



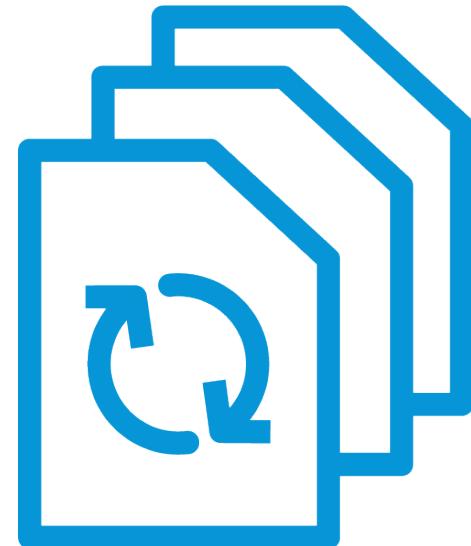
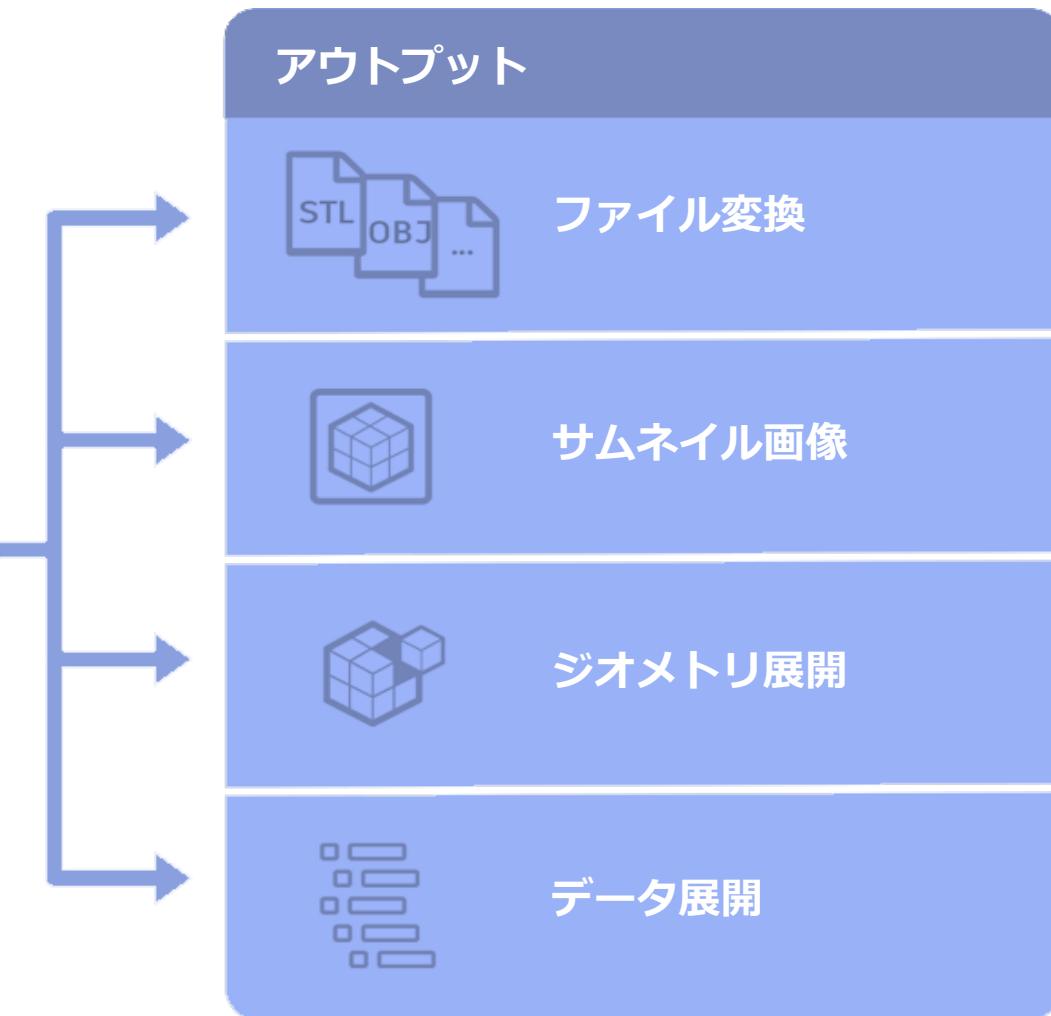
Forge Online

