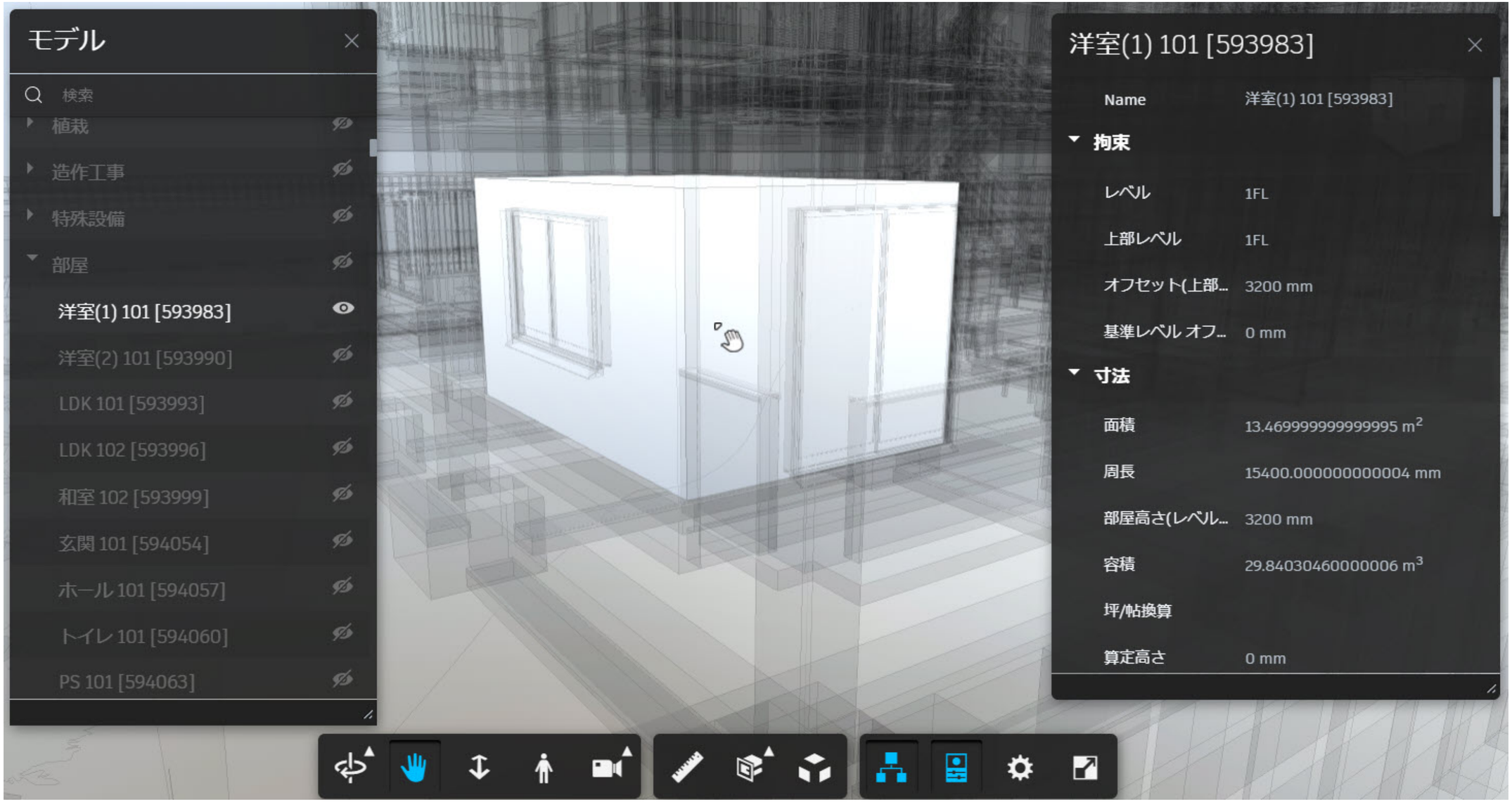
リクエスト パラメータ generateMasterViews

- POST job のリクエスト ボディ

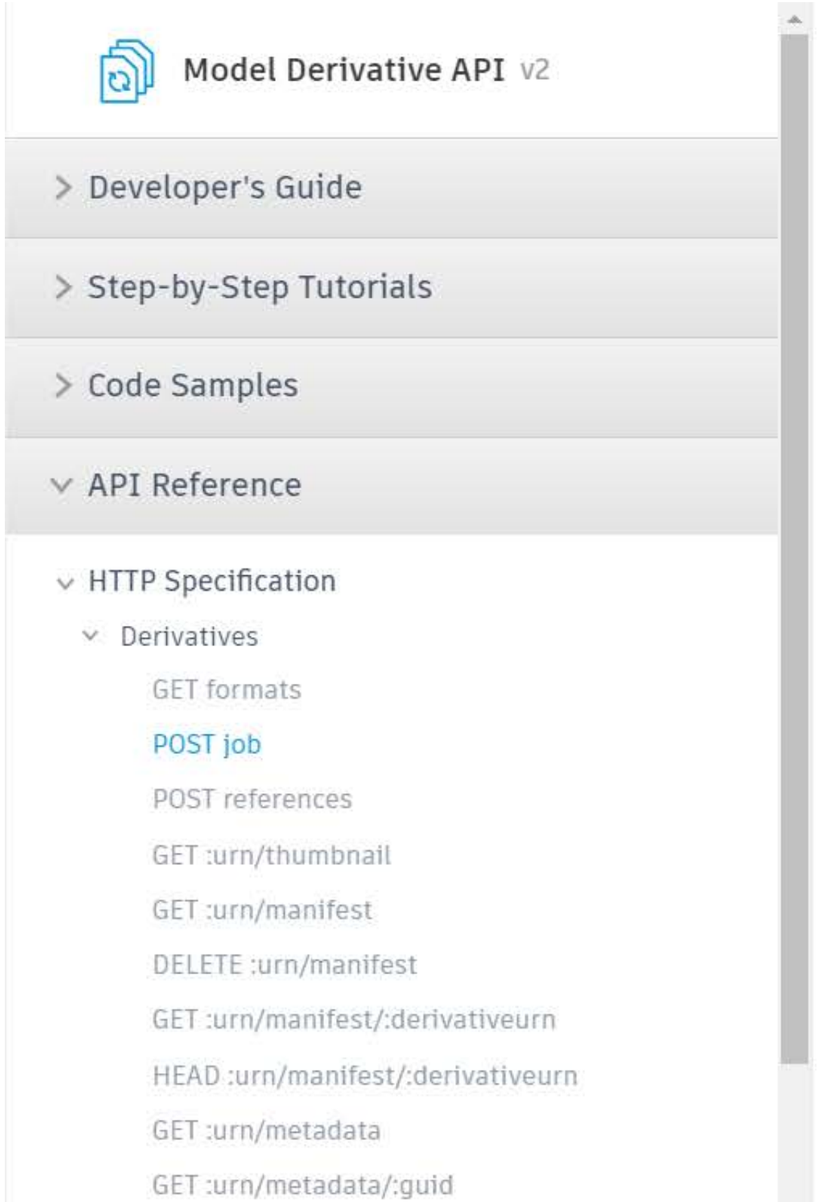

```
{
   "input": {
     "urn": <urn>
   },
   "output": {
     "formats": [
       {
         "type": "svf",
         "views": [
           "2d",
           "3d"
         ],
         "advanced": {
            "generateMasterViews": ”true”
         }
       }
     ]
   }
 }
```

参考ブログ記事：https://adndevblog.typepad.com/technology_perspective/2019/11/rvt-translation-enhancement-on-model-derivative-api.html

部屋とスペース (RVT ファイルのみ)



SVF 変換時の変換オプション



Attributes by Output Type

SVF Output

IFC 変換時の使用ロジック指定
（Navisworks方式かRevit方式か）

旧オプション：非推奨

switchLoader *bool*	**Deprecated** Switches the IFC loader from the Navisworks IFC loader to the new Revit IFC loader, when translating from the IFC input format to SVF. This attribute defaults to `false` .

conversionMethod *string*	An option to be specified when the input file type is IFC. Specifies what IFC loader to use during translation. Available options are: - `legacy` - Use the Navisworks IFC loader. - `modern` - Use the newer Revit IFC loader. If both `switchLoader` and `conversionMethod` are specified, Model Derivative uses the `conversionMethod` parameter. If `conversionMethod` is not specified, Model Derivative uses the `switchLoader` parameter.

新オプション：推奨

リクエスト パラメータ conversionMethod

- POST job のリクエスト ボディ


```
{
   "input": {
     "urn": <urn>
   },
   "output": {
     "formats": [
       {
         "type": "svf",
         "views": [
           "2d",
           "3d"
         ],
         "advanced": {
            "conversionMethod": ”modern”
         }
       }
     ]
   }
 }
```

”modern”:Revit 方式

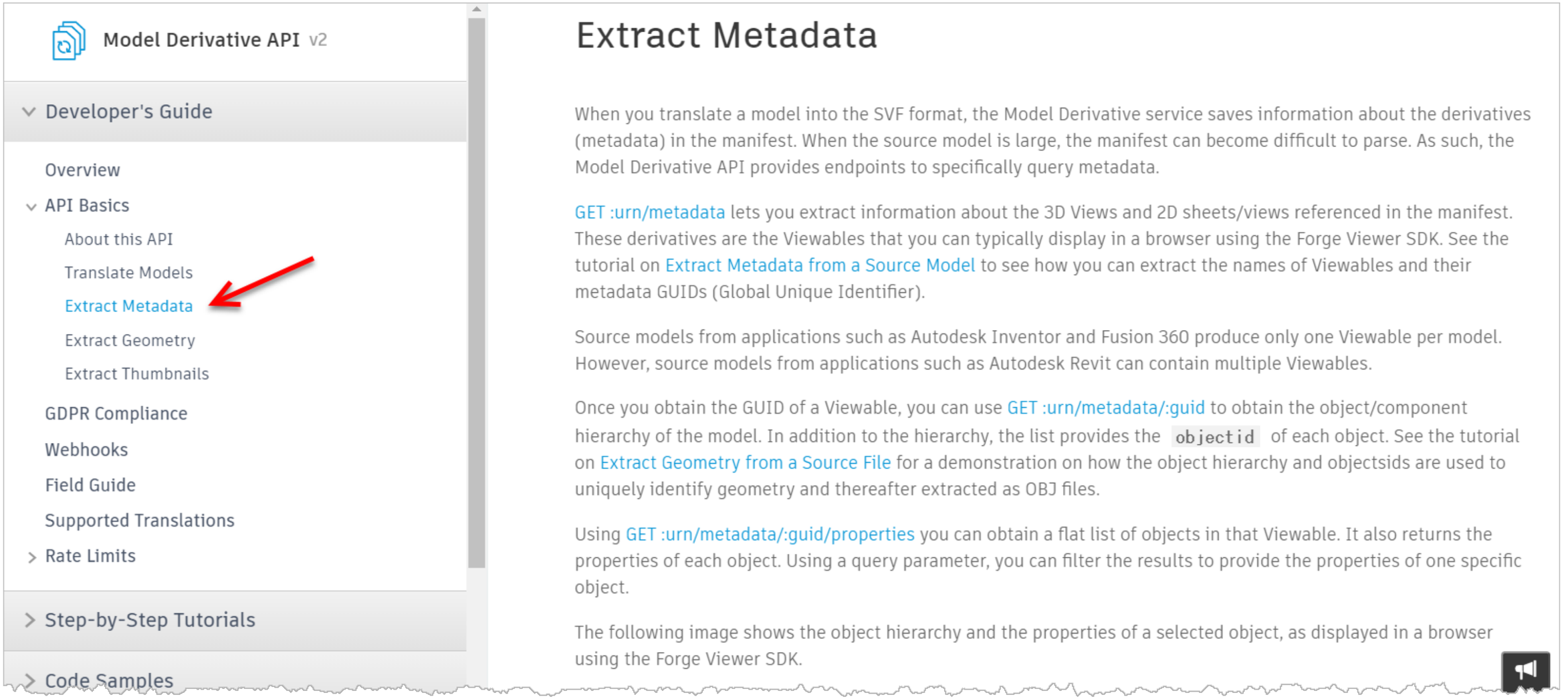
”legacy”:Navisworks 方式

Forge Online

Model Derivative API アップデート メタデータと差分検出

伊勢崎俊明
オートデスク 株式会社

SVF 変換で得られるメタデータの利用



派生データの取得 – その１

- ビュー上のオブジェクト階層メタデータの GUID を取得

GET :urn/metadata

Returns a list of model view (metadata) IDs for a design model. The metadata ID enables end users to select an object tree and properties for a specific model view.

Although most design apps (e.g., Fusion and Inventor) only allow a single model view (object tree and set of properties), some apps (e.g., Revit) allow users to design models with multiple model views (e.g., HVAC, architecture, perspective).

Note that you can only retrieve metadata from an input file that has been translated into an SVF file.

派生データの取得 – その２

- GUID からツリー構造やオブジェクト毎の情報を取得

GET :urn/metadata/:guid

Returns an object tree, i.e., a hierarchical list of objects for a model view.

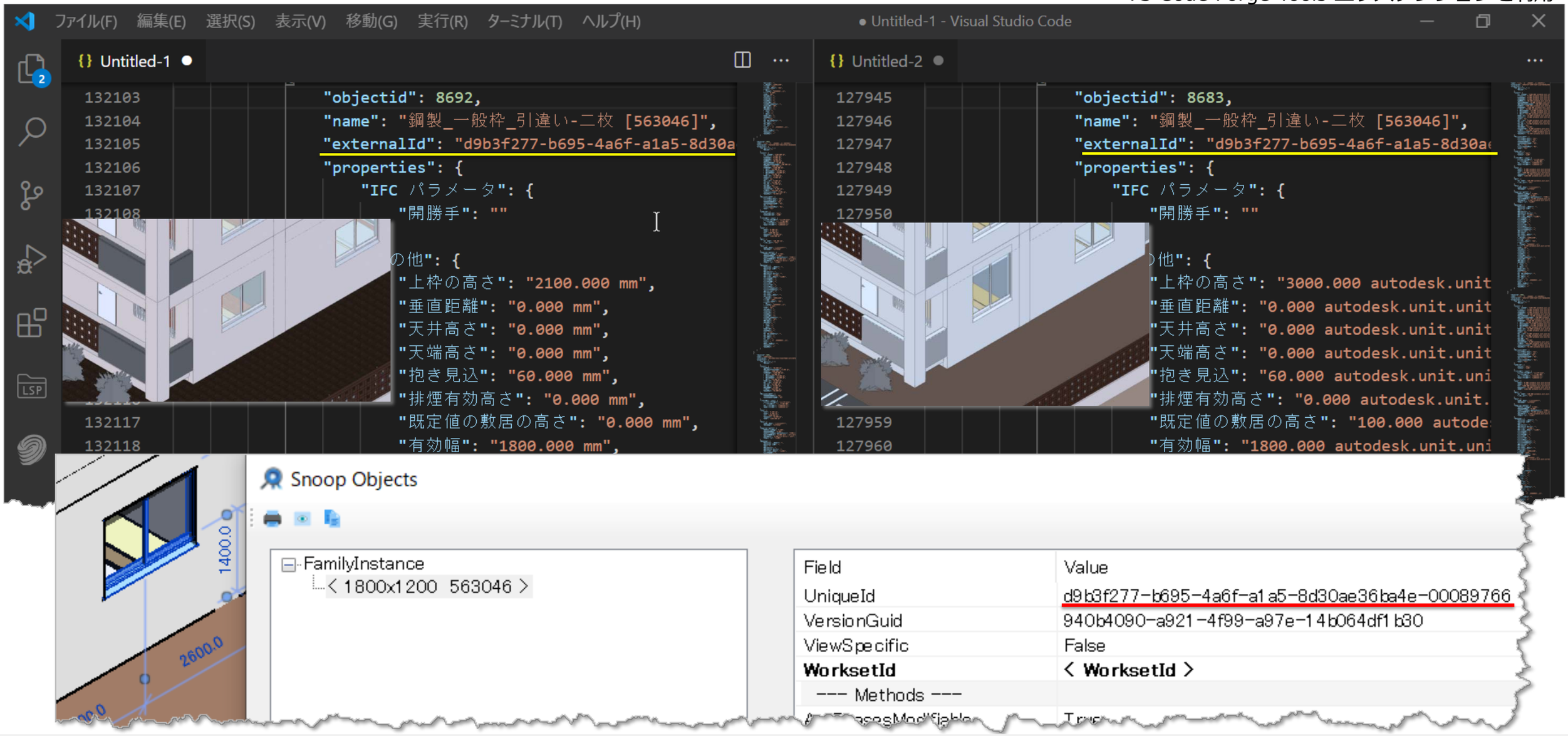
To call this endpoint you first need to call the GET :urn/metadata endpoint, to determine which model view (object tree and set of properties) to use.