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

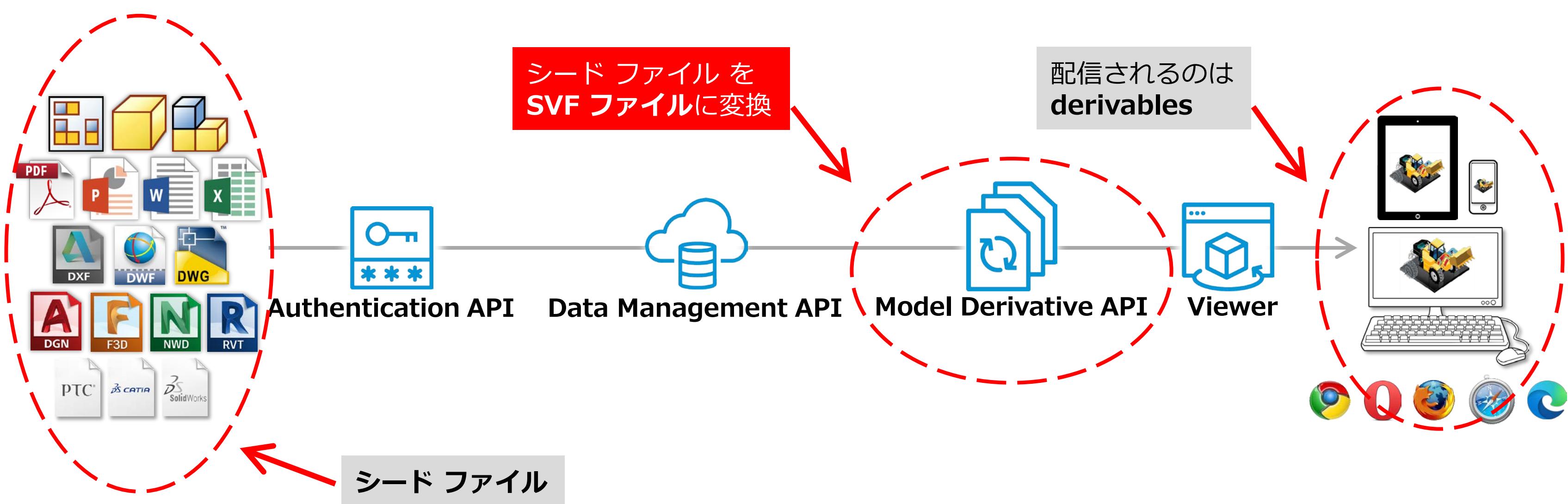
伊勢崎俊明
オートデスク 株式会社

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

The sidebar shows the following navigation items:

- Model Derivative API v2
- > Developer's Guide
- > Step-by-Step Tutorials
- > Code Samples
- ▼ API Reference
- ▼ HTTP Specification
 - Derivatives
 - GET formats
 - POST job**
 - POST references
 - GET :urn/thumbnail
 - GET :urn/manifest
 - DELETE :urn/manifest
 - GET :urn/manifest/:derivativeurn
 - HEAD :urn/manifest/:derivativeurn
 - GET :urn/metadata

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.

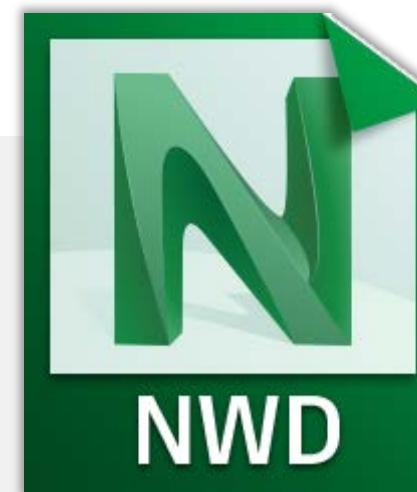
`true` : Extract timeliner properties.

`false` : (Default) Do not extract timeliner properties.