GET :urn/metadata/:guid/properties

Returns a list of properties for each object in an object tree. Properties are returned according to object ID and do not follow a hierarchical structure.

Revit 派生データでのバージョン比較例

＊ VS Code Forge Tools エクステンションを利用



参考ブログ記事：https://adndevblog.typepad.com/technology_perspective/2020/11/utilizeing-meta-data.html

参考：model-compare 差分検出ツール

- Go 言語実装の応用例

```
→  ~ model-compare
Check the difference between two models, identifying
        - changes in component hierarchy;
        - changes in property of a component;
        - changes in geometry of a component.

Usage:
  model-compare [command]

Available Commands:
  file        Compares translated models by providing the local files
  help        Help about any command
  urn         Compares translated models by providing their urns

Flags:
  -h, --help   help for model-compare

Use "model-compare [command] --help" for more information about a command.
→  ~ model-compare urn -h
Compare two translated files by providing their urns as follows:
        -> model-compare urn -t dXJuOmF...mplY3Q dXJuOmF...6YXU
will compare the model trees of the translated files and provide the following result:
        ===================================================
        @ ["data","objects",0,"objects",0,"objects",1,"objects",2]
        + {"name":"RightSide2","objectid":10}
        ===================================================
meaning that compared with first node, the second one has an additional node
```

参考 AU クラス：https://www.autodesk.com/autodesk-university/class/More-Tips-Tricks-and-Future-Forge-Model-Derivative-Service-2020

参考： difftool エクステンション

参考ブログ記事：https://adndevblog.typepad.com/technology_perspective/2020/11/forge-viewer-visualize-3d-model-differences.html

Forge Online

Model Derivative API アップデート SVF2 による大規模モデル対応

伊勢崎俊明
オートデスク 株式会社

2021年1月現在 Public Beta : SVF2 形式

- Streaming Vector Format の正常進化バージョン
- 当初 OTG（Oscar The Grouch‘s）で紹介
- BIM 360 Docs 上で超大規模モデル表示用途で利用
- ジオメトリの共有利用、キャッシュ再利用による効果
- 少メモリ、Socket 通信による高速ロード、etc
- Model Derivative API で SVF2 を指定して変換が必要
- Forge Viewer 7.25 以上のバージョンで表示可能