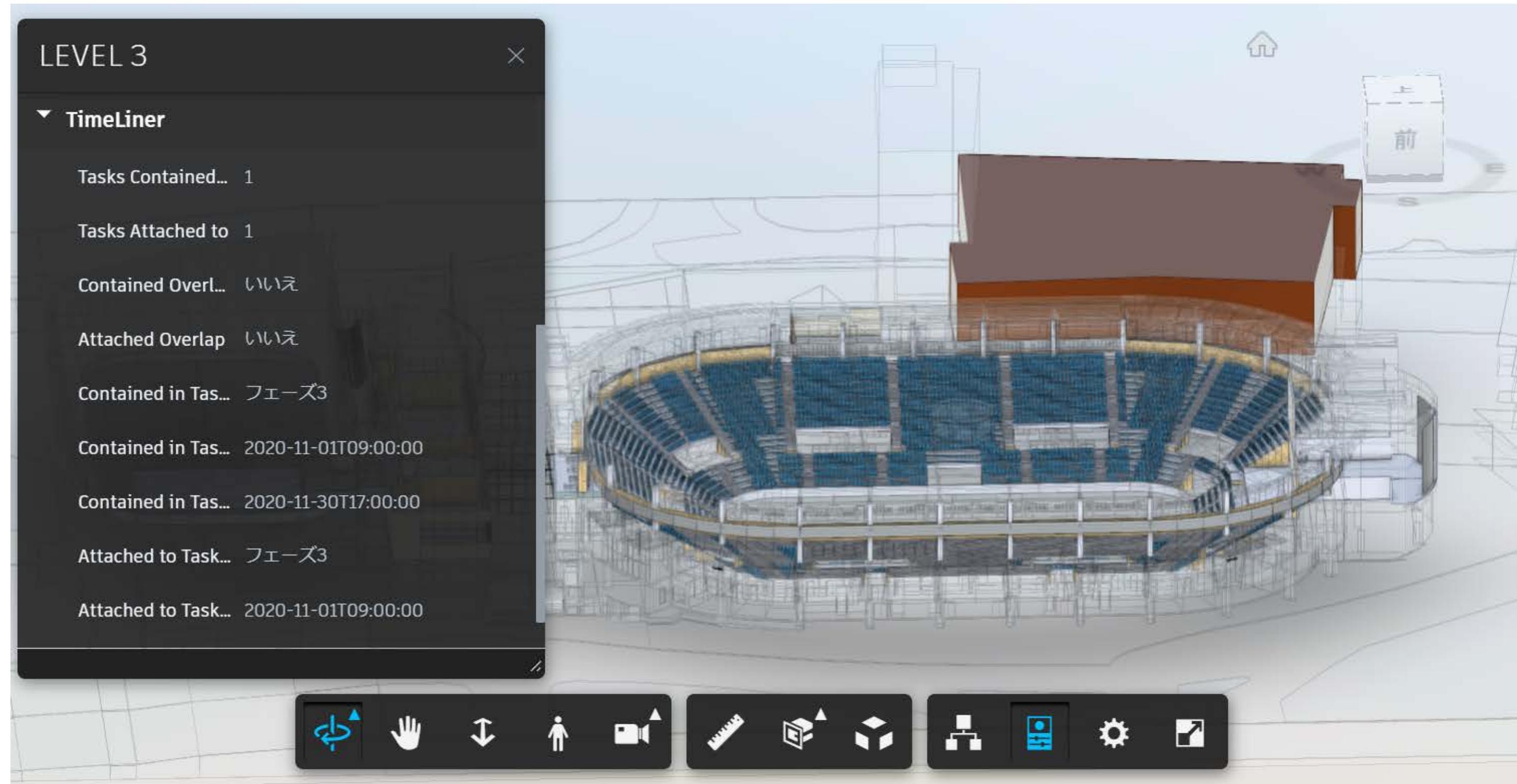
リクエスト パラメータ timelinerProperties

- POST job のリクエスト ボディ

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



Timeliner (NWD ファイルのみ)



SVF 変換時の変換オプション

 Model Derivative API v2

- > Developer's Guide
- > Step-by-Step Tutorials
- > Code Samples
- ▽ API Reference
 - ▽ HTTP Specification
 - ▽ Derivatives
 - GET formats
 - [POST job](#)
 - POST references
 - GET :urn/thumbnail
 - GET :urn/manifest
 - DELETE :urn/manifest
 - GET :urn/manifest/:derivativeurn
 - HEAD :urn/manifest/:derivativeurn
 - GET :urn/metadata
 - GET :urn/metadata/:guid

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"  
        }  
      }  
    ]  
  }  
}
```

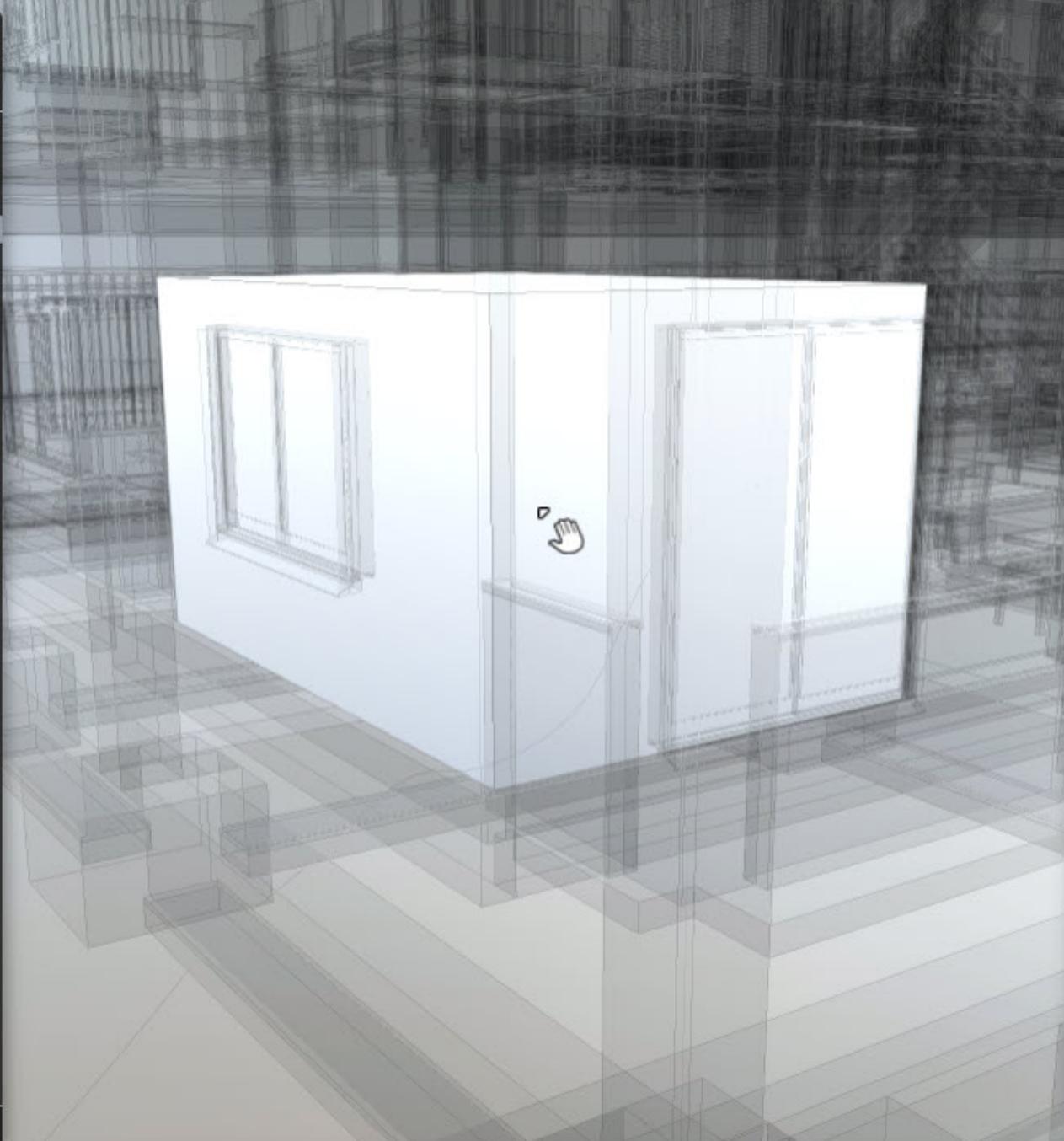


部屋とスペース (RVT ファイルのみ)

モデル

検索

- 植栽
- 造作工事
- 特殊設備
- 部屋
 - 洋室(1) 101 [593983]
 - 洋室(2) 101 [593990]
 - LDK 101 [593993]
 - LDK 102 [593996]
 - 和室 102 [593999]
 - 玄関 101 [594054]
 - ホール 101 [594057]
 - トイレ 101 [594060]
 - PS 101 [594063]



A 3D wireframe architectural model of a room. The room features two large windows on the left wall and a door on the right wall. A small hand icon is positioned near the door handle. The floor is light-colored, and the walls are represented by thin lines.

洋室(1) 101 [593983]

Name: 洋室(1) 101 [593983]

拘束

- レベル: 1FL
- 上部レベル: 1FL
- オフセット(上部...): 3200 mm
- 基準レベルオフ...: 0 mm

寸法

- 面積: 13.46999999999995 m²
- 周長: 15400.000000000004 mm
- 部屋高さ(レベル...): 3200 mm
- 容積: 29.84030460000006 m³
- 坪/帖換算
- 算定高さ: 0 mm



A horizontal toolbar with various icons for navigating and editing the 3D model, including icons for zoom, rotate, and selection.

SVF 変換時の変換オプション

Model Derivative API v2

- > Developer's Guide
- > Step-by-Step Tutorials
- > Code Samples
- ▽ API Reference
- ▽ HTTP Specification
- ▽ Derivatives
 - GET formats
 - [POST job](#)
 - POST references
 - GET :urn/thumbnail
 - GET :urn/manifest
 - DELETE :urn/manifest
 - GET :urn/manifest/:derivativeurn
 - HEAD :urn/manifest/:derivativeurn
 - GET :urn/metadata
 - GET :urn/metadata/:guid

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

<code>switchLoader</code> <code>bool</code>	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 <code>false</code> .
<code>conversionMethod</code> <code>string</code>	An option to be specified when the input file type is IFC. Specifies what IFC loader to use during translation. Available options are: <ul style="list-style-type: none"> - <code>legacy</code> - Use the Navisworks IFC loader. - <code>modern</code> - Use the newer Revit IFC loader. If both <code>switchLoader</code> and <code>conversionMethod</code> are specified, Model Derivative uses the <code>conversionMethod</code> parameter. If <code>conversionMethod</code> is not specified, Model Derivative uses the <code>switchLoader</code> 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

 Model Derivative API v2

Developer's Guide

- Overview

API Basics

- About this API
- Translate Models
- Extract Metadata** 
- Extract Geometry
- Extract Thumbnails

GDPR Compliance

Webhooks

Field Guide

Supported Translations

> Rate Limits

> Step-by-Step Tutorials

> Code Samples

Extract Metadata

When you translate a model into the SVF format, the Model Derivative service saves information about the derivatives (metadata) in the manifest. When the source model is large, the manifest can become difficult to parse. As such, the Model Derivative API provides endpoints to specifically query metadata.

[GET :urn/metadata](#) lets you extract information about the 3D Views and 2D sheets/views referenced in the manifest. These derivatives are the Viewables that you can typically display in a browser using the Forge Viewer SDK. See the tutorial on [Extract Metadata from a Source Model](#) to see how you can extract the names of Viewables and their metadata GUIDs (Global Unique Identifier).

Source models from applications such as Autodesk Inventor and Fusion 360 produce only one Viewable per model. However, source models from applications such as Autodesk Revit can contain multiple Viewables.

Once you obtain the GUID of a Viewable, you can use [GET :urn/metadata/:guid](#) to obtain the object/component hierarchy of the model. In addition to the hierarchy, the list provides the `objectid` of each object. See the tutorial on [Extract Geometry from a Source File](#) for a demonstration on how the object hierarchy and objectsids are used to uniquely identify geometry and thereafter extracted as OBJ files.

Using [GET :urn/metadata/:guid/properties](#) you can obtain a flat list of objects in that Viewable. It also returns the properties of each object. Using a query parameter, you can filter the results to provide the properties of one specific object.

The following image shows the object hierarchy and the properties of a selected object, as displayed in a browser using the Forge Viewer SDK.

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