SVF2（Public Beta）利用に必要な処理

1. Model Derivative API での SVF2 変換
   - デザイン ファイル変換時に SVF2 を指定が必要
     - デザイン ファイル ⇒ SVF2
     - 既存の変換済 SVF ⇒ SVF2
2. Viewer 実装の変更
   - 初期化オプション api と env 属性の変更
   - api: ‘derivativeV2‘ ⇒ api: ‘**D3S**‘
   - env: 'AutodeskProduction‘ ⇒ env: ' **MD20ProdUS**’

SVF2 変換時のリクエスト ボディ

```
{
  "input": {
    "urn": "<Your Encoded URN>"
  },
  "output": {
    "formats": [
      {
        "type": "svf2",
        "views": [
          "2d",
          "3d"
        ]
      }
    ]
  }
}
```

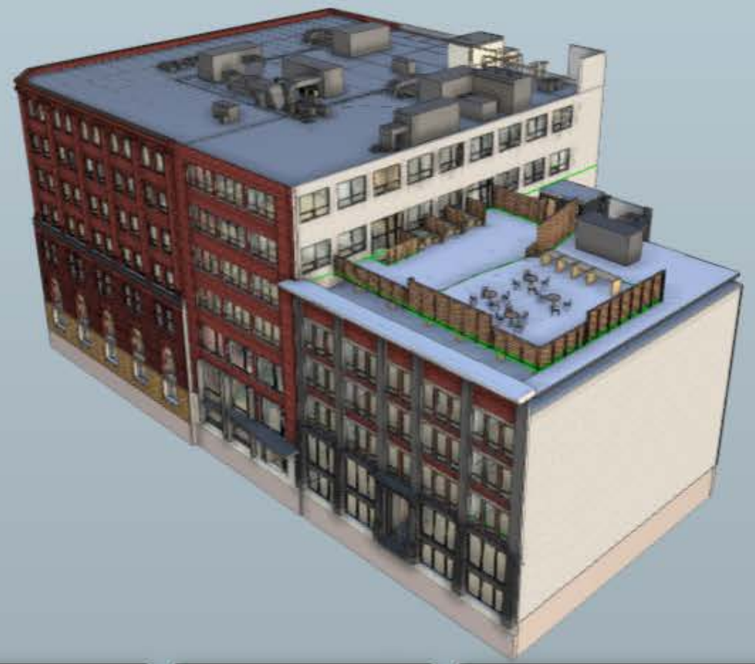
SVF : isSVF2()=undefined

Total geometry size: 108.47375679016113 MB

Number of meshes: 27796

Num Meshes on GPU: 10000

Net GPU geom memory used: 53333904



SVF2 : isSVF2()=true

Total geometry size: 16.585140228271484 MB

Number of meshes: 3040

Num Meshes on GPU: 3040

Net GPU geom memory used: 16369340

参考ブログ記事：https://adndevblog.typepad.com/technology_perspective/2020/11/svf-and-svf2.html

SVF2 変換時のマニフェスト：デザイン ⇒ SVF2

```
{
   "urn": "<Your Encoded URN>",
   "derivatives": [
      {
         "hasThumbnail": "true",
         "children": [
                                 :
         "progress": "complete",
         "outputType": "svf2",
         "status": "success"
      },
                                 :
      }
   ],
   "hasThumbnail": "true",
   "progress": "complete",
   "type": "manifest",
   "region": "US",
   "version": "1.0",
   "status": "success"
}
```