```

132103      "objectid": 8692,
132104      "name": "鋼製_一般枠_引違い-二枚 [563046]",
132105      "externalId": "d9b3f277-b695-4a6f-a1a5-8d30ae36ba4e-00089766"
132106      "properties": {
132107          "IFC パラメータ": {
132108              "開勝手": ""
132109          }
132110      }
132111      "その他": {
132112          "上枠の高さ": "2100.000 mm",
132113          "垂直距離": "0.000 mm",
132114          "天井高さ": "0.000 mm",
132115          "天端高さ": "0.000 mm",
132116          "抱き見込": "60.000 mm",
132117          "排煙有効高さ": "0.000 mm",
132118          "既定値の敷居の高さ": "0.000 mm",
132119          "有効幅": "1800.000 mm",
132120      }
132121
132122
132123
132124
132125
132126
132127
132128
132129
132130
132131
132132
132133
132134
132135
132136
132137
132138
132139
132140
132141
132142
132143
132144
132145
132146
132147
132148
132149
132150
132151
132152
132153
132154
132155
132156
132157
132158
132159
132160
132161
132162
132163
132164
132165
132166
132167
132168
132169
132170
132171
132172
132173
132174
132175
132176
132177
132178
132179
132180
132181
132182
132183
132184
132185
132186
132187
132188
132189
132190
132191
132192
132193
132194
132195
132196
132197
132198
132199
132200
132201
132202
132203
132204
132205
132206
132207
132208
132209
132210
132211
132212
132213
132214
132215
132216
132217
132218
132219
132220
132221
132222
132223
132224
132225
132226
132227
132228
132229
132230
132231
132232
132233
132234
132235
132236
132237
132238
132239
132240
132241
132242
132243
132244
132245
132246
132247
132248
132249
132250
132251
132252
132253
132254
132255
132256
132257
132258
132259
132260
132261
132262
132263
132264
132265
132266
132267
132268
132269
132270
132271
132272
132273
132274
132275
132276
132277
132278
132279
132280
132281
132282
132283
132284
132285
132286
132287
132288
132289
132290
132291
132292
132293
132294
132295
132296
132297
132298
132299
132300
132301
132302
132303
132304
132305
132306
132307
132308
132309
132310
132311
132312
132313
132314
132315
132316
132317
132318
132319
132320
132321
132322
132323
132324
132325
132326
132327
132328
132329
132330
132331
132332
132333
132334
132335
132336
132337
132338
132339
132340
132341
132342
132343
132344
132345
132346
132347
132348
132349
132350
132351
132352
132353
132354
132355
132356
132357
132358
132359
132360
132361
132362
132363
132364
132365
132366
132367
132368
132369
132370
132371
132372
132373
132374
132375
132376
132377
132378
132379
132380
132381
132382
132383
132384
132385
132386
132387
132388
132389
132390
132391
132392
132393
132394
132395
132396
132397
132398
132399
132400
132401
132402
132403
132404
132405
132406
132407
132408
132409
132410
132411
132412
132413
132414
132415
132416
132417
132418
132419
132420
132421
132422
132423
132424
132425
132426
132427
132428
132429
132430
132431
132432
132433
132434
132435
132436
132437
132438
132439
132440
132441
132442
132443
132444
132445
132446
132447
132448
132449
132450
132451
132452
132453
132454
132455
132456
132457
132458
132459
132460
132461
132462
132463
132464
132465
132466
132467
132468
132469
132470
132471
132472
132473
132474
132475
132476
132477
132478
132479
132480
132481
132482
132483
132484
132485
132486
132487
132488
132489
132490
132491
132492
132493
132494
132495
132496
132497
132498
132499
132500
132501
132502
132503
132504
132505
132506
132507
132508
132509
132510
132511
132512
132513
132514
132515
132516
132517
132518
132519
132520
132521
132522
132523
132524
132525
132526
132527
132528
132529
132530
132531
132532
132533
132534
132535
132536
132537
132538
132539
132540
132541
132542
132543
132544
132545
132546
132547
132548
132549
132550
132551
132552
132553
132554
132555
132556
132557
132558
132559
132560
132561
132562
132563
132564
132565
132566
132567
132568
132569
132570
132571
132572
132573
132574
132575
132576
132577
132578
132579
132580
132581
132582
132583
132584
132585
132586
132587
132588
132589
132590
132591
132592
132593
132594
132595
132596
132597
132598
132599
1325100
1325101
1325102
1325103
1325104
1325105
1325106
1325107
1325108
1325109
1325110
1325111
1325112
1325113
1325114
1325115
1325116
1325117
1325118
1325119
1325120
1325121
1325122
1325123
1325124
1325125
1325126
1325127
1325128
1325129
1325130
1325131
1325132
1325133
1325134
1325135
1325136
1325137
1325138
1325139
1325140
1325141
1325142
1325143
1325144
1325145
1325146
1325147
1325148
1325149
1325150
1325151
1325152
1325153
1325154
1325155
1325156
1325157
1325158
1325159
1325160
1325161
1325162
1325163
1325164
1325165
1325166
1325167
1325168
1325169
1325170
1325171
1325172
1325173
1325174
1325175
1325176
1325177
1325178
1325179
1325180
1325181
1325182
1325183
1325184
1325185
1325186
1325187
1325188
1325189
1325190
1325191
1325192
1325193
1325194
1325195
1325196
1325197
1325198
1325199
1325200
1325201
1325202
1325203
1325204
1325205
1325206
1325207
1325208
1325209
1325210
1325211
1325212
1325213
1325214
1325215
1325216
1325217
1325218
1325219
1325220
1325221
1325222
1325223
1325224
1325225
1325226
1325227
1325228
1325229
1325230
1325231
1325232
1325233
1325234
1325235
1325236
1325237
1325238
1325239
1325240
1325241
1325242
1325243
1325244
1325245
1325246
1325247
1325248
1325249
1325250
1325251
1325252
1325253
1325254
1325255
1325256
1325257
1325258
1325259
1325260
1325261
1325262
1325263
1325264
1325265
1325266
1325267
1325268
1325269
1325270
1325271
1325272
1325273
1325274
1325275
1325276
1325277
1325278
1325279
1325280
1325281