SVF2 変換時のマニフェスト：SVF ⇒ SVF2

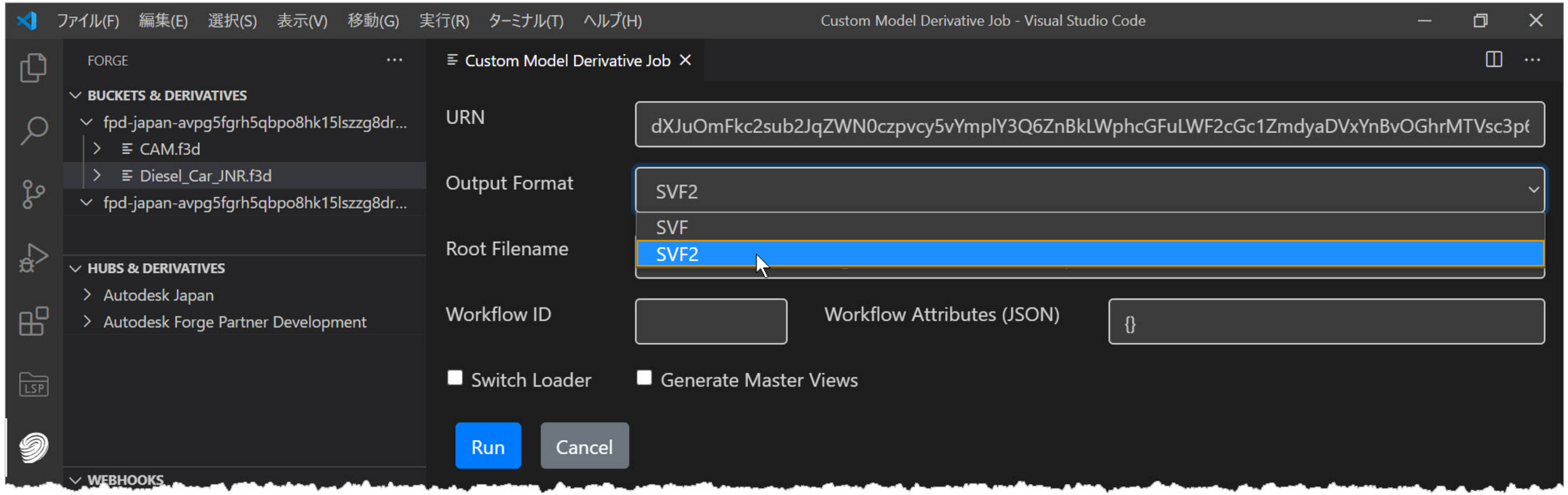
```
{
   "urn": "<Your Encoded URN>",
   "derivatives": [
      {
         "hasThumbnail": "true",
         "overrideOutputType": "svf2",
         "children": [
                                   :
         "progress": "complete",
         "outputType": "svf",
         "status": "success"
      },
                                   :
      }
   ],
   "hasThumbnail": "true",
   "progress": "complete",
   "type": "manifest",
   "region": "US",
   "version": "1.0",
   "status": "success"
}
```

SVF2 利用時の Viewer 実装（Public Beta）

```
var options = {
    env: 'MD20ProdUS',
    api: 'D3S‘,
    getAccessToken: getCredentials
};

Autodesk.Viewing.Initializer(options, function () {
    _viewer = new Autodesk.Viewing.GuiViewer3D(document.getElementById('viewer3d-1'));
    var startedCode = _viewer.start();
    if (startedCode > 0) {
        console.error('Failed to create a 3D Viewer: WebGL not supported.');
        return;
    }

    var documentId = 'urn:' + urn_svf;
    Autodesk.Viewing.Document.load(documentId, onDocumentLoadSuccess, onDocumentLoadFailure);

});
```

VS Code Forge Tools での SVF2 対応

- バージョン 2.2.0 以降で SVF2 変換と表示をサポート



参考ブログ記事：https://adndevblog.typepad.com/technology_perspective/2020/12/svf2-support-on-vs-code-forge-tools.html

AUTODESK®

Make anything.