1325282
1325283
1325284
1325285
1325286
1325287
1325288
1325289
1325290
1325291
1325292
1325293
1325294
1325295
1325296
1325297
1325298
1325299
1325300
1325301
1325302
1325303
1325304
1325305
1325306
1325307
1325308
1325309
1325310
1325311
1325312
1325313
1325314
1325315
1325316
1325317
1325318
1325319
1325320
1325321
1325322
1325323
1325324
1325325
1325326
1325327
1325328
1325329
1325330
1325331
1325332
1325333
1325334
1325335
1325336
1325337
1325338
1325339
1325340
1325341
1325342
1325343
1325344
1325345
1325346
1325347
1325348
1325349
1325350
1325351
1325352
1325353
1325354
1325355
1325356
1325357
1325358
1325359
1325360
1325361
1325362
1325363
1325364
1325365
1325366
1325367
1325368
1325369
1325370
1325371
1325372
1325373
1325374
1325375
1325376
1325377
1325378
1325379
1325380
1325381
1325382
1325383
1325384
1325385
1325386
1325387
1325388
1325389
1325390
1325391
1325392
1325393
1325394
1325395
1325396
1325397
1325398
1325399
1325400
1325401
1325402
1325403
1325404
1325405
1325406
1325407
1325408
1325409
1325410
1325411
1325412
1325413
1325414
1325415
1325416
1325417
1325418
1325419
1325420
1325421
1325422
1325423
1325424
1325425
1325426
1325427
1325428
1325429
1325430
1325431
1325432
1325433
1325434
1325435
1325436
1325437
1325438
1325439
1325440
1325441
1325442
1325443
1325444
1325445
1325446
1325447
1325448
1325449
1325450
1325451
1325452
1325453
1325454
1325455
1325456
1325457
1325458
1325459
1325460
1325461
1325462
1325463
1325464
1325465
1325466
1325467
1325468
1325469
1325470
1325471
1325472
1325473
1325474
1325475
1325476
1325477
1325478
1325479
1325480
1325481
1325482
1325483
1325484
1325485
1325486
1325487
1325488
1325489
1325490
1325491
1325492
1325493
1325494
1325495
1325496
1325497
1325498
1325499
1325500
1325501
1325502
1325503
1325504
1325505
1325506
1325507
1325508
1325509
1325510
1325511
1325512
1325513
1325514
1325515
1325516
1325517
1325518
1325519
1325520
1325521
1325522
1325523
1325524
1325525
1325526
1325527
1325528
1325529
1325530
1325531
1325532
1325533
1325534
1325535
1325536
1325537
1325538
1325539
1325540
1325541
1325542
1325543
1325544
1325545
1325546
1325547
1325548
1325549
1325550
1325551
1325552
1325553
1325554
1325555
1325556
1325557
1325558
1325559
1325560
1325561
1325562
1325563
1325564
1325565
1325566
1325567
1325568
1325569
13255610
13255611

```

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.

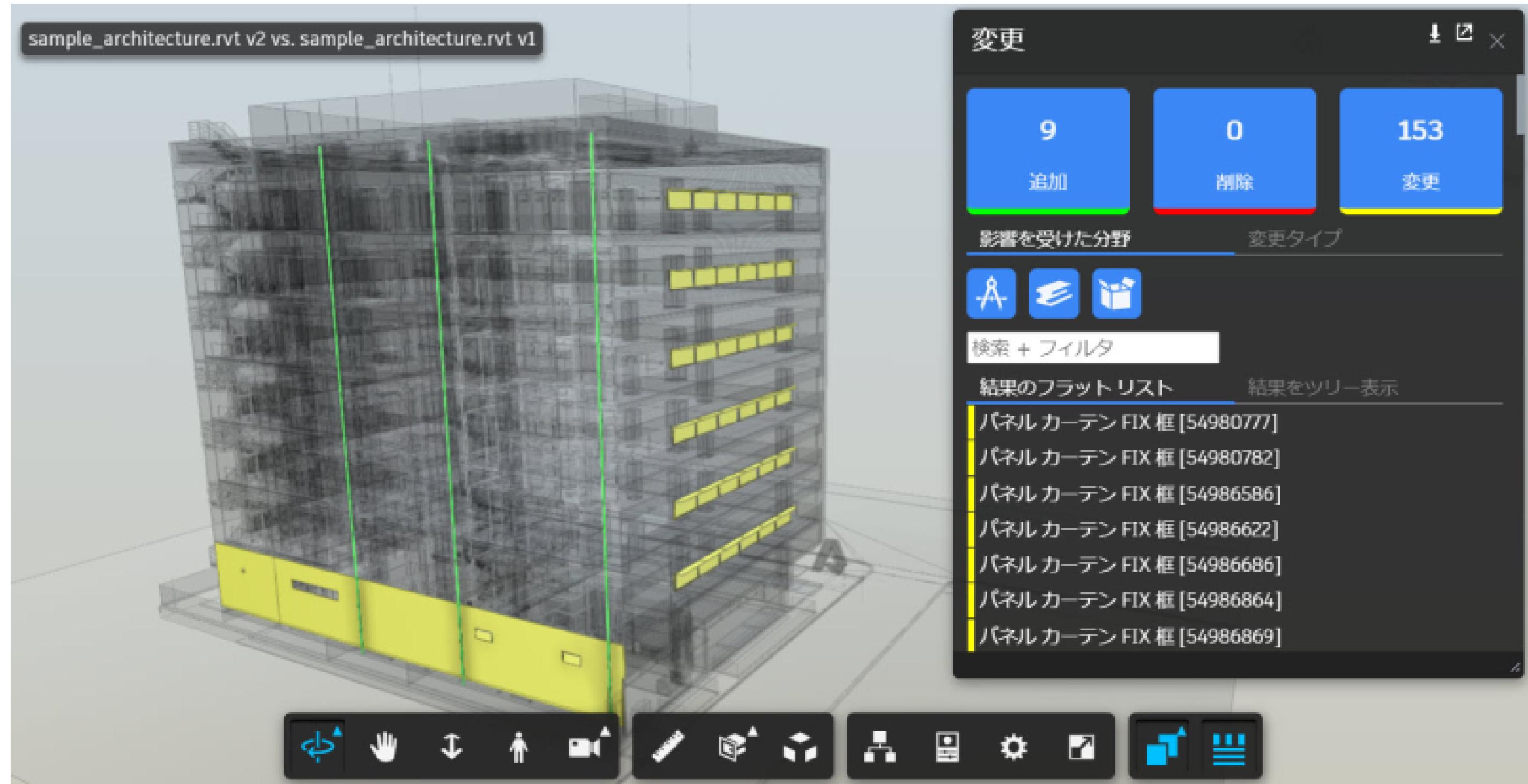
Usage:
  model-compare [command]

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 dXJu0mF...mplY3Q dXJu0mF...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：difftool エクステンション





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"  
        ]  
      }  
    ]  
  }  
}
```

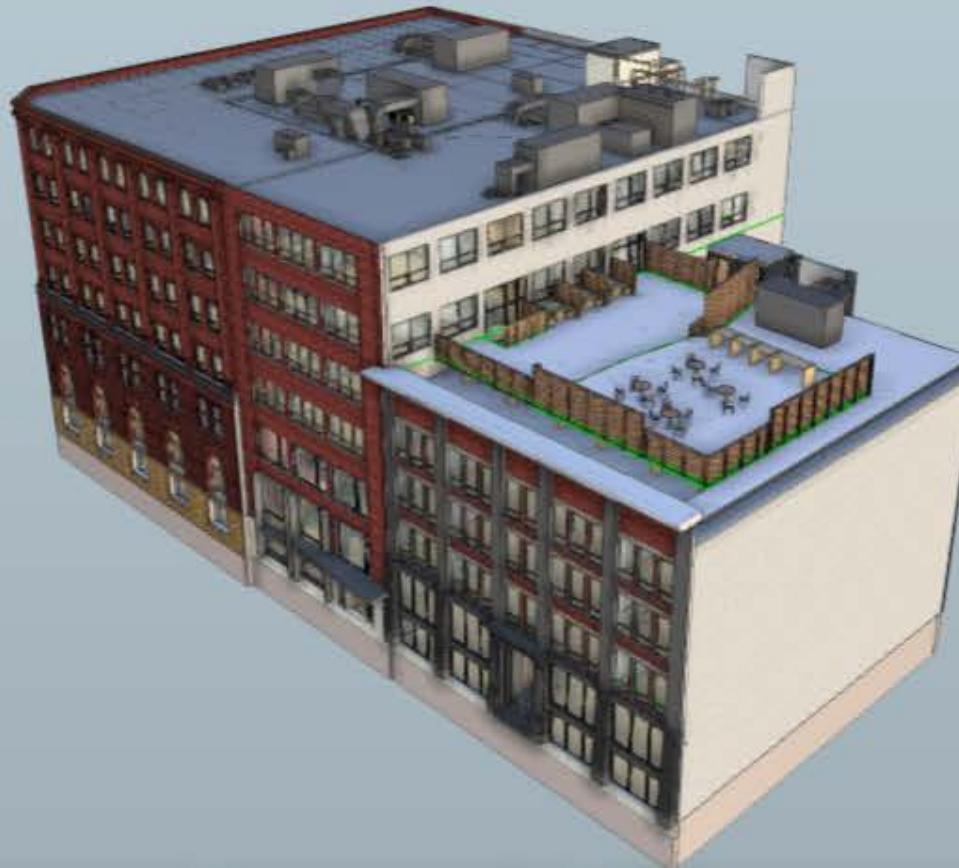
SVF : isSVF2()=undefined

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



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      "children": [  
        :  
        "progress": "complete",  
        "outputType        "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
};

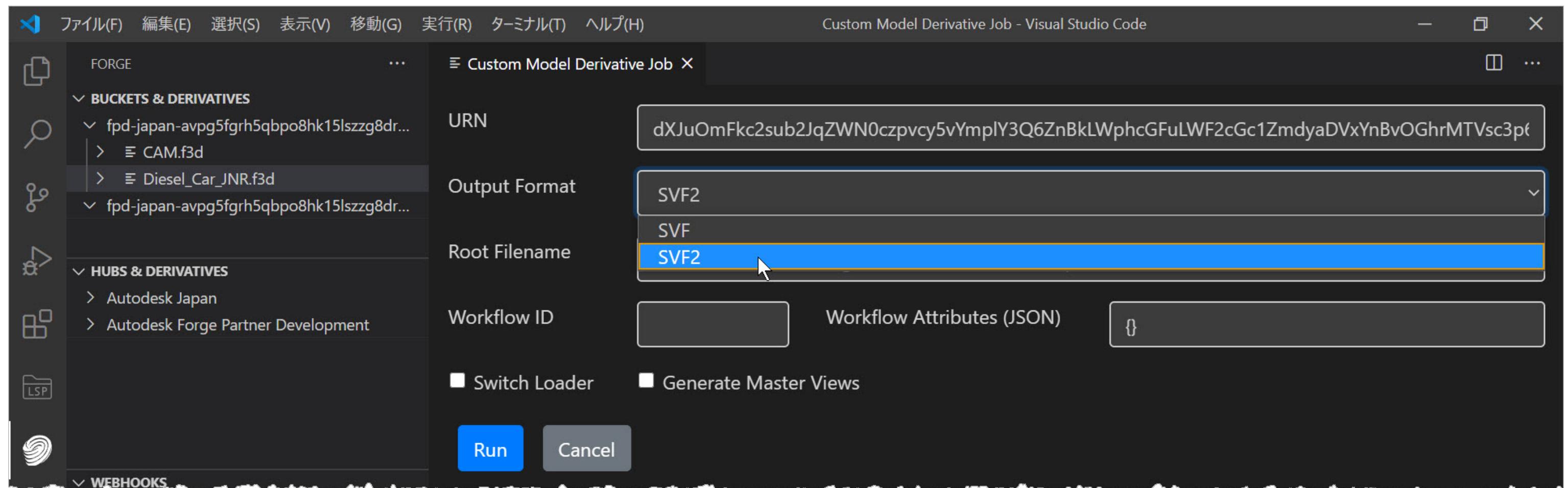
Autodesk.Viewing.Initializer(options, function () {
  _viewer = new Autodesk.Viewing.GuiViewer3D(document.getElementById('viewer3d-1'));
  var startedCode = _viewer.start();
  if (startedCode > 0) {
    console.error('Failed to create a 3D Viewer: WebGL not supported.');
    return;
  }

  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





AUTODESK®

Make anything.